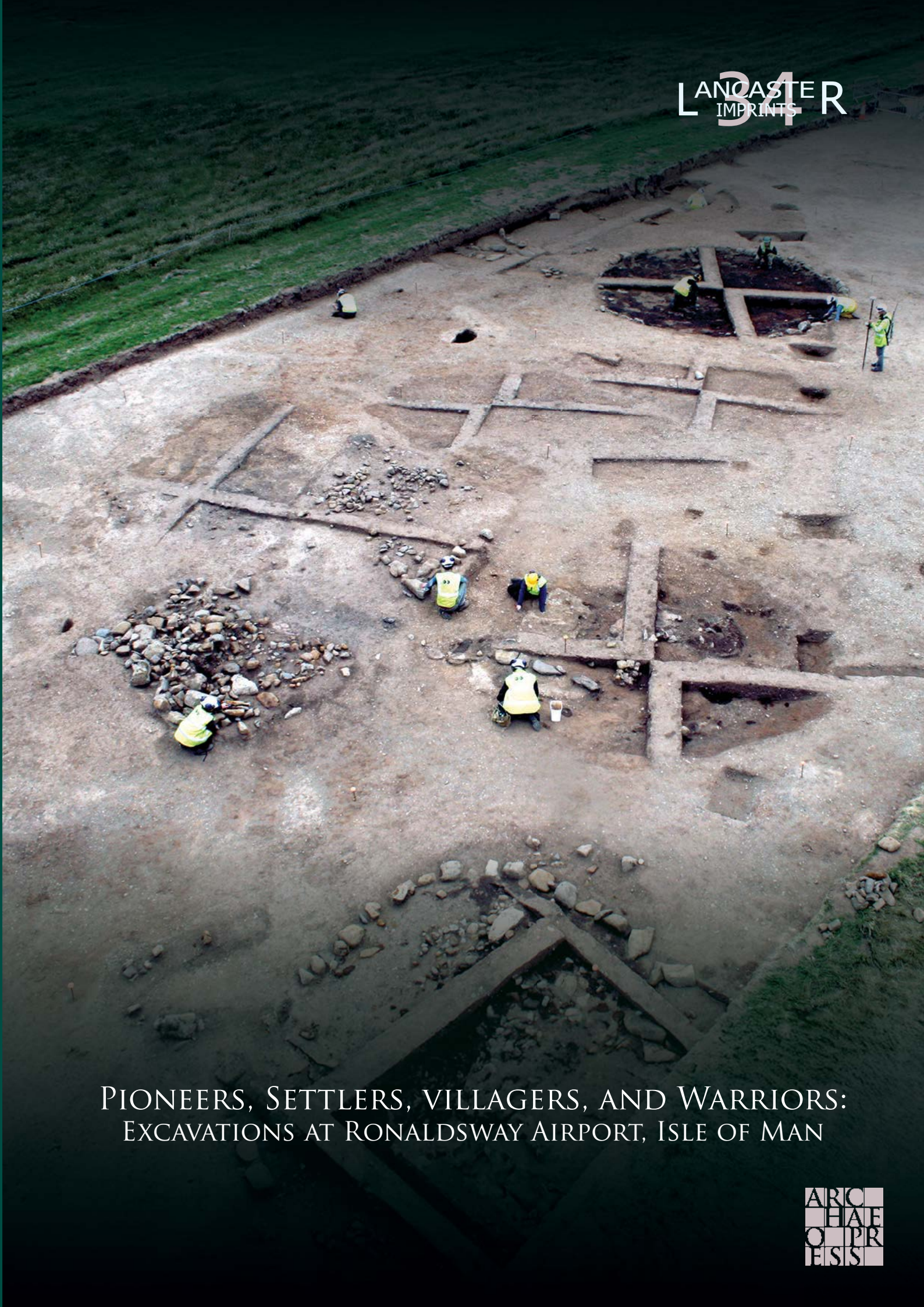


LANCASTER IMPRINTS 31

Pioneers, Settlers, villagers, and Warriors:
Excavations at Ronaldsway Airport, Isle of Man

ARCHAEOPRESS

LANCASTER 34 IMPRINTS

PIONEERS, SETTLERS, VILLAGERS, AND WARRIORS: EXCAVATIONS AT RONALDSWAY AIRPORT, ISLE OF MAN

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ARCHAEOPRESS ARCHAEOLOGY

Published in partnership by

ARCHAEOPRESS PUBLISHING LTD
13-14 Market Square
Bicester
OX26 6AD
United Kingdom
www.archaeopress.com

Oxford Archaeology (Lancaster office)
Mill 3, Moor Lane Mills
Moor Lane
Lancaster
LA1 1QD
www.oxfordarchaeology.com

For sales and distribution enquiries please contact:
ARCHAEOPRESS PUBLISHING LTD
www.archaeopress.com
info@archaeopress.com

ISBN: 978-1-80583-255-3
ISBN (e-PDF): 978-1-80583-256-0

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Front cover: *The excavation of a later Bronze Age settlement at Taxiway Alpha East*
Rear Cover: *The landscape surrounding Ronaldsway Farm, as depicted on historic mapping (top); excavating a Mesolithic house at Cass ny Hawin II (middle); an Iron Age inhumation burial at Taxiway Alpha East (bottom)*

The publication and appendices are available on the Oxford Archaeology Knowledge Hub at:
https://knowledge. oxfordarchaeology.com/library/13132

This book is available direct from Archaeopress or from our website www.archaeopress.com

Series editor: Richard Gregory
Indexer: Marie Rowland
Design, layout and formatting: Marie Rowland

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Abbreviations

aOD	Above Ordnance Datum
CMS	Centre for Manx Studies
DEH	Dental enamel hypoplasia
dGPS	Differential geographical positioning system
EMC	Estimated minimum count
EVEs	Estimated vessel equivalents
FAULU	Field Archaeology Unit of Liverpool University
GIS	Geographical information system
CIfA	Chartered Institute for Archaeologists
LUAU	Lancaster University Archaeological Unit
MGC	Museum and Galleries Commission
MNE	Minimum number of elements
MNI	Minimum number of individuals
MNH	Manx National Heritage
NISP	Number of identified specimens
OA	Oxford Archaeology
ORAU	Oxford Radiocarbon Accelerator Unit
OS	Ordnance Survey
QGIS	Quantum GIS
RESA	Runway End Safety Area
SEM	Scanning electron microscopy
ScARF	Scottish Archaeological Research Framework
SUERC	Scottish Universities Environmental Research Centre

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Summary

A major programme of archaeological excavation was undertakne at Ronaldsway Airport, in the south of the Isle of Man, close to Derbyhaven Bay (SC 2835 6819), throughout 2008 and 2009. The excavations formed part of a programme of runway and taxiway extension, and other airport improvements (together forming the Runway End Safety Areas (RESA) Project), and were conducted by Oxford Archaeology, on behalf of the Isle of Man Airport Division (part of the Isle of Man Government Department of Transport).

The work proved highly successful in recording an outstanding, and highly significant, collection of prehistoric remains. These comprised a Mesolithic 'pit-house' (Cass ny Hawin II), dating to the later ninth millennium cal BC, which is currently the earliest house on Man. The locale had also seen some earlier Mesolithic activity, probably by some of the first human colonisers on the island. The house produced a large assemblage of narrow-blade lithics (21,610 items), coarse-stone tools (60), and palaeoenvironmental remains, and detailed analysis of these has produced a unique 'snapshot' into Mesolithic domestic life. Other Mesolithic remains were encountered in the vicinity, including a pit group (Cass ny Hawin III), dating to the mid-eighth millennium cal BC, along with several Mesolithic lithic scatters. A Neolithic rectangular timber 'house' was another significant find, as well as stray finds dating to this period. The structure has been radiocarbon dated to the last centuries of the fourth millennium cal BC and provides interesting parallels with the 'Ronaldsway House', excavated at the airport in the 1940s.

Important Bronze Age remains were uncovered during the construction of one of the new taxiways. These comprised a timber structure, probably domestic, dating to the late third/early second millennium cal BC, and extensive later Bronze Age remains that were seemingly elements of a large, village-sized settlement extending across a large swathe of the airport. In the taxiway area, five contemporary roundhouses, two other timber structures, and a large midden were in use *c* 1250-950 cal BC. The roundhouses comprised domestic structures, along with a specialised 'kitchen', where food was prepared. In addition, one of the roundhouses and one of the timber structures functioned as 'workshops', associated with the casting of copper-alloy tools and weapons, and lead objects, indicating that such activities were deeply embedded within a largely domestic settlement.

Significantly, the eventual abandonment of the roundhouses was undertaken in a structured and systematic way, which involved burning and/or backfilling them, followed by the construction of stone cairns, in acts of commemoration. At a slightly later date, following this initial episode of abandonment, another small roundhouse was constructed in the area, in *c* 1000-800 cal BC, which was later covered by a small cairn as part of a similar process of abandonment and commemoration.

The RESA project also produced good evidence for Iron Age activity, including unenclosed roundhouses, which are common features of Iron Age settlement in the Irish Sea area, together with much rarer burials. These had been placed within the abandoned later Bronze Age settlement, and included an earlier Iron Age double-burial, of an adult female and child, which may have been contemporary with a small midden, suggesting that feasting was part of the burial rite. Another burial, dating to the end of the first millennium cal BC, or perhaps to the start of the first millennium cal AD, contained an adult male 'warrior', who had clearly been wounded by a sword blow, presumably during an act of interpersonal violence.

In addition to prehistoric remains, the project also uncovered piecemeal evidence for the more recent use of the landscape. This comprised an enclosure and boundaries, relating to later medieval and post-medieval agricultural activity. The evidence has also enabled the medieval remains excavated in the 1930s to be reconsidered. This suggests that an important high-status Viking-age enclosure was present at the airport, established on the site of an early Christian cemetery containing lintel graves and a shrine, which was used later in the medieval period as a battle cemetery, and then as an iron bloomery, perhaps operated by Furness Abbey.

Acknowledgements

The archaeological investigations undertaken as part of the RESA project owe their success to many individuals, and also to the close co-operation of the different organisations involved with the project. Oxford Archaeology would like to thank Balfour Beatty Ltd, on behalf of Ronaldsway Airport, Isle of Man Airport Division (part of the Isle of Man Government Department of Transport), for commissioning the archaeological fieldwork. This was undertaken between May 2008 and November 2009, by Dave Bonner, Fraser Brown, Paul Dunn, Eleri Farley, Sam Grimmer, John Griffiths, Vicki Jamieson, Gemma Jones, Thomas Mace, David Maron, Aidan Parker, Christina Robinson, Rachel Stebbings, Marc Storey, Steve Tamberello, Julian Thorley, and Matthew Weightman. During the fieldwork, Mark Noel, of GeoQuest Ltd, also identified and extracted samples for archaeomagnetic dating.

Post-excavation analysis and publication of the archaeological data from the RESA excavations was funded by Manx National Heritage, and this phase of the project has benefited from the work of many individuals. These included numerous members of staff from Oxford Archaeology, who undertook the analysis of the stratigraphic remains (Fraser Brown, Richard Gregory, and Helen Evans), artefacts (Dot Boughton, Antony Dickson, Christine Howard-Davis, and Aidan Parker) and their spatial distributions (Fraser Brown, Antony Dickson, and Hannah Leighton), and palaeoenvironmental materials (Andrew Bates, Denise Druce, Rebecca Nicholson, Ian Smith, and Helen Webb). Thanks must also be extended to Sandra Bonsall (formerly of Oxford Archaeology), who carried out much of the sorting of the charred plant remains, the weighing of hazelnut shells, and also assisted in the identification of the wood species. Several external specialists have also been instrumental in the success of the project, through their analysis of prehistoric artefacts (Ann Clarke and Patrick S Quinn), and for undertaking the scientific dating of features (Catherine Batt and Sam Harris).

Many people have also contributed their ideas throughout the project, and the valuable input of Sinead McCartan and the late Peter Woodman, who provided advice on the lithics, and Mesolithic archaeology more generally, is gratefully acknowledged. Richard Chiverrell and Richard Macphail also visited the excavations, to advise on geology and sediments, whilst Phillipa Tomlinson provided advice on the history of gorse on the Isle of Man. Fraser Hunter is also thanked for providing information on the Barabhas bracelet, prior to publication. Throughout the project, staff from Manx National Heritage worked closely with Oxford Archaeology, and particular thanks are extended to Jude Dicken, Allison Fox, Andrew Foxon, Kirsty Neate, and Edmund Southworth (formerly the Director of Manx National Heritage), for their valuable input and expertise.

Many of the historical maps and images used in this volume are held by Manx National Heritage (Figs 5, 180, 181, 183-5, 188-90, and 218-20; Pls 1, 24-7, 57, 58, 70-2, 74-81, 89, 97, 98, 104, 105, and 106) and permission to use these is gratefully acknowledged. In addition, thanks are also extended to trustees of the G D B Jones estate for permission to reproduce aerial photographs (Pls 59 and 60) and Andrew Johnson for photographing two of the island's Bronze Age monuments (Pls 90 and 91). Two of the images (Pls 88 and 96) are photographs that are in the public domain (under the Creative Commons Licence) and were taken by Andrew Curtis and Chris Bramhall, respectively.

More generally, the fieldwork and post-excavation process have been greatly assisted by Fraser Brown (Regional Manager, Oxford Archaeology, Lancaster office), who provided project management for both elements of the project, and Rachel Newman (formerly Senior Executive Officer: Research and Publication, Oxford Archaeology, Lancaster office), who edited a draft of the volume and provided quality assurance. Following the completion of the draft, Sinead McCartan reviewed chapters 2, 3, 4, and 10, and Richard Bradley reviewed chapters 5, 6, 7, 10, and 11, and their constructive comments are greatly valued. A very special debt of gratitude is also extended to Andrew Johnson, Manx National Heritage, who reviewed the complete draft of the volume, and provided extremely valuable comments relating to all of the chapters. Moreover, Andrew has overseen all of the archaeological elements connected with the project, from its inception to completion, providing invaluable help and support throughout.

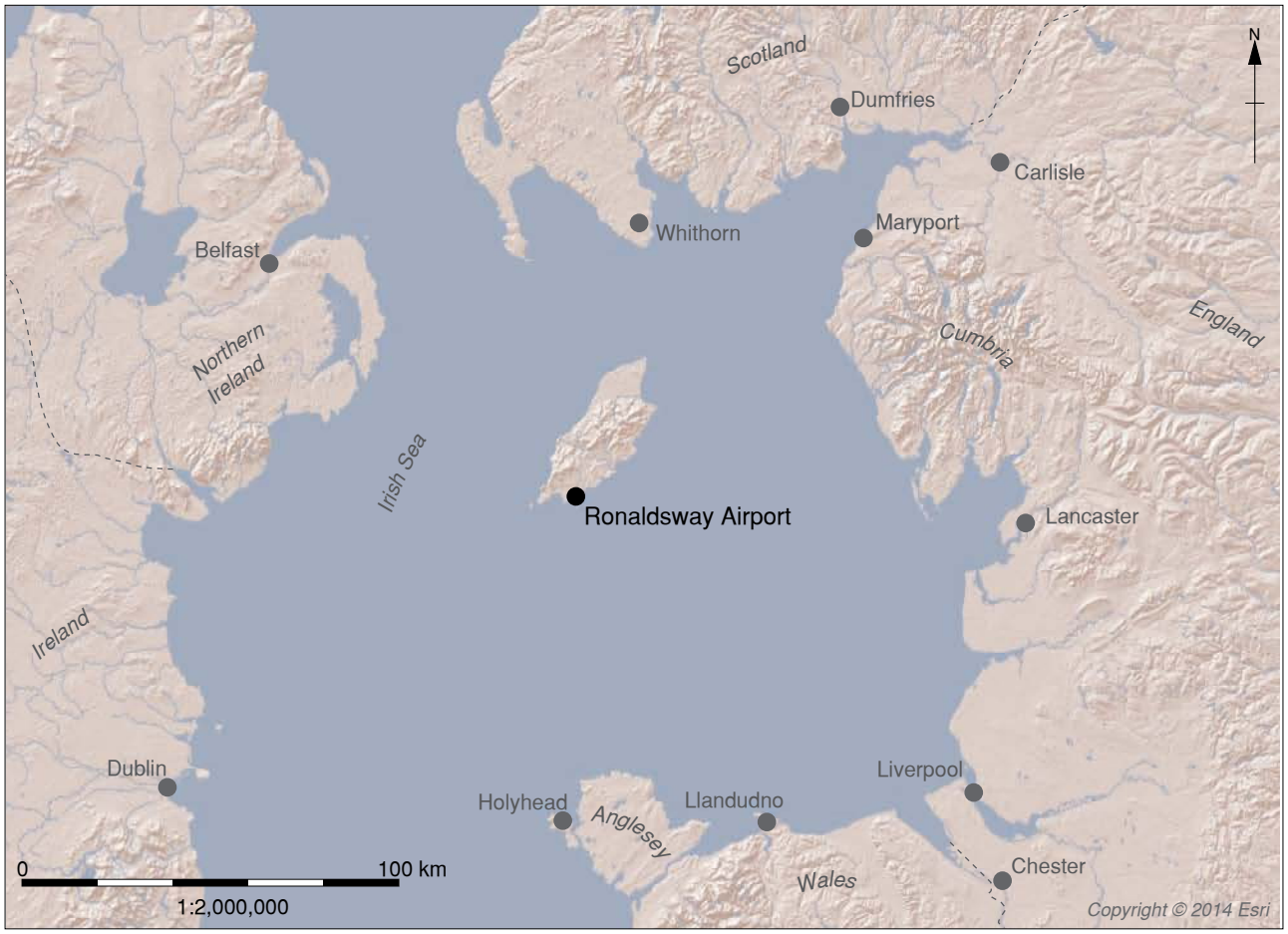


Figure 1: The Isle of Man and its position in the Irish Sea

1

INTRODUCTION

Richard A Gregory, Helen Evans, Fraser Brown, Antony Dickson, and Denise Druce

The Isle of Man

> *An observer on Snaefell (2034 ft [620 m]) can view England, Scotland, Ireland and Wales in one sweep. Since the first settlement of the island, cultural and ethnic differences have approached in all directions, but its size (227 sq miles) and the distance of sea which isolates it from the coasts of the mainlands have been sufficient to ensure vigorous local developments. The interaction of British and Irish influences and the occasional insular developments are the chief features of the prehistory of the island* (Clark 1935, 70).

The Isle of Man forms a small, but distinctive land mass, measuring some 52 km (32 miles) long by 22 km (14 miles), at its widest extent, with a mountainous core and rugged coastlines, at the centre of the Irish Sea. As such, it lies some 30 km (19 miles) to the south of Scotland, 55 km (34 miles) to the east of Ireland, 72 km (45 miles) to the north of Wales, and 48 km (30 miles) to the west of Cumbria (Fig 1). As the eminent prehistorian Grahame Clark noted, in the 1930s (*ibid*), on a clear day, and from the right position, all of these are visible, and the vistas may well have promoted feelings of both 'connectedness' and 'remoteness' for the many communities that have occupied the island over the last 10,000 years (*cf* Frieman 2008). Indeed, in many respects, the island should probably be viewed as a cultural stepping-stone (*cf* Garrow *et al* 2017) between these mainland areas, which both received and facilitated the movement of ideas and culture.

For most of the island's history, these traits were 'transported' via maritime travel, which, throughout much of the Holocene, formed the prime form of long-distance communication (*ibid*; Sturt *et al* 2013). Such travel was of vital importance throughout prehistory and more recently, as it effectively linked those disparate human communities in the Irish Sea area, in Ireland, Wales, north-west England, and south-west Scotland, and, in turn, those to the north in western Scotland, and to the south in south-west England, and from there to those peoples who inhabited the western fringes of Continental Europe. Indeed, as Richard Bradley (2019, 22) has noted, sea travel and navigation within the Irish Sea would have greatly benefited from its enclosed form, which meant that land, in good weather, was never out of sight, and within these waters Man would have formed a central, accessible hub, which could be easily reached via the powerful tides that converge on the island from both the north and south.

In terms of topography, the landscape can be divided into five main geographical components, which have undoubtedly influenced the form of both ancient and modern settlement and land-use (Dackombe and McCarroll 1990; Fig 2). These comprise the Northern Plain, the Eastern Coastal Plateau, the Western Coastal Plain, the Upland Massif, and the Plain of Malew.

The Northern Plain forms the most distinctive landscape on the island, containing a range of classic glacial landforms, and a coastline which is partly formed by a raised fossil cliff (Thomas *et al* 2006, 14). The largest settlement in this area is Ramsey, which is on the southern fringe of this topographical zone, on the island's eastern coast. The Upland Massif is immediately to the south, and can be divided into the Northern and Southern Uplands. The Northern Uplands rise to a height of 621 m above Ordnance Datum (aOD) at Snaefell, the highest point on the island, and is separated from the Southern Uplands by the Central Valley, *c* 0.5 km in width, aligned east/west and opening out at either end to meet the coast at the towns of Peel, in the west, and Douglas, the island's principal settlement, in the east.

These settlements respectively stand on the Western Coastal Plain and Eastern Coastal Plateau, which fringe the Upland Massif. The Eastern Coastal Plain is the more extensive, characterised by low rolling hills and a series of deep incised watercourses that flow from north to south (*op cit*, 13). In contrast to the Northern Uplands, the Southern Uplands are slightly lower and lesser in extent, rising to 483 m aOD at South Barrule. These uplands also extend, southwards, down the western side of the island, culminating in Mull Hill at Man's south-western tip. This rises to a height of 169 m aOD and, although not as high nor extensive as the other upland areas to the north,



Figure 2: The Isle of Man and its main geographical components, with Ronaldsway Airport and the principal settlements

forms a significant landscape feature, when compared to the adjacent coastal plain. This lower area, to the south of the Eastern Coastal Plateau, consists of the Plain of Malew and contains the major settlements of Port St Mary and Castletown (the Manx capital until 1869; Davey 2013, 170). It is characterised by a gently undulating topography (Thomas *et al* 2006) and is the most agriculturally productive part of the island, much of it owned in the medieval period by Rushen Abbey (Davey 2013; *Ch 9, p 284*). This was constructed next to the Silverburn, at Ballasalla, the largest watercourse in this area, that enters the sea at Castletown.

Ronaldsway Airport

The landscape

It is within the Plain of Malew, between the settlements of Castletown and Ballasalla, and just to the east of the Silverburn, that Ronaldsway Airport was built as the island's main civilian airport (Fig 3). It is named after the former Ronaldsway Farm that once stood immediately to the south of the airport, on the coast. Significantly, the airport, and its environs, have produced a rich array of archaeological sites,



Figure 3: The geographical setting of Ronaldsway Airport

with the most recently discovered forming the focus of this volume. It is clear from these that the area was exploited and settled from the Mesolithic period onwards, presumably because of its proximity to Derbyhaven, an excellent natural harbour, protected, and partly formed by, the T-shaped Langness peninsula, which juts out into the Irish Sea, at the south-eastern tip of the island. Indeed, the historic importance of this natural harbour is also preserved in the written forms of Ronaldsway, derived from the Manx and Old Norse languages (*eg Ragnaldsvagr*, Rognoldswath, Ramsway, Ranoldsway, Runisvie, or Roonysvie; Neely 1940, 78), which translate as Reginald's Way, probably referring to a portage between Derbyhaven and Castletown Bay, which was in use from at least the early medieval period onwards (*op cit*, 78-9; Cubbon 1938; Darvill *et al* 1999; *Ch 9, p 277*).

More generally, the archaeological sites are situated within a limestone-dominated landscape, formed of several different classifications of Carboniferous Limestone (Quirk *et al* 2006), which, in addition to a small strip in the northern part of the island, represents a geologically unique part of Man (*cf* Chadwick *et al* 2001). Within the Ronaldsway area, this bedrock has also formed an important economic resource, and has been extensively quarried at Billown Quarry, 1.5 km to the west, and at Turkeyland, immediately north of the airport, with some of the latter material being used as aggregate in the 1930s (Francis 2006; *p 6*).

Superficial deposits overlying the limestone bedrock are largely composed of glacially derived sands and gravels (Chadwick *et al* 2001). These date from the Devensian period (*c* 15,000-11,700 years

ago), and include two discrete deposits (*ie* Shellag Formation—Diamicton, and Shellag Formation—Sand and Gravel; Fig 4), which in certain areas, such as close to Ballasalla, form a series of low hills and ridges. These are often described as drumlin fields (*cf* Dackombe and McCarroll 1990), though many are better understood as drumlin-like hills and knolls, some of which have limestone cores (Thomas *et al* 2006). Although today the land at Ronaldsway Airport is uniformly flat, lying at *c* 10 m aOD, it seems that, before the establishment of the first airfield (*p 6*), this area also contained a series of low sand and gravel mounds (Cubbon 1938; Dackombe and McCarroll 1990). Other superficial deposits within and close to the airport are more recent in date, comprising alluvial sands and gravels laid down in the Holocene (Sulby Glen Formation) and beach deposits (Point of Ayre Formation and Marine Beach Deposits) fringing the present-day shoreline (Chadwick *et al* 2001).

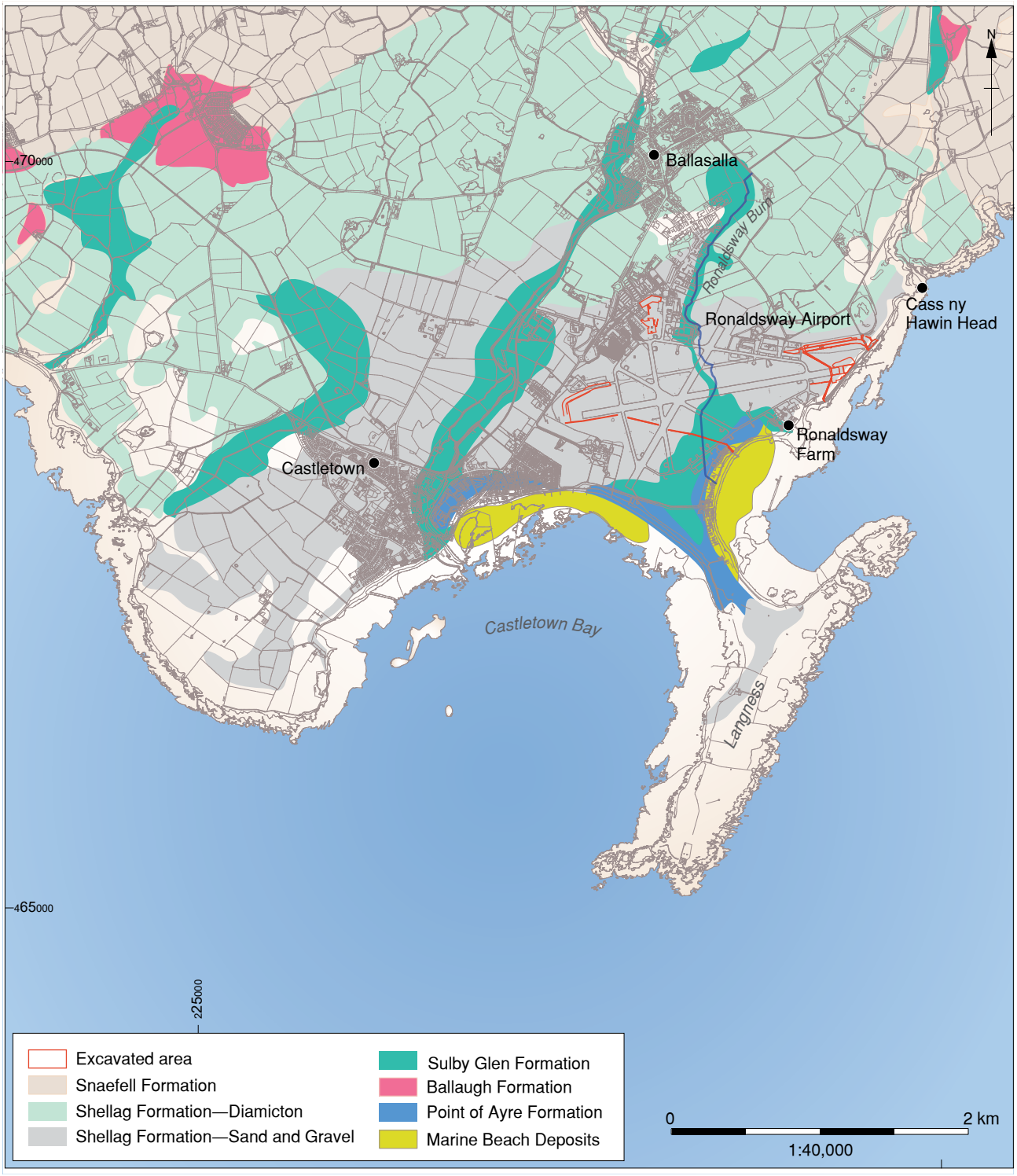


Figure 4: Superficial geology at Ronaldsway Airport and its environs

Another significant landscape feature is the Ronaldsburn watercourse (now culverted; Fig 5). Originally this flowed north/south across the airfield and west of Ronaldsway Farm, but during the nineteenth century it was partly diverted into a millpond, which fed a head race, marked on the Ordnance Survey (OS) map of 1870, which in turn powered a mill at Ronaldsway Farm (Cubbon 1938). Alluvial deposits (classified as the Sulby Glen Formation; *p 4*) dating to the Holocene extend along

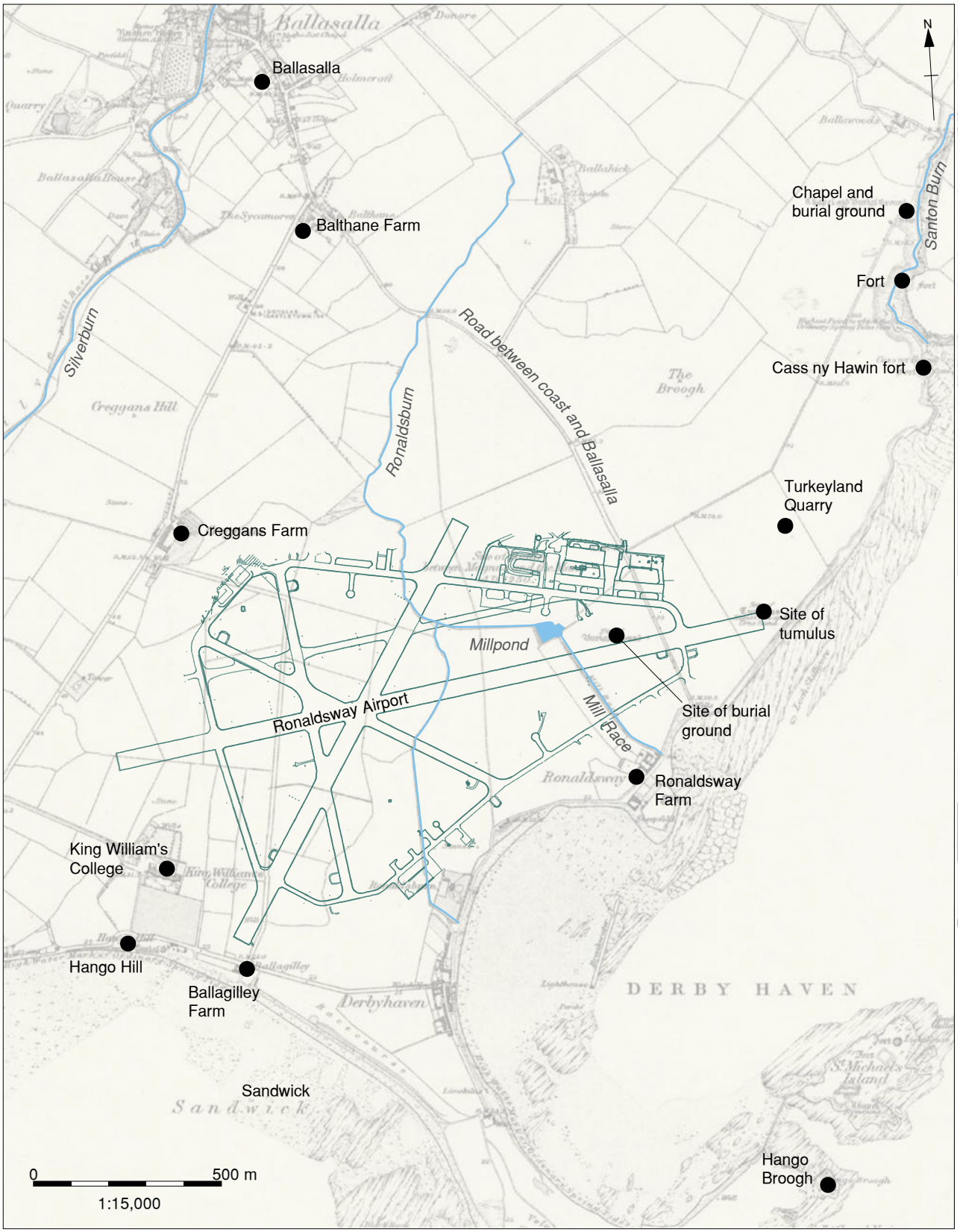


Figure 5: Ronaldsway Airport superimposed on the Ordnance Survey map of 1870

this watercourse, and there is a notable elliptical-shaped formation of these on the eastern side of Ballasalla, which may suggest the presence of a former lake, drained by the burn. When nearing the coast, the alluvial deposits gradually fan out between Sandwick Bay and the peninsula occupied by Ronaldsway Farm, and their accumulation in this area was probably related to a gravel bank composed of Point of Ayre Formation deposits (Thomas *et al* 2006), which seems to have hindered the free access of the burn into the sea. As such, the area behind this bank almost certainly formed a marshy area in antiquity (Cubbon 1938). On the coast side of this gravel bank, sand of the Marine Beach Deposits is present to the west, forming the head of Castletown Bay, whilst the coastline to the south, surrounding the Langness peninsula, and to the north-east, up to Cass ny Hawin Head, is devoid of superficial deposits, being instead rocky and rugged in character (Chadwick *et al* 2001).

Aviation at Ronaldsway

The Ronaldsway area has a long association with aviation. Whilst this has been important for the modern development of the island, it has also greatly enhanced knowledge of the area's history, as a result of numerous archaeological discoveries, made during construction and improvement. The site was first used as an informal landing-strip in 1928 (Kniveton 1986), and in 1933, a formal passenger service was established, between Blackpool and Ronaldsway, run by Blackpool and West Coast Air Services, which provided incoming passengers access to the emerging seaside resort at Douglas (Francis 2006). In 1934, further passenger services were developed, by Aer Lingus and Railway Air Services, with those of the latter being transferred to the Isle of Man Air Services in 1937 (*ibid*). This growth resulted in the creation of a commercial airfield, which, between 1935 and 1939, contained passenger facilities and offices (although no paved runway). The creation of this airfield also involved intensive groundworks, involving the levelling of the area, and the opening of Turkeyland Quarry to provide aggregate (*p 3*); it was during this quarrying and levelling that significant archaeological discoveries were made (*p 7*).

In 1939, with the outbreak of the Second World War, all civil flights were suspended, with commercial planes requisitioned for military use (*ibid*). Therefore, Ronaldsway airfield came under the control of the Royal Air Force (RAF), with a radar station (RAF Scarlett) also being established immediately to the south-west. In 1943 the radar station was decommissioned, and the airfield was handed over to the Admiralty, for development as a Fleet Air Arm training station, named HMS Urley, after the Manx for eagle (*ibid*). Therefore, in October 1943, the Admiralty greatly expanded the airfield, following the compulsory purchase of the entire Ronaldsway estate, Creggans Farm, Ballagilley Farm, near King William's College, and 70 acres of Balthane Farm, north of the airfield, and constructed the first paved runways and taxiways (*ibid*). Significantly, once again, this work also led to important archaeological discoveries (*p 8*).

In the post-War period, the airfield reverted back to commercial use, following its sale to the Isle of Man government in 1948, and in the early part of the twenty-first century the airport was extended and improved. This involved a programme of runway and taxiway extension (*p 13*) and the construction of a new control tower, car park, and associated services, which resulted in the extensive campaign of archaeological excavation reported in this volume.

Archaeological investigations

The archaeology of Ronaldsway has long been the subject of antiquarian and archaeological enquiry. This has ranged from anecdotal notes and descriptions of archaeological 'discoveries', made during the nineteenth century, to 'rescue' excavations undertaken during the development of the airfield in the 1930s and 1940s (*above*), together with a series of 'research' investigations completed in the latter part of the twentieth century. More recent developer-funded archaeological investigations, involving large-scale excavation and trial trenching, have also occurred in the first two decades of the twenty-first century.

The nineteenth-century finds from the area now covered by Ronaldsway Airport have been discussed by G H J Neely (1940), and these, along with additional sites recognised at this time, are depicted on the OS map of 1870, which was surveyed in 1868. One of these, discovered in the 1820s, comprised stone cists and human remains on a 'circular eminence' close to Ronaldsway Farmhouse (*op cit,* 71; Higgins 1999; Fig 5, '*Site of burial ground*'). A 'fence' that enclosed the burial ground was also probably removed at this time (Bruce 1968). During the nineteenth century, several other stone cists and urns were discovered during the destruction of a Bronze Age burial site adjacent to the coast; Neely (1940) suggests that this may have originally comprised three burial mounds, based on a late eighteenth-century description of this area. Again, this site is plotted on the OS map of 1870 ('*Site of Tumulus' [Stone Cists & Urns found]*). Immediately to the north-east, the map also depicts other early sites that were surveyed during its compilation. These were all adjacent to the Santon Burn, which enters the sea at Cass ny Hawin Head, and they comprise two earthworks, both denoted as '*Fort*', and a third site described as '*Chapel & Burial Ground (Ruins of)*'. One other promontory fort, perhaps with Iron Age origins, is also depicted on the map, on Langness peninsula, at Hango Broogh (*cf* Darvill *et al* 1999).

Finally, to the south of the airport, on the coast, close to King William's College, the map marks a '*Burial Ground*', on Hango Hill, which is now also believed to have been a burial mound (*ibid*).

During the mid- and later twentieth century, several key figures and organisations were central to archaeological research at Ronaldsway Airport and in its immediate environs. Initially, these were William Cubbon who, in 1932, was appointed as the second Director of the Manx Museum and Ancient Monuments Trust (precursor to Manx National Heritage (MNH)), succeeding its influential first Director, Philip Moore Callow Kermode, perhaps best known for his study of early Christian crosses on Man and for initiating the Manx Archaeological Survey (Kermode 1907; Harrison 1986, 17, 29). Cubbon, along with his assistant, Basil Megaw (who later, in 1940, became the third Director of the Manx Museum, following Cubbon's retirement), developed folklore studies and undertook a campaign of archaeological fieldwork, the legacy of which remains apparent today (Harrison 1986, 17-23). Indeed, during his time as Director, Cubbon recorded, and at times excavated, many prehistoric and historic sites in the vicinity of Ronaldsway Airport (*cf ibid*), such as the Billown circle and nearby mound, close to Billown House (Fig 6), which produced sherds of Late Neolithic and Bronze Age pottery (Cubbon 1936a; 1936b; 1943).

During William Cubbon's time as Director, two significant discoveries were also made at Ronaldsway Airport, in the spring of 1935, during levelling works across the airfield (*p 6*). One was close to the coast,

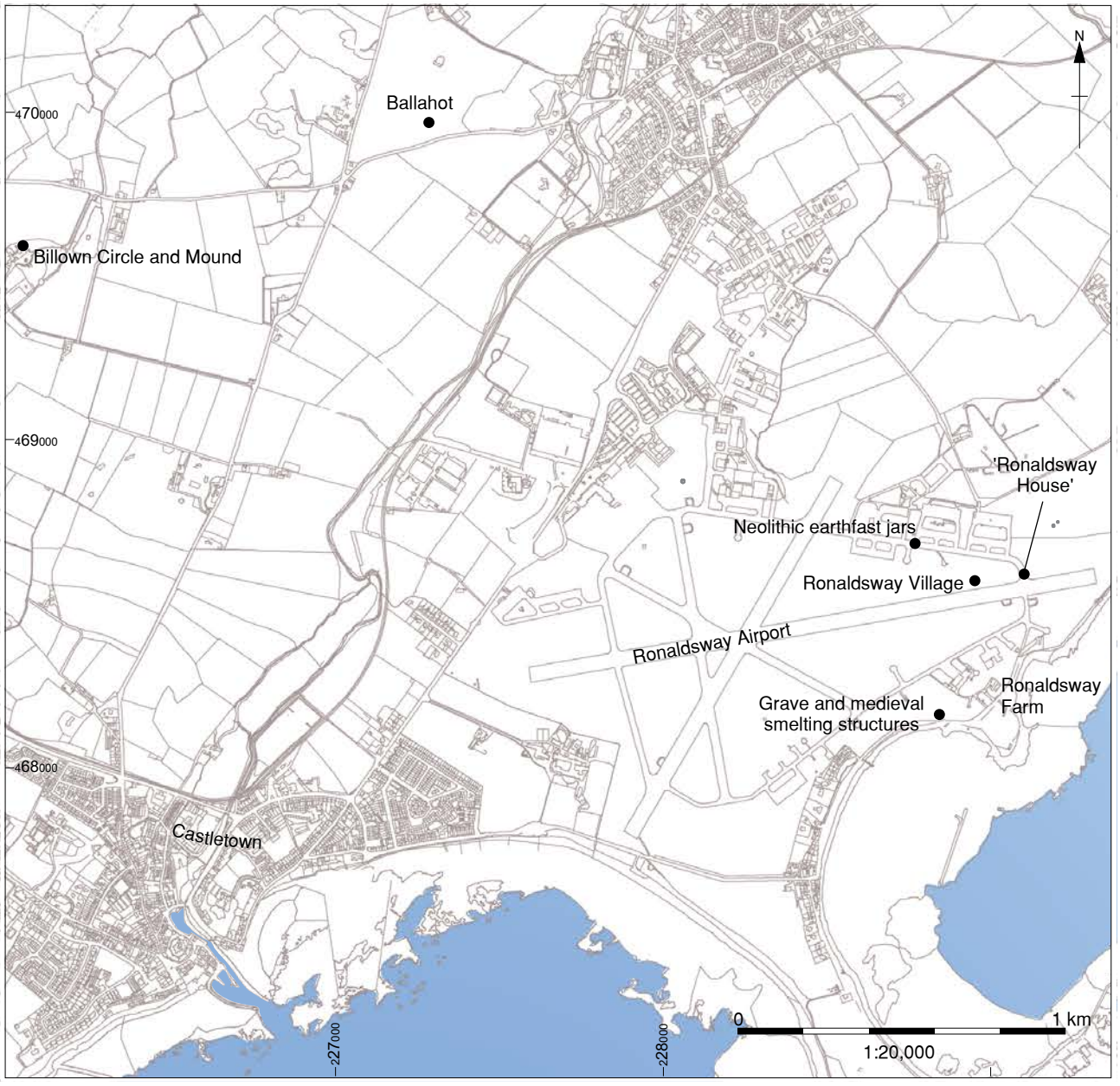


Figure 6: Sites excavated prior to the 1960s, within and adjacent to Ronaldsway Airport

next to Ronaldsway Farm, and comprised a site containing a grave, a potential medieval lead-smelting structure and possible silver-extraction works (Fig 6), which was recorded by Rev E H Stenning (1938), a local man with a keen interest in the history of the area (Megaw 1960).

The second discovery was further inland, at a site that was being worked for levelling material. Coincidentally, the archaeology in this area was recorded by another William (Christian) Cubbon, who owned and had excavated at Rushen Abbey, and was a senior member of the Isle of Man Natural History and Antiquarian Society (A Johnson *pers comm*). Given his proximity to Ronaldsway and his experience, W C Cubbon was therefore on hand, and trusted, to observe the ground works, and hence was undertaking what would now be termed an 'archaeological watching brief'. Significantly, the site in question, on the crown of a small hillock with a diameter of *c* 75 m, was the same 'circular eminence' which had produced human burials in the 1820s (*p 6*). Cubbon was initially alerted to its presence by the discovery of further burials by the workmen who were in the process of lowering this mound. He reports that, during this work, extensive archaeological remains were uncovered, including those of an early Christian burial ground, which contained a variety of grave types (Cubbon 1938). Specifically, on the summit of the mound, a broken and burnt limestone pavement was encountered, along with two cist graves containing an upper and lower chamber. In these, the lower chambers contained single burials, whilst the upper chambers had been left open, having been filled with quartz pebbles. One also contained an eighth-century altar stone, which was decorated with a marigold pattern and three Tau crosses (Neely 1940). Moving down the mound, unenclosed burials were encountered, above a series of earlier graves defined by well-made cists (termed 'lintel graves'; Cubbon 1938).

In addition to the burial ground, Cubbon also recorded three roundhouses, together with a midden, composed of limpet shells and animal bone, and an adjacent Bronze Age cremation cemetery (*ibid*). During the quarrying, he also managed to collect several hundred 'objects of interest', which included flints and a Neolithic axe; jet bracelets; copper-alloy rings, pins, and fragments; bone pins; a green-glass bead; and iron objects, including a spearhead embedded in one of the skeletons (*ibid*).

It is clear from these findings that Cubbon had chanced upon the remains of an extensive settlement and burial ground, the occupation and use of which seemed to span both the prehistoric and historic periods. This site would subsequently be termed the 'Ronaldsway Village' (Fig 6), and it immediately became the focus for three seasons of 'rescue' excavation, undertaken between 1935 and 1937 (Higgins 1999). These excavations were overseen by G H J Neely, the then Inspector of Ancient Monuments, and they seem to have recorded many of the features originally observed by Cubbon, along with additional structures and features. However, as Basil Megaw (1940) noted shortly after the conclusion of the fieldwork, the excavations were not particularly systematic, and they also failed to consider the site's stratigraphy and the provenance of the recovered finds. Hence, Neely's published account of the site is highly anecdotal and lacking in descriptive and stratigraphic detail (Neely 1940). The published account does, however, include a useful plan (Pl 1), and it is also evident from Neely's descriptions that a rich collection of finds was retrieved. These included prehistoric lithics, Bronze Age pottery, and many 'probably Norse' items (*ibid*).

Based on Neely's account (*ibid*), the complexity of the site is difficult to disentangle fully, but it has been suggested, following a reassessment of the evidence, that six main phases of activity were present (*cf* Laing and Laing 1987), although the veracity of this phasing scheme has been questioned (*cf* Higgins 1999; *Ch 9, p 292*). The first phase was related to Bronze Age occupation, largely based on the pottery recovered from the site, some of which has now been radiocarbon dated to the later Bronze Age (Woodcock 1999; *Ch 7, p 225*), whilst the five later phases were associated with early medieval and Viking-age burials, an enclosure, and industry (*Ch 9, p 295*).

In the 1940s, during the wartime developments to the airport by the Admiralty (*p 6*), two other sites were discovered by J R Bruce (a member of the Manx Museum and Ancient Monuments Trust) and Eleanor Megaw (wife of Basil Megaw, who at this time was away on war service; Harrison 1986, 30, 38). Bruce and Megaw were observing these works with a view of recording any archaeological remains that might be uncovered (Bruce *et al* 1947). Both sites related to Neolithic activity, and at one, discovered in 1944, just to the north of the millpond shown on the OS map of 1870 (*p 5*), this activity seems to have involved the deposition of two Neolithic earthfast jars (Fig 6; *Ch 5, p 149*).

The other site lay *c* 200 m north-east of the Ronaldsway Village. It was recorded in October 1943, during levelling works, and comprised a Late Neolithic rectangular timber structure, which is commonly referred to as the 'Ronaldsway House' (*cf* Burrow 1999). This has become one of the best-known prehistoric sites on Man, and is the type-site for the Neolithic 'Ronaldsway Culture' (*cf* Piggott 1954; Burrow and Darvill 1997; *Ch 5, p 148*), a term first coined by Basil Megaw within a discussion forming an element of the

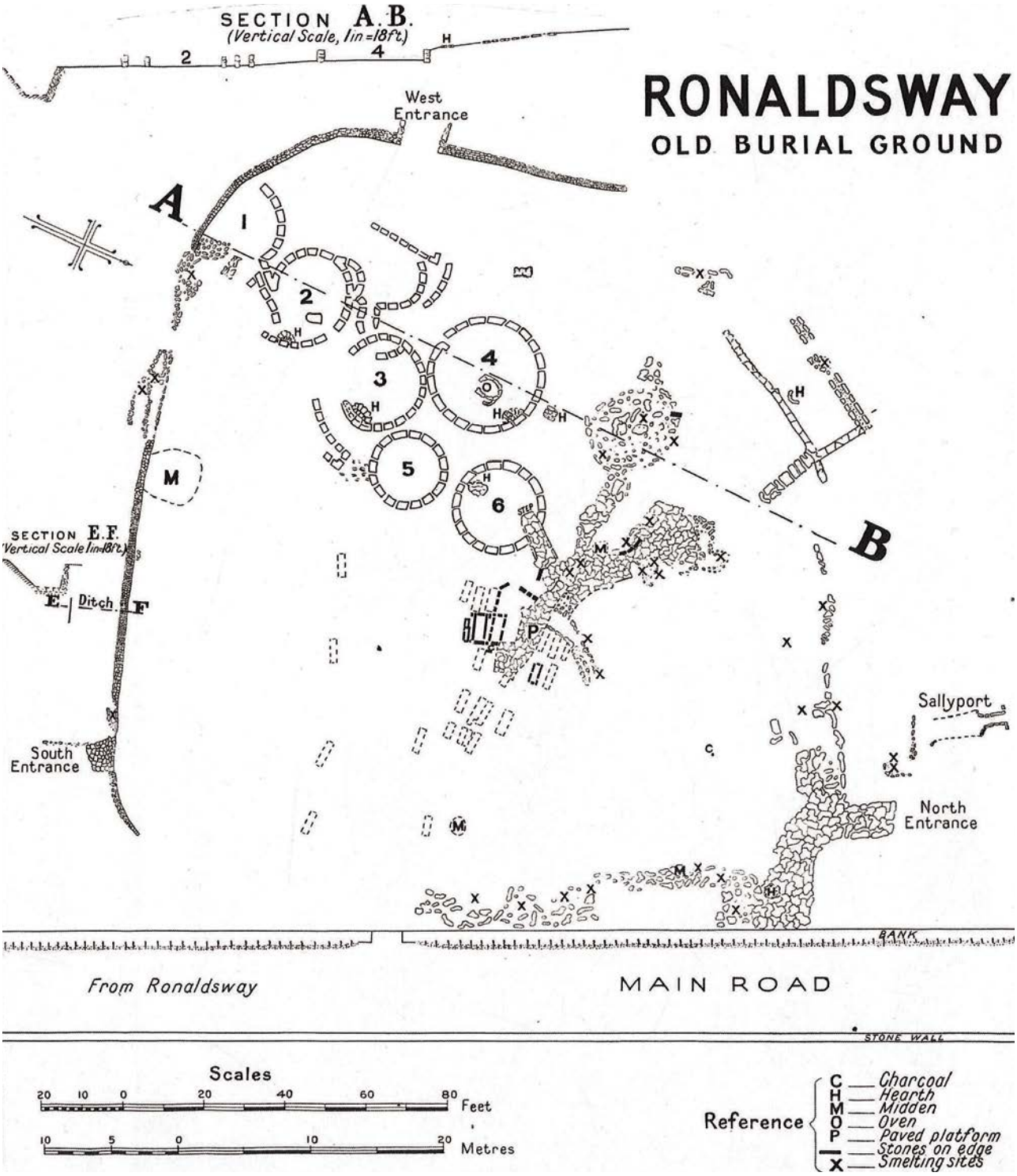


Plate 1: Neely's (1940) plan of the Ronaldsway Village

1947 publication of the site (Bruce *et al* 1947). The house was first revealed in a mechanically excavated section, created during levelling of the area, and was then subjected to a rapid 'salvage' excavation (*op cit*, 141).

Another eminent archaeologist was also uncovering evidence for prehistoric and later activity in the immediate environs of Ronaldsway Airport, during the 1940s. This was the German archaeologist, Gerhard Bersu, who, following the outbreak of the Second World War, had been interned on the Isle of Man as an 'Enemy Alien', in the summer of 1940 (Evans 1998). Fortunately, during his detention, Bersu, along with fellow internees from the Married Aliens camp at Port Erin and Port St Mary, completed several archaeological excavations across the island, largely as a means of filling the time, creating elaborate and painstaking pieces of work. The excavations were

directed by Bersu, and overseen by Eleanor Megaw, in her capacity as acting Director of the Manx Museum and Ancient Monuments Trust, and were funded by the Society of Antiquaries of London and the Manx Museum, with other smaller donations coming from numerous individuals. At the time, these excavations were also considered highly significant and were therefore visited by several notable archaeologists of the day, including Gordon Childe and O G S Crawford (Evans 1998).

In total, seven sites were excavated by Bersu, those in the southern part of the island, close to Ronaldsway Airport, being three large Iron Age roundhouses, the excavation of which formed Bersu's major campaign of work. These houses, excavated between 1941 and 1944, were to the west of the airport, and the Silverburn, and north of Castletown, two at Ballacagen Lough (A and B) and a single structure at Ballanorris (Fig 7). Significantly, as a result of the waterlogged conditions, all three houses were extremely well-preserved and were associated with thousands of posts/postholes and floors, and large collections of artefacts (Bersu 1977). Their preservation allowed Bersu (*ibid*) to reconstruct the architectural form of one of them (Ballacagen A), which has, in many respects, dominated the thinking about Iron Age houses in the island and beyond. It has, however, been argued that this reconstruction failed to take into account the major surviving structural timbers and was actually conditioned by Bersu's earlier reconstruction of a 'dryland' timber house that he excavated at Little Woodbury, Wiltshire (Evans 1998).

In addition, Bersu and his team also excavated another important site, in 1945, west of Ronaldsway Airport. This was on Chapel Hill at Balladoole, and was a Viking boat burial (Bersu and Wilson 1966). Significantly, the burial was on a site that had been

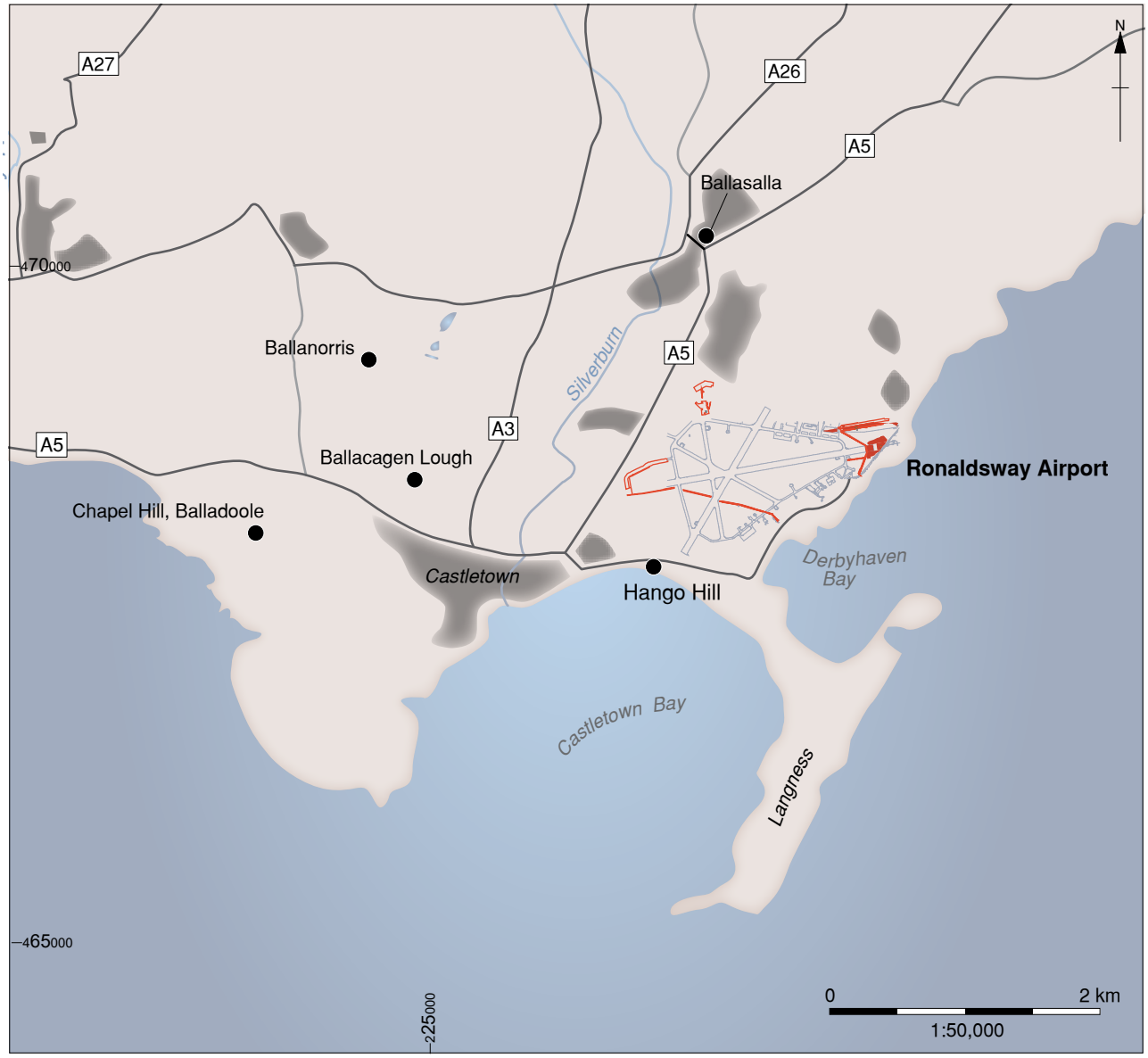


Figure 7: Sites excavated by Gerhard Bersu in the 1940s in the environs of Ronaldsway Airport

the focus for activity over an extended period, as it produced Bronze Age burials, and had later become an Iron Age hillfort (*Ch 8, p 252*), which was itself reused as an early medieval burial ground and chapel (keeill; *Ch 9, p 279*). Presumably, therefore, the hill's *genus loci* may have influenced the siting of the Viking burial (Williams 2006). Another Viking pagan burial was also recorded by Bersu at Hango Hill (*cf* Megaw 1957).

During the 1950s and 1960s, archaeological research on Man continued unabated, with a series of excavations being undertaken by several archaeologists. These principally were Basil Megaw, Marshall Cubbon (Director of the Manx Museum 1957-84), and Peter Gelling (from Birmingham University), who excavated several sites and 'contributed significantly to the advance of Manx archaeology' (Harrison 1986, 42). One of the sites excavated by Gelling was a coastal promontory fort at Cass ny Hawin (Fig 8), which was first depicted on the OS map of 1870 (*p 5*). Gelling's excavations indicated that this was probably established in the Iron Age, and was later reused in the medieval period, since evidence of a Norse-style house was discovered (Gelling 1959; *Ch 8, p 253*; *Ch 9, p 280*).

In the latter part of the twentieth century, archaeological research has continued at Ronaldsway Airport and in its immediate environs, which also have important implications for understanding early settlement and activity in the area. One project was the excavation of a Mesolithic site, to the north-east of the airport, to the

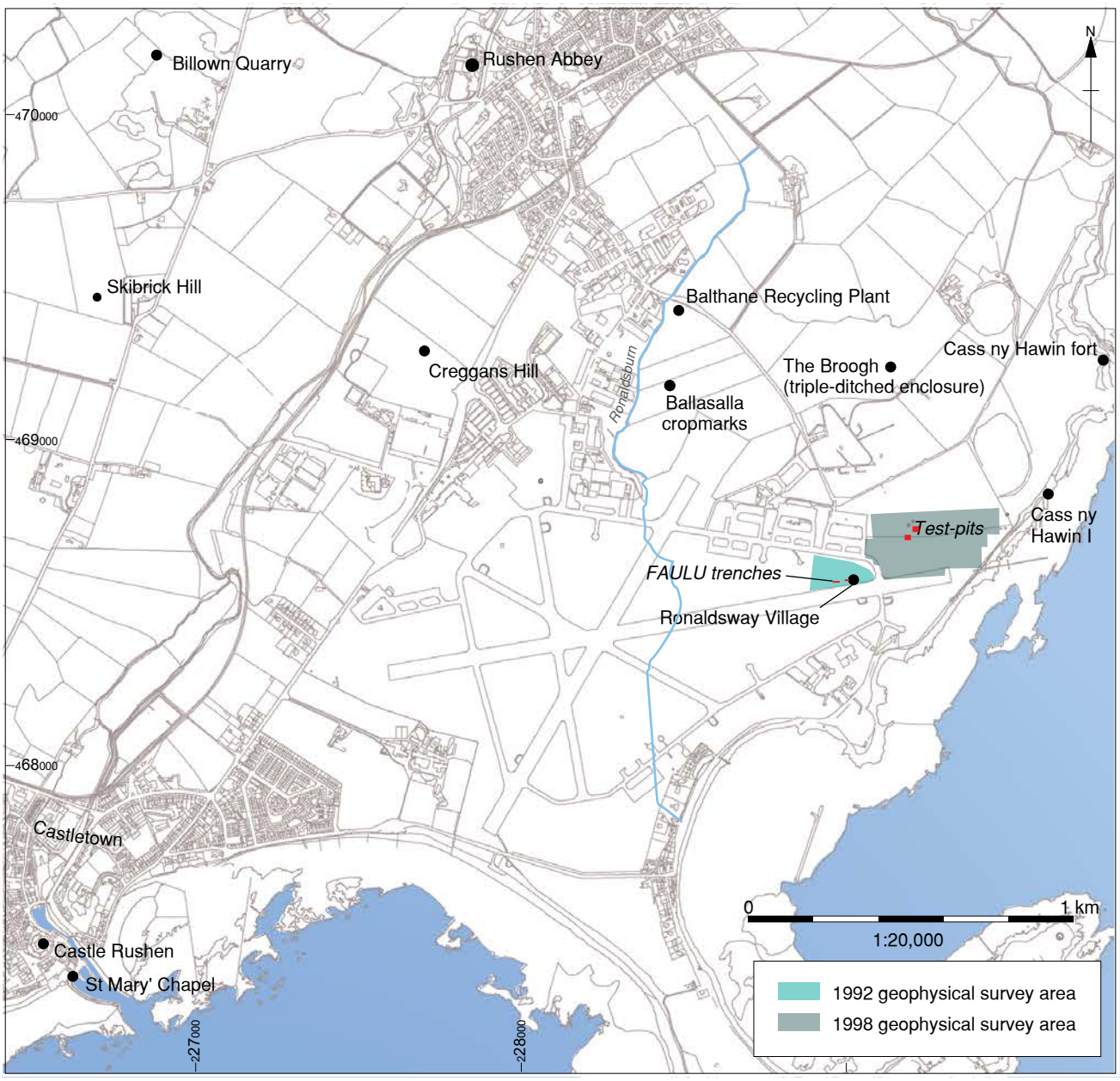


Figure 8: Sites excavated in the later twentieth and early twenty-first centuries, within and adjacent to Ronaldsway Airport (excluding the RESA excavation)

south of the southern promontory fort at Cass ny Hawin excavated by Gelling (*p 11*). At this site, Peter Woodman excavated the remains of a Mesolithic structure (named Cass ny Hawin I in this volume), probably a dwelling, which dated to the mid-seventh millennium cal BC, and, at the time of its excavation, was the earliest domestic structure known on the island (*Ch 2, p 38*; Woodman 1987).

In 1979, Ronaldsway Airport and its environs were the subject of aerial survey by Barri Jones and Nick Higham, from the University of Manchester, as part of a wider programme of aerial reconnaissance of the island (*cf* Higham and Jones 1982; 1984; Jones and Higham 1988). This survey recorded a complex array of cropmarks (Ballasalla cropmarks; Fig 8) immediately north of the airport, which appear to define field systems, enclosures, and house sites and/or barrows, probably dating to the prehistoric and medieval periods. It is also quite likely that, originally, the area of settlement defined by the cropmarks at Ballasalla extended further to the north-west, to the other side of the Ronaldsburn, particularly as a Bronze Age burial mound was discovered in Ballasalla in the 1980s (Darvill *et al* 1999). In addition to these cropmarks, another cropmark site on the summit of a small hill, The Broogh, was identified to the east by Higham and Jones (1982). This seemed to form a large triple-ditched hilltop settlement, probably dating to the Iron Age.

Castletown also witnessed several campaigns of small-scale excavation during the 1960s and 1970s, designed to investigate its medieval archaeology, targeting the medieval chapel of St Mary's (Cubbon 1971), with trial trenching in various places across the town (Garrad 1969). In addition, between 1989 and 1992, Liverpool University (under the auspices of the Centre for Manx Studies and the Field Archaeology Unit of Liverpool University (FAULU)) excavated within the town's medieval castle, Castle Rushen (Davey *et al* 1996). During this period, Liverpool University was also active at Ronaldsway Airport, in 1992, undertaking a programme of survey and excavation on the site of the Ronaldsway Village (*p 8*), during the closure of the main runaway for resurfacing (Higgins 1999). This work comprised a geophysical survey, and the excavation of two trial trenches, one across the site of a roundhouse with stone foundations, suspected to date to the early medieval period, the other positioned across an early medieval ditched enclosure (*Ch 9*, *p 292*; *cf* Laing and Laing 1987). The results were rather disappointing, however, and it was suggested that most of the site had been destroyed during the wartime establishment of the runway (*p 8*; Higgins 1999). In fact, the only definitive archaeological features identified comprised the bases of two parallel ditches adjacent to the suspected line of the early medieval ditched enclosure, one containing material dating to the first half of the first millennium cal AD (*ibid*). Moreover, the only find recovered was a quern fragment from the trench over the roundhouse. Other campaigns by Liverpool University close to the airport were excavations at Rushen Abbey in 1998-9 and 2000-8, a site which had also been previously excavated by the Manx Archaeological Survey, W C Cubbon, J R Bruce, and L A S Butler (Davey and Roscow 2010, 33).

Another research project in the late twentieth century emerged from proposals to extend Billown Quarry, to the north-west of Ronaldsway Airport, between Ballasalla and Ballanorris (Fig 8). These proposals initially prompted a large-scale archaeological evaluation, which uncovered evidence for Neolithic activity (LUAU 1993), and Billown and its surrounding landscape then became the focus of a project by Bournemouth University's School of Conservation Science, in conjunction with MNH (*cf* Darvill 2003a). The Billown Neolithic Landscape Project continued from 1995 to 2004, and entailed open-area excavation covering some 0.8 ha, along with topographical and geophysical survey and test-pitting in the surrounding landscape, which indicated that this area was extremely rich in prehistoric remains (Bayliss *et al* 2011a). These excavations revealed a series of prehistoric enclosures, along with pit groups, scoops, shafts, ring-ditches, and small ceremonial monuments (*Ch 5, p 147*), whilst the surveys identified prehistoric settlements, enclosures, ring-ditches, and field systems.

Other sites comprised a later Bronze Age farmstead at the quarry (Darvill 2003b; *Ch 6, p 171*) and an Iron Age enclosure on Skibrick Hill, incorporating into its design an earlier standing stone and Bronze Age round barrow (Darvill 1997; 1999). In 1998, the project undertook fieldwork directly adjacent to Ronaldsway Airport, largely geophysical and topographical survey (Darvill *et al* 1999). This took place just outside the eastern boundary of the airport, where the magnetometry identified a curved boundary, possibly part of a large enclosure, associated with a smaller rectangular enclosure, and a second, straighter, north-east/south-west boundary. These features were also associated with an elongated cluster of circular features, which it was suggested could have been house sites (*op cit*, 43-8). Two more-isolated circular anomalies were also detected, which were interpreted as small circular structures or possible burial mounds, particularly given that one was at the site of the '*Tumulus*' identified on the OS map of 1870 (*p 5*). As part of the fieldwork, two small test-pits were excavated over two of the possible house sites, which suggested they were gravel platforms, perhaps used for settlement. Significantly, one of these was cut by an earlier Bronze Age ditch, whilst a spread of charcoal above the other was dated to the later Bronze Age (*op cit*, 54).

In addition, Ronaldsway Airport and its immediate environs have been the subject of four programmes

of developer-funded archaeology in the early twenty-first century. The largest of these was the archaeological element of the scheme of runway improvement (*below*), the results being detailed in this volume, whilst a second programme took the form of a watching brief at the Balthane Recycling Plant, north of the airport. Significantly, this recorded prehistoric ring ditches, one associated with two Neolithic earthfast jars, unmarked cists, Bronze Age pottery, a sub-rectangular enclosure, and a wall or structure associated with metalworking (OA North 2010). The third project focused on Creggans Hill, immediately north-west of the airport, where a geophysical survey revealed a series of anomalies, indicative of prehistoric and medieval field systems, and also a palaeochannel close to Silverburn. The most striking remains detected were, however, several large enclosure ditches surrounding the hill, which suggested the presence of a later prehistoric hilltop settlement (OA North 2015). Archaeological trial trenching subsequently took place, which confirmed the presence of the enclosure ditches, one of which produced material that was radiocarbon dated to the earlier Iron Age (OA North 2016a; *Ch 8, p 256*). It was also apparent that activity continued into the first millennium AD, from a midden discovered inside the enclosure, radiocarbon-dated to the first-third centuries cal AD. In addition, two late medieval burials were discovered, suggesting that the site was a burial ground during the twelfth/thirteenth century (*Ch 9, p 281*). More recently, developer-funded excavation has also been undertaken at Billown Quarry to record the archaeological remains within an extension to the quarry, immediately west of the area excavated by Bournemouth University (*p 12*). These excavations seem to have uncovered highly significant evidence relating to Neolithic occupation at this hilltop site (R Gregory *pers obs*; *Ch 5, p 147*).

The RESA Project

In the early part of the twenty-first century, development proposals were made by the Isle of Man Airport Division (part of the Isle of Man Government Department of Transport), to extend and improve the runway facilities at Ronaldsway Airport, with Balfour Beatty acting as the Principal Contractor on this project. The proposals were designed to allow larger aircraft to land and operate safely, and included the extension of the Runway End Safety Area (RESA) by 250 x 150 m, extending both the western and the eastern ends of the main runway, and also providing each with a linked taxiway (Fig 9). At the eastern end of the airport, to allow the required runway length,

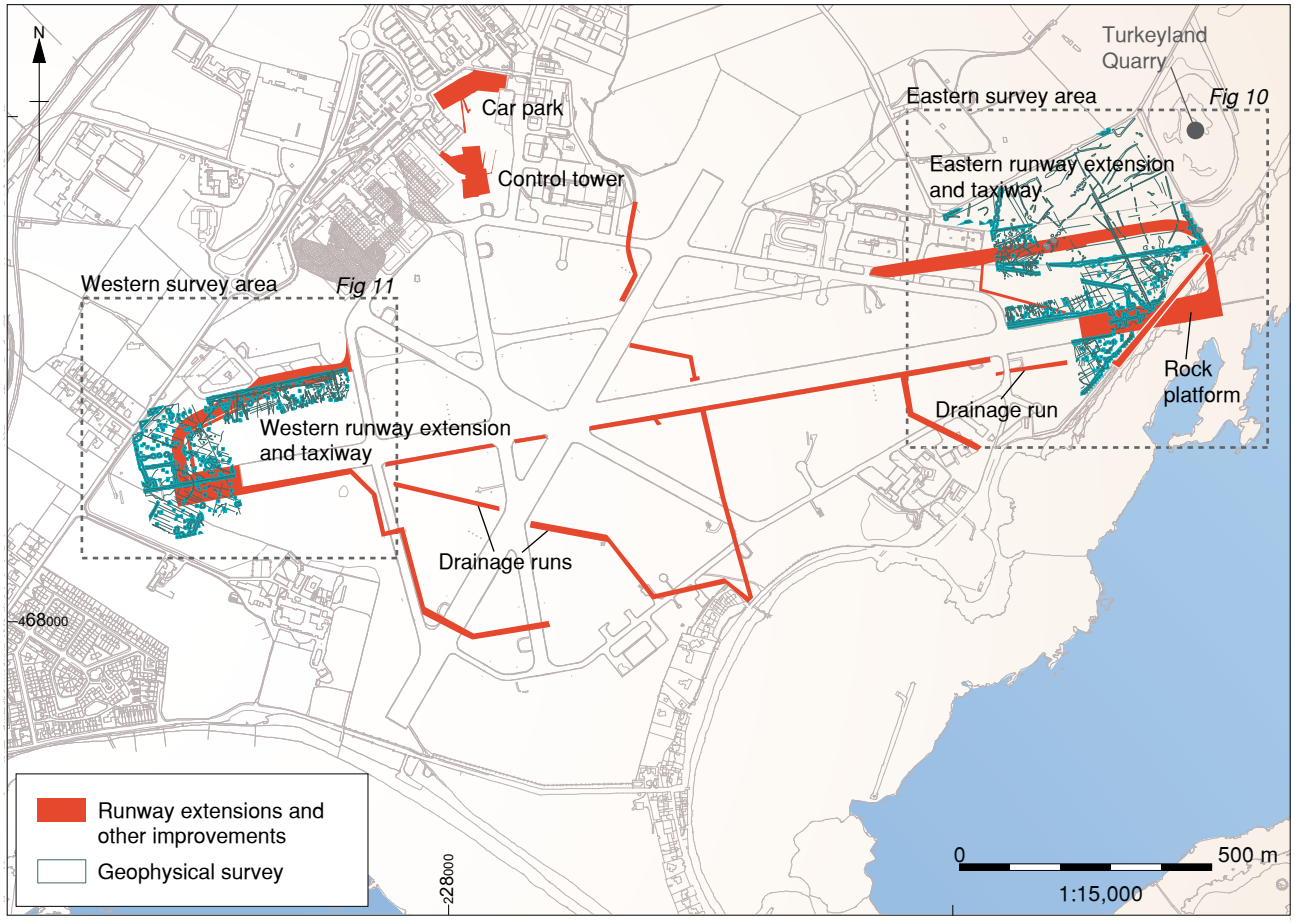


Figure 9: The runway extensions, and other airport improvements, with the geophysical survey overlain



Plate 2: The construction of the armoured rock platform into the Irish Sea, at the eastern end of the airport

the terminals of both the runway and eastern taxiway were to be constructed on land reclaimed from the Irish Sea, entailing the construction of an armoured rock platform (Pl 2). It was also proposed that several other improvements should be made to the airport, including the construction of a new control tower and car parks. In addition, the construction programme would necessitate a series of ancillary works, such as the insertion of service trenches, and, whilst construction was proceeding, temporary haul roads and works compounds.

Given that the previous archaeological work (*p 8*) had uncovered a wealth of archaeological sites, MNH stipulated that any improvement works should contain an archaeological component. This would allow sites in the areas affected by the runway extensions and other construction to be identified, and excavated and recorded as necessary.

This programme of work was initiated in 2006 and adopted a phased approach, consisting of an initial unintrusive investigations, followed by an intrusive phase of archaeological excavation. Finally, after the fieldwork had been completed, a programme of post-excavation work took place.

Initial works

Two investigations, explicitly designed to assess the archaeological potential of the areas affected by the proposed runway extensions and other developments, were completed prior to the main construction works. The first was a desk-based study, forming an element of an Environmental Statement prepared in support of the planning application (Faber Maunsell Ltd 2006). This detailed the context and significance of archaeological remains at the airport and in the vicinity, noting that the construction work might have an impact on any remains within the areas earmarked for improvement or construction. It also stressed that all the remains previously excavated at the airport hold national significance, and that the Ronaldsway Neolithic house (*p 8*) should be considered as an internationally significant structure. Furthermore, it noted that the Ronaldsway Village (*p 8*) is without parallel on the Isle of Man, and holds particular significance for understanding early settlement and burial in the Irish Sea Province more generally (*ibid*).

The second investigation, completed in 2006-7, consisted of a geophysical survey that was designed to clarify the extent and character of the archaeological remains that might be affected by the runway extensions. Two areas were surveyed, one a parcel of land that would be covered by the western runway extension, whilst the other was an area that would be covered by the eastern extension. The latter also included the area previously surveyed as part of the Billown Neolithic Landscape Project (*p 12*), as well as a small triangular parcel of land immediately to the south of the proposed runway extension, and a larger triangular parcel to the north of the proposed extension, immediately west of Turkeyland Quarry (*p 6*).



Figure 10: Geophysical anomalies in the eastern survey area

It soon became apparent that both areas contained a range of potential below-ground remains. Many appeared recent (relating to land drains or other services associated with the airport), but within the eastern area they included a group of circular features arranged on a north-east/south-west alignment, which would be crossed by the proposed line of the eastern taxiway (Fig 10). The form and positioning of these suggested that they could be potential roundhouses, perhaps similar to those excavated at the nearby Ronaldsway Village (*p 8*). Another smaller group of comparable anomalies, on a similar alignment, were apparent some 100 m to the north-east, which might again denote the



Figure 11: Geophysical anomalies in the western survey area

position of houses, whilst to the south-east, a similar cluster of circular anomalies lay close to the shoreline, perhaps again relating to areas of ancient settlement, or other types of activity resulting in the digging of pits.

Surrounding these potential houses was a series of linear anomalies, denoting the presence of buried field boundaries and enclosures. At a broad level, two superimposed boundary systems seemed to be present, one forming an irregular system of boundaries and enclosures, some of which were possibly contemporary with the putative house sites, whilst the other was more regular in character and was probably later in date, as it could be equated with field boundaries depicted on the OS map of 1870 (*p 5*). Another potentially significant feature was a small rectilinear enclosure (Fig 10), again potentially of early date, pre-dating the field boundaries depicted on the nineteenth-century OS map.

In the western survey area (Fig 11), a series of regular linear anomalies seemed to relate to former field boundaries. Scatters of circular anomalies were also present, some of which could conceivably indicate house sites, or episodes of digging pits, whilst the larger circular anomalies might reflect quarrying and levelling across the airfield that was completed in the 1930s (*p 6*).

Excavation methodology

In view of the results of these surveys, in 2008 MNH produced a brief detailing the archaeological works that would be required to mitigate the impact of the airport improvement works (MNH 2008). It was stressed from the outset that the nature of these works (specifically the runway and taxiway extensions) precluded any possibility of the *in-situ* preservation of any surviving archaeological remains. Hence, the mitigation strategy would specifically be geared towards the identification, mapping, excavation,

sampling, and recording of all archaeological features exposed by the groundworks associated with this major construction project (*ie* 'preservation by record'). Following the issue of the brief, Balfour Beatty appointed Oxford Archaeology (OA) as the archaeological contractor, and subsequently, in consultation with MNH, an appropriate programme of excavation and recording was agreed. The archaeological fieldwork was undertaken during 2008 and 2009.

Site discovery and excavation methodology

Given the size of the site, and the complex logistics of undertaking construction work at a functioning airfield, archaeological excavation and recording was carried out over several stages. In one area, adjacent to the coast, and away from the operating runway, this comprised trial trenching and test-pitting prior to any construction work. In most areas, however, excavation and recording were undertaken once the scheme of construction had started. In these areas, initially, topsoil stripping across the areas of airport improvements was supervised by the archaeological team, which allowed the immediate identification of buried remains. It is worth noting that the logistics of stripping areas within a functioning airport were at times challenging. For instance, for those areas immediately adjacent to the runways, excavation had to be undertaken overnight, using floodlights, between the last flight in the evening and the first in the morning (Pl 3).



Plate 3: The night-time excavation of a drainage run

The normal working methodology for the topsoil strip involved the removal of overburden, using back-acting, tracked excavators fitted with smooth-faced ditching buckets (Pl 4). The strip was to the top of the uppermost significant archaeological horizon, or to undisturbed natural deposits, if no archaeological remains were present. During this, the topsoil was removed in successive spits, no greater than 0.2 m, to recover any residual artefacts that might be contained in this uppermost deposit. Following removal of the topsoil, the material revealed was cleaned by hand and the locations of any sub-surface features were surveyed, with the resultant digital plans being submitted to MNH for assessment.



Plate 4: Topsoil stripping adjacent to a haul road at the eastern end of the airport

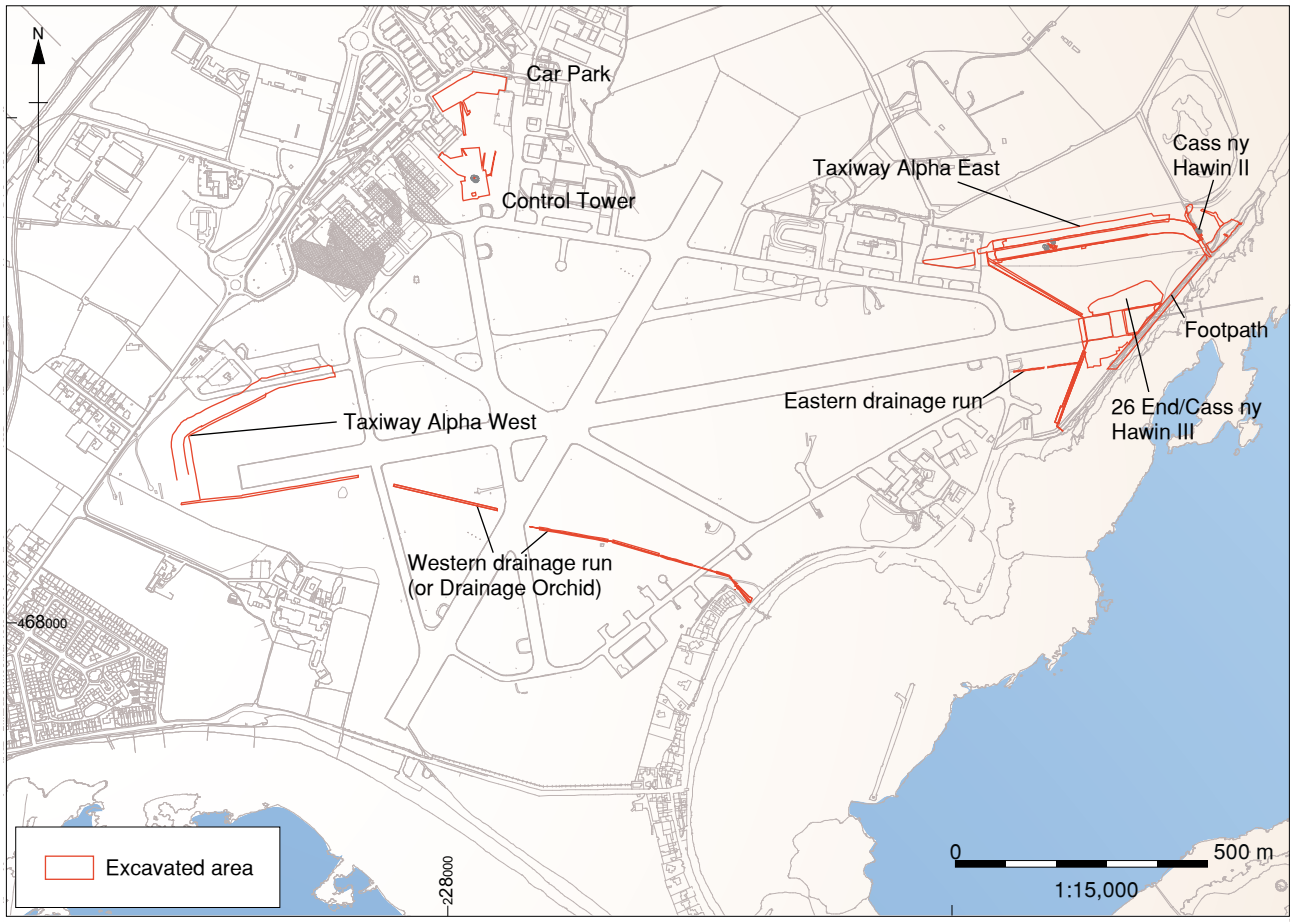


Figure 12: The areas of archaeological excavation in the RESA project

This initial phase of work focused on seven areas (Fig 12), these being principally named after that part of the airport improvements they related to; however, two sites, which contained important Mesolithic archaeology, were named Cass ny Hawin II and III, after the Mesolithic site discovered a short distance to the north-east in the 1980s (*p 11*; *Ch 2, p 36*). Of these, four were at, or adjacent to, the eastern end of the extended runway/taxiway (Cass ny Hawin II; Cass ny Hawin III (also known as 26 End, when referring to the remains that post-dated the Mesolithic period); the Footpath site; and Taxiway Alpha East), whilst one (Taxiway Alpha West) was at the western end of the airport. The two remaining areas (Car Park and the Control Tower) were on the northern side of the airport, between the two main areas.

In addition, archaeological watching briefs were completed during the digging of new drainage runs. These comprised the Eastern and Western (otherwise the Drainage Orchid) drainage runs, which were 0.6 m wide and, in accordance with airport-operating procedures, were excavated overnight, with any sub-surface remains being immediately recorded, after which they were backfilled before flights continued at daybreak.

The exploratory phase of work resulted in the identification of archaeological remains within parts of all seven of the 'strip-and-record' areas (Table 1). It was therefore decided that these remains warranted further, more-detailed archaeological excavation, with project designs for this work being formulated by OA, in consultation with MNH. These archaeological remains consisted of, at the eastern end of the airport, an internationally significant Mesolithic dwelling at Cass ny Hawin II, and regionally significant Mesolithic remains at Cass ny Hawin III/26 End, along with locally significant remains dating to the post-medieval period, and possibly the medieval period. At Taxiway Alpha East, a regionally significant Neolithic structure was revealed, together with elements of a nationally significant Middle/Late Bronze Age settlement (Pl 5), which had later been used as an Iron Age burial place; this area also contained remains dating to the end of the Manx Iron Age. At the Control Tower, regionally significant Iron Age houses were excavated, whilst, at Taxiway Alpha West and the Car Park, locally significant remains were present, in the form of field boundaries and furrows. At all sites, the examination of features concentrated on recovering the plan and any structural sequences, with the phasing and interpretation of the remains being the principal objective.

Site (Fig 12)	Nature of groundworks	Mitigation strategy	Description of archaeology	Reference in volume
Cass ny Hawin II	Construction of a haul road, in an area that would later form part of the eastern taxiway	Strip-and-record excavation, followed by detailed archaeological excavation	Mesolithic house (designated as Cass ny Hawin II) associated with large *in-situ* lithic assemblage and carbonised plant remains	*Chs 2, 3, and 10*
26 End/ Cass ny Hawin III	Extension of the runway eastwards for 150 m, which then continued out into the Irish Sea onto an armoured stone platform. The works included large-scale profiling at the eastern end of the original runway (termed 26 End during groundworks)	Strip-and-record excavation across geophysical anomalies, suggestive of pits and boundaries, followed by detailed archaeological excavation	Mesolithic pits (designated as Cass ny Hawin III); medieval oven; possible medieval pits; medieval(?) enclosure, boundaries, and pits	*Chs 4, 9, and 10*
Footpath	Construction of a haul road along the shoreline, which partially followed the route of a former footpath	Evaluation trenches and test-pitting	Mesolithic lithics from the topsoil and subsoil; no *in-situ* Mesolithic features were present	*Chs 4 and 10*
Taxiway Alpha East	Construction of eastward extension of the eastern taxiway, which linked with, and was parallel to, the main runway	Strip-and-record excavation across circular geophysical anomalies suggestive of house sites, followed by detailed archaeological excavation	Neolithic structure; Early Bronze Age structure; Middle/Late Bronze Age settlement; Iron Age burials and oven; post-medieval boundaries	*Chs 5-11*
Taxiway Alpha West	Construction of westward extension of the western taxiway which linked with and was parallel to the main runway	Strip-and-record excavation within an area of linear geophysical anomalies; sample excavation of some boundary features	Palaeochannels; post-medieval boundaries and furrows	*Chs 9 and 11*
Control Tower	Construction of new airport control tower	Strip-and-record excavation across site footprint, followed by detailed excavation	Iron Age houses	*Chs 8 and 11*
Car Park	Construction of new airport car park	Strip-and-record excavation across site footprint, followed by detailed excavation	Post-medieval boundaries and furrows	*Chs 9 and 11*
Eastern drainage run	Construction of drainage runs	Watching brief	Medieval(?) trackway	*Chs 9 and 11*
Western drainage run (Drainage Orchid)	Construction of drainage runs	Watching brief	Palaeochannels; medieval(?) and post-medieval boundaries	*Chs 9 and 11*

Table 1: The principal sites of archaeological investigation during the RESA Project

At 26 End/Cass ny Hawin III, Taxiway Alpha East, Taxiway Alpha West, the Control Tower, and Car Park, archaeological features and deposits were percentage-sampled by hand-excavation, with the precise proportion of each particular feature or deposit being dependent on its interpretation and morphology. Generally, 100% of graves, hearths, and midden deposits were excavated, whilst at least 50% of all pits and postholes were examined. With linear features, 10-20% of their lengths were excavated; however, any ditch terminals and intersections present were completely excavated (*cf* OA North 2007).

In contrast, at Cass ny Hawin II, the approach to excavation differed, given the presence of a highly significant Mesolithic dwelling. At this site, as a result of the rarity and sensitive nature of the archaeology, the footprint of the house was excavated in quadrants (Pl 6). Initially, standing baulks were left between these quadrants to provide stratigraphic control, and to enable the recording



Plate 5: The excavation of the Bronze Age settlement at Taxiway Alpha East



Plate 6: The excavation of the Mesolithic house at Cass ny Hawin II



Plate 7: Environmental sampling at Taxiway Alpha East

of the full depositional sequence; these were subsequently excavated towards the end of work at the site. The entire area of the structure was divided into a grid of 1 m² (covering an area of 59 m²), and each grid-square was hand-excavated in spits. The thickness of the spits depended on the frequency of the finds recovered, but they ranged from 10 mm to 40 mm, with an average of 20 mm. This programme of work resulted in the collection of 657 samples from the house. The blocks of sediment excavated from single spits formed the smallest sampled units, with these ranging from *c* 1 litre to 140 litres, although 10-30 litres was more common. Additionally, discrete features associated with the house, both within it and external to it, were fully sampled, as were obvious lengths of *in-situ* wood charcoal.

At all the sites where detailed excavation took place, all artefacts were retained for processing and analysis (*p 22*), and samples for environmental analysis (Pl 7) and scientific dating were taken where suitable material was encountered. Generally, in line with accepted professional guidelines (*cf* Campbell *et al* 2011), bulk palaeoenvironmental samples were extracted from all securely stratified contexts, each comprising 40 litres, or the entirety of the deposit, if less than this was present. At Cass ny Hawin II, however, due to the rarity and importance of this site, all of the excavated sediment was collected, by grid-square and spit (*above*), for wet-sieving (for finds retrieval and for the recovery of charred palaeobotanical materials), and monolith samples were also collected for palaeoenvironmental and sedimentological analysis, which meant that the house was sampled *in toto* (*cf* Druce *et al* forthcoming). One of the sites (Taxiway Alpha East, Bronze Age settlement; *Ch 6*) was also associated with an assemblage of animal bone. This material was collected by hand during the fieldwork and was also recovered during the sieving of 25 whole-earth soil samples, specifically taken for the purpose of retrieving this material.

Recording at all the sites followed the normal principles of stratigraphic excavation, and context sheets were used for written field records; these were in a format acceptable to the Chartered Institute for Archaeologists (CIfA 2023). A unique alpha-numeric project code was applied to all records. All archaeological features were accurately located by instrument survey and recorded on an appropriately scaled site plan, and also by photographs, scale drawings, and written descriptions, sufficient to permit the preparation of a detailed archive and report on the material. In addition, all of the artefacts (worked stone) and some plant macrofossils (*ie* charred wood and hazelnuts) identified during the excavation at Cass ny Hawin II were three-dimensionally recorded



Plate 8: Recording the location of Mesolithic finds at Cass ny Hawin II with a dGPS

(to 10 mm accuracy) by a differential geographical positioning system (dGPS; Pl 8). This produced a record of the exact coordinates and height data (X, Y, and Z) for almost 14,500 items of worked stone. Similarly, at Taxiway Alpha East, all of the artefacts and the animal bones were three-dimensionally recorded using a dGPS.

Post-excavation methodology

Following the completion of fieldwork, a programme of post-excavation analysis was undertaken, which focused on those sites that had produced significant Mesolithic, Neolithic, Bronze Age, Iron Age, medieval, and post-medieval archaeological remains (*p 18*). From the outset, this analysis was structured and guided by a series of research themes and questions. These principally comprised:

- *insularity and connectivity*: how has Man's island status affected the development of its past human cultures?

- *topography and geomorphology*: how has this influenced past human agency and how does it affect our understanding of the development of the landscape?

- *Mesolithic settlement and land-use*: what do the structural remains and other evidence at Ronaldsway reveal about the hunter-gatherers who lived there, and how can this be understood in the wider context of both Man and the north-western British Isles?

- *later prehistoric settlement and society*: what evidence is there for the first farmers and metal-users? How does this compare with evidence of a similar date from other parts of the island and from further afield?

- *the agricultural landscape*: what is the date, and nature, of the various boundary features identified, and how do these inform an understanding of wider land-use, land management, and tenure?

With these research questions in mind, the analysis consisted of several interconnected elements, which adopted specific methodologies. These elements focused on the stratigraphic data, and palaeoenvironmental and artefactual evidence, and also included a significant chronological (radiocarbon and archaeomagnetic dating) programme. The wider landscape and available historical archives have also been considered to situate the excavation sites in their local settings.

Stratigraphic analysis

A detailed analysis of the stratigraphic data was completed. During the preparatory stages, the contextual data were entered onto a project database, which allowed the information to be scrutinised more easily. The database thus contains evidence from the primary context records, site plans, and sections, and, as the analysis proceeded, the relationships between deposits and features were examined and refined. This allowed contexts to be aggregated into meaningful stratigraphic and interpretative groups, which were defined within the project database (respectively as *Group* and *Entity*). Following this, secure site-specific sequences were determined, enabling the identification of key contexts suitable for scientific dating. Draft stratigraphic narratives and phase drawings were then produced, and, as the programme progressed, an iterative review of the stratigraphical, artefactual, and palaeoenvironmental evidence was maintained, with revisions being made to the site database to record the updated interpretations.

Artefactual analysis

All of the finds recovered from the sites were the subject of analysis. These materials largely comprised flaked lithics, other items of prehistoric worked stone, prehistoric ceramics, and metalwork.

Flaked lithics
The flaked lithics from Cass ny Hawin II (*Ch 3*), and Cass ny Hawin III, with other nearby lithic scatters (*Ch 4*), and Taxiway Alpha East (*Ch 7*) together formed by far the largest body of finds, with 23,987 stratified items being recovered. Given the costs and timing issues, the flaked-lithic assemblage was not formally assessed, being 'fast-tracked' to the analysis stage, since the assemblage provided a rare opportunity to study prehistoric activity on the Isle of Man; therefore, all the material was the subject of detailed typological and technological analysis. This largely involved inspecting and recording the material, utilising the project's online database. This has enabled each site assemblage to be characterised, providing an insight into lithic use and manufacture. Of particular significance is the Cass ny Hawin II assemblage, as it is both the largest and chronologically earliest, and was (mostly) recovered from a stratigraphically secure feature (a Mesolithic house). Thus, whilst providing a technological characterisation of the worked stone, the analysis was instrumental in addressing questions relating to the character, function, chronology, and length of occupation at this site.

The database is largely modelled on that employed for the assessment and analysis of a large worked-stone assemblage (*c* 303,953 items) from Stainton West, near Carlisle, in Cumbria (Brown *et al* 2023), which followed the recording systems used in several other earlier projects from northern Britain, specifically those developed for analysing assemblages from Kinloch, Rùm, and Colonsay, Scotland (Wickham-Jones 1990; Finlayson *et al* 2000), and the central Pennine region of north-west England (Preston 2012). It incorporates a front-end, storing basic data, designed to enable a rudimentary quantification of the assemblage, and a back-end containing detailed information on the lithics selected for analysis (*cf* Dickson 2023).

Coarse-stone objects
Coarse-stone tools were also recovered from Cass ny Hawin II (*Ch 3*) and Taxiway Alpha East (*Ch 7*), and these were similarly analysed typologically and for technological attributes. This entailed a detailed visual inspection, to determine the raw-material type and detect any use or wear patterns, and consideration of the objects with comparanda from further afield.

Ceramics
Similarly, the prehistoric pottery, and clay-mould fragments and crucibles from Taxiway Alpha East (*Ch 7*) were subjected to visual inspection, and typological comparison with relevant published examples, such as those developed by the Prehistoric Ceramic Research Group (PCRG *et al* 2016). During the analysis, the methodology and terminology used followed that employed by Jennifer Woodcock (1999; 2008), who has analysed the nearby Bronze Age ceramic assemblage from the Ronaldsway Village site found in the 1930s (*p 8*). Elements of the assemblage from Taxiway Alpha East have also been considered in relation to other Bronze Age ceramics known from the island, which have been catalogued (Woodcock 2008). Furthermore, several sherds of Middle/Late Bronze Age pottery were analysed petrographically, to investigate provenance and manufacturing technology (*Appendix 1*).

The clay-mould fragments and crucibles have proved particularly important for providing evidence for later Bronze Age metalworking. These have been described using the terminologies of Stuart Needham (1980), and Trevor Cowie and Katherine Eremin (2011).

Metalwork
Several items of metalwork were recovered, including both Bronze Age (*Ch 7*, *p 230*) and Iron Age (*Ch 8*, *p 272*) objects. These have again been examined, and comparison made with published and unpublished examples from the British Isles.

Palaeoenvironmental analysis
Plant remains and charcoal
An extensive programme of palaeoenvironmental analyses was undertaken on a range of materials from several parts of the site. This first involved the processing of the bulk samples, which followed standard procedures (*cf* Campbell *et al* 2011), with flots being collected on a 250 μm mesh, air-dried, and examined under a binocular microscope. Any charcoal still contained in the 2 mm residue was also extracted and retained with the flots. Once the samples had been processed, analysis considered the Mesolithic charred plant remains and wood charcoal from Cass ny Hawin II (*Ch 3*), the Mesolithic charred plant remains from Cass ny Hawin III (*Ch 4*), the Neolithic (*Ch 5*), Bronze Age (*Ch 7*), and Iron Age (*Ch 8*) charred plant remains from Taxiway Alpha East, and the possible medieval plant remains from 26 End (*Ch 9*). It was thought that these would furnish some insights into the environment, human economy, and subsistence strategies of the respective periods.

The work entailed examining the flots with a Leica MZ6 binocular microscope, at up to x40 magnification, extracting the charred plant remains, and then, when possible, identifying these and quantifying them. Identification was aided by comparison with the modern reference collection held at OA's Lancaster office, and with reference to the digital seed atlas of the Netherlands (Cappers *et al* 2006). Plant nomenclature followed Clive Stace (2010), and the results were entered into the project database.

In addition, at Cass ny Hawin II, a large assemblage of hazelnut-shell (*Corylus avellana*) fragments

was recovered. Several studies of hazelnut remains from Mesolithic houses in Britain and northern Europe have highlighted the value of recording their abundance, alongside other features, as a means of identifying feature types and defined spaces within dwellings (*cf* Grøn 1995; 2011; Cotton 2007; Druce *et al* 2025). Given this, all the fragments larger than 2 mm were quantified and weighed. In order to identify any patterns in breakage, quantifications and the corresponding weight in each of the samples were broken down into less than 2 mm, 2-4 mm, and greater than 4 mm-sized fragments. A standard scale of 1 to 4 was used to quantify the smallest fragments, whereby: 1 is rare (one to five items); 2 is frequent (6-25 fragments); 3 is common (26-100 fragments); and 4 is abundant (greater than 100 items). In contrast, all 2-4 mm and larger fragments were counted.

Generally, charcoal analysis followed standard procedures (*cf* Campbell *et al* 2011), whereby at least 100 fragments greater than 4 mm, or failing this, greater than 2 mm were identified. These were then quantified using an identical abundance scale (1 to 4; *above*). At Cass ny Hawin II, however, two more-detailed forms of analyses were employed. The first entailed extracting and identifying all charcoal greater than 2 mm from features inside the house (26 in total). The second involved a detailed scan of those samples (308 in total) recorded as containing common (score 3) to abundant (score 4) fragments greater than 2 mm, to determine the relative abundance of taxa present. In addition, analysis was carried out on 82 of these samples to check the accuracy of the quantification made during the scanning. On the whole, these proved to be accurate, the occasional discrepancy being the allocation of scores 2 (6-25 fragments) or 3 (26-100 fragments), when the number of fragments of a particular taxa were borderline between the two (*ie* around 20 or 30). A further 54 hand-retrieved samples were also analysed, comprising the remains of burnt structural wood recovered from three discrete areas within the house.

During all of these analyses, the charcoal was initially sorted into groups based on the features visible in transverse section, using a Leica MZ6 binocular microscope, at up to x40 magnification. Then, representative fragments of each group were fractured to reveal both radial and tangential sections, which were examined under a Meiji incident-light microscope, at up to x400 magnification. Identifications were made with reference to standard published works (Schweingruber 1990; Hather 2000), and modern reference material. As with the charred plant remains, nomenclature of the charcoal follows Stace (2010), and the results of the analysis were also entered into the project database.

Human remains

Iron Age human remains (from two adults and a juvenile) formed another element of material from Taxiway Alpha East subjected to analysis. This was undertaken in line with published guidelines (Brickley and McKinley 2004), and aimed to determine the level of preservation of the skeletons, and the sex, age, lifestyle, and potential cause of death of the individuals interred at the site.

Hence, during this study, the preservation of each skeleton was recorded, with reference to completeness (scored as: less than 25%; 26-50%; 51-75%; or 76-100%); degree of fragmentation (scored as: low = less than 25% fragmented; medium = 25-75% fragmented; or high = more than 75% fragmented); and the degree of surface erosion (*cf* McKinley 2004, 16), whilst the sex of the adult skeletons was estimated, based on observations of the sexually dimorphic traits of the skull and pelvis (Bass 1987; Buikstra and Ubelaker 1994). Depending on the level of confidence with which sex could be estimated, adults were recorded as either: possible female (??F); possible male (??M); probable female (?F); probable male (?M); female (F); or male (M). No attempt was made to estimate the sex of the juvenile skeleton, in accordance with accepted practice (Brickley 2004, 23).

Adult-age estimations were also made, based on observations of late-fusing epiphyses (Scheuer and Black 2000), on the morphological changes of the auricular surface (Lovejoy *et al* 1985; Buckberry and Chamberlain 2002), and on the level of dental attrition (Brothwell 1981; Miles 1962). Juvenile age was estimated with reference to dental development (Moorees *et al* 1963). Non-metric traits (minor anomalies of skeletal anatomy that may be genetically or environmentally induced; Mays 1998) were scored as present or absent (Berry and Berry 1967; Finnegan 1978). Lesions of pathology and trauma were identified, described, and diagnosed with reference to standard texts (*ie* Aufderheide and Rodríguez-Martín 1998; Ortner 2003). Due to the fragmentary nature of the assemblage, metrical analysis was very limited, and it was not possible to estimate stature for any of the skeletons.

Animal bone

Analysis of the animal bone focused on material collected from Taxiway Alpha East (*p 18*), which again aimed to provide insights into economy and subsistence strategies, associated with the later Bronze Age settlement (*Ch 6*). This material was identified using OA reference collections and through reference to other standard resources on animal-bone identification (*ie* Sisson and Grossman 1938; Schmid 1972; Halstead and Collins 1995). All parts of the skeleton were identified where possible, including

long-bone shafts, skull fragments, all teeth, and fairly complete vertebra. Sheep/goat distinctions were made using reference material, and by consulting standard published works (*ie* Boessneck 1969; Kratochvil 1969; Payne 1985; Prummel and Frisch 1986). Red and fallow deer were separated following Adrian Lister (1996). Bird bones were also identified with reference to standard works (*ie* Cohen and Serjeantson 1996; Bacher 1967), and the reference collection held at the World Museum, Liverpool. Seal bones were identified with reference to Lisa Hodgetts' (1999) thesis, and with the assistance of Fay Worley of English Heritage (now Historic England).

The assemblage was divided into countable 'A' bones and non-countable 'B' bones (in line with the principles detailed in Dobney *et al* 1999). Fragments were recorded as 'A' bones when over 50% of a zone was present, and for each of these the following information was recorded where appropriate: context; species or species group; element; number of bones; side; the diagnostic zone as either more than, or less than, half present; fusion state; butchery; measurements; tooth-wear development; and other comments. Pathology and other developmental or congenital anomalies were also noted. 'B' bones were recorded by species group and element only, unless they were measurable, displayed butchery marks, pathology, or congenital traits, in which instance they were recorded in the same detail as 'A' bones.

The diagnostic zones used followed those described by Dale Serjeantson (1996), although this excludes the mandible, which was zoned as described in Worley (2011). Vertebrae (except axis and atlas) were recorded as 'A' bones when over 50% of the centrum was present. The condition of the bone was recorded by context as ranked data. This comprised: the state of bone preservation; angularity of archaeological breaks; the relative size of bone fragments; the proportion of the original complete bones present; the level of surface erosion; and the proportion of new breaks, butchered, burnt, and gnawed bones.

The minimum number of elements (MNE) was calculated from the most frequently occurring diagnostic zone of each element, taking side into account. Any phalanges were recorded from the left or right side of the foot, and therefore the MNE is divided by four to compare the phalanges with other limb bones. The minimum number of individuals (MNI) equates to the highest MNE value. The third phalanx was not zoned, and therefore has no MNE. Modified NISP defines pig metapodials, and cattle, sheep/goat, and sheep unfused metapodial epiphyses, as 0.5 NISP. This avoids over-inflating NISP counts of 'A' bones from the two pig metapodials and the two cow or sheep unfused metapodial condyles, when compared to the count of one for every adult cow or sheep metapodial. All other species occurred rarely, and their NISP counts have not been adjusted to allow for skeletal complexity.

The extent of mandibular tooth wear and the epiphyseal fusion of long bones can be used to estimate the age of death of the principal stock animals. Wear stages were recorded for dP4s, P4s, and lower permanent molars of the domestic species (*cf* Grant 1982) and grouped into age stages for cattle (Jones and Sadler 2012), sheep (Payne 1973; Jones 2002), and pigs (Halstead 1992). The fusion stage of post-cranial bones was recorded and, where possible, related age ranges were established (*cf* Silver 1969; Zeder 2002). Sexes were separated using morphological characteristics of the pelvis in sheep and cattle (Grigson 1982) and of the canines in pigs (Schmid 1972). Measurements were also taken on cattle, sheep/goat, pig, and horse bones (*cf* von den Driesch 1976; Davis 1992), whilst the typology for the congenital variation of third molar hypoconulids in cattle followed David Orton (2007).

Spatial analysis

Geographical Information System (GIS) applications were extensively used, in combination with the project database. These used ArcMap, a commercial GIS, and Quantum GIS (QGIS), an open-source GIS package, as a way of considering the spatial distribution of specific artefacts and ecofacts, particularly at Cass ny Hawin II (*Ch 2*) and within the later Bronze Age settlement at Taxiway Alpha East (*Ch 6*). Full details relating to this spatial analysis, including digital text and shape files, are contained in the project archive (*p 31*).

The worked stone from Cass ny Hawin II produced the most complex dataset subjected to spatial analysis (*Ch 2, p 59*). This comprised almost 14,500 items that had been surveyed three-dimensionally during excavation (*p 16*), and an additional 7500 items recovered during sieving, as part of a programme of post-excavation sample processing (*p 23*). Therefore, to enable the sieved material to be compared with, and incorporated into, the lithics retrieved on site, a three-dimensional location had to be calculated and assigned. This procedure involved randomly creating point data for each sieved lithic, which could then be randomly joined to an entry within the sieved-lithics table. As the Mesolithic site was excavated in grid-squares, the extent of each square was used as a boundary to create the random points, the number of points generated reflecting the number of sieved lithics found within that specific square. A height was then calculated, based upon the average known height of material recovered from the same grid square and excavated spit, and three-dimensionally recorded during excavation.

In order to produce a spatial map of the charcoal from the Cass ny Hawin II house, the quantification data (scales of abundance) needed to be converted into a format compatible with the GIS. This was initially achieved by producing an 'estimated minimum count' of all the quantification data from each of the spits from the same stratigraphic unit, and from a given grid square (*cf* Druce *et al* forthcoming).

As part of the spatial analysis of Cass ny Hawin II and the Taxiway Alpha East later Bronze Age settlement, spatial queries were initially created in QGIS by filtering out specific information held within the main shapefiles for each site. This was undertaken in the Query Builder application and the results of each specific query were saved as individual shapefiles in the QGIS project files; all the shapefiles created and used in the spatial analysis are available in the project archive.

The results of the queries were then analysed spatially in QGIS and ArcMap. The queries were constructed at varying levels of detail, depending on the questions being asked of the data. The shapefiles created during the spatial analysis of the lithics at Cass ny Hawin II were also enhanced through the use of the Kriging method. This geostatistical procedure allowed for the generation of interpolated values of selected classes of lithics across the site, based on the known lithic dataset (*cf* Burrough 1986). More specifically, during the spatial analysis, the surrounding data points within a 2 m-search sphere (with a standard deviation between 2 and 5) were used to calculate the estimated lithic concentrations for each grid location. The resulting data have been presented as a series of shaded contour plots, which enable areas of high and low lithic values to be discerned.

Importantly, spatial analysis also allowed for the identification of specific lithic entities. These comprised particular classes of worked stone, which appeared to be associated with certain features, or which clustered in specific parts of the house. The lithic entities were designed to aid the description and interpretation of the worked-stone assemblage. Once these entities had been defined, additional spatial analysis then allowed for the identification of specific activity areas.

Scientific dating

An extensive programme of radiocarbon and archaeomagnetic dating was undertaken during the project. In total, 24 samples were subjected to archaeomagnetic dating (Pl 9), whilst 44 samples were submitted for radiocarbon dating.

The samples for archaeomagnetic dating were derived from two hearths and a burnt layer, forming elements of the Bronze Age settlement at Taxiway Alpha East



Plate 9: Taking archaeomagnetic samples from a hearth at Taxiway Alpha East

(*Ch 6*). These were submitted to archaeomagnetic-dating specialists based at the University of Bradford. Their purpose was to measure the characteristic remanence, if it still existed, which could relate to the last heating event and thus provide a date, and also an additional reference point for a sparse period of the archaeomagnetic calibration curve if any radiocarbon dates were subsequently produced. Full details of the methodologies employed are lodged in the project archive (Harris and Batt 2016). In summary, the analysis comprised an initial consideration of magnetic directions obtained from the sampled areas. This was followed by a pilot demagnetisation study, focused on four samples, which were progressively demagnetised in an alternating magnetic field (AF). Significantly, the directions obtained from the pilot study demonstrated that the stable directions could be isolated in the higher ranges of AF demagnetisation. The uncorrected mean directions were subsequently corrected for variations in the magnetic field at the time of sampling, and the results were then calibrated using the Global geomagnetic field model for the Holocene (Pavón-Carrasco *et al* 2014), using a specifically designed computer program (Pavón-Carrasco *et al* 2011).

In contrast, the radiocarbon samples were derived from a wider spread of contexts, particularly Mesolithic features from Cass ny Hawin II and III (*Chs 2* and *4*), Iron Age features from the Control Tower (*Ch 8*), and Neolithic, Bronze Age, Iron Age, and medieval features from Taxiway Alpha East (*Chs 5*, *6*, and *8*). All material submitted for dating, in line with the recommendations set out by Patrick Ashmore (1999), comprised single-entity samples from sealed deposits. Moreover, single-entity charred plant remains, such as fruits or seeds, were prioritised, given that these represent a single year at age of death; however, in the absence of any macrofossils, or if the selection criteria necessitated it (*ie* unclear taphonomy of macrofossils), then charcoal or wood was selected. This comprised either diffuse porous taxa (*ie* short-lived wood, such as alder/hazel (*Alnus glutinosa*/*Corylus avellana*) or blackthorn-type (*Prunus* sp)), or small roundwood items (or ideally both). In all cases, the species/type of wood was identified. All samples were assayed using the accelerator mass spectrometry (AMS) technique. Of these, 42 samples were dated at the Scottish Universities Environmental Research Centre (SUERC), where they were assigned a 'SUERC-' laboratory code, whilst the remaining two were dated at the Oxford Radiocarbon Accelerator Unit (ORAU), and these were assigned an 'OxA-' laboratory code. Full details of methods and procedures used at SUERC are set out by Elaine Dunbar *et al* (2016), whilst those used by ORAU are presented on their website (ORAU 2022).

Within this volume, uncalibrated radiocarbon measurements are given as BP dates with an error factor, for example, 1700±35 BP. Unless otherwise specified, calibrated dates have been quoted to 2 σ (95.4%) accuracy and rounded outwards to five years where the error measurement is less than ±25 BP, and to ten years when it is greater than this (*cf* Mook 1986). Most of the results (43 samples) were calibrated using IntCal13 (Reimer *et al* 2013) and OxCal v4.3 (Bronk Ramsey 1995; 1998; 2001; 2009), and the date ranges have been calculated using the maximum intercept method (Stuiver and Reimer 1986). In contrast, one of the dates (SUERC-79961) was calibrated using a mix of the IntCal13 and Marine13 calibration curves (Reimer *et al* 2013), given that it dated the bone from a seabird (a cormorant). This bone had a $\delta^{13}C$ value of -12.8‰, which gives a 96% marine contribution (±10%). A regional marine offset (ΔR) of 0±50 years was therefore used in the calibration.

Following radiocarbon dating and stratigraphic analysis, statistical testing and chronological modelling was employed, as a way of producing a more robust project chronology. The statistical testing was undertaken to establish the consistency of the dates and employed the non-Bayesian chi-square test (*cf* Ward and Wilson 1978), which can be used to determine whether duplicate dates are of the same age. Within the test, the level of significance was set at 0.05 (T'(5%), with *v* representing the degree of freedom), and dates are considered statistically consistent when the T value (T') is lower than the critical value (T'(5%)). This test was performed using the Combine function in OxCal v4.3.2, which merges the radiocarbon dates following calibration and provides an agreement index (A_{comb}). Within this index, good agreement between the combined dates is indicated by an A_{comb} value that is greater than the An value.

In contrast, the modelling adopted a Bayesian approach (*cf* Buck *et al* 1996), which was performed using OxCal v4.3.2 using *a priori* archaeological information (Bronk Ramsey 2009). In many cases, it is, therefore, the radiocarbon date-ranges produced by calibration and modelling (posterior-density estimates) that are quoted in this volume, and these, along with their respective lab code, have been italicised, for example, *1200-1000 cal BC* (*SUERC-12345*). On the figures, these are displayed as probability distributions, recording the relative probability that a date occurred at a particular time. For each date, two distributions are plotted, which can be read with reference to the dating scale that is graduated along the X axis (Fig 13). The plot in outline is the simple calibrated radiocarbon date (the standardised likelihood for the model), and the solid plot is the posterior-density estimate that results from a chronological model.

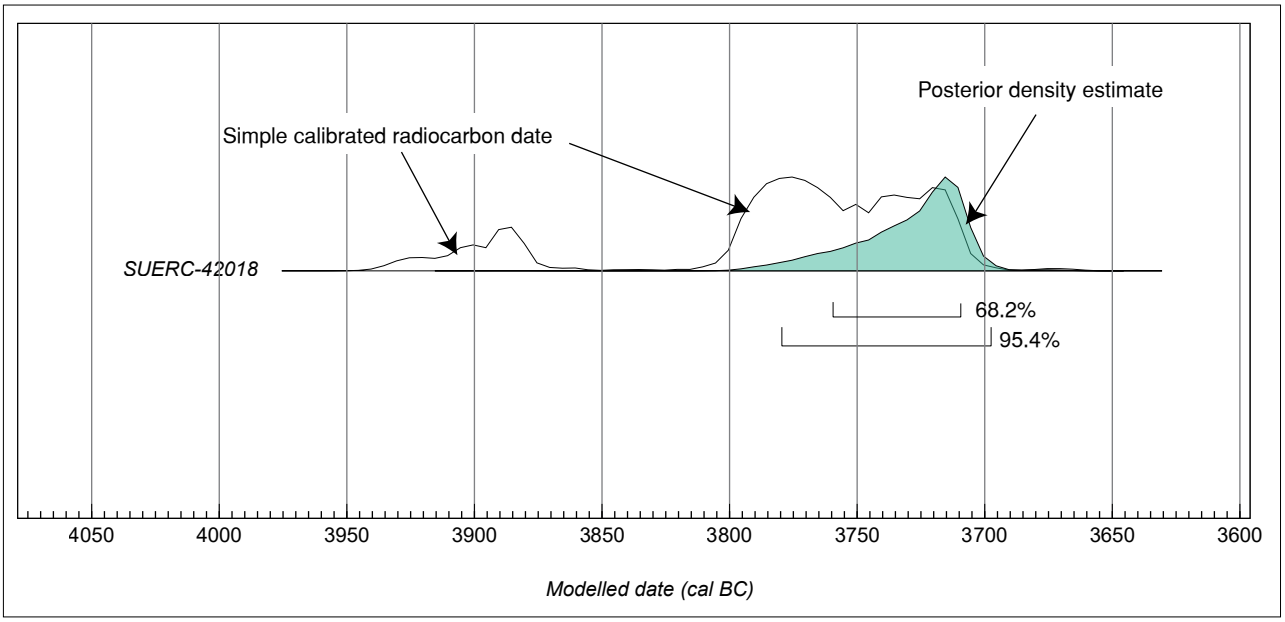


Figure 13: A probability distribution, showing the simple calibrated radiocarbon date and the posterior-density estimate

When radiocarbon measurements have been entered into the models as calibrated dates, they are prefixed with 'R_Date'. If prefixed by 'Prior', then this means that the date has been imported into the model from an earlier calculation (*eg* if it is a product of a previously formulated Oxcal model). Dates that are suffixed with a '?' have been included in the model as Oxcal 'Outliers', and, as such, are not active in it and do not affect the modelled results.

The chronological models have all been organised using 'Sequences' and 'Phases' in Oxcal. These are used to group and order sets of dates and are specified using the terms 'Sequence' or 'Phase' in the figures. A 'Phase' is a group of items for which there is no information about the relative ages, but all share some relationships with items outside their group (*eg* four postholes forming a four-post structure, which all cut the natural geology and are all sealed by topsoil). A 'Sequence', on the other hand, is a group of events which are known to follow one after another with no possibility of overlap (for instance, where a demolished structure has been sealed by a layer of gravel onto which another structure has been built).

When chronological sub-phases or phases (which have been defined as a 'Phase' or 'Sequence' in the coding of the Oxcal model) are quoted in the text, they have been italicised and placed in quotation marks, for example, '*EIA Activity*'. The models are displayed in the figures with the oldest events/phases at the top and the youngest at the bottom. This structure is informed by prior archaeological information, derived from an understanding of the site. The brackets on the left-hand side of the models record the relationship between sequences and phases. The vertical ordering of these reflect their relative age, and the nesting reflects the association of dates or phases into groups. The 'First' and 'Last' date of a phase is displayed as a probability distribution in the figures. Similarly, the dates for the start and end of the activity represented by a sequence are expressed as a probability distribution for the boundaries that bracket the sequence.

Historical research

Historical research was undertaken as part of the analysis. This involved examining primary and secondary sources, particularly the available historical mapping, which dates from the eighteenth and nineteenth centuries. It was primarily undertaken to provide pertinent background information for the archaeology of the medieval and post-medieval periods (*Ch 9*).

Site Chronology

A detailed programme of chronological analysis has been undertaken over the course of the RESA project, which has involved combining the various strands of evidence into a robust and coherent chronological framework, with which to structure the archaeological narrative. The framework has been constructed using historical and cartographical information; stratigraphical information, derived from the inter-relationships between features and deposits; typological information, provided by several different artefact types; palaeoenvironmental information; and chronometric data, provided by radiocarbon dating, archaeomagnetic dating, and Bayesian modelling. It also incorporates the radiocarbon dates that have been obtained previously from other excavated structures at Ronaldsway Airport (*ie* the

Ronaldsway House and dates from the Bronze Age pottery from the Ronaldsway Village; *p 8*). The model orders the chronological interpretation of this site into a series of successive phases that align with recognised archaeological periods (Fig 14).

Significantly, the chronological model for the RESA project demonstrates that the landscape now occupied by Ronaldsway Airport has a very rich time depth. Indeed, it was seemingly occupied and utilised by some of the earliest human settlers on Man. The model indicates that the earliest evidence for activity (Mesolithic Phase I) at the airport dates to the later centuries of the ninth millennium cal BC. This was followed by a second phase of Mesolithic activity (Mesolithic Phase II), dating to the middle centuries of the eighth millennium cal BC. Direct archaeological evidence for activity for the remainder of the Mesolithic period is absent, and it was not until the mid-fourth millennium cal BC that activity (Neolithic Phase I) reappeared, which was a product of the island's earliest farming communities. Based on the radiocarbon dates from the Ronaldsway House (*Ch 10*, *p 332*), a later phase of Neolithic activity (Neolithic Phase II) is also discernible.

The next phase of activity dates to the Early Bronze Age (Bronze Age Phase I) which, as such, falls at the very end of the third millennium cal BC, or the earlier centuries of the second millennium cal BC. This was followed by the establishment of a Bronze Age settlement (Bronze Age Phase II), which dates to *c* 1200-800 cal BC, and thus was occupied in the latter part of the Middle Bronze Age (traditionally dated to 1500-1100 cal BC; *cf* Bradley 2007, 183, table 4.1), and the Late Bronze Age (1000-800 cal BC; *ibid*). The project also revealed evidence for Iron Age activity. Some of this dates to the earlier Iron Age (Iron Age Phase 1), comprising burials and domestic structures, whilst evidence for later Iron Age (Iron Age Phases II and III) activity was also identified, in the form of a human burial dating to either the first century cal BC or first century cal AD, and an oven, which dates to the very end of the Manx Iron Age (*ie c* AD 500; *cf* Freke 1990). The early excavations at the Ronaldsway Village (*p 8*) produced evidence for medieval activity (Medieval Phase), whilst post-medieval activity (Post-medieval Phase) includes many of the boundaries and field systems depicted on historical mapping, some of which were exposed during the excavations, along with other small-scale agricultural features, which again were recorded as part of the archaeological component of the RESA Project.

Structure of the Volume

In line with the chronological model (*above*), the volume has been split into a series of period-based chapters. Hence, *Chapter 2* begins with a discussion of the background to the Mesolithic period and then describes the Mesolithic house at Cass ny Hawin II (Mesolithic Phase I), and the spatial distributions of the associated artefacts and environmental remains. The detailed characteristics of the extensive collection of stone tools and environmental remains associated with Cass ny Hawin II are, however, described in more detail in *Chapter 3*. The evidence for later Mesolithic activity (Mesolithic Phase II) at Cass ny Hawin III and other, undated, Mesolithic lithic scatters are outlined in *Chapter 4*. This chapter ends with a brief discussion of the development of Mesolithic lithic industries on the island.

The background for the Neolithic and Early Bronze Age on Man are presented in *Chapter 5*, followed by a consideration of the activity dating to these periods at Ronaldsway Airport. This chapter therefore details those remains identified as Neolithic (Neolithic Phase 1) and Early Bronze Age (Bronze Age Phase I) structures from Taxiway Alpha East, complementing those discovered by earlier excavations, including the Ronaldsway House (Neolithic Phase II).

The significant remains from Taxiway Alpha East associated with a later Bronze Age settlement (Bronze Age Phase II) are summarised in *Chapter 6*, which is preceded by a discussion outlining the general character of this period. The finds and environmental evidence from the settlement are outlined in *Chapter 7*, which includes details of the assemblages of ceramics, animal bone, and plant remains, and the small number of other artefacts analysed in detail. *Chapter 8* then describes the Iron Age burials (Iron Age Phases I and II) at the site of the by then abandoned Bronze Age settlement at Taxiway Alpha East, along with roundhouses from the Control Tower (Iron Age Phase I) and an oven (Iron Age Phase II) also present at the site of the former Bronze Age settlement.

Chapter 9 presents evidence for the medieval (Medieval Phase) and post-medieval (Post-medieval Phase) landscapes of Ronaldsway. This is derived from earlier excavations at the airport (*p 8*), features excavated during the RESA project, some of which can be identified on historical maps, and palaeoenvironmental and documentary evidence.

Chapters 10 and *11* bring together the significance of the sites identified at Ronaldsway. They set the evidence in a regional context, and incorporate a broader discussion of how Man's location in the Irish Sea can be understood to have influenced the patterning identified in the archaeological record of Ronaldsway and its surroundings. Finally, an appendix also forms part of this volume (*Appendix 1*), which details the petrographic analysis of the Bronze Age pottery from Taxiway Alpha East.

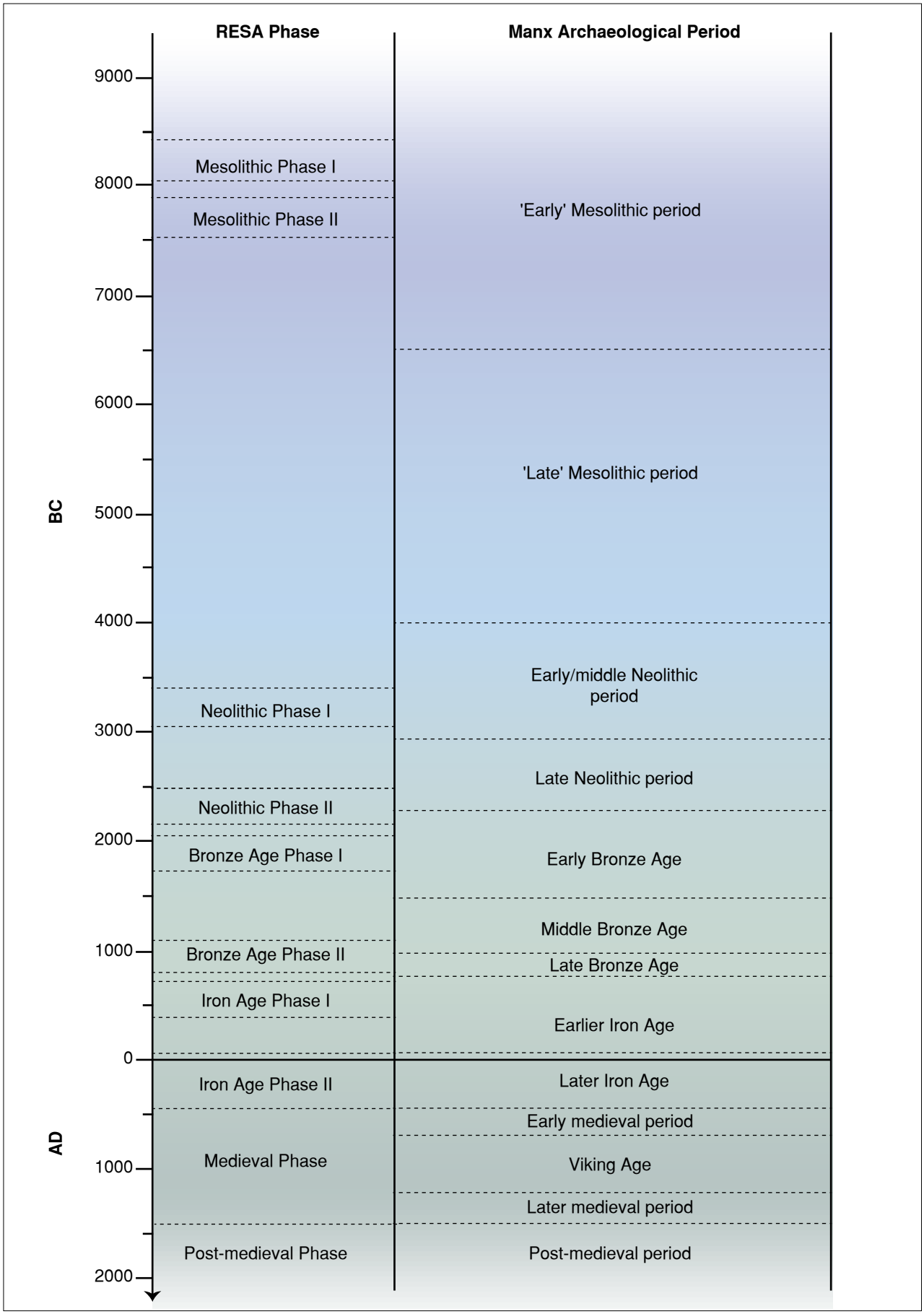


Figure 14: Site chronology

Archive

The project archive, containing all the data generated by OA's investigations, was collated and indexed in accordance with accepted professional guidelines (Walker 1990; Brown 2011; Historic England 2015; CIfA 2020). A digital archive has also been prepared, as recommended by the Archaeology Data Service/Digital Antiquity's (2011) *Guides to Good Practice*. The archive, including all the artefacts found during the course of the project, has been deposited with the Manx Museum, Douglas (accession no 2008-0236), which meets the Museums and Galleries Commission's (MGC) criteria for the long-term storage of archaeological material (MGC 1992).

2

MAN'S FIRST SETTLERS: THE MESOLITHIC BACKGROUND AND THE CASS NY HAWIN II HOUSE

Fraser Brown, Richard A Gregory, Antony Dickson, and Denise Druce

The Mesolithic Period on Man

The peoples that lived in British Isles and Ireland during the Mesolithic period were hunter-gatherers, procuring what they needed from the environment, rather than producing it by farming (Bird-David 1992, 40). As such, they were the last exponents of a way of life that had until that point stretched back throughout the entirety of the existence of *Homo sapiens* and their predecessors. Because of their lifestyle, hunter-gatherers rarely generate surpluses, usually having cause to move from place to place to facilitate procurement, and thus seldom have many possessions, being organised into small-scale groups, which cooperate and share to subsist. There are, however, some problems with the term 'hunter-gatherer' or, alternatively, 'forager', because of the economic and social evolutionary connotations they can carry (Pluciennik 2014; Jordan and Cummings 2014; Warren 2022). Furthermore, their blanket use can risk obscuring the potentially very diverse ways of life that existed between such groups, which may have differed through time (historical particularity), and were probably also dependent on space, such as the physical surroundings (environment, landscape, ecology, *etc*) that these groups inhabited. The fact is, though, presently researchers cannot agree on better replacement terms (*cf* Lavi and Friesem 2019).

Despite the likely variety, over time and space, which would have distinguished Mesolithic societies in the British Isles and Ireland in terms of their character and, possibly, complexity (*sensu* Layton and Rowley-Conwy 2013), as far as is archaeologically visible, and despite evident diversity, they also seemingly shared much in common. Due to reasons of preservation, this is best exemplified by the lithic technologies that such groups employed. The degree of commonality that exists between more recent hunter-gatherer groups, which, materially speaking, also seems to extend to prehistoric hunter-gatherer societies, means that ethnography, if used carefully, can also greatly inform archaeological understanding, by suggesting models and providing ways of filling in some of the gaps in the evidence (*eg* Jordan 2003).

The creation of an island

On the Isle of Man, Mesolithic communities were undoubtedly present at some point following the end of the last Ice Age (*c* 9700 cal BC, at the start of the Holocene epoch; Carlson 2013; Conneller 2022, 36) until the time when farming was first adopted on the island, in the Neolithic period, around 4000 cal BC (*Ch 5, p 145*). At the beginning of the Holocene, it is probable that Man was not yet truly an island, still being connected by land bridges to Cumbria (Innes *et al* 2006; Chiverrell *et al* 2023). In broad terms, this was followed by a period of sea-level rise, reaching a high point in the mid-Holocene (*c* 5000 cal BC), after which sea levels gradually fell, eventually attaining present-day levels (Innes *et al* 2006). The precise date that Man was isolated from the mainland is, however, uncertain, as the sea-level and bathymetric models are complex and, at times, contradictory (Lambeck 1996; Shennan *et al* 2002; Fitch and Gaffney 2011; Sturt *et al* 2013). However, modelling is now suggesting that Man may have lost *c* 20% of its area during the latter half of the ninth millennium cal BC, which implies that any groups colonising or travelling to the island during this and later periods would probably have arrived by sea (Sturt *et al* 2013). Assuming that this was the case, initially during the later ninth- and early eighth millennia cal BC, the maritime distances to the shores of north-western England, south-western Scotland, and northern Wales would probably still have been much less than they are today, and Man would have been visible on their horizons. Treacherous though these waters, and sandy shorelines, undoubtedly were, they do not need to have acted as impediments to colonisation by Mesolithic groups, once they had developed the knowledge and an appropriate maritime technology to enable this. By way of comparison, researchers in Norway have demonstrated that pioneering groups there had the capability, by *c* 8600 cal BC or earlier,

to colonise coastal and island locations extensively, when the latter could only have been reached by boat (*cf* Bjerk 1995; 2009).

Flora and fauna

The landscape that greeted the first Mesolithic colonisers, and their descendants, would have been quite different from that which exists today, particularly in terms of the vegetation covering the emerging island. Details relating to the developing character of the Holocene vegetation can be ascertained, to some extent, from the palaeoenvironmental data collected from the 1970s onwards. These are derived from a series of radiocarbon-dated pollen cores, most from the Northern Plain (*Ch 1, p 1*). This information has been summarised, allowing a broad picture of the island's early and mid-Holocene vegetation history to be reconstructed, indicating that initially grassland environments, typical of the preceding late Glacial period, persisted until the late tenth/early ninth millennium cal BC, interspersed with some juniper (*Juniperus*), birch (*Betula*) and willow (*Salix*) scrub (Chiverrell *et al* 2006a; 2023). Hazel (*Corylus*) then became established in the Northern Uplands and Northern Plain around or before 8250-7650 cal BC; however, its spread was diachronous, being dependent on local environmental conditions (Chiverrell 2023). The appearance of hazel seems broadly to correspond to the period when Man perhaps became separated from the mainland (*p 33*), and the first hazel trees would therefore have been propagated from hazelnuts that reached the newly formed island by natural processes, such as water or animals, or conceivably could even have been introduced by Mesolithic people (*cf* Smith 1970; Rackham 1980; Birks 1989; Simmons 1996). In whatever manner hazel reached the island, once established, it then formed an important resource for the Mesolithic inhabitants, as evidenced by Peter Woodman's (1987) discovery of concentrations of hazelnuts during the excavation of the Mesolithic structure at Cass ny Hawin I (*p 36*; *Ch 1, p 12*).

Oak (*Quercus*) and elm (*Ulmus*) were the next arboreal species to reach the island, becoming prevalent in the pollen record during the second half of the eighth millennium cal BC, and along with hazel, would have created expanses of deciduous woodland (Chiverrell 2023). Once oak and elm had become fully established, pine (*Pinus*) then became a component of the island's woodland, which became established in certain parts of the Northern Plain and Northern Uplands (*Ch 1, p 1*) between *c* 6500 and 5500 cal BC (*ibid*). At the close of the seventh or start of the sixth millennium cal BC, alder (*Alnus*) also appeared and, in some areas, became a dominant woodland species. Indeed, it has been noted that the sharp rise in alder during this period is one of the most significant features of Manx vegetation history (*ibid*). Interestingly, lime (*Tilia*) appears to have been absent during the mid-Holocene, as do other minor tree species, such as ash (*Fraxinus*), maple (*Acer*), yew (*Taxus*), and beech (*Fagus*), which have been recorded only in late Holocene pollen assemblages (Chiverrell *et al* 2006a, 322).

It is also worth noting that the pollen data suggest that the Mesolithic groups on Man may, at certain times, have been actively modifying the primeval woodland, by creating small clearances. The firmest evidence for this comes from Ballachrink, on the Northern Plain (Fig 15), where a pollen core recorded woodland disturbance during the early part of the sixth millennium cal BC, associated with micro-charcoal, suggesting that small areas of woodland were perhaps cleared through deliberate burning (*op cit*, 323). Such evidence from mainland Britain is often viewed as a form of forest husbandry, relating to Mesolithic hunting and foraging strategies, designed to encourage the natural growth of particular plants and/or attract browsing animals to discrete locales, which could then be caught more easily (Simmons 1996, 214; Innes and Blackford 2003; Bishop *et al* 2015). That said, it does seem that the island probably did not possess any large browsing animals (*below*), and so foraging, or even coppicing, may have been the reasons behind any intentional small-scale Mesolithic clearances. In addition, a second, more extensive, phase of woodland disturbance was also identified at Ballachrink, dating to the early fifth millennium cal BC, which curiously was associated with cereal-type pollen (Innes *et al* 2003; Chiverrell *et al* 2006a, 323); however, given the presumed late Mesolithic date of this, they could well have derived from wild grasses (*cf* Andersen 1979), rather than reflecting early experiments in farming, or might even indicate erroneous radiocarbon dates (*cf* Bayliss *et al* 2011b, 560).

The actual fauna that existed on Man throughout the Mesolithic period would have been varied, but the increasingly insular character meant that the range of terrestrial species was more restricted than on the British mainland, being somewhat comparable to the faunal situation in Ireland (McCartan 2003; Tomlinson and Pooley 2006). The actual record of species in this period is scant, though it does appear that many, if not all, of those commonly found in Britain and Ireland immediately prior to the Holocene, during the late Glacial period, had become extinct by the early Holocene. These included the giant deer, or Irish elk (*Megaloceros giganteus*), which, based on radiocarbon dating of numerous specimens on the island, was probably extinct by *c* 10,000 cal BC (Chiverrell *et al* 2006b, 266). The same was probably true of many of the other



Figure 15: Mesolithic palaeoenvironmental sites mentioned in the text

late Glacial ungulates (reindeer, aurochs, saiga, and elk). Similarly, it is also quite likely that, as in Ireland, red deer became extinct in the late Glacial period, and were only reintroduced to Man during the later Holocene, following the establishment of farming, which is in stark contrast to mainland Britain (Tomlinson and Pooley 2006).

In the absence of deer and other ungulates, wild boar may have roamed the island, and could therefore have formed an important focus of Mesolithic hunting, with some slight support for this being provided by a pig-species (*Sus* sp) tusk recovered from a Mesolithic shell midden at Port St Mary (Fig 15), though this is undated and could ultimately derive from a much later domesticated pig (*ibid*). Grey seals were probably also present during the early and mid-Holocene and, again as a result of the absence of deer, and possibly wild pig, may have formed the principal species that was hunted by coastal Mesolithic communities, for both meat and skins (McCartan 2003). Indeed, if this were the case, these would probably have formed an

important seasonal resource, with both adult grey seals and pups, being 'most likely killed in the autumn when they hauled themselves onto rocks to calve' (Conneller 2022, 374). Other coastal resources would also have been available for exploitation, such as shellfish, as evidenced by the midden at Port St Mary, and sea birds. Presumably, fishing would have formed another mainstay of the economy, with a range of different species being present in both coastal and inland waters, including migratory species, such as Atlantic salmon and European eel, and freshwater species, such as brown trout (Tomlinson and Pooley 2006).

Archaeological evidence

Lithic industries on Man

It is apparent that, as in other parts of the British Isles and Ireland, the principal indicator for Mesolithic activity on Man consists of lithic tools, the majority of which have been collected from the surface during fieldwalking; the evidence for this has been progressively reassessed and summarised through the 1990s and early 2000s (McCartan 1990; 1999; 2003; 2004). Unsurprisingly, these have formed the focus for several typological studies, with the first scheme being set out in the 1930s (Clark 1935), and later developed (Woodman 1978a; 1987). In essence, a typological division of the Manx lithics into two broad groups resulted.

The first consisted of a Mesolithic technology largely defined by narrow-blade microliths, these blades being removed from stone (usually flint or chert) cores largely through indirect percussion, using a hammer and punch (Waddell 1998, 14-16). These were then fashioned into several distinctive types of microlith, which could themselves be incorporated into a composite tool or weapon. Microburins form another component of these assemblages, though these, rather than forming a tool, represent a waste product from the manufacture of microliths (Conneller 2022, 26). In addition, several other larger stone-tool types often feature within these narrow-blade assemblages, including burins, scrapers, retouched blades/flakes, and knives. The Manx narrow-blade assemblages were initially viewed by Grahame Clark (1934; 1935) as part of the 'Tardenoisian' industry, and later consideration by Peter Woodman (1978a; 1978b; 2012) suggested that they had strong affinities with lithic traditions in Ireland, associated with the Irish Early (or Earlier) Mesolithic. Hence, these narrow-blade assemblages, which contain significant numbers of microblades/bladelets, with widths of 8 mm or less (*cf* Ballin 2017), are similarly classified as 'Early Mesolithic' in date (McCartan 2004), Distributionally, Early Mesolithic lithic assemblages and findspots have been recorded in three parts of the island: the Plain of Malew; the Western Coastal Plain; and the Northern Plain, and include important assemblages from Port St Mary and Glen Wyllin (Fig 16; Swinnerton 1889; 1892; Woodman 1978a; *Ch 3, p 84*).

Conversely, the second broad typological group has been considered a later Mesolithic industry, which has clear affinities with Irish Late Mesolithic lithic assemblages, being associated with items such as butt-trimmed flakes and tanged points, created through direct percussion, often being struck from bulky cores (Woodman 1978a). Significantly, in terms of the British Isles and Europe, these seem to represent a unique stone-working tradition (Waddell 1998, 16; Woodman 2012; 2015, 127-35), and was classified by Clark (1935) as the 'Bann River Culture', after the river in Northern Ireland, though it was later renamed the 'Heavy-Bladed Industry' by Woodman (1978a). Compared with the earlier group, this later lithic group has a wider distribution across Man, with find spots being more widely scattered across the Plain of Malew, the Northern Plain, and along the western and southern coast. Late Mesolithic lithic sites have also been recorded within the Eastern Coastal Plateau, which is to date completely devoid of any lithics associated with the earlier group.

Excavated sites

Several Mesolithic lithic sites have been excavated on the island, producing radiocarbon dates relevant to the early stages of human activity and settlement. Prior to the RESA excavations, undoubtedly the most important of these lay immediately north-east of the airport, adjacent to an Iron Age/Viking-age promontory fort at Cass ny Hawin (Fig 16; *Ch 8, p 253*, *Ch 9, p 280*). At this site, lithic artefacts had been progressively collected during fieldwalking, from 1910 onwards, which were subsequently examined as part of a study of the Manx Mesolithic (Woodman 1978a). Whilst these items clearly indicated Mesolithic activity at this locale, further, more spectacular, evidence was discovered in 1981 and 1982, following the erosion of the sea cliff. This revealed the remains of a Mesolithic structure (Cass ny Hawin I) which, following an invitation from Marshall Cubbon (*Ch 1, p 11*), was excavated in its entirety (Woodman 1987). This indicated that the structure had been partially lost through erosion, with probably 50% remaining, defined by an artificial hollow, with a flat base and vertical sides, containing a *c* 0.2 m-thick layer of black soil (defined as layer 4), sealed by a deposit of silt. If indeed 50% of the hollow survived it seems likely that, originally, the structure was circular in plan, with a diameter of *c* 4 m (Fig 17).

At the base of this hollow was a hearth, presumably marking the centre of the structure, and also five shallow postholes, four of which extended around the lip of the hollow, with one next to the hearth.

The structure was associated with a sizable assemblage of worked flint, in a layer which also contained two distinct concentrations of hazelnuts (*Corylus avellana*), perhaps representing caches, and scatterings of burnt stone. Several additional features were recorded surrounding the hollow, including a possible pit (16) and posthole (15), and other 'small patches of dark charcoal-stained soil of irregular shape' (*op cit*, 5), several of which also produced flint artefacts.

At the time of excavation, Woodman was reticent about describing Cass ny Hawin I as a domestic structure (*ie* a house), and instead suggested that it may have formed either a light windbreak, surrounding the hollow, or a tent-like structure, with an angled roof covering the hollow, which was supported by the internal posts (*op cit*, 18). Indeed, a discussion of Mesolithic structures from Britain has described it as a 'shelter' (*ie* a structure not necessarily for human occupation; *cf* Mithen and Wicks 2018, 85). Its classification is, however, a moot point, and it may be better to call Cass ny Hawin I a Mesolithic 'house' (*ie* a structure providing protection for a domestic living area), or more accurately, given that it was set in a hollow, a 'pit house', though one

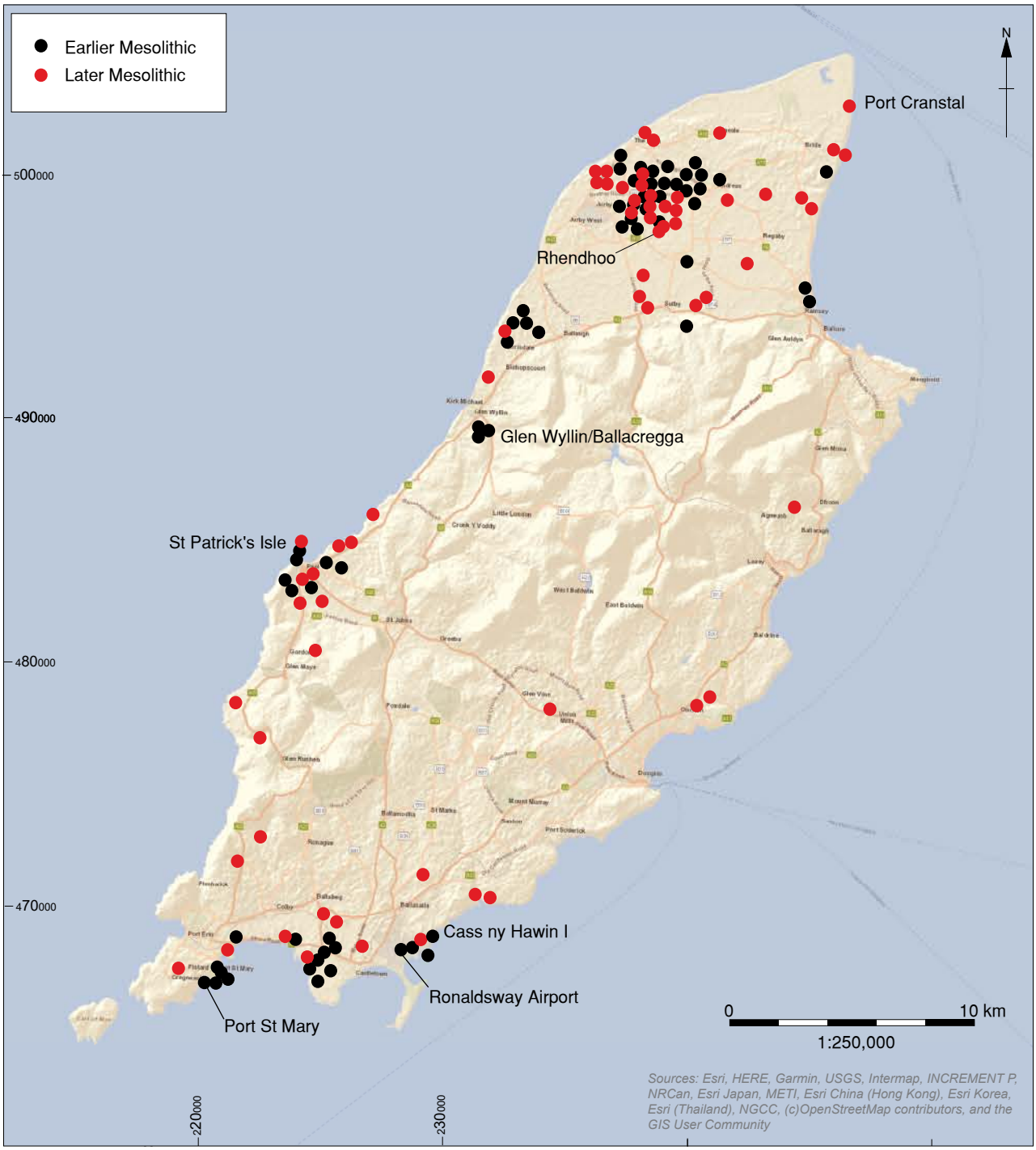


Figure 16: The distribution of Early and Late Mesolithic lithic sites on Isle of Man

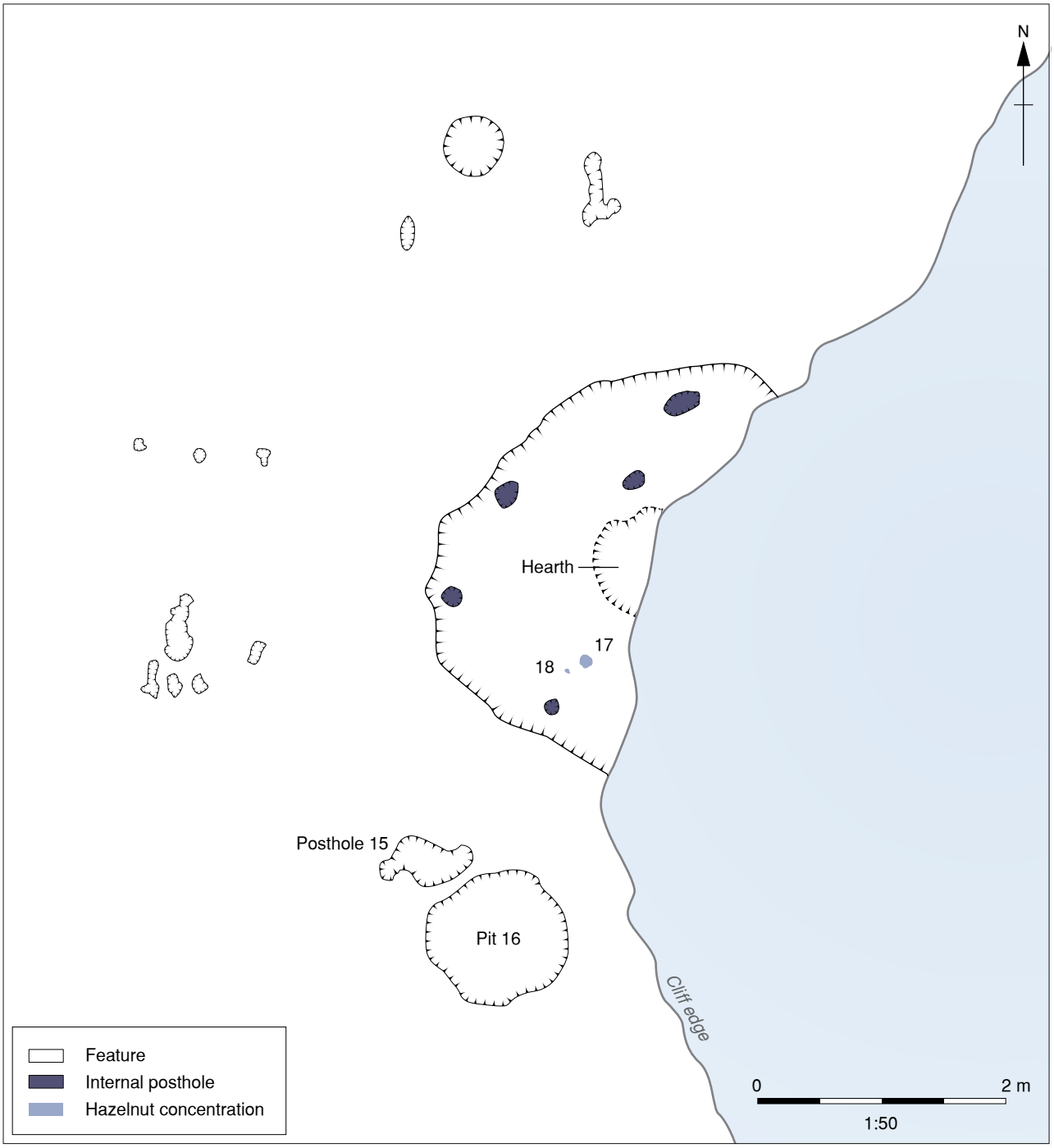


Figure 17: The Mesolithic structure and surrounding features at Cass ny Hawin I

which was possibly only (periodically?) occupied over a very short period, perhaps spanning a matter of weeks (*cf* Grøn 2003; Fretheim 2019).

Four samples of charred material were collected from the hollow and subjected to radiocarbon dating (Table 2). One (UB 2593) comprised charred material collected from several different places (Woodman 1987, 13) and so should be discounted, whilst the others came from 'smaller unique contexts' (*ibid*), associated with the upper and lower levels of the layer (*above*) within the hollow, and also from the external pit (16; *above*). Although, by modern radiocarbon standards, these bulk samples would be considered unreliable (*cf* Ashmore 1999), they do suggest that activity at the site dates to the middle centuries of the seventh millennium cal BC, indicating that, at the time of its excavation, Cass ny Hawin I represented the earliest dwelling then identified on the island.

Following excavation at Cass ny Hawin I, three other lithic sites were excavated (McCartan 2004), one at Ballacregga (Fig 16), close to the area of the Glen Wyllin assemblages (*p 36*). Trial excavation there revealed

Sample	Laboratory code	Radiocarbon age (BP)	Calibrated date range (95% confidence)
Bulk charcoal sample collected from various locations in the hollow	UB 2593	7350±95	6420-6030 cal BC
Bulk charcoal sample from pit 16	UB 2658	7640±80	6650-6370 cal BC
Bulk charcoal sample from the hollow, layer 4 (upper levels)	UB 2659	7660±100	6700-6250 cal BC
Bulk charcoal sample from the hollow, layer 4 (lower levels)	UB 2660	7695±95	6780-6370 cal BC

Table 2: Radiocarbon dates from Cass ny Hawin I

a site associated with microliths and hazelnuts, the latter being radiocarbon dated to *c* 7350-6820 cal BC (McCartan 2003, 326; Davey and Allwood 2016; Table 3), at the time the earliest scientifically dated site on the island. A site at Rhendhoo was also excavated, which produced lithics characteristic of the 'Heavy Bladed Industry' period (*p 36*). Radiocarbon dates, from two charcoal dumps associated with worked flints, spanned the late sixth and first half of the fifth millennia cal BC, whilst a date from a hearth produced a later date, suggesting activity at the end of the fifth or beginning of the fourth millennium cal BC (McCartan 1994). Finally, a Mesolithic 'working hollow', was excavated at St Patrick's Isle, Peel, which produced narrow-blade lithics, perhaps dating to the middle of the sixth millennium cal BC, with other similar assemblages being recovered from the surrounding area (*cf* Freke 2002, 45; McCartan 2003).

Another site can now be added to this list, at Port Cranstal (Fig 16). This was revealed by coastal erosion, exposing *in-situ* tree stumps and a peaty charcoal layer containing worked flint and burnt hazelnut shells (Davey and Tomlinson 2017). A sample of the hazelnut shells from this deposit was dated to 6470-6390 cal BC (7570±30 BP; Beta-405811), although an earlier phase of activity may also have been contained within this layer, as a charcoal sample produced a date spanning the first quarter of the seventh millennium cal BC, corresponding exactly to a date from one of the *in-situ* tree stumps. This earlier phase of activity may even have been associated with residual Early Mesolithic narrow-blade flints from the layer. Significantly, though, many of the other lithics from this layer were characteristic of the island's Late Mesolithic 'Heavy Bladed Industry', in that they included two bulky cores and a butt-trimmed flake; comparable artefacts were also recovered from a stratigraphically later iron pan. The excavators therefore suggested that the island's Late Mesolithic period, based on the dates from the hazelnuts, was perhaps initiated in the mid-seventh millennium cal BC, comparable to the situation in north-east Ireland, where it has been similarly suggested that the use of Late Mesolithic tool types dates from at least 6550 cal BC (*ibid*; Woodman 2015, 127).

Cass ny Hawin II

Given the presence of the highly significant, and rare, Mesolithic house/structure at Cass ny Hawin I (*p 36*), immediately next to Ronaldsway Airport, at the outset of the RESA project it seemed at least possible

Site	Sample	Laboratory code	Radiocarbon age (BP)	Calibrated date range (95% confidence)
Ballacregga	Hazelnut shells	AA-40743	8115±60	7330-6830 cal BC
	Hazelnut shells	AA-40744	8120±75	7350-6820 cal BC
Rhendhoo	Oak (*Quercus* sp) charcoal from charcoal dump	BM-2693	5790±50	4780-4520 cal BC
	Oak (*Quercus* sp) charcoal from charcoal dump	BM-2694	6110±50	5220-4910 cal BC
	Oak (*Quercus* sp) charcoal from hearth	BM-2695	5170±50	4230-3800 cal BC
Port Cranstal	Charcoal from peat layer 26	Beta-405810	7970±30	7050-6710 cal BC
	Hazelnut shells from peat layer 26	Beta-405811	7570±30	6470-6390 cal BC
	In-situ oak stump	Beta-405813	7970±30	7050-6710 cal BC

Table 3: Radiocarbon dates from Mesolithic lithic sites on the Isle of Man

that some additional evidence for Mesolithic activity might be encountered within the areas earmarked for runway development. This evidence was certainly forthcoming, though it proved to be of much greater significance than had been anticipated. A silted depression containing large quantities of worked flint and charcoal was revealed at the eastern extreme of the airport, during a watching brief for a haul road. This was perched at 12.2 m OD, approximately 50 m inland from the low cliff that defined the present-day coastline (Fig 18; Pl 10), and subsequent detailed excavation (*Ch 1, p 19*) showed this to be the footprint of a structure, in many ways comparable to that excavated at nearby Cass ny Hawin I, associated with a series of external pits and postholes on its southern side. The lithic technology was characteristic of the Mesolithic period, being of narrow-blade type (*p 36*), and the charcoal included probable charred structural remains, which suggested that the structure, or elements of it, had burnt down. Given its proximity to the nearby site excavated by Peter Woodman, it was named Cass ny Hawin II (*Ch 1, p 18*). Chronologically, the date of Cass ny Hawin II was ascertained by radiocarbon dating (*p 47*), which, in terms of the Ronaldsway Airport chronological model, places it in Mesolithic Phase I (*Ch 1, p 29*).

The sunken-feature structure

During the excavation at Cass ny Hawin II, the most prominent feature was a roughly sub-rectangular hollow (***9200***; Fig 19; Pl 11) measuring 7.3 m south-west/north-east and 5.3 m south-east/north-west, with a maximum depth of 0.3 m. This hollow seems to have been dug out, rather than representing a pre-existing natural feature, being cut through natural deposits of sandy gravel. A small ramp of undisturbed gravel also extended into it from the north-west. The hollow was excavated in quadrants (A-D), and in 59, 1 m grid-squares (A1-18; B1-12; C1-14; and D1-15; Fig 20), which enabled detailed recording of its stratigraphical and structural remains (*Ch 1, p 21*).

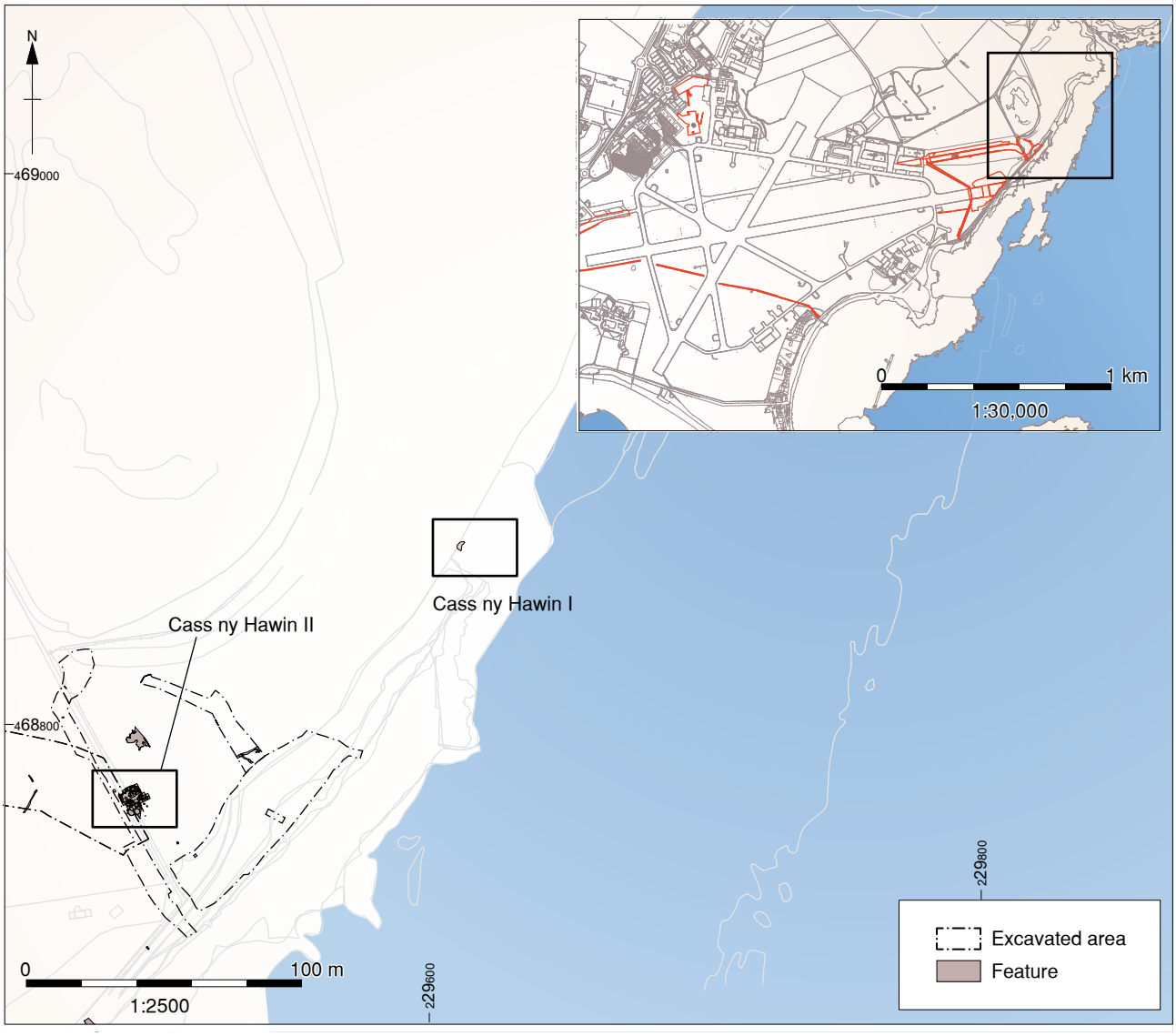


Figure 18: The relative positions of Cass ny Hawin I and II



Plate 10: Cass ny Hawin II in relation to the present-day coastline

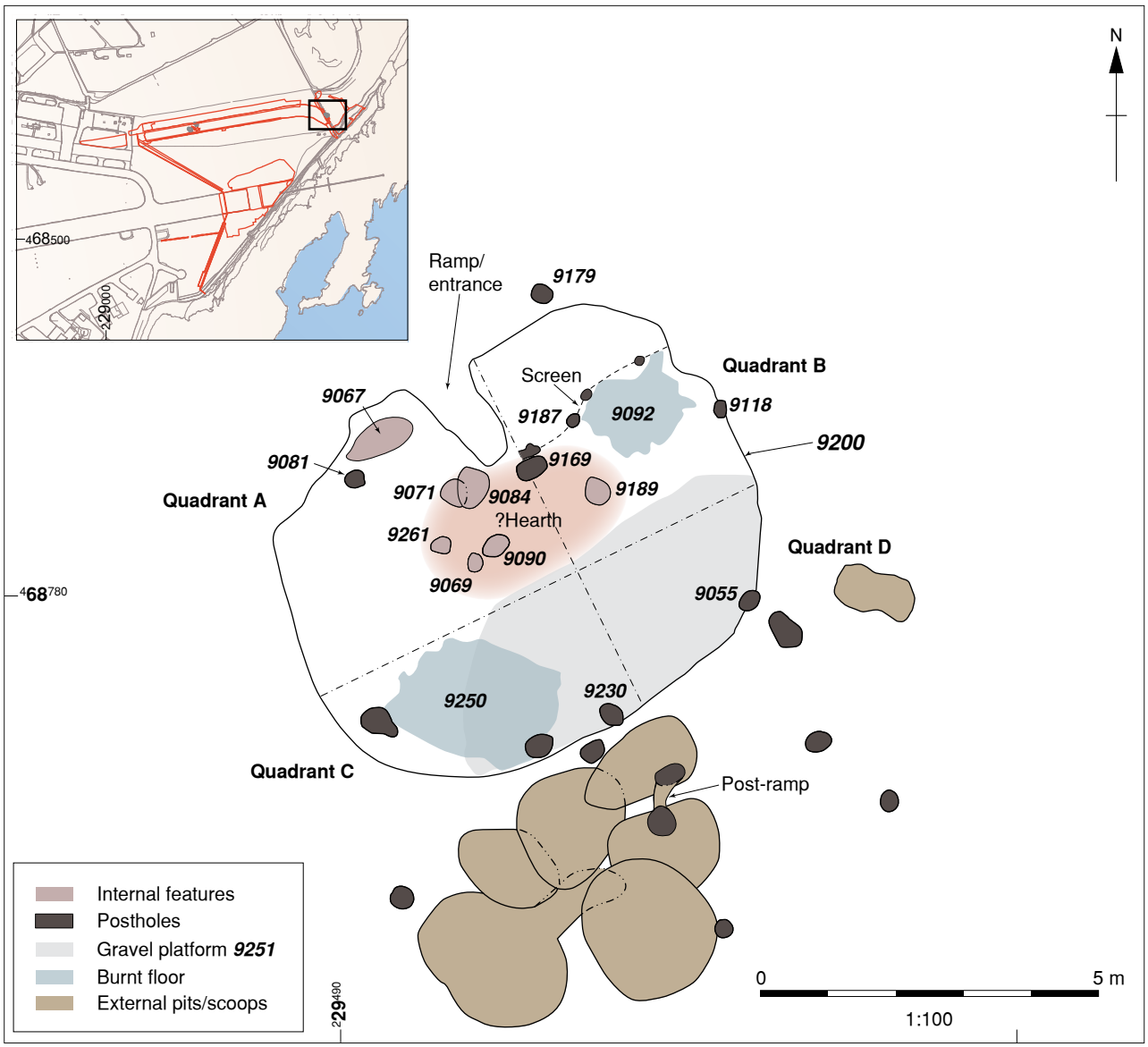


Figure 19: The Mesolithic sunken-feature structure at Cass ny Hawin II



Plate 11: Cass ny Hawin II, during excavation

A ring of seven postholes, six of them at the periphery of the hollow, yet internal to it, and a seventh (***9179***) just outside it, defined the footprint of the structure (Fig 19). The postholes were 0.23-0.3 m in diameter and 0.12-0.26 m deep, suggesting a reasonably substantial wooden frame, although these measurements probably reflect the area disturbed when bedding the frame, rather than, necessarily, corresponding to the actual diameters of the bedded poles. Although the evidence was not definitive, the inward angles of incline of some of the surviving post-pipes (in postholes ***9081***, ***9055***, and ***9118***) imply that the poles were gathered into a cone. Assuming an internal radius of 3 m and a 45° angle of incline for the poles, the structure may therefore have been around 3 m high, and would have been accessed via the gravel ramp, which created an inland-facing entrance.

It seems that after the hollow had been dug, coarse gravel was dumped back into the interior of the structure, against the wall opposing the presumed entrance, which was slightly looser in consistency and of a subtly darker hue than the undisturbed geological substrate. This allowed for the creation of a slightly raised gravel platform (***9251***; Fig 19), measuring 5.95 x 2.35 m, and up to 0.15 m thick,

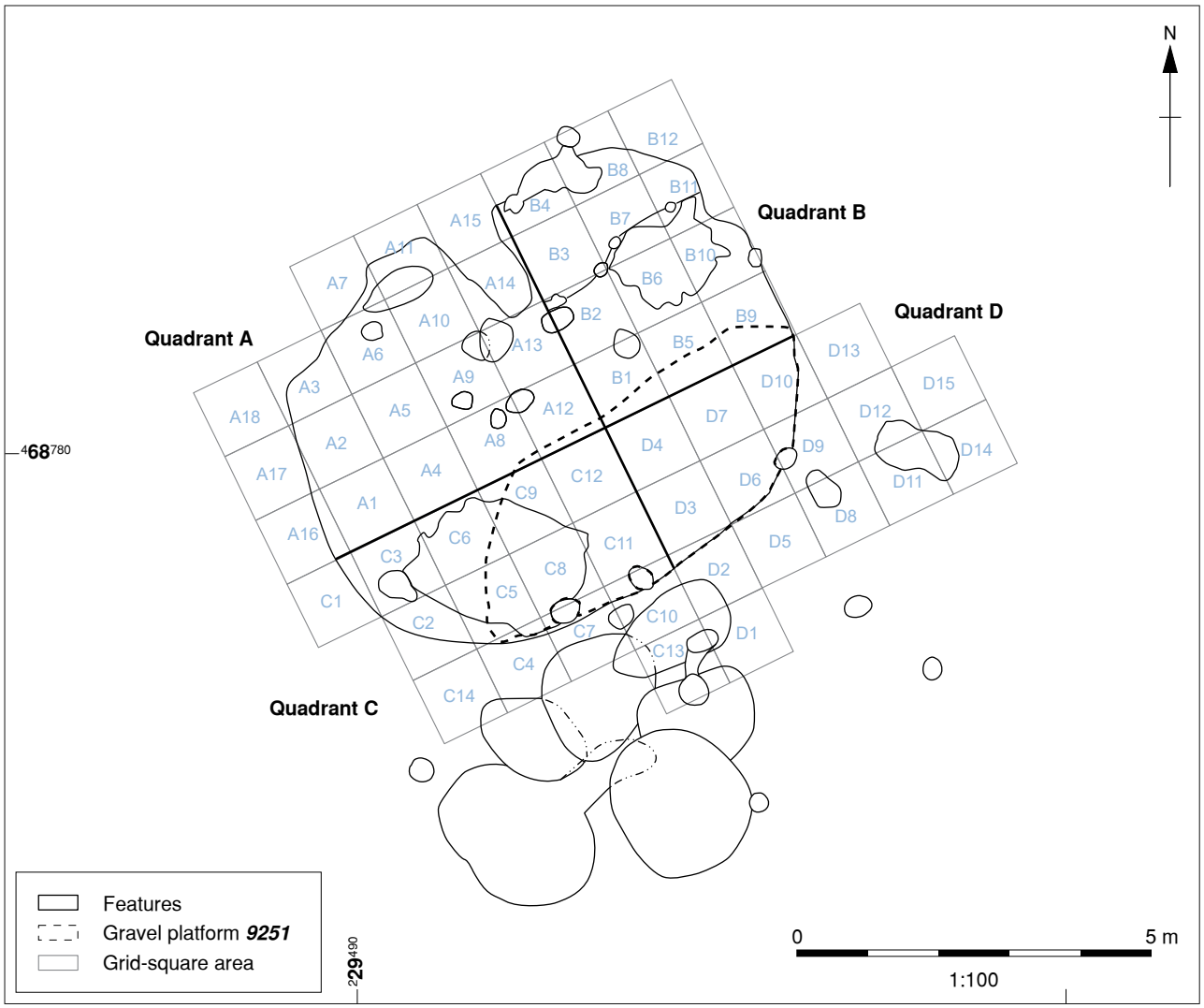


Figure 20: The excavated grid-squares at Cass ny Hawin II

which also contained small amounts of silt and charcoal within its matrix. As there were no features or discrete layers of material below the platform, it appears that this represents an internal feature, created when the structure was first built.

Several additional internal features were present to the north-west of the platform. Immediately east of the entrance, these comprised a row of four shallow postholes, which may have formed a screen defining a small compartment (Fig 19). On the opposite side of the entrance was a pit (***9067***), against the side of the structure, which had a diameter of *c* 1 m and was 0.3 m deep. Moving to the south, a group of discrete features comprised a substantial posthole (***9169***), with a diameter of *c* 0.3 m and 0.3 m deep; four shallow pits or depressions (***9069***, ***9090***, ***9071*** and ***9189***), with depths all under 0.1 m; and two discrete, *c* 0.2 m-thick, lenses of burnt material (***9261*** and ***9084***). Of these, posthole ***9169*** probably formed another element of the screen. Spatially, these features arced around an area with a diameter of *c* 1 m, just north of platform ***9251***, and based on the distribution of charcoal (*p 53*) and burnt lithics (*p 59*), this could have contained a hearth, positioned close to the centre of the structure.

In addition to platform ***9251***, the hollow also contained other deposits, including patches of brown silty gravel in its base and to the edges, probably representing the erosion of its sides and base when the structure was in use (***9253***; not illustrated). A second deposit comprised a very distinctive black silty sand (***9249***; Pl 12), forming a coherent, *c* 0.10 m-thick layer across the depression, which contained a large assemblage of lithics. This sealed the platform (***9251***), and it is highly likely that it partially formed during the use of the structure (effectively forming an occupation layer), though it also seems to relate to its final destruction, particularly as it was stratigraphically later than the other internal features in the hollow (*above*). It also produced a plethora of charred hazelnuts, other charred palaeobotanical remains, and considerable amounts of charcoal, which together suggested that, during its use, or after its abandonment, the structure had burnt down. Further confirmation for this was present in the form of deposits ***9250*** and ***9092*** (stratigraphically equivalent to ***9249***), which seemed to be the remnants of a burnt floor (Pl 13). This comprised layers of charred hazel/hawthorn-type (Maloideae) rods (*Ch 3*, *p 76*), laid in a rough lattice formation.



Plate 12: Deposit **9249**, *visible as a dark layer in the baulk, overlain by deposit* **9248**



Plate 13: Burnt in-situ *floor* **9092/9250**

The uppermost deposit filling the hollow (***9248***; Pl 12), and also sealing the floor and deposit ***9249***, was less rich in charcoal, thickened (*c* 0.15 m maximum) towards the centre of the structure, and seems to have accumulated through a natural silting process after the building had been burnt down. It did, however, also contain a fairly large assemblage of flaked lithics (*below*).

The presence of two, sequential deposits (***9249*** and ***9248***) within the hollow, both containing lithics, charred plant remains, and charcoal, might at first sight imply two separate phases of occupation. However, detailed spatial analysis of these indicated that this was not actually the case and that the material in upper deposit ***9248*** was probably residual, originally derived from deposit ***9249***, although the items did appear to be horizontally *in situ*, and hence could be related to the use of the structure.

Specifically, although the charred hazelnut fragments frequently occurred in both occupation/destruction deposit ***9249*** and the uppermost silt, ***9248*** (*p 44*), those within ***9248*** were more fragmented and dispersed. The increased fragmentation meant that there were nearly as many fragments in ***9248*** as in ***9249***, but these weighed only half as much (*Ch 3, p 71*). This in turn suggests that the hazelnuts in the uppermost silt were in fact derived from deposit ***9249***, rather than from any secondary phase of habitation. Therefore, the relative frequency/mass of hazelnut fragments (*ie* their total count/weight from a grid square) throughout these deposits probably directly relates to where hazelnut fragments were originally concentrated within the building during its use, with dense concentrations indicating areas where these foodstuffs were stored, processed, and consumed, and where the shells were discarded.

In contrast, there were more flaked lithics retrieved from uppermost silt ***9248*** than from ***9249***, which was initially confusing and counter-intuitive, suggesting the possibility that there might indeed have been a later phase of activity. Detailed scrutiny of the distribution of lithics in each spit showed, however, that most of the frequencies peaked within the spits bracketing the interface between the two deposits, suggesting that the lithics had originally been close to the occupation/destruction horizon. After the structure burnt, ash and charred material would have been leeched, eroded, and replaced with silts as they formed, leading to lithic material being included within the latter. There also seems to have been a degree of post-depositional

sorting. This was perhaps caused by earthworm action or other forms of bioturbation, with material potentially migrating slightly up the profile to become included within the sediments of the uppermost silt; this is certainly not unique, as it has also been observed at other sites (*cf* Brown *et al* 2023), and, importantly, does not necessarily lead to horizontal displacement. As such, the lithics were probably all deposited during a single phase of occupation and the apparent bias towards the uppermost deposit is misleading.

There is also a lack of stratigraphic evidence to suggest that the structure was reoccupied. For example, if it had been, surely the burnt debris would have been cleared out first. Indeed, if reoccupied, any fragile charred remains, the rods of the brushwood floor, for instance, would have been trampled and crushed beyond recognition. Additionally, some of the coarse-stone tools had clearly been heat-affected and appeared to be associated with charred elements, when any reoccupation would have disturbed this association. Furthermore, the analysis of the distributions of the flaked lithics provides no evidence for the superimposition of different phases of activity.

Of course, this does not necessarily preclude the possibility that the structure could have been occupied repeatedly prior to its final destruction; however, there was no evidence, in the form of dense concentrations of lithics beyond it, suggestive of middens, to indicate that it had ever been cleared out (*cf* Brown *et al* 2023). Indeed, quite the contrary, all the evidence points to most domestic activity (or at least any that would have produced any archaeological trace) being undertaken within the dwelling, over a short period of time.

Interpretation: a Mesolithic 'pit-house'

The structure, set within a hollow, at Cass ny Hawin II, is obviously not unique to Man, since near-identical remains were recorded at Cass ny Hawin I, some 150 m further up the coast (*p 36*). Casting the comparative net slightly wider, these remains are also not unique to northern Britain and Northern Ireland, as several other narrow-blade sites have produced comparable remains (*Ch 3, p 83*; *Ch 10, p 319*). These include similar, large hollowed-out areas containing structural remains and hearths, which almost certainly represented substantial domestic dwellings, which have been broadly classified as 'pit-houses', a term first applied to similar Mesolithic house sites in Scandinavia (*cf* Fretheim 2019; Mithen and Wicks 2018). These comparable examples provide excellent parallels for the remains at Cass ny Hawin II, and clearly indicate that it forms an element of a wider tradition of Mesolithic domestic architecture, employed by other narrow-blade users, which is characterised by the construction of large and substantial houses (*cf* Conneller 2022, 180-2).

External features

A cluster of features, many intercutting, was found immediately to the south of the Cass ny Hawin II 'pit-house', all probably being intentionally dug and then rapidly backfilled (Fig 21). They produced only very small quantities of charcoal, which might imply that they were created and backfilled before the 'pit-house' was destroyed by fire. This, in turn, suggests that they were earlier features, confirmed, in some measure, by the radiocarbon-dating evidence (*below*).

The earliest of these, ***9143***, was the most substantial, forming a large pit with a diameter of *c* 1.5 m and *c* 0.6 m deep, which also had a curious, 0.6 m-wide, gully (***9176***) extending for some 1.2 m from its north-eastern side, though this might merely represent an earlier animal burrow. Significantly, this pit contained a pecked hammerstone, perhaps used as an anvil (*Ch 3, p 81*), which seems to have been deliberately placed at its base (Pl 14), prior to its rapid backfilling with successive deposits of sand and gravel. These also contained a concentration of flaked lithics, including microliths, other retouched tools, and debitage.

After pit ***9143*** was backfilled, a sequence of shallow pits, or more accurately hollows, with depths in region of 0.1-0.2 m, were dug in roughly the same area, all containing backfilled deposits of sand and gravel, associated with small numbers of worked lithics. The earliest of these, ***9191***, measured *c* 1 x 1.5 m, and was eventually replaced by ***9208***, which had a diameter of *c* 1.8 m. Both hollows produced lithics associated with the primary stages of lithic working (debitage and cores), perhaps implying the selective deposition of lithic material. Contemporary hollows ***9194*** and ***9199*** were the next in the sequence, adjacent to each other: the more northerly (***9194***) was oval shaped, measuring 1 x 1.8 m, whilst its southern counterpart (***9199***) was circular, *c* 1.5 m in diameter. Hollow ***9194*** contained a few retouched tools, as well as cores and debitage, whilst there was a notable absence of lithics in ***9199***. Once these features had been backfilled, ***9196*** was created, which formed the largest hollow within the group, *c* 2.5 m in diameter, though this was comparatively devoid of flaked lithics.

Following the use/backfilling of the hollows, a small, square timber structure, measuring some 4 x 4 m, was erected, which respected the position of the 'pit-house' (Fig 21). Hence, this was probably contemporary with the occupation of the house, and had been added on to its southern side as an annexe, or associated windbreak, or even a drying rack. It was defined by seven postholes, with diameters of 0.27-0.6 m, four of which (***9064***, ***9151***, ***9155***, and ***9218***) formed corner posts. Two (***9064*** and ***9155***) were relatively shallow, though posts ***9218*** and ***9151***, forming the north-western and

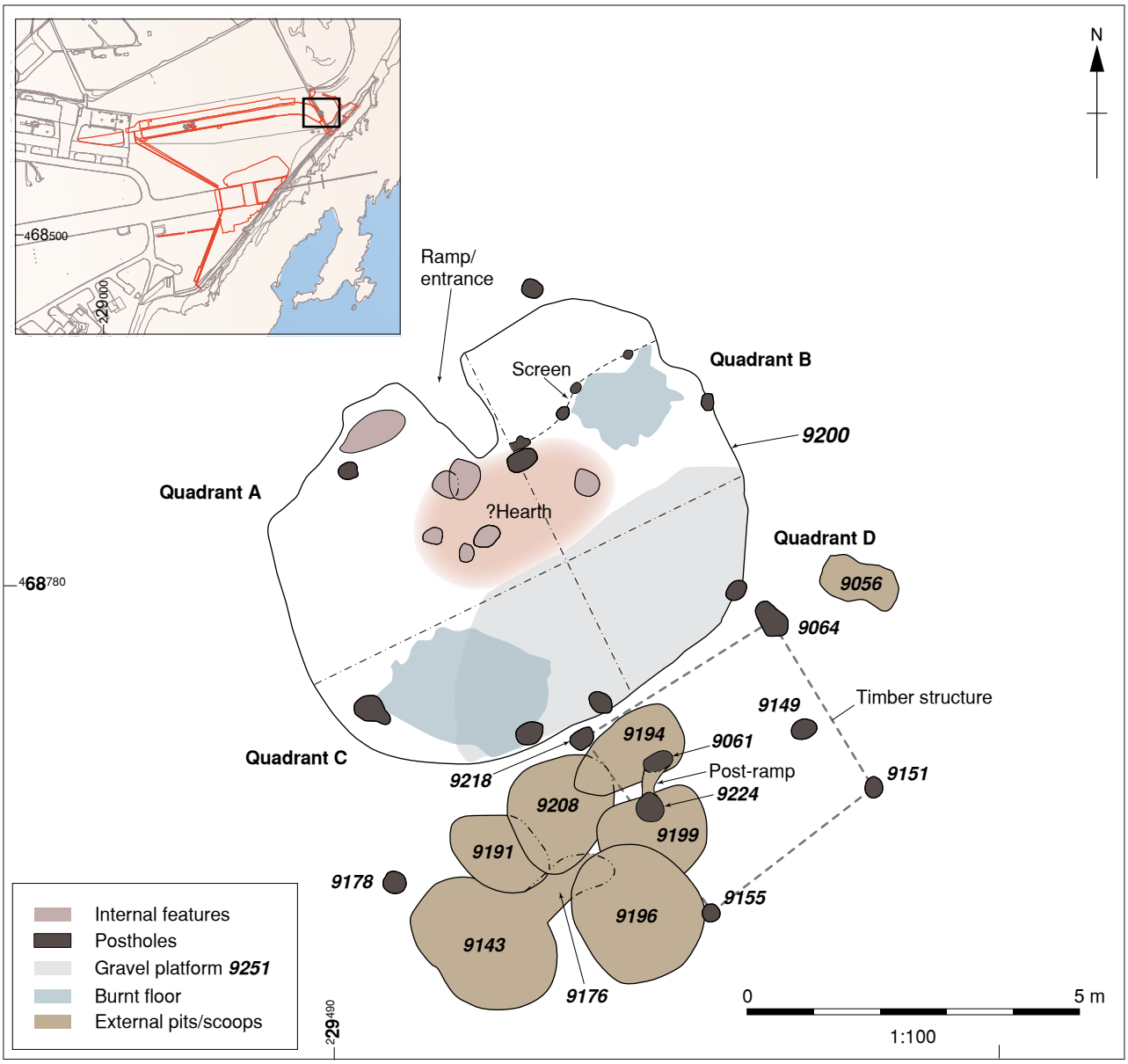


Figure 21: Features external to the Mesolithic house at Cass ny Hawin II



Plate 14: Pit **9143** *following excavation, with the* in-situ *stone anvil*

south-eastern corners of the structure, were slightly deeper (0.29 m and 0.22 m deep respectively), and one (***9218***) also contained a post-pipe, indicating the position of a vertical timber upright, as well as packing stones that seem to have been previously used as coarse-stone tools. These were possibly derived from the adjacent house, presumably confirming that the structure was a slightly later addition. Tellingly, this posthole also contained a distinctive fragment of quartz, with other similar pieces, probably from the same block of stone, being present inside the house, in quadrant B (*Ch 3, p 82*). On its eastern side, posthole ***9149*** was set at the mid-point between corner posts ***9064*** and ***9151***, being mirrored on the opposing side by two posts (***9061*** and ***9224***), one of which (***9061***) was associated with a 'post-ramp', probably created when the timber upright originally contained within it was deliberately removed. Both of these postholes

had also been cut through the backfills of hollows ***9194*** and ***9199***.

Two other features were found to the south-west and north-east of the external structure (Fig 21). One, to the south-west, was an isolated posthole, ***9178***, with a diameter of 0.33 m, being 0.22 m deep, whilst the other, to the north-east, was pit ***9056***. This was oval, measuring *c* 1.15 x 0.65 m, and contained a small number of flaked lithics (24 items) and some burnt hazelnut fragments. This, based on the radiocarbon evidence, seems to have been slightly later than the house (*below*).

Radiocarbon dating and phases of activity

Several features and deposits associated with both the 'pit-house' and the external features to its south, were radiocarbon-dated, in a programme designed to date the house's final use or destruction; any earlier or later occupations; and also the pits and structure immediately to its south. In total, 12 samples were submitted, including seven charred hazelnuts from features associated with the 'pit-house' (postholes ***9081***, ***9230***, and ***9169***; pit ***9090***; and gravel platform ***9251***), along with two short-lived carbonised hazel rods from floor ***9250***/***9092*** (Fig 19). The remaining three samples, all charred hazelnuts, were from features outside the 'pit-house', including two from postholes ***9061*** and ***9218***, elements of the exterior structure, and one from pit ***9056***.

At a gross level, all of the calibrated radiocarbon dates were broadly comparable, indicating that the 'pit-house' and adjacent features were a product of activity occurring in the later ninth- to the early centuries of the eighth millennia cal BC (Table 4). On this alone, these are the earliest evidence for human activity yet recorded on the island, and hence they provide an extremely significant chronological dataset. In terms of wider chronologies, it is also possible to situate these dates within the chronological scheme developed for the British Mesolithic (Conneller 2022, 23-5). Within this, a four-fold division of the period is proposed, partly derived from the Bayesian modelling of radiocarbon dates, and partly on perceived changes in microlith forms; based on this, Cass ny Hawin II would fall at the very beginning of the Middle Mesolithic period, which spans the eighty-second to seventieth centuries cal BC *(op cit*, 24).

However, to explore the chronological dimensions at Cass ny Hawin II a little further, the dates were subjected to statistical testing and then Bayesian modelling, using *a priori* archaeological information (*Ch 1, p 27*). In terms of the statistical testing, three features associated with the house, gravel platform ***9251***, floor ***9092***/***9250***, and pit ***9090***, each contained two radiocarbon samples that potentially dated the same event. The paired samples were therefore combined, and it was evident that each could be the same age, as all passed the chi-square test (Table 5).

Once these tests had been performed, a Bayesian model was constructed using OxCal (*Ch 1, p 27*).

Location		Sample	Material	Uncalibrated date BP	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence)
Gravel platform ***9251***		SUERC-79976	Charred hazelnut (*Corylus avellana*) fragment	8955±28	-24.2	8270-7980 cal BC
		SUERC-79980	Charred hazelnut (*Corylus avellana*) fragment	8989±38	-25.8	8290-7990 cal BC
Postholes	Posthole ***9081***	SUERC-79975	Charred hazelnut (*Corylus avellana*) fragment	9004±27	-26.3	8280-8220 cal BC
	Posthole ***9230***	SUERC-79977	Charred hazelnut (*Corylus avellana*) fragment	8911±26	-27.5	8230-7970 cal BC
Internal features	Pit ***9090***	SUERC-47179	Charred hazelnut (*Corylus avellana*) fragment	8903±39	-24.3	8240-7960 cal BC
		SUERC-47180	Charred hazelnut (*Corylus avellana*) fragment	8882±39	-29.4	8230-7840 cal BC
	Posthole ***9169***	SUERC-80372	Charred hazelnut (*Corylus avellana*) fragment	8868±31	-24.6	8220-7840 cal BC
Floor ***9250***/***9092***		SUERC-47181	Charred hazel (*Corylus avellana*) roundwood	8849±39	-23.6	8210-7820 cal BC
		SUERC-47185	Charred hazel (*Corylus avellana*) roundwood	8854±39	-25.7	8210-7820 cal BC
External features	Pit ***9056***	SUERC-79970	Charred hazelnut (*Corylus avellana*) fragment	8810±34	-24.7	8180-7740 cal BC
	Posthole ***9061***	SUERC-79971	Charred hazelnut (*Corylus avellana*) fragment	8992±26	-23.9	8280-8210 cal BC
	Posthole ***9218***	SUERC-79978	Charred hazelnut (*Corylus avellana*) fragment	8857±26	-23.3	8210-7840 cal BC

Table 4: Radiocarbon dates from Cass ny Hawin II

Location	Sample	Radiocarbon age (BP)	Chi-square test
Gravel platform ***9251***	SUERC-79976	8955±28	Passed: T'=0.4, T'(5%)=3.8; v=1; A_{comb}=140.7%(An= 50%)
	SUERC-79980	8989±38	
Floor ***9250***/***9092***	SUERC-47181	8849±39	Passed: T'=0.01, T'(5%)=3.8; v=1; A_{comb} =117.7%(An= 50%)
	SUERC-47185	8854±39	
Pit ***9090***	SUERC-47179	8903±39	Passed: T'=0.15, T'(5%)=3.8; v=1; A_{comb} =110%(An= 50%)
	SUERC-47180	8882±39	

Table 5: Chi-square test on duplicate dates from Cass ny Hawin II

Within this, the radiocarbon dates were placed within a single OxCal phase ('*Cass ny Hawin II*'), based on the assumption that they could potentially have been associated with the house's occupation, and the combined dates from the three paired samples subjected to the chi-square tests (*above*), which were statistically consistent, were included as 'priors'. Overall, the model had good agreement (A_{model}=116.1; $A_{overall}$=114.5), although one date (SUERC-79970), from pit ***9056*** external to the house, had very poor agreement with the model (there was only 19.5% probability of it belonging to the phase). As it could not be confidently associated with the occupation of the house, it was thus excluded from the model as an active likelihood, and was set as an outlier (denoted by the ? symbol).

It was also possible, based on the stratigraphic sequence, to place the combined priors from two pairs of dates (those dating gravel platform ***9251*** and floor ***9250***/***9092***) within an OxCal sequence ('*Structure*'). Within this sequence, the stratigraphically earlier pair of dates (SUERC-79976 and SUERC-79980) was from gravel platform ***9251***, whilst the stratigraphically later pair (SUERC-47181 and SUERC-47185) was from carbonised hazel rods that lay directly above the platform, forming part of the floor (***9092***/***9250***) that was probably burnt during the destruction of the house. Although these rods from the floor were clearly burnt *in situ*, the taphonomy of the various hazelnut samples is not always perfectly understood, and residuality could be an issue. Taphonomic concerns remain particularly acute for the samples from gravel platform ***9251***, as this material had been redeposited. So, although probably chronologically earlier than the overlying floor, the platform samples could date activity that occurred prior to the house's construction. To account for this in the model, the combined date from gravel platform ***9251*** was entered as a *Terminus post quem* (After) in the Oxcal sequence '*Structure*'. The model proved highly informative, providing a series of modelled date ranges for most of the dated features, as well as first and last dates for the occupation of the house (Table 6; Fig 22).

The modelled dates were also queried, to test the probability that they fell within defined 100-year timespans (Table 7), and this indicates that they formed three distinct clusters, suggesting three different chronological phases of activity. The earliest occurred in *8300-8200 cal BC*, based on the modelled dates from the 'pit-house' (from gravel platform ***9251*** and posthole ***9081***) and from a posthole (***9061***) forming an element of the exterior structure. Significantly, this activity is slightly at odds with the modelled dates from other contemporary features within the house (*below*), and also the exterior structure, and hence, although there are issues with taphonomy, it is suspected that the dated samples derive from

Parameter		Sample	*Modelled date (95% confidence)*
First Cass ny Hawin II		-	*8280-8230 cal BC*
Last Cass ny Hawin II		-	*8180-7950 cal BC*
Gravel platform ***9251***		*SUERC-79976/ 79980* Combined	*8270-8200 cal BC*
Postholes	Posthole ***9081***	*SUERC-79975*	*8280-8210 cal BC*
	Posthole ***9230***	*SUERC-79977*	*8240-8000 cal BC*
Internal features	Pit ***9090***	*SUERC-47179/47180* Combined	*8230-8000 cal BC*
	Posthole ***9169***	*SUERC-80372*	*8220-7970 cal BC*
Floor ***9092***/***9250***		*SUERC-47181/ 47185* Combined	*8210-7950 cal BC*
External features	Pit ***9056***	*SUERC-79970*	-
	Posthole ***9061***	*SUERC-79971*	*8280-8210 cal BC*
	Posthole ***9218***	*SUERC-79978*	*8210-7960 cal BC*

Table 6: Modelled dates from Cass ny Hawin II

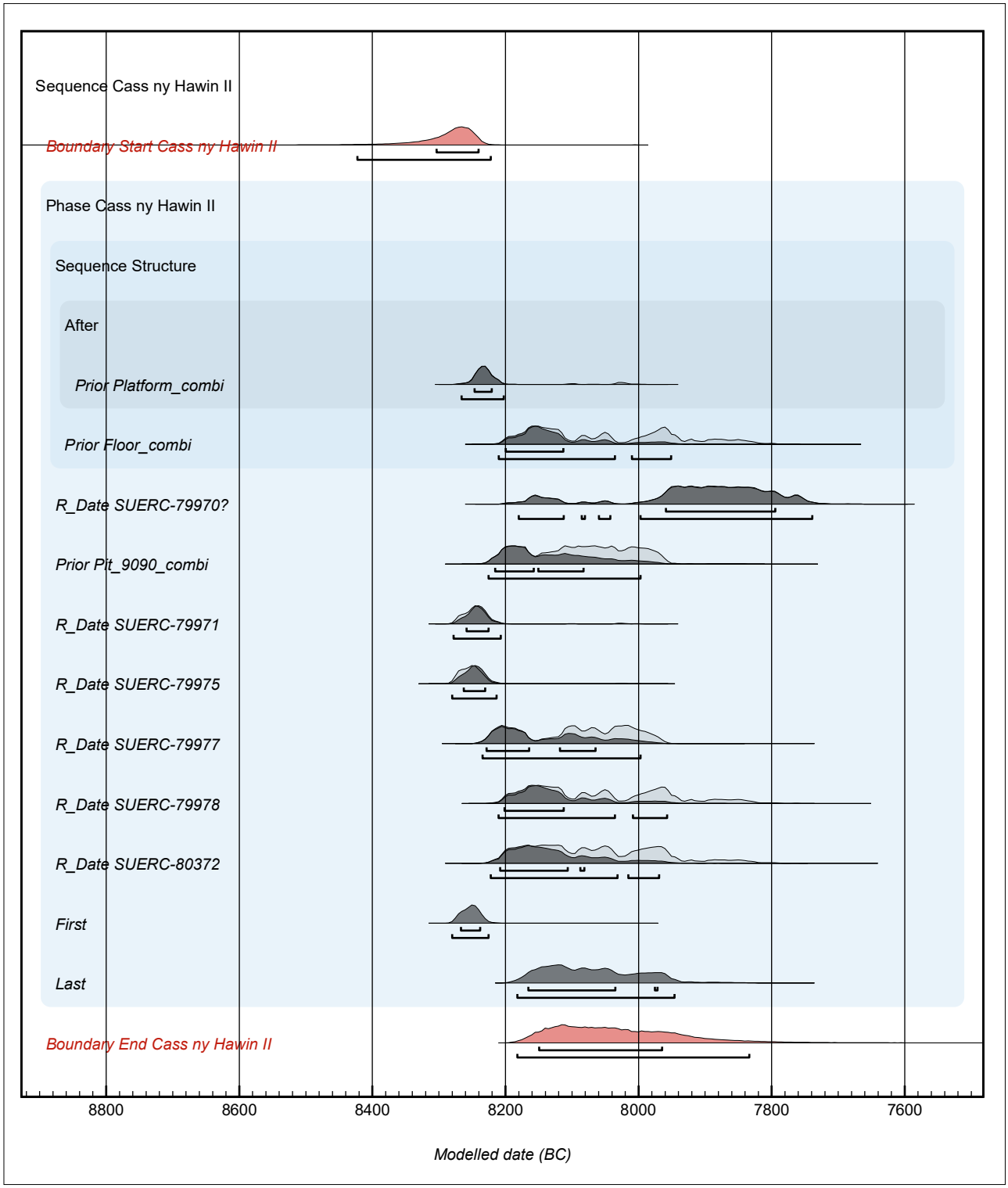


Figure 22: The modelled radiocarbon dates for Cass ny Hawin II

residual materials, which became incorporated into the later features. Hence, if is the case, this indicates that the site was visited prior to the construction of the 'pit-house'. Although this initial visit may have been brief, there is a high probability that the large pit (***9143***; *p 45*) immediately to the south of the house, and the subsequent intercutting hollows, could have formed part of this 'pre-house' phase of activity. This assumption is based on the fact that these features were stratigraphically earlier than the external structure, which was almost certainly contemporary with the use of the house, and the residually dated material from posthole ***9061***, which would probably have come from one of the hollows (***9194***; *p 45*), as it had been cut into the fill of this earlier feature. Presumably, the residual charred hazelnut from the gravel platform, and the

Prior Date		8300-8200 cal BC	8200-8100 cal BC	8100-8000 cal BC	8000-7800 cal BC
Gravel platform ***9251***		**97.3%**	1.5%	1.3%	0.1%
Postholes	*SUERC-79975* (Pit ***9081***)	**98.1%**	0.4%	1.3%	0.2%
	SUERC-79977 (Pit ***9230***)	22.9%	**45.4%**	28.9.0%	3.5%
Internal features	*Pit* ***9090***	12.1%	**56.3%**	27.1%	4.2%
	SUERC-80372 (Pit ***9169***)	6.4%	**65.7%**	21.9%	6.3%
Floor ***9092***/***9250***		7.7%	**80.2%**	9.1%	2.9%
External features	*SUERC-79970* (Pit ***9056***)	0.2%	10.7%	3.7%	**71.7%**
	SUERC-79971 (Pit ***9061***)	**96.6%**	0.8%	2.2%	0.3%
	SUERC-79978 (Pit ***9218***)	3.1%	**71.3%**	17.6%	7.5%

Table 7: The probabilities that the modelled dates from Cass ny Hawin II fall within specific timespans

associated lithics contained within this feature, also represent material from the same activity that led to the creation of the early pit and hollows.

The second phase of activity seems to have related to the occupation and destruction of the 'pit-house', which modelling indicates occurred sometime in *8200-8100 cal BC*. This is indicated by dated samples from the *in-situ* burnt floor (***9250***/***9092***), as well as from postholes ***9230*** and ***9169***, and pit ***9090***. Beyond the 'pit-house', a modelled date from posthole ***9218*** also relates to this phase, and seems to confirm that the exterior structure was contemporary with the 'pit-house'. As this structure was also stratigraphically later than the pit and hollows in this area, this strengthens the suggestion that these were elements of the earliest activity on the site (*above*). Significantly, it is possible to estimate the difference in age (using an Oxcal 'Interval' query) of the material from the earliest phase (in gravel platform ***9251***) from that from the second phase (within floor ***9250***/***9092***) at *7-281 years* (*95.4% probability*), or *32-124 years* (*68.2% probability*).

The modelled dates also indicate that a third, slightly later, phase of activity might have been present, and that the site of the 'pit-house' was revisited, on at least one occasion, following its abandonment/destruction. This phase dates to *8000-7800 cal BC* and is indicated by a charred hazelnut from external pit ***9056***.

When all the dates are considered (except for the latest date from pit ***9056***), the model (using an OxCal 'Span' query) estimates that activity was taking place for *58-318 years* (*95.4% probability*) or *84-277 years* (*68.2% probability*). So, whilst there was not necessarily a sustained occupation of the site, it seems to have been visited and used across several generations.

The material assemblage: artefacts and ecofacts

The Cass ny Hawin II house produced an exceptionally rich assemblage of artefacts and ecofacts, comprising worked stone, and charred wood and plant remains (*Ch 3*). Flaked lithics formed the largest component of the assemblage, with *c* 22,000 individual objects, which is fairly astounding given the relatively small size of the structure. Within the house, *c* 15,000 flaked-lithic pieces were collected individually by hand excavation, with the position of each piece being three-dimensionally recorded (*Ch 1, p 21*). The remaining *c* 7000 pieces were recovered by wet-sieving bulk sediment samples from spits collected within the 1 m grid-squares excavated across the footprint of the structure (*p 40*). A large proportion had been burnt, as might be expected if they had been in the house when it burnt down (*p 43*).

Typologically, these lithics are typical of a Manx Early Mesolithic narrow-blade assemblage and are also similar to other Middle Mesolithic narrow-blade assemblages from northern Britain and Ireland (*Ch 3, p 83*). They had been flaked from four types of identifiable raw materials, with pebble flint being by far the most common (*Ch 3, p 88*), followed by quartz, although some of this was not good for knapping, and it is thus possible that quartz pebbles were collected for other reasons, being used as hammerstones. A coarse-grained chert-like material was also infrequently present, whilst tuff, a pyroclastic rock formed from compacted volcanic ash (Smith 2010), was the least frequent raw-material type in the assemblage.

The flaked lithics included nearly all forms of debitage (cores, blades, and flakes), with smaller numbers of microlithic tools (Pl 15), as well as microburins created during their manufacture (*p 36*), and other non-microlithic retouched tools (*Ch 3*). Micro-scalene triangles were, by far, the most common form, with smaller numbers of elongated scalene triangles and obliquely trimmed blades. Backed bladelets, crescents, miscellaneous points, and isosceles triangles were in smaller numbers, whilst a hollow-based point, a miscellaneous microlith form, and a possible tanged point occurred as single items. Other tool types had a restricted range, dominated by burins and notches, although simple edge-retouched pieces were also



Plate 15: Examples of microliths from Cass ny Hawin II

common. Scrapers, knife forms, awls/borers, and denticulate pieces also occurred in small numbers.

The range of microlith types suggests activities such as butchery, working organic material (such as bone, antler, and wood), and hunting (assuming their use as armatures in projectiles; *cf* Brown *et al* 2023), with the relatively large number of microlith fragments perhaps pointing to the manufacture, use, and discard of broken and damaged implements, and possibly the repair of composite tools, within the house (Finlay 2009). The large numbers of non-microlithic burins might indicate bone- and antler working, which, in a coastal context, accords well with the manufacture of harpoons.

No significant differences in the technological character of the lithic assemblages were detected within the house (*Ch 3*). Instead, the methods of reduction and tool production were remarkably uniform, as might be expected if all the stone working had been undertaken by one individual or a small group of people. Neither is a lengthy occupancy necessarily implied by the large size of the lithic assemblage. For instance, experimental archaeology (Mithen *et al* 2000) has demonstrated that only a few stone nodules can be responsible for substantial amounts of debitage. The numbers of tools and debitage recovered from Cass ny Hawin II could then just reflect a single, relatively fleeting, but intense, bout of activity associated with the house, with production being concentrated inside it.

That so many flaked lithics were recovered from the house was somewhat puzzling, particularly given that most were very fresh and sharp and thus would have posed something of a hazard to those living in the structure, if they had been scattered around it when it was occupied. Rich lithic assemblages have been recovered from other Mesolithic houses of this size and date (*Ch 10, p 319*), and are apparently a common characteristic of them. This can be contrasted with the structural evidence from both earlier (Rowley *et al* 2018) and later (Brown *et al* 2023) Mesolithic sites, where there is evidence that domestic structures were kept relatively clean. The charred remnants of the floor (***9092***/***9250***; *p 43*) might, however, provide an explanation for how the presence of thousands of razor-sharp lithics could have been tolerated during the occupation. If the charred rods indicated a brushwood floor (Grøn 2011), then the lithics could have fallen, or been brushed, into interstices between the twigs, and would thus no longer have been a nuisance. If the flooring was changed or rearranged, lithics could have filtered down to the earthen base of the depression, being covered up when the flooring was reinstated. At Cass ny Hawin II, however, the fact that most of the lithics came from the approximate level of the destruction horizon (*p 44*), and had not sunk to the base of the depression, might provide evidence that the flooring had not been changed, and that occupation had been relatively fleeting.

Flaked lithics were not just confined to the house, but were also recovered from the early pit (***9143***) and hollows located to its south (*p 45*), which, based on the radiocarbon and stratigraphic evidence, probably dated from before the house was constructed (*p 49*). They included burnt flaked flint, which, together with the lack of full reduction sequences, potentially indicate dumping of waste from elsewhere. Although these tools probably dated to an initial phase of (pre-house) activity at the site, they were technologically identical to those from the house. This suggests that, comparatively, no great period of time elapsed between the initial digging of the pit and hollows, and the construction/use of the house. This is confirmed by the radiocarbon-dating evidence, which suggests that only a few decades, or perhaps a century, separated the two events (*p 49*). In addition, a very small assemblage of lithics from pit ***9056*** seems to post-date the abandonment/destruction of the house (*p 47*): again, these were typologically comparable to those from the house and the earlier features.

The area also produced 60 coarse-stone tools in addition to the flaked lithics, mainly made from sandstones or sedimentary rock; in terms of the Manx Early Mesolithic, these are unique. They were mostly recovered from the two upper deposits (***9249*** and ***9248***; *p 43*) within the house and comprised a range of types (*Ch 3, p 76*) probably used in activities that involved grinding, hammering, smashing, crushing, smoothing, and rubbing; it is quite possible that some related to the processing of hazelnuts, as well as skins and hides.

There were also large amounts of carbonised material from within the house, including fruits and seeds, predominantly hazelnuts, as well as wood charcoal, with hazel, hawthorn-type, blackthorn-type (*Prunus* sp), and willow/poplar (*Salix*/*Populus*) being represented, along with limited quantities of oak and elm. Together, this evidence provides valuable information about the wider environment, and how hunter-gatherers interacted with it, such as which plant species were collected for food, fuel, and building materials (*Ch 3, p 71*). Most came from the deposits which were wet-sieved (*Ch 1, p 21*), demonstrating that the charcoal was generally more abundant in deposit ***9249*** (*p 43*). The residues probably primarily derive from combusted structural material, although an element could also have come from furniture or other artefacts within the building, or from fuel associated with its occupation or destruction (if deliberate). Intriguingly, although charcoal was generally well-preserved, the amounts recovered by processing did not seem to reflect the abundance observed during the excavation of the structure. This is probably a result of the fragility of the carbonised materials, many of which appear to have disintegrated during excavation, or whilst being sampled. The variable survival of carbonised materials within the house may also reflect the heterogeneous nature of the conflagration; counter-intuitively, high-frequencies of charcoal may indicate where local conditions caused the fire to be 'dampened down' to some extent. Conversely, where it was fiercest, the wood may have burnt away to ash, and if there were areas where the blaze did not take, organic materials would not have been charred and will have perished without trace.

It is also worth noting that, although great numbers of hazelnut fragments occurred in the Cass ny

Hawin II house, these were not as numerous as those from other similar Mesolithic dwellings in northern Britain (*cf* Robertson *et al* 2013; Waddington 2007). This could have been the result of hazelnuts being in short supply, or if they formed a smaller proportion of the diet, but it could also provide further evidence for the house being occupied for only a short period (*p 52*).

Activity in the house: spatial patterning of the material assemblage

The detailed retrieval and recording strategy (*Ch 1*; *p 21*) allowed a fine-grained spatial analysis of the distribution of the material assemblage. Initially, this was employed to determine whether the artefacts and ecofacts formed an *in-situ* assemblage (*p 44*). In general, the worked stone and palaeoenvironmental materials had good spatial integrity, and, whilst some movement (particularly vertically, both up and down the sediment profile) had potentially occurred, as well as some disturbance by bioturbation, the site was well-preserved and had not been truncated, for example, by agricultural practices. Hence, most of these materials did indeed seem to be largely *in situ*, remaining where they had last been stored, used, lost, or discarded. Once this had been established, spatial analysis was used to consider the patterning of the respective materials and if these exhibited any underlying structure, which might reflect the way that space was practically and conceptually subdivided and used, and how activities were organised within the house.

Charcoal and charred plant remains

The charcoal from each grid-square was quantified (*Ch 1*, *p 24*), revealing some interesting patterns. The most abundant charcoal came from quadrants B and C (Fig 23), probably smaller fragments of structural wood associated with burnt-floor deposits ***9250*** and ***9092*** (Pl 16; *p 43*), comprising charred hazel and hawthorn-type rods (less than 10 mm fragments of these rods survived intact). In contrast, very little charcoal was recovered from the gravel platform (***9251***), perhaps because the floor did not extend over all of it. The absence of charcoal there is significant, as it suggests that the charcoal was indeed from a floor, for if it had derived from the walls or thatch, then a more generalised distribution would be expected. It is therefore possible that other materials were used for roofing, such as seal skins (perhaps repurposed from a boat), or alternatively any vegetable roofing material was removed before the fire, as no charred remnants of birch bark, reeds, grasses, or roots indicative of turf, were recovered. Although hazel charcoal appeared ubiquitous throughout the floored area, higher quantities were recovered from two grid-squares (A6 and A10), probably deriving from posthole ***9081*** (*p 41*). This suggests that this species, apart from being used in flooring, was also used in the construction of the superstructure.

Blackthorn-type charcoal showed a very different spatial pattern to the hazel and hawthorn-type, and was concentrated in a relatively large area in front and just left of the entrance, in the western part of the house, with a small pocket to the east of the entrance. This was tucked in the north-east of the structure, to the north of the putative screen (*p 43*), and would have provided a perfect area for storage; it is therefore possible that this represents the remains of functional items. The more widespread occurrence of blackthorn-type charcoal in quadrant A is more difficult to interpret, and may represent either the remains of functional items, or perhaps the debris left during their manufacture. Given that cherry is a member of this group, and is excellent for carving, its use in this context would make more sense than it being left in its 'raw' spiny form.

The similarly located willow/poplar charcoal from the floor deposits may also have come from the charred remains of functional items. Indeed, a concentration of willow associated with burnt deposit ***9084*** (*p 43*) may represent the remains of a basket, perhaps holding the small group of coarse-stone tools found in the vicinity (*p 57*). Similar hawthorn and blackthorn-type 'rods' were also recovered from an adjacent pit (***9071***), perhaps evidence of this putative basket. The recovery of willow/poplar charcoal from posthole ***9179***, one of the structural uprights to the house, in quadrant B, may also provide tentative evidence for the remains of another wicker basket, or other functional item.

Oak and elm were the least frequent types of charcoal from the house, possibly because these species did not become prevalent on the island until the latter half of the eighth millennium cal BC (*p 34*). Therefore, when the house was occupied, both would have been rare woodland species. Oak is, however, a superior fuel wood (Edlin 1949) and, with this in mind, there seemed to have been a clear association between the distribution of this and the central grid squares (A12, A13, B1, and B2), as well as in A8, just to the south-west. This central area was devoid of features and, although there was no sign of any oxidisation of the natural geology, it is quite possible that these concentrations indicated the position of a central hearth. Tellingly, this area was also surrounded by an arcing group of pits and postholes (*p 43*), which were probably sited with reference to such a hearth, whilst further evidence for its presence was provided by the distribution of charred hazelnuts (*p 55*) and burnt lithics (*p 59*).

The elm charcoal also had a restricted distribution, forming a linear arrangement aligned north-east/south-west (within grid-squares A1, A4, and A8). This pattern is intriguing, and could represent the remains of a piece of wood (or panel) demarcating two areas

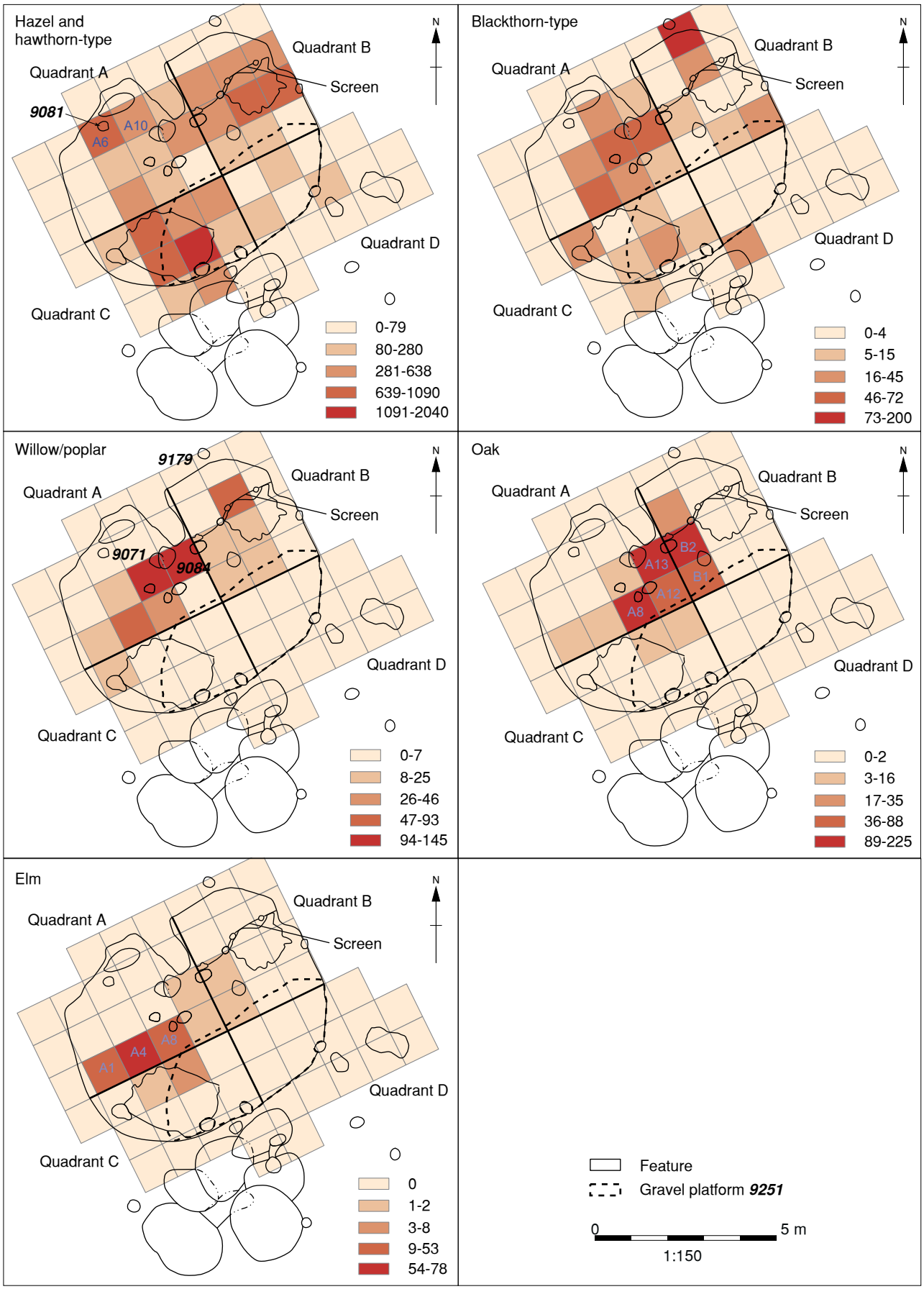


Figure 23: Frequency of different charcoal types across the Mesolithic house



Plate 16: The burnt hazel rods forming floor **9092**

within the house, one in the north-west (in quadrant A) and the other to the south-east (in quadrant C).

The charred hazelnuts were also quantified (*Ch 1, p 24*) and their distribution established. It was striking that *c* 45% (77.09 g) of the total weight from the house came from its central area (grid-squares A8-9, A12-13, and B1-2; Fig 24). Even the frequency within the general layers in these squares was higher than elsewhere, so, like the oak charcoal, the concentration may be coincident with a hearth. More generally, hazelnut fragments occurred in higher frequencies between gravel platform ***9251*** and the entrance, in the vicinity of internal features, and it is probably significant that this closely corresponds to the distribution of the flaked lithic debitage (*p 59*). Few fragments were found on the gravel platform. Likewise, hazelnuts were not usually frequent within the postholes forming the main structural supports for the house, though posthole ***9081***, to the west of the entrance, was a notable exception (*below*). This suggests that these features were not open and silting such that incidental hazelnuts were included, yet if the house had been repaired or reconstructed, the opposite might have been true.

Of all the hazelnuts by weight, 43% (69.92 g) came from internal features. These fragments were also larger and more densely packed, occurring at *c* 0.27 g per litre of soil, as compared to *c* 0.03 g per litre in use/destruction deposit ***9249***. This probably means that hazelnuts were either cached in these features, or that charred fragments accidentally fell into them following processing or consumption. Features ***9084***, ***9069***, and ***9090***, on the western side of the presumed central hearth (*above*), contained many more hazelnuts relative to the others, either reflecting a different use for them



Figure 24: Frequency of hazelnut-shell fragments across the Mesolithic house

or, perhaps more likely, a spatial bias in the processing/consumption/disposal of charred fragments.

There were also notable concentrations on either side of the entrance (including in posthole ***9081*** and pit ***9067*** on the west side), suggesting that this might have been where they were stored. The apparently screened-off area to the east of the entrance (*p 43*) contained a restricted, but very dense (46.26 g, 1657 fragments, 27% of the assemblage overall), concentration of large, charred fragments (defined as deposit ***9003***). Amongst them was a rare instance of a charred kernel, pointing to whole nuts being stored, possibly in a hazel-withy basket, particularly as possible evidence for one such basket came from an adjacent posthole (***9179***; *p 53*). The concentration to the west of the door was not as dense, so this might instead reflect where nuts were processed or spent shells discarded. If so, as might also be suggested

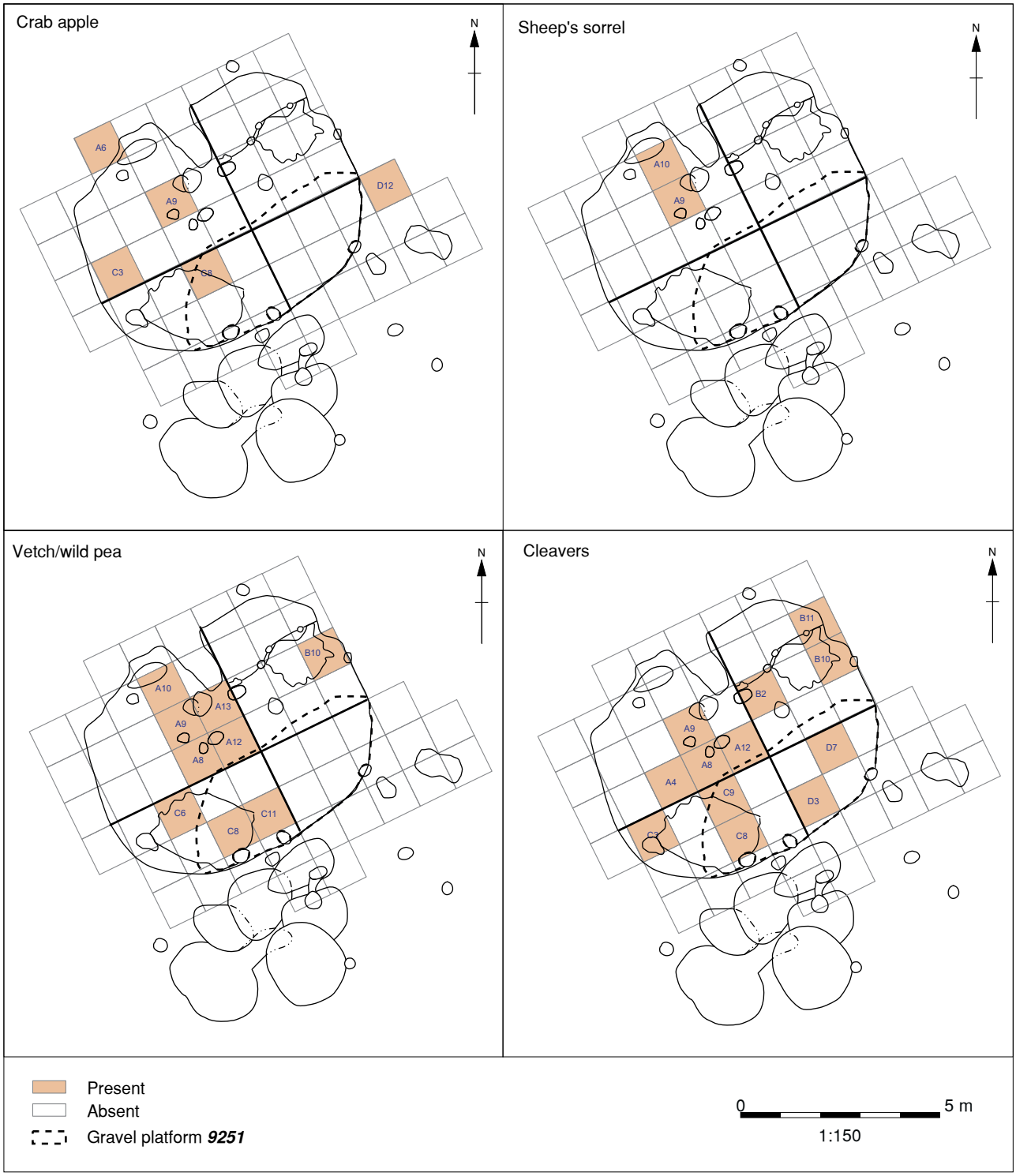


Figure 25: Frequency of crab apple, sheep's sorrel, vetch/wild pea, and cleavers across the Mesolithic house

by the distribution of burnt material in the features, there may have been contrasting east/west patterns in the practices associated with hazelnuts: perhaps storage in the east; and processing/discard in the west.

Spatial analysis of the other charred seeds and fruits suggests that charred crab apples (*Malus sylvestris*) were strongly associated with the western side of the structure, whilst sheep's sorrel (*Rumex acetosella*) occurred only on the western side of the entrance (Fig 25). Vetch/wild pea (*Vicia/Lathyrus* sp) was more centrally distributed than the crab apple, but trended towards the west, including deposits on the western side of the gravel platform, although it also encroached into grid-squares A12 and A13. These contrasting distribution patterns reinforce the impression that there was an east/west division of activities in the dwelling. This cannot be attributed to a bias in preservation, as cleavers (*Galium aparine*) had a much more widespread distribution, with a tendency to focus on the gravel platform and the area to the north of this. Cleavers are close relatives of lady's bedstraw (*Galium verum*), and their distribution might be explained if they formed bedding, which may, in turn, imply that the sleeping area was confined to the gravel platform.

Coarse-stone tools

The coarse-stone tools, except for a few outliers, mainly to the south-west, were largely distributed around the central part of the house and the presumed central hearth (*p 43*). They also tended to cluster where there was relatively less flaked lithic material, skirting denser concentrations and avoiding the densest elements almost entirely. The tools were often reasonably large and usually seemed to lie where they were stored or, possibly, had been used. They could be divided into four groups (CST1-4; Fig 26).

Group CST1 was found in the north-west and comprised three bifacially ground stones clustered within 1 m of each other, immediately to the west of the entrance, next to burnt deposit ***9084***, the putative remains of a basket (*p 53*). Significantly, this could have contained four rounded cobbles, a hammerstone, and a fire-cracked stone (*Ch 3, p 76*), which were nestled like a clutch of eggs within it. A hammerstone was found just to the north, while two bevelled pebbles, lying side by side, were to the south-east, and a third was found to the north-west, next to posthole ***9081***. This group also included an outlying bevelled pebble.

Group CST2 was identified to the east of the entrance and comprised an elongated hammerstone, associated with two fragments of quartz, on the edge of gravel platform ***9251*** (*p 42*). The group also comprised an arc of seven hammerstones, immediately east of the entrance, also associated with a bevelled pebble, and three cobbles, including one dimpled example.

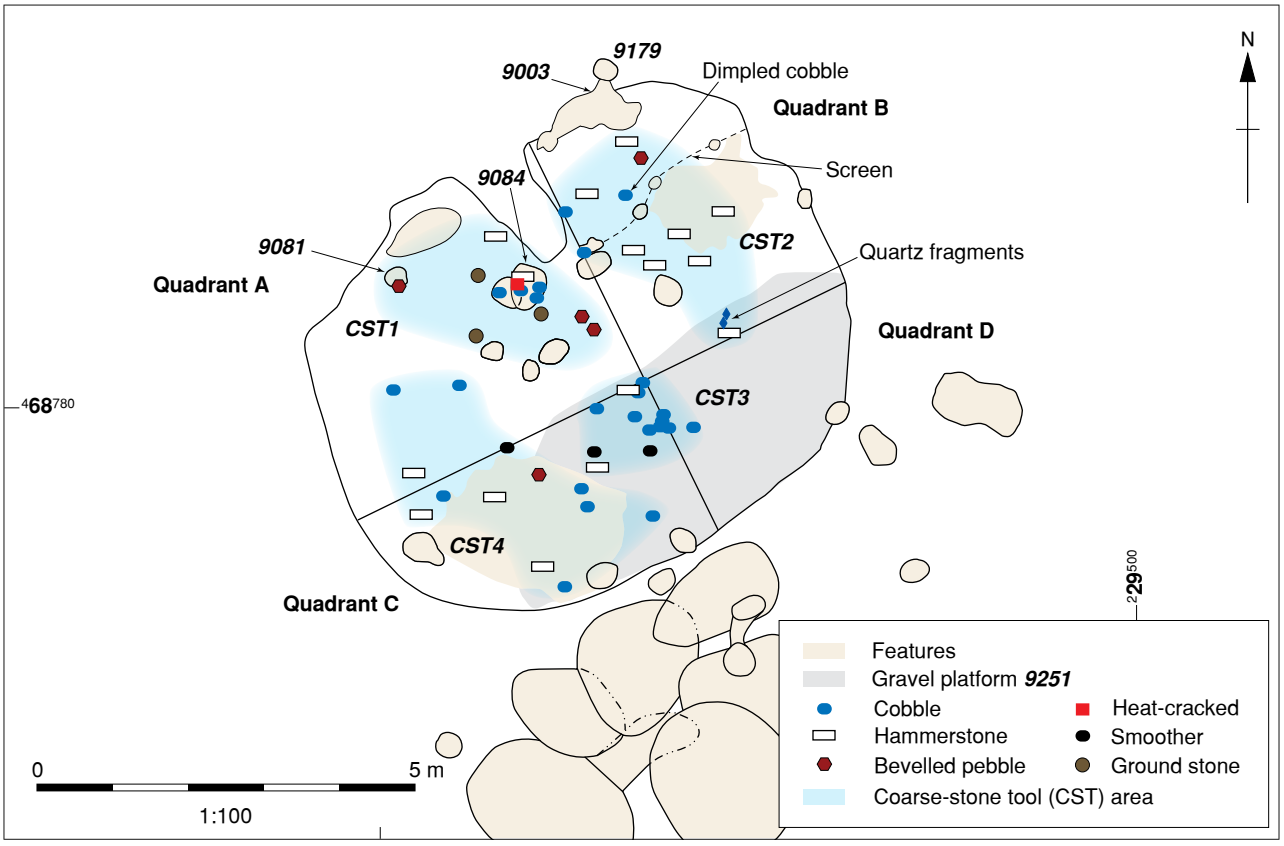


Figure 26: The distribution of coarse-stone tools across the Mesolithic house

This area also contained a hazelnut cache (***9003***; *p 56*) and a possible basket (based on the charcoal from posthole ***9179***; *p 53*), and was separated by the presumed partition screen. If this did indeed indicate a separate compartment, a higher number of coarse-stone tools occurred to the south of it.

Group CST3 clustered at the northern edge of gravel platform ***9251***, just to the south of the putative hearth (*p 43*). Ten cobbles, two smoothers, and two hammerstones created the group, plausibly denoting an activity focus. This was also where a knapping concentration was identified within the flaked-lithic assemblage (*p 59*), so it is possible that the coarse stones there could have been associated. No stone tools were recovered from the eastern part of the platform, which may suggest that that area was used for sleeping.

Group CST4 included three cobbles and a bevelled pebble on the gravel platform, immediately west of CST3, and a smoother to the north-west, close to the edge of the platform, and further west still, four hammerstones and two cobbles. Perhaps significantly, this cluster lay to the south of a linear band of elm charcoal (*p 53*), which may strengthen the case for an internal partition. Immediately north of this putative partition were two cobbles, effectively outliers to the main cluster.

The coarse-stone groups seem to relate to four main zones, or activity areas, in the house. CST1 and CST2 could respect the same east/west dichotomy seen in the distributions of charred plant remains (*p 53*), and are perhaps indicative of different activity foci, on either side of the doorway and presumed central hearth (*p 43*). CST3 would then potentially have acted as a counterpoint, straddling the dividing axis between these, and occupying the space between the hearth and the edge of the gravel platform. CST4 is more diffuse and would seem to have been set apart from the hearth and the other three activity areas (CST1-3).

When the clustering of specific tool types is also factored in, then it appears that different activities may have been undertaken within each of these four zones (Fig 27), although the relationship between tool form and function is not well understood (*Ch 3, p 105*). If certain individuals were more closely associated with certain zones or tasks, this could also relate to the identities or competencies of those occupying the house. Considering this in a little more detail, it appears that ground stones only occurred to the west of the door, and smoothers were only found on the edge of the gravel platform, south of the hearth. Hammerstones and bevelled pebbles were strongly associated with areas to the north-east and south-west of this hearth, with two other bevelled pebbles coming from the presumed hearth area itself. Hammerstones

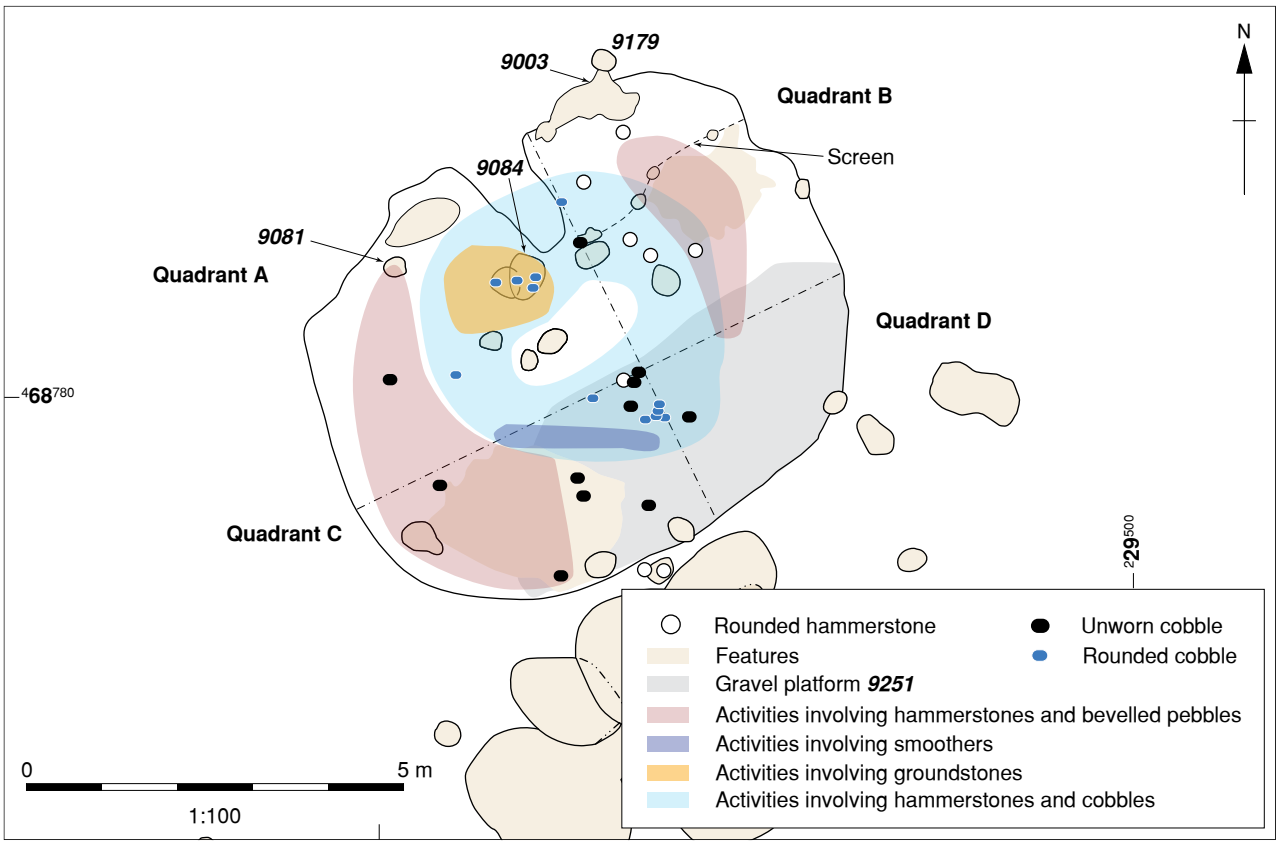


Figure 27: The potential activity areas in the Mesolithic house

and cobbles formed a ring around this area, although their distributions could be contrasted. Specifically, it seems that those rounded (as opposed to elongated or plain) examples of hammerstones were mainly in the north-east, whereas nearly all of the rounded cobbles were to the north or south-west, whilst unworn cobbles were chiefly to the south and south-west of it.

Flaked lithics inside the house

The distribution of the flaked lithics provides further details on the use and structure of the domestic space, reinforcing the impression that this was organised and habitually used with a degree of consistency. The sheer quantity of material, and the dense palimpsest of activity, within such a relatively confined space has, however, resulted in some confusion and 'blurring' in terms of the distribution patterning, although disturbance was not a major factor, and meaningful patterns could still be discerned.

Broad trends

At a broad level, it was apparent that the lithics were not evenly distributed throughout the house. Instead, they occurred in higher frequencies, and in denser concentrations, within the north-western quadrant (A), with this distribution continuing into the northern part of quadrant C (Fig 28). Within one grid-square (A5), there was also a very dense 1 m-diameter cluster of material that appeared to constitute a discrete dump. There was less material over the gravel platform (***9251***), although it tended to be more common in the western and northern parts of it. There was a second, very dense, 1 m-diameter, dumped concentration, focused on grid-square A12 in the central part of the house, coinciding with the position of the presumed hearth (*p 43*). In quadrant B, the density of material fell away from this hearth towards the north and east, and lithics were rarer north of the potential screen dividing off a possible storage compartment (*p 43*).

Knapping, debitage, and tools

Lithic material from all stages of the reduction process (*ie* tested pebbles, cores, debitage, and a range of tools; *Ch 3*) was present, indicative of knapping taking place in the house. Defining individual knapping events was, however, difficult, although some observations on the organisation of stone-working activity are possible.

First, and perhaps predictably, the distribution of knapping evidence directly reflected that of the overall lithic material (*above*). The rarer raw materials had, however, slightly different distributions from each other, and also from the much more common pebble flint. Quartz was scattered across the house, though there was a notable concentration focused on a grid square (C11), immediately adjacent to CST3 (*p 58*), comprising indeterminate chunks and fragments, possibly from a shattered nodule or hammerstone (*Ch 3*, *p 79*). The few pieces of tuff were found just to the west of the door, occupying the same area as CST1, whilst chert was distributed more generally on both sides of the door, coinciding with the extents of CST1 and CST2 (*p 57*).

The distribution of the burnt worked lithics was also highly biased towards quadrant A, being focused on grid-squares A5 and A12, and more concentrated on the latter. The suspected central hearth (*p 43*) probably accounts for the burnt concentration in A12, and the burnt material in A5 might indicate the presence of a second hearth, again acting as a focus for dumping. Significantly, the lithics of indeterminate lithology also mainly surrounded grid-square A5, probably reflecting the intensive calcination of pebble-flint through burning. The sheer quantity of lithic material in the vicinity of these two apparent hearths perhaps shows that waste from knapping was not just generated *in situ* but that material from elsewhere in the structure could have been dumped within these zones.

The cores and core fragments occurred mainly in quadrant A, particularly concentrating in grid-squares A5 and A9, though smaller clusters were also present in other grid-squares, such as B5-6 and C12 (Fig 29). Most were found in an arc around the western side of the presumed central hearth (consistent with coarse-stone distributions CST1 and CST3-4; *p 58*), with a more dispersed distribution in the area of CST2, in the north-east. It is therefore tempting to see most knapping activity around the west and south of this hearth, with either infrequent knapping activity, or some discard of cores (tossing), in the north-east, as well as cores being abandoned in the north-west. This is supported by the numbers of cobbles and hammerstones around this hearth (*p 58*), which may have been used for knapping (perhaps with the exception of the 'rounded cobbles' in CST2, in the north-east; *p 57*).

The distribution of whole and flaked pebbles generally agreed with that of the cores. Thus, when a flint pebble was deemed unsuitable for working, or further knapping, it was discarded into the same areas as the cores. It does, however, seem that the whole pebbles had a pattern more focused along the northern edge of gravel platform ***9251***.

It seems significant that flake and blade/flake cores were dominant on the periphery of the main lithic concentrations, whilst in the north-western and central areas, blade cores were more common. Most of the cores associated with blade production were focused on grid-squares A5, A9, and A12, whereas the cores used solely for flake production were dispersed generally

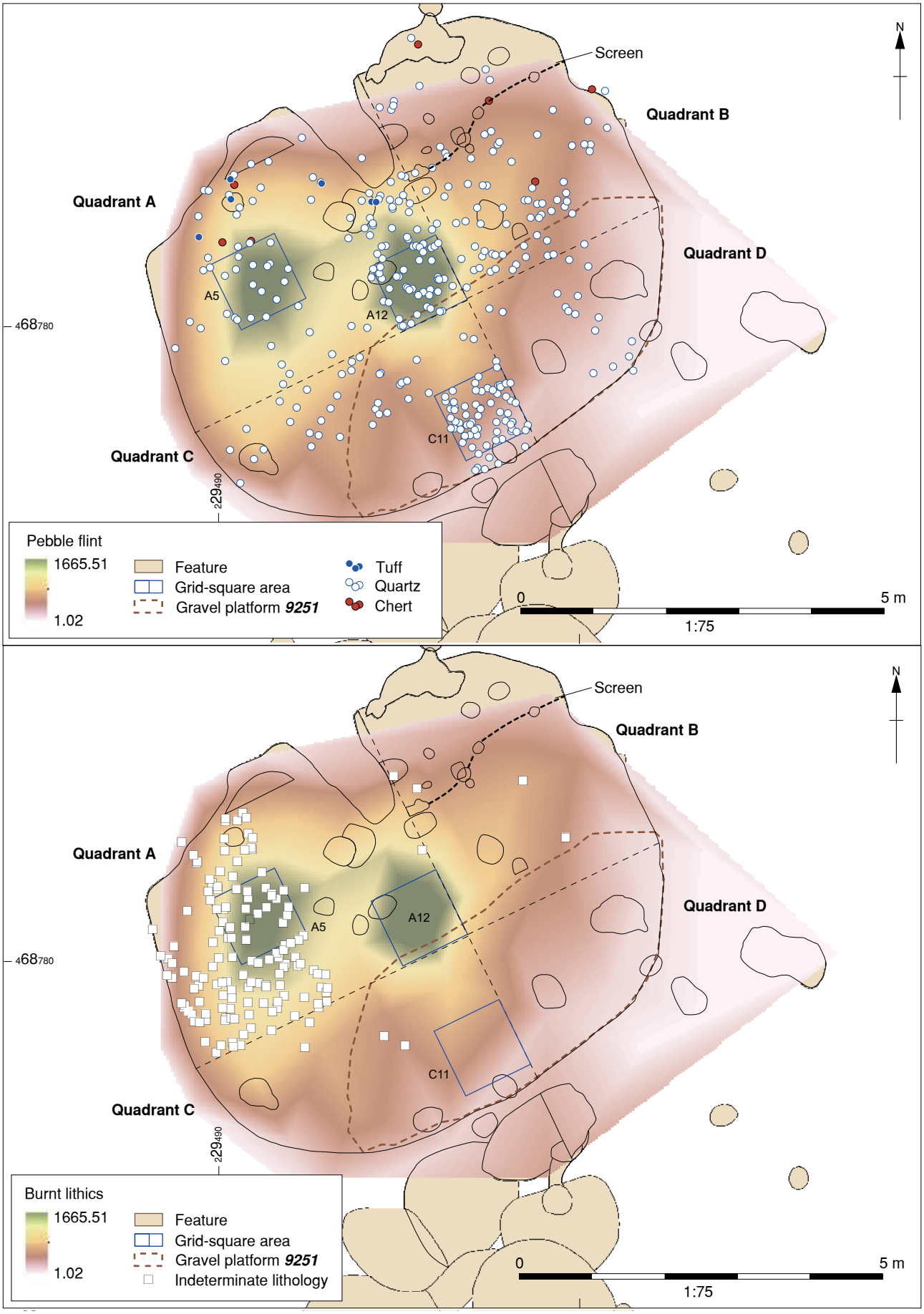


Figure 28: The distribution of all flaked lithics, and burnt lithics and those of indeterminate lithology across the Mesolithic house

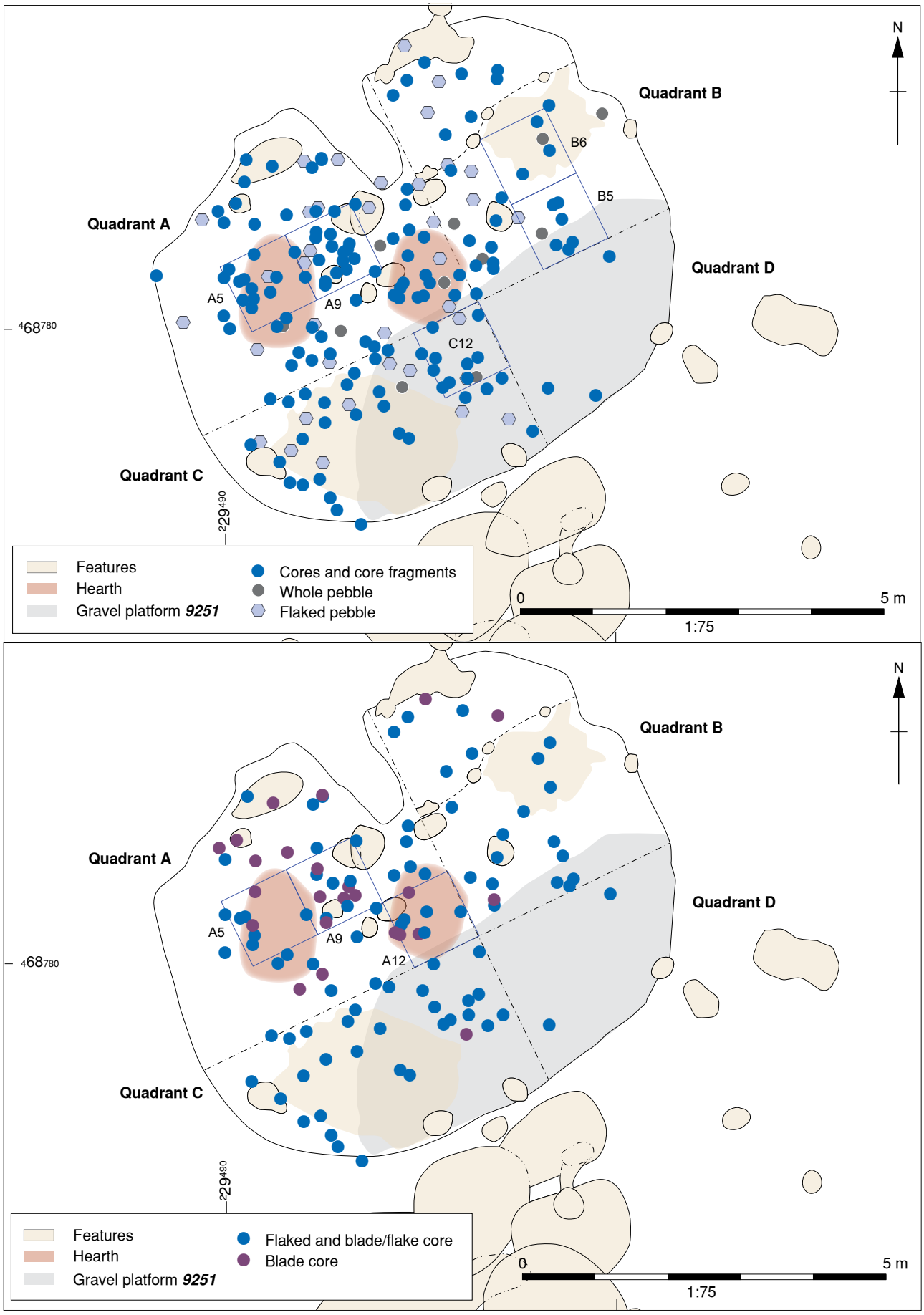


Figure 29: The distribution of core types across the Mesolithic house

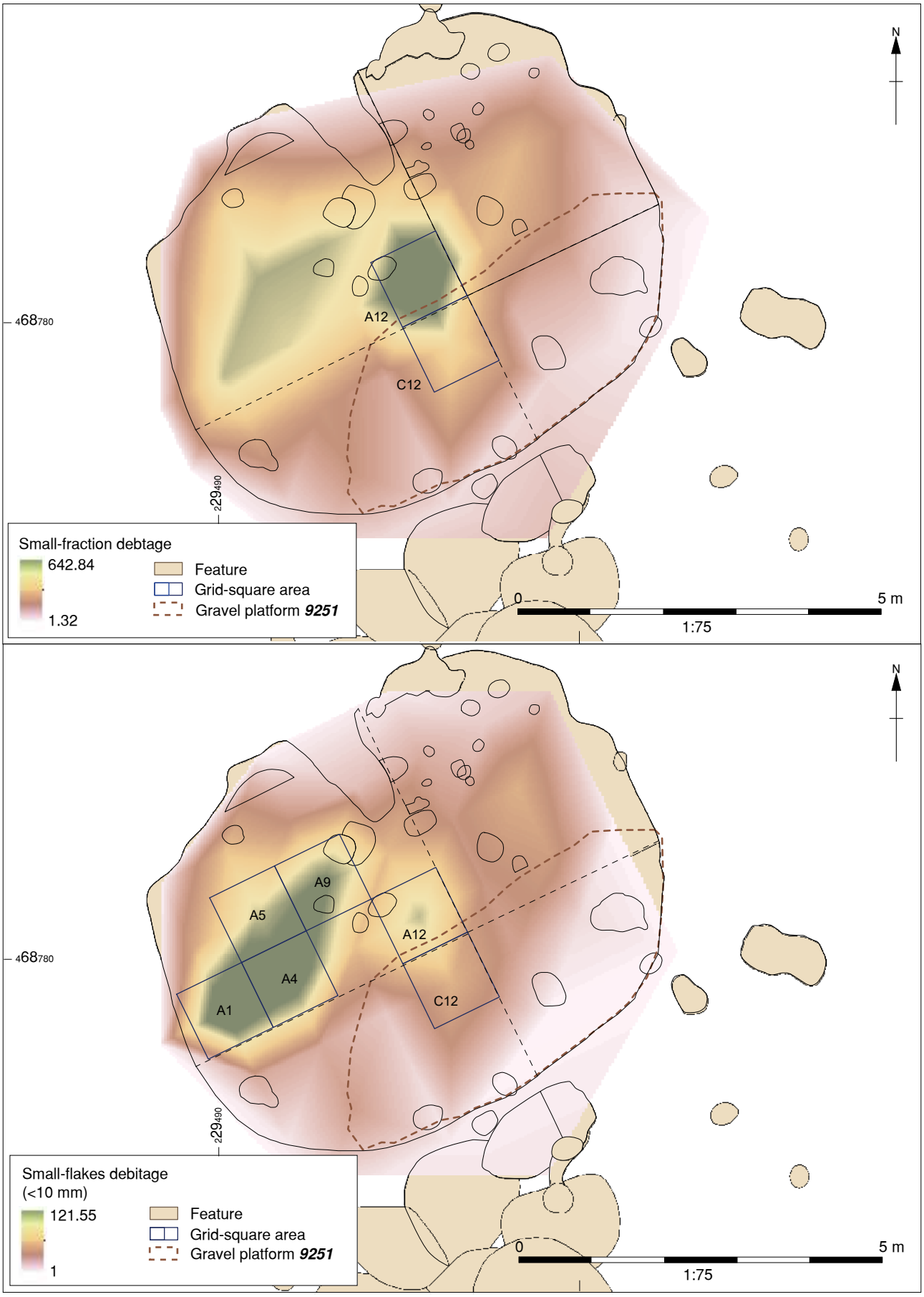


Figure 30: The distribution of the small-fraction and small-flake debitage across the Mesolithic house

across the house and hardly occurred in this area. If the blade cores were indicative of a more specialised mode of production, for example, the production of blade blanks specifically for fashioning into certain tool types, then this activity might have been more closely associated with the north-western quadrant and the area between the two putative hearths. The general distribution of flake and blade/flake cores could, conversely, point to less-specialised, or even *ad hoc,* reduction taking place in many different parts of the structure.

The distribution of the small-fraction debitage (the indeterminate fragments and chunks, blade chips, and small flakes generated as waste material during knapping) accorded well with that of the cores, showing a similar arcing distribution (Fig 30). Within the arc, the indeterminate fragments and chunks were most densely concentrated in grid-squares A12 and C12, which also contained a cluster of cores, suggesting it was an area of knapping, and a similar pattern held for the blade chips.

The distribution of the small flakes (complete flakes with dimensions of less than 10 mm) was slightly different, however, with these being most frequent within grid-squares A1, A4, A5, and A9, and whilst they were present in grid-square A12, they tailed off into C12 to the south. Overall, the small-fraction debitage had a much tighter distribution, seemingly focused on the central hearth in A12 and seemed less disturbed than the small flakes. If debitage was being deposited in this area between knapping events, perhaps by shaking off skins or matting, then the disturbance and blurring of the lithic signature, seemingly focused on the putative second hearth in A5 (*p 59*), might suggest multiple episodes of localised activity, perhaps supplemented by dumped material generated by knapping undertaken elsewhere in the structure. The distribution of the larger blade and flake debitage reinforces these interpretations, as both show a good correspondence with the cores (*p 61*).

The distribution of all retouched items (microliths, and retouched blades and flakes; Fig 31) corresponded to that of the small flakes (*above*). This is probably to be expected, as flakes can be produced during the retouching of tools. Therefore, this would seem to indicate that tool maintenance was taking place

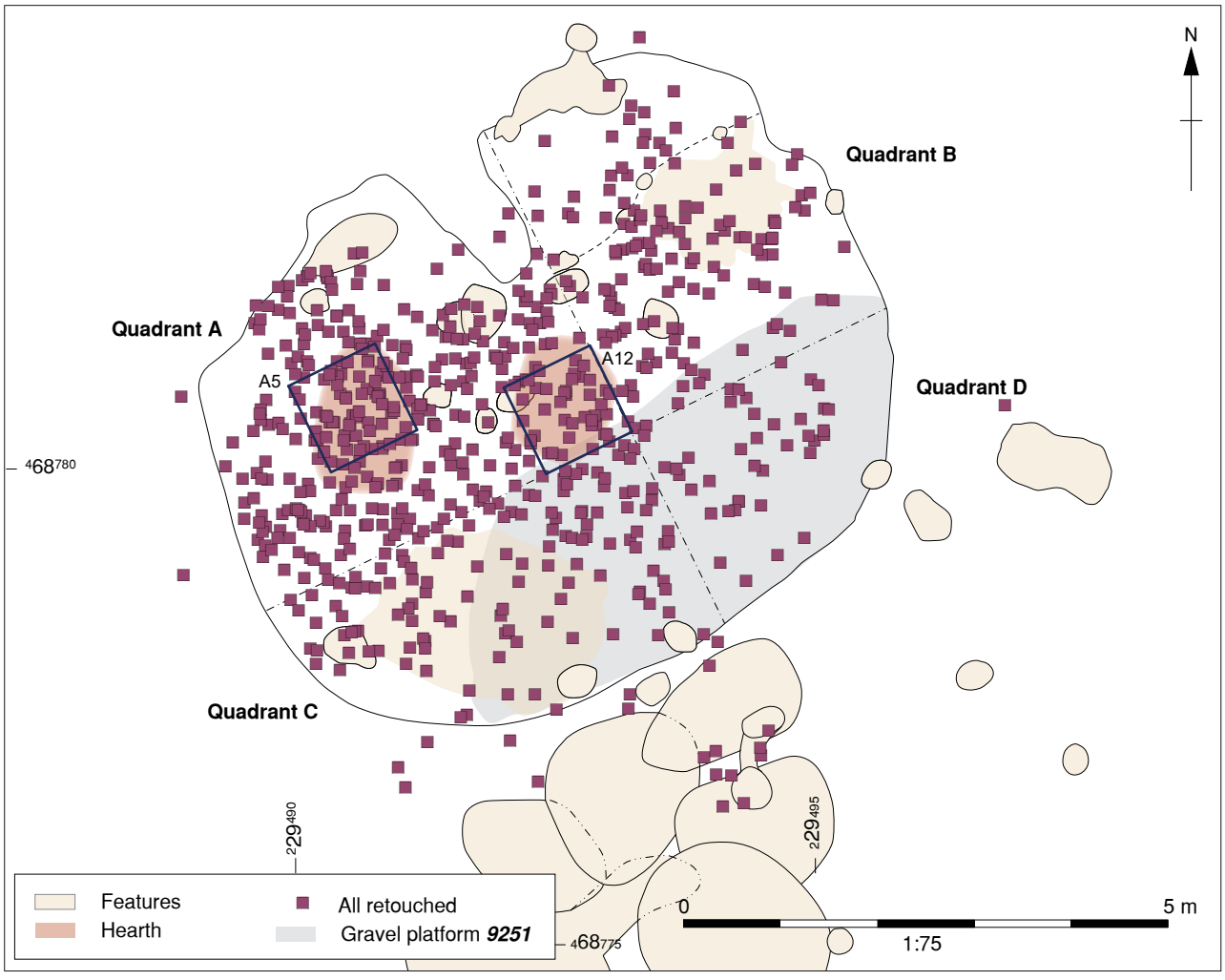


Figure 31: The distribution of retouched items across the Mesolithic house

inside the house, with the knapping of blade blanks to produce microliths to replace damaged ones. Generally, the distribution of microliths and other retouched tools also agreed with that of the cores and debitage (*above*), with concentrations again focusing on grid-squares A5 and A12, although they were densest around the former.

The distributions of microburins, which are produced during microlith manufacture (*p 36*; *Ch 3, p 112*), correlates with those of the cores and debitage, although in the north-east, these are perhaps more frequent than would be expected from the other evidence (Fig 32). The distribution of micro-scalene triangles was similar to that of the microburins, and, whilst they are the most numerous microlith form, this spatial relationship suggests that the microburin technique was closely linked to scalene-triangle production. Microlith fragments also occurred within the main concentrations of flaked lithics, especially in grid-square A5, and their distribution closely followed those of the microburins and micro-scalene triangles. This indicates that the majority were products of microlith manufacture or the repairing of equipment, and that blade and flake blank production within the structure was partially associated with these activities.

In comparison, the elongated scalene triangles tended to occur away from, or on the fringes of, the dense concentrations of flaked lithics. It is possible that the microburins with widths greater than 8 mm were associated with the manufacture of the elongated scalene triangles (*Ch 3, p 107*); however, a comparison of the spatial distribution shows very little direct correlation, except in grid-squares A4, A8, and A12. Some obliquely trimmed blades were associated with the dense concentrations of flaked lithics, but in the main, like the elongated scalene triangles, they tended to be distributed on the fringes of the clusters.

The other tools, in contrast to the microliths, were not always closely associated with the dense concentrations of flaked lithics in grid-squares A5 and A12. Rather than relating primarily to the maintenance of composite tools, their distribution may thus relate to where they were stored, lost, or used within the house. Therefore, like the coarse-stone tools, their positions could potentially indicate where various tasks were being undertaken. For example, the seven scrapers (Fig 33) had a contrasting distribution, with four occurring in the west (predominantly in the area of CST1 and to a lesser extent CST4; *p 57*) and the others found, unusually, in the south-east of the house, on the gravel platform (***9251***), where lithic material was generally scarce. This again emphasises the contrasting nature of the eastern and western sides of the house, apparent also in the distribution of coarse-stone tools (*p 57*) and charred materials (*p 53*), and suggests that any scraping activity was not closely associated with the north-eastern part of the house, whereas to the west, there may have been a functional link between the scrapers, the bevelled pebbles, and the bifacially ground stones, if their co-presence around CST1 is meaningful (*p 57*). If the platform was indeed used for sleeping, then the presence of scrapers in its south-eastern extent might possibly

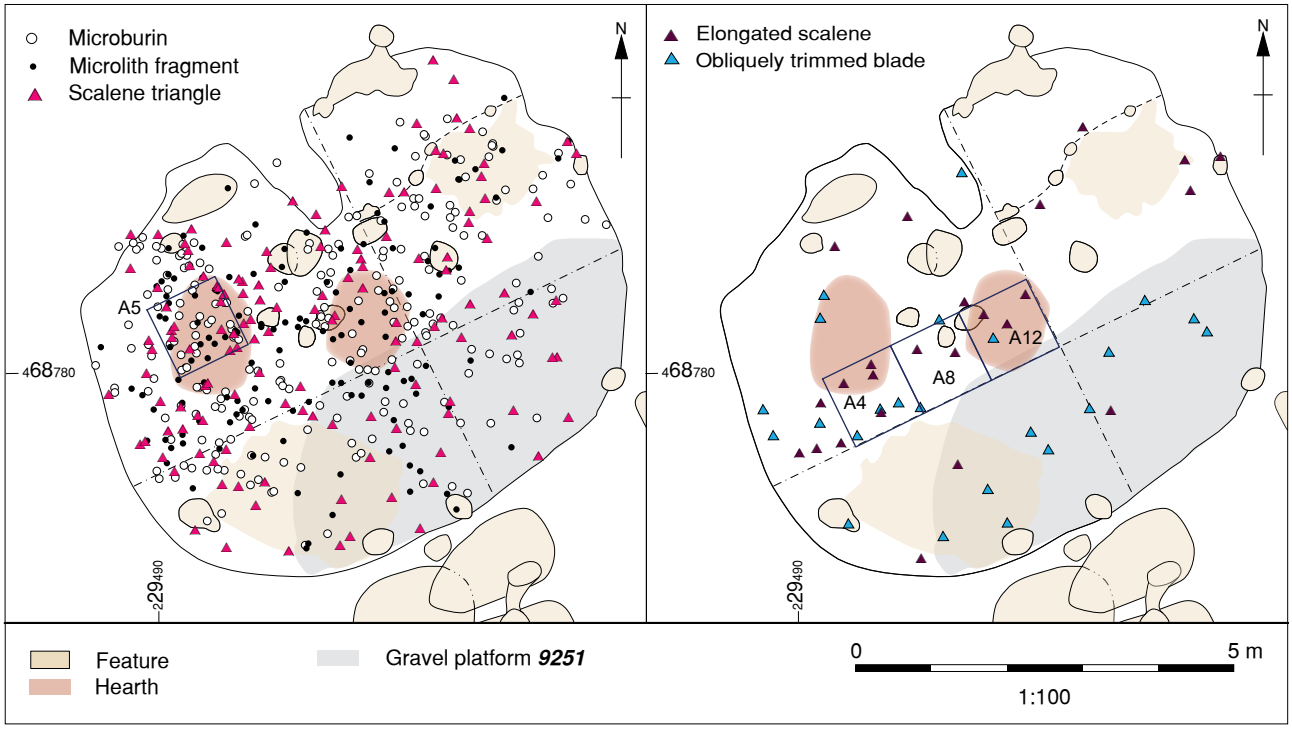


Figure 32: The distribution of microburins and select tool types across the Mesolithic house

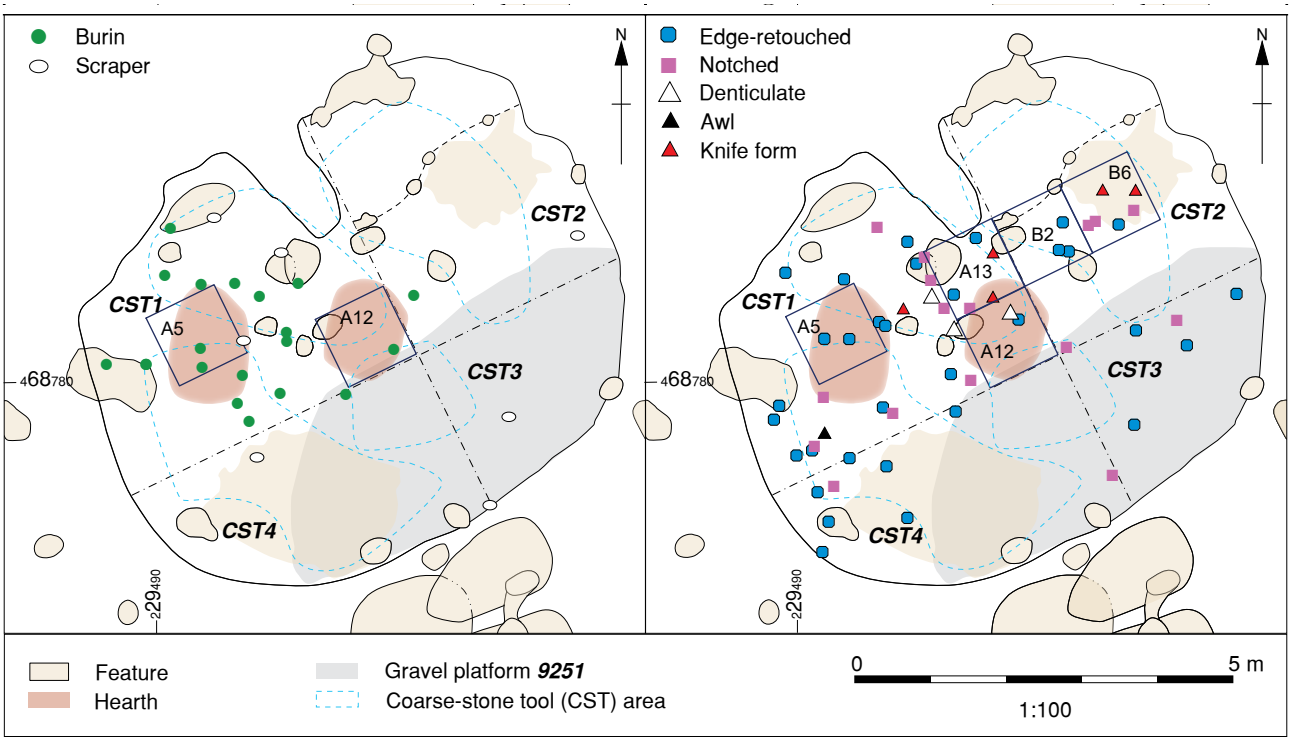


Figure 33: The distribution of tool types across the Mesolithic house

suggest that those who slept there undertook scraping tasks in the opposing north-western part of house.

Similarly, burins were strongly associated with the north-western part of the house, on either side of grid-square A5, and the area of CST1 and CST4. Again, they did not occur in the north-east and were also absent from the platform. Burins are thought to have been used for engraving bone or wood (*Ch 3, p 115*), so, like scraping, this activity seems to have been strongly focused on the west of the structure and did not take place in the east. The knife distribution is interesting, in that only one occurred in the west, indeed towards the centre, whilst two pieces occurred close to the entrance, in grid-square A13, with two other pieces in grid-square B6, to the north-east. This tool type may thus have been used for a different task, or range of tasks, than the burins, the activity being focused on the presumed central hearth and the area to the east.

The other tools all have distinct distributions, although the contrast between them is not as marked as between the burin and knife forms. A single awl occurred just to the south-west of the burins; three denticulate pieces were closely associated with A12, one occurring within it with two others just to the west. The notched pieces were mostly found in the west, like the burins, but three pieces came from grid-square B6, in the CST2 group, and three other pieces were dotted around the eastern half of the platform. Likewise, edge-retouched pieces had a generalised distribution in the west, to a degree in CST1 and CST4, perhaps indicating that they engaged in the same tasks as these coarse-stone tools. In the east, four pieces clustered in grid-squares B2 and B6, and another four were found in the eastern half of the platform.

The worked stone in the environs of the house

Several of the pits and postholes to the south of the house contained worked stone, and a good portion of this was potentially deposited prior to its construction. These flaked lithics included cores and core fragments, and core-dressing pieces, along with various types of debitage (Fig 34).

Microliths were spatially associated with early pit ***9143*** (*p 45*) and later posthole ***9224***, the latter forming an element of the external structure (*p 46*), although the assemblage was small, mainly consisting of microburins and microlith fragments. Hollow ***9194***, which pre-dated the external structure, also produced a microlith fragment, and a microburin. All of the other retouched tools came from pit ***9143*** and hollow ***9194***, comprising six simple edge-retouched pieces and a notch.

Several features also produced relatively large amounts of burnt flaked lithics, with posthole ***9061*** and hollow ***9194*** yielding the greatest amount. However, given that posthole ***9061*** had been cut into the backfill of ***9194***, it is possible that much of this material actually relates to the earlier feature. It is apparent from this material that full reduction sequences were not present, implying that the material represents the secondary dumping of waste. Additionally, the

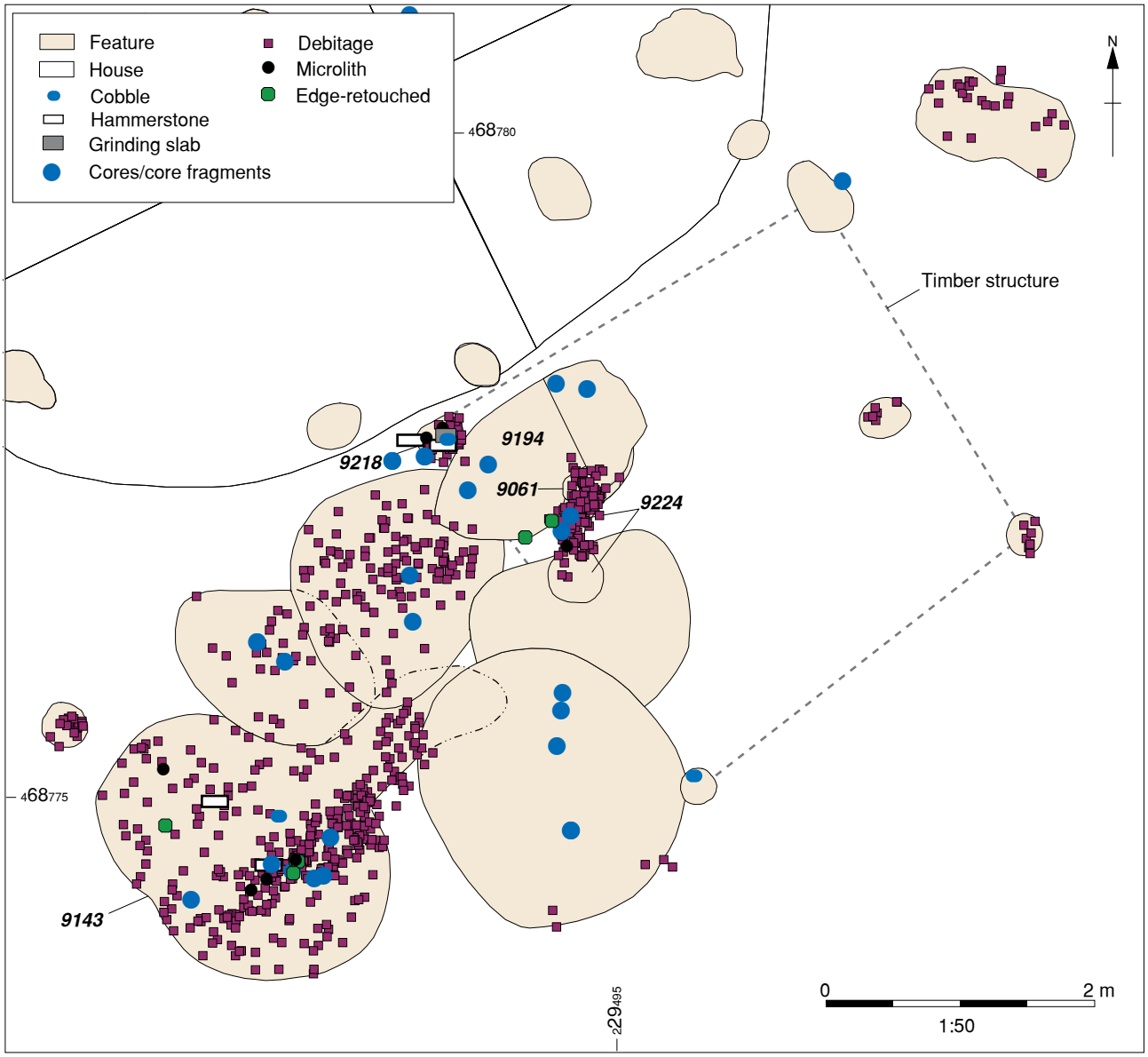


Figure 34: The distribution of flaked lithics and coarse-stone tools in external features to the south of the Mesolithic house

inclusion of mainly unmodified debitage, much of it burnt, from these features, as well as early pit ***9143*** and the adjacent hollows, suggests that selective deposition of some of the material may have taken place.

A small collection of coarse-stone tools also came from two of the features. These comprised an anvil, at the base of pit ***9143***, and two hammerstones and a grinding slab from posthole ***9218***, probably discarded tools used as post-packing (*p 46*).

In addition to these flaked lithics and coarse-stone tools, a dispersed group of flaked lithics was found immediately to the north of the house (covering an area of 5 x 3 m), again, most probably contemporary with it. This material mainly comprised cores used to produce flakes. It was also characterised by a relative lack of debitage, in relation to the number of cores, and therefore it is unlikely that it indicates *in-situ* stone working, being more probably disturbed secondary dumping of waste from the structure, or early activity, possibly contemporary with the early pit and hollows (*p 45*).

A snapshot of life in the late ninth millennium BC

The various strands of evidence allow some excellent insights into the sequence of Mesolithic activity at the site, the form of the Cass ny Hawin II 'pit-house', and particularly the nature and organisation of space within it. Indeed, as many of the microliths were complete, and the coarse-stone tools were seemingly *in situ*, it appears that most of artefacts in the house were found where they had been used, presumably a result of the rapid burning of the house (akin to a 'Pompeii'-type archaeological event). Importantly, following this conflagration, the house was not reoccupied, and therefore the evidence provides

a valuable snapshot of the domestic life of Man's earliest settlers.

It is worth noting, however, that both the stratigraphic and radiocarbon evidence indicate that the house was not built on a 'virgin' site. Instead, it seems to have been erected in an area that had seen some previous Mesolithic activity, which probably occurred not long before the house was constructed (perhaps even only a matter of a few years prior to this), which had presumably influenced its siting. This phase of 'pre-house' activity initially comprised the digging and backfilling of a pit. It is also possible that this was associated with some intentional, or 'structured', deposition of artefacts, as an anvil had been placed at its base, whilst a small concentration of microliths, other tools, and a mass of debitage had been 'dumped' or incorporated into the pit during backfilling. This was followed by the creation of a series of hollows, which were again backfilled, with some also containing lithics, seemingly representing the deliberate and selective dumping of waste, predominantly associated with the initial stages of production. It also seems likely that some of the lithics and charred plant remains from inside the house were associated with this initial phase of activity, since residual items had been serendipitously incorporated into its internal gravel platform (*below*). The same may also be true of some of the lithics found in the postholes for the external structure (*below*), that was contemporary with the use of the house.

Following, this episode, the site was revisited and the 'pit-house' was constructed and occupied. Structurally, from the outside, it possibly resembled a large domed tent, or tepee-style structure, set within an artificial hollow, akin to other narrow-blade 'pit-houses' (*Ch 10, p 319*). This structure would have appeared quite large, perhaps standing some 3 m high, and would have been built using a frame of poles, some, if not all, of hazel. Such pole-type 'tepees' were probably a standard domestic architectural feature during this period, two very well-preserved collapsed examples having been found at Killerby, North Yorkshire. These date to the late tenth or early ninth millennium cal BC and later ninth millennium cal BC, though they seem to have been temporary in character, probably relating to a very short period of occupation (Waddington *et al* 2020).

At Cass ny Hawin II, no clear evidence for the roofing material covering the 'tepee' poles was identified. Although hide could have been used (*cf* Waddington 2007, fig 13.1), no large game (*ie* deer) roamed the island at this time (*p 34*), and seal skin might have been the most readily available hide source on the island. Given the smaller size of seal skins, compared with deer, the number of pelts required to cover a structure of this size would, however, have been fairly vast, perhaps, with as many as 40 (with *c* 2 m^2 area; *cf* Harpseals.org 2022) needed to cover a cone with a diameter of 7 m and a height of 2 m (*c* 83 m^2). Another possibility is that the structure was completely or partially covered with mud, earth, or even bark slabs, which certainly chimes with the ethnographical sources relating to permanent or repeatedly used houses occupied by northern hunter-gatherer groups (*cf* Grøn 2021). If this was the case, though, it is intriguing that no charred palaeobotanical evidence for turf or bark survived, which might have been expected, given the general levels of preservation, and apparent rapid destruction of the house following its occupation (*ie* there being no clear evidence that the house was abandoned and left to decay prior to burning). This might therefore suggest that such roofing materials were deliberately removed prior to a deliberate destruction of the house.

Access into the house was via an entrance on its northern side, which may have been covered with skins. Moving through the entrance and down a short ramp into the interior, the first thing that would have met the eye was a central hearth (which probably covered parts of grid-squares A12 and A13; Fig 35). This was at times fuelled by oak, a very rare species on Man in the late ninth millennium cal BC (*p 34*), used to warm the dwelling and provide heat for cooking, and also for roasting hazelnuts. This putative hearth would have formed the heart of the dwelling, around which was a brushwood floor, composed of hazel/hawthorn rods. This probably covered much of the interior, and 'protected' its inhabitants from the scatters of razor-sharp lithic debris, which had progressively accumulated inside the house, probably falling through the gaps in this flooring. If the floor had been periodically replaced, then material might also have become sealed below the replacement floor, with the process resuming as before.

Looking in from the entrance, behind the apparent central hearth was a slightly raised gravel platform, presumably partly used for sleeping and, although not seemingly floored with brushwood, probably covered with bedding, perhaps including a layer of cleavers. It seems from the distribution of artefacts that the part used for sleeping was to the east. A screened compartment could have occupied the north-eastern part of the dwelling, perhaps used for storage, particularly as it contained a cache of hazelnuts that seem to have been stored in a wicker basket, positioned directly against the side of the house. It also contained a concentration of blackthorn-type charcoal, possibly derived from stored functional items, perhaps carved from cherry wood, which could indicate utensils within a 'kitchen' area. This, and an area immediately to its south-east, did, however, contain a few coarse-stone tools (group CST2; *p 57*), dominated by hammerstones, and including bevelled pebbles, suggesting that other

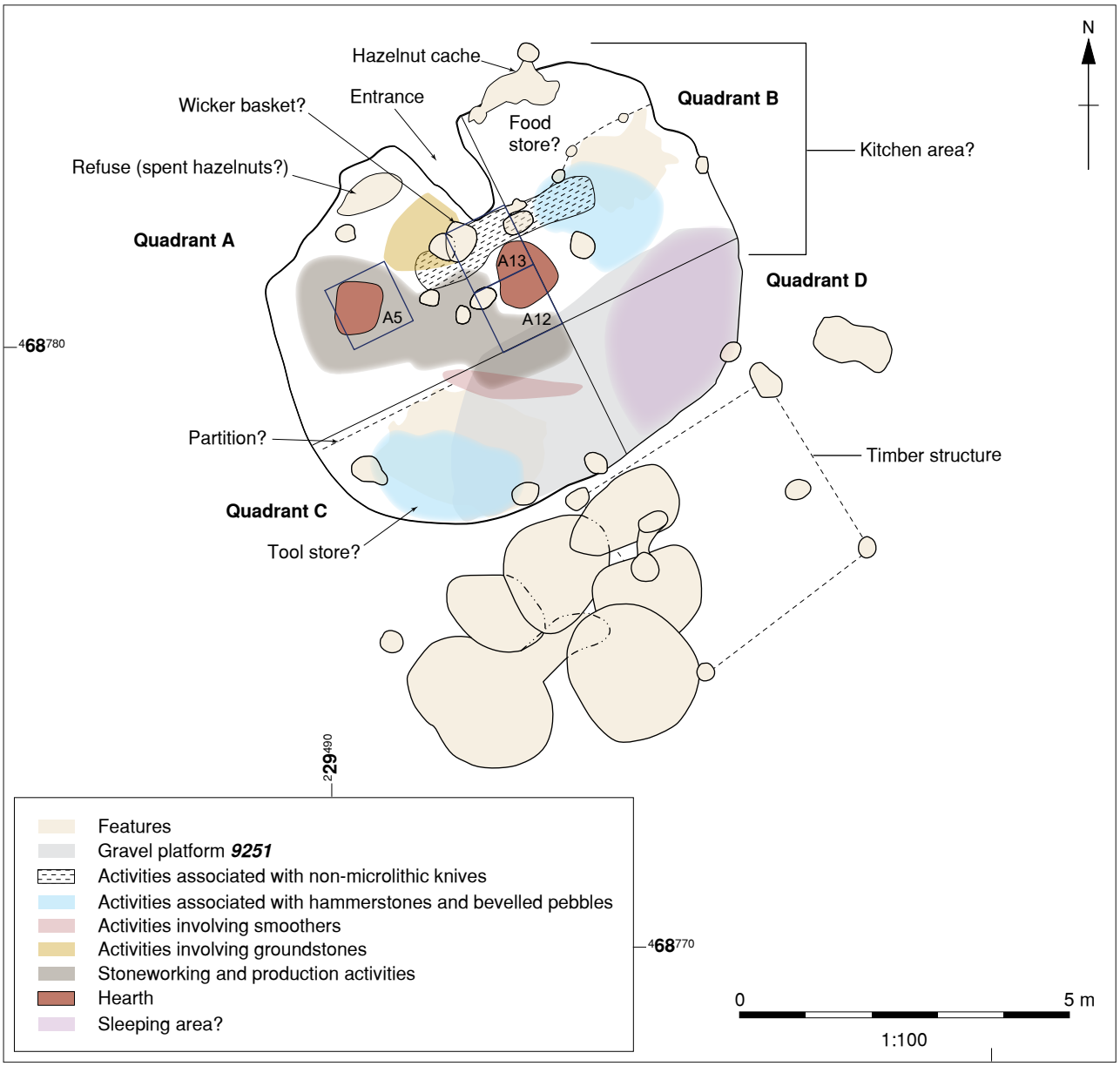


Figure 35: The organisation of space within the Mesolithic house

activities also occurred in this area. Notably, it is also possible that this area, and an area just north of the hearth, were associated with activities involving the use of knives, as these did not seem to occur in other parts of the building. It is of course possible that all these tools related to food processing and preparation.

The part of the house to the west of the central hearth (quadrants A and C) was different in character and, in one sense, formed a more 'active' part of the dwelling. For instance, immediately to its west, the hearth was ringed by several shallow scoops, one of which appears to have contained a wicker basket, apparently within which was a small group of coarse-stone tools (part of group CST1; *p 57*), and it seems that, more generally, this area was associated with activities that involved the use of ground stones. It also seems that the area to the south-east of the hearth formed a focus for stone knapping, based on the distribution of coarse-stone tools (particularly those associated with group CST3; *p 58*) and flaked lithics. In addition, these coarse-stone tools included a group of smoothers, suggestive of another discrete activity area. There was also a notable concentration of burnt lithics on the southern side of the hearth (in grid-square A12), associated with cores, knapping debris, and microliths, suggestive of stone knapping and also the dumping of knapping debris from other parts of the house.

To the west was another secondary hearth (denoted by a dump of burnt lithics within grid-square A5; *above*), whilst to the north, against the wall, was a pit used either to store hazelnuts, or more probably processed/spent shells. Again, both this potential

hearth and pit imply that the western side constituted an 'active' zone. Stoneworking in particular seems to have been focused on this secondary hearth, with the production of blade blanks being one identifiable component. This area also seems to have been the focus for production activities using scrapers, burins, awls, edge-retouched and notched pieces, and possibly involving more concerted or specialised episodes of tool production (for instance, combined endeavours, such as gearing up for hunting expeditions). If so, the relative lack of hammerstones in this area may perhaps suggest that these were returned to the centre of the building for storage. In addition, this area contained a notable amount of blackthorn charcoal, which might conceivably relate to the carving of cherry wood.

It is also possible that the western side of the house was partitioned, since a distinct line of elm charcoal was present, perhaps denoting the position of a panel. The secondary hearth was to the north, whilst the western end of the raised platform was to the south, which also contained a loose concentration of coarse-stone tools (defined as group CST4; *p 58*). These suggest that those activities employing hammerstones and bevelled pebbles occurred at the western periphery of the house, or perhaps that these objects were stored there, which may also explain the presence of the possible partition, opposite the other potential store.

While the house was in use, a large square structure was erected at its rear, which partly covered the area containing the backfilled earlier pit and hollows (*above*). This structure was formed of vertical timber uprights, and one of the earthfast posts had been secured by using packing stones that had previously functioned as coarse-stone tools. It is unclear if this act of reusing and incorporating domestic items into its fabric was linked to their perceived qualities as 'significant' objects, or whether they just formed readily available items that could be used for the job in hand. Similarly, the function of this structure is also uncertain, but it presumably related to, or shielded/protected, activities which were difficult to undertake inside the domestic space.

Overall then, the house would have been a busy space, the focus for a series of regular activities. Although crafts, and tool repair and maintenance seem to have been undertaken almost everywhere (as shown by the knapping debitage, and the micro-scalene triangles and microburins), it seems that the two hearths formed particular foci, set within the more 'active' north-western part. In contrast, more passive activities, such as sleeping and storage, seem to have occurred in the eastern half, with the former area being placed in the rear, and perhaps darker, south-eastern corner, with that partly used for storage being in the opposing, north-eastern corner. It is also possible that the store and the area between this and the platform functioned as a kitchen area, whilst potentially some of the coarse-stone tools were stored (or used) in the south-west. In this sense, there seems to have been, by present-day standards, a fairly logical organisation to the space within this house, which may well have been replicated in any similar dwellings that then existed on Man, and also within the wider Irish Sea area.

Either during its use, or after its abandonment, though probably not too long following its construction, the house was burnt to the ground. Although it is difficult to unpick the evidence leading to this event, there is a sense that this probably occurred at the end of its perceived life, particularly if the roofing materials covering the structure had been removed, as might have been the case (*p 53*). This may therefore suggest that it was a deliberate, rather than accidental, act. In any event, it seems that this Mesolithic locale retained its significance and resonance, and was revisited at a slightly later date, which involved the digging of a small pit (***9056***; *p 47*), which had possibly been deliberately filled with a few flaked lithics.

3

THE WORKED STONE AND ENVIRONMENTAL REMAINS FROM CASS NY HAWIN II

Antony Dickson, Aidan Parker, Ann Clarke, and Denise Druce

The large assemblage of Mesolithic finds from Cass ny Hawin II included a sizable number of worked-stone artefacts, along with the collection of charcoal and charred plant remains (*Ch 2, p 50*). The entire assemblage of artefacts and environmental remains from within the house was recovered, through a combination of hand collection during the excavation of 1m-grid-squares, and subsequent wet-sieving of all the stratigraphic deposits associated with this structure (*Ch 1, p 21*). All of this material was then analysed.

Environmental Evidence

D Druce

One of the defining features of the Cass ny Hawin II house was the presence of numerous deposits that were extremely rich in charcoal and charred plant materials. These materials largely occurred in the interior, effectively representing *in-situ* items, which had become charred in the late ninth millennium cal BC during the conflagration which destroyed the structure (*Ch 2, p 43*). Most of those recovered were a result of the sampling strategy adopted, which involved sieving all of the material to extract as much palaeoenvironmental information as possible (Druce *et al* 2025; *Ch 1, p 23*). Given its early date and context, and the circumstances of its preservation and recovery, the assemblage is highly significant and provides rare insights into the nature and occupation of a Middle Mesolithic dwelling (*Ch 2, p 53*).

Charred hazelnuts

Hazelnut-shell fragments were the dominant charred plant remains in the house, with a total of 10,238 individual items (larger than 2 mm in size) being recovered, which had a combined weight of 170.6 g (Table 8). In addition, a collection of shell fragments less than 2 mm in size were quantified on scales of abundance (1-4; *Ch 1, p 24*). Although the quantities of these were only estimated, this did not seem to have affected the overall spatial pattern and density of the material within the house (such quantifications were also used, and seen as valid, in the analysis of hazelnut densities from other Mesolithic sites in western Britain; *cf* Carruthers 2000)).

The bulk of the fragments (Fig 36) came from internal features (*Ch 2, p 43*), as well as occupation/destruction deposit ***9249***, and the overlying upper silt (***9248***; *Ch 2, p 44*). It is probable, however, based on the spatial distribution of lithics and the vertical distribution of the hazelnut shells, that the material from these two deposits were from the same broad phase of occupation

	Total count	Total weight (g)	Volume of sediment processed (l)	Concentration (count per litre processed)*	Density (weight g per litre processed)**
Gravel platform ***9251***	325	4.09	719	0.452	0.006
Structural postholes	61	1.69	58	1.052	0.029
Internal features	2649	69.49	222	11.932	0.31
Erosion deposit ***9253***	141	1.09	477	0.295	0.002
Occupation/destruction deposit ***9249***	3571	57.55	1885	1.894	0.030
Upper silt ***9248***	3337	35.05	3322	1.004	0.010
External features	154	1.64	485	0.317	0.003
Total	***10,238***	***170.6***	***7168***		

*total count/volume of sediment processed; **total weight/volume of sediment processed

Table 8: Hazelnut-shell fragments (>2 mm) from the main stratigraphic units at Cass ny Hawin II

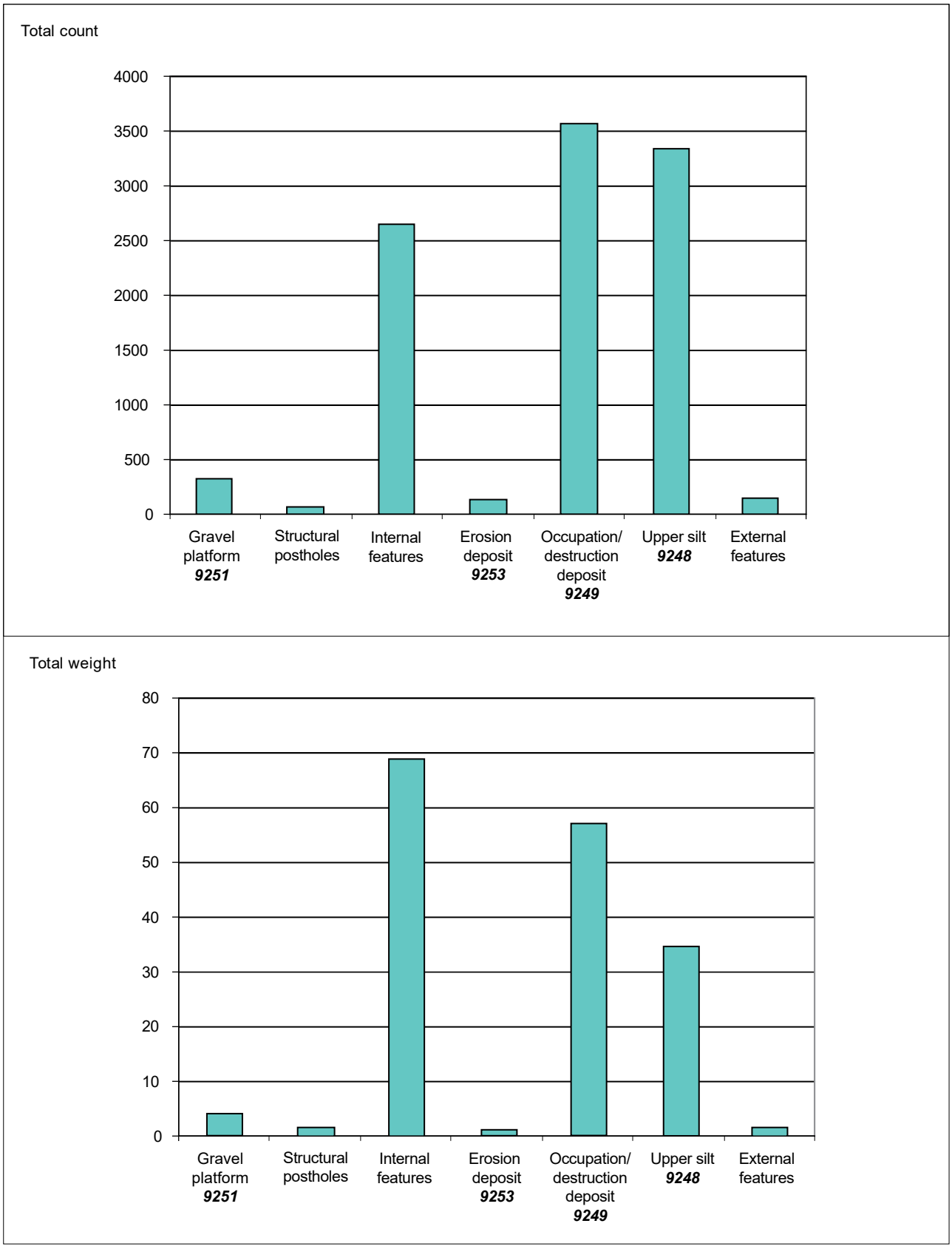


Figure 36: Quantities and weights of hazelnut-shell fragments within the main stratigraphic groups at Cass ny Hawin II

(*Ch 2, p 44*). The relative paucity from erosion deposit ***9253*** is notable, though it is probably not entirely surprising, given that it was very ephemeral (*Ch 2, p 43*). Similarly, the lack of fragments from gravel platform ***9251*** suggests that very little debris had become incorporated into this feature, and at least

some of the shell fragments from there were probably residual, relating to the initial phase of 'pre-house' activity. Other ecofacts associated with this earlier phase probably also included the small amounts of charred plant remains from the external features to the south of the house (*Ch 2, p 45*).

In order that the relative values could be compared between the different stratigraphic units in the house, concentrations (number of fragments per litre of sediment processed) and density (weight per litre of sediment processed) were calculated (Fig 37). This suggests that, although large numbers were present in occupation/destruction deposit ***9249*** and overlying upper silt ***9248***, the concentration and density were by far the greatest in the internal features. This is likely to reflect the caching of hazelnuts, or the inclusion of fragments (whether purposefully or accidentally) within these features, the material in the upper silt deposit (***9248***) probably reflecting

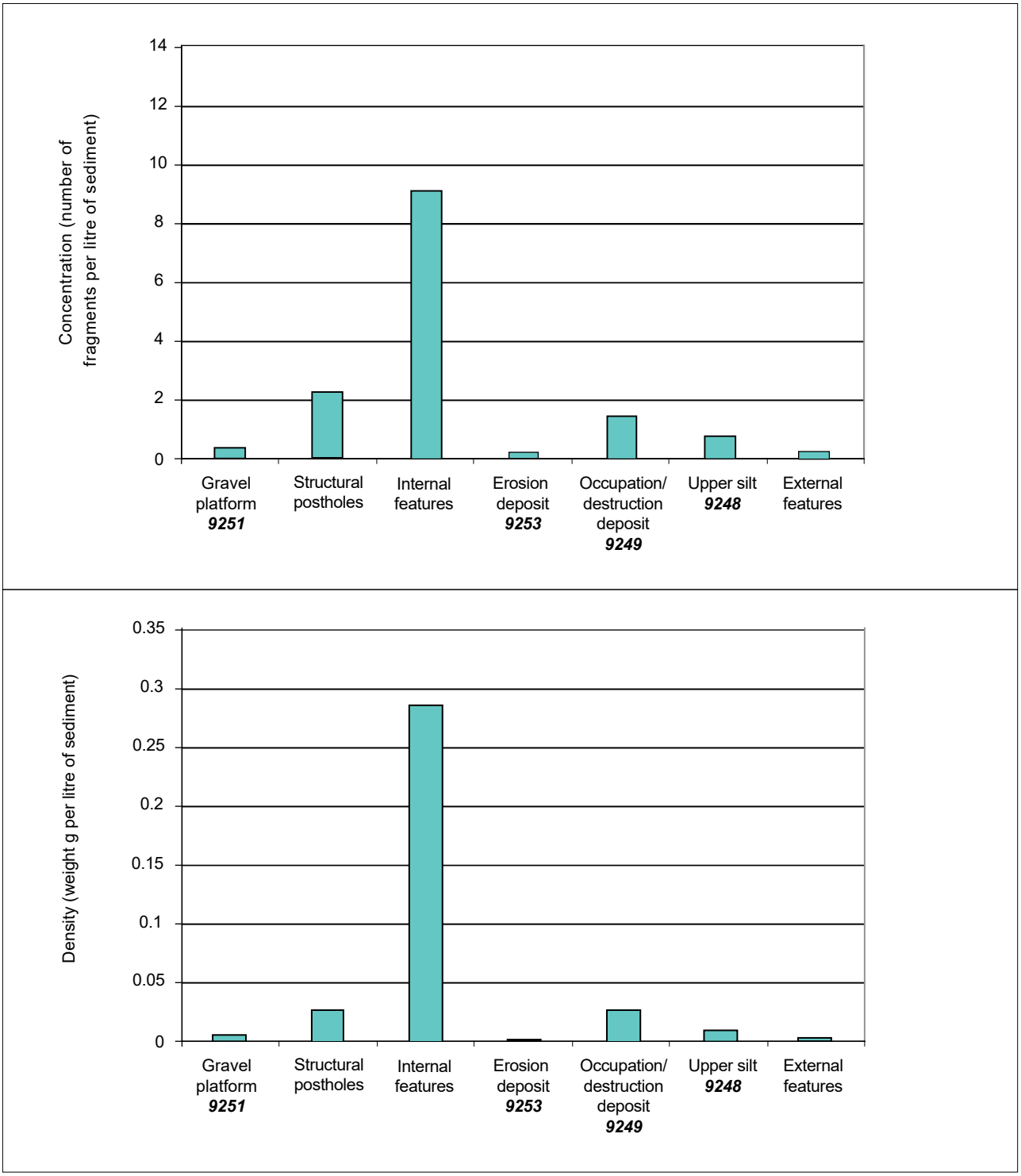


Figure 37: Concentrations and density of hazelnut-shell fragments within the main stratigraphic groups at Cass ny Hawin II

sediment accumulation and reworking following abandonment. The relatively high concentration in the structural postholes is, by and large, attributable to a single feature, ***9081*** (*Ch 2, p 42*), with 2.167 fragments/litre of sediment), in grid-square A6, to the west of the entrance.

Comparisons with Mesolithic 'hazelnut sites' from northern Britain

The recovery of hazelnuts from Cass ny Hawin II is certainly to be expected, as these clearly formed an integral element of the Mesolithic diet across Europe (*inter alia*; Clarke 1976; Zvelebil 1994; Holst 2010; Bishop *et al* 2013). Even considering the energy required to harvest and process hazelnuts, their calorific value is immense (Holst 2010), being surpassed only by beech nuts, another potential component of the European Mesolithic diet (Carruthers 2000). Indeed, modern experiments have revealed that one individual could have acquired 44% of their annual energy requirements during a two-week harvesting season, with up to 7600 hazelnuts being harvested by a single individual in one day (McComb 2009; Holst 2010). In addition, whether stored whole, or ground down to facilitate easier transportation, roasting is believed to have extended their shelf life, making them easier to process (crack and grind), and improving their nutty flavour (Mithen and Finlay 2000; Score and Mithen 2000; Holst 2010; Bishop *et al* 2013; Bishop 2019). Evidence for roasting nuts seems, therefore, to be a feature of some Mesolithic sites, particularly those associated with roasting pits (*eg* Howick; *below*), or masses of charred hazelnut fragments, perhaps best evidenced at Staosnaig, Colonsay, occupied in the seventh millennium cal BC, where a large pit was recorded containing 30,000-60,000 hazelnut fragments, with a total weight of 3 kg (Mithen and Finlay 2000, 379; Carruthers 2000, 413). It is likely that such 'waste' fragments only represent accidentally charred hazelnuts that were rendered inedible during roasting, and that they may only represent between 12% and 26% of the total volume that were roasted, depending on the efficiency of the methods used (Score and Mithen 2000, 510). Such figures clearly highlight the importance of hazelnuts for some Mesolithic peoples.

Given the obvious importance of hazelnuts, it does seem that, compared with other comparable Middle Mesolithic 'pit-houses' from northern Britain (*Ch 10, p 319*), the Cass ny Hawin II assemblage is comparatively small. For instance, much larger assemblages (*c* 223,000 fragments) were recovered from the three main phases of occupation at Howick, on the Northumberland coast, dating to the first quarter of the eighth millennium cal BC, with the secondary phase of occupation also being associated with two roasting pits, containing over 5000 charred hazelnuts (Waddington 2007; Cotton 2007). Similarly, in the 'pit-house' at Echline Fields, close to the Firth of Forth (Robertson *et al* 2013), although smaller quantities of hazelnuts were present (60 g) from the primary (late ninth millennium cal BC) phase of occupation, these were derived from a mere 5% sample of the interior, so the actual quantities associated with this structure were undoubtedly much larger (potentially 1.2 kg), and would have certainly exceeded the assemblage from Cass ny Hawin II. It therefore seems from this, that, at least in terms of hazelnut quantities, Cass ny Hawin II differed in some major respect. Indeed, given these comparatively small quantities, one possibility is that these rather reflect a single, short-lived, occupation, extending for a season at the most. Moreover, the small quantities may also suggest small-scale processing of hazelnuts, perhaps for personal consumption, which would certainly fit with the little cache of hazelnuts found next to the entrance (*Ch 2, p 67*), and would also explain the absence of any roasting pits either inside or outside the house, such as those at Howick (*above*). Of course, pushing this idea slightly further, it could well be that the small quantities of hazelnuts, and lack of dedicated features associated with roasting, might imply that hazel was, in fact, a comparatively rare resource in this part of the island in the late ninth millennium cal BC (*Ch 2, p 34*).

Other charred plant remains

Other types of material from Cass ny Hawin II were rare and tended to be limited to internal layers in the house, rather than particular features (Table 9), with roughly equal numbers being recovered from occupation/destruction deposit ***9249*** and upper silt ***9248*** (*Ch 2, p 44*). The most common were seeds from cleavers (*Galium aparine*), small vetch/wild pea (*Vicia/Lathyrus* sp), and probable crab apple (*Malus sylvestris*) pips and charred fruit fragments. A small number of seeds of sheep's sorrel (*Rumex acetosella*) also came from two of the grid squares, whilst a few charred cereals were also recorded, though these were almost certainly intrusive items.

Although it can be assumed that the crab apples were brought into the house as food (*p 75*), the sources of the cleavers, vetches/wild peas, and sheep's sorrel seeds are potentially wide-ranging. Cleavers and many of the vetches/wild peas are scrambling plants (Godwin 1975), enabling them to grow high into hedgerows and the lower branches of trees. Subsequently, the fruit/seeds of both plants could have entered the house accidentally, collected alongside other material, such as firewood or hazelnut clusters. Cleavers, or goosegrass/sticky willie, as it is familiarly known, also easily sticks to hair/fur and clothing, and therefore it is possible that the fruits may have entered the house directly on humans or animals (RHS 2022). Indeed, it has been suggested that cleavers may have arrived at Staosnaig, Colonsay (*above*), directly as a result of the

	Gravel platform *9251*	Structural postholes	Erosion deposit *9253*	Occupation/ destruction deposit *9249*	Upper silt *9248*	*Total*
Vetch/wild pea (*Vicia/Lathyrus* sp)	2	1		6	4	***13***
Crab apple (*Malus sylvestris*)	1			4	2	***7***
Cleavers (*Galium aparine*)			1	11	9	***21***
Sheep's sorrel (*Rumex acetosella*)				1	1	***2***
Hawthorn (cf *Crataegus monogyna* fruit)				1		***1***
Rose family (Rosaceae)					1	***1***
Grass family (Poaceae)					1	***1***
Cereals				2 (indeterminate)	9 (seven indeterminate; two *Triticum* sp)	***11***
Total	***3***	***1***	***1***	***25***	***27***	***57***

Table 9: The total counts for the other charred-plant remains from the main stratigraphic units at Cass ny Hawin II

gathering of hazelnuts (Carruthers 2000). Cleavers and vetch/wild pea also flourish around human habitation, and it has been suggested that cleavers was strongly associated with this throughout the Holocene (*ibid*; Godwin 1975). Moreover, like most synanthropes, cleavers would have flourished in disturbed areas occupied by people (van der Veen 2014), and the early and close symbiotic relationship between this family of weeds and humans has been identified, in the form of over 11,000 *Galium tricornutum* (corn cleavers) seeds from a 23,000-year-old hunter-gatherers' sedentary camp in Israel (Snir *et al* 2015).

The use of the charred plant remains

Plant macrofossils from Mesolithic sites, other than charred hazelnut fragments, are rare in Britain and Ireland. Therefore, it is notable that all three of the most commonly occurring remains from the Cass ny Hawin II (cleavers, crab apple, and vetch/wild pea) have also been recorded at Mount Sandel (Monk and Pals 1985) and Staosnaig (Carruthers 2000). Their presence as part of what is essentially a very restricted dataset suggests that they may have been an important resource for Mesolithic people, which were perhaps intentionally collected, rather than being accidently introduced into the house (*p 74*). Of these, crab apples are the most obvious food source, which could be made more palatable through cooking (Bishop *et al* 2013), though both cleavers and vetch/wild pea are also edible. The seeds from cleavers, for example, once dried and roasted slightly, can be used to make a drink (Grieve 1931; Mabey 2007), whilst leaves of vetch/wild peas can also be eaten as salads, as can sorrel, which was present in small amounts in the house, which still forms a modern culinary ingredient, with a slightly sharp lemony taste (Edlin 1951; Mabey 2007). It is worth noting that cleavers, and the other salad leaves, as well as the seeds from vetch/wild pea, can be boiled and consumed, although given the lack of ceramic vessels during the Mesolithic period it is unclear if the boiling of water for cooking and other purposes was possible or not.

Cleavers, at least, might also have been put to other non-culinary uses. For instance, these are closely related to lady's bedstraw (*Galium verum*), which, as its common name suggests, was formerly used for stuffing beds (Edlin 1951). It is interesting that, spatially, these were confined to the part of the house potentially used as a sleeping area (*Ch 2, p 57*).

Although many of the seeds and fruits found on Mesolithic sites in Britain would be consistent with occupation in mid/late summer (cleavers and vetch/wild pea) and autumn (hazelnuts, apples, and other fruits; Carruthers 2000), if much of it was food, then the fact that most can easily be stored means that this may not necessarily equate with the time of use (*ibid*). Like hazelnuts, crab apples and some vetches once cooked or dried (*above*) would have been suitable for transportation or storage. Positive evidence for the autumnal charring of crab apple, or other fruits, at Staosnaig, however, was identified by the use of scanning electron microscopy (SEM), which suggested that the specimens were charred in a relatively fresh state (*ibid*). Given the astringency of

fresh crab apples, it may be suggested (Bishop *et al* 2013) that they are likely to represent the remains of fruit accidentally charred during cooking, or drying, prior to consumption or storage.

Of potential importance was the recovery of a number of cereal grains from the grid-square samples. However, on closer examination, they came primarily from deposits associated with features beyond the house, so they are more likely to have been intrusive, from later activity. Moreover, the presence of both emmer wheat (*Triticum dicoccum*) and naked barley (*Hordeum vulgare* var *nudum*) is consistent with the assemblages from the Bronze Age settlement at Taxiway Alpha East (*Ch 7, p 246*), some 300 m from the Mesolithic house.

Charcoal

Six species or groups of species were identified in the charcoal assemblage from Cass ny Hawin II, comprising hazel, hawthorn-type (Maloideae), blackthorn-type (*Prunus* sp), willow/poplar (*Salix*/*Populus*), elm (*Ulmus* sp), and oak (*Quercus* sp), the latter two being represented by only one or two fragments. The relative quantities of charcoal types from the features indicates that higher levels of charcoal were present towards the front (north) of the house (*Ch 2, p 53*). This distribution may, however, reflect patterns of survival rather than actual concentrations, given that many of the features that seemingly contained very few fragments were recorded as being very black during the excavation. Consequently, it is possible that, as a result of poor preservation, the charcoal from these features disintegrated during excavation and/or environmental processing. Indeed, a similar characteristic was noted with the charcoal at Howick, as although many of the features exhibited fire-reddened edges and appeared to contain abundant charcoal, implying *in-situ* burning, much of the material disintegrated during excavation, or whilst being sampled (Cotton 2007).

Relatively large (greater than 10 mm in size) fragments of hawthorn-type and hazel wood, including fragments of small roundwood 'rods', also dominated the hand-retrieved charcoal fragments, interpreted as the remains of flooring in quadrant A (upper silt ***9248***), quadrant B (floor ***9092***), and quadrant C (floor ***9250***; *Ch 2, p 43*). Although the pieces were too fragmented to establish the diameter of the wood, they may possibly have originated from either naturally occurring, or anthropogenically induced, coppiced wood. If the latter were the case, this would imply the active management of woodlands, which certainly seems to be a feature of the later Mesolithic period in some other parts of western Britain, such as at Stainton West, Cumbria (Brown *et al* 2023). Willow/poplar and blackthorn-type charcoal appears to have had a much more restricted presence, but seem to relate to functional items, such as baskets used for storage (*Ch 2, p 53*). Similarly, oak and elm were restricted, with the former perhaps being used as fuel wood, and the latter seemingly relating to an internal panel (*Ch 2, p 53*).

Coarse-stone Tools

A Clarke

The 59 Mesolithic coarse-stone tools from Cass ny Hawin II comprise a wide range of artefact types, consisting of three unusual bifacially ground stones, bevelled pebbles, hammerstones, and anvils, as well as smoothers/rubbers, a dimpled cobble, and a grinding slab (Table 10). A collection of distinctive, large, rounded cobbles was also associated with this house.

The majority of these tools came from either occupation/destruction deposit ***9249*** or upper silt deposit ***9248***, both of which filled the footprint of the house (*Ch 2, p 44*). Spatial analysis suggests, however, that they formed elements of a single phase of occupation, and, aside from some slight vertical movement (of those in deposit ***9248***), that they may have been found where they were last used, stored, or discarded (*Ch 2, p 57*).

Ground stones

Three unusually shaped ground stones were found close to one another. The finest piece (6181; Fig 38) is made from an oval cobble of medium-grained sandstone. Heat damage has caused some breakage and spalling at each end, which has, unfortunately, destroyed much of the perimeter in these areas. It has been shaped by pecking and grinding to form a fine bifacial bevelled edge around the perimeter of the cobble, both faces having been ground at slight inward angles to form a splayed long section, being slightly concave in cross-section. The bevelled edge is noticeably discoloured to a dark surface, in contrast to the lighter brown of the ground faces, and, since this is confined to the sides, it is most probably the result of contact with a substance during the utilisation of the piece, or possibly deliberate colouring, rather than heat damage. The bevels are particularly defined on the long edges, where they have been very finely ground to form a fine curved cross-section with a distinctive angled edge. The bevels are less defined and worn towards either end, and, where the original surface survives, they have been shaped to a curve by pecking, but are much less heavily ground.

One distinctive feature is a raised ribbed pattern, worked on the surface of the ground bevels on either side. When observed side-on, these ridges are angled to form chevrons, with the sharp edge of the bevel as

Coarse stone tool type	Raw material	No of pieces	*% of total*
Ground stone	Medium-grained sedimentary	3	***5%***
Dimpled cobble	Fine-grained sedimentary	1	***2%***
Grinding slab	Medium-grained sedimentary	1	***2%***
Bevelled pebble	Fine-grained sedimentary	4	***8%***
	Medium-grained sedimentary	1	
Rounded cobble	Coarse-grained sedimentary	8	***22%***
	Fine-grained sedimentary	1	
	Medium-grained sedimentary	4	
Rounded hammerstone	Coarse-grained grit	2	***14%***
	Coarse-grained mica	1	
	Coarse-grained sedimentary	2	
	Fine-grained sedimentary	2	
	Medium-grained sedimentary	1	
Elongated hammerstone	Fine-grained sedimentary	5	***12%***
	Medium-grained sedimentary	1	
	Schist	1	
Anvil	Granite	1	***3%***
	Medium-grained metamorphic	1	
Faceted hammerstone	Metamorphosed sandstone	1	***2%***
Plain hammerstone	Coarse-grained sedimentary	1	***3%***
	Medium-grained sedimentary	1	
Smoothers/rubber	Fine-grained sedimentary	2	***5%***
	Medium-grained sedimentary	1	
Unworn cobble	Coarse-grained mica	1	***15%***
	Fine-grained sedimentary	3	
	Granite	1	
	Metamorphic	1	
	Metamorphosed sandstone	2	
	Quartzite	1	
Fragment	Vein quartz	3	***5%***
Heat-cracked	Fine-grained sedimentary	1	***2%***
Total		***59***	***100%***

Table 10: The coarse-stone tools and raw-material types from Cass ny Hawin II

the central spine. Initially, it was suspected that the piece might be a fossil such as an ammonite, though this has subsequently been discounted (Y Candela *pers comm*), and it appears that the ridges, or ribs, are clearly linked with how the edges were ground. It therefore seems likely that the edge was grooved into this pattern prior to use or further shaping. The placing of these grooves may have been to provide purchase during use, or as decoration, or perhaps as a means of decorating another surface on which this tool was subsequently used. These ridges have then been worn to a smooth and rounded finish or, in some cases, are quite flattened with further working. The marks could not feasibly have been produced by rubbing over a ribbed surface, since the curved edge is so regular and sharp, and because the ridges have been subsequently worn down to varying degrees.

Although the precise function of this curious artefact is unknown, its distinctive features suggest that it was manufactured for a very specific purpose. On its own, it could be interpreted at many levels, either as a tool or even as a decorative or symbolic object. However, there are two other pieces of ground stone which share some characteristics with this object, although neither has been so finely altered to shape (Fig 38). One of these is a lump of medium-grained red sandstone (27126), which has no cortical surface and appears to

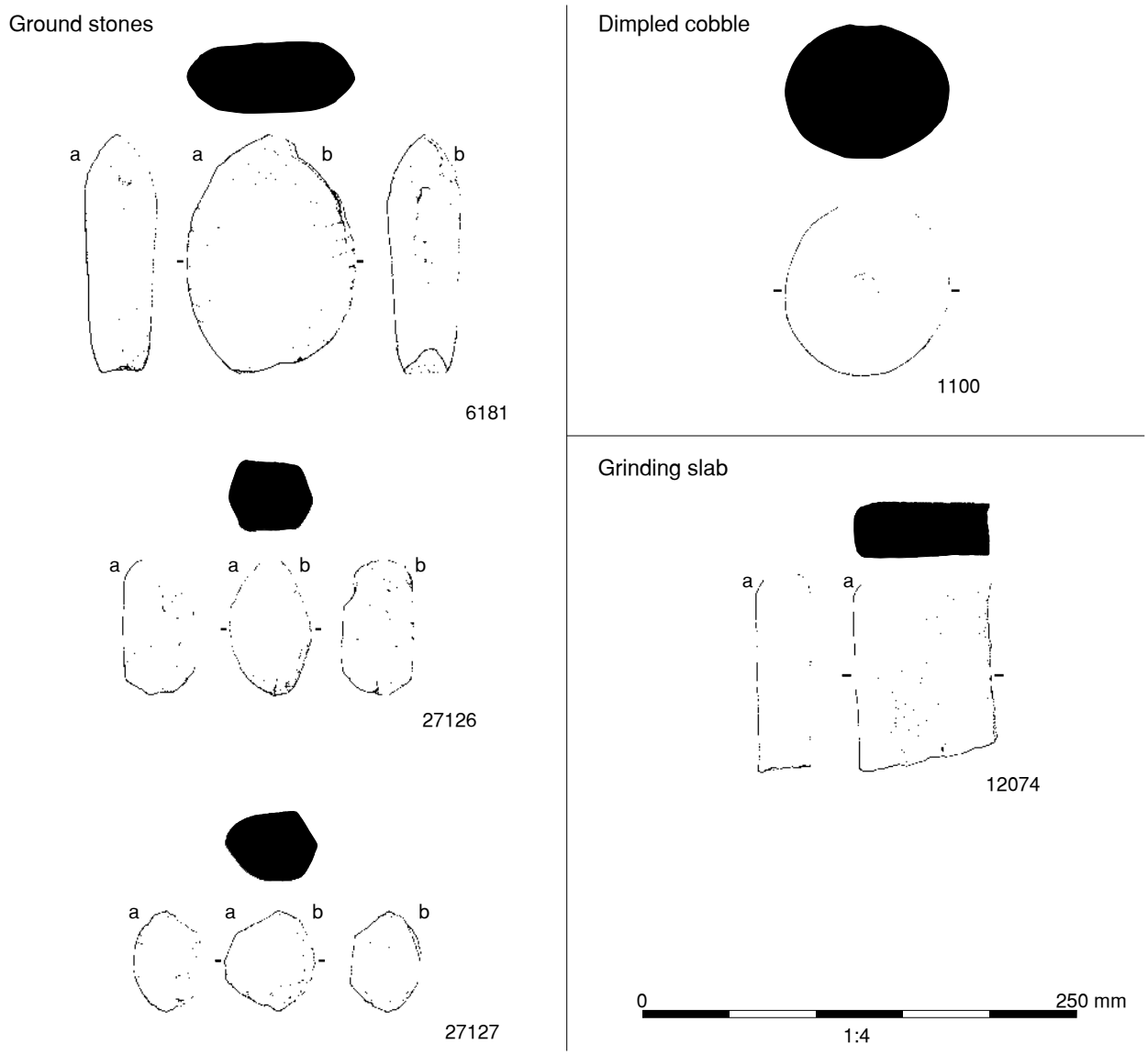


Figure 38: Ground stones, dimpled cobble, and grinding slab from Cass ny Hawin II

have been burnt. It is roughly oval in outline, with flat ground faces, ground at slight inward angles to form a splayed long-section, similar to 6181 (*p 76*). A wide, bifacially bevelled edge has been pecked and ground on one long curved side, although the opposite side is rougher in form, possibly damaged from burning, with one possible partial bevel. The angle of the bevelled edge is more obtuse than on 6181, and there is no evidence for the shaping of grooved chevrons around the bevelled edge. This piece is just 5 mm thicker, though much smaller in length and width.

The other ground stone (27127) is made from grey medium-grained sandstone, and it has been worn to a more irregular form. It has one slightly convex face that has been worn smooth, whilst the opposite face is rounder (unlike the opposing flat faces on the other two pieces). There is part of a bifacially ground bevelled edge around these worn faces, which forms an obtuse angle, but this develops into a series of ground faces with concave and convex faces, similar to heavily worn pumice. There is some flaking damage on one apex and a spread of coarse pecking on the opposite side, possibly from its secondary use as a hammerstone.

These can be considered as a group, since all were found close to one another. The second piece looks as though it was an attempt to copy the shape of the first, though the perimeter has not been finished to a finely grooved and acutely angled bevelled edge. Only parts of the third stone have been shaped to flat or bevelled faces and it appears to have been reused as a hammerstone.

Dimpled cobble

The dimpled cobble (1100) is rounded, and of fine-grained sedimentary rock (Fig 38). It is similar in shape to, but slightly smaller than, the other rounded

cobbles from the house (*below*). Two shallow, circular dimples (*c* 17 mm in diameter) have been ground into its surface, on opposite faces, and on one, the dimple appears to overlap an earlier dimple. There is no other sign of wear, except for very slight traces of pecking around the perimeter, which may be incidental to the main use of this tool. The dimples could have functioned as finger grips, though the ground surface is rather smooth, and the dimples are, perhaps, too shallow to make the grip secure. It should also be noted that this artefact is distinct from a pitted cobble, which is a common Mesolithic tool type (Martinez-Moreno and Mora Torcal 2011), and also a dished cobble, which has pitted depressions in the centre of the face, formed through pecking (Clarke 2009a).

Grinding slab

A corner fragment survives from a rectangular water-worn slab of sandstone, which is 30 mm thick and appears to have been originally used as some form of grinding stone (12074; Fig 38), though it was later reused as post-packing in posthole ***9218***, an element of the external structure (*Ch 2, p 45*). There is a spread of close, regular pecking on the upper face, extending up to 20 mm from the unbroken edges, which was presumably applied to roughen the surface to provide purchase for the substance being worked. Around the unpecked perimeter, the upper face has been worn smooth and slightly polished, and parts of the pecked surface have been lightly ground.

Bevelled pebbles

The five bevelled pebbles are all made from narrow, elongated stones of fine- and medium-grained sedimentary rock and are of a similar shape, being more than twice as long as they are wide. The largest tool (14582; Fig 39) has a flat cross-section, with a naturally formed 'handle' at one end. The narrow end bears a ridged facet, which has been worn by pecking and grinding. In cross-section, this bevel is more abrupt on one face, a similar wear pattern being present on the bevelled pebbles from Howick, Northumberland (Clarke and Waddington 2007). One of the faces bears a polish or gloss, especially around the 'handle' and towards the worn tip of the tool. This may be a result of the post-depositional environment, since it is only present on one face, or it could, perhaps, have been produced through rubbing one face of the tool against organic material, such as hide. A similarly worn bevelled end is present on 20957, which bears light pecking on the narrow end. The opposite end has a ridged facet worn by pecking and rubbing. In cross-section, the bevel is more abrupt on one side and at this point there is also some flaking damage.

The other three tools have bevels formed by single, rounded facets. On two of these (972 and 26033) the facet has been pecked to shape, whilst on the third (10278) the facet appears to have been worn by rubbing. The accompanying striae are worn longitudinally down one face from the bevelled end. The flatter face of 972 also appears to have been worn smooth at the bevelled end on this tool, as if from use as a narrow rubber.

Bevelled pebbles are common to many British Mesolithic sites and there has been much discussion regarding their function, yet to be resolved (Saville 2004; David and Walker 2004). For instance, they have been interpreted as tools used in hide processing, as limpet scoops or hammers, or even as tools used to remove whale and seal blubber (*cf* Conneller 2022, 193). Given the coastal position of Cass ny Hawin these latter suggestions, relating to the processing of marine resources, might be the most relevant. A review of the bevelled pebbles from Howick has suggested that, based on breakage patterns and their discrete size ranges, especially in width, these tools were most likely to have been used in bone or wooden hafts (Clarke *et al* 2012, 7). At Cass ny Hawin II, however, the bevelled pebbles are not numerous enough to observe specific patterning in their selection or use. That said, it is notable that, despite the wide range in their widths (23-45 mm), the range of widths at their working ends is fairly small (17-24 mm), demonstrating that narrow rounded ends were desired for whatever work these tools were put to.

Rounded cobbles and hammerstones

The rounded cobble is the most numerous artefact form (Table 10), and these have been grouped together with rounded hammerstones, as there is a degree of overlap in shape and size between these two classifications. Additionally, several of the cobbles may have been used as hammerstones, but modification was difficult to discern, because of heat damage and weathering.

The rounded cobbles are all naturally shaped pieces of fine-grained to coarse-grained sedimentary rock. These are the largest of the stone artefacts, though many were fragmentary, having been damaged, particularly over one face, from heat and subsequent weathering. Because of this damage, it is difficult to distinguish the presence or absence of wear traces on any of these cobbles; although some surface damage is present, it is almost impossible to determine whether this was a product of use, or whether of heat damage and weathering. This was particularly difficult to determine on the coarser-grained sandstones. If any of these cobbles had been used, then it must have been for incidental work, since only possible traces of sporadic, light pecking remained.

The large rounded hammerstones include three cobbles of coarse-grained rock, whilst the rest are

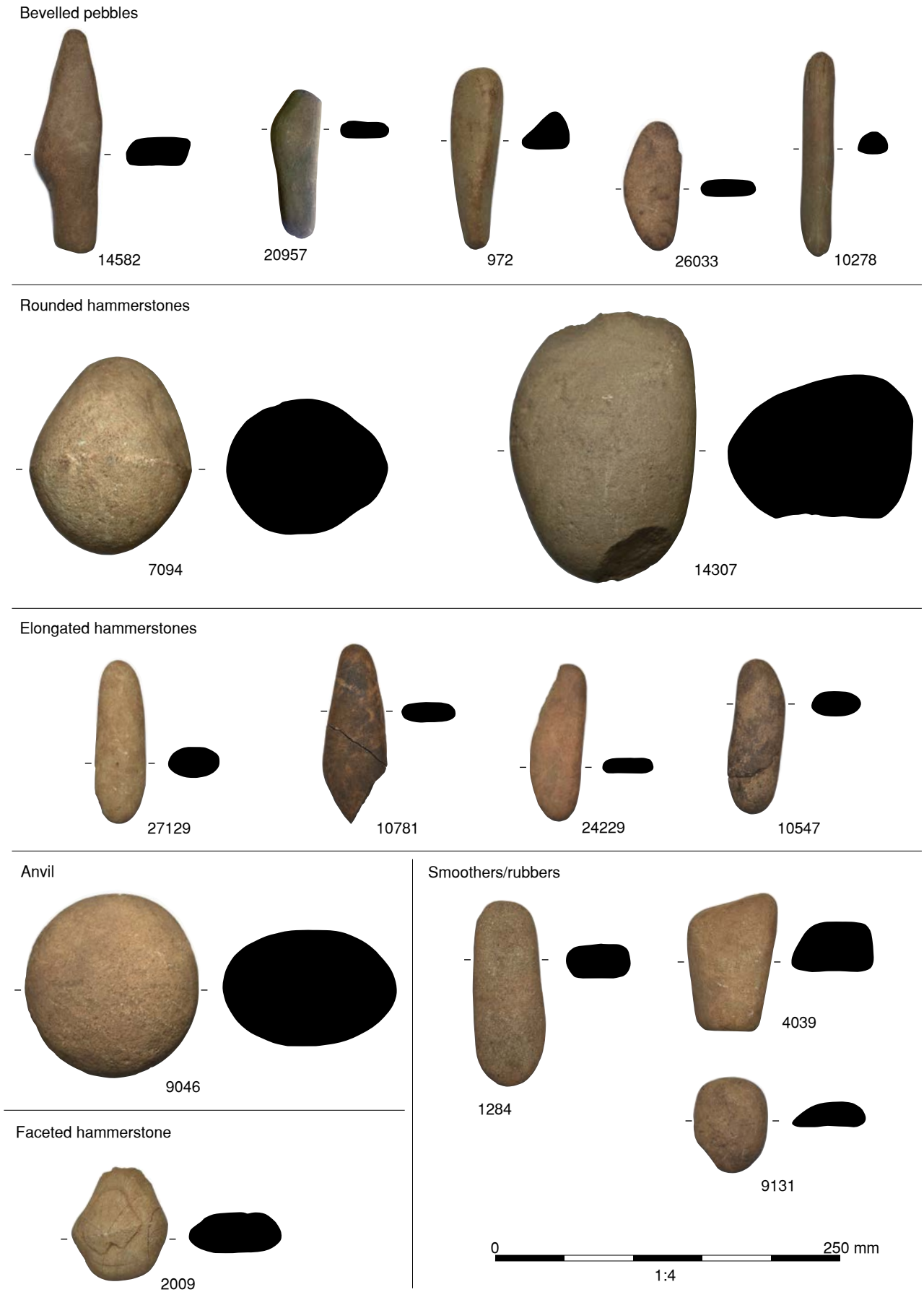


Figure 39: Bevelled pebbles, hammerstones, and smoothers/rubbers from Cass ny Hawin II

finer-grained sandstones. In size, they overlap with the rounded cobbles at the smaller end of the size range. Heavier, more 'organised' wear traces are only present on three of them, one of which (7904; Fig 39) has two areas of heavy pecking on opposite faces, one patch being heavier and deeper than the other. The second item exhibiting wear traces (14307; reused as post-packing in posthole ***9218***, an element of the external structure; *Ch 2, p 45*) is heavily worn, associated with a spread of heavy pecking over both faces and down one side; this had clearly also been used in heavy-duty work, which led to the bifacial removal of large flakes from both ends, though particularly the broader. The third piece with 'organised' wear traces has lighter, more sporadic pecking spread across the ends and both faces.

The remaining items only have light traces of incidental pecking over parts of their surfaces, indicating that none of these tools was used to any great degree. In general, much of the wear is found on the rounded face of the cobble rather than on an end, suggesting their use as anvils or rests, despite the curvature of the surfaces.

Elongated hammerstones

The cobble tools designated as elongated hammerstones lie within the shape and size range of the bevelled pebbles and are generally made of similar finer-grained sandstones, though there is one example composed of schist. Whereas the bevelled pebbles are distinguished by the presence of rounded or angled facets, which have been partially made by grinding and/or rubbing, the elongated hammerstones exhibit a different range of wear patterns, some of which may be undeveloped forms of bevelled pebbles.

Seven examples are present, four of which are worn on their sides (Fig 39). One (27129) has single coarse facets pecked on either side towards the broader end, and pecking over one face at the same end, whilst another (10781) has a similar pattern of wear, though only on one side, as the opposite side is broken. More extensive wear is present on 24229, which has been heavily damaged along half of one side, towards the narrow end. This wear was probably made when it was used to hammer a hard edge; as well as damage along the side there is breakage, flaking, and striations on the contiguous face. On the opposite face, towards the broad end, there is light incidental pecking and a small group of parallel striations. An additional cobble (10547) has some pecking along one side of the tool towards one end, as well as a possible light bevel on one end.

The three remaining pieces bear traces of pecking on one end. Functionally, they are probably similar to the bevelled pebbles, but they may be at the beginning of their use cycle, particularly as their pecked areas do not alter the surface of the items to form a bevel.

Anvils, and faceted and plain hammerstones

Five other cobbles exhibit more individual wear traces. Two are made of sedimentary rock and are flat in cross-section, with one (9046; Fig 39) from pit ***9071*** within the house, the other coming from an external feature (pit ***9143***), which seems to have been an intentionally placed object (*Ch 2, p 45*). These items bear traces of pecking over their faces, with that from the external feature being sporadic, whilst 9046 has two spreads of heavy pecking adjacent to each other, towards the perimeter of one face. The positioning of wear on the face, rather than the end of cobble, suggests that these items may have been used as anvils.

Another cobble, of metamorphic rock (2009), has been damaged by coarse bifacial flaking on the narrow end, and forms a faceted hammerstone (Fig 39). The remaining two items are plain hammerstones and are smaller in size, bearing only sporadic traces of pecking. One of these was from inside the house, whilst the other was used or reused as post-packing in a posthole for the external structure (*Ch 2, p 45*).

Smoothers/Rubbers

Three cobbles appear to have been used as either smoothers or rubbers (Fig 39). The most distinctive of these is an elongated, flat rectangular cobble (1284), which exhibits a clearly worn face. Although this flat face has been worn quite smooth, there are no striations visible, which could have aided determining whether the stone had been used on a hard material, or the direction of movement of this tool. Another cobble (4039) is also flat and sub-rectangular in shape. The lower face appears to have been worn smooth, with a slightly concave cross-section, a flat end, and a flat, long side, and it may also have been used for smoothing or rubbing. A flat oval cobble (9131) was probably selected for its naturally worn lower face. This is slightly concave in profile, and its smoothness and slightly darker staining suggests it too was used as a smoother or rubber.

Unworn cobbles

Several cobbles do not exhibit clear wear traces, tending to be more irregular in shape than other cobble tools. They are also narrower in plan and flatter in cross-section than the larger, unused rounded cobbles. However, they were clearly selected and brought to the house for a purpose, and their lack of wear patterns could suggest either that they were unused, or else were used in a task which left no traces of surface damage.

Fragments

Three fragments of coarse-grained vein quartz were found, which may have come from the same block of stone. The largest piece was from external posthole ***9218*** (*Ch 2, p 45*) whilst the other two were found close together in quadrant B, within the house (*Ch 2, p 57*). None of these pieces show any sign of having been used, and the quartz would have been completely unsuitable for knapping, or as hammerstones. The lack of smaller fragments suggests that they had not been reduced to smaller fractions for use as grinding grit and, instead, may have been brought into the structure for more esoteric reasons. In addition to these, there is a heat-cracked cobble. This comprises a fragment of an irregular, blocky cobble, which shows no clear sign of wear traces.

The function of the coarse-stone tools

It is possible that some of the coarse-stone tools may have been directly linked to processing hazelnuts. These are almost ubiquitous in any Mesolithic occupation, but at some sites they occur in large quantities, for example at Staosnaig, on the Scottish island of Colonsay. There, a large concentration of charred plant remains, including hazelnuts, was found within a circular feature, which has been interpreted as the base of a house, or possibly a roasting pit (Mithen and Finlay 2000). The quantity of charred shells from the feature indicated that this resource was exploited intensively, although there was no *in-situ* evidence for burning in the depression, despite the presence of charred remains and burnt flint and rock. A stone setting at the site, comprising five stones, was interpreted as a fortuitous collection, possibly used to weigh down coverings, rather than as a structural feature (*op cit*, 377). However, this is comparable to the group of five cobbles from depression ***9071*** and burnt deposit ***9084***, to the west of the entrance in the Cass ny Hawin II structure (though these were smaller than the Staosnaig stones), which could, in turn, be more closely linked to the charring, or processing, of hazelnuts, particularly as these lay directly adjacent to its presumed central hearth (*Ch 2, p 43*).

At Cass ny Hawin II, the caches of carbonised hazelnut shells may also indicate processing (*p 74*), supported by the presence of some stone tools, which may have been closely involved with this activity; these included the grinding slab and the large, rounded, facially pecked cobbles. At Duvensee, in northern Germany, nut-processing sites have been excavated, where hearths, formed by thick layers of sand and nutshells, have been interpreted as roasting areas (Holst 2010, 2872). Processing equipment was also identified, including large anvil stones, which were used to crack nuts, as well as rectangular grinding slabs, measuring *c* 800 x 600 x 15/25 mm (*op cit*, 2873-4). Their similarities to the tools found at Cass ny Hawin II may suggest that similar nut-processing was carried out there. Daniela Holst (*ibid*) makes reference to the frequency of grinding and pounding tools found at Mesolithic sites in Europe, presumably indicating the processing of plants, but in the British Isles there is either a lack of these types of stone-tool assemblages, or they have not been properly identified. For instance, although a large assemblage of coarse-stone tools was recovered from the structure/pit at Staosnaig (Whitehead 2000), none can be interpreted confidently as nut-processing tools from the catalogue descriptions, although a review of the assemblage in the light of the findings from Cass ny Hawin II may identify variation between tool types.

At Cass ny Hawin II, the other tool types, such as the bevelled pebbles, elongated hammerstones, and, perhaps, the smoothers/rubbers, indicate that there were additional, though unidentified, activities undertaken within the structure. A small assemblage of coarse-stone tools was found at the nearby Cass ny Hawin I, comprising three bevelled pebbles and a grooved stone (a possible shaft smoother), but none of these came from within the structure (Woodman 1987). The bevelled pebbles are interesting, and have been found at other Mesolithic sites, including in the Hebrides (Whitehead 2000), and in association with other houses of similar date and form (*eg* Howick, Northumberland (Waddington 2007); East Barns, East Lothian (Engl and Gooder 2021; and Echline Fields, Midlothian (Robertson *et al* 2013)). This suggests that they had a specific function (*p 79*). The elongated hammerstones were relatively unworn and may have been newly made.

The three ground-stone objects (*p 76*) are unusual artefacts. As yet, there are no parallels at other sites, Mesolithic or later, the closest comparison being a perforated and ground-stone disc from Nab Head (Site 2), Pembrokeshire (David and Walker 2004, 326, fig 17.17.4). Despite the lack of a perforation on the example from Cass ny Hawin II (6181), as well as a different outline in plan, there is close similarity in the profile of the bifacially ground, angled edge around the perimeter of both pieces. This is not to say that these artefacts were made to be used in the same way, as this is highly unlikely; however, it is perhaps evidence that the template for a regular bifacially ground edge existed, across regions and time, though whether it was a functional or stylistic device cannot be determined. Of note is the decorative grooving forming raised chevrons around the spine of the bevelled edges of the Cass ny Hawin II object, which does not occur on the disc from Nab Head.

Stone tools are infrequently shaped prior to use within the British Mesolithic period and grinding as

a stone-shaping technique is uncommon (*cf* Conneller 2022). Although ground-stone axes occur in Ireland at this time (Woodman 1978b), they are only rarely attributed to this period in Britain, most notably the three axes from Nab Head, Site 2 (David and Walker 2004). However, the discovery of an adze with a ground blade edge, and several fragments from polished-stone axe blades made from tuff, including Group VI material from the Langdales, in Late Mesolithic contexts at Stainton West, near Carlisle, highlights that such objects were being made and used (Brown *et al* 2023). A small number of ground-stone artefacts of various forms have been found further north, at the Mesolithic site of Kinloch, Rùm, and at Sand, Inverness-shire (Clarke 2009b), though none resemble the Cass ny Hawin II objects. Given the presence of grinding, the dimpled cobble (*p 78*) can also be linked to the ground-stone objects. Again, there are no known parallels for this object and its function is unknown.

It is becoming evident that coarse-stone tools are quite sensitive indicators of craft or processing activities at Mesolithic sites, more so perhaps than the large assemblages of flaked lithics, and the assemblage from Cass ny Hawin II is yet another, along with that from Howick, Northumberland (bevelled pebbles), and Sand, Skye (dished cobbles), with evidence for the specialisation of processing activities (*ibid*). The ground and shaped cobbles are also unusual, both in shape and manufacturing technique, and these, together with the ground dimpled cobble, demonstrate the early use of grinding as a shaping technique for stone tools.

Flaked Lithics

A Dickson and A Parker

Technological and chronological background

The large flaked-lithic assemblage from Cass ny Hawin II forms an important component within the island's Mesolithic narrow-blade, geometric microlith technology (McCartan 2004). This technology has been seen as a distinctive feature of the Manx Early Mesolithic period (*ibid*), and is viewed as sharing many affinities with Irish Early Mesolithic narrow-blade assemblages (*Ch 2, p 36*), typified by that recovered from the 'pit-house' at Mount Sandel, Co Londonderry (Fig 40). This house is similar in many ways to that at Cass ny Hawin II (*Ch 10, p 319*), though slightly later in date, falling in the latter half of the eighth millennium cal BC (Woodman 1985: Bayliss and Woodman 2009). However, the slightly earlier material from Cass ny Hawin also shares many similarities with narrow-blade assemblages from other comparable structures in northern Britain, which chronologically are now seen as elements of the British Middle Mesolithic period (Conneller 2022, 24, 172-202). These date from the late ninth- to mid-eighth millennia cal BC and many, in a

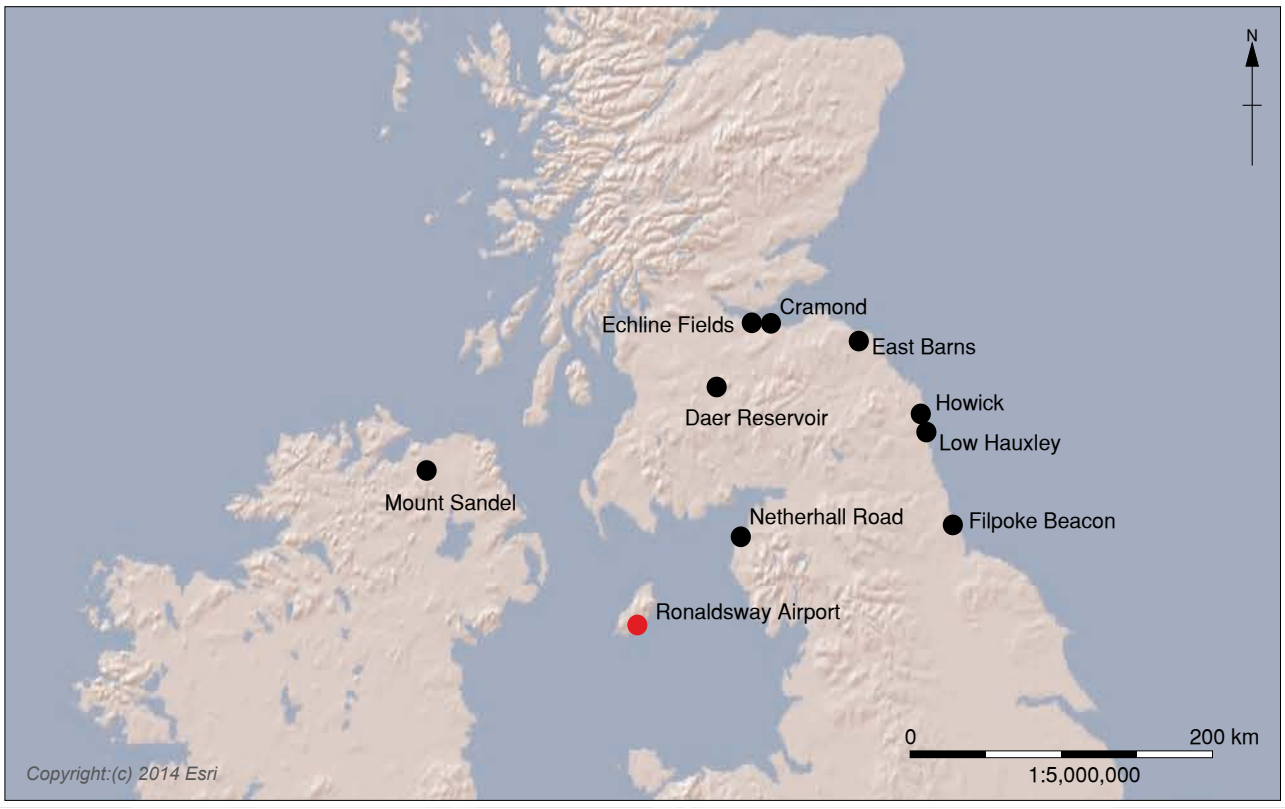


Figure 40: Mesolithic narrow-blade sites mentioned in the text

similar way to that from Cass ny Hawin II, pre-date Mount Sandel by several decades (*cf ibid*; Waddington *et al* 2017).

The published examples include the Scottish sites at East Barns, East Lothian (Engl and Gooder 2021), and Echline Fields, South Queensferry (Robertson *et al* 2013), and the Northumberland sites of Howick (Waddington 2007) and Low Hauxley (Waddington and Bonsall 2016); the first three sites are associated with Mesolithic structures, also classified as 'pit-houses' (*op cit*, 216), with the latter seen as a 'shelter' (Mithen and Wicks 2018). To this list can also be added the narrow-blade site at Netherhall Road, Maryport, dating to the later ninth millennium cal BC, which was associated with scatters of pits and postholes, perhaps denoting the positions of circular structures (Clarke and Kirby 2022). In addition, there are several sites in northern Britain that are associated with narrow-blade microlithic technology of a broadly similar date, but without unequivocal evidence for structures. These include sites at Filpoke Beacon, Cleveland (Coupland 1948) and Daer Reservoir, South Lanarkshire (Ward 2010). The site at Cramond, Edinburgh (Saville 2008; Waddington *et al* 2017), might also be added to the list, though the lithics from this site, dating to the mid-ninth millennium cal BC, are slightly contentious typologically, and they might instead represent a hybrid assemblage that spans the transition between the British Early and Middle Mesolithic, containing lithic types characteristic of both periods (Conneller 2022, 24).

On drilling into the technological complexities of Manx Early Mesolithic assemblages in a little more detail, Woodman (1978a) initially argued that two technologically, and possibly chronologically, distinctive microlithic industries could be identified within the Early Mesolithic narrow-blade group. The earlier is represented by an assemblage from the probable midden at Port St Mary (*Ch 2, p 36*; Fig 41), which may reflect an insular technological development. This industry is characterised by a primary technology that bears a resemblance to that recorded at Mount Sandel (*p 83*), comprising a large number of prismatic cores, principally worked unidirectionally from single platforms; debitage; and a few other tools consisting of scrapers and awls (*op cit*, 121). Alongside this is a secondary microlith technology, dominated by scalene triangles. These include many large and broad examples, classified as elongated scalene triangles, with unmodified leading edges, many exhibiting a concave short, oblique edge (*op cit*, 122).

The microlithic assemblage is also characterised by the occurrence of broad hollow-based points (classified as Type A), derived from scalene triangles, rather than being examples of the superficially similar 'Horsham-type' points (*above*) from central/southern England (*ibid*; Woodman 1987, 20). Amongst the other microlith forms are large numbers of oblique and transversely trimmed bladelets (less than 12 mm in width), obliquely trimmed bladelets (greater than 12 mm in width), a possible rod, a rhomboid, and possibly a basally retouched point (Clark 1935, fig 3, 23). This assemblage also had a notable absence of particular microlith types: namely isosceles triangles; trapezes; and crescents; and produced only one slender elongated hollow-based point (classified as Type B; Woodman 1978a; *below*). It is also of note that micro-burins are almost absent from the assemblage, with only one specimen being identified.

The other Manx Early Mesolithic narrow-blade industry, based on an assemblage from Glen Wyllin (*Ch 2, p 36*), is characterised by a similar range of cores to those from Port St Mary, but the blades appear to be much finer. This assemblage is also associated with a preponderance of geometric microliths, including small scalene and isosceles triangles, small trapezes, crescents, and also (Type B) hollow-based points, which were viewed as a local form of microlith (*ibid*; 1987, 20). It is notable that, whilst scalene triangles are present, these do not dominate the secondary technology as they do in the Port St Mary industry. Additionally, some of the scalene triangles from the Glen Wyllin assemblage have concave short, oblique edges, and retouch on the leading edge, which can be extensive (Woodman 1978a). This assemblage also contains needle points, a rod, obliquely and transversely trimmed bladelets, and obliquely trimmed blades. Both of the latter two types are common to both the Glen Wyllin and Port St Mary industries, and are viewed as a type-fossil of Manx Early Mesolithic lithic industries (*ibid*). Finally, microburins tend to be relatively common in the Glen Wyllin assemblage, which contrasts with their near absence from the Port St Mary assemblage (*above*).

The other important narrow-blade assemblage from the island is that from Cass ny Hawin I (*Ch 2, p 36*), excavated by Peter Woodman (1987). This dates to the middle centuries of the seventh millennium cal BC, and includes types present in both the Port St Mary and Glen Wyllin assemblages (*ibid*). This has therefore led to the suggestion (*op cit*, 20) that it bridges the chronological gap between the two microlithic industries represented by these assemblages, though this may not have been the case (*Ch 4, p 142*). The core technology within this assemblage was dominated by single-platform reduction, though small numbers of other core forms are present (*op cit*, 7). There are also large numbers of cores made on flakes, which are probably a result of the cores being made on pebbles, that have been split, potentially using bipolar reduction. Blades dominate the debitage component, probably produced using a punch technology (*ibid*).

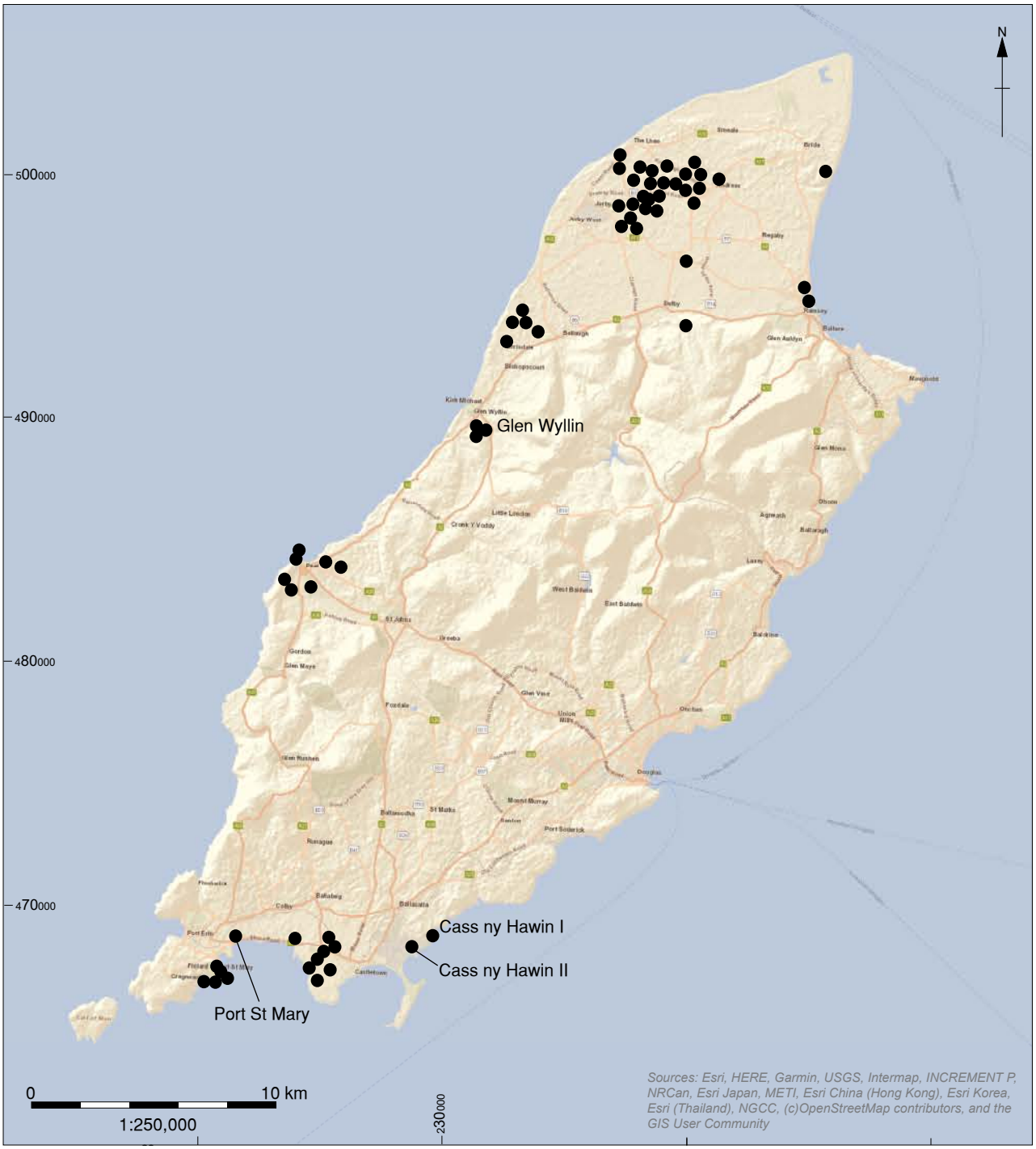


Figure 41: The distribution of Early Mesolithic sites on the Isle of Man

The secondary technology is dominated by scalene triangles, and to a lesser extent isosceles triangles, along with needle points and rods, whilst trapezoids and crescents are absent (*op cit*, 7-11). Notably, the scalene triangles are short and broad in morphology, and the short, oblique edge is often concave in outline, which is a feature also associated with some of the isosceles triangles. Woodman's (1978a) Types A and B hollow-based points are also present in significant numbers (*op cit*, 10-11), along with obliquely trimmed blades, both transverse and oblique forms, and possible tanged forms (*op cit*, 11). In addition, large numbers of microburins were recovered from Cass ny Hawin I (*ibid*). Other, non-microlithic tools were, however, rare, with only two probable spoke shaves and two miscellaneous retouched flakes being recognised (*op cit*, 7).

The Cass ny Hawin II assemblage and its location

The narrow-blade assemblage from Cass ny Hawin II comprised 21,610 items recovered from a range of

deposits and features, either associated directly with the house, or deriving from the external features immediately to the south (*Ch 2, p 45*). In addition, it contained a small scatter of lithics from immediately north of the house, found in topsoil/subsoil deposits. Radiocarbon dating indicates that the assemblage broadly dates to the latter part of the ninth/early centuries of the eighth millennia cal BC (*Ch 2, p 47*), and all items are typologically comparable.

Most of the lithics were from the house itself (Table 11), with *c* 85% from occupation/destruction deposit ***9249*** and upper layer ***9248***, sealing ***9249*** (*Ch 2, p 44*). Spatial analysis suggests that most, if not all, of the lithics within silt ***9248*** originated in occupation/deposit ***9249***, so all probably relate to a single phase of occupation dating to *8200-8100 cal BC* (*Ch 2, p 50*). Similarly, the small numbers from apparently burnt floor ***9092/9250*** and deposit ***9253*** (derived from the eroded sides and base of the house; *Ch 2, p 43*) probably also relate to this same phase of occupation. This is probably also true of the small quantities of lithics in the pits and postholes within the house, and those forming elements of its superstructure (*Ch 2, p 42*).

A very small portion of the assemblage, however, probably derives from activity that both pre-dates and post-dates the house, though in terms of dating, this material might only have been deposited a few decades or years before and/or after the house was occupied. Inside, the lithics pre-dating the dwelling could comprise those from gravel platform ***9251*** (*Ch 2, p 42*), as radiocarbon dating suggests that this contained residual material dating to *8300-8200 cal BC* (*Ch 2, p 49*), and perhaps also those recovered from natural deposits (Table 12).

During analysis, all the lithics from the external features were broadly grouped (Table 13), and it is probable that the bulk of these also pre-date the house. For instance, most were from features that are suspected to relate to an initial phase of activity, particularly pit ***9143*** and several adjacent intercutting hollows (*Ch 2, p 45*). In this area, very small quantities of lithics were also present

	Lithic type		**Floor** ***9092/9250***	**Postholes**	**Internal features**	**Erosion deposit** ***9253***	**Occupation/ destruction deposit** ***9249***	**Upper silt** ***9248***
Primary technology	Pebble		-	-	1	2	13 **(3)**	34 **(3)**
	Core		-	-	2	4	32 **(8)**	100 **(14)**
	Core dressing	Core trimming		1		5	30 **(6)**	40 **(2)**
		Core rejuvenation	-	-	-	-	2 **(1)**	2 **(1)**
	Debitage	Blade chip	-	5 **(3)**	10 **(2)**	27 **(9)**	152 **(60)**	547 **(119)**
		Broad blade	10 **(3)**	9 **(3)**	49 **(14)**	84 **(19)**	702 **(283)**	1841 **(455)**
		Indeterminate chunk	2 **(2)**	4 **(3)**	11 **(5)**	31 **(21)**	331 **(224)**	1090 **(596)**
		Indeterminate fragments	3 **(3)**	8 **(6)**	22 **(11)**	74 **(39)**	784 **(492)**	2947 **(1456)**
		Irregular flake		2 **(1)**	2 **(2)**	6 **(4)**	76 **(56)**	207 **(124)**
		Narrow blade	7 **(2)**	7 **(3)**	50 **(15)**	74 **(24)**	613 **(259)**	1987 **(567)**
		Regular flake	6 **(3)**	13 **(3)**	62 **(30)**	161 **(54)**	1376 **(656)**	4291 **(1413)**
		Small flakes	-	-	4 **(3)**	21 **(1)**	99 **(29)**	454 **(83)**
Secondary technology	Microliths		-	2	-	11 **(4)**	131 **(44)**	466 **(71)**
	Non-microlithic tools	Retouched blade	-	2	-	1	18 **(1)**	40 **(1)**
		Retouched flake	-	-	-	6 **(1)**	20 **(2)**	
		Burin spall	-	-	-	6 **(1)**	5 **(1)**	
	Edge-utilised blades and flakes	Blade	-	-	-	-	2	
		Flake	-	-	1	1		
Total			28 **(13)**	53 **(22)**	213 **(82)**	501 **(175)**	4374 **(2124)**	14072 **(4908)**
% of total assemblage			0.13%	0.24%	0.98%	2.32%	20.24%	65.12%

Figures in brackets and bold denote the number of burnt pieces from each stratigraphic unit

Table 11: Flaked lithics from the Cass ny Hawin II house, potentially dating to 8200-8100 cal BC

	Lithic type			Gravel platform *9251*	Natural geology
Primary technology	Pebble			1	-
	Core			-	-
	Core dressing	Core rejuvenation		-	-
		Core trimming		2	-
	Debitage	Blade chip		4 **(1)**	-
		Broad blade		53 **(25)**	1
		Indeterminate chunk		19 **(9)**	1
		Indeterminate fragments		33 **(19)**	2 **(1)**
		Irregular flake		6 **(5)**	
		Narrow blade		46 **(14)**	1
		Regular flake		73 **(45)**	2
		Small flakes		4 **(4)**	1
Secondary technology	Microliths			6 **(3)**	-
	Non-microlithic tools		Retouched blade	1	-
			Retouched flake	-	
			Burin spall	-	
	Edge-utilised blades and flakes		Blade	-	-
			Flake		
Total				248 **(125)**	8 **(1)**
% of total assemblage				1.15%	0.04%

Figures in brackets and bold denote the number of burnt pieces from each stratigraphic unit

*Table 12: Flaked lithics from the Cass ny Hawin II house, perhaps pre-dating its construction (*8300-8200 cal BC*) or relating to its occupation (*8200-8100 cal BC*)*

	Lithic type			External features	Topsoil/subsoil
Primary technology	Pebble			2	5
	Core			9 **(2)**	32 **(3)**
	Core dressing	Core trimming		6	3
		Core rejuvenation		1	
	Debitage	Blade chip		14 **(2)**	17 **(1)**
		Broad blade		215 **(34)**	192 **(30)**
		Indeterminate chunk		82 **(43)**	133 **(43)**
		Irregular flake		13 **(4)**	28 **(11)**
		Narrow blade		135 **(37)**	105 **(24)**
		Regular flake		381 **(101)**	376 **(99)**
		Small flakes		12 **(2)**	13 **(1)**
Secondary technology	Microliths			10 **(2)**	29 **(4)**
	Non-microlithic tools		Retouched blade	5	6
			Retouched flake	3	
			Burin spall	1	
	Edge-utilised blades and flakes		Blade	-	1 **(1)**
			Flake	-	-
Total				1004 **(280)**	1109 **(286)**
% of total assemblage				4.65%	5.13%

Figures in brackets and bold denote the number of burnt pieces from each stratigraphic unit

Table 13: Flaked lithics from external features and the topsoil at Cass ny Hawin II

in the postholes forming elements of a timber structure, contemporary with the house (*Ch 2, p 45*). However, although it is possible that some were contemporary with the use of the house, many could also represent residual material deriving from the earlier occupation, particularly in the case of those items from one of the postholes, which cut into an earlier hollow (*Ch 2, p 45*). The external features also contained a small collection of lithics (a mere 24 items) from a pit (***9056***) dating to *8000-7800 cal BC* (*Ch 2, p 50*), so in theory these could be later in date. The few flaked lithics from the topsoil and subsoil over the structure and the areas to its north and south are more perplexing and impossible to untangle chronologically, as this disturbed material could conceivably have come from any of the three suspected episodes of activity.

Raw-material types

Four main types of identifiable raw materials were used in the production of the flaked lithics at Cass ny Hawin II. Pebble flint was by far the most common raw material, accounting for 97% of the assemblage, and it is represented by a variety of colours and hues. Grey pebble flint, which is semi-opaque and has a dull lustre, is the most common material and, probably the most readily available. This is followed by smaller amounts (17%) of white pebble flint, supplemented by smaller quantities of other coloured material, particularly that exhibiting an orange and red hue. A high proportion (37%) of the pebble flint is also burnt. Regardless of colour, the pebble flint possesses similar physical characteristics, in that a fine-crystalline structure is common throughout, and inclusions and other flaws are minimal. As a result, only a very small number of the pebbles have been tested and discarded. Cortex is largely smooth, averaging around 2-3 mm in thickness and is generally light brown/beige in colour. Patination is extensive across the pebble flint, with most pieces possessing at least a thin, milky veneer. In more extreme cases, this becomes a thick, opaque, white coating, dulling the acuteness of the edges, and in consequence the original colour of the flint is only visible in the cross-section of broken pieces. Despite patination, edge damage is negligible, the pieces seemingly benefiting from a lack of post-depositional movement.

The other raw materials comprise quartz (1.5%), chert (0.4%), and tuff (0.4%). The quartz varies from bright white to a duller grey, particularly among burnt examples, and most is opaque, although a degree of translucency was apparent on some of the thinner examples. It is coarse-grained and prone to fracturing along linear planes, leading to a large number of angular indeterminate chunks amongst the debitage. Given these physical characteristics, it is possible that it was procured for reasons other than knapping (for instance, use of quartz pebbles as hammerstones; *cf* Waddington 2007, 81), especially as more suitable material, such as pebble flint, was available. The chert is a dark bluish-grey in colour with some examples being almost black. It is also coarser-grained than most of the other raw-material types (most notably the pebble flint) and some technological characteristics, such as conchoidal scarring and bulbs of percussion, can be under-developed. The cortex is less defined than it is in the flint, as it lacks the stark contrast of an outer weathered/eroded surface against fresh stone, appearing as a thin, dull veneer, which is slightly darker than the internal material. Finally, the tuff (formed from compacted volcanic ash; Smith 2010) is creamy white in colour with a smooth, fine-grained texture, and nothing resembling cortex was identified.

A small proportion of the assemblage (0.7%) comprises items that have been recorded as having an indeterminate lithology (classified as 'cannot determine' in the lithics database). In most cases, it applies to burnt material, which has undergone surface alteration due to extensive heat damage, although, given that pebble-flint use is dominant throughout the assemblage, it is probable that much relates to this raw-material type.

Not all the raw materials were represented throughout the reduction sequence. For instance, pebble flint, quartz, and indeterminate raw materials were associated with all phases of the reduction sequence, whilst the chert debitage is either broken or was recorded as indeterminate fragments or chunks. Similarly, tuff is under-represented, mainly consisting of broken items or indeterminate pieces, with only one complete inner flake recorded.

All the raw materials can be found on the Isle of Man, according to modern geological mapping (BGS 2001). However, it is important to stress that, during the early part of the Holocene, there were considerable fluctuations in sea level, sometimes up to 65 m lower than the present day, at around 10 ka BP (Reynier 2005, 79; Innes et al 2006; Chiverrell *et al* 2023). This date is contemporary with the occupation of Cass ny Hawin II (*Ch 2, p 50*) and could have resulted in available raw-material sources very different from those existing today, with sources near the modern coastline perhaps being more exposed during the Manx Early Mesolithic period.

Primary technology

The assemblage contains several classes of items relating to a primary technology. These comprise pebbles which can be subdivided into whole and flaked, clearly part of the first stage of the core-reduction process: raw-material procurement and testing. Cores are also associated with primary lithic technology, and can be subdivided into several types used to produce blades and flakes, which could then be fashioned into

microlithic and other tools (*ie* objects forming elements of secondary lithic technology; *p 105*). During the reduction of cores, large amounts of debitage would also have been produced, forming another element of primary technology, which can be subdivided into blade, flake, indeterminate, and small-flake debitage. In addition, the primary lithic assemblage includes several blades and flakes, classified as core-dressing pieces, relating to the maintenance and preparation of core platforms and flaking fronts.

Flaked/whole pebbles

In total, 58 pebbles were recovered from Cass ny Hawin II, of which 42 are flaked and 16 are unaltered, with most being concentrated in the footprint of the house. Given the size of the assemblage, their quantities are relatively small, suggesting that most raw-material testing probably took place at source. The pebbles include the four main raw-material types, and also several indeterminate examples; however, most (51 examples) are flint, with only one chert pebble (7511; Fig 42) and one indeterminate pebble, along with five quartz pebbles, one of which is flaked. The chert pebble had been flaked only once before being discarded, and possessed a red patina, indicating that it had probably been burnt, whilst the flaked quartz pebble had been split before being abandoned, seemingly because of the poor quality of the raw material.



Figure 42: A chert flaked pebble (7511) and a pebble-flint flaked pebble (13452) from the Cass ny Hawin II house

The average dimensions of the flaked pebbles are 31.5 x 24.9 x 16.9 mm. Comparison with the mean dimensions of the whole examples, which are 27.8 x 20.1 x 13.2 mm, shows only a slight discrepancy, although the unworked pebbles are generally smaller. While pebbles may have been left unworked or ultimately discarded for a variety of reasons, a basic minimum in the preferred size of individual items is apparent. Most flaked pebbles were discarded after only one or two flakes had been removed, with two being the average. Only three examples were recorded with five or more flake removals (*eg* 13452; Fig 42). Each of these had dimensions greater than the mean for the flaked pebbles, which suggests more extensive testing was undertaken on larger nodules, presumably to ascertain if any part was usable. This, in turn, indicates an efficiency in raw-material testing and a reluctance to discard any nodule that could prove useful.

Cores

The assemblage contains many cores, the vast majority of which came from the footprint of the house. Smaller numbers were associated with the external features, with a concentration of five cores in pit ***9143*** (*Ch 2, p 45*). It is possible to subdivide all the cores into 14 types, attributed to seven different reduction strategies, which define whether a core was involved in the production of flakes and blades, or both types of blanks (Table 14). In addition, there are several core fragments which have not been reconciled with a specific reduction strategy.

Single-platform cores

Single-platform cores are the most numerous core-type, most of which have been made on flint pebbles, apart from a single quartz example from north of the entrance to the house. These cores are worked unidirectionally from one platform, often resulting in a conical, or sub-conical, shape at the point of discard. Furthermore, the extent of flaking from the platform edge is variable. Relatively small numbers were reduced around the entire circumference of the platform, though most were flaked along a proportion of the platform edge; the majority had 50-75% of the edge worked (Fig 43), with only one core being reduced on only 25%, or less, of their circumference. The latter were then discarded, although the reasons for this are unclear. Ultimately, the preferred reduction strategy for single-platform cores was to create a working face on at least half of the circumference, moving back into the nodule as debitage was removed.

Classification/ sub-type		External features	Internal features *9252*	Erosion deposit *9253*	Occupation/ destruction deposit *9249*	Upper silt *9248*	Topsoil/ subsoil	Total	% of total
Single Platform (SP)	Blade		1	1	5	14	1	22	12.29%
	Flake		1		5	8	9	23	12.85%
	Blade-Flake	6		2	12	36	13	69	38.54%
Opposed Platform (OP)	Blade				1	1		2	1.12%
	Flake					1		1	0.56%
	Blade-Flake						1	1	0.56%
Right-angled Platform (PRA)	Blade					1		1	0.56%
	Flake	1			1	4	1	7	3.91%
	Blade-Flake				2	11	1	14	7.82%
Multi-platform (MP)	Blade					1		1	0.56%
	Blade-Flake	1				2	1	4	2.23%
Disc core							1	1	0.56%
Core on a flake						1		1	0.56%
Partially flaked chunk						1		1	0.56%
Core fragment		1		1	6	19	4	31	17.32%
Total		***9***	***2***	***4***	***32***	***100***	***32***	***179***	
% of total		***5.03%***	***1.12%***	***2.23%***	***17.88%***	***55.86%***	***17.88%***		

Table 14: Cores from Cass ny Hawin II, by type and stratigraphic provenance

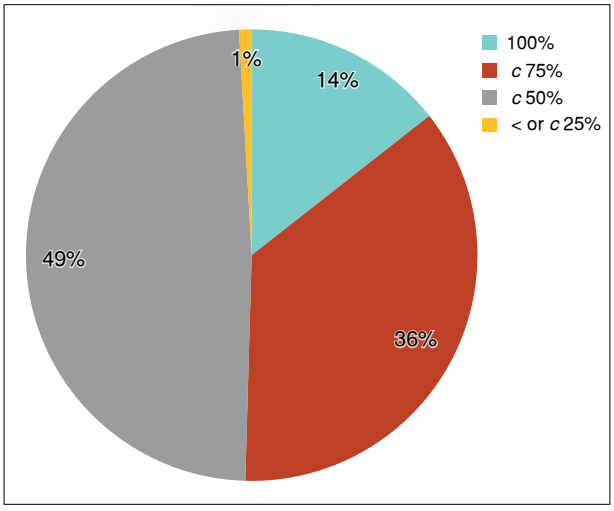


Figure 43: The extent of flaking on the platform edge of the single-platform cores from Cass ny Hawin II

Most cores with single platforms were worked for the production of both blade and flake blanks (Table 14). This greater emphasis may have resulted from the quality of the raw material influencing flaking trajectories, or less-skilled knappers could have been involved in core reduction. Another possibility is that cores were abandoned early on in the reduction process, as they were deemed unsuitable for further reduction. Given the domestic context of the material, it is also possible that various blade and flake blanks were required for use in a range of different tasks within the house. Therefore, the cores associated with the manufacture of particular types of blanks could have been specifically flaked in order to produce blanks to be used in explicit tasks.

Opposed-platform cores

A few cores worked from opposed platforms are present, all made on flint pebbles. Typically, opposed-platform cores have two platforms at 180° to one another, and debitage is removed from each platform unidirectionally. This generally leaves blade- and flake-scar patterns that overlap, and thus allow for the sequence of removals to be identified and recorded. Often, one platform is reduced to a point where further flaking becomes difficult to maintain and the core is rotated, with reduction commencing from the opposite platform. Alternatively, the core may have been periodically rotated during reduction. The opposed-platform cores from Cass ny Hawin II generally fall into the former category, as blade- and flake scars emanating from one platform have been truncated by those related to the opposed one. One exception is a core (715; Fig 44) from an external feature, which exhibits bi-directional working, but, in this instance, the flaking fronts are on opposite faces.

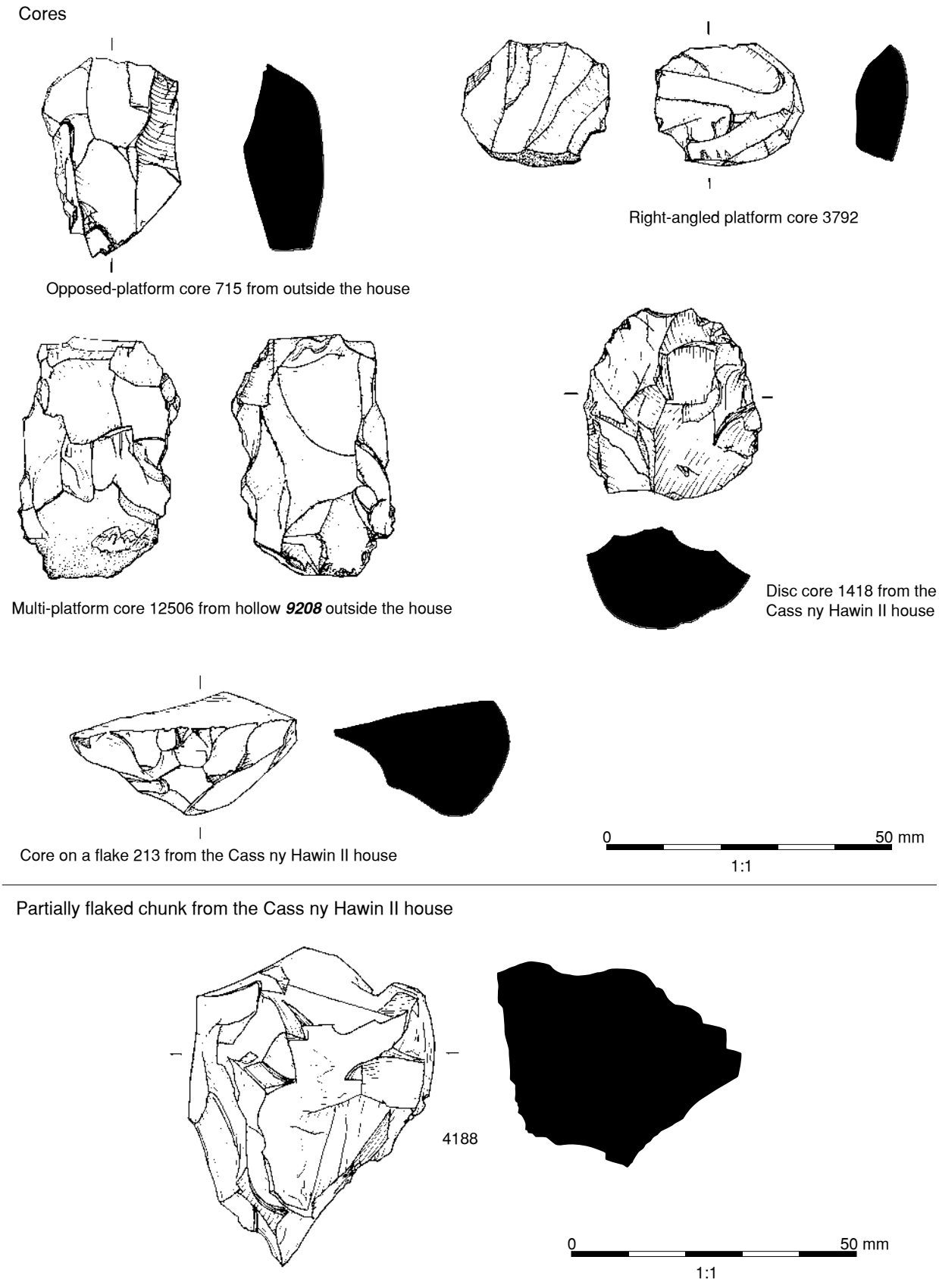


Figure 44: Pebble-flint cores and a partially flaked pebble-flint chunk from both within and without the Cass ny Hawin II house

Right-angled platform cores

Cores with platforms at right-angles are the second most common core type, all of which are made on flint pebbles. Right-angled platform cores are characterised by reduction from two platforms, and with many of the Cass ny Hawin II examples, the direction of flake

removals from one platform crosses the removals from a second, perpendicular platform, set at 90°. As with the opposed-platform cores (*above*), this often leaves distinctive flake-scar patterns, which cut one another. Alternatively, one platform may be on a different face to the other; however, the flaking trajectories are still perpendicular to one another (*eg* 3792; Fig 44).

Multi-platform cores
A few multi-platform cores are present, all made on flint pebbles. The multi-platform cores often have an irregular morphology, which appears to be a product of nodule rotation during reduction. This is characterised by the multiple directions from which removals have been made, some of which can be assigned to platforms, though others cannot, given their truncation by later reduction. This often leads to a network of intercutting scars on multiple-worked faces, and, for example, one multi-platform core (12056; Fig 44) appears to have eight separate reduction stages, reflecting working from several platforms, some of which no longer exist. Additionally, crushing on one end of the core probably indicates that the platform-on-anvil reduction technique had been applied during its use-life, which is a technique under-represented in the assemblage. This may have been employed to maximise the production of blade and flake blanks from nodules, particularly those where areas of intractable raw material were encountered during working. In this respect, this core exhibits areas of extensive step fracturing, and these appear to have influenced the knapper to rotate the nodule to set up new platforms, so the maximum amount of debitage could be removed prior to the eventual discard.

Disc cores
A single disc core (1418; Fig 44) was recovered, again made on a flint pebble. These are generally circular in shape and worked on two faces. Flakes are first removed from the outer edge, with the direction of working focused towards the centre, then, when one flaking front had been exhausted, the core was often turned over and reduction resumed in the same manner, on the opposite face. It has been suggested that disc cores are simply worked-out multi-platform cores (Butler 2005), and it is probable that the core from Cass ny Hawin II is an example of this.

Core on flake
The assemblage contains one core (213; Fig 44) derived from a pebble-flint flake, from which a few blades and flakes have been removed. It is possible that this represents the opportunistic reduction of previously worked material.

Partially flaked chunk
There is one example of a partially flaked pebble-flint chunk (4188; Fig 44), which appears to have been burnt, and was abandoned after several flake removals resulted in stepped and hinged termination scars. These may have been caused by the intractable nature of the raw material, or knapping errors. The piece, although heavily worked, does not exhibit a systematic pattern of reduction similar to any of those observed on the other cores. Furthermore, given the number and intensity of flake scars, it is unlikely to have been a flaked pebble.

Core fragments
Relatively large numbers of core fragments are present in the assemblage (Table 14). These pieces represent broken cores, some of which were created by thermal processes, although the bulk appears to be shatter that was detached during reduction. Whilst some of the fragments are undiagnostic to a specific reduction strategy, they do include a significant number that can be reconciled with the main core classifications (*above*).

Reduction strategies
While evidence for several reduction strategies can be found on the cores, and to a lesser extent the core fragments, from Cass ny Hawin II, none exist in any quantity other than unidirectional working from single platforms, which dominates the core technology (64% of all complete cores). Given this overwhelming evidence for unidirectional working, it is tempting to see the alternative strategies as representing experimentation, or idiosyncratic approaches to reduction with specific aims in mind, as opposed to a determined shift in reduction methodology. As such, they could simply reflect decisions made during knapping to deal with nodules that did not lend themselves easily to single-platform reduction. Moreover, it could be argued that reduction from multiple platforms would be a means of maximising the productivity of a nodule, particularly if the material was scarce, or of a particular type. However, all the examples of alternative reduction strategies make use of flint pebbles (the dominant raw material within the assemblage) and this, again, suggests the application of different reduction strategies to deal with the vagaries of raw-material quality. Therefore, it appears that core reduction was highly structured and geared to a specific method of working, unless the physical character of the raw material disallowed this. It also highlights that the raw material was on the whole of a good quality.

Technological character
Based on the evidence from the complete cores, and the reduction stages that could be identified on each, platforms without any preparation are the most common across all core classifications and all stages of reduction (Table 15). Where preparation is evident, the application of simple abrasion to the edge of the striking platform was preferred, particularly among

Core classification	Crushed	Indeterminate	Simple preparation	Unprepared	*Total*
SP/B		3	15	4	***22***
SP/B-F		1	32	35	***68***
SP/F		1	7	15	***23***
OP/B				4	***4***
OP/B-F				2	***2***
OP/F		2			***2***
PRA/B				2	***2***
PRA/B-F		1	9	18	***28***
PRA/F			4	10	***14***
MP/B			1	1	***2***
MP/B-F	2	1	4	11	***18***
Disc core				1	***1***
Core on flake				1	***1***
Total	***2***	***9***	***72***	***104***	***187***
% of total	***1.08%***	***4.81%***	***38.50%***	***55.61%***	

Note: SP= Single Platform; OP= Opposed Platform; PRA= Right-angled Platform; MP= Multi-platform; B= Blade; F= Flake

Table 15: The frequency of core platform-preparation types at all reduction stages, at Cass ny Hawin II

the single-platform cores and those with platforms at right-angles. With the latter type, however, one of the platforms was a secondary attempt to exploit single-platform cores further. Furthermore, as working from platforms at right-angles to the original often cuts across the primary unidirectional core face, a degree of preparation would be necessary, effectively to change the direction of working and ensure successful removals. Core platforms exhibiting evidence for crushing are extremely rare, with that observed on two opposing platforms from one core (12056; *p 92*) perhaps caused by the possible use of an anvil during reduction.

Most complete cores had cortex remaining on an unworked face, although in most instances this covered 25% or less of exterior surfaces (Table 16). This indicates a systematic approach to reduction, resulting in cores that had been intensively worked, until further freehand reduction was difficult to achieve. It seems that several of the single-platform cores were fully worked around the striking platform, and in morphological terms they can be defined as small, conical-shaped cores, which were discarded when reduction could no longer be easily achieved. A comparison of the data for the amount of remaining cortex, and the extent of the platform worked, on the

Core classification	0	< or *c* 25%	*c* 50%	> or *c* 75%	*Total*
SP/B	2	11	9		***22***
SP/B-F	6	41	17	5	***69***
SP/F	1	12	6	4	***23***
OP/B	2				***2***
OP/B-F		1			***1***
OP/F			1		***1***
PRA/B		1			***1***
PRA/B-F	1	12		1	***14***
PRA/F	1	6			***7***
MP/B		1			***1***
MP/B-F	3	1			***4***
Disc core			1		***1***
Core on flake		1			***1***
Total	***16***	***87***	***34***	***10***	***147***
% of total	***10.89%***	***59.18%***	***23.13%***	***6.80%***	

Note: SP= Single Platform; OP= Opposed Platform; PRA= Right-angled Platform; MP= Multi-platform; B= Blade; F= Flake

Table 16: Percentage of the remaining cortex on the core types from Cass ny Hawin II

Core classification	Flaws	Inclusions	Indeterminate	Platform angle	Size	Step/ hinge fractures	Thermal plains	Unknown	*Total*
SP/B			5	2	6	6		3	***22***
SP/B-F	1		22	3	17	25		1	***69***
SP/F			2		7	11	1	2	***23***
OP/B						2			***2***
OP/B-F			1						***1***
OP/F						1			***1***
PRA/B					1				***1***
PRA/B-F		1	3		2	6		2	***14***
PRA/F			2			3		2	***7***
MP/B						1			***1***
MP/B-F			1		1	2			***4***
Disc core			1						***1***
Core on flake					1				***1***
Partially flaked chunk								1	***1***
Total	***1***	***1***	***37***	***5***	***35***	***57***	***1***	***11***	***148***
% of total	***0.68%***	***0.68%***	***25.00%***	***3.38%***	***23.65%***	***38.50%***	***0.68%***	***7.43%***	

Note: SP= Single Platform; OP= Opposed Platform; PRA= Right-angled Platform; MP= Multi-platform; B= Blade; F= Flake

Table 17: Possible reasons for core discard at Cass ny Hawin II, by core type and frequency

single-platform cores appears to confirm that this approach was applied systematically to the majority of those cores. Significantly, none of the other core classifications had an excessive amount of cortical material remaining, which further illustrates the significance of maximising blank productivity during core reduction.

Size (*ie* cores too small to be worked, with average dimensions of 22 x 24 x 18 mm) appears to be one of the main reasons for their discard at the end of their use-life, though there were certainly other reasons, as some were large enough (average dimensions of 29 x 30 x 22 mm) to have been reduced further (Table 17). It is therefore tempting to see these latter cores as pieces set aside for further reduction, which did not take place as a result of the sudden destruction of the house. Notwithstanding this, it also suggests that raw material was easily accessible and that some nodules were discarded before their full potential had been realised. Furthermore, cores discarded because of flaws or inclusions within the body of the raw material are minimal, lending further weight to the argument that the workable material was of reasonable quality.

Unsurprisingly, based on average dimensions (Table 18), it also seems that those cores with a focus on blade production are generally longer, while those leaning more towards flakes are wider. Whilst this is certainly applicable to the cores worked unidirectionally, and to a lesser extent the opposed-platform cores, it is less evident for those with multiple platforms, and with platforms at right-angles. However, reduction of those cores appears to have been less structured, and flaking trajectories were probably influenced by a wider range of decisions relating to how blanks were removed. Generally, the smallest cores are the single-platform classifications, and it appears that these reduction strategies were the most successful in terms of the number of removals made, thus maximising the full potential of nodules.

Core classification	Number	Average length mm	Average width mm	Average thickness mm
All cores	146	26.70	27.74	21.27
SP/B	22	28.14	24.56	18.95
SP/B-F	69	25.64	27.88	21.69
SP/F	22	25.47	30.09	24.64
OP/B	2	41.50	20.25	16.00
PRA/B-F	14	28.46	28.43	20.82
PRA/F	7	25.71	27.14	19.00
MP/B-F	4	31.25	27.25	17.50

Note: SP= Single Platform; OP= Opposed Platform; PRA=Right-angled Platform; MP=Multi-platform; B=Blade; F= Flake

Table 18: Mean dimensions for all cores, and all core classifications with more than one piece, Cass ny Hawin II

Core dressing

Several blades and flakes associated with the maintenance and preparation of core platforms and flaking fronts are present in the assemblage. These are specifically classified as core-trimming pieces and core-rejuvenation flakes.

The core-trimming pieces comprise two forms associated with the removal of areas of step fracturing and other irregularities on the core face, to refresh it and facilitate the removal of further blades and flakes. The first relates to those pieces that have been removed from core-flaking fronts (*flanc de nucléus*), comprising those struck down or across the face (*eg* 20228; Fig 45); the second are those pieces struck across the edge of the platform (*eg* 7078). The first form mainly consists of flakes, whilst the second is predominantly of blades which have been struck along the edge of platforms,

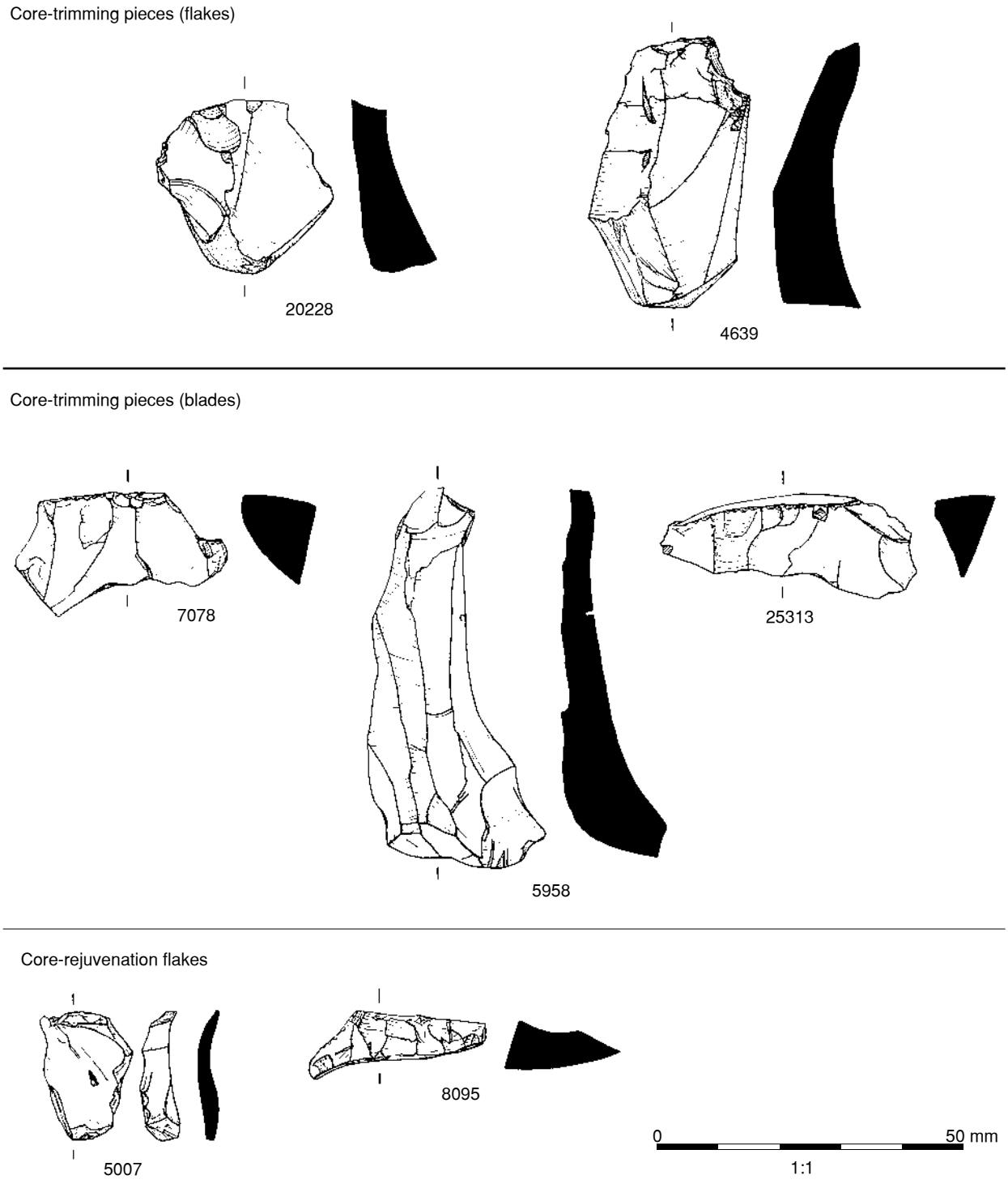


Figure 45: Core-trimming and core-rejuvenation blades and flakes from the Cass ny Hawin II house, all associated with the maintenance of pebble-flint cores

Classification/ Type		External features	Gravel platform *9251*	Structural postholes	Erosion deposit *9253*	Occupation/ destruction deposit *9249*	Upper silt *9248*	Topsoil/ subsoil	*Total*	*% of total*
Core rejuvenation	Regular flake	1				2	2		***5***	***5.43%***
Core trimming	Broad blade	2	1		1	15	18	2	***39***	***42.40%***
	Narrow blade	1			2	2	1		***6***	***6.52%***
	Regular flake	3	1	1	2	13	21	1	***42***	***45.65%***
Total		***7***	***2***	***1***	***5***	***32***	***42***	***3***	***92***	
% of total		***7.6%***	***2.17%***	***1.10%***	***5.43%***	***34.79%***	***45.65%***	***3.26%***		

Table 19: Core-dressing blades and flakes from Cass ny Hawin II, by type and stratigraphic provenance

to remove irregularities (for instance, deep bulb scars and overhangs) and to correct flaking angles. Both types, however, are chiefly associated with the removal of areas of step fracturing and other irregularities, to maintain cores and facilitate the removal of further blades and flakes.

Core-rejuvenation flakes are struck to remove damaged platforms, or those where further flaking would have been hampered by irregularities and/or adverse flaking angles. The result of their removal effectively creates a new platform from which further flaking could be conducted. Quite often, core-rejuvenation flakes are tablet-like in form, with the relict-platform edge spanning the circumference of the piece; however, flakes, and a few blades, with partial-platform edges on lateral edges, distal terminals, and the proximal terminals, are also common (*eg* 5007; Fig 45).

A relatively large number of core-dressing blades and flakes were found, all associated with the maintenance and upkeep of cores made on flint pebbles (Table 19). Of these, 11 items are broken, comprising nine distal fragments, including eight core-trimming blades and flakes and a core-rejuvenation flake, and two medial sections, one from a core-trimming blade and one from a similar flake classification.

Technological character

The majority of the core-dressing blades and flakes were from within the house, mostly from occupation/destruction deposit ***9249*** and upper silt ***9248*** (*Ch 2, p 44*), which also provide the most informative technological information. Given that the lithics from these deposits relate to the same broad phase of occupation, unsurprisingly, they were highly comparable in terms of the core-dressing types and quantities. Hence, these pieces consist of similar numbers of blade and flake types, of which nearly equal numbers were removed from core faces and platform edges (Fig 46), and, where a classification could be made, they were chiefly concerned with the removal of irregularities from core-flaking fronts (Table 20). Furthermore, nearly equal numbers of the core-dressing pieces were removed from the intermediate and later stages of the reduction process (Fig 47). These deposits also contained three complete core-rejuvenation flakes that are representative of a flake morphology; two

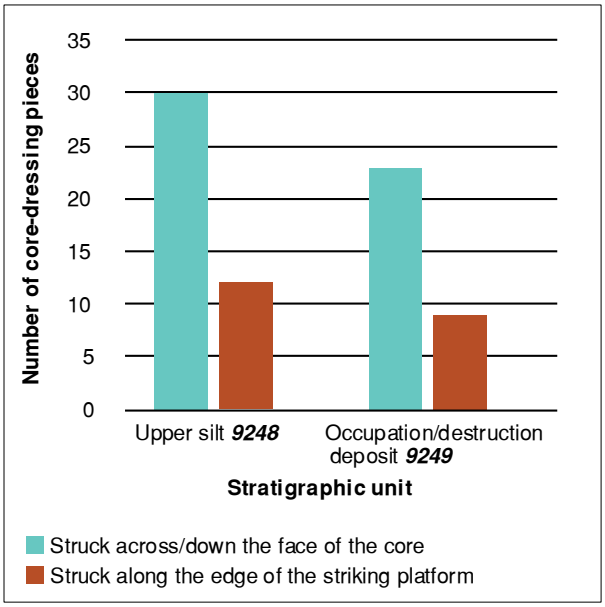


Figure 46: Favoured positions for the removal of blade and flake types from the core-dressing pieces, from occupation/destruction deposit **9249** *and upper silt* **9248**, *in the Cass ny Hawin II house*

	Occupation/ destruction deposit *9249*	Upper silt *9248*	*Total*
Damaged platform	-	-	*-*
Flaking angle	4	6	***10***
Indeterminate	9	13	***22***
Irregular flake scars	1	2	***3***
Overshot/ plunging removal?	2	3	***5***
Removed as a possible guide piece	2	1	***3***
Step/hinge fracture scars	14	17	***31***

Table 20: Dorsal-face morphology on the core-dressing pieces from deposits **9249** *and* **9248**, *Cass ny Hawin II*

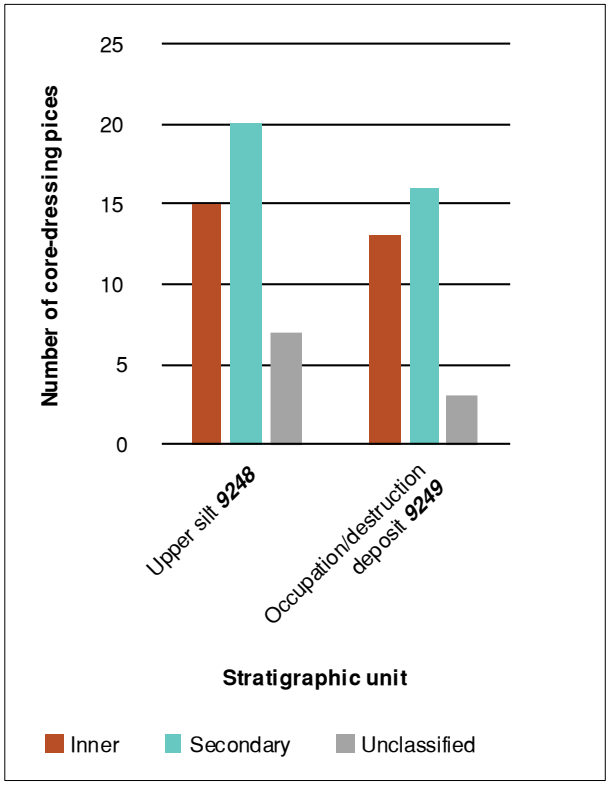


Figure 47: The reduction stages associated with the core-dressing pieces, from occupation/destruction deposit **9249** *and upper silt* **9248**, *in the Cass ny Hawin II house*

of these (from ***9249***; *eg* 8095; Fig 45) were removed during the intermediate stages of the reduction process from the edge of striking-platforms, whilst the other (5007 from ***9248***) was removed during the later stages of the reduction process.

Core-trimming blades and flakes with dorsal-scar patterns following the same direction of the main axis of removal are the most common in both deposits ***9249*** and ***9248*** (46 items). Whilst most relate to the maintenance of flaking fronts, a few blades have been removed from platform edges, which chiefly relate to correcting flaking angles, although one unilateral crested blade was removed as a possible guide piece (*eg* 25313; Fig 45). Within the assemblage, the evidence relating to the cresting of core faces is very rare, with only four other examples identified. The reasons for this are unclear, but it appears that the dominant unidirectional reduction strategy did not involve the intentional preparation of cores for the systematic removal of blades by cresting, suggesting that there was no preference towards the morphology of the blanks required for use. Over half of the platforms on the complete core-dressing pieces were not prepared prior to removal and they generally followed a similar morphology (Table 21), with the majority being flat/plain platform types.

The blades and flakes were probably removed using indirect percussion with soft hammers (with diffuse bulbs of percussion forming 82%) where, to a certain extent, a high level of control was achieved during knapping. This is evidenced by the relatively large number (35%) of feathered terminations, although there are also similar numbers of core-dressing pieces with plunging terminations. The majority of these relate to the removal of stepped irregularities on core-flaking fronts, particularly during the intermediate phase of the reduction sequence, which could relate to mishits made when dealing with intractable raw material.

Finally, it is worth noting, based on the mean dimensions of all the core-rejuvenation and trimming blades and flakes from deposits ***9249*** and ***9248*** (*c* 25 x 18 x 7 mm for core rejuvenation and *c* 28 x 15 x 7 mm for core trimming), compared to those of the cores (*c* 27 x 28 x 21 mm), that platform rejuvenation was probably undertaken more often during the later stages of reduction. In contrast, the trimming of core faces and platform edges appears to have been more commonly applied during the intermediate and later stages, particularly during the flaking of single-platform cores and those with platforms at right-angles.

	Occupation/ destruction deposit *9249*	Upper silt *9248*	*Total*
Abraded	8	12	***20***
Faceting	2	1	***3***
Unprepared	19	22	***41***
Unclassified	3	7	***10***

Table 21: Types of platform preparation associated with the core-dressing pieces from deposits **9249** *and* **9248**, *Cass ny Hawin II*

Blade, flake, indeterminate, and small-flake debitage

The blade, flake, indeterminate, and small-flake debitage is represented by eight lithic types. Five of these (Fig 48) are: blade chips (blades with a width less than 5 mm); narrow blades (blades with a width equal to or greater than 5 mm and less than 8 mm); broad blades (blades with a width greater than 8 mm); regular flakes (flakes with greater than 10 mm of the surviving acute edge); and irregular flakes (flakes with less than 10 mm of the surviving acute edge). The other types are: indeterminate fragments (thin irregular material of all sizes, which cannot be ascribed to a specific blade and flake type); indeterminate chunks (blocky, irregular material of all sizes which cannot be ascribed to any lithic type); and small flakes (all complete flakes and blades with dimensions less than 10 mm).

Taken together, 20,364 pieces of these types of debitage were recovered from Cass ny Hawin II, which included material that was probably mainly associated with 'pre-house' activity (from the natural geology, gravel platform, and external features; *p 86*); items from features and deposits associated with the occupation of the house; and debitage from the topsoil/subsoil (Table 22). Of these, 3785 complete examples, with dimensions greater than 10 mm, were analysed in detail and, when identifiable, the broken material was assigned to one of five fragmentation categories. A large amount of indeterminate debitage was also identified; however, given the physical nature of this material, pieces could only be recorded as either fragments or chunks.

Edge-preservation information was recorded for all debitage (including broken and indeterminate), with the exception of small flakes, and this indicated that around two-thirds had preserved acute edges. This suggests that post-depositional movement was minimal, particularly within the house, which again contained the majority of the material.

Most of the debitage (*c* 17,461 items) again came from occupation/destruction deposits ***9249*** and upper silt ***9248*** (*Ch 2, p 44*), with smaller quantities deriving from other deposits, probably also contemporaneous (*p 86*). Approximately 5% of the debitage came from the external pits and postholes (*Ch 2, p 45*).

Technological character

Nearly all of the debitage came from the reduction of pebble-flint cores (97% of this assemblage), with very few items made on chert, quartz, tuff, or from material of indeterminate lithology. Pebble-flint was also the

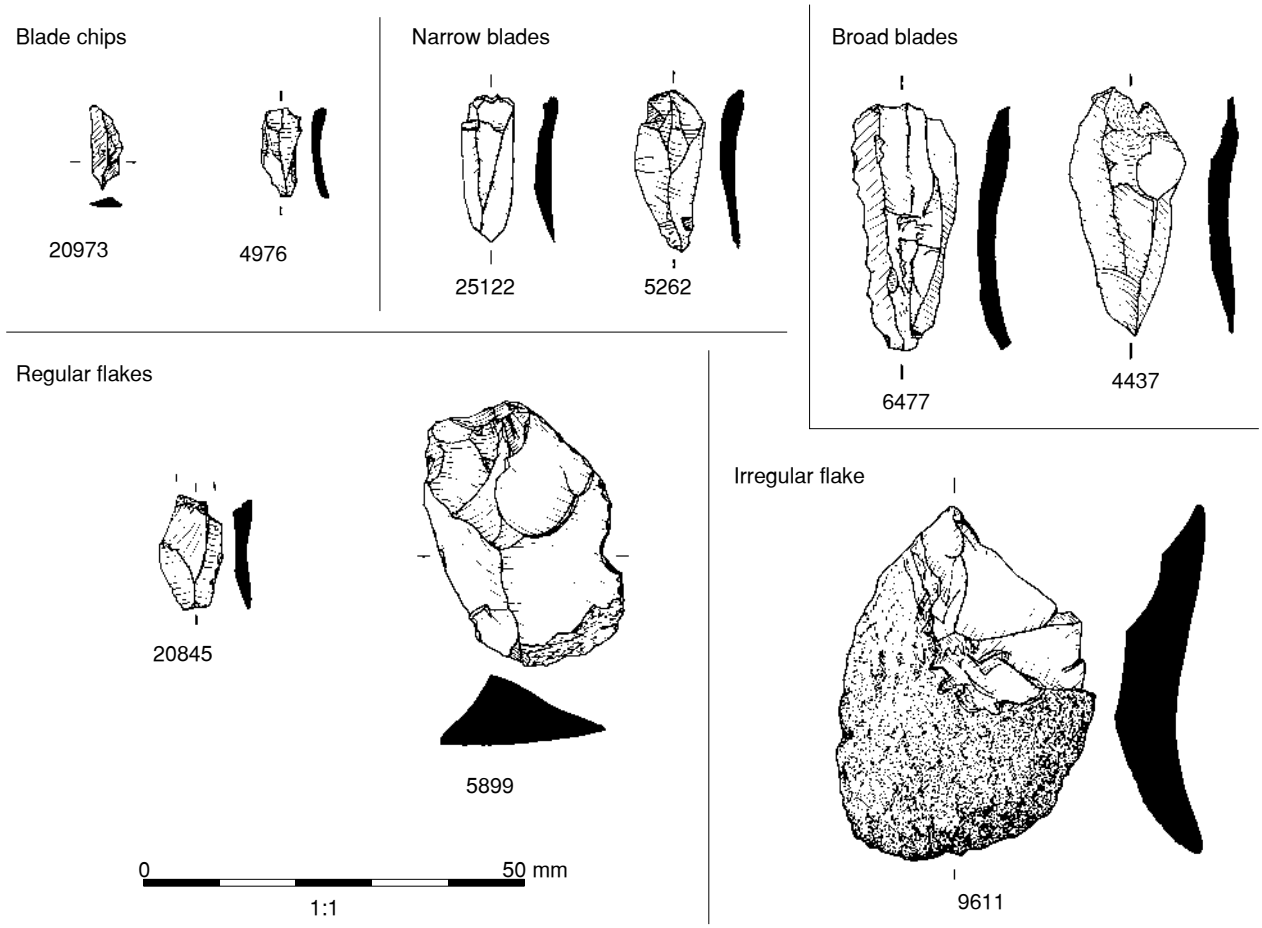


Figure 48: Blade and flake pebble-flint unmodified debitage from the Cass ny Hawin II house

	Fragmentation	Blade chip	Broad blade	Indeterminate chunk	Indeterminate fragments	Irregular flake	Narrow blade	Regular flake	Small flakes	*Total*	*% of total*
Natural geology	Complete		1					1	1	***3***	
	Indeterminate			1	2					***3***	
	Proximal fragment						1	1		***2***	
	Total		***1***	***1***	***2***		***1***	***2***	***1***	***8***	***0.04%***
External features	Complete	3	76			4	30	142	12	***267***	
	Distal fragment	6	24			1	31	83		***145***	
	Indeterminate			82	115			2		***199***	
	Medial fragment	2	34			1	28	42		***107***	
	Proximal fragment	3	79			6	44	102		***234***	
	Split		2			1	1	8		***12***	
	Total	***14***	***215***	***82***	***115***	***13***	***134***	***379***	***12***	***964***	***4.73%***
Features/ deposits contemporary with the occupation of the house	Complete	123	702			49	443	2016	582	***3915***	
	Distal fragment	272	537	1	2	109	678	1613		***3212***	
	Indeterminate	2	4	1487	3868	2	7	39		***5409***	
	Medial fragment	178	517			74	639	575		***1983***	
	Proximal fragment	164	972			59	1003	1476		***3674***	
	Split	6	12			4	14	130		***166***	
	Total	***745***	***2744***	***1488***	***3870***	***297***	***2784***	***5849***	***582***	***18,359***	***90.16%***
Topsoil/ subsoil	Complete	1	37			10	12	135	13	***208***	
	Distal fragment	8	35		1	3	18	80		***145***	
	Indeterminate			132	167			4		***303***	
	Medial fragment	7	44		1	5	33	48		***138***	
	Proximal fragment	1	75			7	40	99		***222***	
	Split		1			3	1	12		***17***	
	Total	***17***	***192***	***132***	***169***	***28***	***104***	***378***	***13***	***1033***	***5.07%***
	Grand Total	***776***	***3152***	***1703***	***4156***	***338***	***3023***	***4608***	***608***	***20364***	
	% of grand total	***3.79%***	***15.42%***	***8.34%***	***20.31%***	***1.66%***	***14.78%***	***32.79%***	***2.91%***		

Table 22: The blade, flake, and indeterminate debitage (all raw-material types) from Cass ny Hawin II, by lithic type, fragmentation type, and stratigraphic provenance

only raw-material type with significant amounts from all stages of the reduction process.

The complete blade and flake-blank component of the pebble-flint debitage can be considered in relation to reduction stage (primary, secondary, or inner), and it is evident that primary removals, blades and flakes removed at the beginning (primary stages) of core preparation, are in a significant minority (Fig 49). In general terms, there is a ratio of 1.22:1 of primary pieces to cores. This could be taken to indicate that the initial preparation was

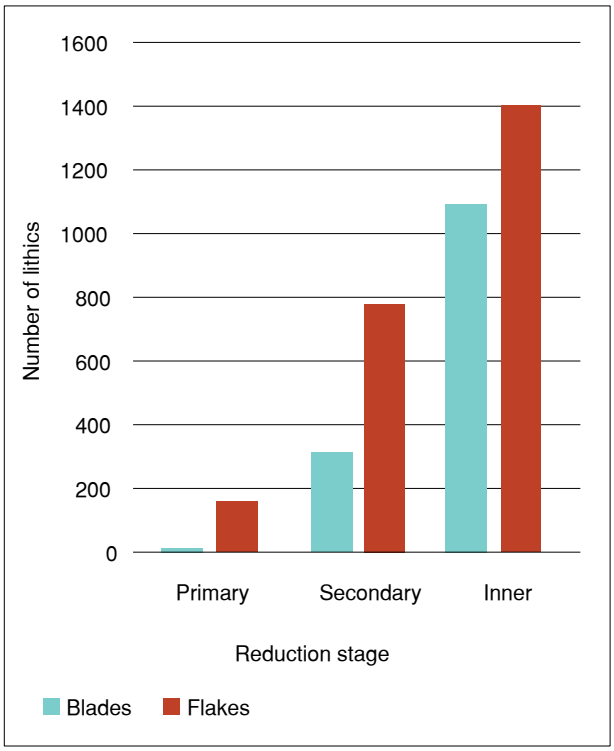


Figure 49: The frequency of complete pebble-flint blades and flakes within the generalised reduction sequence, Cass ny Hawin II

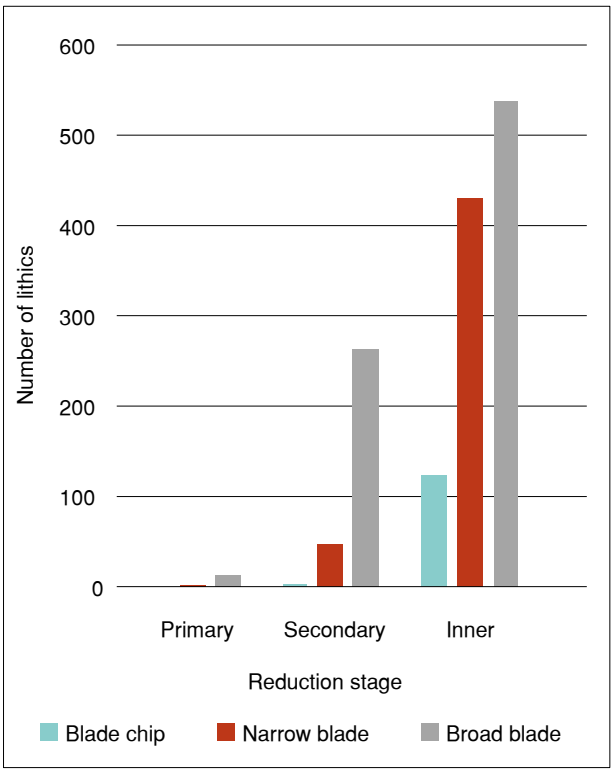


Figure 50: The frequency of the main types of complete pebble-flint blades within the generalised reduction sequence, Cass ny Hawin II

undertaken elsewhere, before the partially flaked nodules were brought to the house. Whilst this may have been the case for some, the available data are based on complete pieces, and there are potentially more cortical blades and flakes subsumed within the incomplete debitage. Additionally, *c* 89% of the cores had cortex remaining, and around a third of these had *c* 50% or more cortex still present, indicating that most cores were prepared within, or adjacent to, the structure.

Blade chips are more commonly associated with the later (inner) stages of reduction (Fig 50). Indeed, these most probably result from the removal of small, very narrow pieces during the later stages of reduction (Table 23),

Lithic type	Reduction stage	Number	Average length (mm)	Average width (mm)	Average thickness (mm)
Blade chip	Secondary	3	11.00	3.60	1.17
	Inner	123	11.80	3.85	1.16
Narrow blade	Primary	1	22.00	8.00	2.00
	Secondary	47	20.12	7.17	2.29
	Inner	431	18.13	6.63	1.84
Broad blade	Primary	12	28.92	13.12	4.17
	Secondary	262	30.32	12.33	4.06
	Inner	538	28.38	11.25	3.19
Irregular flake	Primary	22	25.91	23.91	8.05
	Secondary	27	23.95	21.51	5.43
	Inner	10	15.14	13.30	3.00
Regular flake	Primary	136	23.32	18.89	5.67
	Secondary	752	23.61	17.45	5.17
	Inner	1391	16.98	12.98	2.82

Table 23: Mean dimensions of the complete pebble-flint blades and flake types, by reduction stage at Cass ny Hawin II

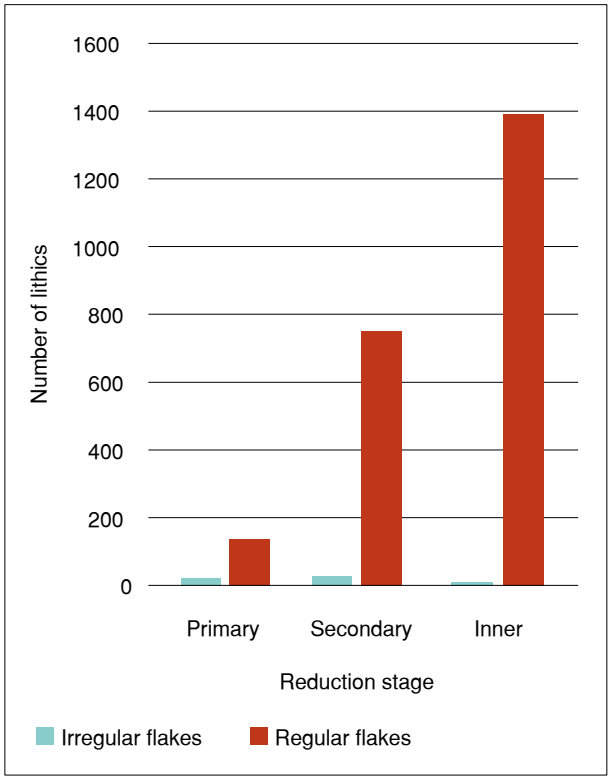


Figure 51: The frequency of the main types of complete pebble-flint flakes within the generalised reduction sequence, Cass ny Hawin II

the majority probably being associated with the preparation and trimming of platforms. Narrow blades are also more common to the latter stages of reduction, and there is a clear trend for these pieces to get smaller and narrower as reduction progresses, which is related to the reductive process of working cores. Significantly greater numbers of the broad blades were removed during the intermediate (*ie* secondary) stages of the reduction process, although they also remain relatively common to the later stage. It is also noticeable that, during the intermediate stage, there is a propensity for relatively long removals; however, they are likely to be narrower than those removed in the previous stage. This trend for narrower blades is also associated with the later stages of reduction, although these are also likely to be of a similar length to those removed during the initial preparation of cores. This is difficult to account for, but possibly indicates that once cores had reached a certain size, the production of larger blades was not of significance, suggesting that they were related to preparing core faces for the removal of narrower pieces.

Very few irregular examples of flakes were produced in comparison to those with a more regular morphology, and it is of note that they were more common to the early and intermediate (primary and secondary) stages of reduction (Fig 51). This could relate to the initial preparation of cores, when a more percussive force may have been applied, implying less control during knapping. Regular flakes at the early and intermediate stages of the reduction process appear to be of the same general dimensions (Table 23); however, those removed at the later stages of reduction were of smaller dimensions, whilst also becoming thinner.

Although the assemblage of complete blades and flakes is dominated by flake blanks, when the broken blades and flakes are considered, along with the fact that some of the chunky pieces are also likely to include further fragments of the blades and flakes, it seems that roughly equal amounts of these were produced during knapping. That said, when the length/breadth analysis of the complete pebble-flint blades and flakes is considered, some alternative scenarios relating to blank production can be postulated.

First, 40.7% of the complete flakes possess a length/breadth ratio of between 1.50-1.99:1 (*ie* pieces that are nearly twice as long as they are wide; Fig 52). In morphological terms, these are nearly similar in appearance to blades (pieces with a length/breadth ratio greater than 2:1), and many of the flakes with this trait often have a 'blade-like' appearance. Furthermore, 48.13% of the complete blades are just over twice as long as they are wide (length/breadth ratio 2-2.49:1). In this respect, 43.51% of the complete flakes and blades fall within the length/breadth ratios of 2-2.49:1 and 1.50-1.99:1, indicating that there may have been an emphasis towards the production of relatively short and narrow blanks, which does not strictly adhere to the blade/flake classification systems that are presently used.

Second, the bulk of the debitage selected for modification was blade blanks, particularly narrow blades, and therefore the production of these was possibly a common feature of stone-working within the house. The presence of a brushwood floor within the structure would allow for a trickledown effect, whereby unused pieces, or those not selected for implement manufacture, remained within the structure (*cf* Grøn 2003; *Ch 2, p 52*), which, in general, probably accounts for the large amount of knapping debris within the house; however, it may also explain the large amounts of flake debitage, in relation to blade blanks. It is possible, for example, that blades were selected for modification and/or possibly removed from the house for use elsewhere, whilst more flakes remained within the structure, gradually becoming incorporated within and below the flooring.

The analysis of dorsal-scar direction on the complete debitage (Fig 53) backs up the evidence from the cores (*p 89*) for a predominance of working unidirectionally from single platforms. The small number of blades and flakes with alternative dorsal-scar directions also goes some way to confirming the small number of other

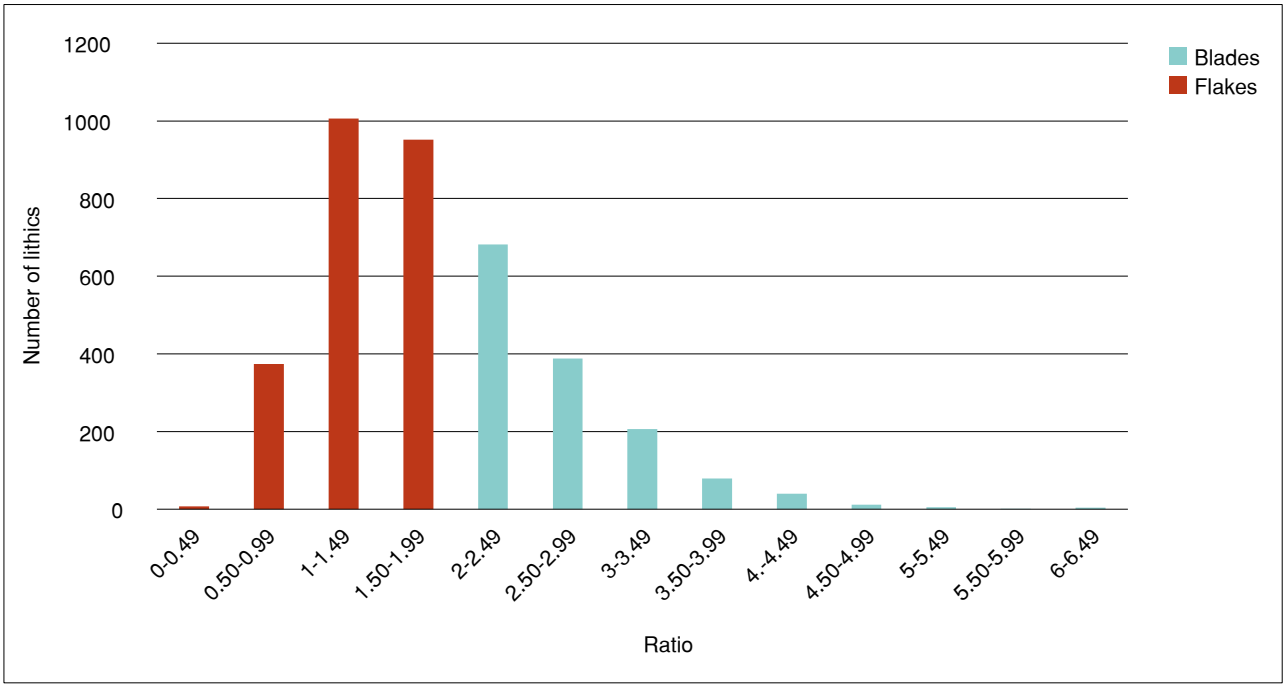


Figure 52: The length/breadth ratio of complete pebble-flint blades and flakes, Cass ny Hawin II

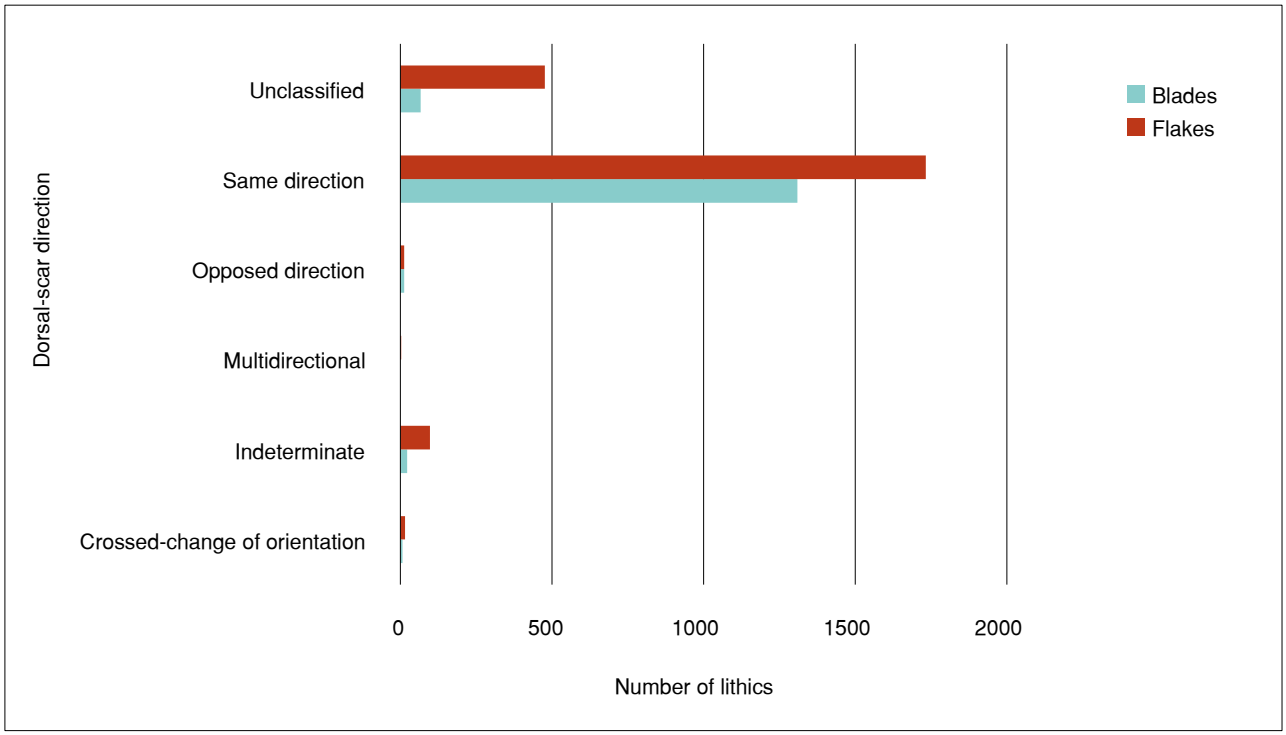


Figure 53: The frequency of dorsal-scar direction on the complete pebble-flint blades and flakes, Cass ny Hawin II

reduction strategies defined by some core forms. More specifically, blades and flakes with opposed, crossed, and multi-directional dorsal-scar patterns are likely to reflect the working of cores with platforms at right-angles, and the small amount of other core types with bi-directional and multiple-flaking trajectories. In addition, the number of dorsal scars on blades and flakes from different stages in the reduction process indicates that there was no significant variation in reduction strategies when knapping flint pebbles (Fig 54). Both of these observations indicate a homogeneous approach to working pebble flint, both within the house and in its vicinity.

Most distal terminations (*c* 83%) on the complete blades and flakes are of a feathered morphology. Given that

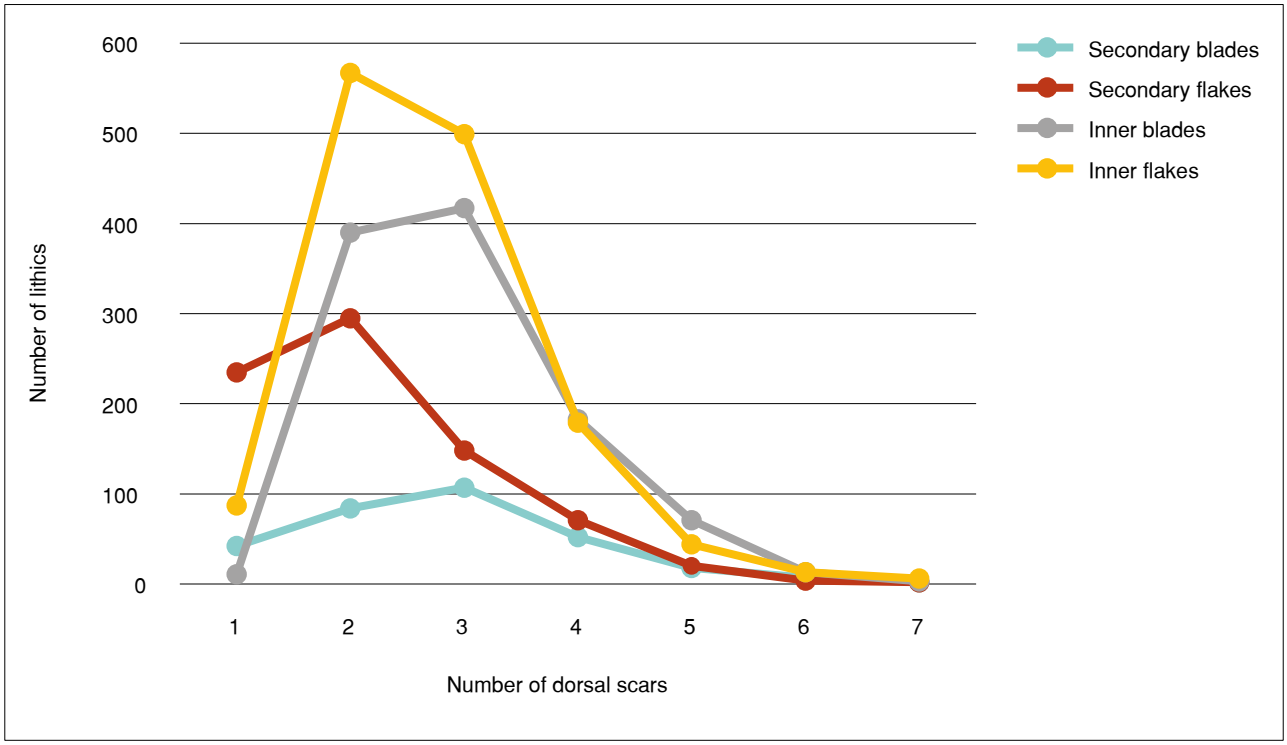


Figure 54: The frequency of dorsal scars for the complete pebble-flint blades and flakes, by reduction stage, Cass ny Hawin II

feathered terminations are likely to reflect adeptly struck blanks (Butler 2005, 32-5), this also indicates that those engaged in knapping pebble flint were competent stone workers, particularly as mistakes, such as the use of insufficient force and incorrect flaking angles made during reduction, appear to be relatively rare. The preponderance of feathered terminations is further testament to the quality of the available flint, as material with more inclusions or flaws could potentially result in a higher number of failed terminations. Nevertheless, such failures do exist, and the small number of stepped, abrupt, and hinge-fractured terminations appear to correlate with the step- and hinge-fracturing recorded on the discarded cores (*p 94*). It has been noted that some cores were discarded when flaking fronts became flawed, and that the size of nodules possibly prevented their effective maintenance. Therefore, it is possible that cores were discarded prior to maximising their productive potential and, given a ready supply of raw materials, new nodules could be selected indiscriminately. This, in turn, could also account for the small number of failed distal terminations amongst the complete debitage.

Most (*c* 94%) of the blade and flake blanks support flat/plain platforms, and this prevalence suggests a relatively simple approach to reduction strategies, employing soft hammers. Relatively few (less than 1%) of the blades and flakes have crushed platforms, which often signifies the application of too much force during reduction and/or bipolar reduction. Notably, most of the blades and flakes exhibiting this attribute are associated with the latter stages of reduction; thus, it is possible that bipolar reduction was applied to a few cores towards the end of the knapping process. Alternatively, crushed platforms could also indicate the presence of less-skilled knappers, such as juveniles or novices. A few blades and flakes with cortical platforms were also recorded (*c* 4%), these being associated with the earlier (primary) and intermediate (inner) stages of the reduction process, particularly with the preparation and setting up of cores.

The apparently practical, but skilful, approach to reduction is further exemplified by the general lack of platform features on complete pebble-flint items, which are thought to signify heavy-handed percussion and mistakes made when removing blanks from cores. For instance, incipient cones, often regarded as a feature of forceful direct percussion (Butler 2005, 37-8), are present in small numbers (Fig 55). These seem to be more common to blanks removed during the later stages of the reduction process, although they do not appear to correlate with blades and flakes with crushed platforms. Therefore, they could signify further evidence for the limited use of bipolar reduction during the final stages of working some cores. The most common platform feature was the presence of a ventral spur at the proximal end of blade and flake blanks. This attribute is normally associated with the removal of debitage, particularly blades, by means of a punch placed between the striking edge of the platform and the hammer.

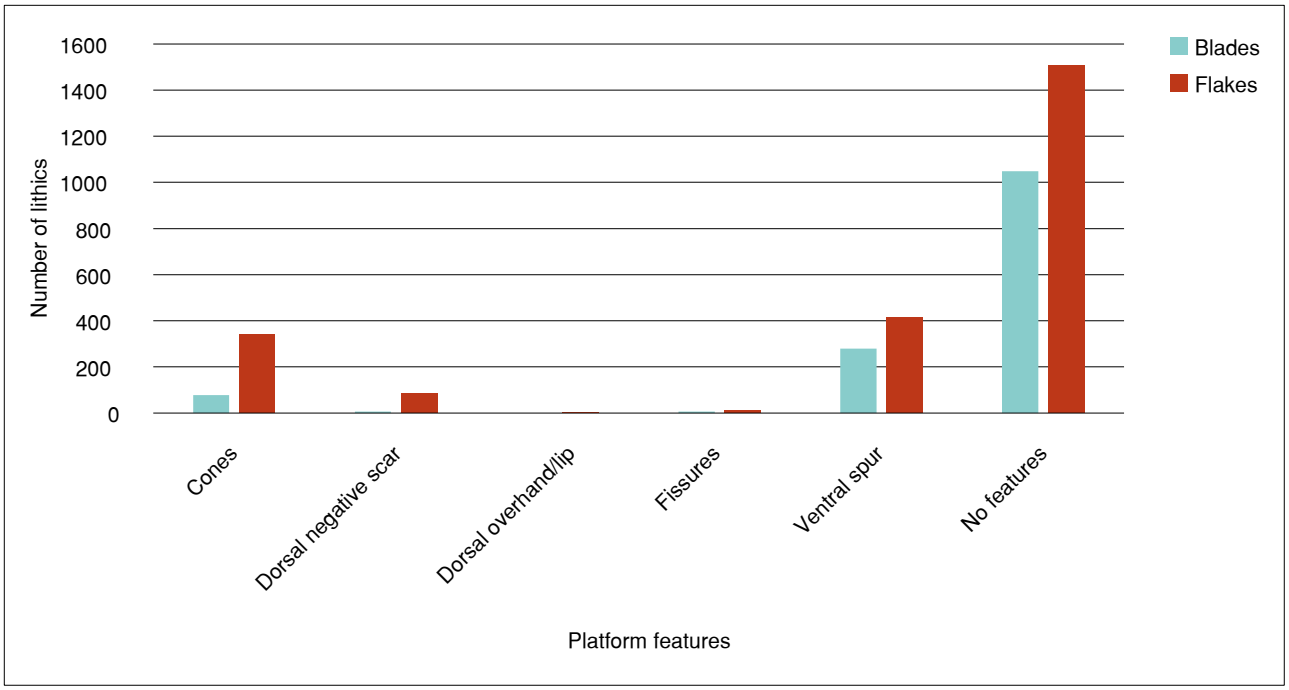


Figure 55: The frequency of platform features on the complete pebble-flint blades and flakes, Cass ny Hawin II

The size and prominence of the bulb of percussion may also directly relate to the force of impact applied whilst knapping. More specifically, it is generally accepted that small/diffuse bulbs equal soft hammers, while large, pronounced bulbs equate to hard-hammer usage (Butler 2005, 37-8). Given the preponderance (*c* 96%) of diffuse bulbs on the complete pebble-flint blades and flakes, it might be the case that the use of soft hammers, such as wooden billets, was associated with knapping activity. Furthermore, the blades and flakes with pronounced bulbs very rarely exhibit other characteristic traits associated with hard-hammer use, such as incipient cones and platform fissures, so it is questionable whether such features do indicate the use of heavy percussors at the site. In addition, blades and flakes with pronounced bulbs were recorded from

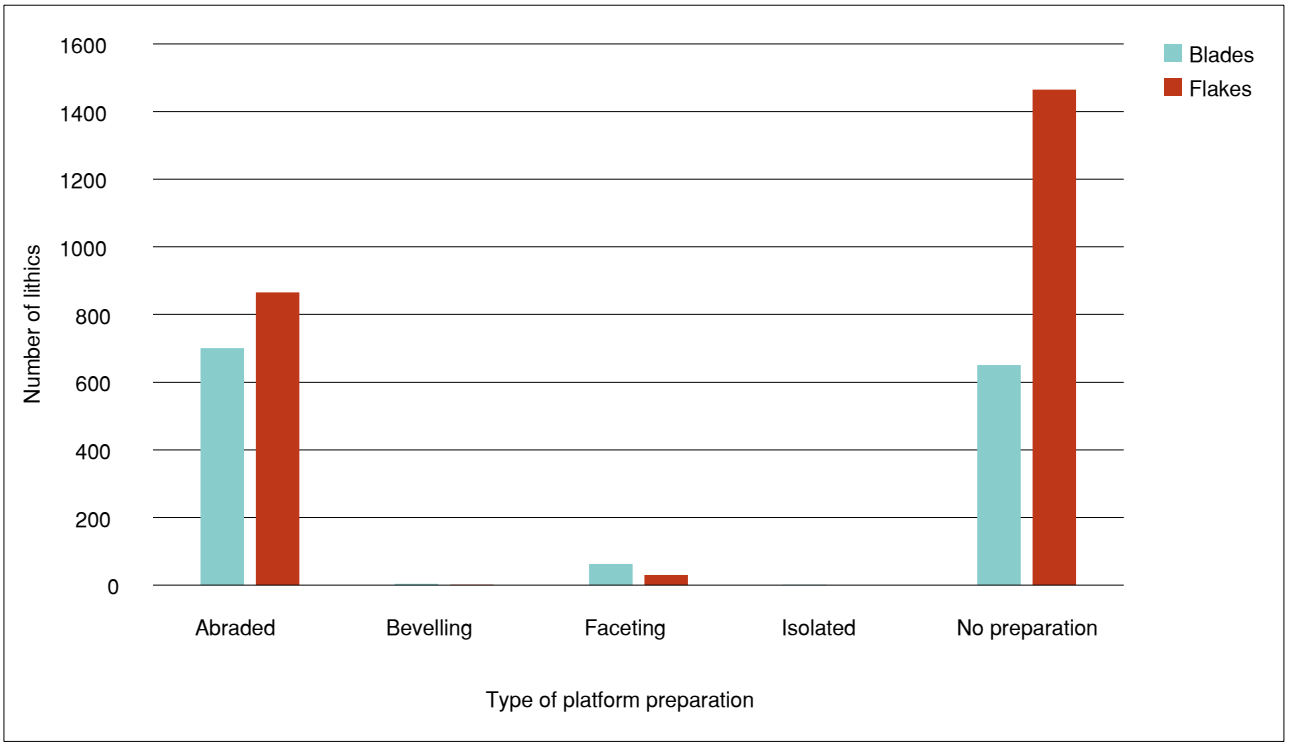


Figure 56: The frequency of the type of platform preparation on the complete pebble-flint blades and flakes, Cass ny Hawin II

all stages of the reduction sequence, so they do not appear to have been a feature of hard-hammer use or bipolar reduction during core preparation.

Platform preparation, when present, invariably consists of simple abrasion (Fig 56). This technique was probably applied to remove spurs from the striking edge of core platforms, prior to blank removal; however, the platforms of a larger number of blades and flakes exhibited no evidence for preparation. It is probable that the reason for this is that previous removals were often clean enough to have left a serviceable edge on the core platform, from which a successive removal could be made. This, in turn, demonstrates that a certain level of stone-working skill existed. The bevelling, isolation, and faceting of platforms was also undertaken, although infrequently, with platform faceting being the more common of these types. This approach consists of a more intensive method of preparation, involving the removal of small flakes from the platform edge to pre-form the butt of a blade, or flake, prior to removal. This allows the knapper greater precision in aiming their strike, and could further demonstrate the use of punches during systematic blank production.

The analysis of platform dimensions shows a strong concentration of platforms that are at least twice as wide as they are thick. This trend shows very little variation across blade and flake types and the reduction sequence (ratio 2.00:1 and above). This does not correlate with the use of indirect percussive methods, such as a punch (*above*), in which smaller, more symmetrical platforms would be the norm. It may suggest that a variety of hammer techniques was applied during knapping, and their use may have potentially related to numerous factors, such as their significance to specific stages of the reduction sequence; the production of particular types of blanks for specific tool types; and/or where the systematic production of blade blanks was required.

Secondary technology

Microliths

A large collection of microliths was recovered from the house and from the external features to the south, the majority from occupation/destruction deposit ***9249*** and upper silt ***9248*** (Table 24), as with the primary technology. These can be subdivided into various types, which accord with those categories of narrow-blade microliths associated, more generally, with the Manx Early Mesolithic culture (*p 83*). Nearly all are made from pebble flint, with only a single piece of quartz, along with six made on material of an indeterminate lithology, though these latter items are all burnt and are probably also made from flint.

Backed bladelets

Nine backed bladelets are present in the assemblage. These can also be classified as straight-backed microliths (*eg* Preston 2012, 674), and those from Cass ny Hawin II should not be confused with backed blades/backed pieces, which are usually associated with Upper Palaeolithic and mainland Early Mesolithic stone-working technologies (*cf* Barton 1998; Butler 2005, 79-81). The Cass ny Hawin II examples are

	External features	**Gravel platform *9251***	**Structural postholes**	**Erosion deposit *9253***	**Occupation/ destruction deposit *9249***	**Upper silt *9248***	**Topsoil/ subsoil**	***Total***	***% of total***
Backed bladelet					2	6	1	***9***	***1.37%***
Crescent					2	6		***8***	***1.22%***
Isosceles triangle					2	3		***5***	***0.76%***
Scalene triangle	3	3	1	4	48	110	3	***172***	***26.26%***
Obliquely trimmed	1	1			8	15		***25***	***3.82%***
Tanged form?						1		***1***	***0.15%***
Basally modified (hollow-based) point?					1			***1***	***0.15%***
Miscellaneous point form					1	5		***6***	***0.92%***
Miscellaneous microlith					1			***1***	***0.15%***
Microlithic fragment	3			3	27	117	10	***160***	***24.43%***
Microburin	4	2	1	4	38	203	15	***267***	***40.77%***
Total	***11***	***6***	***2***	***11***	***130***	***466***	***29***	***655***	
% of total	***1.68%***	***0.92%***	***0.30%***	***1.68%***	***19.85%***	***71.14%***	***4.43%***		

Table 24: The microliths from Cass ny Hawin II, by type and stratigraphic provenance

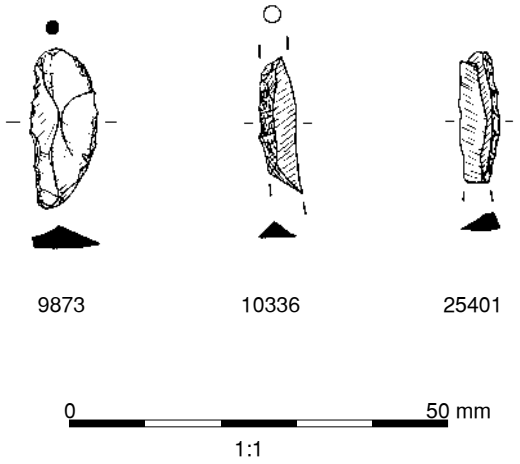


Figure 57: Backed bladelets from the Cass ny Hawin II house

largely characterised by abrupt retouch along one lateral edge (Fig 57), and a few of these also possess retouch on the leading edge, though this is never as extensive or steep as that on the main retouched edge.

These pieces vary in length (0.2-20 mm), and the majority have widths between 3 mm and 5 mm, with only one example of 9 mm width. Even taking into account that the blanks could have been produced using the microburin technique, several pieces appear to be broken tools. The incomplete pieces have retouch on the thicker lateral edge parallel to the leading edge, and/or dorsal ridges, for a length of, or greater than, 10 mm. These items also exhibit no modification typical of the other diagnostic microlith forms from the assemblage. Including the incomplete examples, there appears to be a preference for retouch to be applied to the right lateral edge of the blade blanks, with seven items exhibiting this. One of the backed bladelets has retouch on the leading edge, which could relate to edge-damage from use, whilst two have damaged leading edges, which could also relate to use.

On the Isle of Man, backed bladelets are a rare component of the Port St Mary and the Glen Wyllin Early Mesolithic microlith industries (*p 84*; Woodman 1978a), and none appear to have been recovered from Cass ny Hawin I (*Ch 2, p 36*; Woodman 1987). In Ireland, however, backed bladelets were present in the assemblage from the Irish Early Mesolithic site at Mount Sandel (*p 83*), and these were subdivided based on variations in width, into narrow (less than 5 mm wide) and broad (greater than 5 mm wide; Woodman 1985, 43). The narrow forms from this site generally exhibited *enclume* retouch on their modified edges, though this is not a significant feature of the Cass ny Hawin II examples. Similarly, at the Mesolithic narrow-blade sites of Howick and Low Hauxley, Northumberland (*p 84*), backed bladelets formed a significant component of the respective microlith assemblages, with examples from Howick being larger than those from Cass ny Hawin II (Waddington 2007, 84), whilst those from Low Hauxley were slightly more common than scalene triangles (Waddington and Bonsall 2016, 107). In contrast, backed bladelets are absent from some of the narrow-blade sites in Scotland, specifically Cramond and Echline (Saville 2008; Robertson *et al* 2013; *p 84*).

Crescents

Crescents are characterised by their shape, which is chiefly created by abruptly retouching one edge of a bladelet/blade to produce a convex edge. Eight examples were recovered from the Mesolithic house, the majority of which had been retouched on the right-lateral edge of the blade blank (Fig 58). The crescents represent one of the smaller microliths produced at the site (Table 25), with most being 7-13 mm long, although one example is 17 mm long.

Elsewhere on the Isle of Man, crescents are particularly common in those Early Mesolithic assemblages associated with the Glen Wyllin technological complex (Woodman 1978a), but are absent at Cass ny Hawin I (Woodman 1987). Beyond Man, they have also been recorded from the narrow-blade sites at Cramond (Saville 2008) and Echline (Robertson *et al* 2013), Scotland, and Low Hauxley (Waddington and Bonsall 2016) and Howick (Waddington 2007), in Northumberland, being particularly numerous at the latter site.

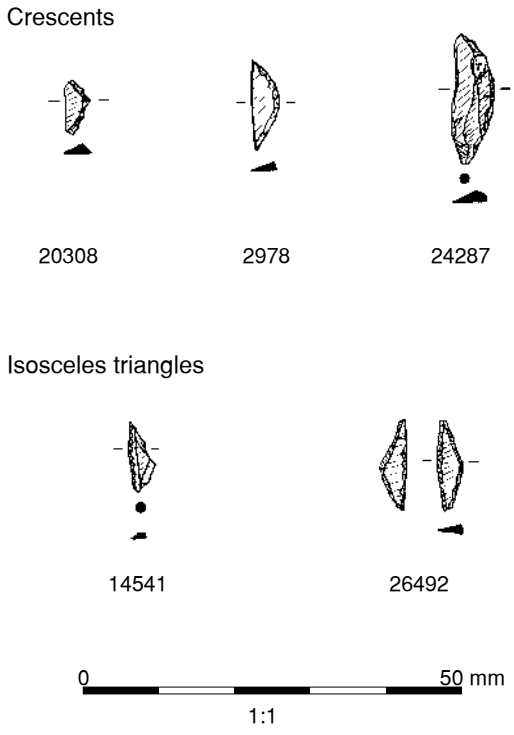


Figure 58: Crescents and isosceles triangles from the Cass ny Hawin II house

	Number	Average length (mm)	Average width (mm)	Average thickness (mm)
Crescent	6	11.17	4.00	1.67
Isosceles triangle	5	9.00	3.48	1.62
Microburin	242	12.78	7.39	1.96
Obliquely trimmed	22	20.68	6.66	2.40
Elongated scalene triangles	23	28.97	6.85	2.49
Micro-scalene triangles	122	11.87	4.06	1.63

Table 25: Mean dimensions of complete microliths from Cass ny Hawin II

Isosceles triangles

Isosceles triangles are characterised by a regular triangular shape, whereby two edges are, or are nearly, of equal length, and normally the two oblique edges are modified by abrupt retouch (*cf* Jacobi 1978, fig 6.2a). At Cass ny Hawin II, they represent one of the most infrequent microlith forms, with a mere five examples coming from the house. Most are retouched on both oblique edges, although two pieces are also characterised by retouch on the leading edge (Fig 58); however, in both instances, this could be edge-damage relating to their use. The isosceles triangles are also the smallest microlith types at the site, with the majority being 9 mm or less in length and 4 mm or less in width, although one example is 12 mm long, but still less than 4 mm wide.

Across Man, isosceles triangles are particularly common to the Glen Wyllin technological complex, tending to be small in size (Woodman 1978a), though at Cass ny Hawin I they formed a small component of the total triangular implements (Woodman 1987). Beyond the island, they are very rare on similar narrow-blade sites, though this may be due in part to their similarity to scalene triangles and their inclusion within that lithic classification (Woodman 1985). The exception is Howick, where they form a small component of the microlith assemblage, although, in comparison to those from Cass ny Hawin II, they were generally larger (Waddington 2007, 85).

Scalene triangles

The scalene triangle is the dominant microlith form at Cass ny Hawin II, making up around a quarter of the assemblage. A few are of large dimensions and have been accordingly classified as elongated scalene triangles, whilst the remaining examples are shorter and narrower, and are classified as micro-scalene triangles. It should be stressed, however, that whilst the two sub-groups relate to a gradation in size, the larger elongated scalene triangles do possess a distinctive morphology, exhibiting some regularity in their shape, and were probably a formal tool type in their own right.

In total, 25 elongated scalene triangles are in the assemblage, all 20-42 mm long, 5-10 mm wide, and 1.64-4 mm thick. All are of pebble flint and were probably made on broad blades (with widths greater than 8 mm), with the majority (15) being made on the distal sections of blade blanks. The remainder were either made on the proximal end of the blank, or the direction of the original removal could not be ascertained. All of the elongated scalene triangles have abrupt edge modification, which extends fully along both the oblique edges, and on four examples it consists of *enclume* retouch (*eg* 22219; Fig 59). On these pieces, the *enclume* retouch is on the long oblique edge, at the end where it meets the leading edge to form a pronounced point. The short, oblique edge on the majority of the implements cuts across the width of the blank on a straight, obtuse angle and only on one implement is this edge concave in shape. On at least three examples the leading edge is left unmodified (*eg* 10583). On the remainder, it has been modified with, usually, fine semi-abrupt retouch, which can vary in extent and location. Several items have had the leading edge fully retouched (*eg* 24724), whilst on others the secondary modification can be at either end, or both, which, in one instance, is inverse. However, there appears to be an emphasis on the majority for the leading-edge retouch to be at the pointed end, and it is possible that this was done to define the point further (*eg* 10384). Additionally, some of the patchy and finer retouch on the leading edge could be the result of edge-damage from use, or potentially from hafting. Given the shape, size, and technological character of the elongated scalene triangles, it is probable that they were produced as a form of robust point.

On the Isle of Man, elongated scalene triangles have some affinity with lithic sites associated with the Port St Mary technological complex (Woodman 1978a). Across the Irish Sea, they were relatively common at Mount Sandel in Ireland, where they were described as long and narrow in morphology, with widths that rarely exceeded 10 mm, and were often over 30 mm in length (Woodman 1985, 43). These dimensions are very similar to the elongated scalene triangles recorded at Cass ny Hawin II (*above*). Short, oblique edges with a concave shape were also a common feature of the Mount Sandel 'narrow elongated' scalene triangles and they were often characterised by leading-edge

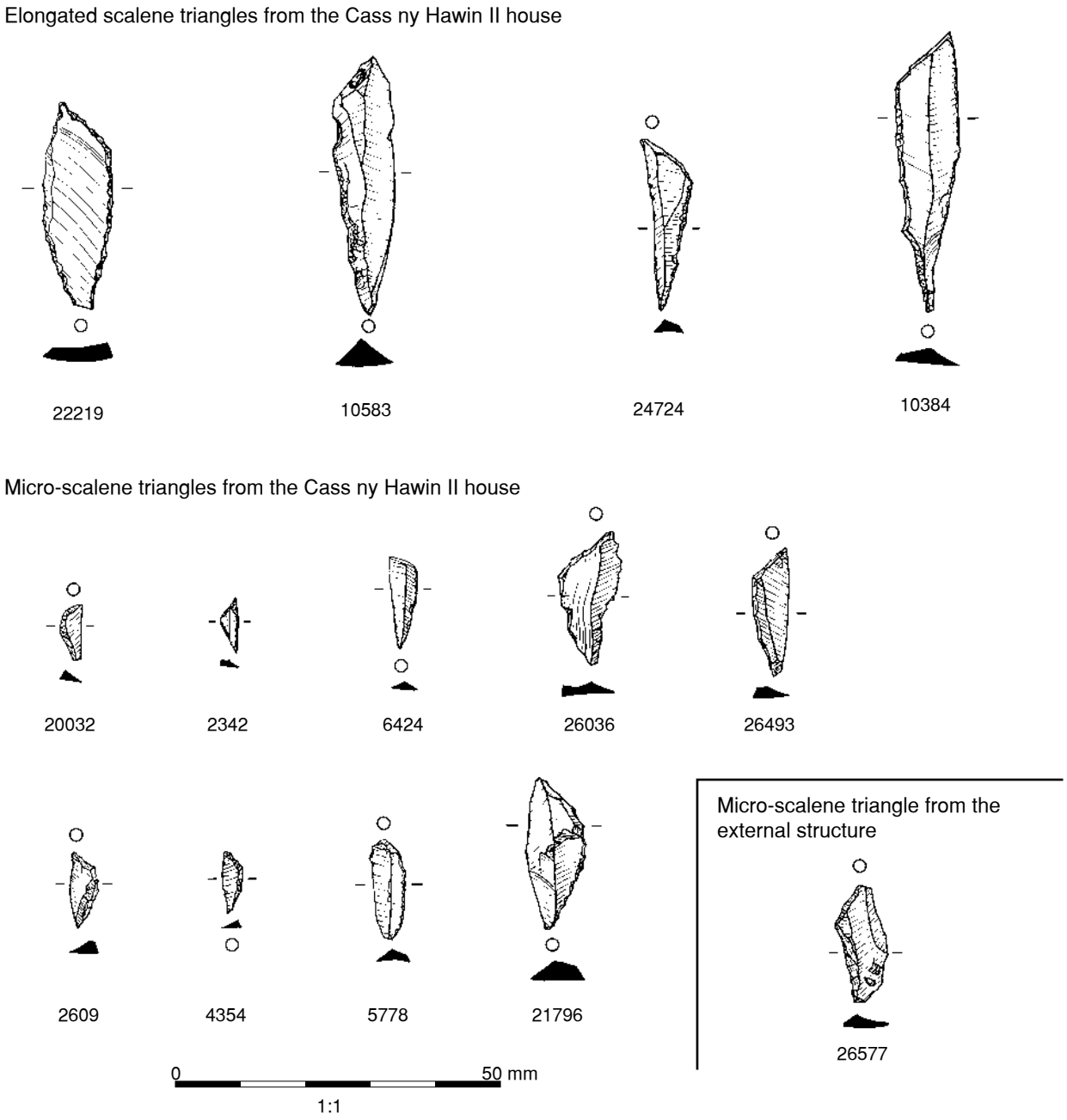


Figure 59: Scalene triangles from the Cass ny Hawin II house and its external structure

retouch, indicating that they share some stylistic features with those from Cass ny Hawin II.

Beyond the Isle of Man and Ireland, the presence of elongated scalene triangles is difficult to define on the basis of published assemblages, but the scalene-dominated microlith assemblage from Howick, Northumberland, comprises such microliths with a narrow elongated form, with mean dimensions of 17.8 x 5.1 x 1.7 mm (Waddington 2007, 84). At Low Hauxley, the scalene triangles are noted as being smaller than those from Howick (Waddington and Bonsall 2016, 107-8), although at least one had a length of 26 mm, being a comparable length to some of those from Cass ny Hawin II.

In total, 147 micro-scalene triangles were recovered from the Mesolithic house, and it is of note that many of the fragments probably represent comparable pieces, damaged from use or during manufacture. The micro-scalene triangles are much smaller than the elongated versions (Table 25), at 6-24 mm long, with widths between 2 mm and 11 mm. In a similar way to the elongated versions, they are defined by abrupt retouch on the two oblique edges; however, unlike the elongated forms, the leading edge was rarely modified (*eg* 20032; 2342; 6424; 26036; 26493; and 26577; Fig 59). Indeed, only seven (4.76%) were identified with leading-edge retouch, and on the majority this followed the full length of the edge and could relate to use-damage. Furthermore, very few

of the micro-scalene triangles exhibited concavity to the short oblique edge. In fact, on many, the angle between the two oblique edges was rounded, and on 26 this rounding was so pronounced that it formed a continuous asymmetrical arc, giving the implements a sub-triangular outline (*eg* 2609; 4354; 5778; and 21796). It is tempting to see these sub-triangular forms as representing the grading of scalene triangles into isosceles triangles, but they are asymmetrical and do not exhibit oblique edges of equal length. In this respect, some of the pieces have more in common with crescents (*above*), with a gradation across all three forms.

The scalene triangles from Cass ny Hawin II appear to be much smaller than those from Cass ny Hawin I (Woodman 1987, 7) and they also differ in some other ways. For example, at Cass ny Hawin I, over 50% had a concave short oblique edge, which on some pieces was quite acute, making them almost isosceles in plan. Both oblique edges could also be concave on some of the Cass ny Hawin I scalene triangles, producing a pronounced spur at the angle between the two edges. In addition, a few were formed by retouch to the short edge only, and often this was also concave in plan. When considering other Mesolithic sites on Man, those associated with the Port St Mary complex comprise quite large, broad triangles, with slight concave short oblique ends, very few showing evidence for leading-edge retouch. In contrast, those associated with the Glen Wyllin complex are smaller (greater than 20 mm in length), narrower, and occur less frequently than those associated with the Port St Mary complex. Moreover, they tend to have a concave short oblique edge and are often retouched along the leading edge (Woodman 1978b).

Beyond the Isle of Man, chronological modelling of Mesolithic industries containing small scalene triangles indicates a start for their production in the late ninth/early eight millennium (Conneller *et al* 2016a; Conneller 2022, 23), which fits comfortably with the dates from Cass ny Hawin II. It should be noted, however, that a slightly earlier date for their inception has been argued, on the basis of the mischaracterisation of the Cramond lithics by Conneller *et al* (2016a) as a basally modified microlith assemblage (*cf* Waddington *et al* 2017).

Obliquely trimmed blades

There are 25 blades in the assemblage that have been trimmed obliquely across their long axis by, usually, abrupt retouch, and these are amongst the larger microlith types from the site (Table 25). Similar microliths were present at Cass ny Hawin I and the pieces from Cass ny Hawin II have been recorded following Woodman's (1978a; 1987) classification system, which allows then to be divided into two groups.

The first group comprises short broad blades, which are retouched on an obtuse angle. Five are present, four of which are made on the proximal end of blades, and have been obliquely modified at an obtuse angle across the width of the blades. Four of these are relatively small, with lengths, for the complete pieces, lying between 14 mm and 21 mm, and widths between 6 mm and 8 mm (*eg* 10881 and 12361; Fig 60). These pieces are, therefore, slightly smaller than the Cass ny Hawin I examples, which were rarely under 20 mm in length (*ibid*). They are also relatively thin, and none have thick supports

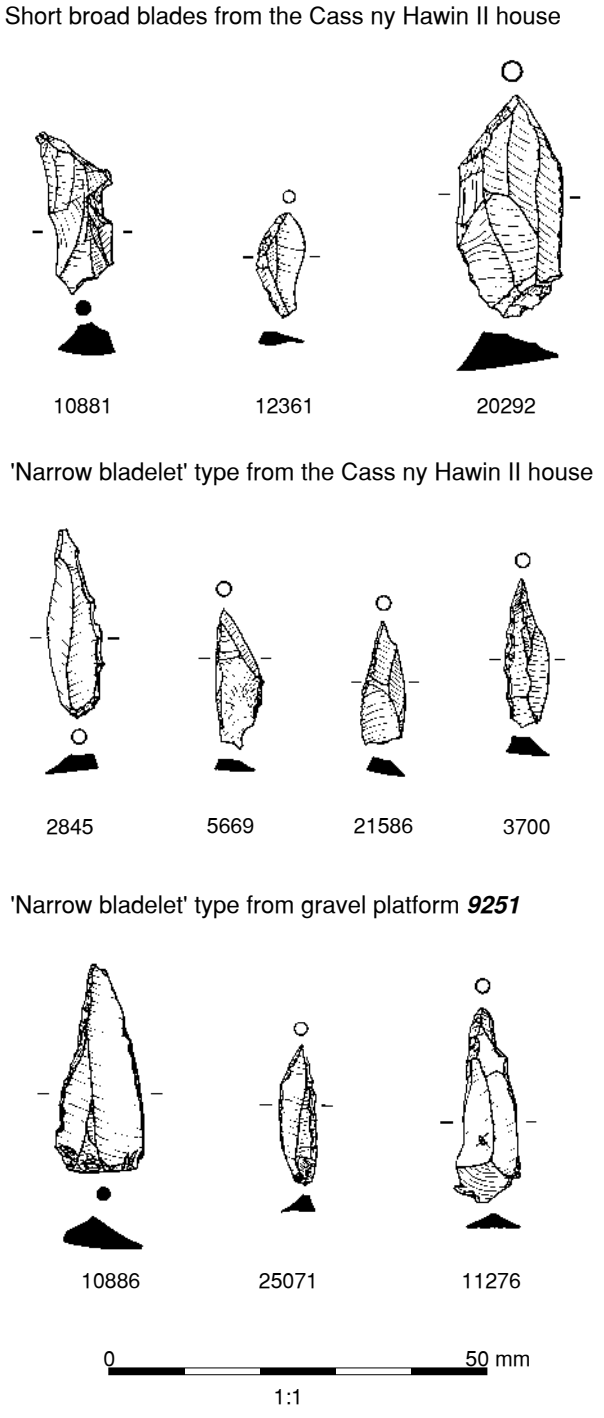


Figure 60: Obliquely trimmed blades from the Cass ny Hawin II house and gravel platform **9251**

or curving bulbar faces, which also characterised some of the Cass ny Hawin I items (Woodman 1978a; 1987). The remaining Cass ny Hawin II item (20292) does, however, correspond closely to the Cass ny Hawin I examples, as it possesses the thick supports and is also larger than the other Cass ny Hawin II pieces, with dimensions of 28.56 x 14 x 5 mm. This also has a small patch of possible inverse retouch on the right-lateral edge, at the distal tip, although this could be edge-damage produced during hafting.

The second group resembles the narrow bladelets retouched on an acute angle from Cass ny Hawin I, which often exceeded 30 mm in length (Woodman 1978a; 1987). There are 20 pieces from Cass ny Hawin II (recorded as obliquely blunted blades), though they differ slightly from those from Cass ny Hawin I, particularly in relation to their length, as only one is over 30 mm long.

The majority (14) are made on the distal end of blades, which have been prepared using the microburin technique. Of these, 13 have been modified on the right-lateral edge, whilst a single specimen is retouched on the left edge, and all have been modified with dorsal retouch on these edges. The retouched edge is straight in plan and cuts across the blade obliquely, on an acute angle, to form a point at the proximal end, where it meets the opposite edge; however, in contrast to the Cass ny Hawin I examples, where retouch rarely extends for more than half the length, the secondary modification either extends along the full length of the implement, or thins just before it reaches the distal end. In two cases, *enclume* retouch has also been applied to the modified edge. At the opposite end, the angle of the retouched edge ensures that most of the distal termination remains intact and, in at least two examples, this is thicker than the opposite end. In addition, four of the implements have been retouched on the leading edge, which, in one instance, has been applied to the medial section of the edge, whilst three pieces have inverse retouch at the point. It should be noted that several of these points are so homogeneous in their technological character, and to some extent their dimensions and morphology, that it is possible that they were produced by the same individual.

In addition to the implements made on the distal end of blades, a further six are made on proximal sections. These items have a similar technological signature to their distal counterparts, with four being modified on the right lateral edge and two on the left. On one example (2845; Fig 60), the retouch extends around the proximal end, but this is confined to the dorsal face. In addition, a large example (10886) has been modified on the leading edge on the dorsal face, whilst the same edge appears to have been polished or worn smooth on the ventral face at the tip.

Obliquely trimmed blades are a common element of Manx Early Mesolithic lithic assemblages, leading Woodman (1978a, 126) to describe them as the type-fossil for the period. Elsewhere in the British Isles, although at some early narrow-blade sites they are either rare or absent, they are present at Cramond (Saville 2008), Low Hauxley (Waddington and Bonsall 2016), and Howick (Waddington 2007). These may have technological parallels to the Manx obliquely trimmed blades, though this requires confirmation through further comparative analysis.

Tanged form?

One piece was recovered from the house that is very similar to the tanged forms at Cass ny Hawin I, which, in terms of the Manx Early Mesolithic culture, are seemingly rare implement types (Woodman 1978a; 1987). That from Cass ny Hawin II (5304; Fig 61) has been obliquely trimmed across the blade, forming a slightly concave point at the distal end and, at the opposite end, the right-lateral edge is abruptly retouched on an acute angle from the butt end to approximately the medial section of the blade. The opposite edge also has finer semi-abrupt retouch running from the same end, which tapers out *c* 10 mm from the butt, forming a slight step. Both these retouched edges appear to have formed a tang at the proximal end of the point.

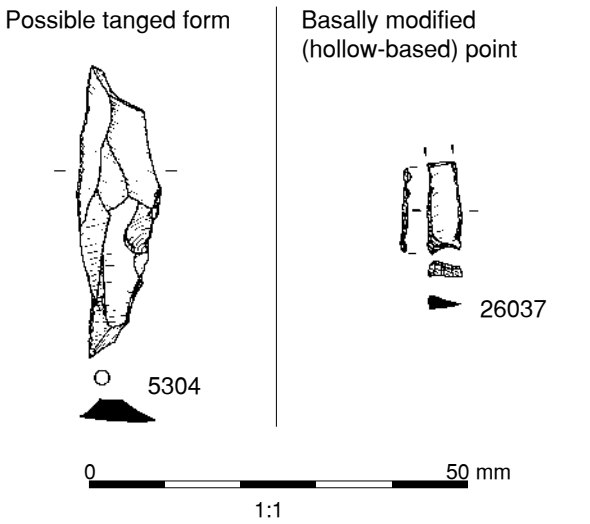


Figure 61: A possible tanged form and basally modified (hollow-based) point from the Cass ny Hawin II house

Basally modified (hollow-based) point

One possible example of a basally modified point also came from the house (26037). This is broken, with only the base (distal end) surviving, which is 4.4 mm wide and 2 mm thick. It has parallel lateral edges, of which the thicker right-lateral edge has steep, abrupt retouch, whilst the thinner, opposite edge has finer abrupt retouch, which becomes deeper towards the base. There is a blunted hollow at the distal end,

formed by retouch applied from the ventral face. The hollow is at right-angles to the lateral edges and kinks where it meets the right lateral edge.

On Man, basally modified points have been recovered from several other Mesolithic sites and are classified as hollow-based points, which have been subdivided by Woodman (1978a; 1987) into two principal types (A and B; *p 84*). That from Cass ny Hawin II, although broken, bears some similarities to the Type B forms, thought to represent a local form (*ibid*), as opposed to deriving from the Horsham industries (Barton and Roberts 2004), which have a southern English and Welsh distribution (Reynier 2005). On Man, the Type B examples are common to the Glen Wyllin complex, which has no Type A examples, and occur in more limited numbers in the Port St Mary industry, which is dominated by Type A hollow-based points (Woodman 1978a, 127). At Cass ny Hawin I, both types of hollow-based points were recorded in roughly the same quantities (Woodman 1987, table 3, 15). All the Manx sites are later in date than Cass ny Hawin II (*Ch 4, p 143*), however, which may suggest that the development of the basally modified microliths on the island has more complex origins than originally thought (Woodman 1978a; 1987).

Beyond Man, hollow-based points are not associated with narrow-blade assemblages of a similar date to that from Cass ny Hawin II, and although the assemblage from Cramond (Saville 2008) does contain a basally modified microlith, it is not a hollow-based point *sensu stricto*. Given this, the microlith within the Cass ny Hawin II assemblage can be regarded as an oddity within a Mesolithic narrow-blade technology dominated by micro-scalene triangles (*p 107*).

Miscellaneous points

Six other point forms are present in the assemblage in addition to the basally modified point, being defined by steep retouch along one lateral edge, which can vary in extent. On two examples, this extends fully along the edge, whilst it is partial on the others; however, in all instances, the retouched edge meets the opposite one to form a pronounced point (*eg* 20383; 7671; 14642; and 8267; Fig 62). Furthermore, the shape of the modified edge can vary between straight and convex and, on those pieces with straight edges, the retouch has been applied obliquely across the blade on an acute angle. On all the pieces, the opposite edge is also retouched, but this is usually less abrupt, and in only one instance (14642) does it nearly extend along the whole length of the edge. On four pieces, this retouch has been applied to accentuate the point and, in one example, it is inverse, whilst it appears to have been applied at the base of the implement on two pieces, possibly to facilitate hafting. All but one

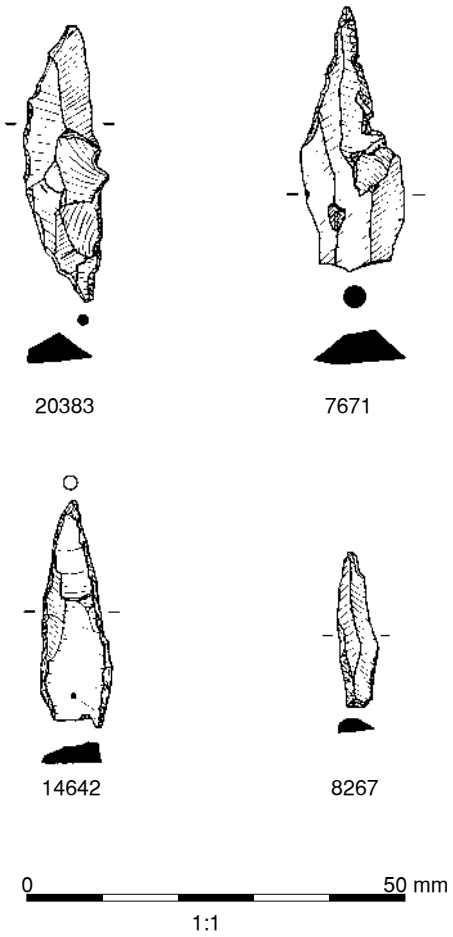


Figure 62: Miscellaneous points from the Cass ny Hawin II house

of these points are incomplete in terms of their length, whilst their widths vary from 10.05 mm to 4 mm. It is probable that these points functioned as awl/borers, or as arrow tips.

Based on morphology, one of the points (20383; Fig 62), from upper silt ***9248***, stands out from the others. This piece, which measures 36.34 x 10.05 x 4.36 mm, is made on a large blade segment of grey flint, which was probably produced using the microburin technique, and the original blank was of broad-blade dimensions. It has been modified with steep abrupt retouch along the entirety of the left-lateral edge, which has been consistently applied from the ventral face. The modification has produced a convex-shaped edge, which meets the mainly unmodified right-lateral edge to form two well-defined points at the proximal and distal ends. At the proximal end, the retouch is finer on the left-lateral edge and steps in by *c* 5.5 mm from the terminal, to form a shallow shoulder. A similar style of retouch has been applied on the right-lateral edge and this also forms a shoulder, although in this instance the retouch extends for *c* 7 mm from the proximal end, and is more irregular. The shouldering of the lateral edges appears to have produced a tang at the proximal

end; however, given that this tang is relatively short, it is also possible that the modification was applied to produce a point for use as an awl or related tool. At the distal end, fine acute inverse retouch has been applied to the right-lateral edge, which extends for *c* 4.5 mm from the end. The distal point is slightly rounded and there is potential impact damage, or resharpening, in the form of a short linear scar, emanating from the tip. On the dorsal face, at the proximal end, several flake scars with hinge terminations have also formed a slight ridge, perpendicular to the main axis of the piece. If there is indeed a tang at the proximal end, this ridge may well have facilitated the hafting or handling of the implement.

This object shows some similarities with convex backed blades and/or lanceolate microliths (Jacobi 1978). Given its overall morphology, it could easily, however, represent an over-large crescent (*p 106*), which has been modified into an awl at the proximal end. The potential tang and the morphology of the piece also indicate that it could represent another implement type, and it does exhibit some similarities with the two possible 'tanged forms' (Woodman 1987, fig 9, 19-20) at Cass ny Hawin I, although the location, style, and extent of retouch differs on those pieces. Nevertheless, given that it was recovered from the house, it is probably a variant point form, chronologically related to the wider assemblage.

Miscellaneous microlith

One miscellaneous microlith (26037; Fig 63) came from occupation/destruction deposit ***9249***. This small implement (10.8 x 4 x 1.4 mm) has an elongated leaf-shaped form, with a triangular cross-section, and the distal portion of a bladelet has steep, abrupt retouch along the right-lateral edge, which continues across the blade at the proximal end. The retouch on the right-lateral edge is on an acute oblique angle, while the continuation has been applied on a much more obtuse angle, but only partially across the width. The left-lateral, or leading, edge also has fine, inverse retouch extending along its length, which continues on an obtuse angle across the width of the piece, and then reverts to normal dorsal retouch. This edge and the opposite one meet to form a short broad asymmetrical point, defined by a small protrusion at the apex. Based on its shape and the retouch on its right-lateral edge, this item could conceivably be a micro-scalene triangle (*p 107*), though one which witnessed further modification (on its left-lateral edge) for some unknown reason.

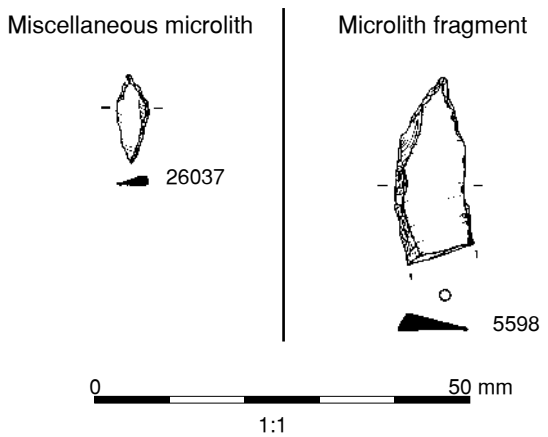


Figure 63: Miscellaneous microlith and microlith fragment from the Cass ny Hawin II house

Microlith fragments

Microlith fragments constitute around a quarter of the assemblage from the site. These clearly relate to the manufacture, use, and maintenance of (composite) tools, and their discard. In many analyses, microlith fragments are not considered in detail; however, for those from Cass ny Hawin II, an attempt has been made to understand the original form of the larger pieces by recording retouch type and location, when identifiable. This indicates that 69 pieces are distal fragments, 45 proximal, and the remainder are unidentifiable. Therefore, the majority are indeterminate pieces and could be the result of several processes relating to tool manufacture, use, and discard (Finlay 2009). Of the small number that still retain diagnostic retouched edges, four pieces are possible fragments of backed bladelets; two have evidence for a convex retouched edge and could be fragments of crescents; two could be pieces of triangles; and two could be unfinished microliths. In addition, at least 51 pieces could be possible fragments of scalene triangles. The latter mainly comprise pieces with remnants of two modified oblique edges, and several show lateral truncation on the opposite edge, which could relate to impact damage. This implies the possible maintenance of used composite tools, or potentially the processing of kills brought back to the site. Finally, eight pieces are possibly fragments of point forms. Most are small in dimension and, when lateral edges can be identified, both retouched and unmodified, which suggests that they are narrow enough to be representative of obliquely trimmed blades and/or miscellaneous point forms. These possible points also include a large example (5598; Fig 63), which exhibits similar technological characteristics to one of the large miscellaneous points (20383; *p 111*), being of similar breadth, though slimmer.

Microburins

Many microburins were recovered (267), and, whilst not strictly microliths, they are a secondary debitage by-product of their manufacture (Fig 64; *Ch 2, p 36*). They are characterised by a truncated notch, prepared by microlith blunting, on a lateral edge, and an associated oblique facet, which continues the break, initiated through the application of the notch, across the width of the piece (Wickham-Jones 1990, 100; Inizan *et al* 1992, 69-70; Butler 2005, 88-9;

Miolo and Peresani 2005, 66-7; Reynier 2005, 131). Usually, microburins comprise the proximal end of a blank, but distal ends are not uncommon, and within the Cass ny Hawin II microburin assemblage, 191 (71.53%) are proximal; 63 (23.59%) are distal; two are double; and 11 pieces are unclassifiable. The latter are either damaged or failed pieces, and four are possible Krokowski microburins (*cf* Sørensen 2017).

Some of the microburins appear predominantly to reflect the selection of narrow blades for microlith manufacture, with 190 (71.16%) possessing narrow-blade widths (equal to or greater than 5 mm and less than 8 mm); 71 (26.59%) have broad-blade widths (greater than 8 mm); whilst the remainder cannot be classified. Furthermore, where identification could be made, 167 (62.55%) of the microburins are notched on the right-lateral edge, whilst 92 (34.46%) are notched on the left. There are also several long and broad microburins, and one (20221; Fig 64) is a *lamelle à cran*, whilst the others could be, though most do not exhibit the classic tapering notch, terminating at the break.

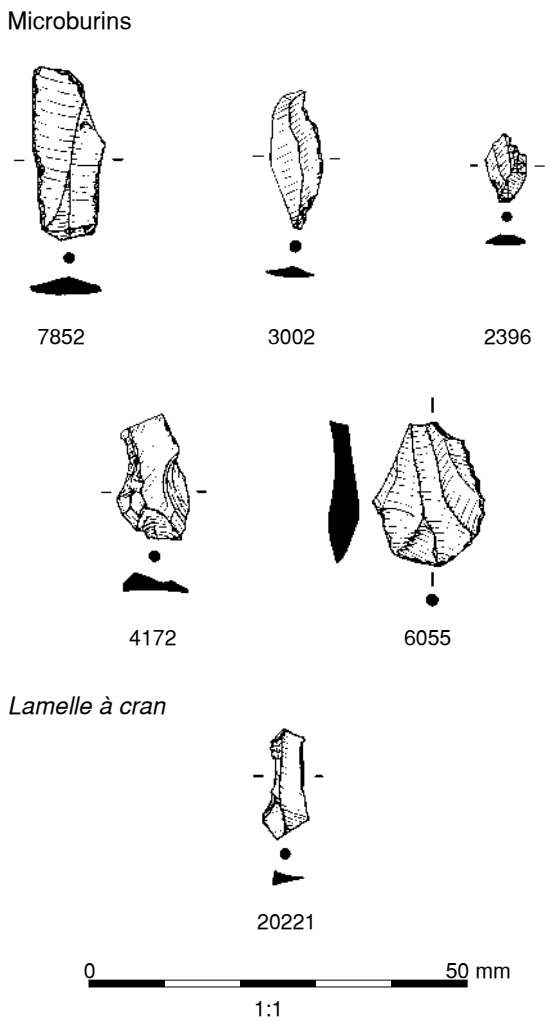


Figure 64: Microburins and a lamelle à cran *from the Cass ny Hawin II house*

Only one microburin is known from the Port St Mary assemblage on Man (Woodman 1978a), though they are common to the Glen Wyllin technological complex (*ibid*), but it is of note that *lamelles à cran* are not a feature of these assemblages. Cass ny Hawin I also produced a significant number of microburins and, while it was noted that this produced some long examples, none appear to represent *lamelles à cran* (Woodman 1987, 11). Beyond this, on mainland Britain, microburins are associated with the narrow-blade sites at Cramond (Saville 2008) and Howick (Waddington 2007); however, at the latter, the quantities are small, indicating that this technique was not used extensively during microlith manufacture. They were also recorded at Low Hauxley, though the frequencies are not fully detailed (Waddington and Bonsall 2016). In Ireland, at Mount Sandel, microburins also occurred in significant numbers, and alongside them, a much smaller collection of *lamelles à cran*, which tended to be larger than the microburins (Woodman 1985).

Other tools

The other implements from Cass ny Hawin II, comprising retouched blades and flakes, again mainly came from the Mesolithic house, with a much smaller collection from the adjacent external features. All are pebble flint, the majority (*c* 71%) being made on blade blanks, and they can be subdivided into seven main tool types, along with an additional category of burin spalls (Table 26).

Awls/borers

Recognisable awls/borers are infrequent, with only two examples, though this general scarcity could be a result of the use of some of the microliths as awls. One (3172; Fig 65) is formed on a blade-like flake, and the awl point is formed by inverse, semi-abrupt retouch, applied to the medial and distal sections of the right-lateral edge; a patch of acute retouch has also been applied to the opposite edge at the distal end. The other has bilateral abrupt retouch and the point is worn from extensive use. This piece is stylistically similar to the miscellaneous points (*p 111*); however, given its larger dimensions, it has been classified as a macrolithic tool.

Denticulates

Three blades have been modified with micro-denticulation. In all, the modified edge is worn from use, and two also have retouch on the opposite edge. The best-preserved example (9615; Fig 65) is made on an irregular blade-like flake, and a series of continuous tiny notches has been removed from the left-lateral edge, to create a saw-like tool.

Knife forms

Five possible knives came from within the house. Four possess retouch applied to a lateral edge at a low angle

	Gravel platform *9251*	Structural postholes	Erosion deposit *9253*	Occupation/ destruction deposit *9249*	Upper silt *9248*	External features	Topsoil/ subsoil	*Total*	*% of total*
Awl/Borer					1		1	***2***	***1.75%***
Denticulate				2	1			***3***	***2.63%***
Knife form				3	2			***5***	***4.38%***
Miscellaneous edge-retouched	1	2	1	10	22	6	4	***46***	***40.35%***
Notched				3	14	1	1	***19***	***16.67%***
End scraper					1			***1***	***0.88%***
Side scraper				1	2	1		***4***	***3.51%***
Side-and-end scraper					1			***1***	***0.88%***
Scraper fragment				1	1			***2***	***1.75%***
Burin				4	15			***19***	***16.67%***
Burin spall				6	5	1		***12***	***10.53%***
Total	***1***	***2***	***1***	***30***	***65***	***9***	***6***	***114***	
% of total	***0.88%***	***1.75%***	***0.88%***	***26.32%***	***57.02%***	***7.89%***	***5.26%***		

Table 26: The other tools from Cass ny Hawin II, by type and stratigraphic provenance

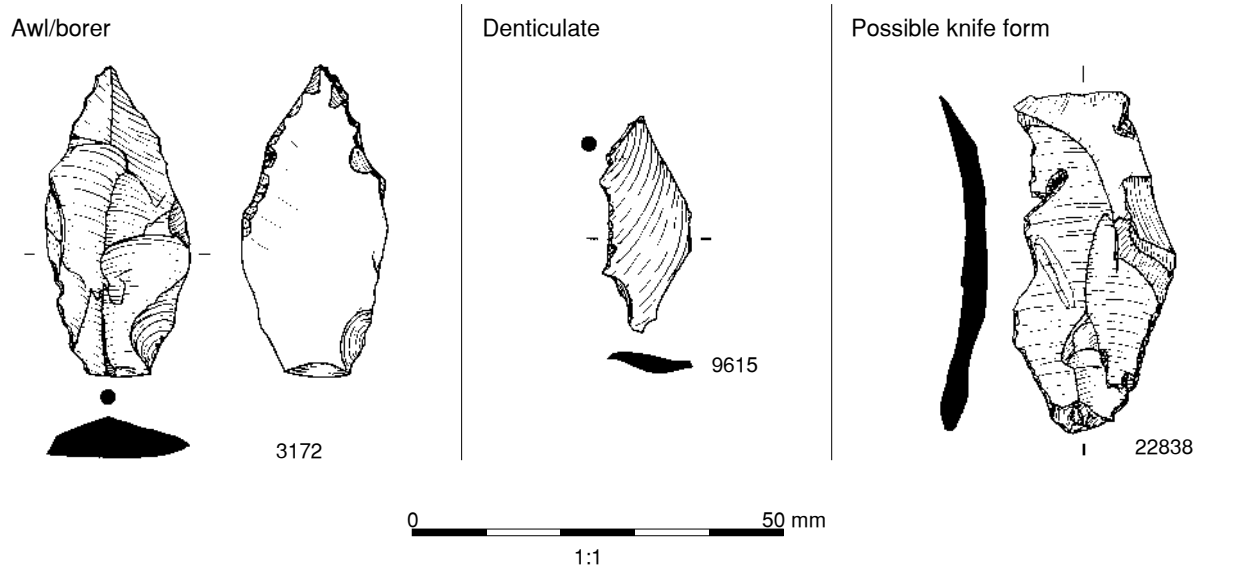


Figure 65: An awl/borer, denticulate, and possible knife from the Cass ny Hawin II house

(*eg* 22838; Fig 65), whilst the fifth has heavy, irregular, abrupt retouch on the left-lateral edge, which may represent backing. The opposite edge is unmodified, but has several patches of small, irregular scars, which could be edge-damage from use.

Miscellaneous edge-retouched blades and flakes

In total, 46 blades and flakes with miscellaneous edge retouch were recovered from Cass ny Hawin II. Some have very light patchy retouch on their lateral edges, which could relate to edge-use or post-depositional damage (*eg* 20223; Fig 66). On others, the retouch is more extensive and heavier, and appears to represent intentional modification, although, in most instances, it does not cover the full length of the edge. The retouch is usually on the medial section of the blank on one lateral edge, though there are instances of retouch at the distal and proximal ends of blades and flakes, along with pieces with bilateral retouch (*eg* 6102). One example (24768) with bilateral retouch consists of a blade with abrupt retouch along both lateral edges, extending from the butt end to the medial section of the piece. The distal end is splayed and unmodified, although it appears to be damaged from use, and the piece could have been a chisel-type implement. It seems that the retouched edges possibly served to facilitate

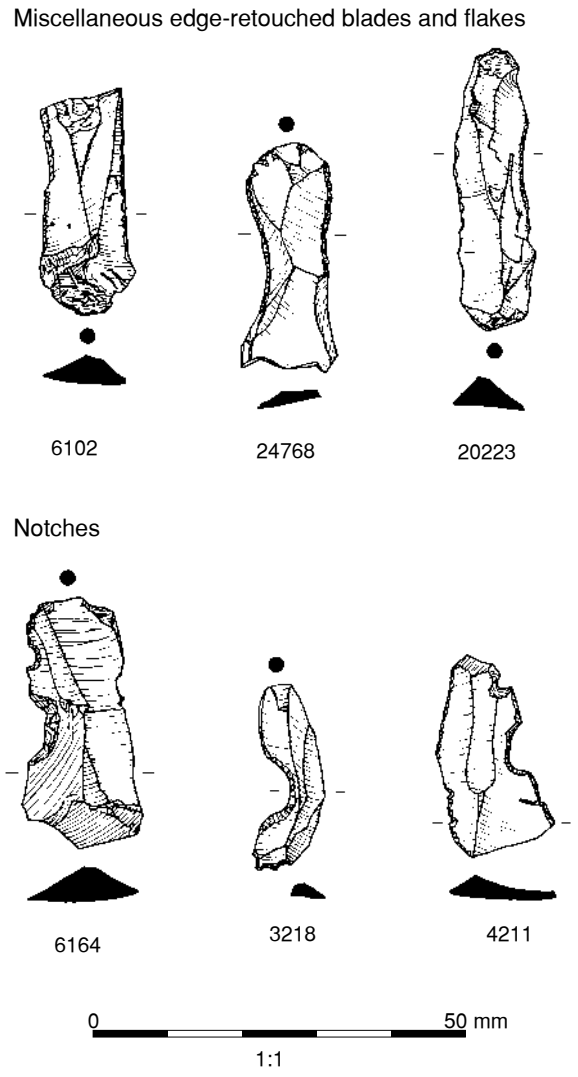


Figure 66: Miscellaneous edge-retouched blades and flakes, and notches, from the Cass ny Hawin II house

hafting, as on both lateral edges it terminates at the point where a ridge, formed by a hinge termination from a dorsal scar, cuts across the width of the blade.

The retouch style on all pieces is usually abrupt/semi-abrupt, and several instances of inverse retouch were also recorded. The miscellaneous retouched blades and flakes were possibly attempts to make an expedient tool for tasks involving scraping and possibly cutting. Furthermore, two flakes have possibly been retouched to create piercing tools. One is made on a fragment of a flake, whilst the second has light retouch on a curving lateral edge, which may have been applied to emphasise the naturally occurring pointed distal end of the flake.

Notches

The assemblage contains 19 notched blades and flakes. The notch in all cases is formed from continuous abrupt retouch, though it can vary in depth from extremely deep and U-shaped to broad and shallow in outline. In most cases, the notch is positioned on the medial section of blades and flakes, and, in some instances, bilateral notches are present, giving the pieces a waisted outline. Additionally, three have retouch on the opposite lateral edge, but in all cases, this is patchy and undiagnostic in terms of it indicating a formal tool edge. It is unclear what function the notches could have had, and while some may have been used for working wood, such as shaping or straightening shafts for composite tools, others (*eg* 3218; Fig 66) probably represent a lost or abandoned microburin.

Scrapers

Eight scrapers came from the house, with a single example from the external features immediately to the south. Two are fragments (*eg* 22277; Fig 67), though the others can be classified according to the location of the retouch. This indicates that the assemblage contains a single end-scraper, four side-scrapers (*eg* 2488 and 6149), including that from an external feature, and a single side-and-end scraper (5551). Significantly, all appear to have seen extensive use, reflected by the small irregular scars at the base of the retouched edge. The discovery of scrapers at Cass ny Hawin II holds some significance, as there is an almost complete absence of these from Manx Early Mesolithic lithic assemblages (Woodman 1978a), and these are also rare in the narrow-blade assemblage from Mount Sandel, Ireland (Woodman 1985).

Burins

Nineteen flakes and blades, all from the house, are burins, as they possess at least one burin facet. As with the scrapers (*above*), the presence of burins holds some significance, as they are almost completely absent from Manx Early Mesolithic technological complexes.

Ten have a very similar form, possessing a single burin facet either on the left- or right-lateral edge, with the majority at the distal end. In addition, the termination often exhibits clear evidence for edge damage. It is possible that they represent a form of microburin, although there is no evidence for a retouched notch, or a blank for another tool type, such as obliquely trimmed implements.

Two examples (5582 and 6115; Fig 67) are more typical of conventional forms, probably single-angle burins. Alongside these are two examples that are probably double-angle burins, and on one (7714), the burin facets may have been struck to form a chisel-type edge at the distal end, or it may have been prepared as a blank for an awl. One example also has a patch of retouch adjacent to the burin facet. This (5324) is very similar to a microburin, except that the retouch and burin facet are on the distal termination, and therefore the piece has not been prepared as such. It should be noted that 12 burin spalls were also recovered from

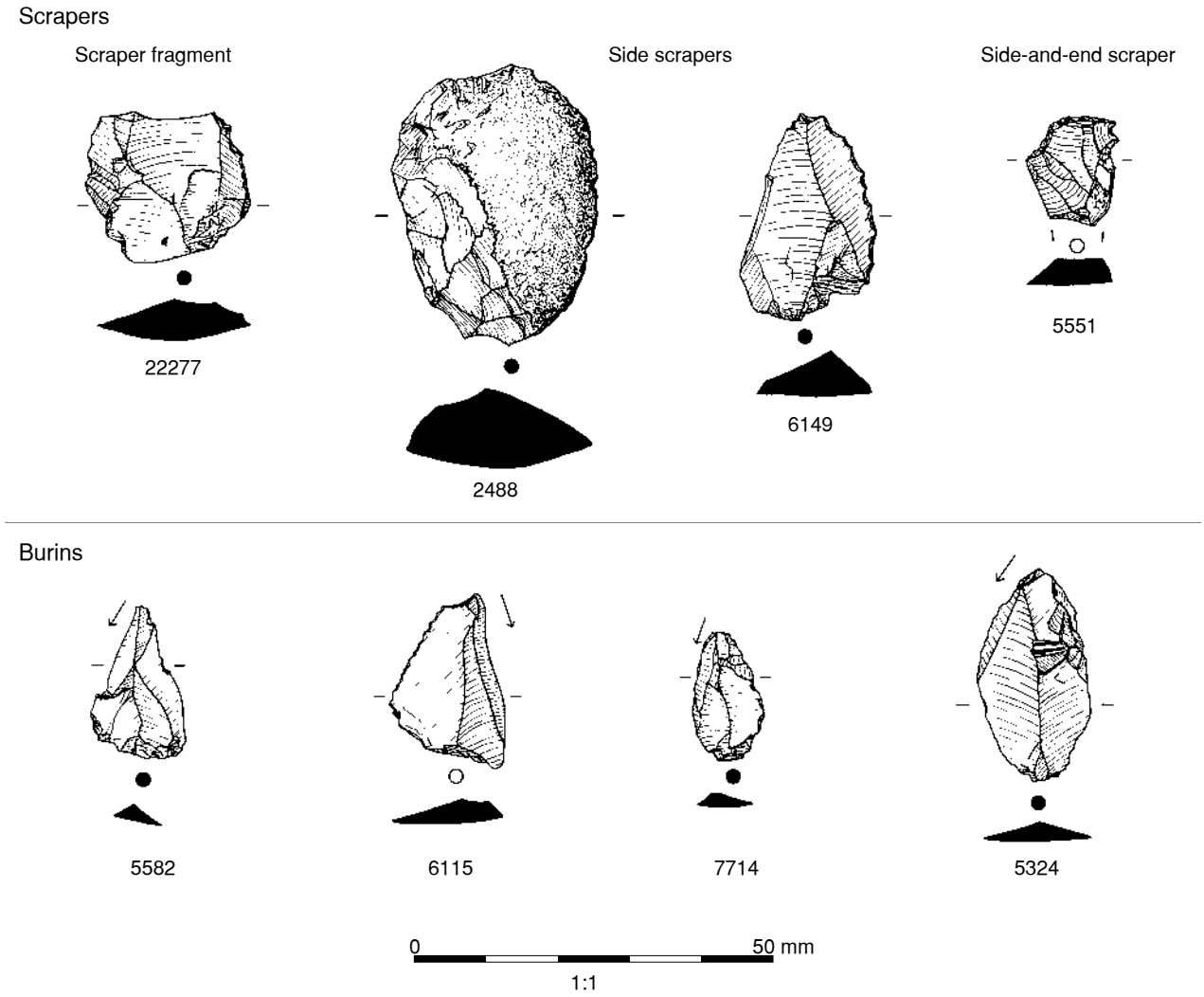


Figure 67: Scrapers and burins from the Cass ny Hawin II house

Cass ny Hawin II, 11 deriving from the house, and the other coming from an external feature (Table 26).

Edge-utilised blades and flakes

The lithic assemblage contains five blades and flakes with continuous small, irregular scarring along their lateral edges, representing edge modification (Table 27). The morphological character of this modification suggests that it was possibly related to the direct use of the pieces, rather than being intentional retouch, or a by-product of post-depositional activity.

	Occupation/ destruction deposit *9249*	**Upper silt *9248***	**Topsoil/ subsoil**	***Total***
Utilised blade	2		1	***3***
Utilised flake	1	1		***2***
Total	***3***	***1***	***1***	***5***

Table 27: The edge-utilised blades and flakes from Cass ny Hawin II, by type and stratigraphic provenance

Four of the five pieces have a gloss on their lateral margins. It is possible that this relates to the use of the blades and flakes as simple knives, used to cut fibrous materials, although the post-depositional movement of flint artefacts, particularly within gravel-rich soil matrices, can also produce bright spots, which look very similar to gloss created through intentional use.

Significance of the Assemblages

Environmental remains

The palaeoenvironmental remains from Cass ny Hawin II provide valuable details of plant use and exploitation during the early Mesolithic period on Man. Significantly, the extremely detailed sampling and processing regime employed, in part driven by the requirement to retrieve the entire lithic assemblage, allowed for a similarly detailed palaeobotanical study. The material formed a three-dimensional dataset, and provided details of the temporal and spatial organisation of the house, and also of the nature and

selection for use of the surrounding vegetation and woodland. The relatively large volumes of hazelnut shells, and the presence of crab apple remains and cleavers, mirror existing evidence of plant use during the Mesolithic period. The recovery of large volumes of charcoal, is, however, seemingly unique, and provides detailed information on wood selection and use, such as the selective use of oak for fuel, indicating a prior knowledge of its burning qualities, whilst willow and some of the blackthorn-type woods may have been selected for basketry and possible wood-craftsmanship.

The interpretations of other, equally well-excavated, Mesolithic house sites in Britain, such as Howick, Staosnaig, and Echline Fields (*Ch 10, p 319*), has provided invaluable inter-site comparisons. Indeed, when compared to these sites, the small number of hazelnut-shell fragments and the simple stratigraphy imply that Cass ny Hawin II was a single occupancy domestic structure, which was not associated with 'industrial'-scale hazelnut-processing.

The excellent preservation of the range of Mesolithic palaeobotanical material certainly makes this site unique. Although some of the methodologies did not produce particularly useful results, this should not preclude further investigations that may adopt different methodologies and scientific techniques. For example, the effects that charring has on both whole and hand-broken (processed) hazelnuts, as a means of identifying their primary use, has to date only been carried out on modern material (López-Dóriga 2015), and the Cass ny Hawin II assemblage could potentially contribute greatly to such studies, providing a valuable 'ancient' dataset. Other techniques, which have proven to be extremely informative on similar sites, such as Staosnaig, include the use of scanning electron microscopy (SEM) on charred-fruit remains, as a way of investigating seasonality (Carruthers 2000). Also of potential importance is the use of SEM for identifying cellular tissue (parenchyma) of roots and tubers from Mesolithic sites (Bishop *et al* 2013; 2023). Phytolith research is still in its infancy in Britain, and its use as a tool for investigating delicate vegetation, that may not necessarily survive the charring process, means that the potential exists for the recovery of even more palaeobotanical information from the Cass ny Hawin II assemblage.

Worked stone

Within the large assemblage of worked stone, pebble flint dominates and, judging by the worn and battered nature of the cortex, most was probably procured from beach-shingle deposits. Although it is unclear how local such deposits would have been in the ninth and eighth millennia cal BC, the present-day distribution of pebble flint is relatively wide, with good availability in the north and north-western parts of the island, with more sporadic sources stretching along the eastern and western coastlines (McCartan 1999), whereas it is apparently scarce in the southern end of the island (Woodman 1987).

The flaked-lithic technology revolves around the production of blades and narrow flakes from single-platform cores. Whilst it is likely that fresh blade and flake blanks were used in a variety of tasks, demonstrated by the occurrence of several items with possible edge-use gloss, a reasonable amount had been modified into microliths and other retouched tools. Microliths were manufactured using the microburin technique (Inizan *et al* 1992), chiefly on narrow blades (widths equal to or greater than 5 mm and less than 8 mm), to produce a range of, predominantly, small geometric implements, of which micro-scalene triangles are paramount. Beyond the scalene triangles, the presence of a possible hollow-based point is notable. Such implements are common to chronologically later Mesolithic assemblages from the Isle of Man, as represented by the Port St Mary and Glen Wyllin industries (*p 84*). Peter Woodman (1987) has proposed an insular development for such implements, possibly originating from scalene triangles with concave short, oblique edges. However, such technological traits are not a feature of the Cass ny Hawin II scalene triangles and it is thus possible that Manx hollow-based points have wider origins.

The analysis of microburin widths indicates that blades with broader widths (greater than 8 mm) were also used in the production of microliths, but less intensively, and it is possible that, in some instances, they were preferred for manufacturing specific implements, such as elongated scalene triangles and obliquely trimmed blades. Nevertheless, the style of the microliths and the nature of the primary technology indicates that a narrow-blade, geometric microlith industry characterises stone working at Cass ny Hawin II. This industry is broadly comparable to that from a range of sites of a similar date, often from post-built structures with an analogous form to that at Cass ny Hawin II, identified in the north of England (Waddington 2007; Waddington and Bonsall 2016), Scotland (Saville 2008), and Ireland (Woodman 1985; *Ch 10, p 319*). The other lithic pieces share a common theme with the microliths, in that they were predominantly manufactured on blades to produce a restricted range of formal tool types, dominated by burins, obliquely trimmed blades, and notches, although simple-edge retouched pieces are also common.

The coarse-stone tools have particular significance, as, in terms of the Isle of Man, they form a unique, and stratified, collection of Early Mesolithic artefacts. The assemblage contains a range of tools with wear traces,

which indicate that they were employed in a variety of tasks, including grinding, rubbing, and pecking actions. Some of the tools with wear patterns indicative of grinding could have been used in the processing of hazelnuts. Other tools have wear patterns from being used as hammerstones and/or anvils and they may have been used in a range of craft and processing tasks, perhaps also involving the processing of foodstuffs, and materials such as animal skins, bone, and wood.

Of particular note are three ground stones (*p 76*), which are rare within the Manx Early Mesolithic assemblages, though two similar stones have been recovered from Poyllvaaish, on the present-day coastline, west of Castletown (S McCartan *pers comm*), an area which, interestingly, has also produced a Mesolithic pendant made from an oyster shell (MNH OR 1954-0032/11.093). These grounds stones also appear to be very rare objects in the period within the British Isles, although an edge-ground cobble from Nab Head, in Wales, bears some technological similarity, and it also has a central perforation (David and Walker 2004). They clearly demonstrate, as do several other cobble tools from Cass ny Hawin II, that the occupants of the house had knowledge of a grinding and pecking technology that could be applied to reshape cobble blanks. The grinding of a chevron design, clearly identifiable on the largest piece, is notable, and whilst a symbolic or ritualistic significance could be attributed, the fact that such a design would have provided extra purchase in grinding or smoothing tasks, possibly during the processing of animal hide, cannot be ignored.

The Cass ny Hawin II assemblage forms a highly significant research resource, which could be studied further, including microwear analysis, particularly as such a study of a sample of flaked lithics associated with the late Mesolithic site near Carlisle demonstrated that the formal tools and debitage were put to a wide variety of uses, and that certain task activities were spatially organised (Brown *et al* 2023). A similar study of the unburnt component of the Cass ny Hawin II flaked-lithic assemblage could define the types of tasks or activities undertaken and their spatial representation within the house.

Statistical analysis might have specific relevance to the interpretation of the spatial distribution of the flaked-lithic assemblage (*Ch 2, p 59*), particularly the technological and spatial relations of different lithic types. Indeed, there is a range of statistical approaches available that could be applied to answer specific questions relating to this component of the worked-stone assemblage. For example, cluster analysis could be helpful in determining spatial patterns of association between types within the structure. Indeed, statistical analysis could also be extended beyond Cass ny Hawin II to consider the variability of the lithic assemblage in relation to other excavated assemblages of a similar date and technological character.

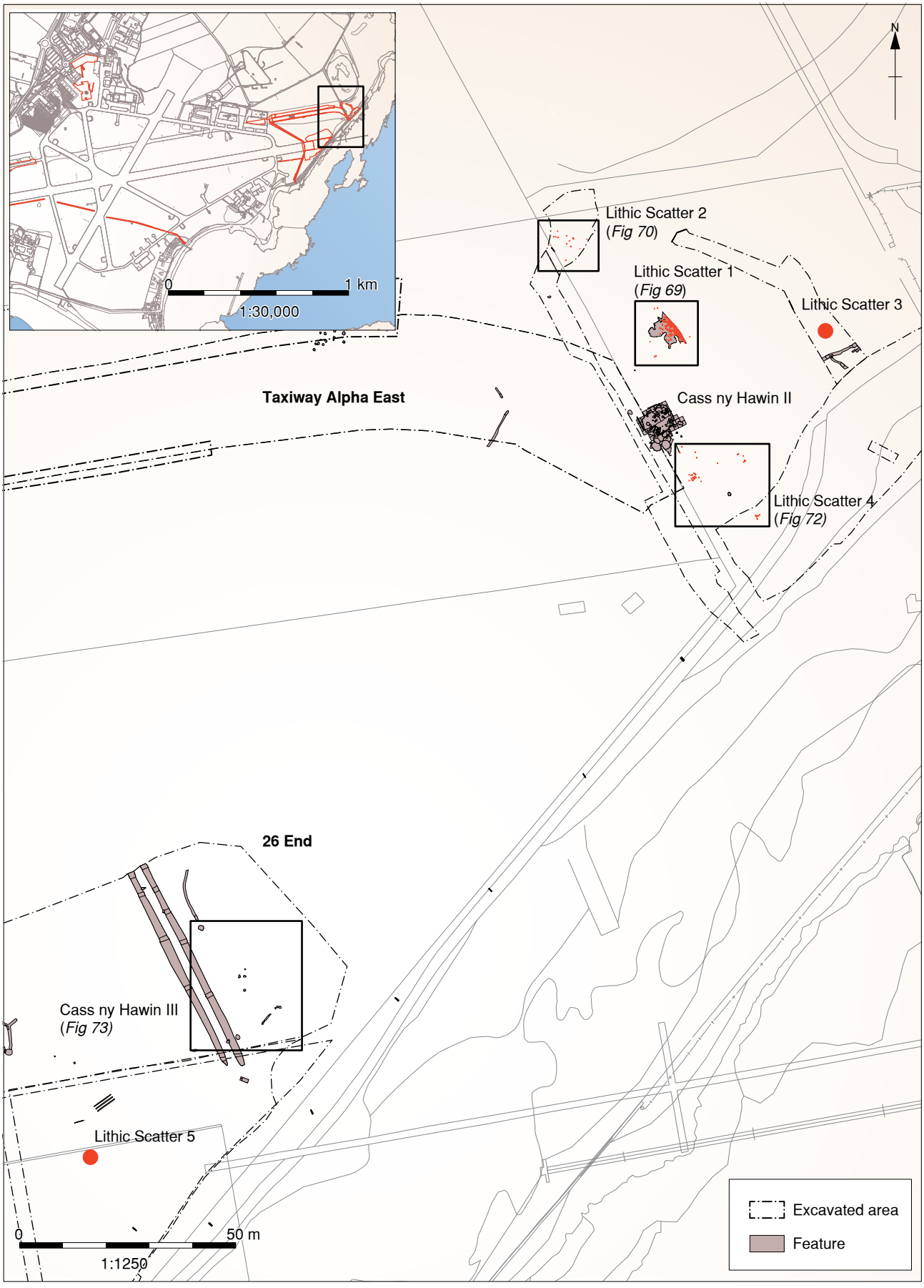


Figure 68: Lithic scatters and the Cass ny Hawin III pit group

4

MESOLITHIC LITHIC SCATTERS AND PITS

Antony Dickson, Aidan Parker, Denise Druce, and Richard A Gregory

The discoveries of two temporally separate Mesolithic houses at Ronaldsway (Cass ny Hawin I and Cass ny Hawin II), within and adjacent to the Airport, clearly indicates that nationally important archaeological remains, relating to early hunter-gatherer groups on Man, were present in close proximity (Woodman 1987; *Ch 2, p 39*). During their occupation, these dwellings stood in coastal locations as, even assuming lower sea levels (*Ch 2, p 33*), the Mesolithic coastline was not likely to have been any great distance away (*op cit*, 19).

These structures did not sit in isolation, however, and during the RESA project it became apparent that they formed elements in a much wider zone of Mesolithic activity, with the discovery of other sites adjacent to the present-day coastline (Fig 68). These consisted of several discrete lithic scatters within topsoil and subsoil deposits exposed by earth-moving for construction of the runway extension. Although the lithics were effectively unstratified, and it has not been possible to date the scatters by radiocarbon assay, technologically, all are Mesolithic narrow-blade assemblages, and thus relate to the Manx Early Mesolithic period (*Ch 2, p 36*). It is therefore possible that some were contemporary with either of the dwellings at Cass ny Hawin I and II.

One of these scatters (Lithic Scatter 1) was found 18 m to the north of the Cass ny Hawin II house, with others some 46 m to the north-west of the dwelling (Lithic Scatter 2) and 35 m to the north-east (Lithic Scatter 3), where a new footpath and a perimeter fence were being constructed (Footpath site; *Ch 1, p 18*). A more dispersed group (Lithic Scatter 4), forming three main concentrations, was also present *c* 15 m south-east of the house, with another small concentration (Lithic Scatter 5) being recorded some *c* 220 m to the south-west of the dwelling. It is also worth noting that, apart from these five scatters, Mesolithic struck flints were also observed eroding from the cliff edge between Cass ny Hawin I and II during a visit to the RESA excavations by Peter Woodman, suggesting that this coastal area is rich in Mesolithic archaeology and evidence for extensive hunter-gatherer activity.

Significantly, some further confirmation of the archaeological richness of the area, aside from the scatters, was found 160 m to the south-west of Cass ny Hawin II, during stripping for the new runway at the 26 End site (Pl 17; *Ch 1, p 18*), where Mesolithic pits and associated lithics were identified. This pit cluster has been called Cass ny Hawin III, and its Mesolithic date was confirmed by radiocarbon assay (*p 132*).



Plate 17: The 26 End site during the early stages of excavation, looking north-west

The dating, however, suggests that this activity occurred some time after the abandonment of Cass ny Hawin II (*Ch 2, p 47*), and, in the chronological model for the scheme, dates to Mesolithic Phase II (*Ch 1, p 29*).

Lithic Scatters

Lithic Scatter 1

Lithic Scatter 1 was focused on an outcrop of limestone bedrock (Pl 18), and contained 22 cores (Fig 69), of a similar technological character to those associated with Cass ny Hawin II (*Ch 3, p 83*). They are dominated by pebble flint, and are single-platform types, which were worked to produce either blades and flakes, or just flakes; no cores are solely associated with blade production. It is also of note that the average dimensions (30 x 31.53 x 23.60 mm) appear to be slightly larger than the cores from Cass ny Hawin II. Although it is not clear what these traits signify, it could be that they represent a chronologically disparate phase of activity. Alternatively, it is possible that they represent a discrete task area, contemporary with Cass ny Hawin II, where the production of flake blanks was more significant.

In addition to the cores, the assemblage contained a linear spread of debitage, extending in a north-west/south-east direction. All forms of debitage were identified, with flakes and broad blades being particularly common, and there appeared to be spatial relationships between clusters of debitage and some of the cores. Of the 88 blade and flake blanks that are complete, those removed in the intermediate and later stages of reduction are almost equal in number, whilst primary removals are relatively rare. Given the relative numbers of secondary and inner blades and flakes, it is possible that core preparation was a significant feature of the stone-working activity in this area. A few microliths and other retouched tools were also associated, the former mainly represented by microburins and microlith fragments, with only one diagnostic implement, an obliquely trimmed blade, whilst the latter type includes a single edge-retouched flake. Taken together, the material forming the scatter perhaps indicates a stone-working area, although the lack of micro-debitage, specifically blade chips and small flakes, argues against this; however, given that the material was recovered by hand-excavation, and no sieving of the topsoil/subsoil deposits was undertaken, much of the small fraction could have been missed and would be under-represented.



Plate 18: The small outcrop of limestone with Lithic Scatter 1 (right), looking north-east

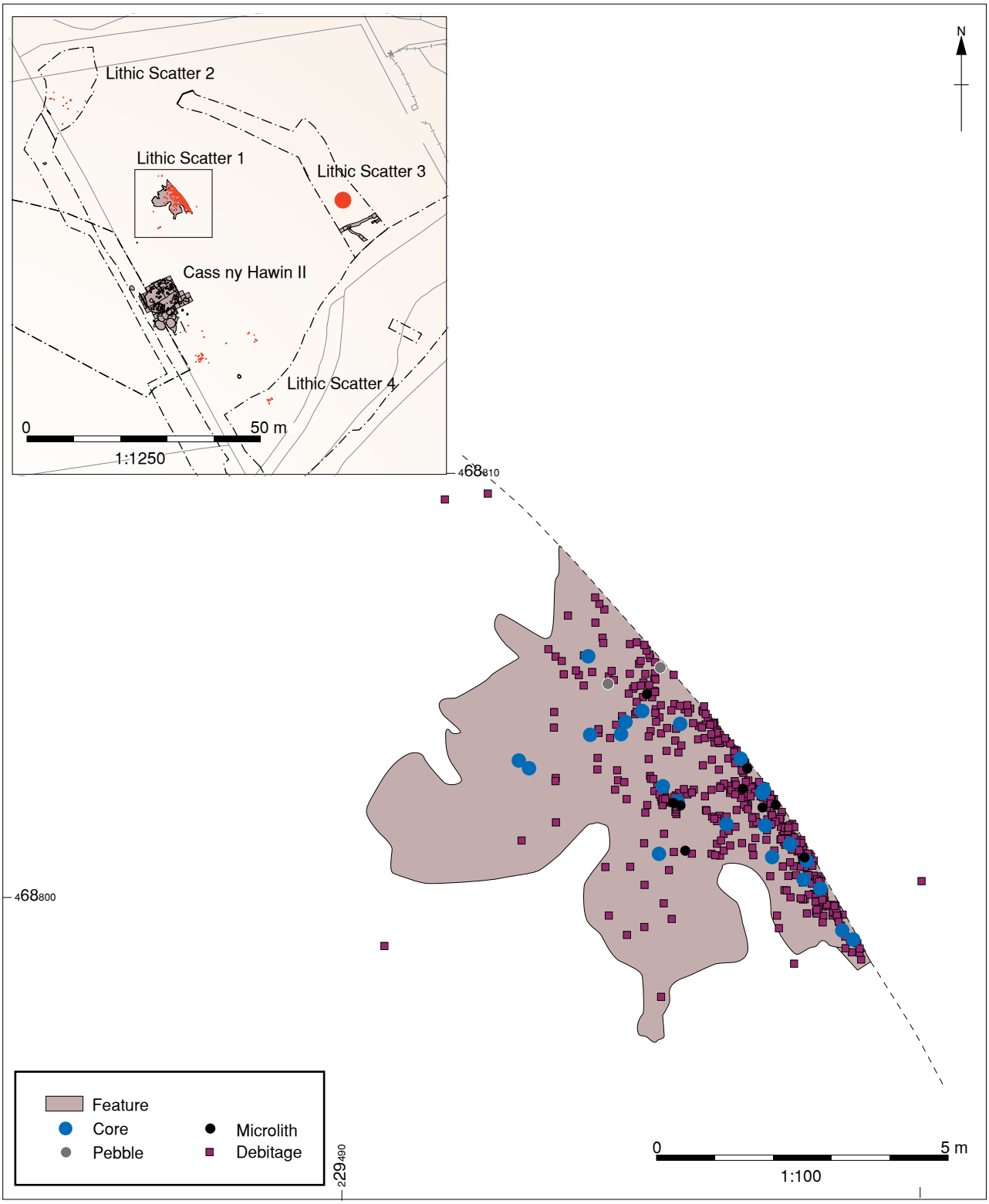


Figure 69: Lithic Scatter 1

Lithic Scatter 2

A smaller and more dispersed scatter of flaked lithics was identified to the north-west (Fig 70). This group again consists of all forms of debitage and, like the material in Lithic Scatter 1 (*p 122*), is primarily composed of broad blades and flakes, along with smaller quantities of indeterminate chunks and fragments. In contrast, the debitage in Scatter 2 was not associated with any complete cores. It is also of note that no retouched implements were associated with this concentration.

Lithic Scatter 3 (Footpath site)

A larger assemblage of lithics was associated with Lithic Scatter 3, relating to the reduction of pebble

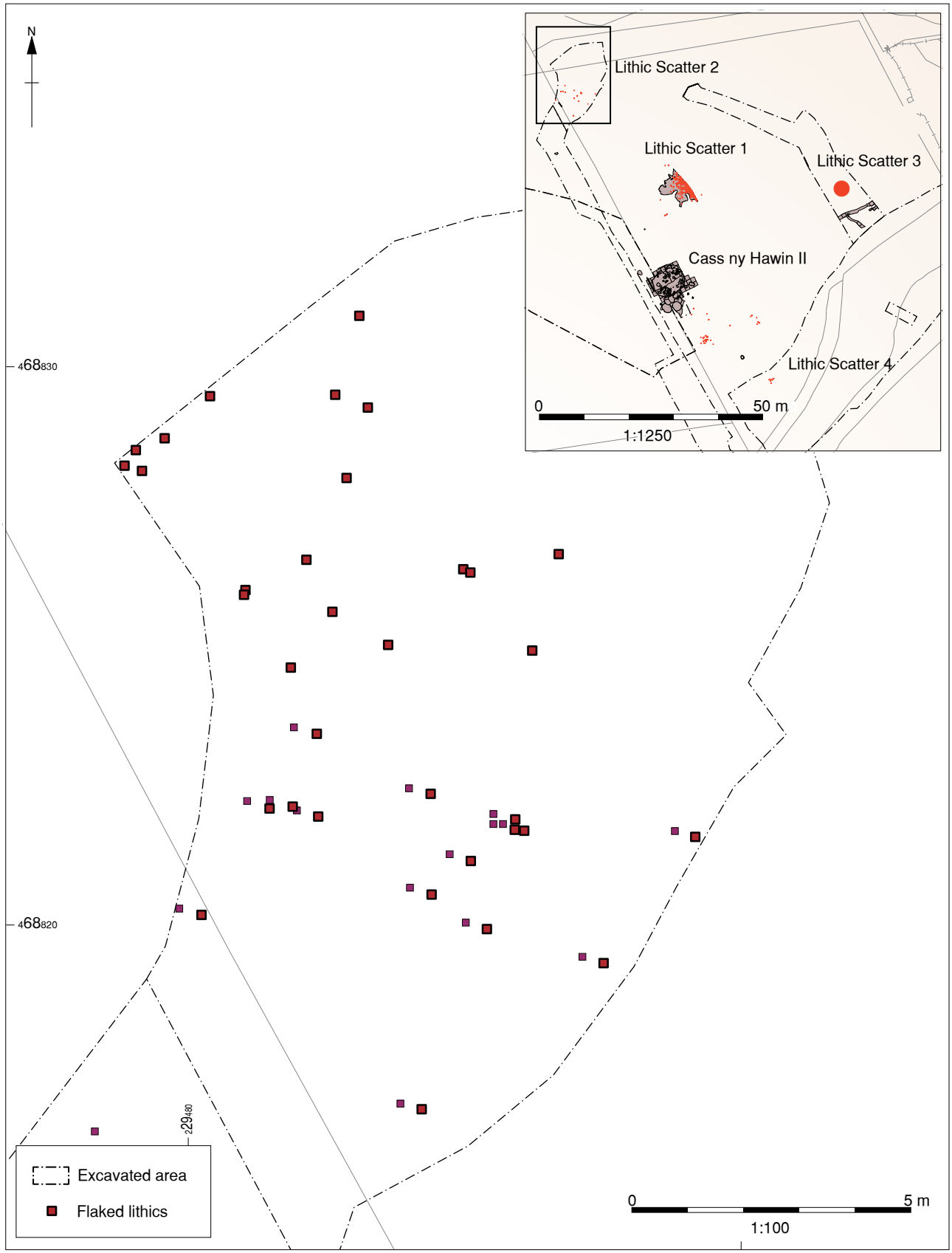


Figure 70: Lithic Scatter 2

flint (Table 28), which again has strong technological similarities with the Cass ny Hawin II assemblage (*Ch 3, p 88*). Although the scatter was effectively unstratified, being recovered from the topsoil and subsoil (Pl 19), it contained items relating to all stages of the reduction process and is thus of interpretable value.

	Lithic type		Topsoil *9500*	Subsoil *9501*	*Total*	*% of total*
Primary technology	Pebble			1	***1***	***0.47%***
	Core		5 **(1)**	5	***10 (1)***	***4.74%***
	Core dressing	Core rejuvenation		1	***1***	***0.47%***
	Debitage	Blade chip	2	4 **(1)**	***6 (1)***	***2.84%***
		Broad blade	25 **(2)**	21 **(6)**	***46 (8)***	***21.80%***
		Indeterminate chunk	14 **(5)**	6 **(5)**	***20 (10)***	***9.48%***
		Irregular flake	4 **(3)**	4	***8 (3)***	***3.79%***
		Narrow blade	8	14	***22***	***10.43%***
		Regular flake	33 **(1)**	32 **(2)**	***65 (3)***	***30.81%***
		Indeterminate fragments	6 **(2)**	16 **(7)**	***22 (9)***	***10.43%***
		Small flakes	1		***1***	***0.47%***
Secondary technology	Microliths		2	2	***4***	***1.90%***
	Non-microlithic tools	Retouched blade	1	3 **(1)**	***4 (1)***	***1.90%***
		Retouched flake	1		***1***	***0.47%***
	Total		***102 (14)***	***109 (22)***	***211 (36)***	
	% of total		***48.34%***	***51.66%***		

Note: Figures in brackets and bold denote the number of burnt pieces from each stratigraphic unit

Table 28: Flaked lithic types from Lithic Scatter 3



Plate 19: The excavated topsoil and subsoil containing Lithic Scatter 3, looking south-west

Primary technology

Flaked/whole pebbles

The assemblage contains a single flaked, flint pebble, which reflects raw-material procurement and testing.

Classification/sub-type		*Total*
Single Platform	Blade	***1***
	Blade-Flake	***5***
Multi-platform	Flake	***1***
	Blade-Flake	***1***
Core fragments		***2***
	Total	***10***

Table 29: Core types in Lithic Scatter 3

It has one negative flake-scar and measures 42 x 21 x 27 mm, a size in keeping with the pebbles from Cass ny Hawin II (*Ch 3, p 89*).

Cores

A few cores were found within the scatter (Table 29). These represent a restricted range of classifications, associated with two main reduction strategies, comprising single-platform cores; multi-platform cores; and core fragments.

Cores with a single platform largely conform to those from Cass ny Hawin II (*Ch 3, p 89*), in that they are worked unidirectionally from single platforms to produce both blades and flakes. However, the extent of flaking from platform edges is slightly different from the Cass ny Hawin II cores, as the majority (five) have 75-100% of the edge worked. Whether this reflects a different approach to reduction, or is a result of the smaller sample size, is not, however, clear.

Two multi-platform cores were present, which indicate two different approaches to reduction: one concerned with the production of flakes; and the other with both blades and flakes. The former is irregular in shape and exhibits four stages of reduction from two partial platforms, these being the edge of the core, and a platform removed during the early stages of working. The other is sub-circular in shape and has been less intensively flaked from three partial platforms, mainly during the production of flakes. The assemblage also contains two core fragments, both of which are not diagnostic of any particular reduction strategy. Although damaged by heat, one piece has possibly been reflaked and could represent the recycling of raw material.

Considering the cores together, working unidirectionally from single platforms is the most common approach to reduction, which was also the case at Cass ny Hawin II (*Ch 3, p 89*). These single-platform cores were chiefly concerned with the production of blades, whilst there is more of an emphasis in flake production associated with cores worked multi-directionally. This possibly serves to emphasise that different reduction strategies were employed to produce blanks for specific tasks, or that the quality of some nodules prevented a methodical approach to reduction. Most of the unidirectional cores bore no evidence for preparation on their platform edges, the exception being a blade core which exhibits simple abrasion. Incidentally, this piece was also flaked entirely around the platform edge. These traits imply that a systematic approach to the production of blade blanks was of significance during the reduction of the core.

The multi-platform cores were also mainly worked from platforms that were unprepared, and the majority had less than 25% of their cortex remaining. This is in keeping with the cores from Cass ny Hawin II (*Ch 3, p 92*), although a variety of shapes was recorded for the cores from Lithic Scatter 3 at the point of discard, including conical, irregular, sub-circular, and sub-cylindrical. The presence of irregularities on core-flaking fronts and internal flaws appears to have been the main reason behind the abandonment of the cores. Again, this is similar to Cass ny Hawin II, where the presence of stepped irregularities and size were deemed to be the main reasons for core discard (*Ch 3, p 94*); however, size was not a significant determining factor in Lithic Scatter 3, as only one specimen, the single-platform blade core, was probably abandoned for that reason. That said, the analysis of the mean dimensions of the cores from the scatter shows that the single-platform cores (26.83 x 24.33 x 19.67 mm) and the multi-platform cores (28.50 x 28.50 x 27.50 mm) were generally reduced to the same size as those from Cass ny Hawin II (*Ch 3, p 94*).

Core dressing

A single core-rejuvenation flake, with a relict-platform edge spanning the right-lateral and proximal end of the piece, is present in the assemblage. This had been removed from a pebble-flint core to refresh the platform during reduction. The presence of a single core-dressing piece in association with eight cores is of note, as, at Cass ny Hawin II, they were more numerous and had a ratio of nearly one piece per complete core (*Ch 3, p 95*). Numerous explanations for the lack of core dressing in Lithic Scatter 3 can be postulated: for instance, it might be that complete reduction sequences are not a feature of the assemblage.

Blade, flake, indeterminate, and small-flake debitage

Perhaps unsurprisingly, blade, flake, indeterminate, and small-flake debitage forms the largest component of Lithic Scatter 3. Only 35 items are, however, complete, consisting of 14 blades, 20 flakes, and a single small flake (Table 30). In relative terms, this is slightly less than is the case for the debitage from Cass ny Hawin II (*Ch 3, p 98*). In fact, across all lithic types, the relative proportions of the different types vary slightly, whereby there are approximately 5% more blades and flakes in Lithic Scatter 3; conversely, there are approximately 5% more indeterminate pieces at Cass ny Hawin II. Additionally, when the composition of the debitage between the two sites is considered, some inconsistencies are apparent. Specifically, there are relatively few small flakes and blade chips in Lithic Scatter 3, and the amount of indeterminate debitage, particularly fragments, is also comparatively less. Broad blades are also comparatively more common, and the condition of the debitage indicates that it is also well preserved, with only 13.83% exhibiting edge damage from taphonomic processes, implying that different processes were responsible for the formation of the flaked-lithic assemblage at this site.

The frequency of cortex remaining on the complete blades and flakes (excluding the small flakes), although the data are limited, implies that debitage from the later stages of the reduction process is under-represented in Lithic Scatter 3. This may indicate that reduction was focused on the preparation and setting up of pebble-flint cores, although the removal of inner blade and flake blanks for use elsewhere may be an alternative explanation. Additionally, the mean blade and flake dimensions indicate that the blades from Lithic Scatter 3 possess a similar size range to those from Cass ny Hawin II (*Ch 3, p 100*). However, in all instances, the regular flakes from the various reduction stages appear to be slightly larger, although it must be remembered that the amount of pieces available for analysis was less, and it is possible that there is a bias towards the survival of larger flakes in this scatter. Given the small numbers of complete debitage, little can be said about the technological detail of the assemblage; suffice

Fragmentation	Blade chip	Broad blade	Indeterminate chunk	Indeterminate fragments	Irregular flake	Narrow blade	Regular flake	Small flakes	*Total*	*% of total*
Complete	1	10			1	3	19	1	***35***	***18.52%***
Distal fragment	2	9			2	4	26		***43***	***22.75%***
Indeterminate			20	22					***42***	***22.22%***
Medial fragment		6			1	5	5		***17***	***8.99%***
Proximal fragment	3	20			3	10	14		***50***	***26.46%***
Split		1			1				***2***	***1.06%***
Total	***6***	***46***	***20***	***22***	***8***	***22***	***64***	***1***	***189***	
% of total	***3.17%***	***24.34%***	***10.59%***	***11.64%***	***4.23%***	***11.64%***	***33.86%***	***0.53%***		

Table 30: Blade, flake, and indeterminate debitage in Lithic Scatter 3, by lithic and fragmentation types

it to say that platform and dorsal-face morphology and distal terminations exhibit a similar range of technological attributes to the debitage from Cass ny Hawin II. Furthermore, bulb types and platform features also exhibit a similar range of traits to the latter material.

Given the similarity in technological character of the core technology, and debitage in the lithic scatter, with those from the Cass ny Hawin II house, it is probable that the stone-working activity represented by this scatter reflects Mesolithic occupation. However, the composition of Lithic Scatter 3 is quite different from that associated with the house. Although this could partly relate to the more intensive recovery strategy (*ie* sieving of all excavated deposits) adopted at Cass ny Hawin II (*Ch 1, p 19*), particularly as Lithic Scatter 3 was characterised by a lack of small debitage, it is also typified by inconsistency in the reduction sequence, indicated by the variation in primary, secondary, and inner blades and flakes (Fig 71). This might suggest that it was not associated with *in-situ* stone working, but instead reflects the secondary dumping of waste-lithic material from elsewhere.

Secondary technology

Microliths and non-microlithic tools

Only a few microliths were present in the scatter. These comprised two microburins, a microlith fragment, and a scalene triangle, which are similar to the microliths and microburins from Cass ny Hawin II (*Ch 3, p 105*).

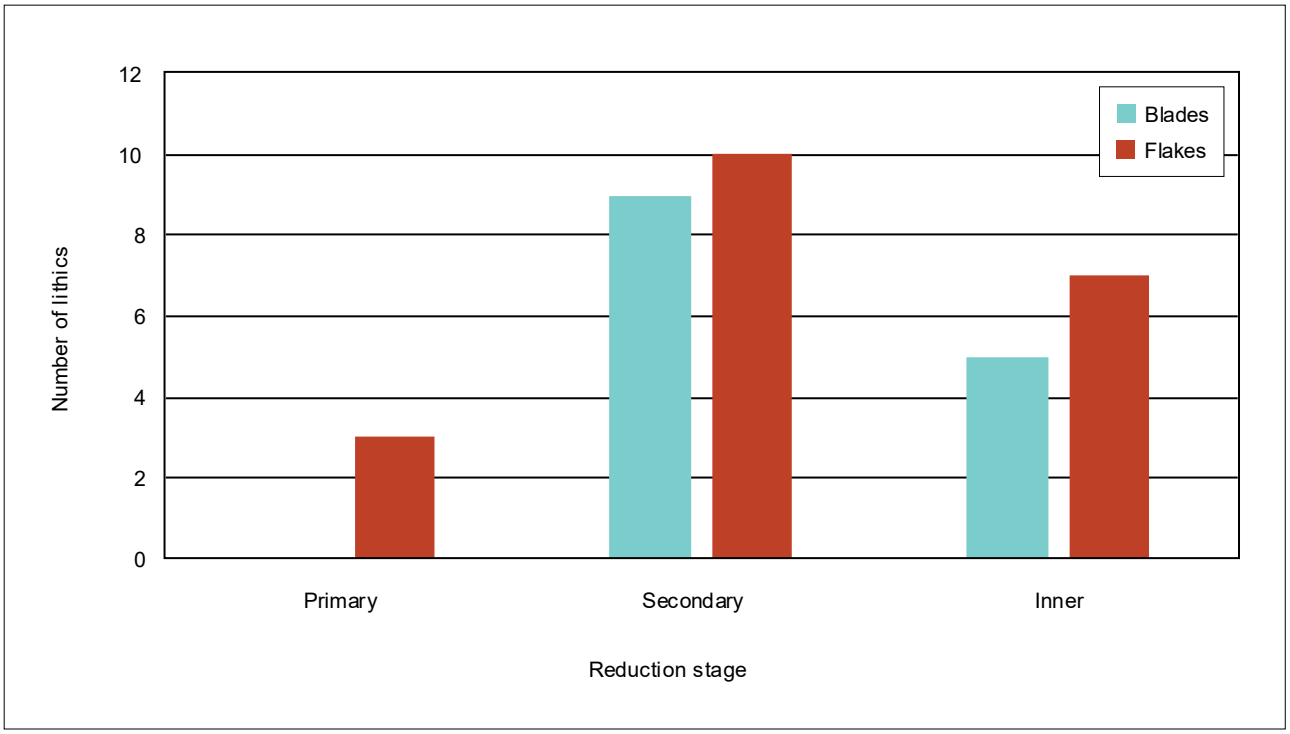


Figure 71: The frequency of the complete blades and flakes from Lithic Scatter 3 within the generalised reduction sequence

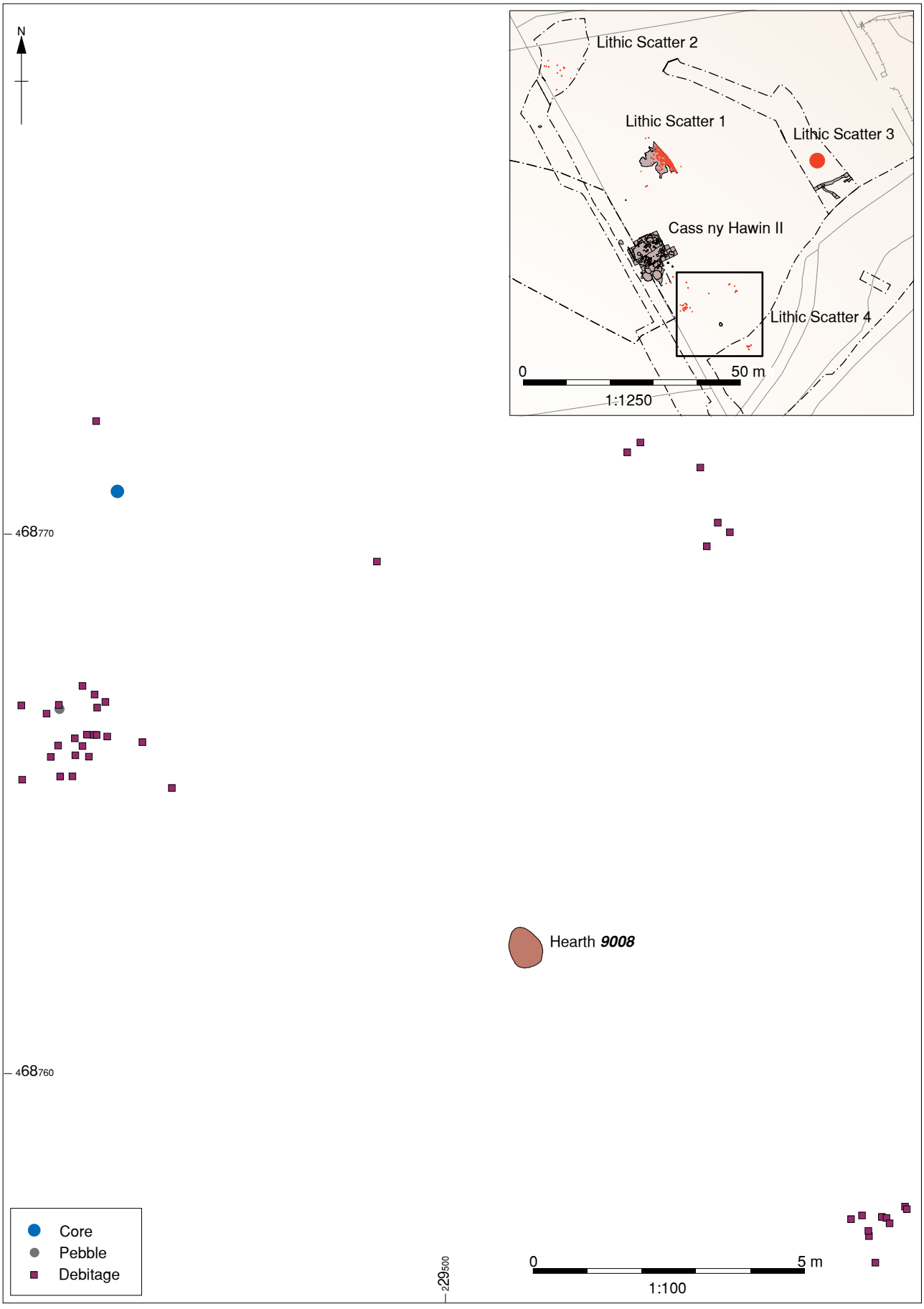


Figure 72: Hearth **9008** *and the clusters forming Lithic Scatter 4*

In addition, five undiagnostic edge-retouched pieces were recovered. These include four broad blades and a regular flake, with patchy acute and semi-abrupt retouch on their lateral edges. On one of these the retouch cuts through a patinated surface, indicating the reuse of older material, whilst one of the edge-retouched blades could be a denticulate; however, this interpretation is not conclusive, given the irregular and worn nature of the retouched area.

Lithic Scatter 4

A small quantity of flaked lithics was contained in three loose clusters *c* 10 m south of Cass ny Hawin II, including an outlying core. The largest of these comprised a small collection of debitage (23 items), and although no cores or retouched tools were present, this group includes a flaked flint pebble (Fig 72). The second cluster lay to the north-east and consisted of seven blades and flakes, whilst the third was located to the south-east, also consisting of blades and flakes (ten). It is of note that a small, oval-shaped hearth (***9008***) was also discovered in this area, which measured some 0.85 x 0.65 m, with a depth of *c* 0.15 m, containing charcoal-rich silty sand and some burnt pieces of quartz (Pl 20). Although this remains undated, it was positioned roughly in the centre of the lithic clusters, and hence could be contemporary, perhaps denoting the position of a small camp.

Lithic Scatter 5

The fifth scatter was found some 220 m to the south-west of the house. It formed a small concentration of material, in total 13 blades, flakes, and indeterminate chunks. No cores and retouched tools were associated with the debitage, suggesting that this scatter was not obviously associated with *in-situ* stone working, perhaps instead relating to the secondary dumping of lithic waste.

The Cass ny Hawin III Pits

Approximately 160 m south-west of Cass ny Hawin II, in a similar position relative to the modern-day cliff (11.40 m OD, but *c* 30-50 m inland), a scatter of nine pits was recorded at the 26 End site (*Ch 1, p 18*; Fig 73; Pl 21). Some were associated with Mesolithic lithics and charred environmental remains that seem to have been intentionally deposited in the pits. Two scenarios relating to this phenomenon can be postulated: first,



Plate 20: Hearth **9008**, *half-sectioned, looking north-east*

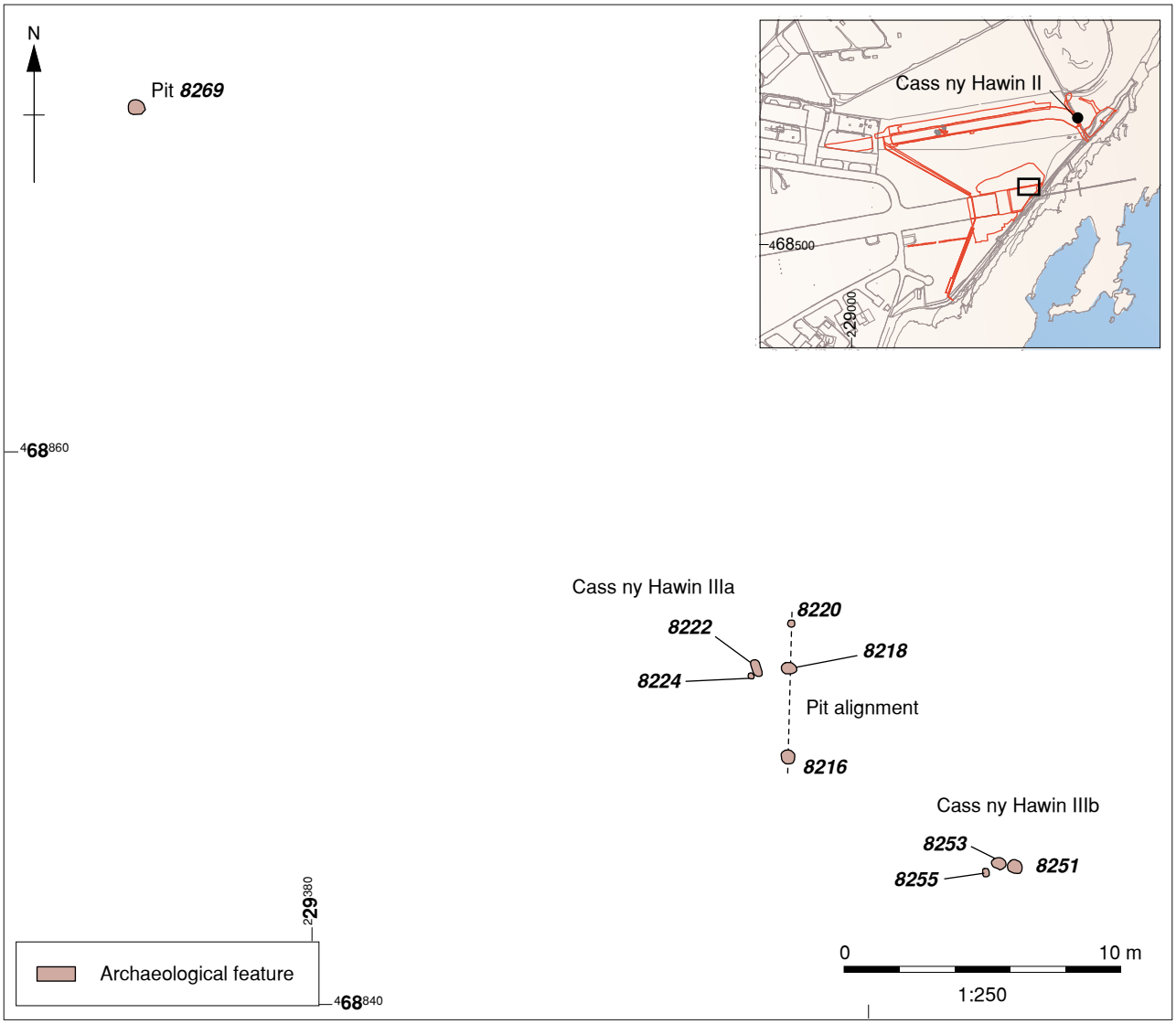


Figure 73: The Cass ny Hawin III pit groups



Plate 21: The area containing the Cass ny Hawin III pits, following the stripping of the topsoil, looking north-west

the intentional collection of burnt material from secondary contexts, such as hearths or middens, for inclusion in the features; or the intentional burning and deposition of artefactual material as part of symbolic/ritual activity. Given the presence of Mesolithic artefacts, this pit scatter is named Cass ny Hawin III, as it represents a third activity site (along with Cass ny Hawin I and II), associated with definitive Mesolithic features relating to hunter-gatherer activity at Ronaldsway.

The pits were all sub-circular in plan and 0.07–0.4 m deep, although they had probably been truncated by agriculture or levelling for the airport, and hence may originally have been more substantial features. One (***8269***), with a diameter of *c* 0.8 m, was isolated, and seems to have been intentionally backfilled with sandy gravel containing burnt material and lithics, whilst the other eight pits, situated 30 m to the south-east, formed two separate groups. The northern of these groups (IIIa) comprised five pits (***8216***, ***8218***, ***8220***, ***8222***, and ***8224***), and it is possible that three (***8220***, ***8218***, and ***8216***) formed a north/south alignment, some 5 m in length. If this was the case, this alignment might represent a form of Mesolithic 'monument', as has been suggested for other more substantial Mesolithic pit alignments recorded in north-east Scotland (*cf* Conneller 2022, 182-6; *Ch 10, p 328*). Perhaps, significantly, the two pits (***8220*** and ***8216***) defining the ends of this alignment appear to have been left open, as they contained deposits of silt, and so would have been present as visible features, for at least a brief period of time. The smaller (***8220***), at the northern end, had a diameter of *c* 0.3 m, whilst that to the south (***8216***) was slightly larger, *c* 0.4 m in diameter. In contrast, the central pit (***8218***), 0.4 m



Plate 22: Pit **8218**, *following half-sectioning, looking north*

in diameter, had been deliberately backfilled with sandy gravel, together with considerable amounts of burnt material (Pl 22). The other two pits (***8222*** and ***8224***) in this group lay immediately to the west, adjacent to each other. The smaller (***8224***) had a diameter of *c* 0.2m and the other (***8222***) had a linear shape, measuring some 0.6 x 0.3 m; however, both contained silt, suggesting that, once dug, they had also been left open, in a similar way to the pits at the end of the possible pit alignment.

The other pit group (IIIb), some 7 m to the south-east, formed a tight cluster of three pits (***8251***, ***8253***, and ***8255***). The two larger pit (***8253*** and ***8251***) were adjacent to each other (Pl 23), with respective diameters of *c* 0.4 m and *c* 0.5 m, and these had been deliberately backfilled with sandy gravels and abundant quantities of charcoal and other charred



Plate 23: Pits **8251** *and* **8253**, *following half-sectioning, looking south*

materials. The third pit (***8255***) lay immediately to the south-west of pit ***8253*** and was smaller in size, with a diameter of *c* 0.3 m. Similarly, though, this pit also contained sandy gravel and burnt materials that bore a striking resemblance to the deposits filling pits ***8255*** and ***8251***, suggesting that all were deliberately backfilled at the same time.

The spatial separation of the two groups suggested that they might relate to two discrete zones or phases of activity, although radiocarbon dating of the hazelnut fragments from pit ***8218***, in group IIIa, and from all three of the pits forming group IIIb, confirmed their Mesolithic date (Table 31). The dates were then subjected to Bayesian modelling (Fig 74; *Ch 1, p 27*),

Location	**Sample/ Parameter**	**Material**	**Uncalibrated date BP**	**$\delta^{13}C$ (‰)**	**Calibrated date range (95% confidence)**	***Modelled date (95% confidence)***
Cass ny Hawin IIIa pit group: pit ***8218***	SUERC-53413	Charred hazelnut (*Corylus avellana*) fragment	8717±31	-26.5	7930-7600 cal BC	*7740-7600 cal BC*
Cass ny Hawin IIIb pit group: pit ***8251***	SUERC-53414	Charred hazelnut (*Corylus avellana*) fragment	8533±32	-26.3	7600-7540 cal BC	*7600-7540 cal BC*
Cass ny Hawin IIIb pit group: pit ***8253***	SUERC-53415	Charred hazelnut (*Corylus avellana*) fragment	8533±30	-25.7	7600-7540 cal BC	*7600-7540 cal BC*
Cass ny Hawin IIIb pit group: pit ***8255***	SUERC-53419	Charred hazelnut (*Corylus avellana*) fragment	8490±30	-25.2	7590-7520 cal BC	*7590-7530 cal BC*
-	*Start Pits*	-	-	-	-	*7890-7590 cal BC*
-	*End Pits*	-	-	-	-	*7580-7360 cal BC*

Table 31: Radiocarbon dates from Cass ny Hawin III

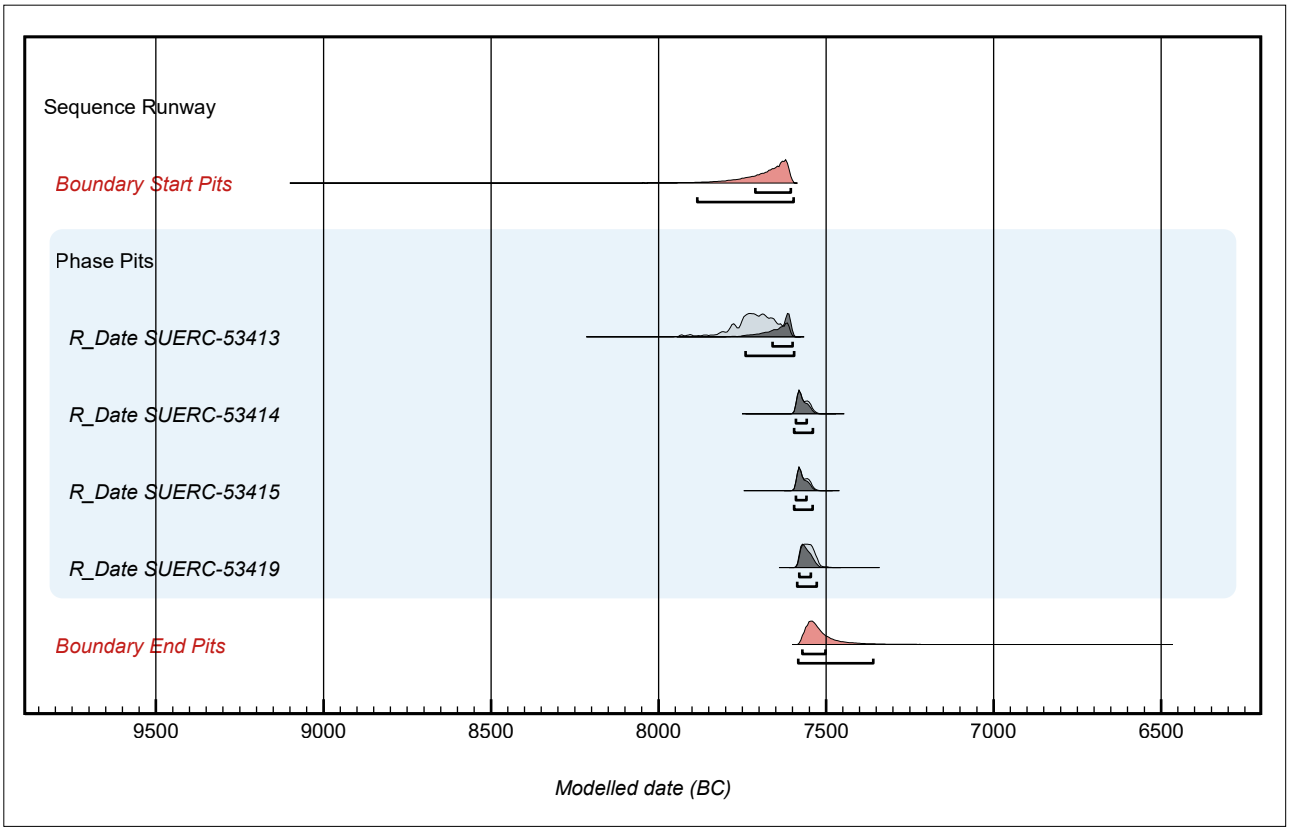


Figure 74: The modelled radiocarbon dates for Cass ny Hawin III

Prior Date	7650-7600 cal BC	7600-7550 cal BC
SUERC-53413	**62.3%**	2.7%
SUERC-53414	0.2%	**87.9%**
SUERC-53415	0.1%	**88.1%**
SUERC-53419	0%	**71.8%**

Table 32: The probabilities that the modelled dates from Cass ny Hawin III fall within specific 50-year timespans

which provided date ranges for each of the dates and a 'start' and 'end' date for the pits. Additionally, this model was queried, to examine the probability that the dates fell within specific 50-year timespans (Table 32). This confirmed that they did indeed relate to two separate phases of activity, with a *c* 62% probability that Cass ny Hawin IIIa dates to *7650-7600 cal BC*. In contrast, there is a *c* 88% probability that Cass ny Hawin IIIb continued after *7600 cal BC* and a *c* 72% probability that it ceased before *7550 cal BC*.

Flaked lithics

In total, 1395 flaked lithics were recovered from Cass ny Hawin III, comprising three raw-material types, dominated by pebble flint (99%), with small amounts of chert (0.6%) and quartz. Cass ny Hawin IIIa produced only a small quantity of lithics (0.93%), whilst the bulk (79.5%) of the material was associated with IIIb, with one pit (***8251***; *p 131*) containing over half (52.4%) of the material (Table 33). The undated and isolated pit (***8269***; *p 131*), *c* 30 m to the north-west (*above*), also produced a moderate-sized assemblage of lithics (17.78%). In addition, small numbers of lithics were present in post-medieval and natural features in the vicinity of the two pit groups.

Primary technology

Flaked/whole pebbles

Two flaked-flint pebbles were recovered, one from Cass ny Hawin IIIb, and the other a residual item in a post-medieval feature, both relating to the testing of this raw material. That from Cass ny Hawin IIIb was from pit ***8251*** and is a complete example that had been tested by the removal of five flakes and then discarded, although the reasons for this are not clear. The piece also represents an attempt to recycle raw material that had already been worked, as fresh flake scars had been cut through patinated ones on

		Cass ny Hawin IIIa pit group		Cass ny Hawin IIIb pit group			Pit *8269*	Natural and post-medieval features	*Total*	*% of total*
Primary technology		*8218*	*8224*	*8251*	*8253*	*8255*				
Pebble				1				1	***2***	***0.14%***
Core						1		3	***4***	***0.29%***
Core dressing	Core trimming	1					1		***2***	***0.14%***
Debitage	Blade chip			11	11	9	2		***33***	***2.37%***
	Broad blade	1		33	27	10	6	2	***79***	***5.66%***
	Indeterminate chunk	5		44	13	10	14	1	***87***	***6.24%***
	Indeterminate fragments	1	1	476	68	81	207	5	***839***	***60.14%***
	Irregular flake			9	6	2		1	***18***	***1.30%***
	Narrow blade			60	28	15	6		***109***	***7.81%***
	Regular flake	4		60	48	19	11	9	***151***	***10.82%***
	Small flakes			8	9	8	1	1	***27***	***1.94%***
Secondary technology										
Microlith				28	13				***41***	***2.94%***
Non-microlithic tools	Retouched Blade							1	***1***	***0.07%***
	Retouched Flake							1	***1***	***0.07%***
	Burin spall			1					***1***	***0.07%***
Total		***12***	***1***	***731***	***223***	***155***	***248***	***25***	***1395***	
% of total		***0.86%***	***0.07%***	***52.40%***	***15.99%***	***11.11%***	***17.78%***	***1.79%***		

Table 33: Flaked lithic types from Cass ny Hawin III

the pebble's surface. Once discarded, this pebble was then heated, prior to it being deposited within the pit with the rest of the worked stone.

Cores

The assemblage contains three complete pebble-flint cores, all from post-medieval features, which represent the same reduction strategy. These were worked from single platforms, across 50% of the platform edge, and have varying amounts of cortex left on their unworked faces. This varies in coverage from one piece with 25% or less, to another example with 75% or more. One has an area of patinated flake scars, which are cut across by fresher examples, suggesting the recycling of previously worked material. The single-platform cores were mainly concerned with the production of flakes, and flake scars on core faces outnumber blade scars by a ratio of 3:1. Blanks were struck from platforms that had seen no preparation, apart from one specimen, which has crushing and marked negative bulbs along the platform edge. These traits suggest that bipolar reduction may have been employed.

Two of the cores have a regular morphology, being sub-cylindrical and sub-circular at the point of discard. The third example is much more irregular and difficult to classify in terms of shape. The two regular cores had probably been discarded because of thermal planes and flaws, whilst a reason for the abandonment of the irregular core could not be determined. In essence, these are comparable to the Mesolithic single-platform cores from Cass ny Hawin II (*Ch 3, p 89*) and Lithic Scatter 3 (*p 125*). However, they are slightly larger, with average measurements of 30.47 x 36.67 x 24.33 mm, which may indicate, given the largely flake-based reduction strategies, that they relate to later periods of Mesolithic stone-working activity.

A single core fragment was also present in pit ***8251*** (*p 131*), and was the only core associated with the pits. Unlike the other residually deposited cores (*above*), it cannot be assigned to any specific reduction strategy.

Core dressing

Two core-dressing pieces were recovered. Both have comparable dimensions (20x16x7mm and 34x9x4mm respectively) to similar pieces from Cass ny Hawin II (*Ch 3, p 95*), and they are also of a similar technological character to the core-dressing pieces from there. One is a core-trimming flake from pit ***8218*** (*p 131*), from the early/intermediate stage of the reduction process, which was struck from the face to remove an area of irregular flake scars. The presence of a ventral spur on its platform suggests that it was removed by indirect percussion.

The second is of broad-blade dimensions, from isolated pit ***8269*** (*p 131*). It came from the later stage of the reduction sequence and was possibly removed from the platform edge to correct flaking angles, to facilitate subsequent reduction.

Blade, flake, indeterminate, and small-flake debitage

Some 1338 pieces of blade, flake, indeterminate, and small-flake debitage were analysed (Table 34). The bulk

	Fragmentation	Blade chip	Broad blade	Indeterminate chunk	Indeterminate fragments	Irregular flake	Narrow blade	Regular flake	Small flakes	Total	% of total
Cass ny Hawin IIIa											
8218	Complete							3		3	
	Distal fragment							1		1	
	Indeterminate			5	1					6	
	Medial fragment		1							1	
	Total		***1***	***5***	***1***			***4***		***11***	***0.82%***
8224	Indeterminate				1					1	
	Total				***1***					1	***0.07%***
Cass ny Hawin IIIb											
8251	Complete		5			3	8	22	8	46	
	Distal fragment	7	12			1	22	13		55	
	Indeterminate			44	476			1		521	
	Medial fragment	3	7			1	7	6		24	
	Proximal fragment	1	9			4	23	16		53	
	Split							2		2	
	Total	***11***	***33***	***44***	***476***	***9***	***60***	***60***	***8***	***701***	***52.39%***

Table 34: The blade, flake, and indeterminate debitage from Cass ny Hawin III, by lithic type, fragmentation type, and context

	Fragmentation	Blade chip	Broad blade	Indeterminate chunk	Indeterminate fragments	Irregular flake	Narrow blade	Regular flake	Small flakes	Total	*% of total*
8253	Complete	1	3				7	11	9	31	
	Distal fragment	4	5			4	4	17		34	
	Indeterminate			13	68					81	
	Medial fragment	5	9			1	10	1		26	
	Proximal fragment	1	10				7	17		35	
	Split					1		2		3	
	Total	***11***	***27***	***13***	***68***	***6***	***28***	***48***	***9***	***210***	***15.70%***
8255	Complete	2	2			1		4	8	17	
	Distal fragment	5	1			1	4	6		17	
	Indeterminate		1	10	81		1	1		94	
	Medial fragment	1	4				5	1		11	
	Proximal fragment	1	2				4	5		12	
	Split						1			1	
	Total	***9***	***10***	***10***	***81***	***2***	***15***	***17***	***8***	***152***	***11.36%***
8269	Complete		2				1	5	1	9	
	Distal fragment						3	1		4	
	Indeterminate	1		14	207			1		223	
	Medial fragment	1					1			2	
	Proximal fragment		4				1	1		6	
	Split							1		1	
	Total	***2***	***6***	***14***	***207***		***6***	***9***	***1***	***245***	***18.31%***
Natural feature ***8247***	Complete							1		1	
	Total							***1***		1	***0.07%***
Post-medieval features	Complete		1					4	1	6	
	Distal fragment							3		3	
	Indeterminate			1	5					6	
	Proximal fragment		1			1				2	
	Total		***1***	***2***	***5***	***1***		***7***	***1***	***17***	***1.28%***
	Total	***33***	***79***	***87***	***839***	***18***	***109***	***146***	***27***	***1338***	
	% of grand total	***2.47%***	***5.90%***	***6.50%***	***62.71%***	***1.35%***	***8.15%***	***10.90%***	***2.02%***		

Table 34: The blade, flake, and indeterminate debitage from Cass ny Hawin III, by lithic type, fragmentation type, and context (cont'd)

of the debitage (99.03%) represents the reduction of flint pebbles, although there are also seven chert pieces and six of quartz. The chert consists of several indeterminate fragments, a broad blade, a blade chip, and a small flake from pit ***8251*** (*p 131*), whilst a single indeterminate fragment of chert was present in isolated pit ***8269*** (*p 131*). The quartz consists of a blade chip and an indeterminate fragment, also from pit ***8269***, whilst pit ***8253*** (*p 131*) produced the remaining four items, which comprised indeterminate pieces and a flake.

Very few blades and flakes are complete, with those that are consisting of 32 blades and 54 flakes (excluding the small flakes: debitage with dimensions greater than 10 mm), amounting to 6.43% of the total assemblage. Beyond the complete blades and flakes, a further 286 pieces are proximal, medial, and distal fragments, whilst another seven blades and flakes are blanks, which have split longitudinally during reduction. Given the chronological sequence of the features, it is unlikely that many were fragmented elements of the same blade or flake, although there do not appear to be any discrepancies between the amounts of fragments in each lithic type, apart from proximal blade chips, which are relatively under-represented.

By far the most common debitage type are the indeterminate chunks and fragments, which amount

to 69.21% of the total debitage from the site. This form is a good indicator for *in-situ* reduction; however, given the nature of the features from which they were retrieved, in this instance, they are likely to be associated with the secondary deposition of knapping waste. The majority of the unmodified debitage has also been subjected to heat, and therefore the incidence of edge-damaged pieces is significantly higher (53.24%) than that in the other site assemblages. This is a result of the edges of the debitage being weakened by the effects of heat and thus becoming more susceptible to breakage.

The Cass ny Hawin IIIa pit group produced very few complete items, the debitage from this being dominated by indeterminate shatter, as well as a flake distal fragment and a blade medial fragment. The three complete flakes were associated with pit ***8218*** and relate to the intermediate and later stages of the reduction sequence (Fig 75). They all have flat/plain platforms, of which two exhibited evidence for simple preparation in the form of abrasion. Bulbs of percussion on the three flakes are diffuse, and no platform features were recorded. Two of the flakes have feathered distal terminations, whilst the third has a hinge. Very little can be said about the dorsal-face morphology of the three flakes because of damage from the effects of heat.

The lithic assemblage from the Cass ny Hawin IIIb pit group was also composed of large amounts of broken blade and flake blanks, and indeterminate waste, the latter dominated by burnt indeterminate waste, particularly small fragments of pebble flint, the majority of which is probably shatter from core reduction. All of the Cass ny Hawin IIIb pits contained indeterminate chunks and fragments; however, they were particularly common in pit ***8251*** (*p 131*), amounting to 75.14% of the total assemblage from this group. Identifiable blade and flake fragments recorded as proximal, medial, and distal were also common, being found in roughly the same proportions in two of the pits (***8253*** and ***8255***; *p 131*). In contrast, there were nearly equal amounts of proximal and distal fragments in pit ***8251***, but significantly less medial pieces.

The Cass ny Hawin IIIb pits also contained noteworthy collections of complete blades and flakes, particularly regular flakes, with pits ***8251*** and ***8253*** producing the majority of blank types. In a similar fashion to the Cass ny Hawin IIIa pits, debitage (which was significantly less in quantity; *above*), blades, and flakes removed during the later stages of reduction were common. The analysis of platform morphology indicates that both blades and flakes are chiefly characterised by plain platforms, with only one secondary flake with

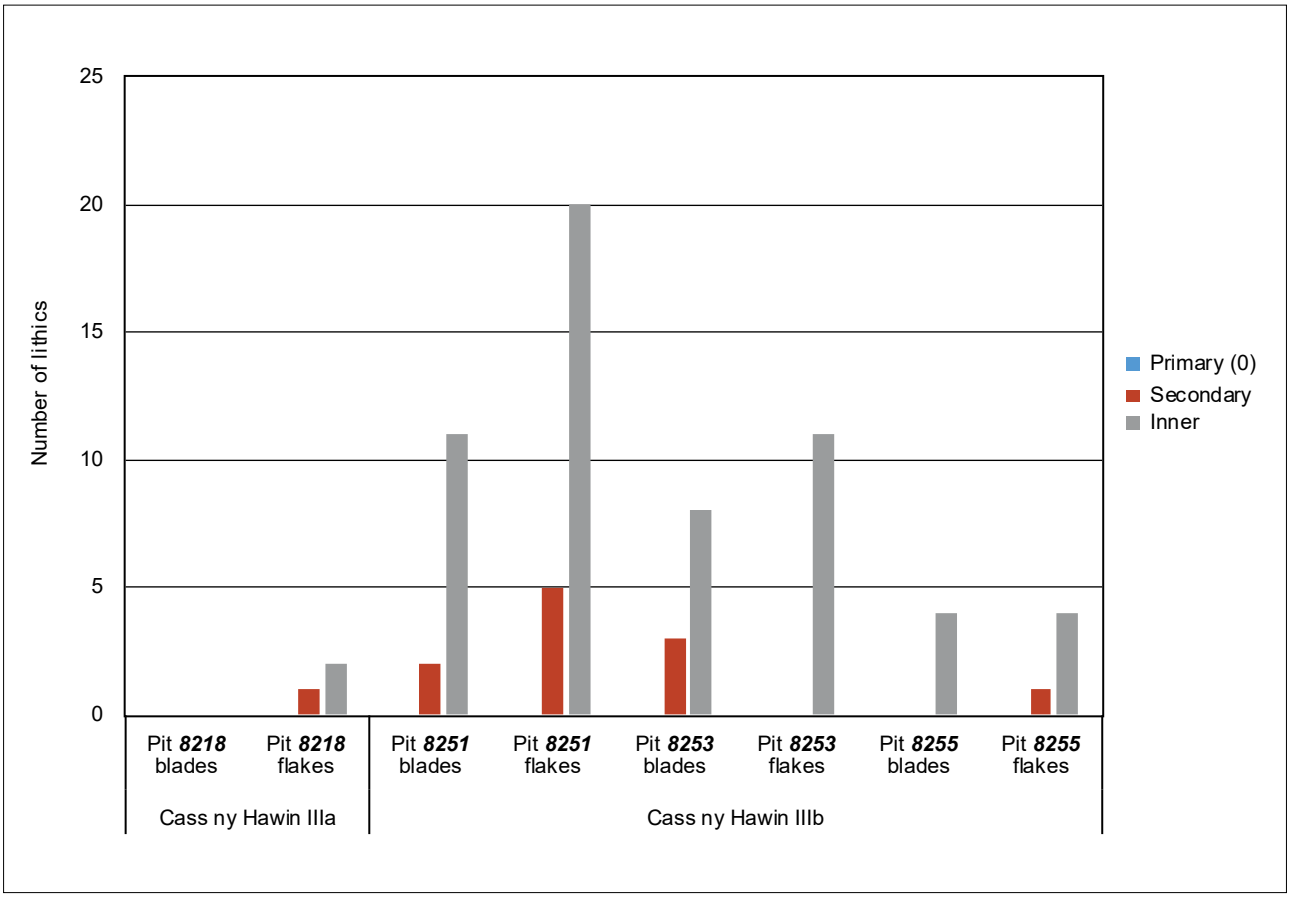


Figure 75: The frequency of complete blades and flakes within the generalised reduction sequence in the Cass ny Hawin III pit groups

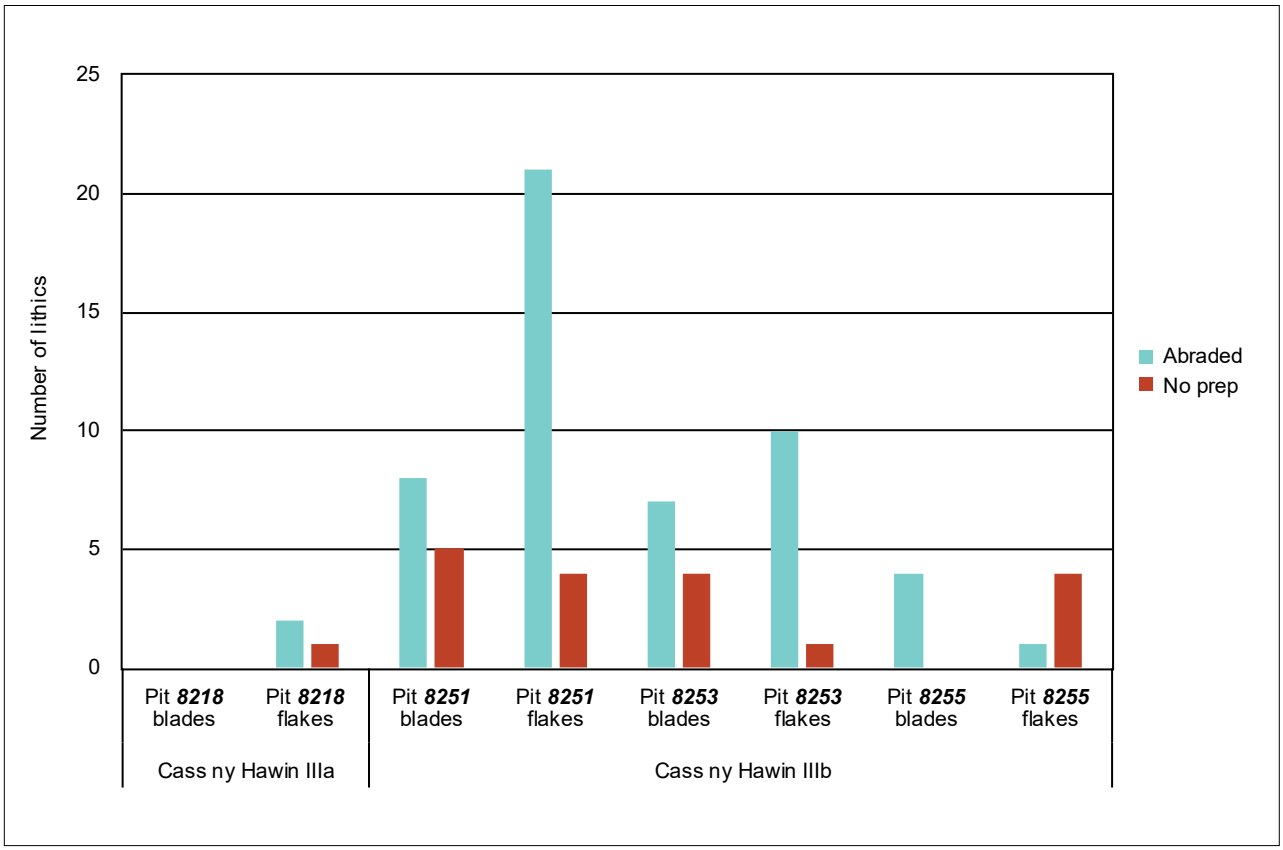


Figure 76: The frequency of the type of platform preparation on the complete pebble-flint blades and flakes in the Cass ny Hawin III pit groups

a cortical platform being the exception (from pit ***8251***). Preparation of the platform edge during core reduction is a common theme (Fig 76) and only four flakes from pit ***8251*** do not have prepared platforms.

When the incidence of blade and flake blanks with prepared platforms from Cass ny Hawin IIIb is compared with the same data from Cass ny Hawin II (*Ch 3, p 103*), two observations can be made. First, *t*he occurrence of blades and flakes with preparation at Cass ny Hawin IIIb amounts to 73.91% of all complete blanks, whilst for Cass ny Hawin II it is 44.44%. Second, none of the blade and flake blanks from Cass ny Hawin IIIb exhibit other forms of platform preparation, such as faceting. When based on the available evidence, these disparities are difficult to interpret, but they could reflect the intentional selection of specific blade and flake blanks and/or the signature of a specific reduction strategy at Cass ny Hawin IIIb, or the outcome of a shift in technological routine over time. Furthermore, all complete blade and flake blanks at Cass ny Hawin IIIb have diffuse bulbs of percussion. This is again in contrast to the Cass ny Hawin II house, where a small number of blades and flakes had pronounced bulbs (*Ch 3, p 104*). This could indicate an emphasis on soft hammer use at Cass ny Hawin IIIb. With this in mind, it is of note that when platform features could be detected, they mainly relate to the presence of ventral spurs, although such features are rare.

Distal terminations on the blade and flake blanks from Cass ny Hawin IIIb are invariably feathered (Fig 77), though there is a small number of hinged, irregular, and abrupt forms, which are more common to flakes and larger blades. The preponderance of feathered terminations indicates that there was a level of skill associated with systematic blank production during the stone working that occurred at the time of these pits (*ie* in the mid-eighth millennium cal BC).

The dorsal-face morphology of these blades and flakes also shows that unidirectional flaking, probably from cores with single platforms, was paramount (Fig 78). Whilst this corroborates the evidence on the cores from Cass ny Hawin II (*Ch 3, p 89*), no complete specimens are associated with any of the Cass ny Hawin IIIb pit assemblages, which could strengthen the argument for selective deposition of lithics into the pits.

The debitage associated with isolated pit ***8269*** (*p 131*) exhibits a similar range of fragmentation patterns and technological attributes as the same material from the pit groups. Indeterminate chunks and fragments again dominate the debitage and most, apart from one piece, are burnt. Beyond the indeterminate

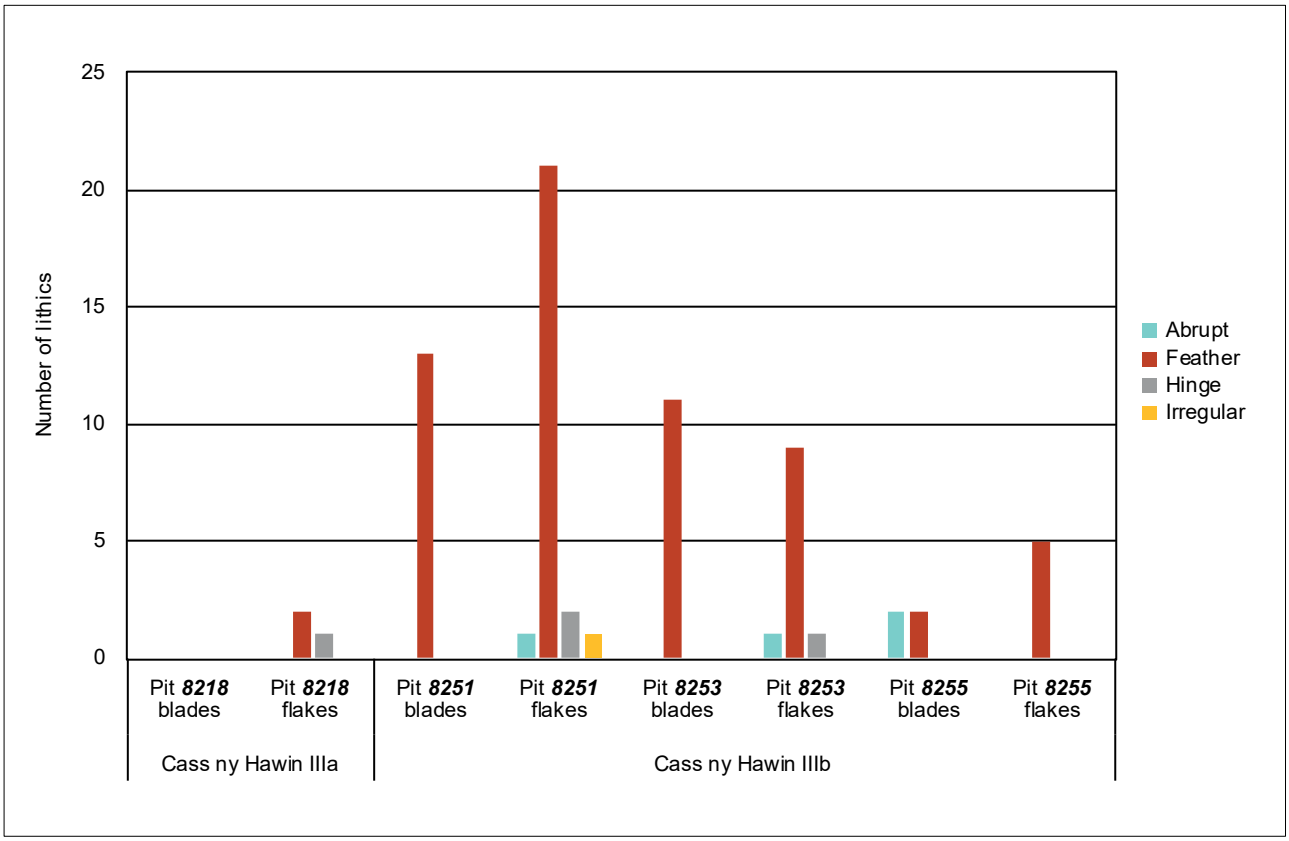


Figure 77: The frequency of distal terminations on the complete blades and flakes in the Cass ny Hawin III pit groups

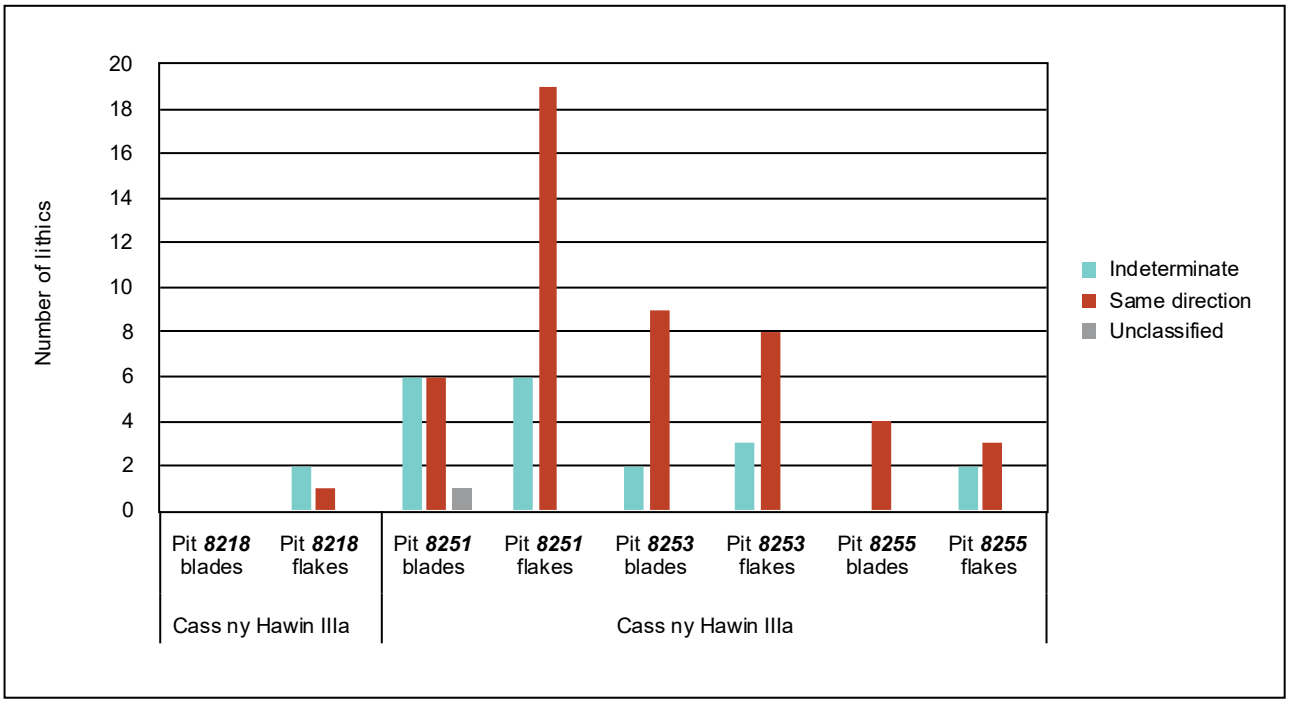


Figure 78: The frequency of dorsal negative-scar direction on the complete blades and flakes in the Cass ny Hawin III pit groups

shatter, recognisable blade and flake fragments are present, but in significantly smaller amounts than in the pit groups; complete blades and flakes are also represented by fewer pieces. These items exhibit a similar technological character to the material from the pits and, again the majority are from the later

	Pit *8251*	Pit *8253*	*Total*	*% of total*
Crescent	1		***1***	***2.44%***
Scalene triangle	18	9	***27***	***65.85%***
Obliquely trimmed blade	1		***1***	***2.44%***
Tanged form		1	***1***	***2.44%***
Basally retouched point	1	1	***2***	***4.88%***
Miscellaneous point form	1		***1***	***2.44%***
Microlith fragment	6	2	***8***	***19.51%***
Total	***28***	***13***	***41***	
	68.29%	***31.71%***		

Table 35: Microlith types from Cass ny Hawin IIIb

stages of the reduction sequence. Their platforms are mainly plain and, of the eight complete blades and flakes, six have abraded platforms. Bulbs of percussion are invariably diffuse, and terminations are mainly feathered. Furthermore, dorsal-face morphology again suggests that most of the blade and flake blanks were removed from platform cores where unidirectional flaking was the dominant reduction strategy. These observations suggest that this isolated, undated pit has several technological and physical characteristics in common with the dated pit groups.

The rest of the assemblage, from natural and post-medieval features, is a small collection of 18 flaked lithics. Indeterminate shatter and regular flakes dominate and, of the identifiable blades and flakes, six are complete, five being flakes. When the complete blades and flakes are compared with those from the pit groups, it seems that some have similar technological characteristics, such as platform and dorsal-face morphologies, indicating comparable unidirectional flaking from single platform cores (*p 137*). This might therefore indicate that these are contemporary with the lithics from the pits. There are, however, some clear differences. Most notably, only four pieces have been burnt and the majority are secondary blades and flakes. Furthermore, when the mean dimensions of the unmodified debitage from the post-medieval features are compared with the same data for the flakes from pit ***8521*** (Cass ny Hawin IIIb; *p 131*), the former appear to have been from much larger flakes (28.40 x 18.39 x 7.18 mm) than the latter (16.85 x 12.53 x 3.73 mm). Whilst the flakes from the post-medieval features are secondary pieces, and are therefore likely to be larger than the mainly inner flakes from the pit, further comparison of these data with that from Cass ny Hawin II (*Ch 3, p 98*) suggests that they are still beyond the average size for Mesolithic debitage. It is therefore possible that the debitage is related to later stone-working traditions.

Secondary technology: Microliths

The assemblage contained some microliths, though only from pits ***8251*** and ***8253*** (*p 131*), in the Cass ny Hawin IIIb pit group (Table 35). All are made from pebble flint, apart from one of chert. Additionally, as with the debitage (*p 134*), nearly all are burnt, the exceptions being two scalene triangles, two microlith fragments, and a miscellaneous point from pit ***8251***.

Crescents

Pit ***8251*** produced a single crescent (Fig 79), which is arc-blunted, with a patch of semi-abrupt retouch at one end, on the leading edge. The dimensions and technology of this crescent are similar to those from other Manx Early Mesolithic sites (*cf* Woodman 1978a).

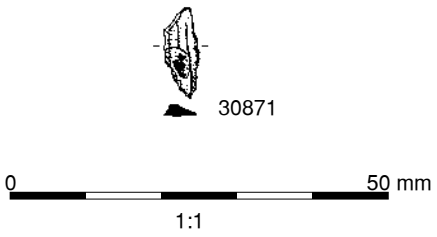


Figure 79: The arc-blunted crescent from pit **8251**

Scalene triangles

Scalene triangles are the most frequent microliths in the assemblage, and can be subdivided into three types. The first, and most common, represents those implements which have both oblique edges blunted; the short edge is always concave in outline and there is a pronounced spur at the angle between the two oblique edges (*eg* 30331; 30866; and 31094; Fig 80). The concave edge can vary in angle, with some almost reaching 90°, although, in all instances, like the long oblique edge, the retouch has been applied from the ventral face. On one example, the long oblique-edge is partially retouched up to the spur, whilst on another the concavity on the short edge is so pronounced that it has also created a spur where it meets the leading edge. On a third specimen, both oblique edges are concave in outline, which has produced a pronounced spur at the angle between the two edges. In this respect, several of these pieces morphologically resemble

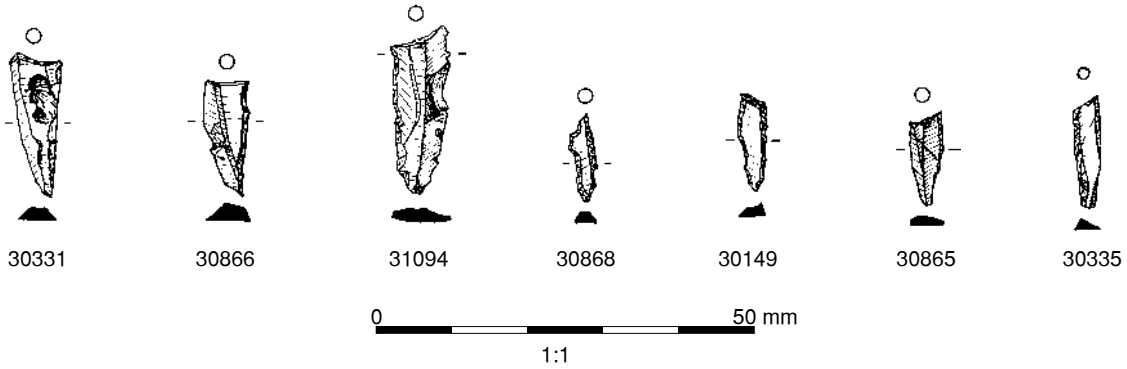


Figure 80: Scalene triangles from pit **8251**

hollow-based points (*eg* 30866; Fig 80), though they lack the inverse retouched hollow, and none of the short edges are less than 90° (*cf* Woodman 1987).

The second type is represented by four examples. These are similar to the first type, in that they represent implements that have two modified oblique edges, but, in contrast, they have a more regular morphology, as they lack the distinct concavity of the short oblique edge. As such, a spur at the angle between the two oblique edges is absent (*eg* 30868).

The third type consists of scalene triangles with additional retouch on the leading edge. Five are present, and on all, the retouch is continuous and tends not to be as abrupt as that applied to the oblique edges. The majority (*eg* 30149 and 30865) are morphologically similar to the first type, although one example (30335) lacks the concave short edge and associated spur.

It is noteworthy that pit ***8251*** produced most of the scalene triangles, comprising six of the first type and all of the second and third types. In contrast, pit ***8253*** yielded only the first type. When compared with the other Ronaldsway sites, the scalene triangles from Cass ny Hawin IIIb differ from those from Cass ny Hawin II (the micro-scalene triangles; *Ch 3, p 108*) in morphological traits and dimensions. Specifically, the Cass ny Hawin IIIb scalene triangles have mean dimensions of 14.79 x 4.70 x 2.10 mm, indicating that they are generally longer and slightly thicker than those from Cass ny Hawin II. Indeed, the Cass ny Hawin IIIb pieces appear to have more in common with those associated with Cass ny Hawin I (Woodman 1987) and the Port St Mary complex (Woodman 1978a), in terms of possessing concave short edges and spurred angles.

Obliquely trimmed blade

The assemblage contains a single obliquely trimmed blade (30148; Fig 81). This is defined by blunting at the distal end of the blade, which cuts across its width on an obtuse angle.

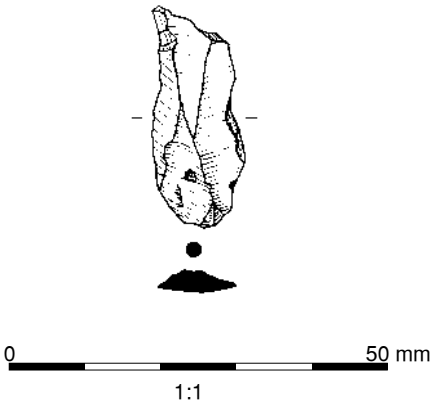


Figure 81: The obliquely trimmed blade from pit **8251**

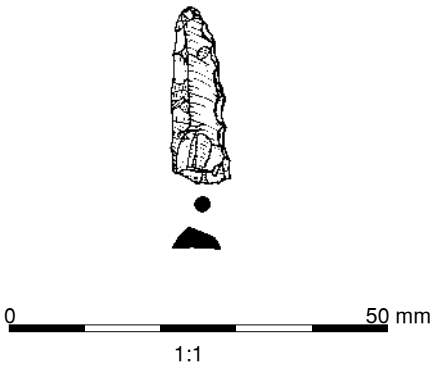


Figure 82: The possible tanged form from pit **8253**

Tanged form

A possible tanged form was recovered from pit ***8253*** (31103; Fig 82), which is very similar in character to those from Cass ny Hawin I (Woodman 1987) and Cass ny Hawin II (*Ch 3, p 110*). The blade is obliquely trimmed across one end on an obtuse angle, whilst at the opposite end, both lateral edges are blunted for approximately three-quarters of their length. Both edges converge to form a broad tang at the end of the blade.

Basally retouched points

Two points with basal retouch came from the Cass ny Hawin IIIb pit group. On one of these points (30330;

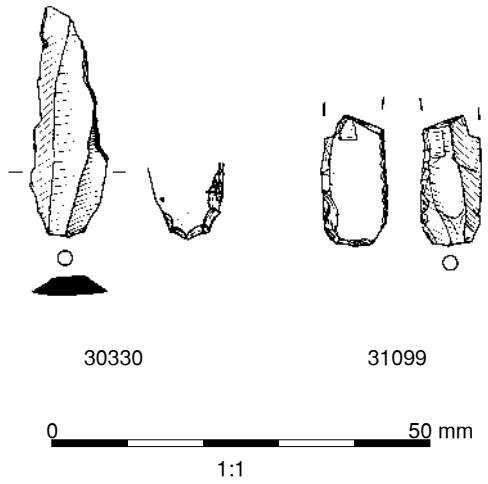


Figure 83: Basally retouched points from pits **8251** *and* **8253**

Fig 83), from pit ***8251***, the right-lateral edge is blunted obliquely on an acute angle across the width of the blade. There is also a patch of inverse semi-abrupt, semi-invasive retouch at the base of the point on the left lateral edge and on the butt, and one end is also broken. The other point (31099), from pit ***8253***, is complete and of a similar technology, although, in this instance, the left lateral edge is blunted, and the inverse basal retouch is on the right lateral and the butt.

More generally, basally retouched points, which may reflect improvements in hafting technology (Conneller 2022, 205), appear to be rare occurrences within Manx Early Mesolithic assemblages, being more common in Middle Mesolithic narrow-blade assemblages from England (for instance, from Honey Hill and Horsham assemblages; Reynier 2005; Conneller 2022, 205-6). A point was, however, recorded with inverse trimming from Port St Mary (Clark 1935, fig 3.23), which appears to be stylistically comparable to Cass ny Hawin IIIb points. Additionally, Woodman (1978a) also notes that some of the points from the Glen Wyllin complex (*Ch 3, p 84*) have invasive retouch at the proximal end, and these could also be of a similar technology.

Miscellaneous point form

Pit ***8251*** produced a single miscellaneous point (Fig 84). This implement is blunted on an acute angle on both lateral edges, which converge to form a point at the distal end. The point is heavily worn and has small negative scars at the apex, which were either produced by resharpening or use damage. This point was probably used as an awl.

Microlith fragments

A small collection of microlith fragments was also recovered from Cass ny Hawin IIIb. It is of note that all were the points of broken microliths and, based on

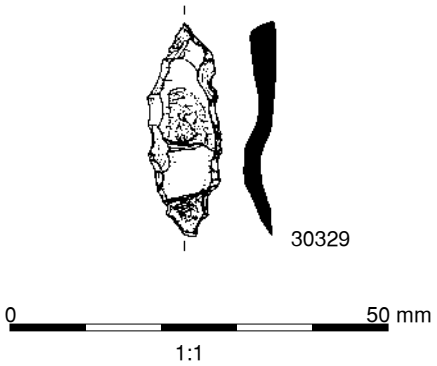


Figure 84: The miscellaneous point form from pit **8251**

their shapes, many could originally have been from scalene triangles.

Secondary technology: non-microlithic tools

Both the two non-microlithic tools came from post-medieval features. They comprise a simple edge-retouched flake, made from pebble flint, and an end scraper, made on a broken pebble-flint broad blade. The latter is defined by abrupt retouch applied to the butt end of the blade, forming a convex tool edge. The retouch also cuts through a patinated surface, suggestive of the reuse of previously worked material. There is also a small patch of potential abrupt retouch forming a shallow notch on the left-lateral edge of the implement, although it is possible that this relates to hafting damage. In addition to these retouched items, a possible burin spall came from pit ***8251***. Whilst not strictly a tool, the spall was probably removed during the production of a burin.

Environmental remains

Charred plant remains

Five of the pits (***8218***, ***8251***, ***8253***, ***8269***, and ***8255***) produced abundant hazelnut-shell (*Corylus avellana*) fragments. In addition, pits ***8251***, ***8253***, and ***8224*** produced rare fragments of charred crab apple (*Malus sylvestris*) flesh, and two (***8251*** and ***8253***) contained rare cleavers (*Galium aparine*) seeds, similar to those species present at Cass ny Hawin II (*Ch 3, p 74*). More generally, these pits are reminiscent of similar hazelnut-rich prehistoric features found in England, which, although similarly enigmatic, are thought to contain structured? waste material, rather than stored food (*cf* Druce 2007).

Charcoal

Four of the pits containing hazelnut shells also produced frequent to abundant identifiable charcoal, being dominated by either a single taxon, in the form of oak (*Quercus* sp; pits ***8251*** and ***8269***), or a mixed assemblage of oak, hawthorn-type (Maloideae), blackthorn-type (*Prunus* sp), and hazel (*Corylus*; pits ***8253*** and ***8255***). Although hazel (and probably hawthorn and blackthorn-type) are likely to have

been well-established on the island by the time the pits were dug in the second quarter of the eighth millennium cal BC (*p 132*), pollen records from the island indicate that oak (and elm; *Ulmus* sp) did not rise to prominence until the latter half of this millennium (Chiverrell *et al* 2023; *Ch 2, p 34*), as was also the case in Britain and Ireland (*ibid*; Birks 1989), which is perhaps a few hundred years later than the date of the latest of the pits, and also 800 years later than the oak charcoal from Cass ny Hawin II (*Ch 2, p 47*). This seems to suggest that very few oak trees were likely to have been growing on the Isle of Man at this time.

Given oak's specific association with the possible hearth at Cass ny Hawin II (*Ch 2, p 53*), and its superior qualities as a fuel (Edlin 1949), it appears very likely that it was sought out and specifically selected for its burning qualities. Moreover, the other types of wood that were likely to have been available at the time, particularly birch and willow, were not ideal choices for fuel wood (*ibid*). Hazel, however, and some of the hawthorn-type and blackthorn-type species, would have supplied viable alternatives, which, judging by the evidence from Cass ny Hawin II, were used to supplement oak as a fuel.

The Importance of the Lithic Assemblages

Of the other Mesolithic lithic sites found at Ronaldsway, those associated with Lithic Scatter 3 and the Cass ny Hawin III pits are clearly the most important, in terms of size and composition. Although the occupation leading to the formation of Lithic Scatter 3 is undated, it is evident that it produced a narrow-blade assemblage, associated with a small collection of microliths, including microburins, fragments, and a scalene triangle. Several undiagnostic retouched tools are also present. On technological grounds, particularly based on core (*p 125*) and debitage (*p 126*) types, sizes, and morphology, this assemblage might be contemporary with that from Cass ny Hawin II, dating from the later ninth millennium cal BC (*Ch 2, p 47*), and it thus seems to relate to the period when the island was first colonised. If so, it is another valuable addition to the lithic dataset for this important period in the island's early history.

In contrast, the later lithic assemblage from Cass ny Hawin III, radiocarbon dated to the mid-eighth millennium cal BC, probably relates to the period when the island was more extensively occupied by Mesolithic groups, following the initial phase of colonisation some 600 years or so previously. It is also possible that these lithics were intentionally chosen for deposition in the pits, possibly representing material derived from domestic occupation, which could conceivably have been linked to the marking of this area (with a possible pit alignment/monument). The lithics selected for deposition, although of comparable narrow-blade type to those from Cass ny Hawin II, do exhibit some slight differences (*ie* slightly larger cores and differences in platform preparations), although it is unclear if these are a result of the later date of the assemblage, or the deliberate selection of particular lithic items for deposition.

The Development of Man's Lithic Industries

The lithics and radiocarbon dates from RESA can now be slotted into existing schemes, highlighting a broad progression of Man's lithic industries (Fig 85). Hence, Cass ny Hawin II and Lithic Scatter 3 represent the island's earliest narrow-blade assemblages (*above*), whilst the lithics from the Cass ny Hawin III pits are later, dating to the seventy-sixth/seventy-fifth century cal BC. It is also possible that the assemblage from the midden at Port St Mary, which prior to the excavations at Cass ny Hawin II was considered to be the island's earliest lithic assemblage (Woodman 1978a; *Ch 3, p 84*) bridges the chronological gap between the Cass ny Hawin II and III assemblages. Significantly, the Port St Mary lithics include tool types common to both, which may confirm this suggestion, such as a large collection of elongated scalene triangles, which are also associated with the Cass ny Hawin II assemblage (*Ch 3, p 107*), and basally retouched points and scalene triangles with a concave short, oblique edge, which are features of the Cass ny Hawin III lithics (*p 133*).

The Glen Wyllin lithic complex might represent the next lithic assemblage of the island, as Woodman (1987a) thought this followed the Port St Mary industry (*Ch 3, p 84*). The radiocarbon evidence (from Ballacregga, located in the same general area as the Glen Wyllin lithic sites; *Ch 2, p 38*) also suggests that this lithic complex was probably later than Cass ny Hawin III, placing this industry in the period *c* 7350-6820 cal BC (McCartan 2003, 326; Davey and Allwood 2016). It is also worth noting that the Glen Wyllin industry contained varied geometric microliths (Woodman 1978a), which have much more in common with sites in mainland Britain than those from Cass ny Hawin II and III. Therefore, perhaps by the latter part of the eighth millennium cal BC, there was much more interaction between Mesolithic groups across the Irish Sea area.

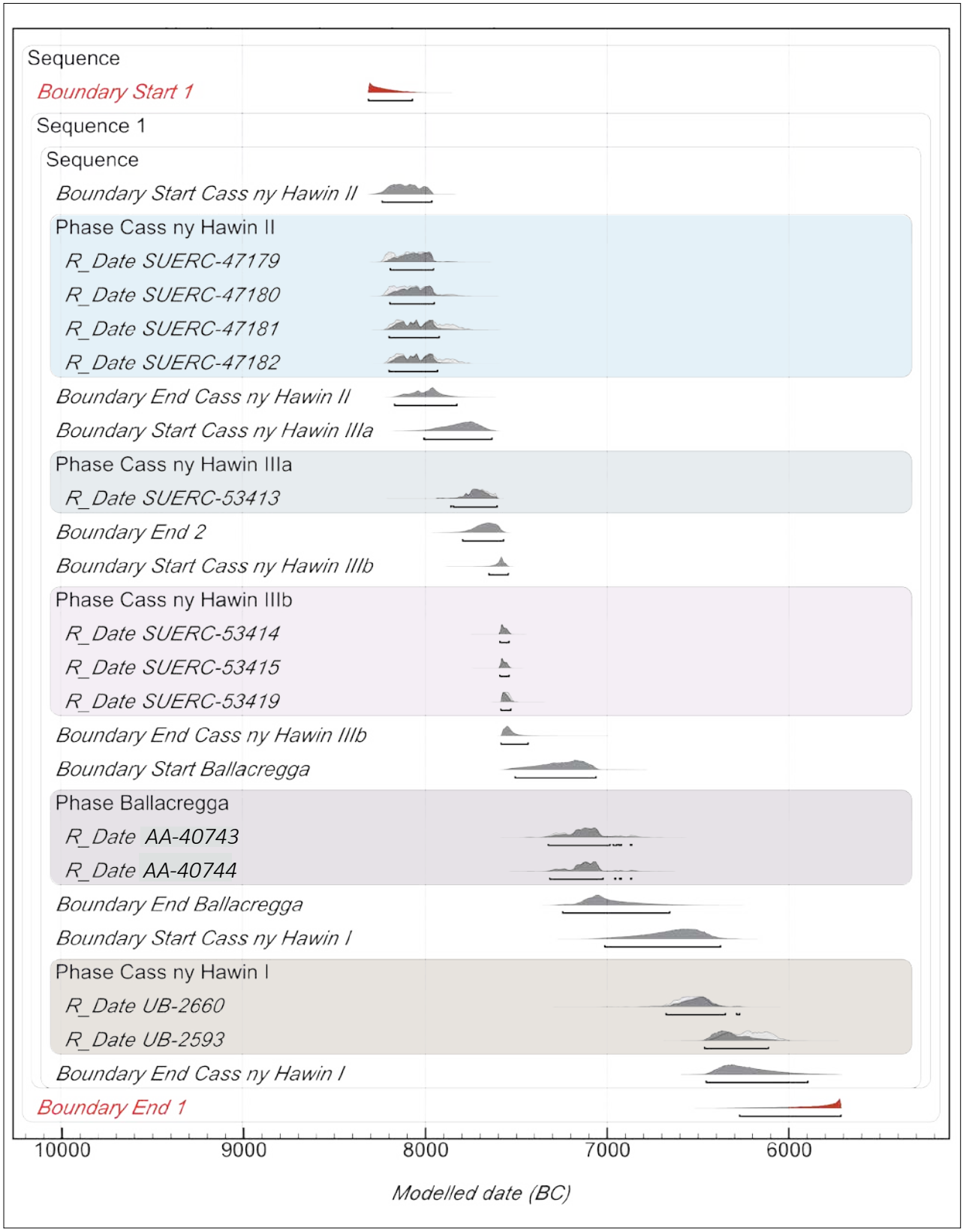


Figure 85: Modelled radiocarbon dates from key Manx Early Mesolithic lithic sites

Based on the radiocarbon-dating evidence, it now seems that Cass ny Hawin I provided the latest in the sequence of important narrow-blade lithic assemblages, dating to the mid-seventh millennium cal BC (Woodman 1987). Thus, although it was previously suspected that, chronologically, this assemblage lay between the Port St Mary and Glen Wyllin industries (*ibid*), this now seems less likely.

Given the wider radiocarbon-dating evidence from the island, the Cass ny Hawin I assemblage might also immediately precede the shift to the Late Mesolithic 'Heavy-bladed Industry', which could have first appeared in the mid-seventh millennium cal BC (*Ch 2, p 36*).

5

NEOLITHIC AND EARLIER BRONZE AGE STRUCTURES AND ACTIVITY

Richard A Gregory, with Antony Dickson, Denise Druce, Helen Evans, Chris Howard-Davis, and Aidan Parker

One important archaeological outcome of the RESA project was the evidence it produced for Neolithic and earlier Bronze Age activity. This comprised the remains of two timber structures, both within Taxiway Alpha East, which complement the other known Neolithic structure from the airport, the Ronaldsway House, excavated in the 1940s (*Ch 1, p 8*; *p 150*). The RESA structures were initially discovered during topsoil stripping and then formed the focus for detailed excavation. Significantly, during the excavations, suitable organic samples were recovered, which were subjected to radiocarbon assay, as part of the programme of post-excavation analysis (*Ch 1, p 26*). During the excavation along Taxiway Alpha East, a small collection of Neolithic stone tools was also recovered, with parallels to those from the Ronaldsway House.

Characterising Man's Neolithic Period and Early Bronze Age

Although difficult to define precisely (*cf* Thomas 2013, 1-4; Bradley 2019, 30-42), the Neolithic period can be equated with the emergence of the first farming communities in the British Isles. The culture seems therefore to have been primarily associated with the adoption of agricultural economies, focusing on domesticated plants and/or animals, which probably first occurred in south-east Britain at the very end of the fifth millennium cal BC (Bayliss *et al* 2011a, 729). However, in addition to these domesticates, other (usually geographically restricted) artefacts, technologies, and practices were adopted, including specific types of pottery and stone tools; the burial of the dead in tombs; the construction of monuments; and the emergence of substantial timber houses or halls (*cf* Hodder 1990; Bradley 2019). This process of 'adoption', which defines the start of the earlier part of the period, was extremely dynamic, temporally, spatially, and materially, with Neolithic 'practices', involving different elements, emerging across Britain and Ireland at different times, and in different areas (Whittle *et al* 2011; Griffiths 2011). Once established, these practices developed over the course of the period, with new types of monuments emerging subsequently (later Neolithic monuments), along with different forms of artefacts, such as stone tools and pottery. Again, these later Neolithic monuments and artefacts were often geographically restricted, resulting in the appearance of distinctive, Neolithic regional and sub-regional styles and traditions (*inter alia*; Piggott 1954; Bradley 1984, 38-67; Thomas 1996a, 141-5; Cummings 2011).

The earlier Neolithic evidence

The Neolithic culture in the Isle of Man shares some of the expected characteristics associated with the wider emergence and development in the British Isles, and can be divided into two main 'phases'. The first covers the Early and Middle Neolithic periods (*c* 4000-3100 cal BC) and relates to the adoption and initial maturing of Neolithic practices, corresponding to a time when the largely wooded natural landscape of the island was increasingly subjected to small-scale clearance, associated with the growth of early agriculture (*cf* Davey and Innes 2003; Chiverrell *et al* 2006a, 324). Once small-scale clearances had been made, however, it seems that forest regeneration was commonplace, suggesting the presence of fairly mobile agricultural communities (Chiverrell *et al* 2004). Hence, by the end of this phase, the landscape of the island was still largely forested, with oak, alder, and hazel forming the dominant arboreal species (*ibid*). Spatially, denser areas of woodland seem to have been present in the southern, eastern, and western lowlands, with lighter woodland cover on the northern plain and the upland areas, the latter perhaps also containing some pine (Chiverrell *et al* 2006a, 324).

Prior to the excavations at the airport, several key features characterised this period on Man. The first,

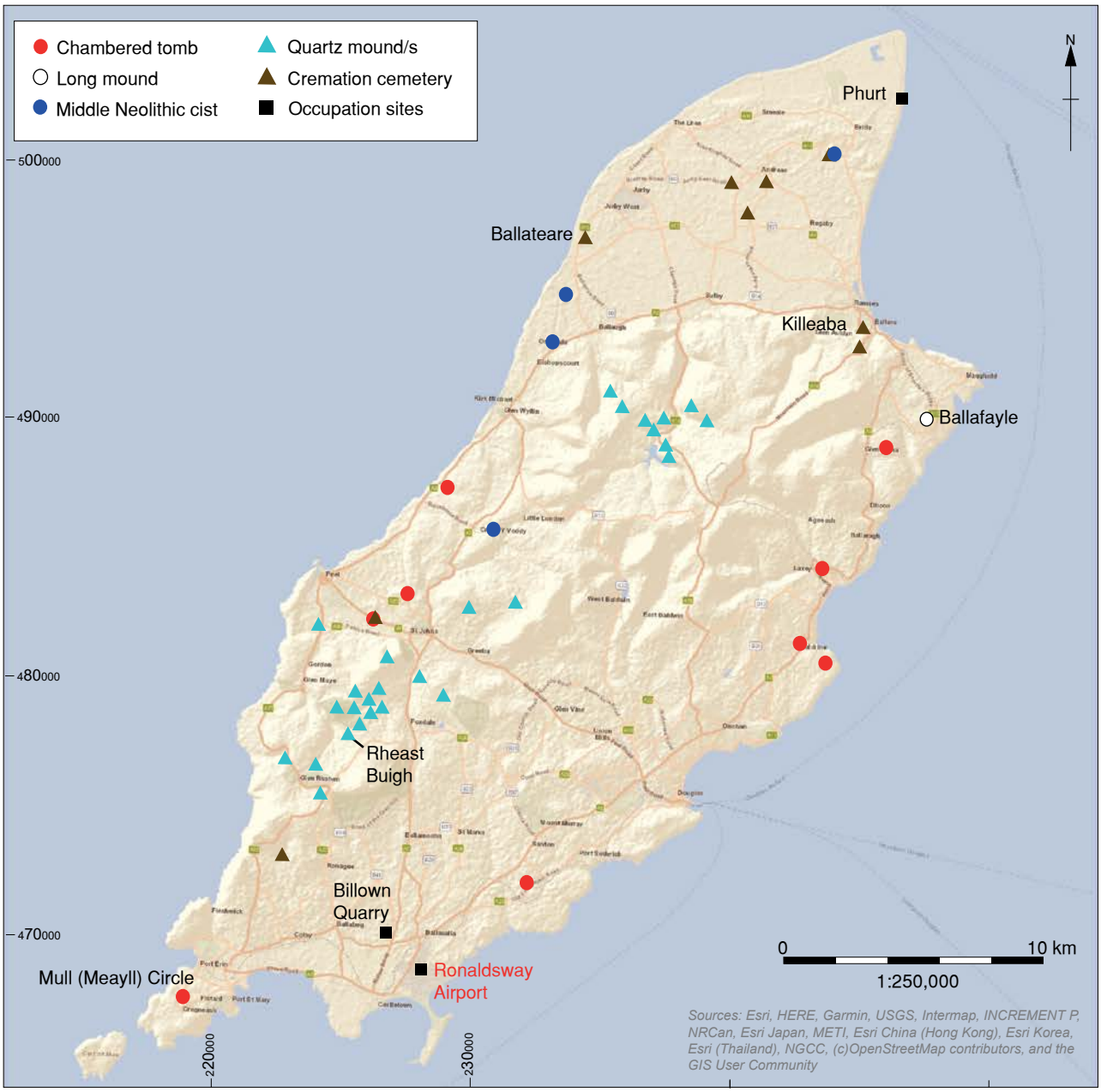


Figure 86: The distribution of earlier Neolithic burial sites, other monuments, and occupation sites across the island

and most visible, are burial monuments (Fig 86), containing both cremations and inhumations (Lynch and Davey 2017, 11), which referenced distinctive local peaks, watercourses, and the sea, and in particular, bays and natural harbours (Cummings and Fowler 2004). Importantly, aside from being sites for the dead, they probably also functioned as places of social congregation and interaction. These burial monuments are not, however, homogeneous, but comprise several specific types of chambered tombs similar to those found in eastern Ireland (*ie* court tombs) and south-west Scotland (*ie* Clyde tombs), as well as a possible long mound and crematorium at Ballafayle, comparable to those in south-west Scotland, implying influence/ contact with other Neolithic communities in the Irish Sea zone (*cf* Henshall 1978; Burrow 1997, 11; Cooney



Plate 24: The Meayll Circle

2000; Davey 2004; Lynch and Davey 2017). One unique burial monument is also known on the island, this being the Mull (Meayll) Circle (Pl 24), a circular arrangement of six sets of T-shaped chambers (Burrow 1997, 12), which might have taken inspiration from, or influenced, several megalithic tombs in south-west Scotland and south-west Wales (Henshall 1978; Lynch 1972). There are presently no radiocarbon dates relating to the construction of these tombs, though it seems probable, based on the pottery and dating evidence from other parts of the Irish Sea zone, that they date to the early to mid-fourth millennium cal BC (Fowler *et al* 2021, 84). The human remains from the long mound/crematorium at Ballafayle have, however, been dated to the fortieth- to thirty-eighth centuries cal BC (*op cit*, 89).

Apart from intentionally built tombs, it also seems that prominent natural features were singled out in the middle part of the fourth millennium cal BC as appropriate burial sites for cremated human remains (*ie* at Killeaba; Fig 86; Crellin 2015). In addition, flat cremation cemeteries were used from the mid-fourth millennium cal BC onwards (*eg* Ballateare; Fowler *et al* 2021, 92), and four cists containing cremated human remains have been dated to the Middle Neolithic period, indicating that this tradition was rooted in Neolithic culture (*op cit*, 90). These may well complement other cremation burials which possibly also date to this period, buried in pits and associated with large, intact pottery vessels, which perhaps acted as substitutes for the cists (*below*; *op cit*, 96-7). Conceivably, the appearance of these burial traditions may have happened at the same time as the cessation of building chambered tombs, and they also mirror the appearance of Middle Neolithic flat graves on the British mainland, at a time when causewayed enclosures and long mounds were going out of use (Bradley 2019, 64). One other type of earlier Neolithic 'monument' might also exist on Man. These sites are defined by low quartz mounds, with one example (at Rheast Buigh) dating to the mid-fourth millennium cal BC (Davey and Woodcock 2003). The function of such mounds is unknown, but their distribution might reflect patterns of Neolithic (seasonal?) movement, probably between coastal areas and the uplands.

Monuments aside, two earlier Neolithic 'occupation' sites are known on the island (Fig 86). One is at Phurt, where pits have been recorded, together with a large collection of earlier Neolithic pottery, eroding from a cliff face (Burrow 1997, 12; Davey and Woodcock 2003), whilst the other is at Billown Quarry, only some 1.7 km north-west of Ronaldsway Airport. This latter site was partially excavated in the late 1990s and early 2000s, and more recently, in 2019 (*Ch 1, pp 12-13*). Initially, within the earlier area excavated, an Early Neolithic causewayed-style enclosure was suspected (Darvill 2003a), though subsequent radiocarbon dating indicates that this was probably an element of a field system dating to the second millennium cal BC (*Ch 6, p 171*), containing residual Neolithic material, including pottery and worked stone (Bayliss *et al* 2011b). However, it does now seem possible that a causewayed-type enclosure was indeed present on the site, but this was within the area excavated in 2019, where a large arcing segmented ditch was recorded, which was packed with quartz pebbles and Neolithic arrowheads (R Gregory *pers obs*). The presence of this potential enclosure might also go some way to explain the evidence indicating the apparent referencing, perhaps veneration, of the hill through the digging of pits and the intentional deposition of pottery and worked-stone artefacts, such as Neolithic leaf-shaped arrowheads, as well as white quartz pebbles that had been brought from the coast (Darvill 2003a). Moreover, the modelled radiocarbon dates from these features suggest that Neolithic activity at Billown commenced in the period *4040-3700 cal BC* (*95% probability*; Bayliss *et al* 2011a, 808, fig 14.148), implying that this site was of fundamental importance to the adoption of Neolithic culture on Man.

Several distinctive types of portable artefacts also characterise this earlier Neolithic culture on Man. Pottery seems to have been an important component, perhaps from the inception of the period, and includes shouldered bowls (Meayll Hill ware; Piggott 1932; Burrow 1997, 42) and carinated bowls from the chambered tombs, the latter representing a type of pottery widely used by earlier Neolithic communities in other parts of western Britain and Ireland (*cf* Lynch and Davey 2017; Sheridan 2007a; Sheridan *et al* 2023). In addition, it also now seems, based on radiocarbon dating of cremated remains from Ballateare (*above*), that Ronaldsway pottery, a distinctive and unique Manx ceramic type, previously thought to date solely to the Late Neolithic period (*below*), had its genesis in the mid-fourth millennium cal BC. Moreover, during this period, it seems that intact Ronaldsway jars were buried with cremated human remains (Fowler *et al* 2021, 97). Other portable artefacts comprise worked stone, though most of this has been found by chance or through surface collection. These include flaked lithics and ground- and polished-stone axes, produced from volcanic rock types from Cumbria (Group VI), North Wales (Group VII), Ireland (Group IX), and locally (Group XXV), along with a single jadeite example from Continental Europe (Burrow 1997, 13; Cooney 2000; Coope and Garrad 1988).

Taking all this evidence together, it is clear that the earlier Neolithic period is well represented on the island. Moreover, based on the similarities of some practices, tomb design, and material culture, long-range contact with other Neolithic communities in the Irish Sea area was a distinctive feature, clearly linking the island to the wider Neolithic world.

The later Neolithic period

Throughout the later Neolithic period (*c* 3100-2400 cal BC) the natural environment of Man was dominated by woodland of a similar composition to that which existed in the earlier Neolithic period (*p 145*; Chiverrell *et al* 2004). Undoubtedly, this would have contained small clearances used for agriculture, though it has been noted that woodland density may have been higher during the later part of the period, compared with the earlier (*ibid*).

Culturally, across the British Isles, the Late Neolithic period is often viewed as a time when distinctive sub-regional traditions emerged (*p 145*) and Man is certainly no exception to this, this time being largely being defined by the Ronaldsway Culture, which was first identified through excavations of the Ronaldsway House (Bruce *et al* 1947; *Ch 1, p 8*) and at Ballateare, on the north-west coast, where the Middle Neolithic cemetery (*p 147*) continued to be used (Bersu 1947; Fowler *et al* 2021, table 1; Fig 87). This 'culture' is

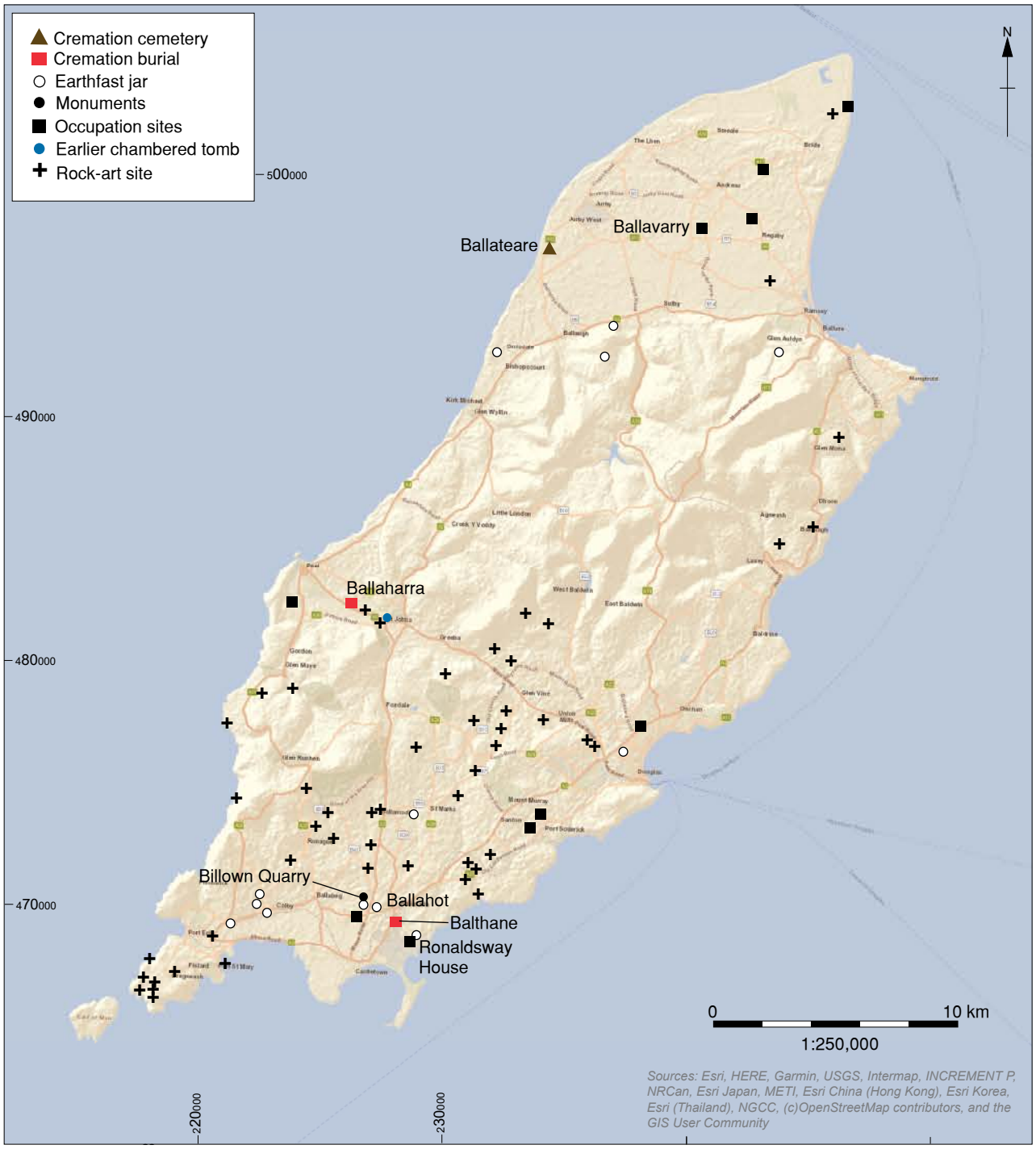


Figure 87: The distribution of later Neolithic occupation sites, cremation cemeteries, earthfast jars, and monuments across the island

believed to be distinctive to the island (Bruce *et al* 1947; Piggott 1954; Moffatt 1978; Burrow 1997; Burrow and Darvill 1997; Darvill 2003a), and whilst it has been suggested that it might reflect a period of cultural insularity, with the adoption of a unique cultural identity, it must be stressed that if this was the case, contacts with outside communities along the northern and north-eastern perimeters of the Irish Sea basin appear to have been maintained (*cf* Frieman 2008; Crellin 2015). Therefore, given these contacts, the idea that the Isle of Man was at any point in its prehistory isolated from wider influences in the Irish Sea zone is now strongly refuted by many studies (*inter alia*; Fowler 1999; Crellin 2014; 2019; Kewley 2016; Fowler *et al* 2021).

The Ronaldsway Culture is characterised by the use of deep, baggy ceramic jars (termed Ronaldsway jars), with thickened rims, which are only found on the Isle of Man (Burrow 1997, 23-4; Pl 25). Significantly, some of these vessels from Billown Quarry were also painted with polychrome (white, black, and red) designs,

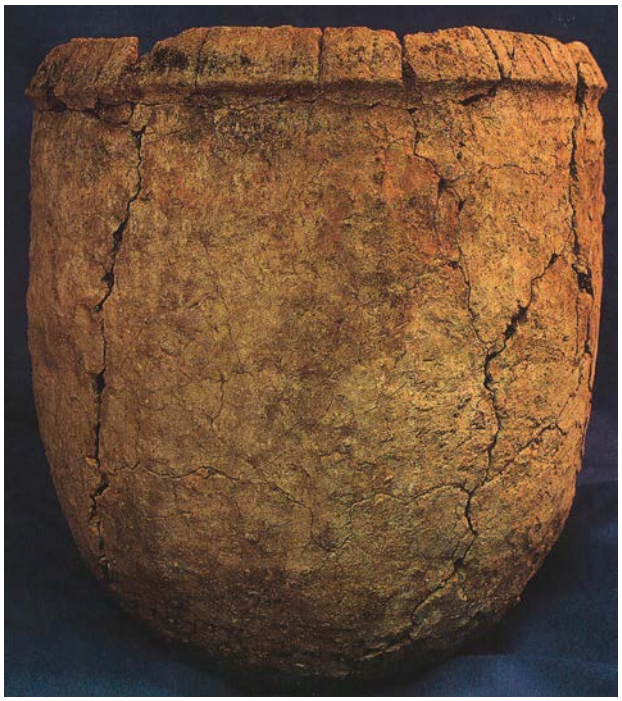


Plate 25: A Ronaldsway jar



Plate 26: Schist plaque from the Ronaldsway House, with incised Grooved Ware-inspired designs

similar in style to contemporary rock art (*p 150*), and the inscribed designs on other types of Later Neolithic pottery and portable artefacts, forming elements of the Ronaldsway Culture (*below*; Darvill and Andrews 2014). These jars were originally viewed as one of the defining features of the Late Neolithic period, and the charred residues on several have been radiocarbon dated, indicating that many do indeed date to this period (*cf* Burrow and Darvill 1997); however, it now transpires that their origins lay in the Middle Neolithic period when they were used in association with cremation burials (*p 147*; Fowler *et al* 2021). As such, they represent a long-lived and persistent feature of Manx Neolithic culture.

A small amount of Grooved Ware, another type of Late Neolithic pottery known from across the British Isles, is also present on Man (including at the Ronaldsway House; *p 150*), indicating contact with outside groups. Furthermore, Grooved Ware forms and decoration appear to have had some influence on the design of some of the Ronaldsway jars, meaning that, at times, it is difficult to differentiate between the two styles, particularly when they are represented by plain body sherds (Burrow 1997, 24). Grooved Ware designs were also incised onto schist plaques found at the Ronaldsway House (*p 150*) and Ballavarry, these being another distinct element of the Ronaldsway Culture (*op cit*, 21; Burrow 1999, fig 5; Pl 26). Other distinctive objects associated with the Ronaldsway Culture comprise stone axes with roughened, truncated butts, produced from local stone (Group XXV; Coope and Garrad 1978), perhaps obtained from the upland massif close to Douglas (*cf* Burrow 1997, fig 6.4), and stone from 'exotic' sources (Barrs 2010). Based on the evidence from the Ronaldsway House, these were used in conjunction with more familiar Neolithic polished-stone axes (*p 147*), comparable to those found in other parts of Britain and Ireland (Crellin 2014). Hump-backed flint scrapers, polished flint knives, serrated saws, lozenge-shaped arrowheads, disc cores, and hollow scrapers are other worked-stone items associated with the Ronaldsway Culture, examples being recovered from the Ronaldsway House itself (Burrow 1997, 21).

The burial of cremated remains also seems to have been a feature of this period (*eg* at Ballateare cemetery (*p 147*) and in a pit outside Ballaharra chamber tomb; Cregeen 1978; Lynch and Davey 2017), which continued the tradition that emerged in the Middle Neolithic period (*p 147*). One of these burial sites, quite close to Ronaldsway Airport, is at the Balthane Recycling Plant, where four Ronaldsway jars containing cremations were found, along with a possible Grooved Ware cup, in association with a ring-ditch and cists (OA North 2010). The period is also characterised by a very particular type of site on Man, where 'earthfast jars'

have been found (*cf* Burrow 1997, 20) buried upright to their necks, often sealed with slate lids, and always empty. They have therefore been interpreted as storage vessels, or perhaps even mimicking pits used for specific types of intentional deposition; another suggestion is that cremated remains were periodically placed in these vessels, but later removed (*ibid*; Crellin 2015; Fowler *et al* 2021, 98, 100). Such sites probably date to the third millennium cal BC, and are scattered across the lower-lying parts of the island (Fig 87), two such jars being discovered at the Airport in the 1940s (*Ch 1, p 8*; Fig 88), whilst other nearby examples have been excavated at Billown and Ballahot (Burrow 1999, 126, fig 1).

At Billown, a possible stone circle (although this could have been a Bronze Age round mound; *p 153*), excavated by William Cubbon in 1929 (*cf* Burrow1997, 38-9), and a potential Class I henge, defined by a ditch and possible external bank, with a *c* 9 m-diameter internal area and south-eastern entrance, perhaps referencing a natural earthfast boulder (Bayliss *et al* 2011b, 554), were set within a wider area where the tradition of pit digging and artefact deposition continued (*p 147*). The veracity of the latter monument, and existence of henge monuments more generally on the island, has, however, been questioned (*cf* Burrow 1997, 19; Fowler *et al* 2021, 87). A penannular ring-ditch (seemingly associated with earthfast jars; *above*), a horseshoe arrangement of pits (Bayliss *et al* 2011b, 554), and an unusual 'mini-henge', 'one of the smallest in the British Isles at only 2 m across internally' (Darvill 2003a, 117), have been identified; others may have been constructed in the later Neolithic period, though they tend to be superficially invisible, perhaps creating arenas for congregation and small-scale interaction.

Rock art, although notoriously difficult to date, might also be a product of the third millennium cal BC (Bradley 1995; Cummings 2017, 177-9), though it was also incorporated into, or associated with, Bronze Age monuments. It provides additional links with mainland areas (Morris 1989), and mainly comprises cup-and-ring marks, with some passage-grave-style art (Darvill and O'Connor 2005). Perhaps significantly, 55 individual sites have been recorded (Fig 87), making the Isle of Man 'one of the more densely populated landscapes in the west of Britain' (*op cit*, 283), the symbols perhaps acting as signposts or markers relating to movement between upland and lowland areas (*op cit*, 326). Sites relating more directly to occupation are poorly understood, however, being invariably defined by collections of Ronaldsway pottery, pits, and postholes, perhaps associated with stone structures (*cf* Burrow 1997, 20; Woodcock 2008, 107; OA North 2013; Fowler *et al* 2021, 96). Indeed, only one site, that of the Ronaldsway House itself (*Ch 1, p 8*; *Ch 10, p 331*), has revealed a considerable degree of coherence.

Its excavation in the 1940s indicated that this had a rectangular plan, *c* 7.5 x 4 m, with postholes and stone slabs along the outer walls, and two inner rows of postholes parallel to its long axis (Fig 89). However, its veracity has been questioned (Thomas 1996b, 12), largely because of the size and distribution of the postholes, as depicted on the published plan, which, it has been suggested, were too small to support a timber structure, such as a substantial building. This of course assumes that all the postholes associated with the house were identified, which was probably not the case, given the circumstances of its discovery and the rapid nature of the excavation (*Ch 1, p 8*). In addition, the published

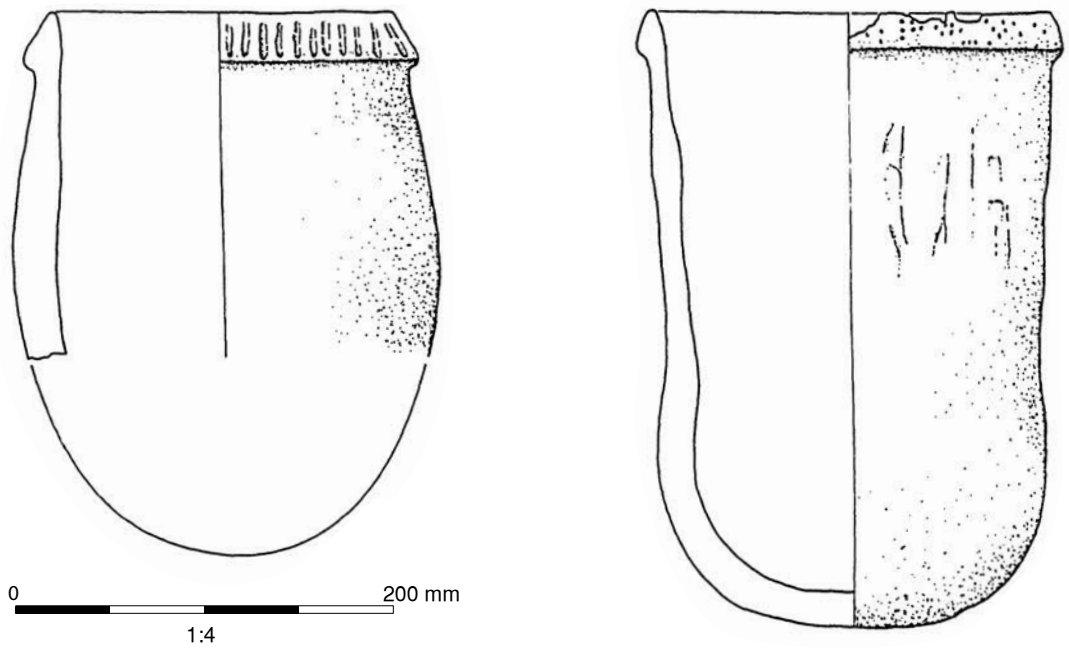


Figure 88: The earthfast jars from Ronaldsway Airport (after Burrow 1997)

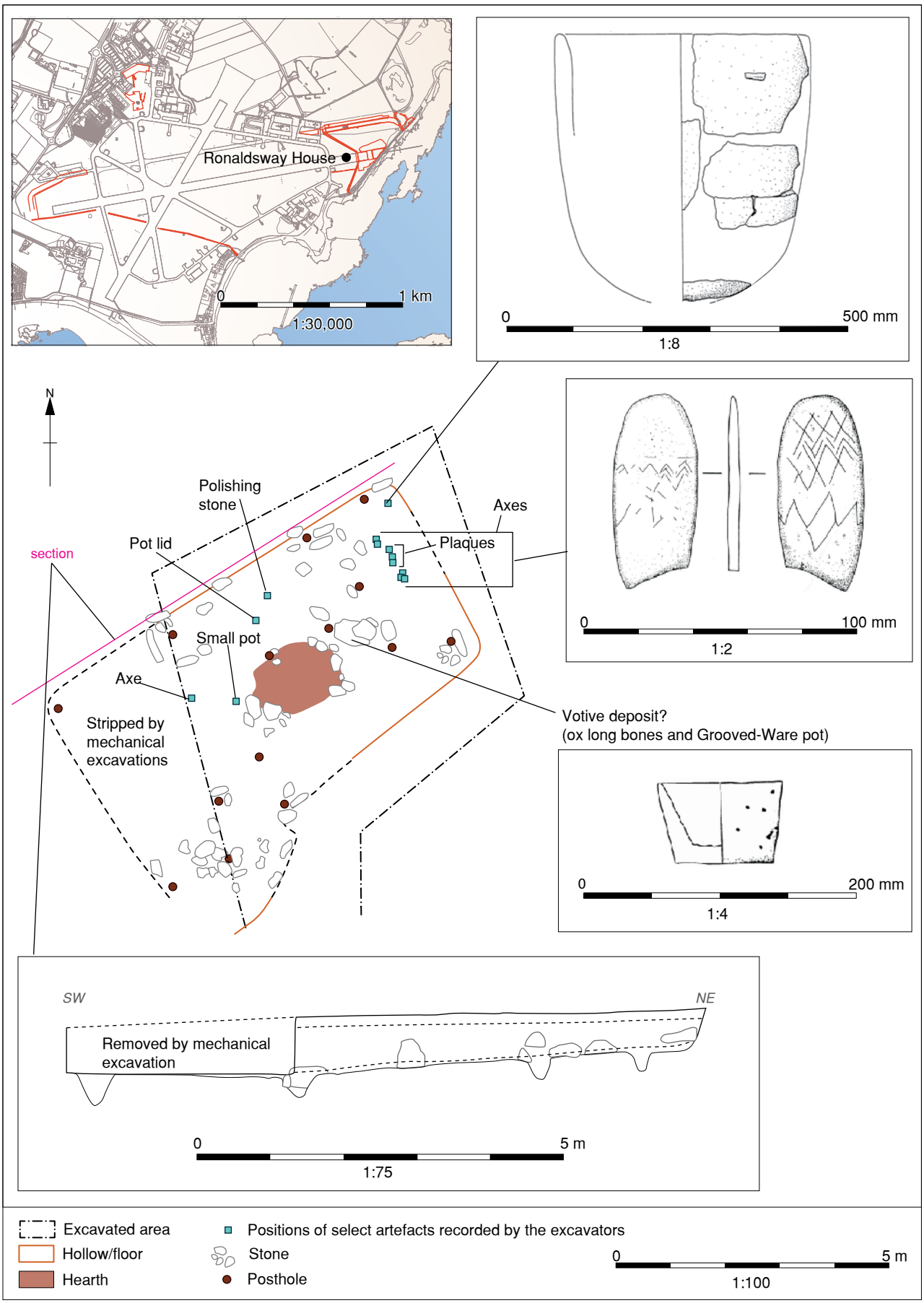


Figure 89: The Ronaldsway House, with selected artefacts

sections indicate that the postholes were in fact fairly substantial (at least substantial enough to support the framework of a house), with diameters of *c* 0.3-0.6 m, some with chock stones. It seems, therefore, that whilst the positions of the postholes were depicted on the plan (as a series of schematic dots) their size in plan was not recorded.

This was a pit-house, constructed in a rectangular hollow intentionally cut into the slope of a gravel terrace, which effectively formed the floor. This hollow was probably revetted by some of the stone slabs (*contra* Thomas 1996b) recorded during the excavation. A central hearth seems to confirm its use as a domestic structure; this was rectangular and lined with stones. A group of possible votive offerings, comprising complete long bones from oxen, and a small, complete Grooved Ware vessel (Burrow 1999), had been placed into a shallow pit, adjacent to the hearth, which was sealed by a stone slab (Bruce *et al* 1947). One possibility is that these were a foundation deposit. It is also noteworthy that the vessel is comparable to a Grooved Ware 'pinch-pot' from the Late Neolithic settlement of Barnhouse, Orkney, which may have acted as a small mortar to grind ochre (Richards *et al* 2016, 197-200, fig 5).

The house was associated with a large collection of artefacts, from the hollow, which were subsequently used to define the Ronaldsway Culture (*p 148*), including pottery (Ronaldsway pottery and some Grooved Ware) representing a minimum of 44 vessels (Burrow 1997, 43), five schist plaques, polished-stone axes (seven local (Group XXV) roughened truncated butt axes and four Cumbrian (Group VI) axes)), grinding stones (*ibid*), and a variety of chipped-flint tools. Numerous animal bones were on the floor, particularly around the hearth, of cattle, sheep, and pig, as well as a cormorant bone (*op cit*, 146). All the long bones from cattle and sheep were broken, suggesting that the marrow had been consumed. In addition, one human femur was recovered (*ibid*).

Several radiocarbon dates have since been obtained (*Ch 10, p 332*), including two dates derived from animal bone, though these are considered unreliable (since they date to the Early/Middle Bronze Age and early medieval period respectively; Burrow and Darvill 1997), and from charred residues adhering to the sherds of Ronaldsway pottery, which fall in the mid-third millennium cal BC (*ibid*). One important point, however, in relation to the stratigraphic position of the artefacts, is that the house site probably 'had a secondary use as a dumping ground, whether ritual, or domestic' (Burrow 1997, 20).

The earlier Bronze Age

The earlier Bronze Age lasted some 900 years, from *c* 2400 cal BC to 1500 cal BC, and encompasses what is now known as the Chalcolithic period (*c* 2400-2200 cal BC; *cf* Needham 2012) and Early Bronze Age (*c* 2200-1500 cal BC; Needham 1996; 2012). This period was complex and dynamic, and across the British Isles is characterised by significant and ongoing changes in technology, particularly involving the introduction of metalwork, and new types of pottery and stone tools, and also changes in settlement and land allotment, burial and ritual practice, and social organisation (*cf* Bradley 2019).

In terms of the natural environment, palynological studies (Chiverrell *et al* 2004) suggest that in *c* 2400 cal BC most of the lowland areas of the island were still covered by deciduous woodland. After *c* 2050 cal BC, significant changes then occurred, which involved the progressive (though spatially asynchronous) reduction of the island's woodlands, seemingly related to an expansion in agriculture, involving both the cultivation of cereals and the creation of pasture for grazing (*ibid*). Indeed, significant and consistent pastoral and arable activity across the island is evident in the pollen records for the period 2050-1650 cal BC (*ibid*). In some areas, peat formation also dates to this period (*ibid*), possibly as a result of woodland clearance, although in other areas episodes of woodland regeneration occurred, suggesting that particular sites were agriculturally exploited and then abandoned following the exhaustion of soils. Alternatively, this regeneration could reflect woodland management, which might have included coppicing and the active creation of forest grazing for domesticates (*ibid*).

Archaeologically, the initial phase of the earlier Bronze Age (the Chalcolithic period) within the Irish Sea zone is characterised by the appearance of copper artefacts (specifically flat axes; *cf* Schmidt and Burgess 1981; Davey *et al* 1999) and also early Beaker pottery, and associated artefacts (*cf* Needham 2012; Crellin 2014). The evidence from Man conforms well with this broad pattern, as five copper flat axes have been discovered, along with a copper blade and unclassified copper objects (Fig 90; Davey *et al* 1999; Crellin 2014, 93-4). In addition, a decorated gold disc is known, which probably also dates to this period (Davey *et al* 1999). Significantly, metallurgical analysis indicates that the material used to manufacture one of the axes was probably from the Ross Island copper mines in Ireland, indicating contact with this area (*op cit*, 58). Similarly, there is some early Beaker pottery on Man, although admittedly it is notably limited in quantity (Woodcock 2008, 33, 75, 107; Darvill 2003a, 18; Crellin 2014, 88).

In northern and western Britain, following the initial adoption of copper and Beaker pottery, the technology



Figure 90: The distribution of Chalcolithic metalwork and Beaker pottery across the island

associated with metalworking alters and the period effectively transforms into the Early Bronze Age. One noteworthy feature of this period relates to the treatment and disposal of the dead, which forms a readily identifiable component of the archaeological record. The evidence comprises various types of funerary sites and their associated artefacts, mainly ceramic vessels that either accompanied the dead, or contained their cremated remains, and, in some instances, other associated items placed with these vessels, such as flint and bone artefacts, and bronze razors. Again, the evidence from the Isle of Man conforms well with this wider pattern, with funerary ceramics from the island being identical to those used in south-west Scotland, Cumbria, and Ireland (*cf* Gregory 2002; Barrowclough 2010; Waddell 1998). These include ceramics in the Food-Vessel tradition (Pl 27), which had strong ties to the Beaker tradition, and Collared and Cordoned Urns. Importantly, though, after 1500 cal BC, Cordoned Urns were used in domestic contexts and formed one of the main Middle and Late Bronze Age ceramic types from the Ronaldsway Village (*Ch 7, p 219*). It now seems possible, based on the evidence of the RESA project and on chance finds (*p 155*), that, on the Isle of Man, Collared Urns were potentially also used in a domestic context during the earlier Bronze Age (*p 163*).

The actual burial sites on Man (Fig 91) associated with these various ceramic forms seem to have been of two main types: both cremations and inhumations placed within or beneath round mounds, sometimes



Plate 27: Earlier Bronze Age Food Vessels from Killeaba

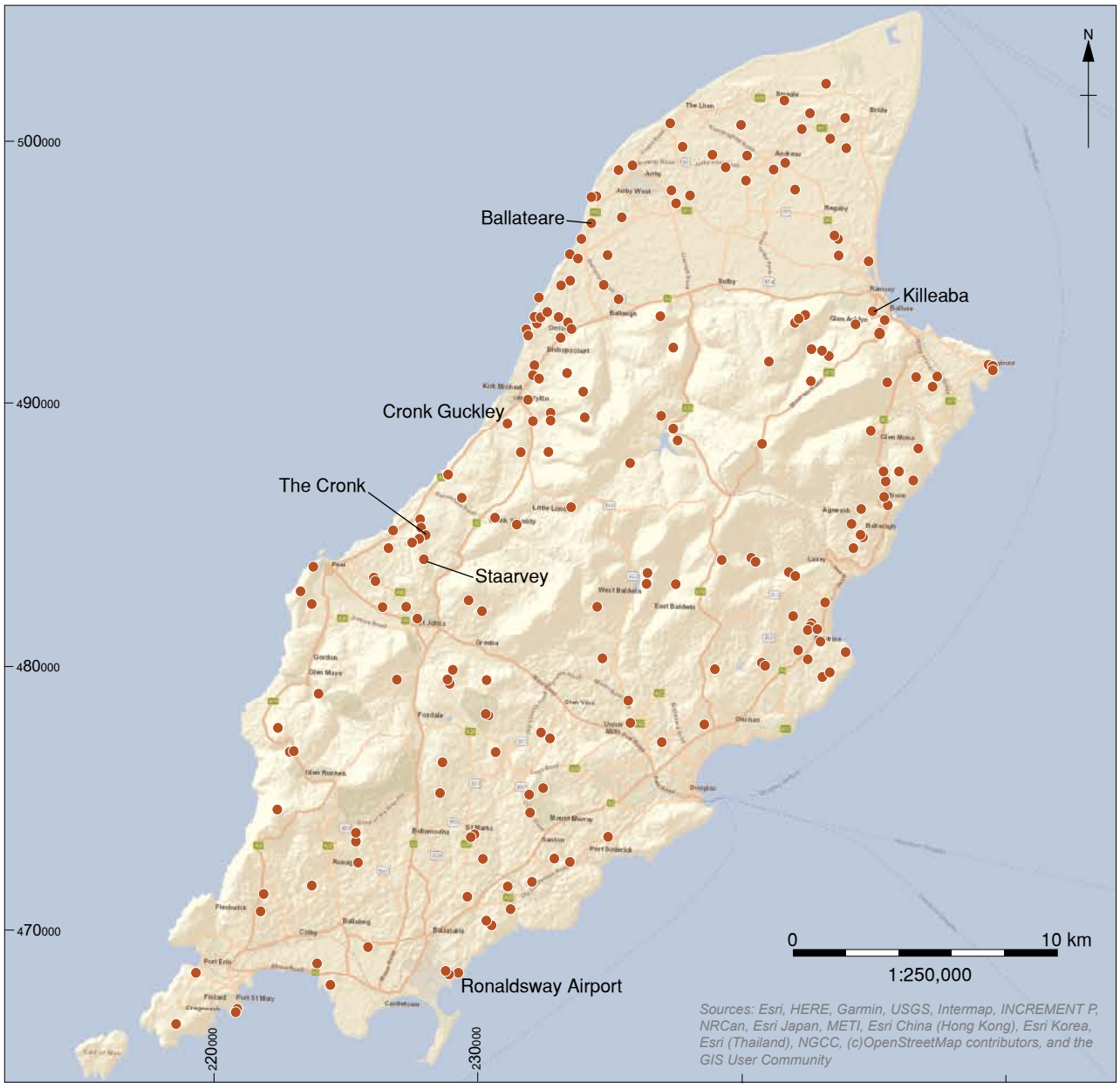


Figure 91: The distribution of earlier Bronze Age burial sites across the island

within stone cists, although it is also evident that some (Early Bronze Age?) round mounds were constructed that did not contain burials, presumably creating cenotaphs (Crellin 2015). One mound at Cronk Guckley has been excavated in detail, being found to contain a primary inhumation burial, associated with a jet (or jet-like) necklace, surrounded by later burials associated with all of the main Early Bronze Age funerary ceramic types (*ie* Food Vessels/ Encrusted Urns, Cordoned Urns, and Collared Urns), one of which had also been placed in a stone cist (Crellin and Fowler 2020). Prior to the construction of the mound, this site had also witnessed some Late Neolithic activity, which perhaps imbued the location with a lasting significance, making it, in turn, suitable for later acts of burial.

The second main burial type is in a flat cemetery, with no obvious form of marker. These are overwhelmingly associated with cremation burials, sometimes within cists, and at least two, at Staarvey and The Cronk (Fig 91), were associated with unusual bone artefacts (Crellin *et al* 2020). In most respects, these burials are identical in form to the flat cremation cemeteries dating to the Middle and Late Neolithic period. Indeed, two such sites, at Killeaba and Ballateare (*p 147*), also contained Early Bronze Age burials (*cf* Crellin 2015; Fowler *et al* 2021, 92-4), indicating a continuation of the earlier burial rite within the confines of a 'traditional' cemetery, a theme which seems to be echoed at some of the round mounds (*above*).

There also seems to have been an Early Bronze Age cremation cemetery at Ronaldsway Airport, recorded in the 1930s (*Ch 1, p 8*), though there was no evidence there for any earlier burials. As far as can be ascertained, this cemetery also contained a sizable group of Bronze Age cinerary urns, with possibly as many as 30 vessels present (Cubbon 1938).

Apart from burial, other sites were seemingly associated with small-scale ritual activity. For instance, 'traditional' ritual sites, such as some of the earlier Neolithic chambered tombs, appear to have been visited and venerated during this period (Crellin 2015), perhaps in a similar way to the earlier cremation cemeteries and round mounds (*above*), whilst many of the standing stones on the island, including a group surrounding Billown Quarry (*Ch 10, p 336*), might also conceivably have been erected in the earlier Bronze Age (Burl 1993). Possible domestic sites are elusive, and prior to the work at Ronaldsway Airport, no definitive Early Bronze Age domestic structures had been identified, although, on the basis of pottery finds, one fairly extensive potential settlement area is known on the western side of the Northern Plain (*Ch 1, p 1*; Fig 92). There, pottery has been recovered from Crawyn Brooghs and Ballakoig Brooghs, along with burnt material suggestive of 'domestic' occupation (Woodcock 2008, 65). Most of the 'domestic' pottery is in the Cordoned Urn tradition, comparable to that from the Ronaldsway Village, presumably dating it to the Middle/Late Bronze Age (*Ch 6, p 170*). However, Ballakoig Brooghs also produced Food Vessel-style bowls and a complete Collared Urn (*op cit*, 91), hinting at the existence of an earlier settlement. Phurt might also have been settled in this period, based on the discovery of pottery, though again, this might date to the later Bronze Age (*op cit*, 107). Another possible settlement site may have been at Billown Quarry, close to Ronaldsway Airport, where features dating to the earlier Bronze Age have been excavated (*Ch 10, p 336*).

Some of the burnt mounds (Fig 92) on the island are perhaps are a product of earlier Bronze Age 'occupation' (*cf* Davey and Woodcock 2003, fig 14.3), particularly as one example at Phurt has been radiocarbon dated to 1940-1680 cal BC (3480±50 BP; AA-29331; *cf* Woodcock 2008, 153). These are common around the Irish Sea, such as in south-west Scotland, north-west Wales, and Cumbria, though they have a long chronological range, from the Late Neolithic to the early medieval periods (*cf* Maynard 1993; 2012; OA North 2016b).

Early Bronze Age metalwork has been found on the Isle of Man (*cf* Davey *et al* 1999; Crellin 2014; Fig 92), which has been manufactured from bronze, created through the alloying of copper with tin, probably derived from Cornwall (Bray and Pollard 2012; Knight *et al* 2015). Typologically, these objects reveal a clear link between Man and other parts of the Irish Sea 'province', particularly Ireland and Wales, with Man perhaps playing an important role in their exchange (Davey *et al* 1999). Indeed, a bronze flat axe (a Killaha type) from Hango Hill, immediately south of Ronaldsway Airport (Crellin 2014, 177), dating to *c* 2200-2050 cal BC, is probably an Irish import (Schmidt and Burgess 1981). Many belong to a period (*c* 2000-1500 cal BC) when, 'there was a change in the production of copper, with many new regional sources appearing in both Britain and Ireland, with the earliest type of copper slowly disappearing' (Davey *et al* 1999, 58). Notably, though, it does seem that exploitation of these new regional sources was small-scale and short lived and obtaining copper from Continental mines became of prime importance (*cf* Timberlake 2016; O'Brien 2015), at least until the scale of copper extraction increased dramatically at Great Orme, in north Wales, in the later Bronze Age (Williams 2023; *Ch 6, p 168*).

Metallurgical analysis confirms that the bronzes from Man were probably made from copper from one of these new mines, though it was not possible to determine the precise source (Davey *et al* 1999, 58).

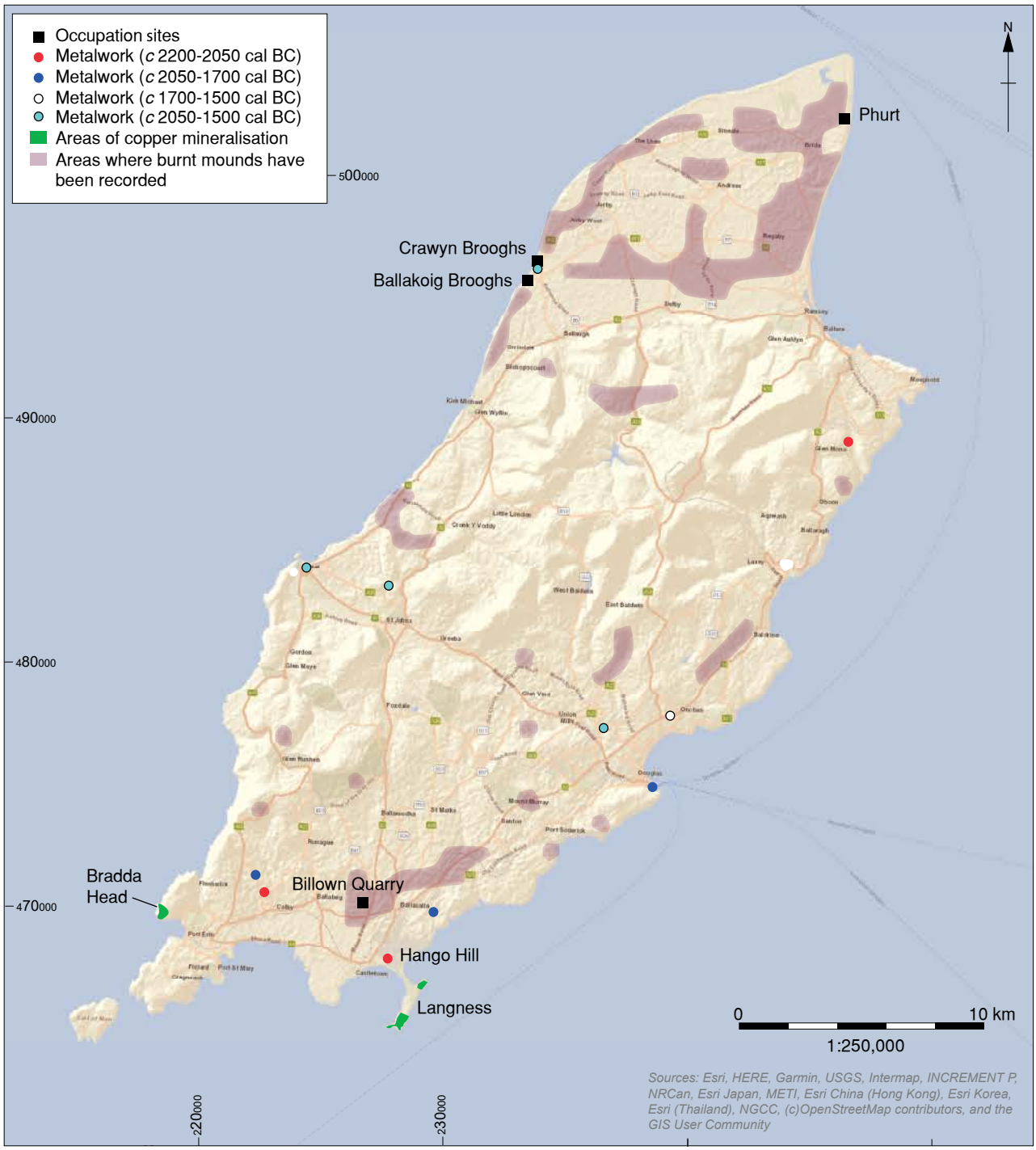


Figure 92: The distribution of earlier Bronze Age 'occupation' sites, burnt mounds, and metalwork across the island

It may also be important that two copper veins have been found at the southern end of the island, which may have been sporadically exploited as one of the new regional insular sources, although no firm evidence for this has yet been identified. One is at Bradda Head (*c* 10 km to the south-west of Ronaldsway Airport), whilst the other is on Langness, just to the south of the airport. At both sites, copper mineralisation is evident on the sea-cliffs, and hammerstones have been found close by (Davey *et al* 1999; Doonan and Eley 2000). One possibility therefore is that these areas became an important focus, and stimulus, for earlier Bronze Age activity, and also formed important linking points within wider Bronze Age exchange networks across the Irish Sea that were probably maintained during the later Bronze Age (*Ch 6, p 168*). Within this context, it is also worth stressing that long-distance maritime movement would have been greatly facilitated by improvements in maritime technology (*ie* the adoption of sewn-plank boats) that also occurred in the latter stages of the earlier Bronze Age (*cf* Bradley 2022, 118).

Neolithic and Early Bronze Age Activity at Taxiway Alpha East

It is evident from the Neolithic and earlier Bronze Age remains that timber structures, whether of a 'domestic' or 'ritual' function, are extremely rare on the Isle of Man. Given this rarity, the evidence from Ronaldsway Airport is extremely significant, particularly as two timber structures were located within Taxiway Alpha East (Fig 93), one dating to the earlier Neolithic period, the other to the earlier Bronze Age. The significance of these structures is, however, amplified, as the only other Manx example of a complex timber structure dating to this broad period is the nearby Ronaldsway House (*p 150*). In addition, some more limited evidence for Neolithic

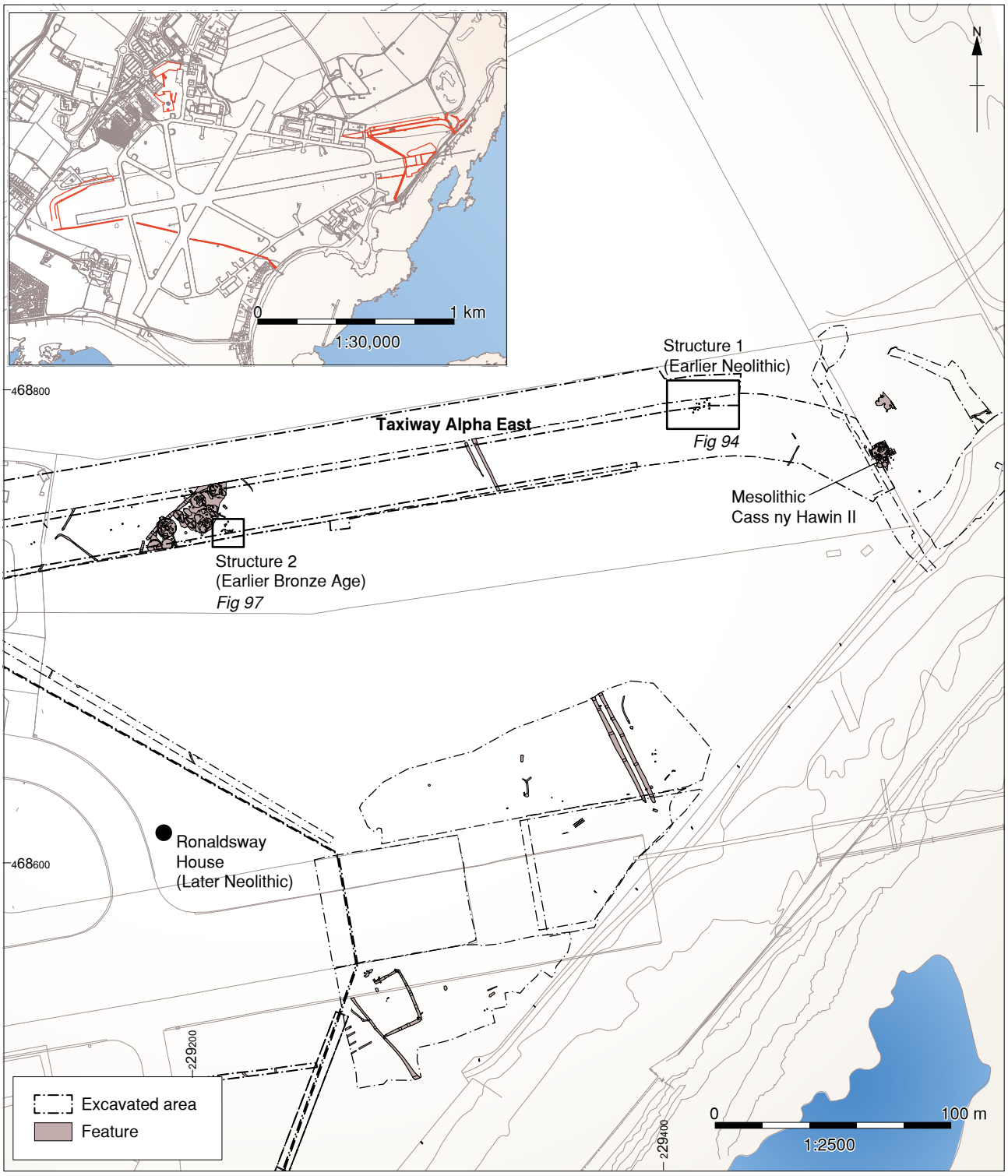


Figure 93: Excavated Neolithic and Early Bronze Age structures at Ronaldsway Airport

activity was uncovered immediately west of the Bronze Age structure, in the form of several stray lithic finds from later deposits, whilst a pit in this area also contained a sherd of Early Bronze Age pottery (*p 165*).

Earlier Neolithic structure

The earlier Neolithic structure (Structure 1) lay at the eastern extent of Taxiway Alpha East, some 120 m from the coast and 70 m to the north-west of Cass ny Hawin II (*Ch 2;* Fig 94). It was defined by a discrete

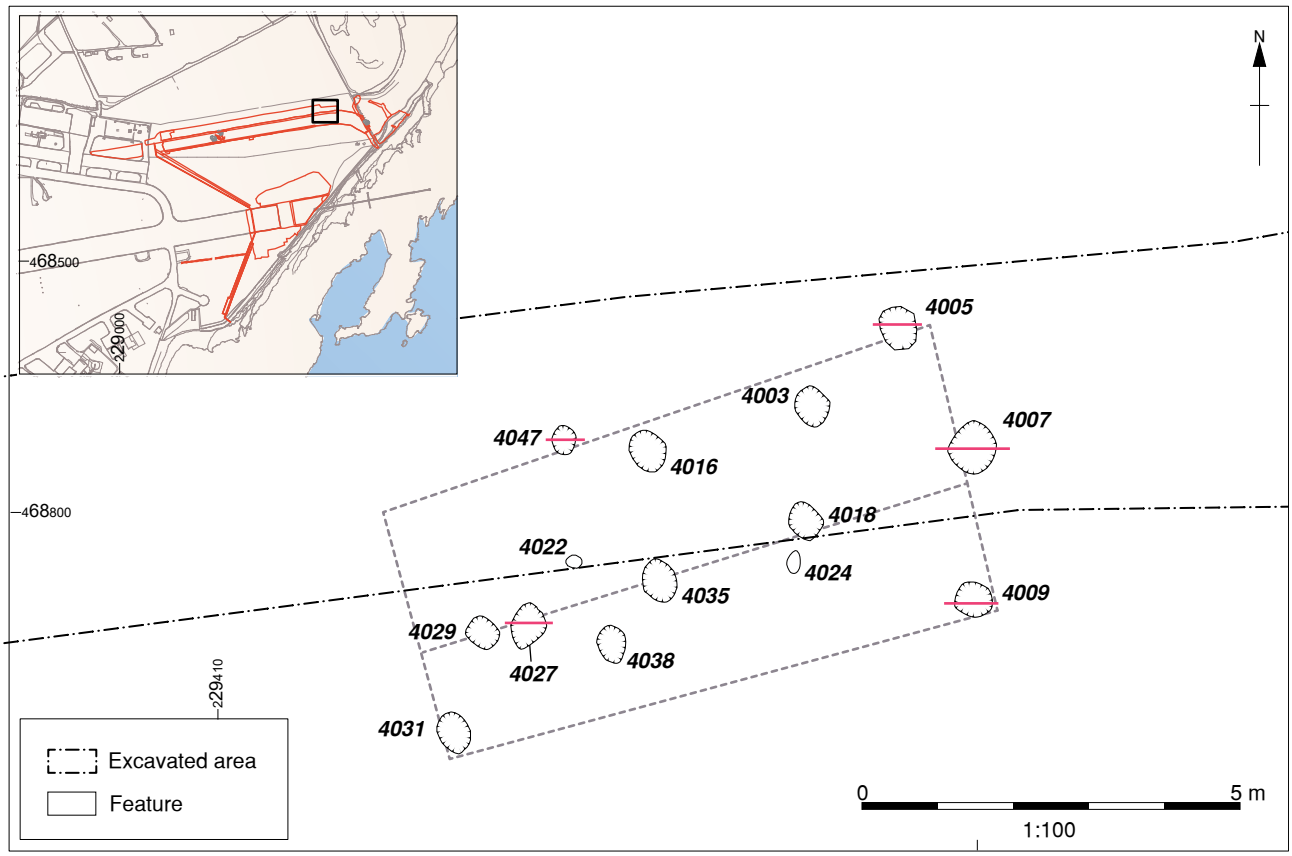


Figure 94: Structure 1



Plate 28: Structure 1, following excavation, looking north

cluster of 14, probably contemporary, features, which were isolated from any other archaeological remains, and lay only *c* 0.2 m beneath the modern topsoil (Pl 28).

Eight of the features (***4003***, ***4005***, ***4007***, ***4016***, ***4031***, ***4035***, ***4038***, and ***4047***; Fig 94) were clearly U-shaped and would have secured earthfast posts. These were from 0.25 m to 0.35 m deep, with diameters mainly ranging from 0.45 m to 0.6 m; most contained two deposits, of which one was a post-pipe (Fig 95), indicating that the posts had decayed *in situ*. The only exception was posthole ***4031***, which contained three fills. In addition, there were three features (***4009***, ***4029***, and ***4027***) containing single fills, which were again presumably postholes, as these had comparable diameters. Two stakeholes (***4022*** and ***4024***) were also identified, along with shallow (0.18 m-deep) feature (***4018***), that was probably the base of a truncated posthole.

Two postholes contained worked-stone artefacts: a chunk of worked quartz from ***4035***; and a pebble-flint blade from ***4047***. Small quantities of indeterminate charred cereal grains were also present in postholes ***4035*** and ***4047***, though posthole ***4005*** contained a large assemblage of charred plant remains in both its lower and upper fills (***4006*** and ***4020***; Table 36). Although a large proportion of the cereal grains from both fills were too distorted for positive identification, at least two varieties of wheat (*Triticum* sp) and barley (*Hordeum vulgare*) were recognised. Significantly, one

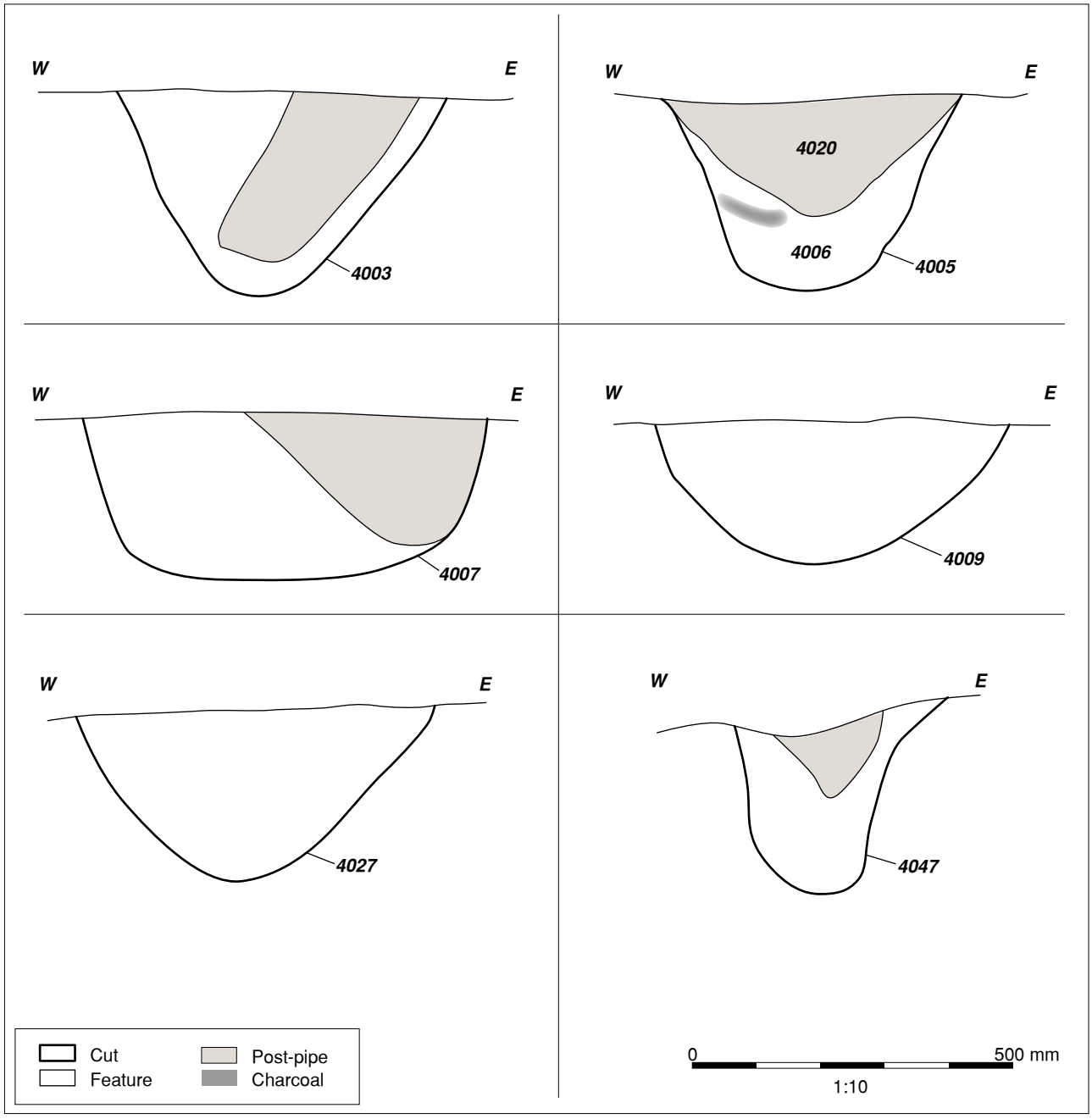


Figure 95: Sections across some of the postholes forming Structure 1

		Upper-fill *4020*	Lower-fill *4006*
Charred cereal grains			
Hordeum sp (undifferentiated)	barley	7	11
Hordeum vulgare L var *nudum* Hook f	naked barley		12
Triticum sp	wheat	7	13
Triticum sp (glumed)	glumed wheat	6	3
Triticum cf *dicoccum/spelta*	*cf* emmer/spelt wheat	8	9
Indeterminate cereal grains		86	96
Indeterminate cereal fragments		50-100	
Charred cereal chaff			
cf *Triticum aestivum* rachis fragment	*cf* bread-wheat	1	
cf *Triticum dicoccum* spikelet fork	*cf* emmer wheat	1	
Charred weed seeds/fruits			
Chenopodium album	fat-hen	1	
Other			
Charcoal fragments		100+	

Table 36: The charred plant remains from posthole **4005**, *Structure 1*

Location	Sample	Material	Uncalibrated date BP	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence)
Posthole ***4005***; Structure 1	SUERC-53384	Charred emmer wheat (*Triticum* cf *dicoccum*) grain	4498±31	-21.9	3350-3100 cal BC

Table 37: Radiocarbon date from Structure 1

of the wheat grains from the lower fill (***4006***) returned a radiocarbon date in the Middle Neolithic period, being charred and/or deposited in the thirty-fourth- to thirty-second century cal BC (Table 37).

The assemblage included several grains with distinct glume impressions and characteristics consistent with either emmer (*Triticum dicoccum*) or spelt wheat (*Triticum spelta*; Jacomet 2006). It is likely, though, that emmer wheat was the variety grown in the area, as a Neolithic date for spelt wheat would be extremely early, this crop being usually associated with later prehistoric arable cultivation (Greig 1991). Although cereal chaff was extremely rare, there was positive identification of emmer-wheat chaff. The recovery of a single bread-wheat (*Triticum aestivum*) rachis fragment from fill ***4006*** also provides tentative evidence for the utilisation of a free-threshing variety of wheat. Several of the barley grains from fill ***4006*** possessed rounded/notched ends with marked wavy striations going across the grain, which are characteristic of naked barley (*Hordeum vulgare* var *nudum*; Jacomet 2006).

There were in addition some charred weed seeds/fruits, though these were extremely rare, and comprised a single fat-hen (*Chenopodium album*) fruit from fill ***4020***, which is a ubiquitous weed of cultivated/waste ground, often found on nutrient-rich soils (Stace 2010). Importantly, the lack of crop-processing waste within the assemblage suggests the remains are likely to represent fully processed crops from possible parching/cooking accidents. Indeed, the abundant charcoal in fill ***4020*** also indicates the presence of fuel waste. Quite how this assemblage entered the posthole is not entirely clear, though it is possible that food 'waste' was deliberately dumped into the base of the posthole, during construction, perhaps as a foundation/votive deposit.

It is tempting to suggest that this group of postholes formed a rectangular structure, plausibly *c* 7.8 x 4 m, with its long axis orientated north-east/south-west, the northern side being defined by postholes ***4047***, ***4016***, ***4003***, and ***4005*** (Fig 94). Posthole ***4005*** might also have held a corner post, and, along with postholes ***4007*** and ***4009*** would have formed the eastern end. Again, posthole ***4009*** might have held a corner post, and posthole ***4031*** could have held the opposing post, also forming part of the western end. The evidence also suggests that the interior contained a series of posts, roughly positioned along its central axis. The two stakeholes within the building's interior might have defined smaller settings, or internal partitions.

If this arrangement and interpretation is valid, the posts along the structure's central axis could have

supported the ridge beam for a roof, perhaps covered in thatch, with the rafters perhaps extending down to ground level, or close to it, giving the building a tent-like appearance. If this were the case, the surrounding postholes almost certainly held the walls, and indeed, may have had a dual function, supporting both the wall plates and perhaps also tie beams, designed to support the roof and give the structure extra rigidity. Perhaps significantly, the absence of slots used to secure upright split timbers might suggest that this walling comprised wattle panels sandwiched between and attached to these upright posts, although another possibility is that these walls were formed of cut turf blocks. Presumably, only the deeper settings for the wall posts had survived, with any additional, shallower, post settings having been destroyed by later activity. A similar destructive process may also have erased occupation deposits or hearths associated with the interior, which might have been expected if it had a domestic function. This type of Neolithic building would not be out of place in an Irish Sea context, adding to the growing corpus of Neolithic houses known from Ireland, north Wales, and south-west Scotland (*cf* Bradley 2019, 42), though, based on the dating evidence, it constitutes one that may have been extant in the terminal stages of this distinctive Neolithic architectural tradition (*Ch 10, p 330*).

Neolithic stray finds

Several Neolithic pebble-flint artefacts were recovered during the excavation of a Middle/Late Bronze Age settlement at Taxiway Alpha East (*Ch 6*). These were clearly residual in later deposits and features, or came from the topsoil, suggesting low-level later Neolithic activity. They do, however, complement the other later Neolithic stray finds from the airport, in the form of the two sherds of Ronaldsway pottery from the Ronaldsway Village site (*Ch 1, p 8*), excavated in the 1930s (Burrow 1997, 44).

One of these chipped-stone items (12; Fig 96) is probably the medial section of a lozenge, or kite-shaped, arrowhead. The piece has semi-invasive acute retouch extending along all the surviving edges, and has two slight angles opposite one another, which relate to the original lozenge shape of the piece. This type of arrowhead is a common feature associated with the Manx Late Neolithic period (Bruce *et al* 1947). Another well-executed tool is a knife form (801), a broken flake with semi-invasive acute retouch on the surviving lateral edge, and acute retouch on the opposite edge.

Six scrapers were also recovered from this area. Three are side-and-end scrapers, well-executed in terms of the retouch applied to their edges. One example is probably a reused single-platform blade and flake core, a feature of some scrapers from Late Neolithic deposits in the Ronaldsway area (*ibid*). The other three are end scrapers, all exhibiting evidence for use, in the form of small irregular scarring along the base of the tool edge. These are well made and are stylistically similar to examples from the Ronaldsway area (*ibid*). Two have been made on relatively large secondary flakes and have abrupt retouch at the objective end, producing a steep working edge (*eg* 1169). The third example is heavily burnt and also has a steep tool edge formed from abrupt retouch. This scraper could also have been produced on a core fragment.

Earlier Bronze Age structure

The remains of the earlier Bronze Age building (Structure 2) were found close to the central section of Taxiway Alpha East, some 200 m west of the earlier Structure 1 (*p 158*). It was defined by ten postholes that had clearly been disturbed by later activity, six (***4297***, ***4279***, ***4303***, ***4301***, ***4310***, and ***4299***; Fig 97) with diameters of *c* 0.5 m. There were also several smaller postholes, with three (***4293***, ***4295***, and ***4308***), each *c* 0.3 m in diameter, clustering in the vicinity of postholes ***4297*** and ***4279***, whilst another (***4325***), next to postholes ***4303***, ***4301***, and ***4310***, was comparatively small with a diameter of *c* 0.15 m.

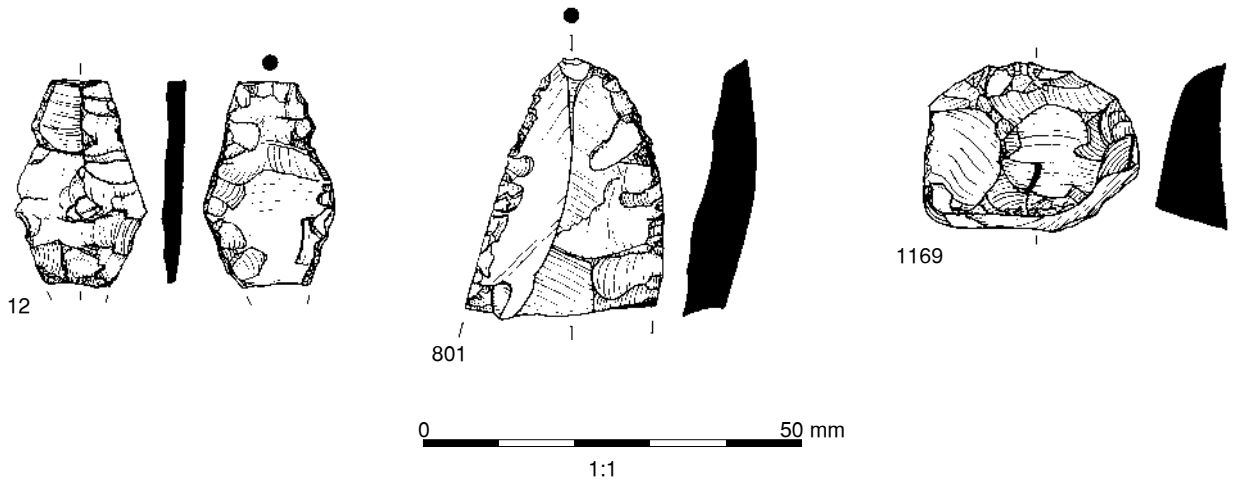


Figure 96: Neolithic pebble-flint artefacts

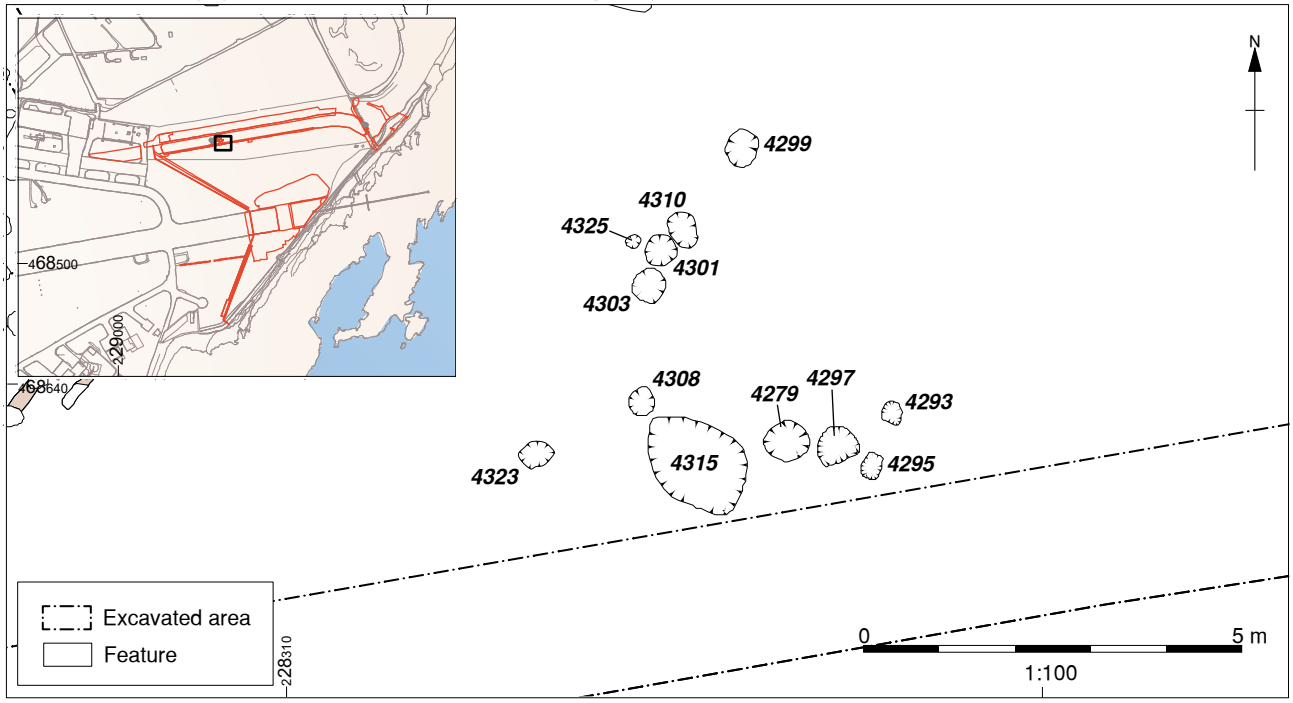


Figure 97: Structure 2

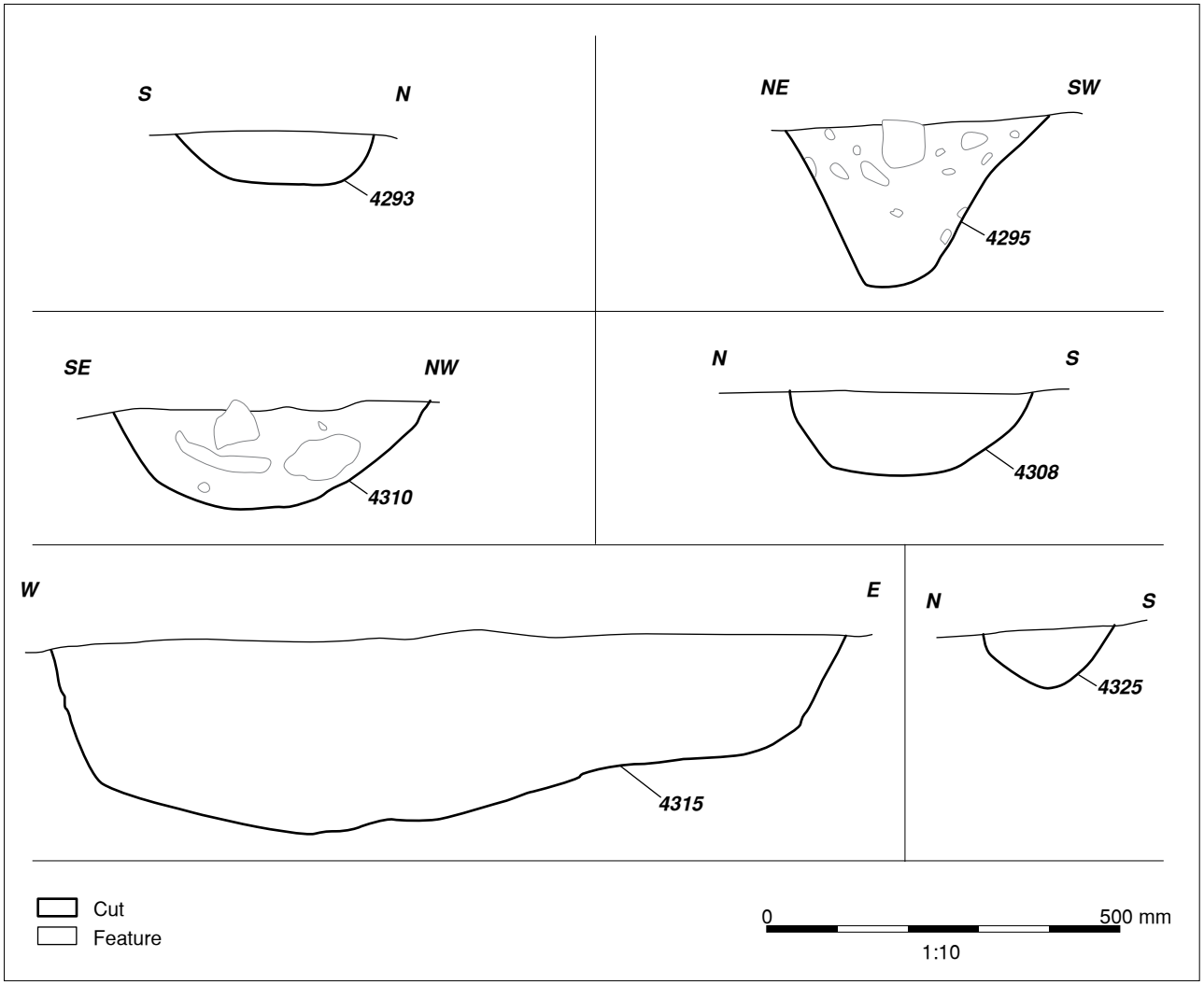


Figure 98: Sections across features forming elements of Structure 2

The depths of the postholes ranged from *c* 0.1 m to 0.25 m (Fig 98), and all had been filled with redeposited natural material, consisting of a mid-reddish-brown silty sand, which in some instances also contained small amounts of charcoal. Two (***4310*** and ***4295***) also contained large packing stones, that would have secured the timber uprights (Pl 29).

Several of the posts produced pebble-flint artefacts. These comprised an end scraper (1179; Fig 99) from posthole ***4308***, and two broad blades from postholes ***4295*** and ***4310***. Posthole ***4299*** also contained ten sherds of very abraded pottery, one (1165) bearing a roughly incised herringbone pattern, suggesting that the fragments came from a Collared Urn (*p 153*).



Plate 29: Posthole **4310**, *Structure 2, following half sectioning, with* in-situ *packing stones*

Two other associated features were also present. One (***4323***) was an outlying posthole, to the south-west, that had been badly disturbed by later animal burrowing, whilst the other was a large oval pit (***4315***; Fig 97). This measured 1.5 x 1 m, was 0.25 m deep, and had been filled with redeposited natural material. It also contained a pebble-flint flake, with evidence for platform preparation, and a pebble-flint side-and-end scraper. This has a shallow tool edge, with irregular retouch forming its scraping edge. A fragment of blackthorn/bird cherry (*Prunus spinosa/padus*) charcoal was also retrieved, which returned a radiocarbon date spanning the end of the third- and first centuries of the second millennia cal BC (Table 38).

Whilst the evidence points to a post-built structure and associated pit (Pl 30), with materials suggestive of domestic occupation, defining the exact form is difficult. One possibility is that the complete remains of the structure were exposed, and that it was an open-sided windbreak, or shelter, adjacent to the pit. However, given the shallow depth of many of the postholes, it is quite possible that only one

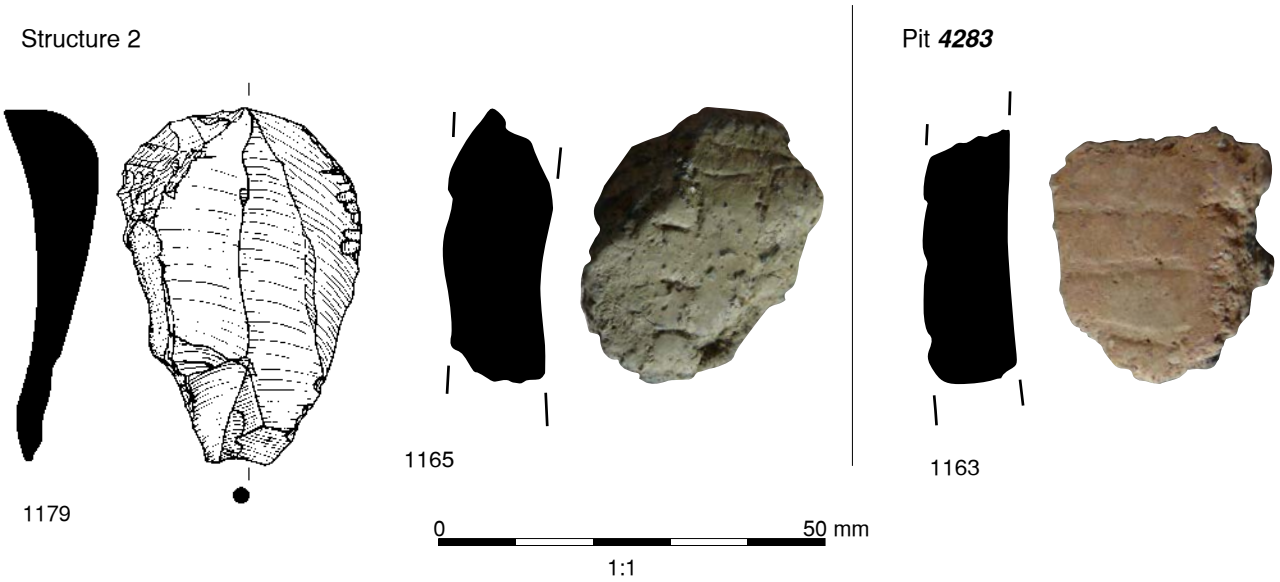


Figure 99: A pebble-flint end scraper and a decorated Collared-Urn sherd from Structure 2, with similar pottery from nearby pit **4283**

Location	Sample	Material	Uncalibrated date BP	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence)
Pit ***4315***; Structure 2	SUERC-53385	Blackthorn/bird cherry (*Prunus spinosa/padus*) charcoal	3591±31	-25.4	2030-1880 cal BC

Table 38: Radiocarbon date from Structure 2



Plate 30: Structure 2, following excavation, looking south

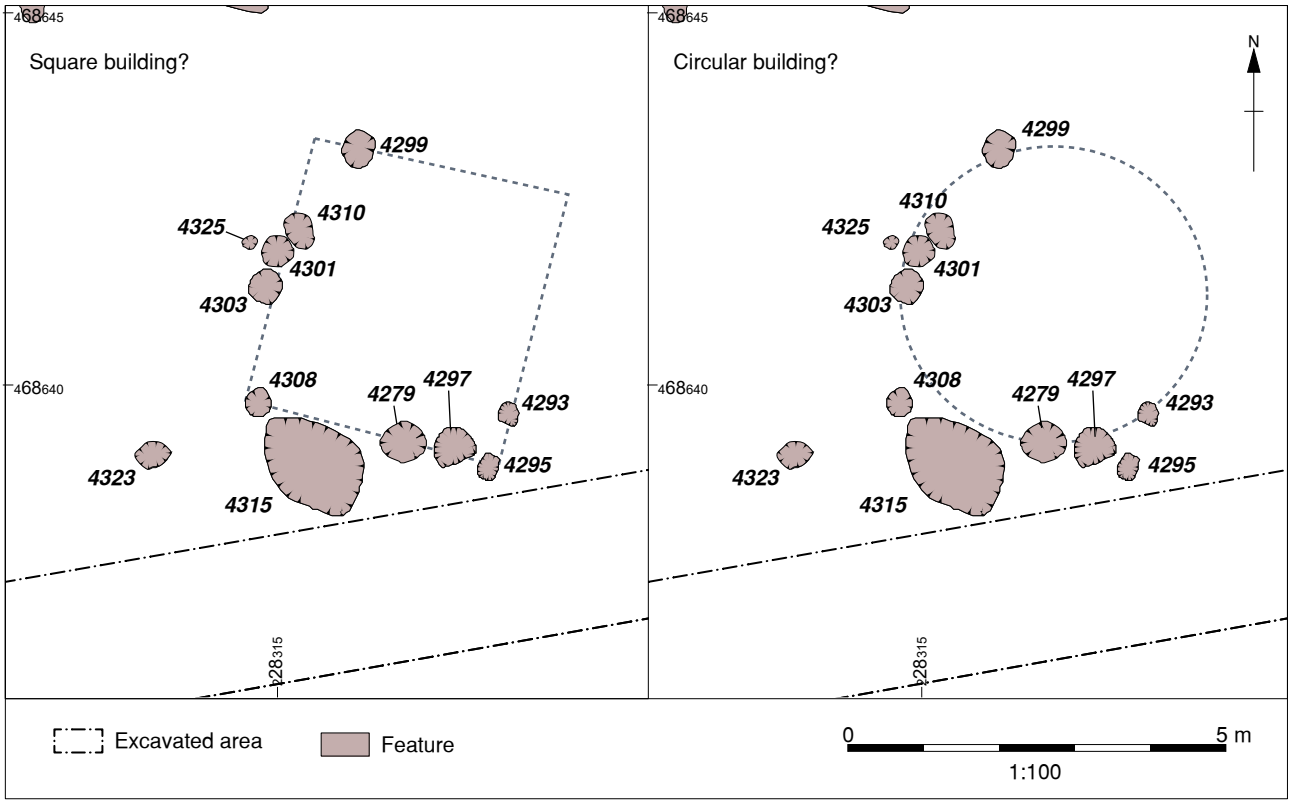


Figure 100: Possible plan forms of Structure 2

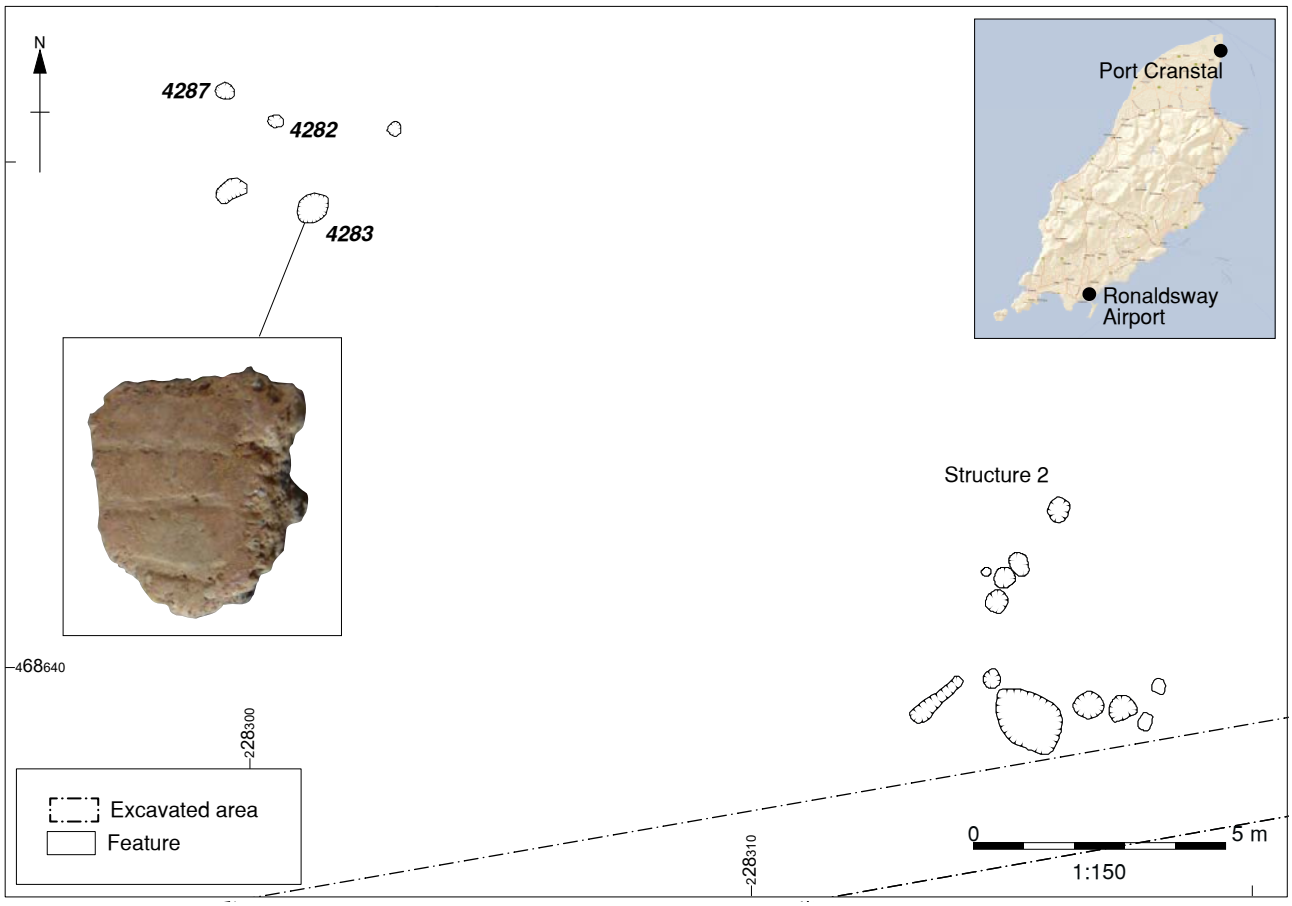


Figure 101: The Early Bronze Age pit group

part survived, with the recorded elements perhaps forming the western side or end of a dwelling. If this is correct, the situation is further complicated, as two very different structures can be postulated (Fig 100).

It could, conceivably, have had a rectilinear plan, with posthole ***4308*** forming a corner post, two of the wall lines, defining the western and southern sides, surviving. Posthole ***4299*** could then have formed the corner post on its western side, whilst to the south, posthole ***4295*** could have been another corner post, linking with posthole ***4293*** to form elements of the eastern side of the putative building. With this scenario, the structure could have measured 3.5 m square. Beyond, posthole ***4323*** could have been an outlier, securing an isolated post with no structural function (it could even have acted as a 'totem pole'), posthole ***4325*** could have held an angled raking post, giving additional support to the western wall, and pit ***4315*** would have abutted the southern side. The other possibility is that the structure was circular, and that postholes ***4295***, ***4308***, and ***4325*** formed a second ring, the remaining posts forming the western side of a post-ring for a small house, with an extrapolated diameter of 4 m.

A group of three shallow pits (***4282***, ***4283***, and ***4287***) were also located *c* 12 m to the north-west (Fig 101). It is possible that these were contemporary with Structure 2, as one (***4283***) produced a sherd of pottery (1163; Fig 99), with broad impressed lines, which can be paralleled amongst the Early Bronze Age sherds from Port Cranstal (Woodcock 2008, fig 14, no 12).

It seems then, that a small settlement was potentially in existence in the earlier Bronze Age, which, based on the radiocarbon date (*p 163*), was seemingly occupied at the very end of the third millennium or early second millennium cal BC. Given this, it is quite possible that it was the direct successor to the Ronaldsway House (*p 150*), which was in existence in the later third millennium cal BC (*Ch 10, p 331*). Another later Bronze Age settlement was then established a mere 5 m to the north-west of Structure 2 (*Ch 6*), although it is unclear whether this spatial association is significant, particularly as the latter settlement was probably established some 500 years later. It might suggest, however, that this location was a suitable site for 'occupation' throughout most of the Bronze Age, with other structures, dating to the intervening 500 years, perhaps, existing beyond the taxiway.



Figure 102: The later Bronze Age settlement at Ronaldsway Airport

6

LATER BRONZE AGE SETTLEMENT ON THE TAXIWAY

Richard A Gregory, with Helen Evans, Fraser Brown, Sam Harris, and Catherine Batt

The geophysical survey undertaken in 2006-7, at the start of the RESA project, detected several circular anomalies, which formed a distinct cluster within the proposed line of Taxiway Alpha East (*Ch 1, p 15*). This seemed reminiscent of the roundhouses excavated at the nearby Ronaldsway Village, in the late 1930s (*Ch 1, p 8*), some 170 m to the south-west, and hence it was suspected that the anomalies could have formed another comparable site, or even, perhaps, more elements of this settlement (Fig 102). Excavation revealed a number of roundhouses that dated to the thirteenth to ninth centuries cal BC, which, in terms of traditional chronological schemes, covered part of the Middle Bronze Age (*c* 1500-1100 cal BC) and all of the Late Bronze Age (*c* 1100-800 cal BC; *cf* Needham 1996), but are now grouped together as the later Bronze Age (*cf* Bradley *et al* 2016).

The Character of the Later Bronze Age

Across most parts of the British Isles, the later Bronze Age is characterised by several distinct changes in the archaeological record. The most striking of these occurred in the earlier part of the period (*ie* traditionally, the Middle Bronze Age) and relates to an increase in archaeologically visible, more substantial, settlements (Bradley 2019, 207). Typically, these comprise one or more roundhouses, constructed in timber or stone, or a combination of these materials, which at times were associated with other settlement features, such as middens, pits, and four-post structures (Brück 1999). A range of domestic artefacts is also often associated with these settlements, including items such as loomweights, querns, tools, and pottery vessels (*ibid*), with the latter usually providing the initial clue that the settlement dates to this period. The favoured domestic types in northern and western Britain seem to have been Cordoned Urns (mainly associated with funerary sites in the earlier Bronze Age; *Ch 5, p 153*), along with flat-rimmed, plain bucket-shaped urns, also found in funerary contexts (Sheridan 2007b).

During the Middle Bronze Age, two broad settlement types seem to have existed, one being an isolated farm, containing a single roundhouse, the other a larger settlement, consisting of multiple houses. The latter category is, however, more difficult to define, as in many cases the contemporaneity of the respective houses is unknown, and it is also unclear whether all were occupied by separate households. For instance, analysis of Middle Bronze Age settlements in southern and south-western Britain suggests that, in many cases, the settlement unit comprised a major residential structure plus one or more ancillary buildings, used as workshops and food-processing areas, and that together these groups of structures formed single household units (Nowakowski 1991; 2001; Brück 1999; 2001; Bradley 2019, 222). It is possible, though, that in some areas one or more household units did indeed coalesce to form small nucleated settlements, effectively representing 'hamlets', being occupied by a handful of households, or larger 'villages', containing ten or more households (*cf* Rathbone 2013, 40).

Geographically, it seems that the smaller Middle Bronze Age settlement units, comprising either a single household, or a small number forming a hamlet, were the norm, whilst larger village-type settlements were seemingly more restricted. Indeed, to date, only two of these large Middle Bronze Age settlements have been confidently identified through excavation, one at Corrstown, Co Londonderry, Northern Ireland, and the other at Reading Business Park; other unexcavated examples have been suggested in upland areas, such as Dartmoor and the Scottish Borders (*op cit*, 48-50). It is also possible that the excavated remains from Ronaldsway Airport formed elements of another of these substantial village-type sites (*Ch 11, p 356*).

It is clear that many of these Middle Bronze Age settlements did not exist in isolation, as, though some were open, others (mainly in southern Britain) were enclosed (Bradley 2019, fig 5.6). In addition, many, whether open or enclosed, were associated with field systems (particularly in southern and south-western Britain; *op cit*, fig 5.9) or other ditched boundaries,

perhaps defining territorial areas, which suggests that land division and perhaps tenure were common themes during this period.

These Middle Bronze Age settlement types persisted during the latter half of the later Bronze Age (*ie* the Late Bronze Age), in many parts of the British Isles. However, several other distinctive forms of 'settlement' emerged at this time, including the appearance of large circular enclosures (or 'ringworks') in both mainland Britain and Ireland, with a large central roundhouse, which may have functioned as an elite residence or public building (Bradley 2019, 240-3). In northern and western Britain, and Ireland, this period also seems to have witnessed the first use of large hilltop, or hillfort, settlements (*cf* Coombs 1976; Rideout *et al* 1992; Ellis 1993; Waddell 1998, 354), and in some areas, such as those surrounding the Solway Firth, and in Ireland and north-west Wales, the appearance of small curvilinear settlements, enclosed by a palisade or bank/wall. These, along with the use of hilltop settlements, may suggest that defence (or perhaps display) was becoming more of a preoccupation (*cf* Waddell 1998, 211; Gregory 2002, 70; Waddington 2013; Ginn 2016). In Ireland, at least, some crannogs (artificial island sites) were also constructed during this period (Fredengren 2002; O'Sullivan 2024).

Changing attitudes towards the treatment of the dead is another defining feature of the later Bronze Age. For instance, in northern and western Britain, the start of the Middle Bronze Age was marked by the end of the use of cinerary urns (Food Vessels; Collared and Cordoned Urns; *Ch 5, p 153*). In fact, as is apparent from the Isle of Man, during this period Cordoned Urns, although still in use, were seemingly transferred to a domestic context (*p 170*). It is also quite possible that in north-west Britain the decline in the use of these cinerary urns was contemporary with the petering out of formalised burial monuments and burial grounds (*ie* round mounds and flat cemeteries; *Ch 5, p 153*). Indeed, the available evidence seems to suggest that, whilst cremation continued to be important, many burials were interred in pre-existing Neolithic and earlier Bronze Age monuments, as opposed to being placed in distinctive new cemeteries and round mounds; these are instead a feature of southern and eastern England and the English Midlands (*cf* Bradley 2019, 229-32). Presumably, though, only the bodies of certain individuals were treated in this manner, and perhaps many others were subjected to a mortuary rite that has left little archaeological trace. It is also worth noting that token amounts of cremated human bone have been recovered from the pits associated with some later Bronze Age settlements, suggesting that bodies were cremated within these settlements, with most of the remains being scattered elsewhere (Brück 1995).

The situation in Ireland appears slightly different, as burial monuments and cemeteries seem to have retained their importance there, as ring-ditches/enclosures have been found in association with Late Bronze Age cremations (Waddell 1998, 365-9). Irish 'ring-barrows' also date to this period (and continued to be used into the Iron Age), which were initially associated with burials and grave goods, and then, from 1300 cal BC, with token burials comprising a few selected bones (Bradley 2019, 232). These monuments are defined by a mound surrounded by a ditch, with an external bank, and it has been suggested that similar sites are also found in northern Scotland, though there they have been classified as small 'henges' (*ibid*).

The later Bronze Age is also marked by the appearance of novel forms of tools, ornaments, and weapons (dating to Needham's (1996) Periods 5-7), many of which were deposited in hoards, or as single objects deliberately placed in rivers or bogs (Bradley 1998). These artefacts include various types of palstaves and socketed axes, along with different styles of socketed spearheads (some with basal and side loops), dirks/rapiers, and swords (*cf* Needham *et al* 1997).

Throughout the period, similar metallurgical alloys to those employed earlier were used to create these metal objects (*ie* copper and tin; *Ch 5, p 155*); however, in the latter part of the later Bronze Age, lead often replaced tin as the alloying element, where it was locally available, the Isle of Man being one such place that had both copper and lead resources (*Ch 5, p 156*; Davey *et al* 1999; Marshall and Solman 2015). Significantly, it also seems that in 1600-1400 cal BC copper-mining at the Great Orme, north Wales, dramatically increased to such an extent that it became the major source of most of the metalwork in Britain at this time (*cf* Williams and Le Carlier de Veslud 2019; Bradley 2022, 120; Williams 2023). After mining at the Great Orme declined, however, it appears that the recycling of bronze, which consequently would have formed a very precious material, became rife (Davey *et al* 1999, 58), and it is likely that many of the surviving later copper-alloy objects were actually made using a transformative process involving the breaking and remelting of existing bronzes (Brück 2001, 157). Naturally, the seaways of northern Atlantic Europe and along Britain's western seaboard would still have held the key to the production, trade, and exchange of metalwork (Cunliffe 2001; Henderson 2007), providing the maritime routes along which both the ore from the Great Orme and items for recycling could travel.

Importantly, direct evidence for the production of some of this metalwork is also apparent, in the form of moulds and metallurgical waste. Some have been recovered from ringworks (*above*) and early hillforts (Bradley 2022, 136-7), suggesting a possible link between this type of activity and high-status, or public, sites. In other instances, however, it seems that bronzeworking and production occurred within

a seemingly more mundane, domestic, context, being directly associated with some settlement sites (*cf* Parker Pearson *et al* 2004; Jones *et al* 2015).

The Later Bronze Age on the Isle of Man

Palynology is useful for determining the form of the natural landscape during the later Bronze Age, and also the systems of agriculture and land-use that were in operation on Man. Pollen data from the Northern Plain and Central Valley (*Ch 1, p 1*) indicate that the pattern of woodland clearance and agricultural activity that typified the earlier Bronze Age (*Ch 5, p 152*) continued (Chiverrell *et al* 2004; 2006a, 325). The period therefore witnessed a reduction in woodland cover (with episodes of regeneration, perhaps relating to management) and the continued reliance on both pastoral and arable agriculture, with peat formation occurring in some areas at *c* 1430-1260 cal BC (Chiverrell *et al* 2004).

Later Bronze Age activity largely conforms to the expected range of features in other parts of northern and western Britain (*p 167*). Several settlement sites are known (Fig 103), indicating that, as in other parts of the



Figure 103: The distribution of later Bronze Age sites across the island

Irish Sea area, such remains become more dominant in the archaeological record. An area of settlement on Man's north-western coastline, at Crawyn Brooghs and Ballakoig Brooghs, has produced sherds of Cordoned Urns from the eroding cliff face (Woodcock 2008, 65), and a fragment of clay mould for a leaf-shaped sword from Crawyn Brooghs (probably of Late Bronze Age date), which formed (along with several items of metalwork relating to production) the best evidence for metalworking on the island (Davey *et al* 1999, 54-5). The form of the settlement there is, however, unknown, though, on the strength of the artefacts, presumably one or more later Bronze Age houses and workshops may have been present.

Significantly, a large collection of later Bronze Age pottery was also recovered from Ronaldsway Airport during the excavation of the Ronaldsway Village site in the 1930s (*Ch 1, p 8*; Woodcock 1999). Just under 5000 sherds were found, making it by far the largest collection of prehistoric pottery from the island, conservatively estimated to represent approximately 16 Cordoned Urns and 22 plain urns, the latter divided by fabric into 'Coarsewares' and 'Finewares' (Woodcock 2008, 108-10; *Ch 7, p 219*). Although it is likely that some of this material was associated with the Early Bronze Age flat cemetery (*Ch 5, p 155*), as all of the pottery from the 1930s excavations survives as a single group (*ibid*), others were almost certainly later Bronze Age domestic vessels. This was confirmed by four radiocarbon dates, obtained from charred residues adhering to sherds, which spanned the Middle and Late Bronze Age (*Ch 7, p 225*). Moreover, it has been suggested that this pottery was derived from

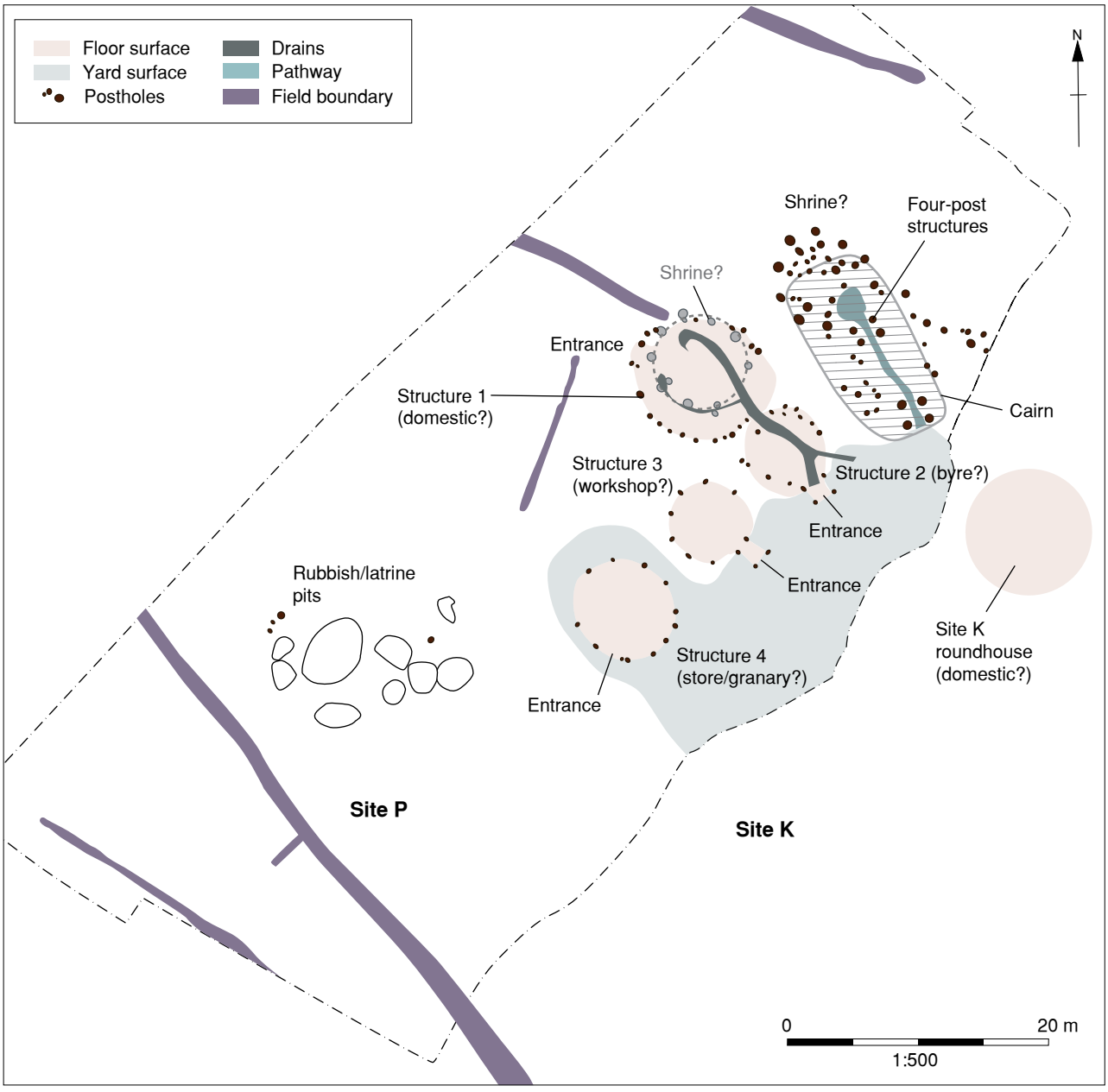


Figure 104: The later Bronze Age settlement at Billown Quarry

an open settlement associated with a midden (Laing and Laing 1987). Based on its proximity and date, this assemblage therefore holds great relevance to the later Bronze Age structures found on Taxiway Alpha East, and also for an understanding of the wider pattern and form of settlement in this area (*Ch 11, p 356*).

The remains of a later Bronze Age settlement have been excavated at Billown Quarry (in Sites P and K), to the north-west of Ronaldsway Airport (Darvill *et al* 2003; *Ch 1, p 12*). There, several circular timber roundhouses were identified (Fig 104), which have produced radiocarbon dates extending from the early fourteenth- to the late ninth century cal BC (Bayliss *et al* 2011a, table 11.5). These structures had diameters of 6-9 m, the largest (Structure 1 and Site K) being provisionally interpreted as domestic dwellings (Darvill *et al* 2003). Other roundhouses in the settlement have been interpreted as an animal byre, a workshop, and a store/granary, seemingly ancillary buildings (*ibid*). Another post-structure within this settlement was interpreted as a free-standing timber circle, possibly a 'shrine'. In addition, a near-identical circular post-defined structure was found immediately to the south-west, beneath Structure 1, suggesting the presence of an earlier phase of 'shrine' activity at the site (*ibid*). Of course, another explanation is that both of these 'shrines' were actually the post rings associated with domestic roundhouses. Another significant feature was a rectangular cairn, containing a possible cist (*ibid*), and covering the north-eastern 'shrine' (or perhaps roundhouse), which may well have been created to mark or commemorate its abandonment, whilst at the far south-western end of the settlement were several rubbish/latrine pits (*ibid*). In addition to the structural remains, the settlement was associated with a substantial collection of Bronze Age pottery, including the familiar cordoned and plain vessels, perhaps deriving from three Cordoned Urns and five plain vessels (Woodcock 2008, 114-15).

It is evident that the settlement at Billown Quarry did not exist in isolation, as at least one extensive boundary was identified, containing material that has been radiocarbon dated to the Middle Bronze Age (Bayliss *et al* 2011b, 557). This boundary extended in a north-west/south-east direction across the site and turned through a right-angle at its southern end, suggesting that it formed an element of a large, enclosed field. It also seems possible, though only on the strength of a single radiocarbon date, that part of this field system was established at the very end of the earlier Bronze Age (*Ch 10, p 336*), and that the ditched boundaries were added in the Iron Age (*ibid*; *Ch 8, p 257*). Perhaps significantly, another field system, which may well date to the Bronze Age, has also been found at Ballasalla to the east, surviving as cropmarks recorded by aerial survey (*Ch 1, p 12*).

In addition to Billown Quarry, another comparable settlement was seemingly located at Braddan, in Douglas (Fig 103). This settlement was initially identified by an archaeological evaluation (OA 2021) and was subjected to large-scale excavation in winter 2024/2025, which, significantly, revealed several roundhouses, forming elements of a settlement suspected to date to the later Bronze Age (P Dunn *pers comm*).

South Barrule is another site that has produced later Bronze Age pottery (at least one Cordoned Urn and 14 undecorated vessels; *op cit*, 111-13), on a 483 m-high summit in the Southern Uplands (*Ch 1, p 1*; Fig 103). This hilltop settlement comprised a large number of roundhouses enclosed within a double, widely spaced, rampart (*Ch 8, p 252*). Although most probably date to the Iron Age (on the strength of a radiocarbon date from one of them; *cf* Gelling 1970a; 1972), the pottery indicates that the site was also in use in the later Bronze Age. Indeed, this fits well with the wider evidence from Ireland and northern Britain that many hilltop settlements had their origins in the later Bronze Age (*p 168*), forming a distinctive settlement type during this period. Indeed, comparisons have been drawn between South Barrule and a series of distinct Irish hillforts, with similarly spaced ramparts, which were seemingly in use throughout this period (Bradley 2019, 252-4). Given this, it is possible that the other later prehistoric hilltop settlements on Man, at Chapel Hill and Cronk Sumark (*ibid*), might also have their origins in the later Bronze Age. One interesting observation (Woodcock 2008, 113) is that both the later Bronze Age settlements at Ronaldsway Village and Billown would have been visible from the summit of South Barrule. These settlements would also have been visible from Chapel Hill, if this site was also in use during this period.

Metalwork of the period largely consists of single 'stray finds' of bronze objects that can typologically be assigned to the Middle and Late Bronze Age, which have parallels with items from Ireland, Wales, and Cumbria, highlighting the links between these areas (Davey *et al* 1999). The Middle Bronze Age objects comprise palstaves, a sickle, flanged axes, and dirks, whilst a gold earring also probably dates from this period (*ibid*). The Late Bronze Age objects include socketed axes and swords, and a fragment from a sheet-bronze vessel (*ibid*). In addition, two Late Bronze Age hoards are known, one from Close Lake (comprising two axes and a palstave) and the other from Ballagawne (associated with swords, an annular ring, and a copper ingot; Fig 103). It has been suggested that the objects in both hoards indicate links between the Isle of Man and Wales (*op cit*, 59).

Some of the Late Bronze Age objects also provide direct evidence for metalworking, including a partially recast sword and copper ingot from the Ballagawne hoard,

a reworked sword (from Foxdale), and patches on a sheet-bronze vessel (from Strandhall; *op cit*, 55). It seems then, from these and also the clay mould from Crawyn Brooghs (*p 170*), that metalworking formed an important element of later Bronze Age life on the island. It is therefore possible that those areas in the southern part of the island where copper could be obtained (*ie* Bradda Head and Langness) became more important during this period, and may have influenced the types of activities occurring in later Bronze Age settlements. It is also worth noting that the island also contains sources of lead (Woodcock 2004, 218),



Figure 105: The circular geophysical anomalies at Taxiway Alpha East, suggestive of roundhouses

and this may again have influenced activity patterns, following the adoption of leaded bronze (*p 168*).

The Later Bronze Age Settlement at Taxiway Alpha East

The geophysical survey undertaken at the start of the RESA project (*Ch 1, p 14*) suggested the presence of several roundhouses in an area along the proposed route of Taxiway Alpha East (Fig 105). This site was therefore investigated during the construction phase of the project.

Significantly, the initial topsoil stripping of this site revealed a dense concentration of midden material and later Bronze Age pottery centred on several structures, which were clearly responsible for creating the geophysical anomalies (Pl 31). These features can



Plate 31: The remains of the later Bronze Age settlement, looking south-west

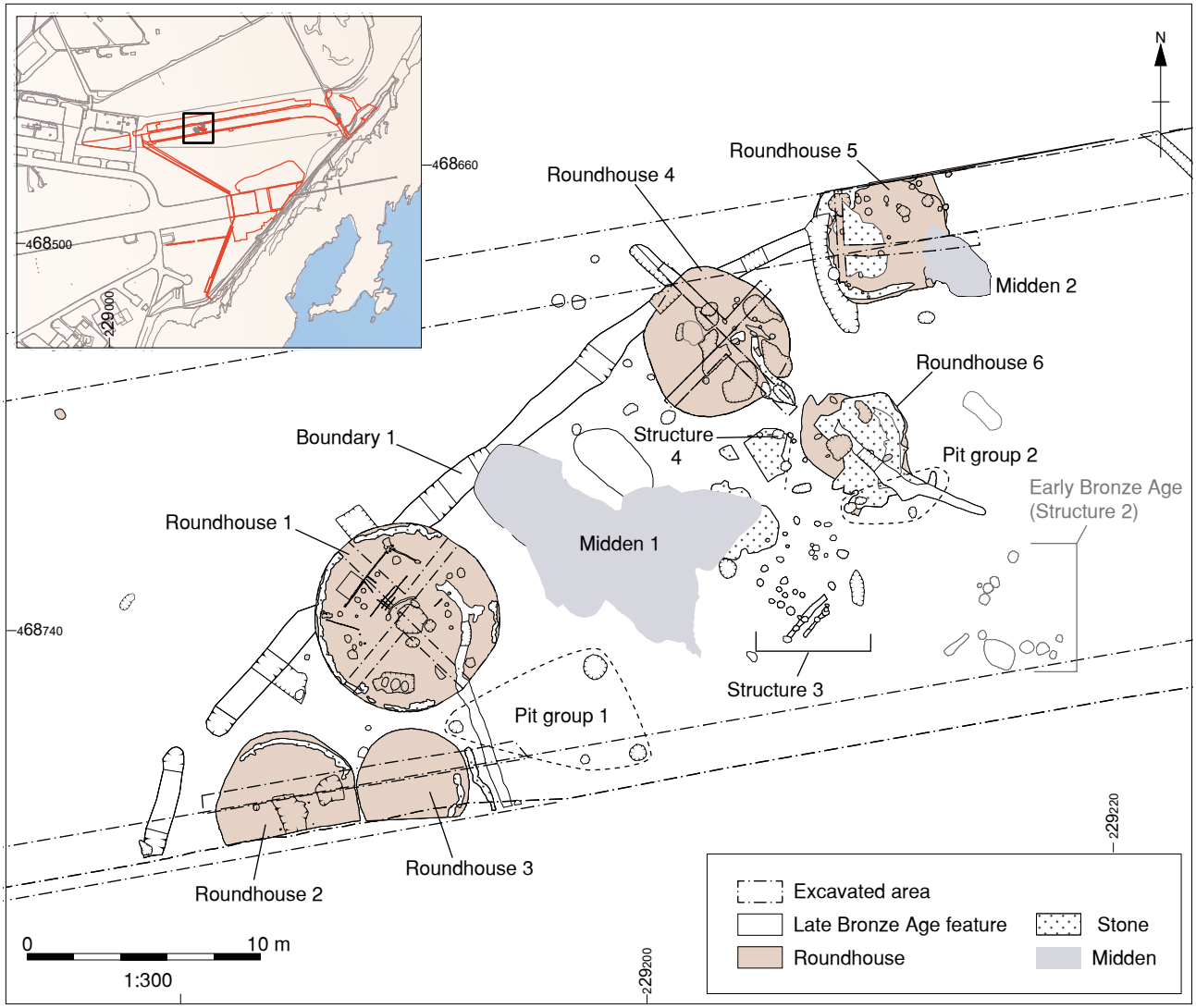


Figure 106: The later Bronze Age settlement at Taxiway Alpha East

be interpreted as six later Bronze Age roundhouses (Fig 106; Roundhouses 1-6), and two additional structures (Structures 3 and 4), one of which (Structure 3) was used for casting bronze artefacts. These surrounded a midden in the centre of the excavated settlement. Following abandonment, some of the structures were backfilled, whilst others were covered with stone-built cairns, which in one instance was also associated with another midden. Other later Bronze Age features at Taxiway Alpha East comprised a boundary and two pit groups. Immediately to the east of the settlement were piecemeal remains of an earlier Bronze Age structure (*Ch 5, p 161*), indicating that this location had seen earlier settlement.

Phase 1: a Middle Bronze Age(?) field system

The earliest feature was defined by two *c* 1.3 m-wide ditches (***4151*** and ***4168***), separated by a *c* 1.8 m gap, which formed a causeway across what seems to have been a major boundary (Fig 107; Pl 32). Both ditches had maximum depths of *c* 0.6 m, steep sides and flat bottoms, and seem to have gradually silted, prior to the settlement phase (*p 176*); however, the position of this boundary was probably still visible, as three roundhouses (1, 4, and 5) were established along its line, and it also seems to have bounded the north-western side of the midden. Perhaps significantly, no settlement remains were found to the north-west, which may suggest that there was originally a bank on this side, which had effectively hemmed in and bounded the later settlement.

Ditch ***4151*** produced a small collection of worked-stone artefacts, though these were residual Mesolithic and Late Neolithic items. Although no artefactual material was present in ditch ***4168***, following its near-complete silting, the partial remains of a sheep (***4155***) had been placed into it (*Ch 7, p 239*). Although the date of these skeletal remains has not been established, it is feasible that a sheep carcase was placed into the top of the

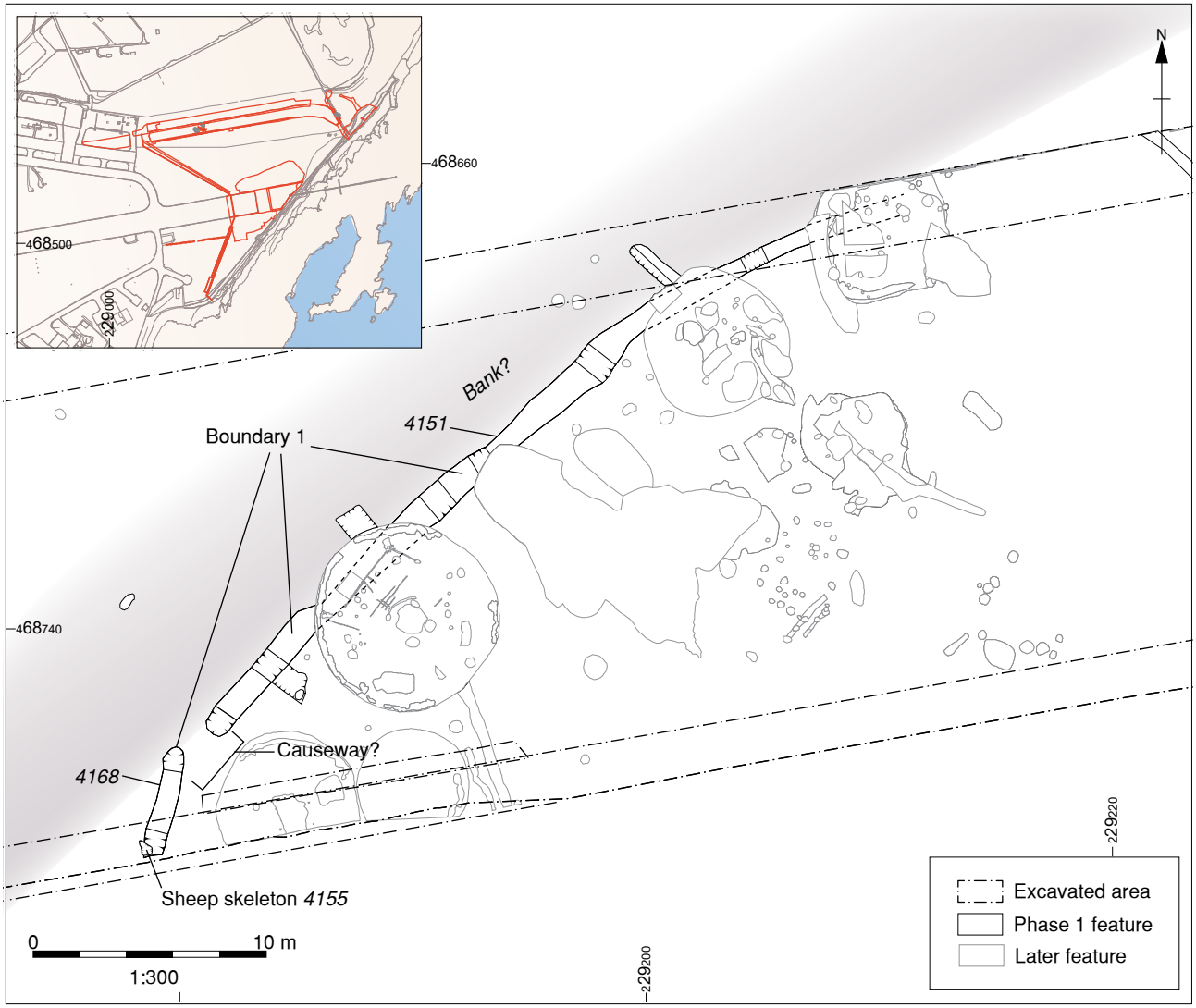


Figure 107: The Phase 1 boundary



Plate 32: The entrance through the Phase 1 boundary (right), looking south

infilled ditch immediately prior to the creation of the settlement.

The geophysical survey indicated that this boundary extended beyond the excavation, and would have formed a major landscape feature during the latter part of the second millennium cal BC. On the north-eastern side of the taxiway, it continued to form the south-eastern side of a large rectangular enclosure (Field 1; Fig 108), measuring some 90 x 100 m, and a more irregular field (Field 2). The geophysical survey also suggests that the north-western side of Field 1 was linked to a smaller rectangular enclosure (Field 3), measuring *c* 50 x 70 m. Several other boundaries were aligned with these fields, including two small enclosures and a trackway close to the Taxiway, so they might have been contemporary features. It seems that together these elements formed a field system comparable to those at Billown Quarry and Ballasalla (*p 171*). Indeed, it is quite possible that the Ronaldsway and Ballasalla fields actually formed elements of the same extensive system (*Ch 11, p 339*).

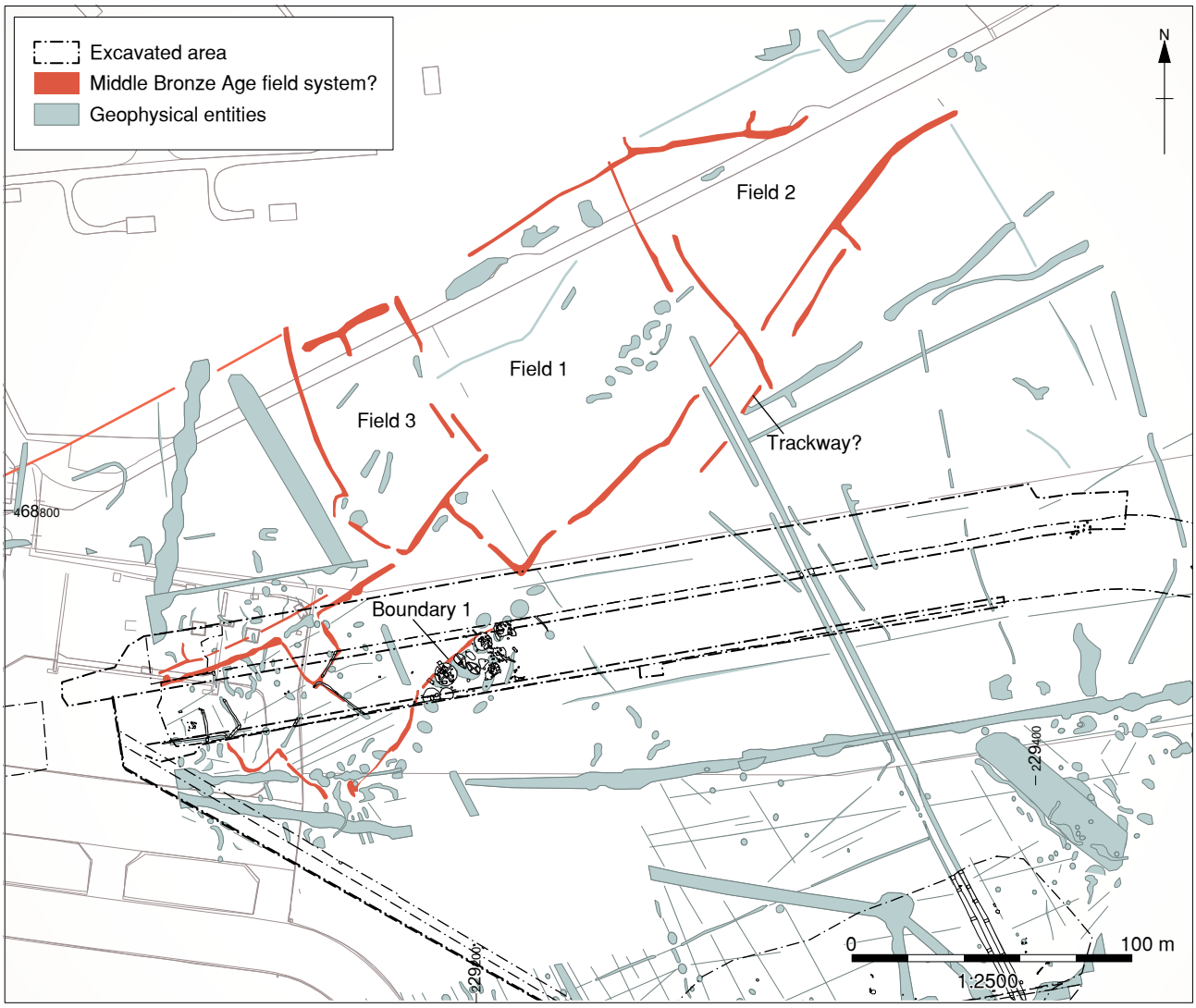


Figure 108: The extent of the possible Middle Bronze Age field system

Phase 2: The Middle/Late Bronze Age settlement

The primary roundhouse (Roundhouse 1)

Roundhouse 1 (Fig 109; Pl 33) seems to have been the earliest structure in the settlement, based on the radiocarbon dating evidence (*p 199*). It was partially constructed over the Phase 1 field boundary (*p 174*) and was 7.8 m in diameter, being built within a shallow, concave, circular pit (***4145***). This had been intentionally cut into the natural sand and gravel, to create a slightly sunken, undulating floor. It was revetted with a drystone dwarf wall (***4447***), with a maximum width of 0.4 m and height of 0.4 m, formed of large limestone blocks up to 0.6 m across. Its better-preserved sections were on the western side, where it formed a continuous wall of a single course for much of its extent. This would have lain beneath the eaves of the house. Given the continuous nature of the wall on the west, the entrance must have been on its eastern side and, although no obvious termini or features suggestive of a threshold survived, its presence was confirmed by several features within the house (*p 179*). This might also add weight to the suggestion that an earlier bank, associated with the Phase 1 boundary (*p 174*), may have lain directly beyond the settlement, which would have made access into the house from the north-west impracticable.

The interior contained a series of features with a range of different functions. Several of these were shallow postholes, with diameters of *c* 0.3-0.6 m, marking the positions of timber uprights designed to support the superstructure. These created an irregular post-ring with a diameter of *c* 5.8 m that was inset 1 m from ***4447*** in the south-west and west, and 0.5 m in the south-east. In the north-west, however, the post-ring was inset 1.9 m, creating a larger space beneath the eaves. Significantly, this seems to have been an intentional element of the design, as this area was also associated with a 0.08 m-wide line of clay/daub (***4660***), standing 0.14 m high, forming the remains of a wattle-and-daub panel (Pl 34). This extended north-east/south-west for a distance of 3 m, and at its north-eastern end it seems to have linked to another wattle-and-daub panel, defined

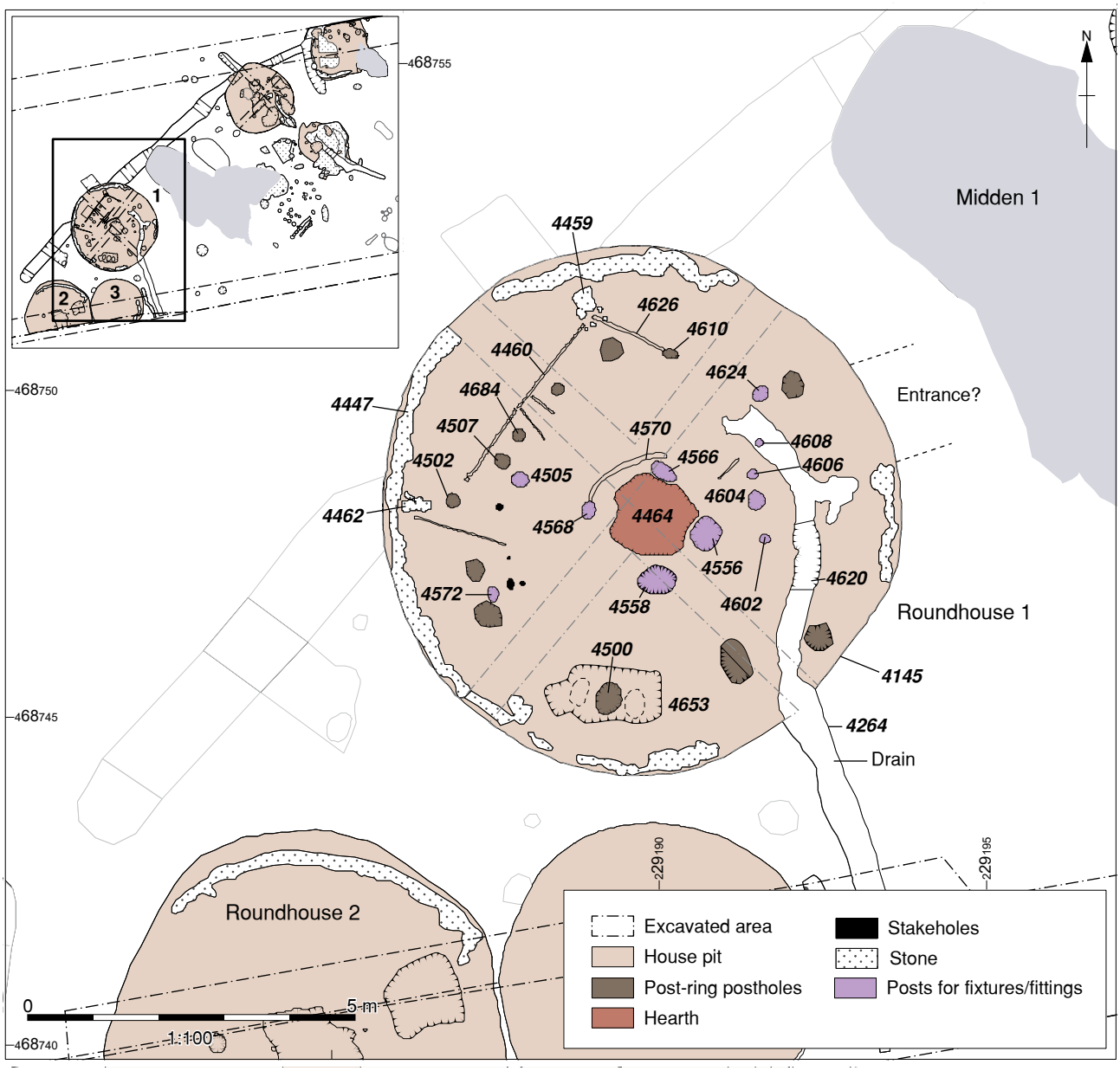


Figure 109: Roundhouse 1

by a narrow linear slot (***4626***), set perpendicularly. Together, these panels would have screened off the area beneath the low eaves, perhaps forming a storage area. In addition, stone settings ***4459*** and ***4462*** at the northern and southern ends of ***4660*** seem to have formed steps or thresholds associated with the area. Significantly, one of these (***4459***) incorporated a complete saddle quern (*Ch 7, p 209*).

A large circular hearth (***4464***) at the centre of the house had a diameter of *c* 1.3 m (Fig 109). Its base survived, formed of a 0.15 m-thick layer of grey to light red clay, containing *c* 40% small cobbles. This had been placed directly on the natural subsoil and, unsurprisingly, the clay base had been baked hard through use. The hearth was surrounded by four fairly substantial postholes, creating a rectangular structure, measuring some 1.3 x 1.5 m, that probably acted as both supports for the roof and may also have secured a gantry, allowing a cooking pot to be suspended over the fire (Pl 35).

The postholes (***4556***, ***4566***, ***4568***, and ***4558***) had diameters of 0.32-0.43 m and depths of 0.18-0.25 m, those on the southern side (***4556*** and ***4558***) containing charcoal-rich fills, and charred plant remains, which may have been derived from sweepings; a charred bread-wheat-type (*Triticum* cf *aestivum*-type) grain from posthole ***4556*** has provided a radiocarbon date of *1180-1010 cal BC* (*SUERC-53404*; *p 199*). In addition, a curvilinear slot (0.1 m wide, and 0.04 m deep; ***4570***) between the northern postholes (***4566*** and ***4568***) extended along the north-western edge of the hearth for a length of 1.3 m. The most likely interpretation is that this secured a wattle-and-daub panel, similar to those in the north-western part of the house (*above*),



Plate 33: Roundhouse 1, looking south-east



Plate 34: The remains of wattle-and-daub panel **4660**, *looking south-west, with stone-setting* **4459** *in the foreground*



Plate 35: Hearth **4464**, *the surrounding timber structure, and the possible slot for a wattle-and-daub panel*

designed to screen the north-western side from whatever activity took place there.

To the east was a line of five postholes (***4602***, ***4604***, ***4606***, ***4608***, and ***4624***; Fig 109), which probably formed the uprights for another screen. Functionally, this screen may have been inserted in order to prevent people from inadvertently straying into the hearth area when entering the roundhouse from the presumed east-facing entranceway (*p 176*), and it would also protect the hearth from any random draughts blowing through this entrance area. A small group of features to the west of the hearth comprised two postholes (***4572*** and ***4505***), 1.9 m apart, in between which were four stakeholes, presumably relating to some form of domestic fixtures and fittings.

Another prominent interior feature was a clay base (***4653***) to the south of the central hearth, surrounding one of the posts (***4500***) forming an element of the post-ring (*p 176*). This base was *c* 1.9 x 1 m, and was 0.14 m thick, and contained two circular hollows, with diameters of *c* 0.5 m, on either side of the post, suggesting that it functioned as a pot stand for two vessels (Pl 36). The clay base was also heat-affected, though this most likely occurred when the building was destroyed (*p 191*).

The roundhouse also had a drain, defined by a gully, extending across its south-eastern quadrant (as ***4620***) in a southerly direction, and beyond (as ***4264***; Fig 109). The flat base of the gully, which was 0.3 m wide and 0.08 m deep, was lined with large stone slabs, and it was filled with a mid-reddish-brown waterborne silt (***4621***), which contained a charred grass (Poaceae) culm fragment that has been dated to *1240-1080 cal BC* (*SUERC-53409*; *p 199*). Within the house, the drain also possessed a small spur eastwards, terminating at the



Plate 36: Pot-stand **4653**, *looking south, surrounding posthole* **4500**

inner face of dwarf wall ***4447*** on the southern side of the putative entrance.

Settlement expansion: Roundhouses 2-5

The dating evidence (*p 202*) suggests that the settlement expanded when Roundhouse 1 was still in use. Four more roundhouses were built (2-5), two of which (2 and 3) were constructed immediately south of Roundhouse 1. The other two (4 and 5) were to the north-east and were separated from Roundhouse 1 by a midden (*p 188*). In addition, a timber structure (3) was constructed, immediately south-east of the midden. The fragmentary remains of another timber structure (4) were also found to the north of Structure 3.

Roundhouses 2 and 3

Although only the central and northern parts of Roundhouses 2 and 3 lay within the excavated area, it was evident that these were related, being only separated by a 0.1 m gap (Fig 110). Roundhouse 2 was the larger, with a diameter of 6 m, defined by a flat-based circular pit (***4248***), with regular vertical sides and a maximum depth of 0.25 m (Pl 37). A revetted stretch of dwarf-stone wall on the northern edge of the pit (***4252***) was comparable to that in Roundhouse 1 (*p 176*); presumably this originally extended around the complete circuit of the pit. Based on the surviving portion and the proximity of Roundhouse 3, an entrance must have been either on the western or southern side of the house.

Several features within the interior suggest that its function was domestic. At its centre was a rectangular clay and stone-slab hearth (***4451***), measuring *c* 1 x 1.4 m. This contained several fragments of pottery (*Ch 7, p 219*), and a small assemblage of charred plant remains (*Ch 7, p 246*), including cereal grains, chaff, and weed seeds; a hulled barley (*Hordeum* sp) grain returned a radiocarbon date of *1190-1000 cal BC* (*SUERC-53403*; *p 199*). Four stakeholes, arranged in a square, surrounded the hearth, comparable to the larger posthole setting associated with the hearth in Roundhouse 1 (*p 177*), which may have formed a structure that was used to suspend a cooking pot over the fire.

A second hearth (***4453***) lay 1 m to the east of the central hearth. This was defined by a 0.04 m-thick layer of hard, burnt, yellow and reddish-grey clay, forming

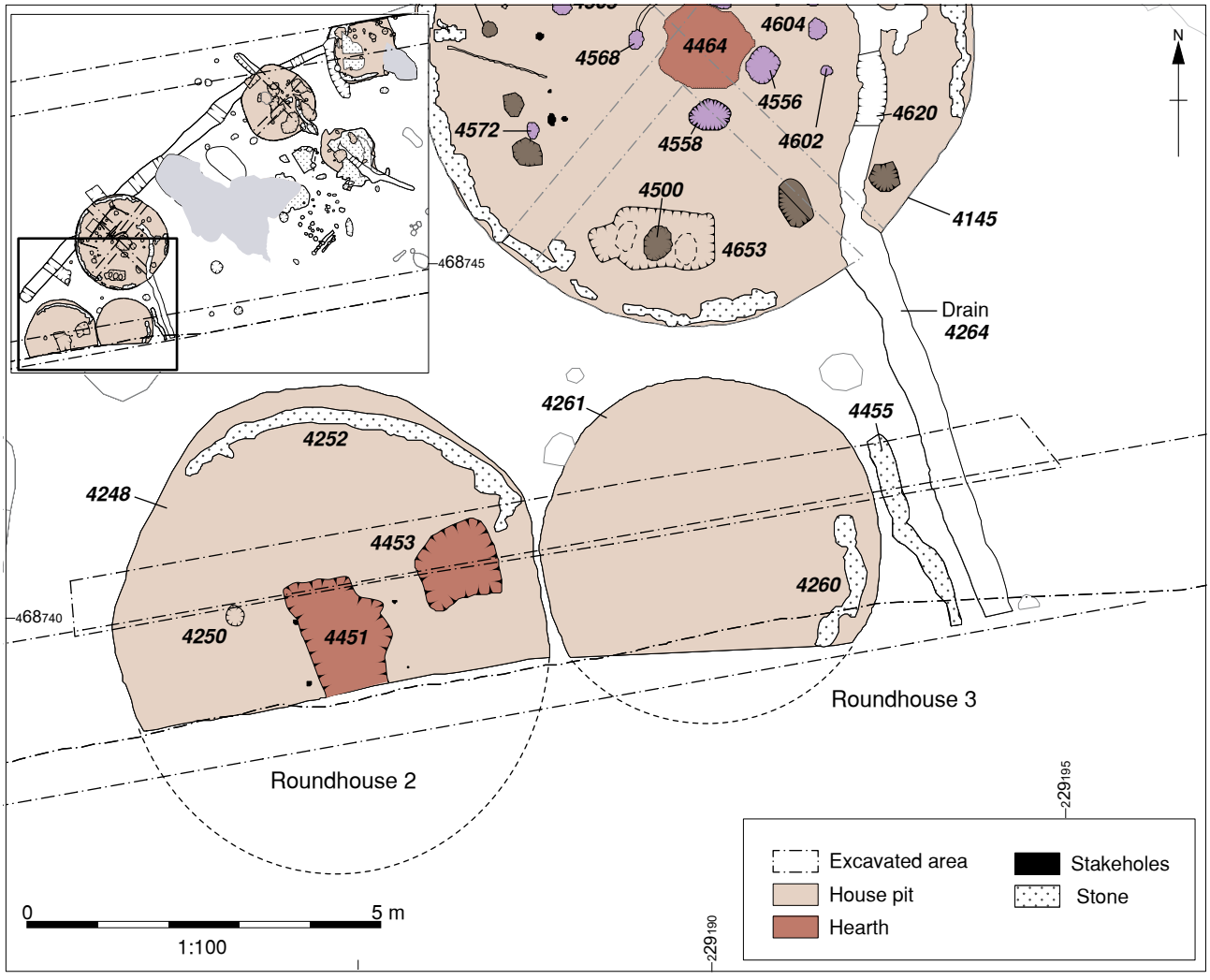


Figure 110: Roundhouses 2 and 3



Plate 37: Roundhouse 2, looking south

its base, contained in a shallow, vertically sided rectangular pit with a flat base, measuring some 1 x 0.6 m. Significantly, this contained a charred naked barley (*Hordeum* sp var *nudum*) grain that provided a radiocarbon date of *1130-940 cal BC* (*SUERC-53402*; *p 199*). Above the base was a deposit of mid-greyish-brown silty sand with pebbles and pea-gravel, which contained a fragment of saddle quern (*Ch 7*, *p 209*), and pottery (*Ch 7*, *p 219*).

The only other feature within the house was a posthole (***4250***). This lay *c* 0.7 m to the west of hearth ***4451*** and had a diameter of 0.1 m. Due to its isolated nature, however, its function is not clear.

Roundhouse 3 was immediately east of Roundhouse 2, and was smaller, having a diameter of 4.8 m (Fig 110). It was, however, similarly defined by a steep-sided circular pit (***4261***), with a flat base and a maximum depth of 0.25 m, partially associated with a dwarf-stone wall (***4260***). This lined the eastern edge of the pit and was composed of relatively large stones (0.35 x 0.30 x 0.20 m). No internal features were identified, the absence of a hearth perhaps implying that this building did not have a domestic function, possibly being a byre or store. A north/south-aligned stone-lined drain (***4455***) was identified immediately east of the building, parallel and to the west of drain ***4264*** serving Roundhouse 1 (*p 179*). It is probable that this was designed to protect the building from surface water.

Roundhouse 4

The fourth roundhouse was *c* 10.5 m north-east of Roundhouse 1 and had similarly been built partially over the filled Phase 1 field boundary (*p 174*). It was defined by an irregular sub-circular pit (***4246***), with a diameter of 5.8 m (Fig 111; Pl 38). Although no evidence for an encircling dwarf-stone wall was present, two postholes (***4439*** and ***4351***) were found on its south-eastern edge, which probably marked the entrance into the structure. These were spaced 1 m apart, and both had diameters of *c* 0.5 m, with V-shaped profiles and depths of 0.3 m. Both also contained three fills, the upper containing significant quantities of charcoal, with smaller quantities in the lower. Significantly, a fragment of alder (*Alnus glutinosa*) charcoal from the primary fill of posthole ***4351*** returned a date of *1190-1010 cal BC* (*SUERC-53390*; *p 200*).

Several small postholes, with diameters of *c* 0.1 m, were found in the interior, most probably relating to fixtures and fittings, the majority being confined to the north-east quadrant and the central area. They comprise two sets of paired postholes, one (***4483*** and ***4481***) separated by 0.3 m, close to the centre of the structure, and the other (***4334*** and ***4367***), separated by 0.06 m, to the north-east; together, these may have

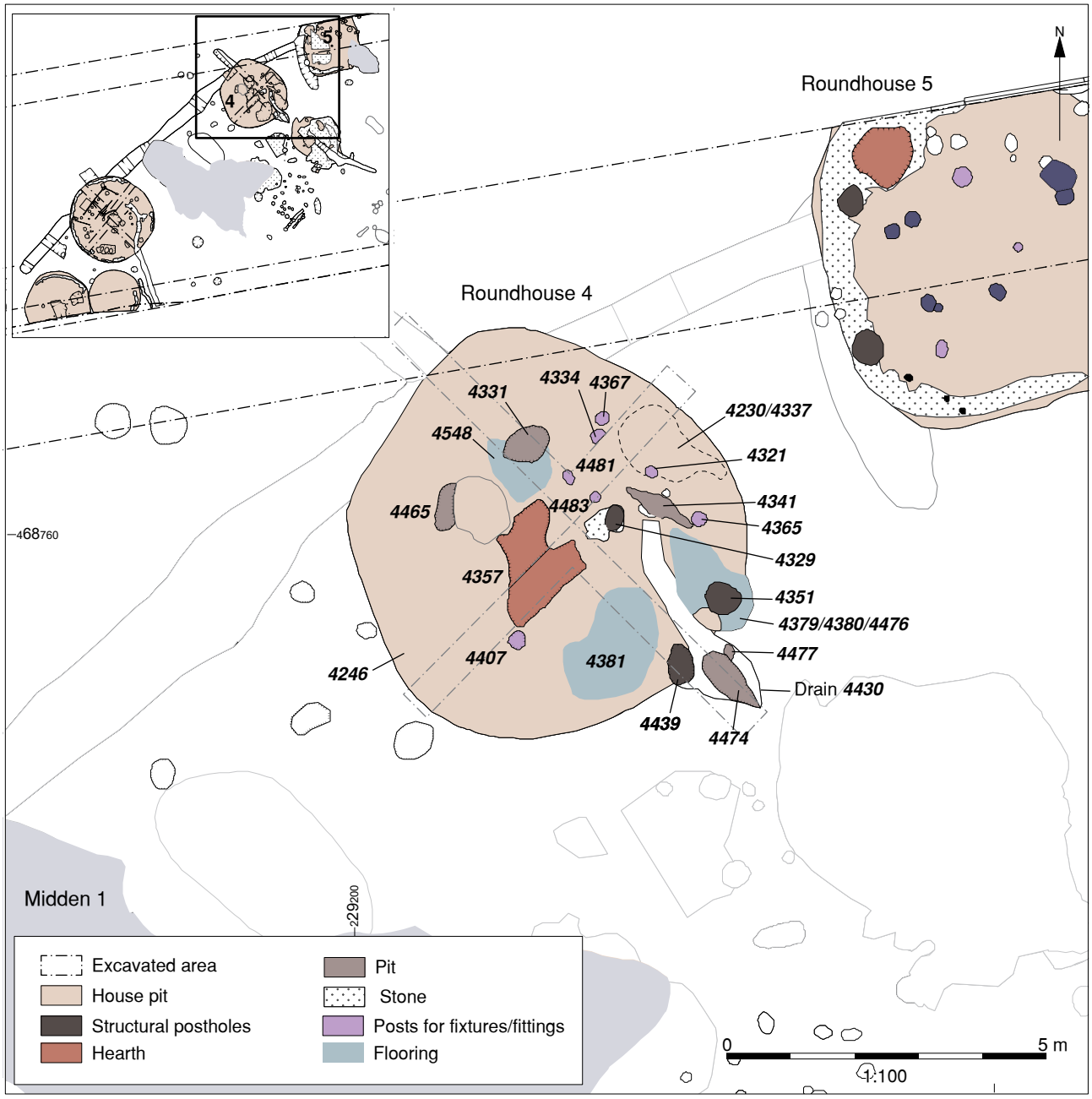


Figure 111: Roundhouse 4

formed elements of a timber partition. Postholes ***4483*** and ***4367*** contained significant amounts of charcoal, whilst pottery was found in posthole ***4334***. Another posthole (***4329***) was immediately to the south-east of ***4481***/***4483***, and contained a substantial quantity of packing stones (Pl 39). These suggest that the upright was load bearing, and given its central position, it was probably used to support the roof. The other internal postholes comprised ***4321***, to the north-east, ***4365***, in the south-eastern part of the building, and ***4407*** in the south-western quadrant. Posthole ***4365*** contained a solidified lead drip (*Ch 7, p 231*), and three ceramic mould fragments for socketed tools and weapons (*Ch 7, p 225*), which, along with other mould fragments from abandonment deposits (*p 191*) and a nearby floor (*p 184*), indicate that bronze casting occurred within this building.

Other interior features included a hearth, some fragmentary areas of flooring, a drain, and several pits and hollows. The hearth (***4357***) was positioned close to the centre, between paired-postholes ***4481***/***4483*** and posthole ***4407***. It measured some 1.5 x 1.3 m and consisted of heat-affected clay and pebbles. It also contained charcoal, and one fragment of heath/heather (*Erica* sp/*Calluna vulgaris*) charcoal provided a date of *1120-940 cal BC* (*SUERC-53400*; *p 199*). This hearth was also subjected to archaeomagnetic dating, which suggested that it most likely dated to 1200-1090 BC (*p 198*).



Plate 38: Roundhouse 4, looking south-west



Plate 39: Packing forming posthole **4329**, *looking south-west*

Three areas of flooring were identified, all composed of pebbles and gravel, within a matrix of compacted silty sand/clay. One (***4548***) was immediately to the north of the hearth, measuring *c* 0.9 x 1.1 m, whilst the other two lay to the south-east of the hearth, close to the presumed entrance (Fig 111). One (***4379/4380/4476***) measured *c* 1 x 2 m, and was associated with a crucible fragment (*Ch 7, p 228*), whilst the other (***4381***) covered an area of *c* 1.4 x 1.2 m to the south-west, some of its surface being heat-affected, possibly because of its proximity to the hearth. The drain (***4430***) was found between these two areas of flooring and was a shallow, slightly curving gully, aligned north-west/south-east, extending from the south-eastern quadrant, through the entrance, and beyond the building for 1.2 m. It was 3.4 m long and capped with eight flagstones. Three pits (***4341***, ***4477*** and ***4474***) were also identified beneath the drain, which may have been dug and filled immediately prior to its construction. Two (***4477*** and ***4474***) were just outside the house, at the threshold of the building, between the entrance postholes (*p 181*), one (***4477***) being small and circular, with a diameter of *c* 0.3 m, whilst the other (***4474***) was larger and oval-shaped, measuring 0.8 x 1 m, containing pottery sherds. Following filling, this latter pit had also been capped with two large stones. The third pit (***4341***), beneath the drain, was within the building, and was oval-shaped, *c* 0.4 x 1.2 m.

The remaining features within the roundhouse comprised two oval pits and a large irregular hollow (Fig 111). The pits, ***4465*** and ***4331***, were in the north-western half of the building, separated by floor ***4548*** (*above*), though the latter pit also partially truncated this floor, indicating it was a slightly later feature. They respectively measured 0.3 x 0.8 m and 0.8 x 0.9 m, though the smaller (***4465***) had been disturbed by a later grave (*Ch 8, p 263*). The hollow (***4230***) was to the east and, significantly, contained an occupation deposit

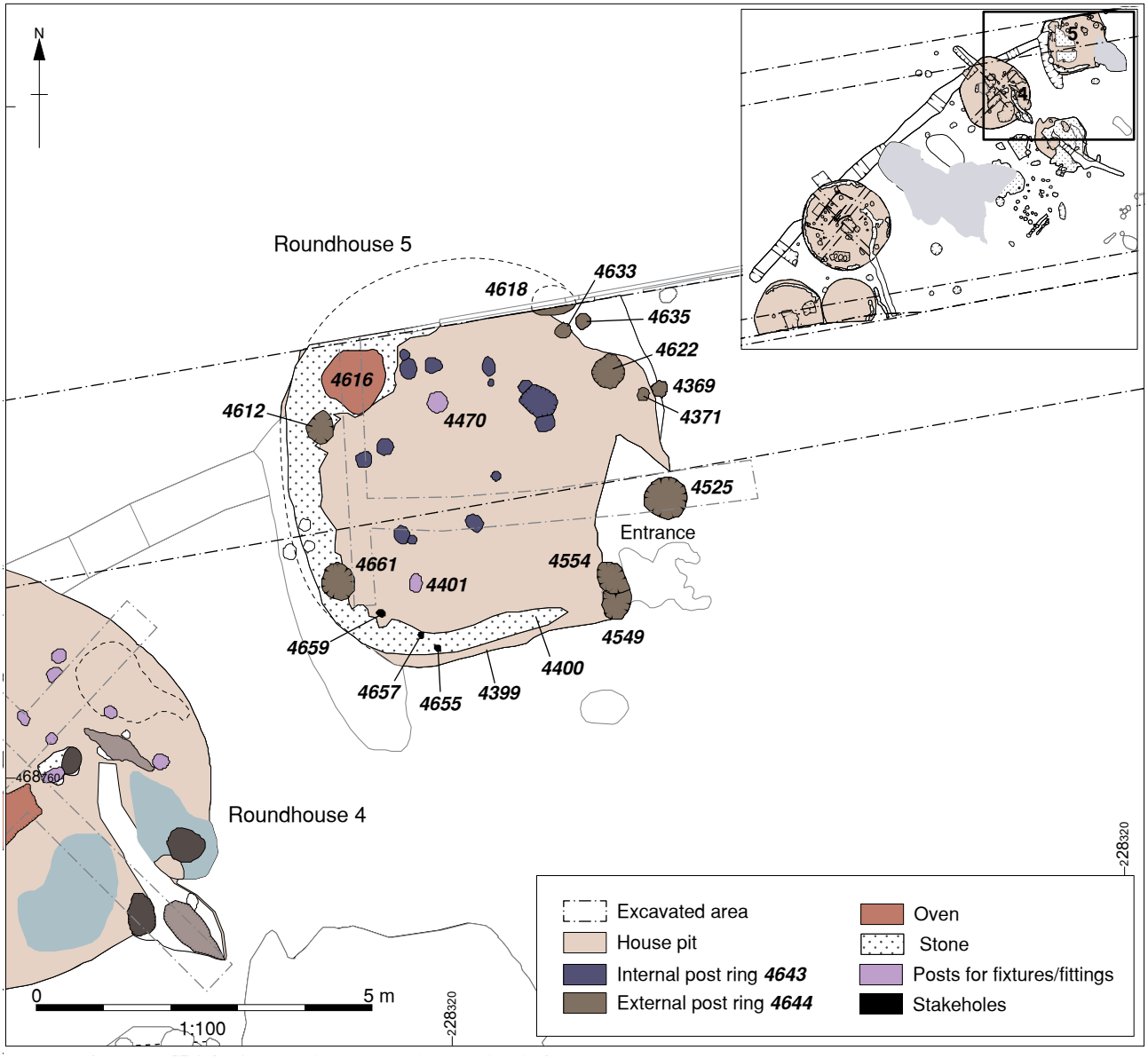


Figure 112: Roundhouse 5

(***4337***) that had accumulated during the life of the building. This comprised a dark grey silt containing a large amount of fire-blackened pottery (*Ch 7*, *p 219*), burnt stone, lithics (*Ch 7, p 211*), amorphous fired clay (*Ch 7*, *p 229*), and heat-altered lead (*Ch 7*, *p 231*), suggesting that, in addition to bronze casting (*p 182*), lead working also occurred within this building.

Roundhouse 5

Roundhouse 5 was *c* 2.2 m north-east of Roundhouse 4 (Fig 112), and had also been built over the filled Phase 1 field boundary (*p 174*). It had a roughly circular morphology with a diameter of *c* 5.4 m (Pl 40). The house was defined by a post-ring, comprising 14 postholes and three stakeholes, within, and following the edge of, a shallow circular pit (***4399***). The stakeholes (***4655***, ***4657***, and ***4659***) were on the south-western side of the pit, whilst four postholes (***4612***, ***4618***, ***4622***, and ***4661***), all with diameters of *c* 0.5 m, would have supported the roof. On the south-eastern side, two twinned postholes (***4554***/***4549***), also with diameters of 0.5 m, and another similar-sized posthole (***4525***), set some 1 m distant, probably defined the entrance to the structure.

On the eastern side, additional support for the roof was provided by two sets of paired postholes (***4633***/***4635*** and ***4369***/***4371***), with diameters of 0.2 m, whilst the postholes and stakeholes on the western side were associated with a dwarf-stone wall (***4400***), which revetted the edge of the pit. In the south-western part, this was formed of a single course of large, rounded blocks of limestone up to 0.4 m across; however, it gradually thickened on the north-western side, as it incorporated a feature that appears to have been integral to the use of the structure. This was a sub-circular pit (***4616***), containing two large stone slabs laid on their short edges, with a gap of 0.3 m between them (Pl 41). The base of the pit, which had a maximum depth of *c* 0.3 m, sloped downwards to the north, creating a flue, suggesting that the feature functioned as a small oven. This also contained a dark brown organic-rich silty sand associated with charred plant remains, including grains of barley and wheat, together with weed seeds (*Ch 7*, *p 246*). Two of the cereal grains, one barley and one wheat, returned respective dates of *1110-920 cal BC* (*SUERC- 53405*) and *1210-1040 cal BC* (*SUERC-79969*; *p 200*).

A series of postholes within the house seem to have formed elements of an internal post-ring, with a diameter of 2.6 m, positioned slightly off-centre, and providing further support for the superstructure. The postholes had diameters of *c* 0.2 m and all were filled with redeposited natural material; those on the north-eastern side were also paired with stakeholes. One posthole (***4470***) was located inside this post-ring, presumably securing fixtures or fittings, and this



Plate 40: Roundhouse 5, looking south



Plate 41: Oven **4616**, *looking north-west*

contained charred plant remains that included wheat and barley grains, and heathland weeds (*Ch 7, p 246*). One wheat grain subsequently returned a radiocarbon date of *1070-910 cal BC* (*SUERC-53394; p 200*). An isolated interior posthole (***4401***) also lay to the south of the internal post-ring.

Structure 3

Some 6.4 m to the south of Roundhouse 4, and 10.5 m east of Roundhouse 1, a scatter of features formed the remains of a sub-rectangular timber structure (Structure 3), measuring *c* 8 x 9 m (Fig 113; Pl 42). The south-east corner was defined by two gullies, ***4419*** and ***4485***, set at right-angles, one of which (***4419***) seems to have contained four postholes, each with a diameter of *c* 0.2 m. These were elements of a larger group of earthfast posts, with diameters of 0.1-0.8 m and depths of *c* 0.1 m, defining the north-eastern and northern sides. It seems, however, that the south-western side was open, adjacent to an internal structure (*below*). Generally, the postholes were filled with clayey silt, though one (***4363***) also contained oak charcoal, copper staining, pottery, and fragments of amorphous fired clay (*Ch 7, p 229*), whilst another (***4598***) again contained pieces of amorphous fired clay, indicative of bronze melting or casting. Significantly, the base of a large hearth (***4691***) was found in the north-eastern corner of the interior, defined by a shallow irregular pit with a slight mound (0.03 m high) of fire-hardened natural clay at its centre, whilst a deposit of reddish-brown clayey sand containing burnt material (***4537***/***4639***) filled other parts of the pit. A mould fragment for a spearhead was recovered from this latter deposit (*Ch 7, p 226*).

The hearth base had been cut by five small pits (***4544***, ***4546***, ***4542***, ***4540***, and ***4538***). One (***4544***), with vertical sides and a flat-base, 0.18 m in diameter and 0.15 m deep, had been cut through the fire-hardened material in the centre, and contained several small droplets of solidified copper alloy. Twenty pottery sherds were also found in this pit (*Ch 7, p 219*), suggesting that originally it had functioned as the setting for a vessel. Pit ***4546*** was larger, and flat-based, with a diameter of 0.32 m and a depth of 0.45 m, containing a large concentration of oak charcoal and other burnt material; a radiocarbon determination on a charred rhizome (probably from turf) returned a date of *1160-940 cal BC* (*SUERC 53410; p 199*). Pit ***4542*** had a diameter of 0.3 m, was 0.25 m deep, and contained oak charcoal, *c* 20% fire-cracked stone, and other burnt materials, and animal bone, whilst pit ***4540*** (0.2 m in diameter; 0.2 m deep) produced a mould

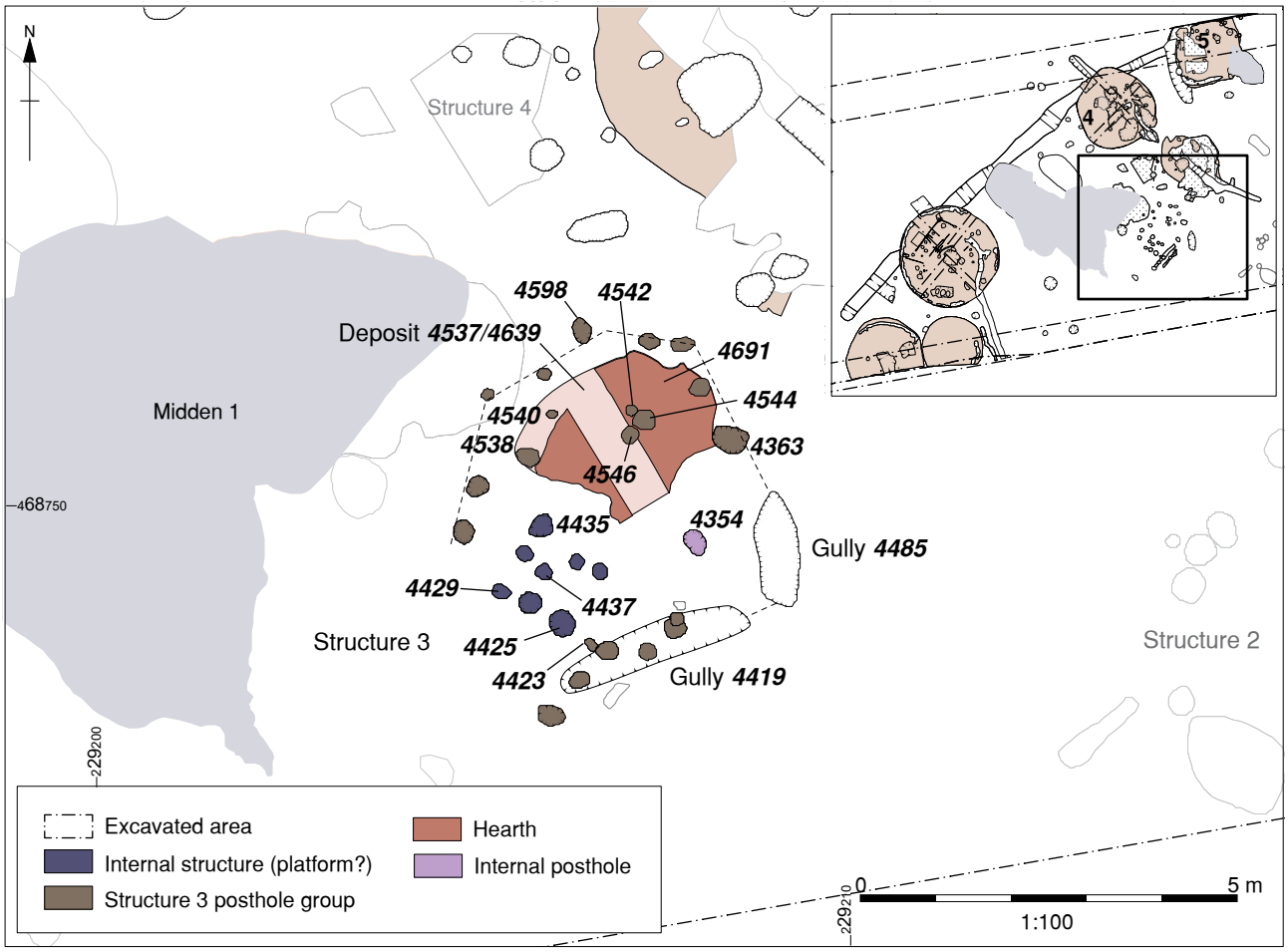


Figure 113: Structure 3



Plate 42: Structure 3, looking north

fragment for a socketed axe (*Ch 7, p 227*). Pit ***4538***, at the western end of the hearth, had a maximum diameter of 0.4 m, and also contained pottery and burnt material.

Seven postholes seemed to define a small, 1 m-square, setting, surrounding another posthole (***4437***). This may have supported a platform immediately to the south-west of the hearth and adjacent to the open side of the structure (Fig 113). Two of its postholes (***4429*** and ***4435***) produced evidence for bronze casting, in the form of two mould fragments and the terminal of a copper-alloy ring (*Ch 7, p 228, p 230*) from posthole ***4435***, and copper-alloy droplets and possible mould or crucible (amorphous) fragments from posthole ***4429*** (*Ch 7, p 230*). Another posthole (***4425***) also contained heather/heath (*Erica* sp/*Calluna vulgaris*) and oak charcoal and charred cereal; the heather produced a radiocarbon date of *1190-1020 cal BC* (*SUERC-53392*; *p 199*), comparable to the date from pit ***4546*** (*p 186*). Two other postholes (***4423*** and ***4354***) were also nearby, one (***4423***) containing a fairly large assemblage of oak charcoal (*Ch 7, p 247*).

Structure 4

The fragmentary remains of another post-built structure were found 2 m to the north of Structure 3, which may have been contemporary. Structure 4 was defined by an arc of six postholes (***4346***, ***4669***, ***4671***, ***4673***, ***4675***, and ***4677***; Fig 114) that might have formed a *c* 3 m-long windbreak or barrier. Posthole ***4346*** contained a crucible fragment (*Ch 7, p 229*), though presumably this may have derived from nearby Structure 3 (*p 186*).

A pit (***4344***) was found within the arc, probably a contemporary feature. This was *c* 0.4 m in diameter, 0.15 m deep, and contained a significant amount of pottery, with two fragments from the same saddle quern. Once filled, it had then been capped with a large stone (Pl 43). It therefore seems to have been a structured deposit, perhaps with some form of ritual connotations.

The central midden (Midden 1)

One notable feature within the settlement area was a large midden. This lay between Roundhouses 1 and 4

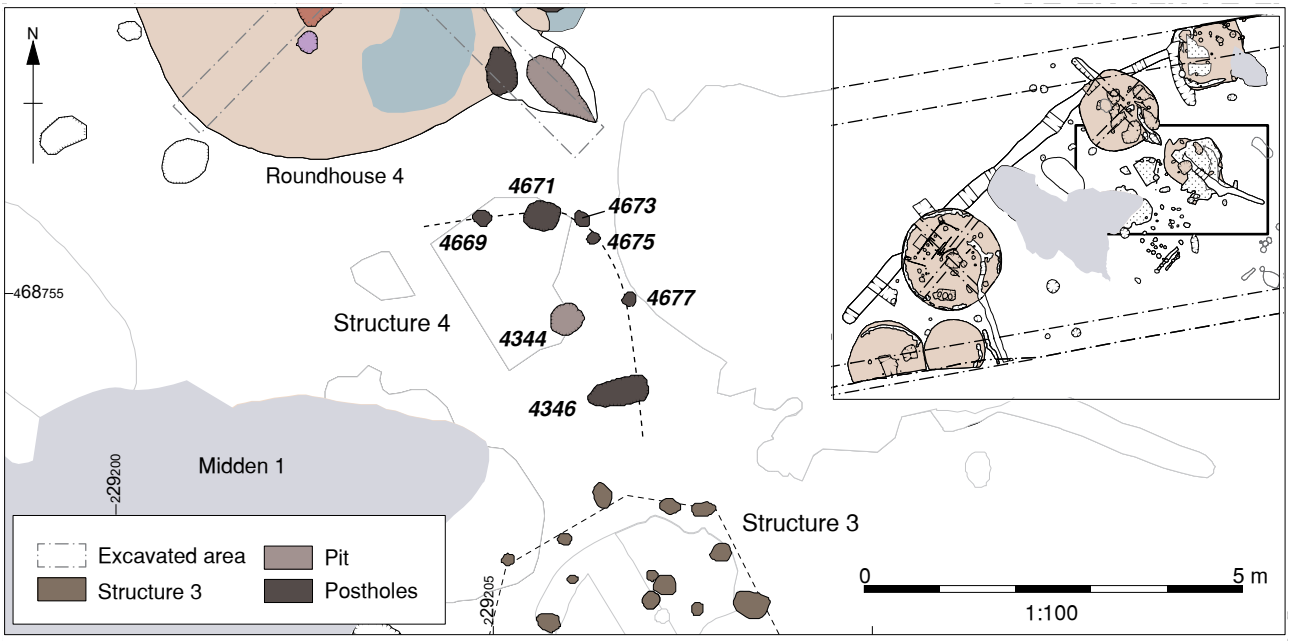


Figure 114: Structure 4



Plate 43: Pit **4344**, *with pottery at its base (bottom), quern fragments above (middle), and a capping stone in place (top)*

and its north-western edge sealed the filled Phase 1 boundary (*p 174*). There was again no trace beyond the ditch, presumably indicating an upstanding bank there. The midden was a dynamic and long-lived feature, which began to accumulate during the occupation of Roundhouses 1-5 and Structure 3, continuing to receive material for several centuries.

It was initially visible as a large spread of dark brown friable clay (***4146/7***), associated with large quantities of cultural material, covering a triangular area of *c* 12.5 x 7 m (Fig 115). However, it became evident that its eastern side had eventually covered Structure 3 and Roundhouse 6 (*p 194*), whilst its western side was defined by three discrete concentrations (***4188***, ***4193***, and ***4213***) that had accumulated in irregular shallow hollows.

Concentration ***4213*** had formed in an oval, 0.2 m-deep scoop, measuring *c* 3.8 x 6 m, situated 3 m to the east of Roundhouse 1, and also partially overlay the Phase 1

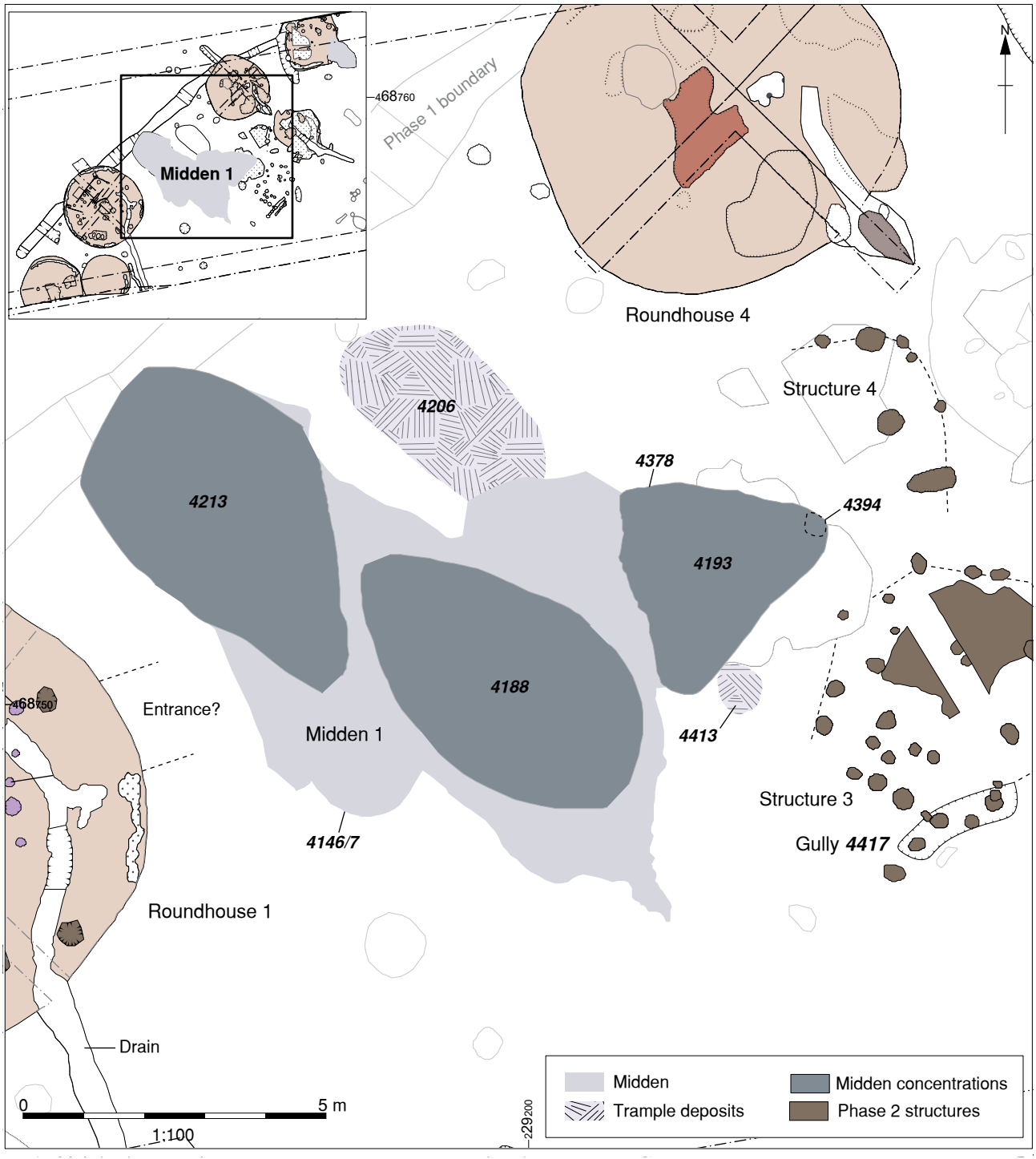


Figure 115: Midden 1 and adjacent trample deposits

boundary (*p 174*). It was defined by several discrete deposits, including a basal layer of mid-orange/brown friable sandy silt, containing small amounts of charcoal, in the southern and north-eastern parts. This was sealed by a dark blackish-brown sandy silt, rich in organic matter and cultural material, which in the north-west quadrant extended onto the natural geology as the midden expanded.

To the south-east, a second broadly oval concentration of material (***4188***; Fig 115), with similar dimensions (3.2 x 5.6 m and 0.2 m deep), was composed of several discrete deposits, including a thin basal layer of orangey-brown gritty-sandy loam and gravel, containing fragments of pottery; this may have formed as a result of trampling. It was sealed by a sticky dark brownish-grey sandy clay, containing an abundance of ceramic debris and also moderate (*c* 30%) quantities of small fragments of quartz, slate, and sandstone.

The third concentration (***4193***), immediately east of concentration ***4188***, was contained within a triangular scoop (***4378***) measuring 3.5 x 2.6 m, and 0.15 m deep, and was also associated with a fairly rich assemblage of animal bone (*Ch 7, p 231*), and some amorphous fired clay, indicative of metalworking. At the eastern end, a discrete circular dump of material (***4394***) was *c* 0.7 m in diameter, and consisted of a mid-brown sandy silt, containing several large cobbles and a concentration of sheep and pig bones (Pl 44). One of the pig bones returned a radiocarbon date of *1040-910 cal BC* (*SUERC-79965*; *p 200*). A layer of redeposited natural material sealed dump ***4394***, and contained pottery, animal bone, and flint, also filling the remainder of the scoop. This was partially overlain by a dump of heat-affected reddish-brown clayey silt, covering some 0.35 x 0.3 m, which may have been a product of metal-producing in Structure 3 (*p 186*), immediately to the south-east. Moreover, the upper spread of material (***4146/7***; *above*) in this area produced two possible mould fragments, for a spearhead and a blade, possibly a sword (*Ch 7, p 227*), and two amorphous fired clay fragments, probably derived from crucibles or moulds (*Ch 7, p 229*).

Two other deposits (***4206*** and ***4413***) were identified directly above the natural geology. These were both shallow spreads of dark gravelly sand, containing small amounts of midden material, which probably formed as a result of trampling. Deposit ***4413*** also contained animal bones, including several seal bones



*Plate 44: Dump of animal bone (**4394**) within Midden 1, looking west*

(*Ch 7, p 238*), which were almost certainly derived from concentration ***4193***, this being similarly associated with a comparatively rich faunal assemblage (*above*).

The end of the settlement

The modelled radiocarbon dates suggest that most of the settlement (Roundhouses 1-4 and Structure 3) was abandoned in *1100-1000 cal BC*, whilst Roundhouse 5 may have continued to have been occupied slightly longer, being finally abandoned in *1000-900 cal BC* (*p 202*). All the roundhouses were, however, associated with abandonment deposits, some of which directly related to destruction, whilst others seem to have been associated with commemoration.

It appears that the end of Roundhouse 1 was the result of fire, either an accident or, perhaps more likely, the deliberate burning of the structure. There were two sequential burnt deposits, the lower (***4221***; Pl 45) comprising gritty black silt containing large pieces of charred wood, cereal grains, lead drips, and a lead artefact, possibly part of a bangle (*Ch 7, p 231*). Archaeomagnetic dating suggested that this dates to either 1080-730 BC or 710-630 BC (*p 198*). Layer ***4221*** was overlain by burnt layer ***4366***, consisting of a friable reddish-brown silt, 0.05 m deep, containing burnt daub, small amounts of degraded sandstone, a lead drip (*Ch 7, p 231*), and also a charred glumed wheat grain that returned a radiocarbon date of *1180-1010 cal BC* (*SUERC-53391*; *p 199*). Significantly, the lower demolition deposit also sealed a layer of silt and degraded limestone (***4422***/***4373***), identified in the northern half of the house, which, again, contained a solidified lead drip (*Ch 7, p 231*), but was not burnt, suggesting that the structure had been abandoned for a period before it was destroyed. It also seems that, following the burning, the footprint was intentionally backfilled with large stones and pea grit (***4202***). This material was within a matrix of silty sand that produced several pottery sherds (*Ch 7, p 219*) and amorphous fired clay (*Ch 7, p 229*).

Similarly, Roundhouses 2-4, once abandoned, were intentionally backfilled, with soil, stone, and pea gravel. The backfill in Roundhouse 2 contained several sherds of pottery, as did that in Roundhouse 3, one of which had a cordoned rim (OR 4203; *Ch 7, p 221*). The backfill (***4200***) within the north-western quadrant of Roundhouse 4 also contained numerous pottery sherds and evidence for casting, in the form of crucible fragments and a pouring cup (*Ch 7, p 228*), amorphous fired clay (*Ch 7, p 229*), galena (lead ore), and solidified lead drips, along with a small perforated lead disc (*Ch 7, p 231*). Although all of these items were recovered from abandonment deposits, it is quite likely that originally, they related to activities within the respective houses in which they were found.



*Plate 45: Excavating the burnt deposit (**4221**) in Roundhouse 1, looking east*

Roundhouse 5 contained more complex and substantial evidence for abandonment. It seems that initially the house had burnt down. The evidence for this was two sequential charcoal-rich deposits that covered the interior (***4348*** and ***4383***). The upper (***4383***) also contained charred cereals and a single flaked lithic, whilst the lower (***4348***) contained fragments of two long bones from a dog (*Ch 7, p 238*), and an assemblage of charred plant remains, including barley, wheat, and weed species indicative of a heathland environment (*Ch 7, p 247*). This lower deposit also sealed a small, discrete patch of carbonised material (***4457***), containing a large assemblage of carbonised oat, barley, and wheat grains, the latter returning a radiocarbon date of *1090-910 cal BC* (*SUERC-53393*; *p 200*).

Probably not long after its destruction, a cairn (***4382***) was built within the interior, covering an area of 1.4 x 1.8 m, and surviving to a height of 0.4 m (Fig 116; Pl 46). This cairn was composed of several large limestone blocks, with the largest measuring *c* 0.8 m across, interspersed with smaller stones, with diameters ranging between *c* 0.1 m and 0.2 m. It also seems that a fairly substantial linear feature (***4685***) was created at a similar time, immediately to the west of the cairn, and partially destroying the western side of the roundhouse. Indeed, it is quite likely that this was a robber trench, dug to remove part of the original dwarf-stone wall (*p 185*), the material being incorporated into the cairn. The remaining parts of this were also seemingly capped with a gravel-rich abandonment deposit (***4149***).

A second cairn (***4458***) was created directly over the entrance to the former house, perhaps therefore representing a conceptual act of abandonment, which involved 'blocking' passage into the now defunct building. This cairn was contained within a shallow oval

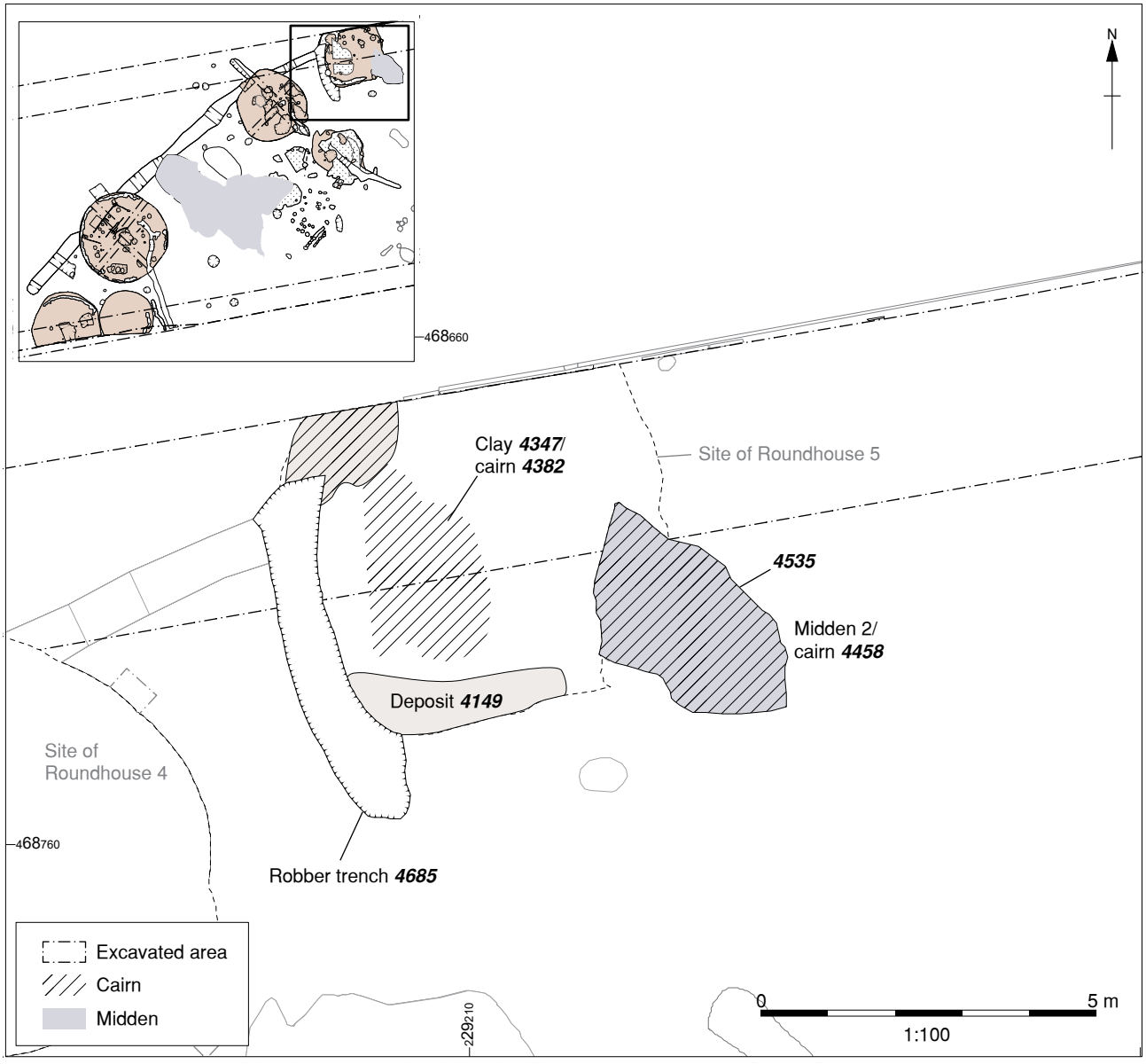


Figure 116: Features associated with the abandonment/commemoration of Roundhouse 5



Plate 46: Cairns **4382** *(right) and* **4458** *(left), constructed within the abandoned remains of Roundhouse 5, looking south*



Plate 47: The midden covering cairn **4458**, *looking south-west*

pit (***4535***), *c* 2 x 3.5 m and stood to a height of *c* 0.5 m. It comprised limestone blocks comparable in size to those found in cairn ***4382*** (*p 192*). Furthermore, as with ***4382***, it is also possible that this second cairn was partially created from robbed walling associated with the former house, particularly as it incorporated a large stone slab (*c* 0.5 x 0.3 x 0.2 m) that had fractured into two pieces, which probably originally came from this structural feature.

After these cairns had been constructed, it then seems that the site was used for different activities, seemingly involving feasting and the deposition of salvaged materials associated with the consumption of food. Cairn ***4382*** was covered with a thin (0.04 m-thick) layer of baked clay (***4347***), which contained a lens of burnt material, associated with charred cereals. This seemed to suggest that the cairn was used as the base for one or more hearths, used for cooking.

Cairn ***4458*** was also covered by a midden deposit (Midden 2; Pl 47). This comprised a very rich assemblage of shell and animal bone (*Ch 7*, *p 231*, *p 245*), along with

charred cereals and weed seeds, contained within a blackish-brown silty soil (***4443***). Some of this material had percolated down through the voids that existed in the cairn. Generally, the majority of the shell was on the surface, below which were smaller animal bones, with larger bones towards the base of the deposit, which seem to have been intentionally placed on the cairn. Whilst some of this material was presumably a product of the consumption of food, cooked on the adjacent hearths, analysis of the faunal remains suggests that some of the sheep/goat and sheep bones had first accumulated in another midden (perhaps Midden 1, to the south; *p 188*), and were then removed and added to this midden. Overall, the combined assemblage of sheep/goat and sheep from this midden also suggests that it principally comprised young animals, slaughtered as lambs or hoggets (castrated yearlings). The midden also contained the remains of other domesticated animals (cattle and pig), as well as several different bird species, which were all perhaps caught and eaten, a field/wood mouse, a large marine mammal, as well as bone from a skate (*Raja* sp). Two objects, a cormorant bone, and a charred barley grain, produced dates of *1040-770 cal BC* (*SUERC-79961*) and *1110-920 cal BC* (*SUERC-53395*) respectively (*p 200*).

Phase 3: The Late Bronze Age settlement

Roundhouse 6

The dating evidence suggests that at some stage, up to 100 years after the abandonment of the roundhouses, settlement resumed at Taxiway Alpha East during the Late Bronze Age. This is evidenced by a small roundhouse (Roundhouse 6) constructed on the northern side of the central midden (*p 188*; Fig 117), which the radiocarbon evidence suggests was established in *1000-900 cal BC* and abandoned by *900-800 cal BC* (*p 202*). Although the remains of this house had been disturbed by later activity, it appears to have been domestic, and clearly similar in design to the roundhouses associated with the Phase 2 settlement. It was defined by a shallow circular pit (***4408***), with a diameter of *c* 4 m, within which was a post-ring, comprising five postholes following the edge of the pit to support the roof. The two better-preserved postholes (***4522***, Pl 48; and ***4551***) were in the north-eastern quadrant, and both contained packing stones and pockets of pink clay or daub, above redeposited natural material. Posthole ***4522*** also contained a significant quantity of charred wheat, barley, grasses, and charcoal (*Ch 7, p 246*). One of the cereals, a naked barley (*Hordeum*

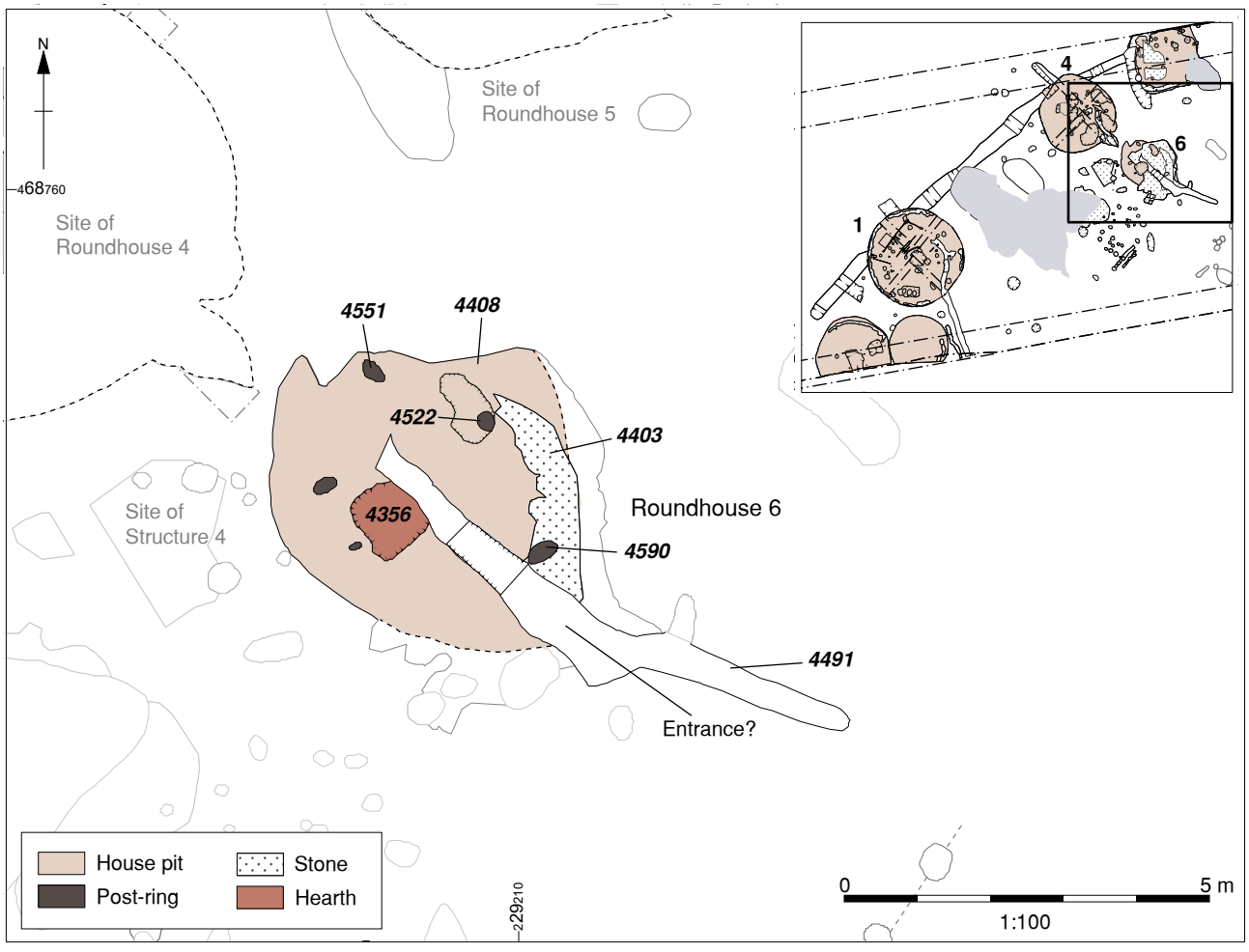


Figure 117: Roundhouse 6



Plate 48: Posthole **4522**, *looking north-east*

sp var *nudum*) grain, has been radiocarbon dated to *980-820 cal BC* (*SUERC-53401*; *p 200*). On the eastern side of the house, the remains of a dwarf-stone wall (***4403***) also survived, for a distance of 3 m between postholes ***4522*** and ***4590***, revetting the edge of the pit and forming an outer wall beneath the eaves. This comprised a single course of limestone boulders, 0.1-0.6 m in diameter.

Of the several features within the interior, a hearth (***4356***) was in the south-western quadrant, adjacent to its centre point. This measured 1.1 x 1.4 m and consisted of a rough stone slab and cobbles, set within a layer of heat-affected clay (Pl 49) containing small amounts of charcoal. A piece of alder (*Alnus glutinosa*) charcoal has been radiocarbon dated to *1010-870 cal BC* (*SUERC-53399*; *p 200*).

Hearth ***4356*** partly overlay a shallow stone-capped drain (***4491***), which was 0.45 m wide and 0.22 m deep. This was filled with a large amount of stained and degraded stone and gravel, below the limestone and dolomite capping stones. The drain was oriented north-west/south-east, and extended beyond the roundhouse for a distance of 4 m, and it is possible that it also went through the entrance of the house, if it were similar to Roundhouse 4 (*p 181*), which would imply that this entrance was on the south-eastern side of the structure. Some further confirmation for this is provided by dwarf wall ***4403*** (*above*), which appeared to terminate on the north-eastern side of the drain.

The commemoration of Roundhouse 6

Following the abandonment and demolition of Roundhouse 6, a stone cairn was built on its site, presumably as a form of commemoration (Fig 118). This cairn was probably created shortly after the house had been abandoned (and hence was later in date than the other cairns covering the Phase 2 houses; *p 191*), and its construction first entailed creating a base of limestone and sandstone rubble and turf, effectively sealing the footprint of the house, which would have been visible as



Plate 49: Hearth **4356**, *looking south-west*

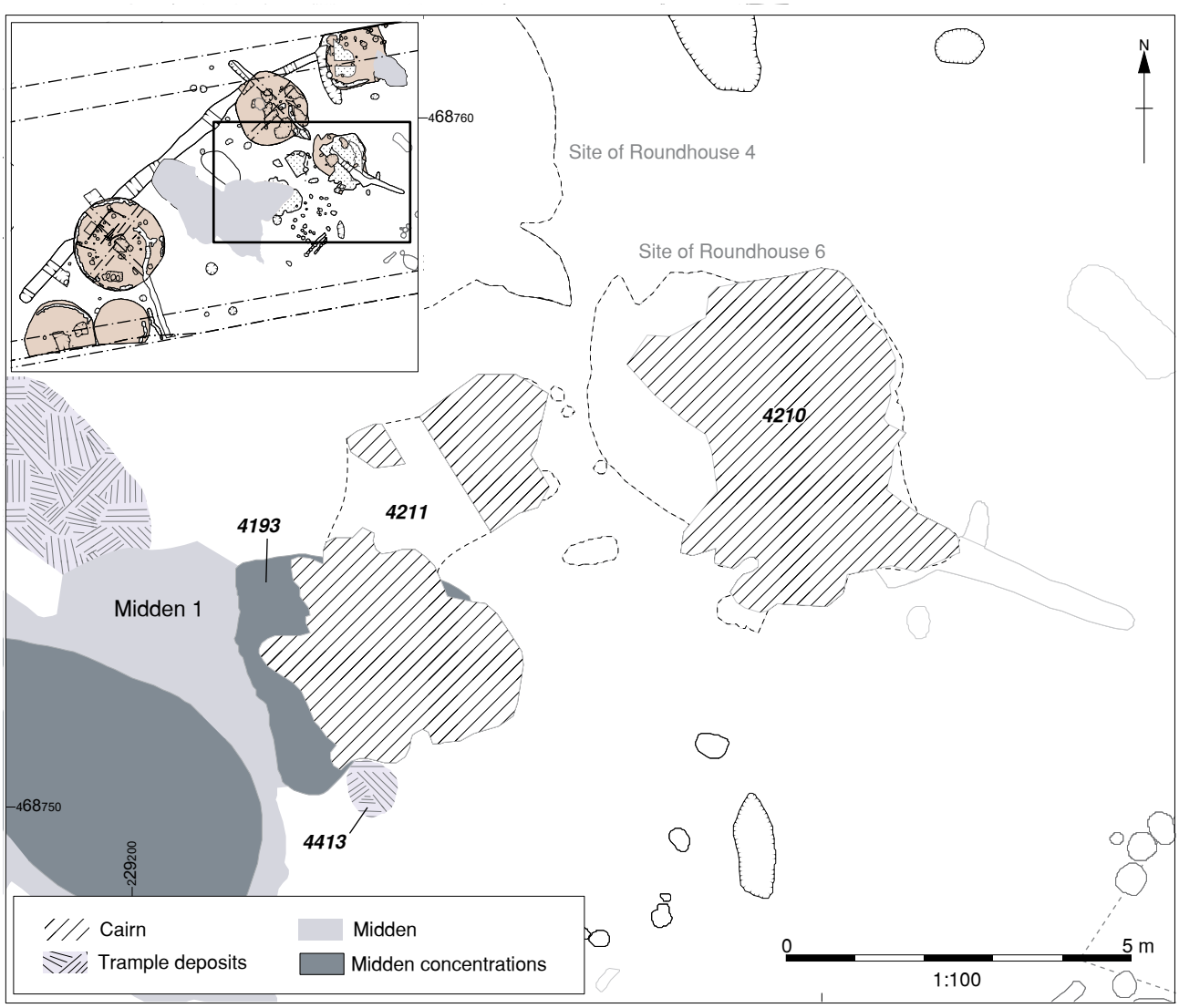


Figure 118: Cairns **4210** *and* **4211**



Plate 50: Cairn **4210**, *looking south-west*

a circular hollow. Large quartz, sandstone, and limestone boulders (with some up to 0.3 m across) were then dumped onto this base, forming the main body of the cairn (***4210***; Pl 50); this covered an area of *c* 5 x 4 m and survived to a height of *c* 0.6 m. A second cairn (***4211***) was also constructed immediately to the west, partly above a concentration of midden material (***4193***; *p 190*), on the eastern edge of the earlier midden (Midden 1). This was also composed of large quartz, sandstone, and limestone boulders and, although it had been heavily disturbed by later activity, its surviving elements suggest that it originally had a crescent-shaped plan form, measuring some 3 x 6 m, with a surviving height of *c* 0.3 m.

Pit groups

Beyond the roundhouses, several isolated pits were probably associated with the later Bronze Age settlement. These ranged in size (with diameters of 0.3-1 m and depths of 0.2-0.5 m), and were probably dug throughout the life of the settlement.

Four pits were found to the south of Midden 1, south-east of Roundhouse 1, and east of Roundhouse 3, these perhaps being contemporary with these houses (Fig 119). The largest of these (***4314***) had a diameter of 1 m, vertical sides, and a flat bottom, and thus could have been for storage (Pl 51). It was *c* 0.5 m deep and had gradually filled with silty sand.

Another four pits (Fig 120) were excavated to the east, immediately south of Roundhouse 6. One (***4642***) was certainly earlier than the roundhouse, as it had been cut by its drain (*p 195*), though the other three (***4517***, ***4519***, and ***4304***) may have been contemporary with its occupation. These lay to the south-west, beneath stone cairn ***4210*** (*above*), and one (***4519***), once filled, was capped with a large stone slab.

The date of the settlement: scientific dating and Bayesian modelling

F Brown, S E Harris, and C M Batt

During the excavation, three burnt features were selected for archaeomagnetic dating. This resulted in 22 samples being taken, with six from hearth ***4357*** in Roundhouse 4 (*p 182*), five from hearth ***4356*** in Roundhouse 6 (*p 195*), and 11 from burnt deposit ***4221***, associated with the destruction of Roundhouse 1

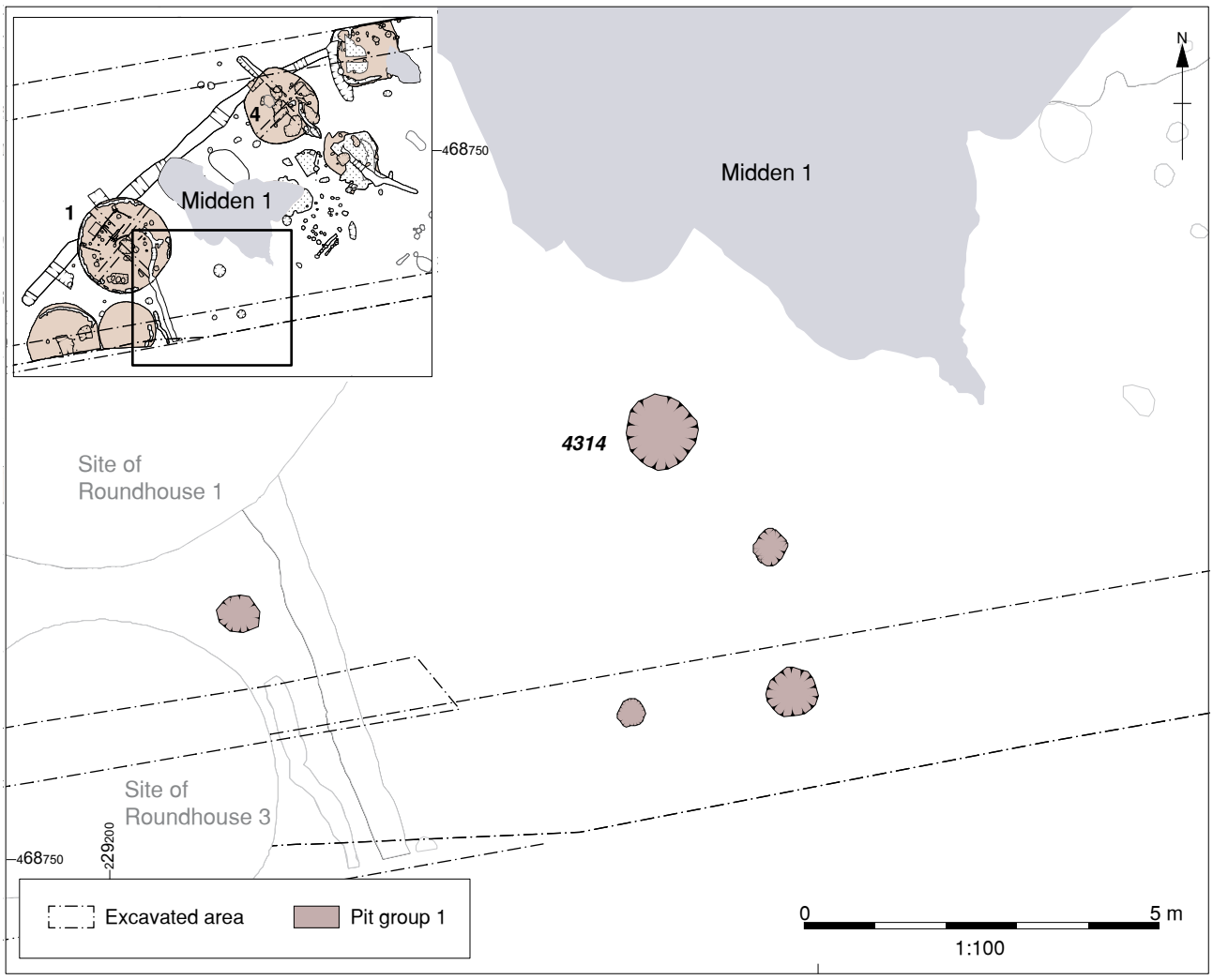


Figure 119: Pits in the south of the settlement



Plate 51: Pit **4314***, following half-sectioning, looking south*

(*p 191*). This employed standard methodologies and techniques, though, following demagnetisation of the samples (*Ch 1, p 27*), it was evident that those from hearth ***4356*** showed scatter. This suggested that the samples had been disturbed since the last heating event and therefore it was not possible to obtain an accurate date for this feature. In contrast, the samples from hearth ***4357*** showed stable directions in agreement with each other at 15 mT, while samples from burnt layer ***4221*** showed stable directions at 20 mT. Once the uncorrected stable directions had been acquired (*Ch 1, p 27*), it was possible to remove two outlier directions from burnt layer ***4221***, using the methods outlined in Fisher *et al* (1981) and produce a new uncorrected mean. The uncorrected mean directions from hearth ***4357*** and burnt layer ***4221*** were then corrected for variations in the magnetic field at the time of sampling, which is -4.2°, using the International Geomagnetic Reference Field (IGRF-11th generation) model. The archaeomagnetic dates for each feature was then calibrated against the geomagnetic model for the Holocene (*Ch 1, p 27*; Table 39). Although this calibration method gives a plethora of date ranges for each dated feature, taking into account the archaeological interpretation and radiocarbon determinations, the most probable date ranges for the cooling down events are: 1200-1090 BC for hearth ***4357***; and 1080-730 BC and 710-630 BC for burnt layer ***4221***.

A good selection of the features and deposits associated with the settlement also produced organic materials that were suitable for radiocarbon dating. Therefore, 18 dates were obtained, which allowed the dating of

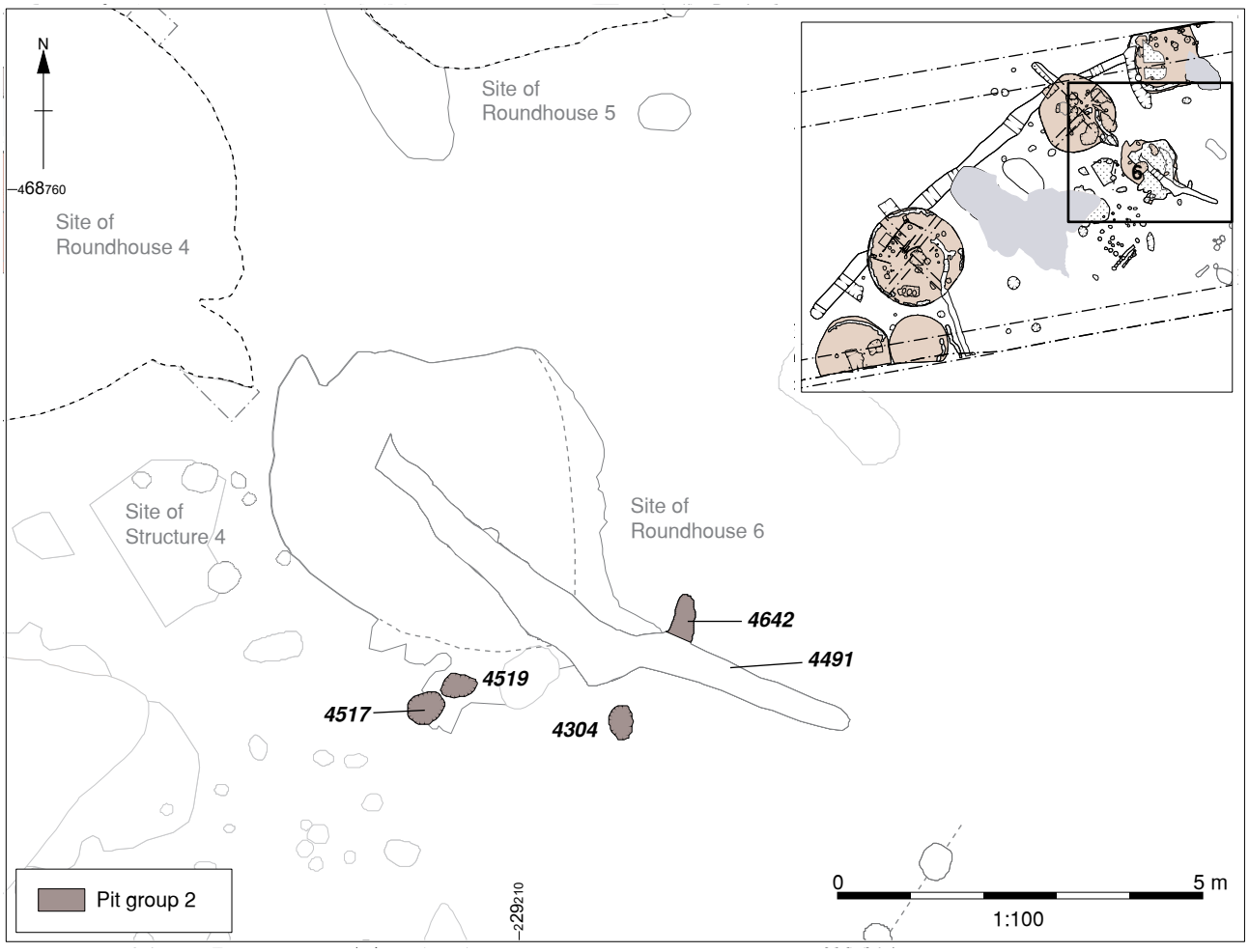


Figure 120: Pits in the north of the settlement

Feature	Hearth *4357*	Burnt layer *4221*
Location – latitude:	54.084°N	54.084°N
Location – longitude;	4.627°W	4.627°W
Magnetic deviation:	-4.2°	-4.2°
Number of samples (taken/used in mean):	10/6	13/11
AF demagnetisation applied:	Yes	Yes
Distortion correction applied:	No	No
Declination (at Meriden):	23.8	1.7
Inclination (at Meriden):	63.4	54.3
Alpha-95:	4.7	8.6
k:	202.95	29.31
Calibration Method Utilised:	Pavón-Carrasco *et al* 2014	Pavón-Carrasco *et al* 2014
Date range (95% confidence):	11410-11150 BC, 9340-8950 BC, 7160-6200 BC, 5490-4570 BC, 4520-3040 BC, 2780-2630 BC, 2590-1530 BC, **1200-1090 BC**, AD 90-490, and AD 1080-1600	12000-11820 BC, 11130-10970 BC, 9430-8990 BC, 5360-5200 BC, 4620-4470 BC, 3740-3550 BC, **1080-730 BC, 710-630 BC**, and AD 950-1140

Table 39: The archaeomagnetic dating evidence from hearth **4357** *and burnt layer* **4221**. *The dates in bold represent the most likely date for the cooling down event*

most of the roundhouses, apart from Roundhouse 3, as well as Structure 3, and Middens 1 and 2. These samples comprised a selection of bird and animal bone, as well as charred cereals, charred grass and heather, and together the dates clearly indicated that the roundhouses and middens belonged to a later Bronze Age settlement, spanning the thirteenth to ninth centuries cal BC (Table 40).

Two sets of radiocarbon dates were duplicates, from Midden 2 and oven ***4616*** in Roundhouse 5, those from Midden 2 passing the chi-square test (*Ch 1, p 27*) indicating that these were statistically consistent and could be of the same age (Table 41). In contrast, the dates from the oven failed the test, although not by any great margin, and this might suggest that this structure, and in turn the

Location	Sample	Material	Uncalibrated date BP	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence)	*Modelled date (95% confidence)*
Roundhouse 1; gully ***4620***	SUERC-53409	Charred culm (Poaceae) fragment	2985±30	-26.6	1370-1120 cal BC	*1240-1080 cal BC*
Roundhouse 1; posthole ***4556***	SUERC-53404	Charred bread-wheat-type (*Triticum* cf *aestivum*-type) grain	2927±28	-24.2	1220-1030 cal BC	*1180-1010 cal BC*
Roundhouse 1; burnt layer ***4366***	SUERC-53391	Charred wheat (*Triticum* sp; glumed) grain	2922±30	-23.8	1210-1020 cal BC	*1180-1010 cal BC*
Roundhouse 2; hearth ***4453***	SUERC-53402	Charred naked barley (*Hordeum* sp var *nudum*) grain	2875±30	-23.7	1190-940 cal BC	*1130-940 cal BC*
Roundhouse 2; hearth ***4451***	SUERC-53403	Charred barley (*Hordeum* sp; hulled) grain	2901±30	-22.6	1210-1000 cal BC	*1190-1000 cal BC*
Structure 3; posthole ***4425***	SUERC-53392	Heath/heather (*Erica* sp/*Calluna vulgaris*) charcoal	2924±30	-26.6	1210-1020 cal BC	*1190-1020 cal BC*
Structure 3; pit ***4546***	SUERC-53410	Charred rhizome (indeterminate)	2878±30	-26.3	1190-940 cal BC	*1160-940 cal BC*
Roundhouse 4; hearth ***4357***	SUERC-53400	Heath/heather (*Erica* sp/*Calluna vulgaris*) charcoal	2866±30	-26.4	1130-930 cal BC	*1120-940 cal BC*

Table 40: Radiocarbon dates from the later Bronze Age settlement

Location	Sample	Material	Uncalibrated date BP	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence)	*Modelled date (95% confidence)*
Roundhouse 4; posthole ***4351***	SUERC-53390	Alder (*Alnus glutinosa*) charcoal	2914±30	-26.2	1210-1020 cal BC	*1190-1010 cal BC*
Roundhouse 5; oven ***4616***	SUERC-53405	Charred barley (*Hordeum* sp) grain	2843±30	-24.1	1110-920 cal BC	*1110-920 cal BC*
Roundhouse 5; oven ***461***6	SUERC-79969	Charred wheat (*Triticum* sp; glumed) grain	2937±26	-23.4	1220-1050 cal BC	*1210-1040 cal BC*
Roundhouse 5; carbonised deposit ***4457***	SUERC-53393	Charred bread-wheat-type (*Triticum* cf *aestivum*-type) grain	2833±30	-24.5	1090-910 cal BC	*1090-910 cal BC*
Roundhouse 5; posthole ***4470***	SUERC-53394	Charred emmer wheat (*Triticum* cf *dicoccum*) grain	2827±30	-23.4	1070-900 cal BC	*1070-910 cal BC*
Roundhouse 6; hearth ***4356***	SUERC-53399	Alder (*Alnus glutinosa*) charcoal	2780±30	-25.4	1000-840 cal BC	*1010-870 cal BC*
Roundhouse 6; posthole ***4522***	SUERC-53401	Charred naked barley (*Hordeum* sp var *nudum*) grain	2695±30	-24.3	900-810 cal BC	*980-820 cal BC*
Midden 1; midden concentration ***4193***	SUERC-79965	Pig bone	2815±26	-21.2	1040-900 cal BC	*1040-910 cal BC*
Midden 2; soil ***4443***	SUERC-53395	Charred barley (*Hordeum* sp) grain	2837±30	-24.3	1110-910 cal BC	*1110-920 cal BC*
Midden 2; soil ***4443***	SUERC-79961	Cormorant bone	3034±28	-12.8	1030-750 cal BC	*1040-770 cal BC*

Table 40: Radiocarbon dates from the later Bronze Age settlement (cont'd)

Location	Sample	Radiocarbon age (BP)	Chi-square test
Roundhouse 5: oven ***4616***	SUERC-53393	2833±30	Failed: T′=5.61, T′(5%)=3.8; v=1; A_{comb}=29.1%(An= 50%)
	SUERC-79969	2937±26	
Midden 2	SUERC-53395	2837±30	Passed: T′=1.57, T′(5%)=3.8; v=1; A_{comb}=71.6%(An= 50%)
	SUERC-79961	3034±28	

Table 41: Chi-square test on duplicate dates from the later Bronze Age settlement

roundhouse, was used over a comparatively long period of time, being an enduring and important feature of the settlement.

All of the radiocarbon dates from the settlement were also subjected to Bayesian modelling, using OxCal (*Ch 1, p 27*). Within this model (Fig 121), the dates were placed in a broad *'Settlement'* phase, and within this, the dates associated with three of the individual roundhouses were placed within discrete sub-phases (*'Roundhouse 2'*; *'Roundhouse 4'*; and *'Roundhouse 6'*), and similarly those dates associated with Structure 3 were placed within a discrete sub-phase (*'Structure 3'*). Based on stratigraphic relationships, it was also possible to create two distinct sequences, which could be inserted into the overall *'Settlement'* phase. One of these *('Roundhouse 1'*) contained a single date (SUERC-53409) that seems to relate to the initial occupation of Roundhouse 1, followed by two dates that probably derived from its final occupation (*'Final occupation Roundhouse 1'*). The other sequence (*'Roundhouse 5'*), contained those dates relating to the construction/occupation of Roundhouse 5 *('Occupation'*), followed by the pair of statistically consistent dates (*above*) derived from a stratigraphically later midden (*'Midden 2'*); the statistically consistent dates from this midden (*above*) were combined and entered into the model as a 'prior' and also as a *Terminus post quem* (After), as they could date activity that occurred before the deposition of the midden (*ie* they might have originally accumulated in an earlier midden and then have been later deposited in Midden 2; *Ch 7, p 244*).

The model provides estimated date ranges for each of the radiocarbon dates from the settlement (Table 40). It also provides estimated dates for several key parameters relating to the 'Start' and 'End' of the settlement, and the 'First' and 'Last' use of the dated roundhouses and Structure 3 (Table 42).

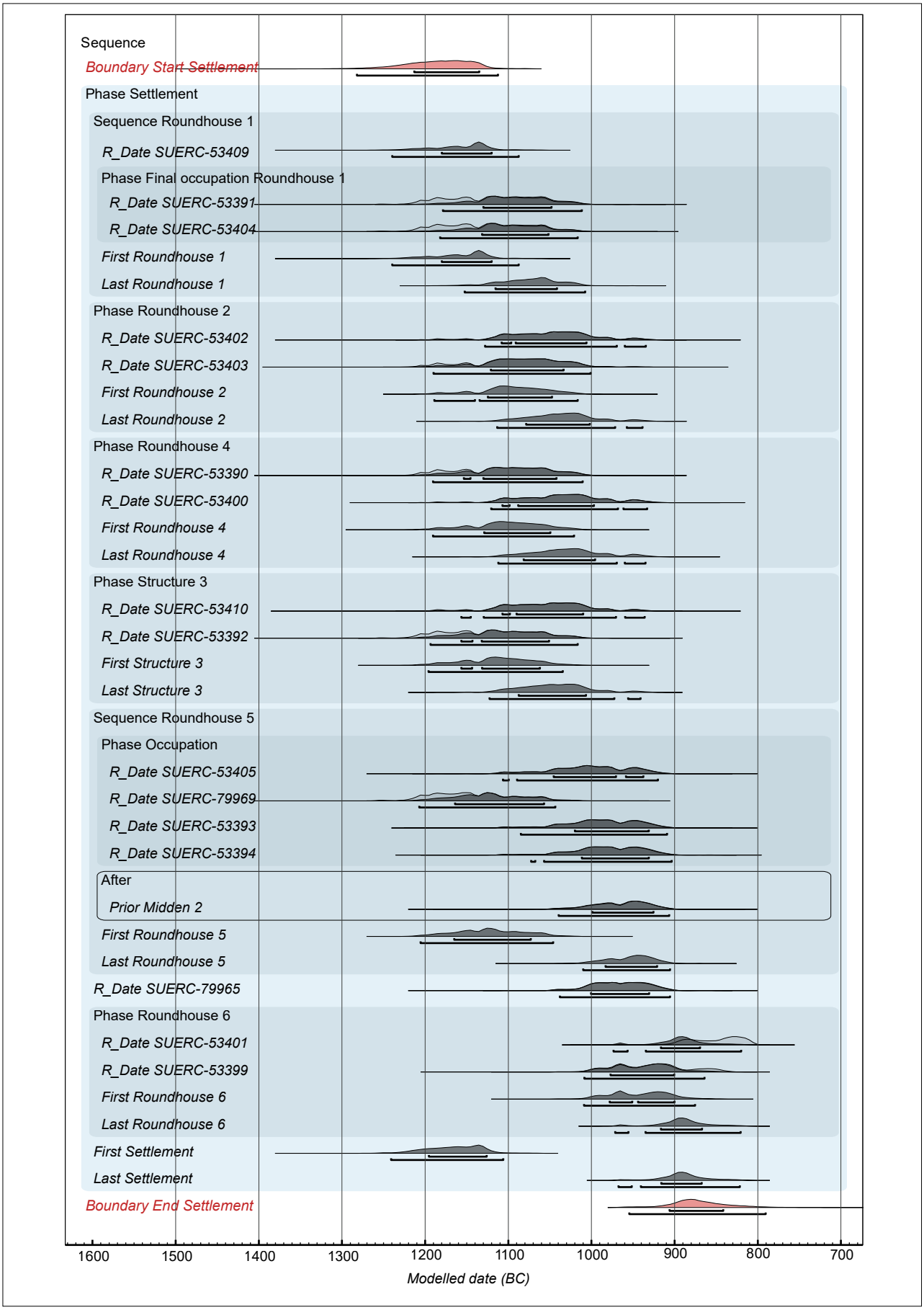


Figure 121: Modelled radiocarbon dates from the late Bronze Age settlement

Start Settlement	*1290-1110 cal BC*
End Settlement	*970-790 cal BC*
First Settlement	*1250-1100 cal BC*
Last Settlement	*970-820 cal BC*
First Roundhouse 1	*1240-1080 cal BC*
Last Roundhouse 1	*1160-1000 cal BC*
First Roundhouse 2	*1190-1010 cal BC*
Last Roundhouse 2	*1120-940 cal BC*
First Structure 3	*1200-1030 cal BC*
Last Structure 3	*1130-940 cal BC*
First Roundhouse 4	*1200-1020 cal BC*
Last Roundhouse 4	*1120-930 cal BC*
First Roundhouse 5	*1210-1040 cal BC*
Last Roundhouse 5	*1020-900 cal BC*
First Roundhouse 6	*1010-870 cal BC*
Last Roundhouse 6	*980-820 cal BC*

Table 42: Estimated date ranges of key parameters associated with the occupation of the later Bronze Age settlement

The model was also queried to test the probability that the dates associated with the roundhouses, Structure 3, and middens fell within defined 100-year timespans (Table 43). Importantly, this suggested that the primary structure, Roundhouse 1, was most likely (*c* 83% probability) to have been built in *1200-1100 cal BC*, though there is a slim chance (*c* 12% probability) that it was slightly earlier, perhaps being established in *1250-1200 cal BC* (Fig 122). Significantly, this roundhouse, the first on the site, also sealed the Phase 1 boundary (*p 174*), providing a *terminus ante quem* for this feature, suggesting that it was in existence immediately prior to *c* 1200 cal BC.

While Roundhouse 1 was still in use, the settlement then seems to have expanded with the construction of Roundhouses 2-5 and Structure 3, again probably at some stage in *1200-1100 cal BC*. It is also possible that Structure 4 was contemporary with this expanded settlement. A midden also began to accumulate, at the centre of the excavated area, with Roundhouses 1-3 to its south-west, Roundhouses 4 and 5, and Structure 4, to its north-east, and Structure 3 on its south-eastern side. The radiocarbon evidence suggests that Roundhouses 1, 2, and 4, and Structure 3, were abandoned in *1100-1000 cal BC*, as the 'Last' dated events associated with these have a *c* 73-79% probability of falling within this timespan. Roundhouse 3, although undated, may also have been abandoned at a similar time. However, it seems that Roundhouse 5 continued to be occupied, being finally abandoned in *1000-900 cal BC* (with a *c* 94% probability that its 'Last' dated event falls in this period). The abandonment of this latter structure was associated with a phase of activity, referencing this roundhouse. This entailed the construction of two cairns, and the creation of another midden (Midden 2).

Following the abandonment of Roundhouse 5, Roundhouse 6 was built, indicating that settlement activity resumed in the excavated area in Phase 3. The radiocarbon evidence suggests that Roundhouse 6 was most probably established in *1000-900 cal BC* (with *c* 86% probability that it occurred then) and was perhaps abandoned in *900-800 cal BC* (with a *c* 66% probability for this). Again, following abandonment, the site of this house and its immediate environs were commemorated through the construction of two cairns.

Finds, activity areas, and disposal

An important aspect of the later Bronze Age settlement was the comparative wealth of artefactual and palaeoenvironmental remains produced, including worked stone, ceramics, metalwork, animal bone, and

Prior Date	**1250-1200 cal BC**	**1200-1100 cal BC**	**1100-1000 cal BC**	**1000-900 cal BC**	**900-800 cal BC**
First Roundhouse 1	12.2%	**83.2%**	4.0%	0%	0%
Last Roundhouse 1	0%	21.6%	**78.2%**	1%	0%
First Roundhouse 2	1.6%	57.8%	40.6%	0%	0%
Last Roundhouse 2	0%	8.4%	**79.8%**	11.9%	0%
First Structure 3	0.5%	40.8%	58.3%	0.4%	0%
Last Structure 3	0%	4.6%	**79.4%**	16.2%	0%
First Roundhouse 4	1.0%	47.8%	51.6%	0.2%	0%
Last Roundhouse 4	0%	4.4%	**73.4%**	22.5%	0%
First Roundhouse 5	2.3%	**66.2%**	31.0%	0%	0%
Last Roundhouse 5	0%	0%	5.3%	**93.7%**	1%
First Roundhouse 6	0%	0%	4.2%	**86.0%**	10.2%
Last Roundhouse 6	0%	0%	0%	34.4%	**65.8%**
First Settlement	16.1%	**82.1%**	1.3%	0%	0%
Last Settlement	0%	0%	0%	30.2%	**69.8%**

Table 43: The probabilities that the modelled dates from the later Bronze Age settlement fall within specific 100-year timespans

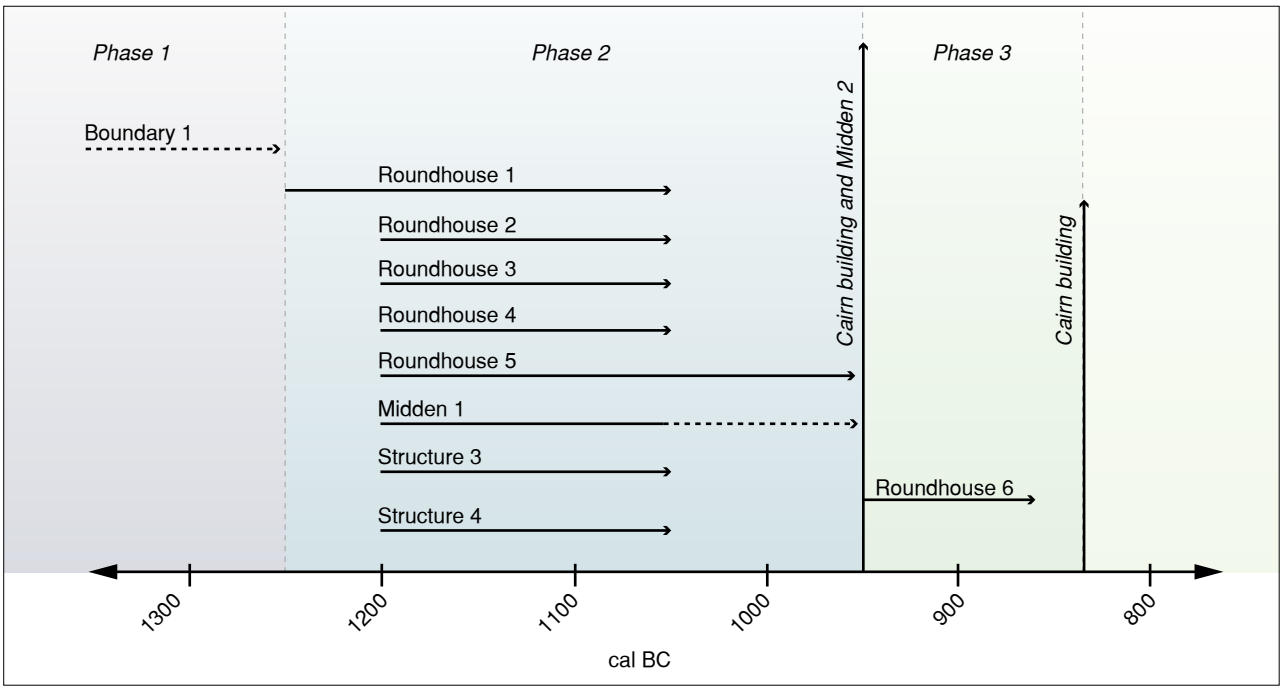


Figure 122: The chronology of the later Bronze Age remains

plant remains, providing insights into domestic life, craft production, and the economy of the settlement (*Ch 7*). However, the spatial distributions of these items are also highly significant, as they provide valuable evidence for activity within the excavated settlement area.

The flaked lithics, both stone tools and material relating to tool production, were limited (135 items; *Ch 7, pp 211-12*), but some concentrations were apparent. Just under a quarter of the assemblage was recovered from Midden 1 (concentrations ***4188***, ***4193***, and ***4213***; Fig 123), indicating that some stone-working waste was actively dumped onto this. There was also a notable assemblage from ***4213*** (*p 189*), suggesting that the north-western part of the midden was a favoured place for dumping this. Perhaps significantly, Roundhouse 1 faced onto this, and it may be that stone working formed one of the activities associated with this house. Indeed, this is supported, in some measure, by the fact that its interior also contained a marked concentration of lithics. Two other concentrations were apparent, within Roundhouses 4 and 5, indicating that sporadic, and perhaps opportunistic, knapping occurred within them.

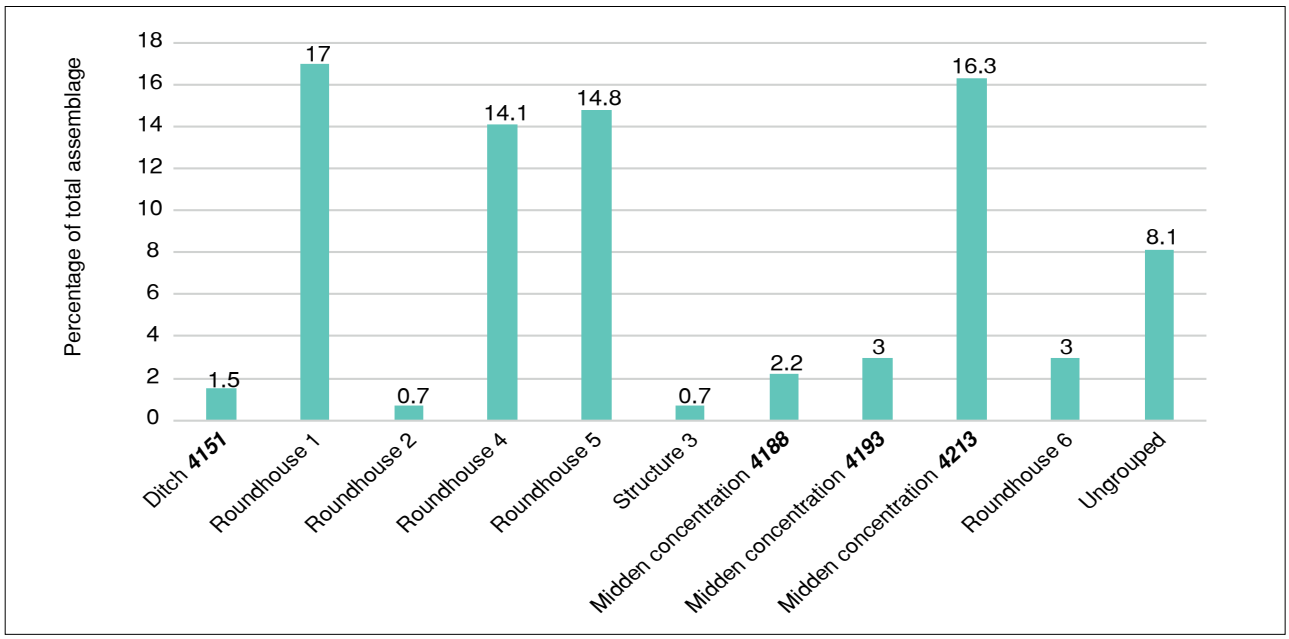


Figure 123: The frequency of flaked-stone tools within the later Bronze Age settlement

The coarse-stone objects included quern fragments from a pit within Structure 4, which together with a pottery vessel might have been intentionally placed as a ritual deposit (*p 188*). Querns were also recovered from Midden 1, and Roundhouses 1 and 2 (*Ch 7, p 209*), the latter being probably more significant, in that they indicated food preparation within them, presumably associated with domestic habitation. Indeed, it is also notable that both contained large central hearths, associated with structures that were probably designed to suspend a cooking pot over the fire. In this context, it is also worth noting that Roundhouse 1 contained a pot stand (*p 179*), which perhaps secured ceramic vessels containing drinking water.

The later Bronze Age pottery is particularly informative, if it can be assumed that it was found *in situ*. Analysis indicates that the two different fabric types within the assemblage comprise small amounts of fineware (Fabric 1; *c* 15% of the assemblage) and a larger amount of coarseware (Fabric 2; *Ch 7, p 219*). When the distributions of these are considered together certain patterns emerge (Fig 124).

It is evident that Roundhouses 1-3, and 6, were comparatively 'clean', containing only limited amounts of pottery, suggesting that these structures were regularly cleared of any waste material. Indeed, in the case of Roundhouses 1 and 2, keeping the living areas free from waste may have been an important feature associated with later Bronze Age habitation. At a gross level, most of the pottery derived from Midden 1, indicating that this area was receiving both ceramics and other domestic waste. The largest concentration was found on the south-western edge of the midden, much being found on the southern side of concentration ***4188*** (*p 190*). One possibility is that this pottery ultimately derived from Roundhouse 1 to the west, and, as this house probably had an east-facing entrance (*p 176*), it could reasonably be suggested that domestic rubbish was being removed and dumped, at a culturally acceptable distance, outside the door, within the adjacent midden. However, it is also possible that, initially, the material was dumped directly outside the door, after which it was then swept into the midden, with each clearance episode tidying and pushing into its predecessor. This pattern of disposal would certainly explain the large concentration,

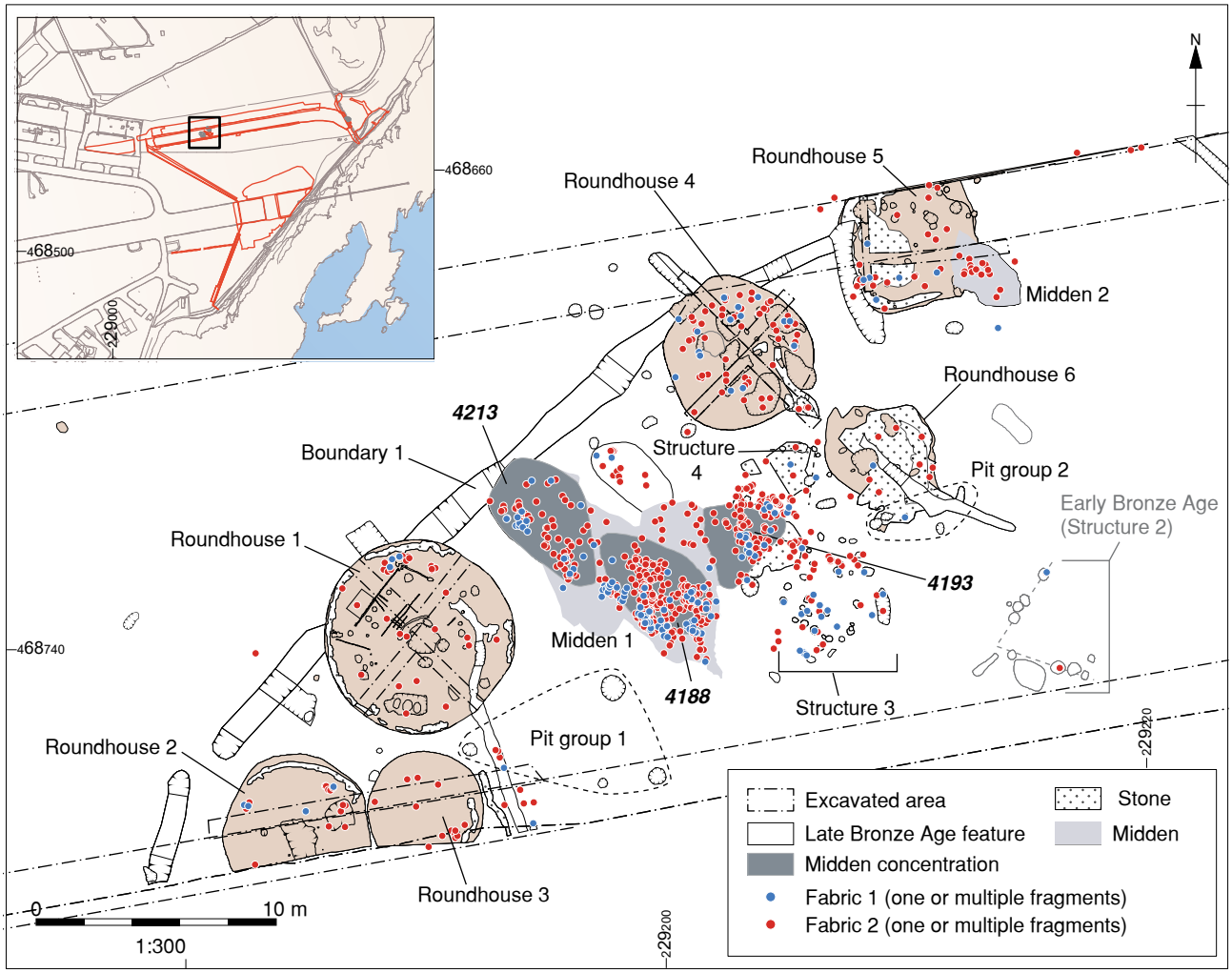


Figure 124: The distribution of pottery (Fabrics 1 and 2) across the later Bronze Age settlement

and, tellingly, this process of clearing chimes with those archaeological and anthropological accounts of compounds and courtyards immediately outside a domestic dwelling being kept extremely clean, often by sweeping (*cf* Yensch 1994). Presumably, a similar process may explain the concentrations of lithics on this side of the midden, which may have been ultimately derived from Roundhouse 1 (*p 176*).

Although Roundhouse 1 was comparatively clean, it is evident that there was a single concentration of pottery, comprising both Fabrics 1 and 2, towards its northern side. This was close to one end of the putative wattle-and-daub dividing wall, demarcating a small area beneath the eaves (*p 176*). This may reflect the position of a storage area for dry foodstuffs, perhaps stored in pottery vessels, which might have been expected to be protected from breakage or spillage caused by day-to-day activity in the rest of the dwelling space. Another feature is the almost complete lack of pottery from the central hearth area. This may again be a trait associated with the domestic use of the structure; similarly, the central hearth of Roundhouse 2 was also relatively devoid of pottery.

The other roundhouses and structures all had markedly different pottery distributions. Roundhouse 4 had a relatively even distribution across the internal space, with perhaps slight concentrations in or around cut features, although this might well be a largely accidental phenomenon, with rubbish falling into depressions or pits in the floor. There also appears to have been little pottery close to the walls, perhaps indicating the positions of large, and relatively impenetrable, objects along the inside of these walls. There was a marked concentration of pottery associated with Structure 3, with lesser amounts associated with Structure 4 and Roundhouse 6. Generally, however, there do not appear to be any particular trends in the distribution, beyond a slight tendency for the sherds to be associated with postholes.

The distribution of the crucible and mould fragments (including fragment of amorphous fired clay), relating in most cases to the melting and casting of bronze, is informative (Fig 125). These were concentrated within Structure 3 and Roundhouse 4, indicating that these were the focus for metalworking activities, probably both functioning as workshops. Support for this was

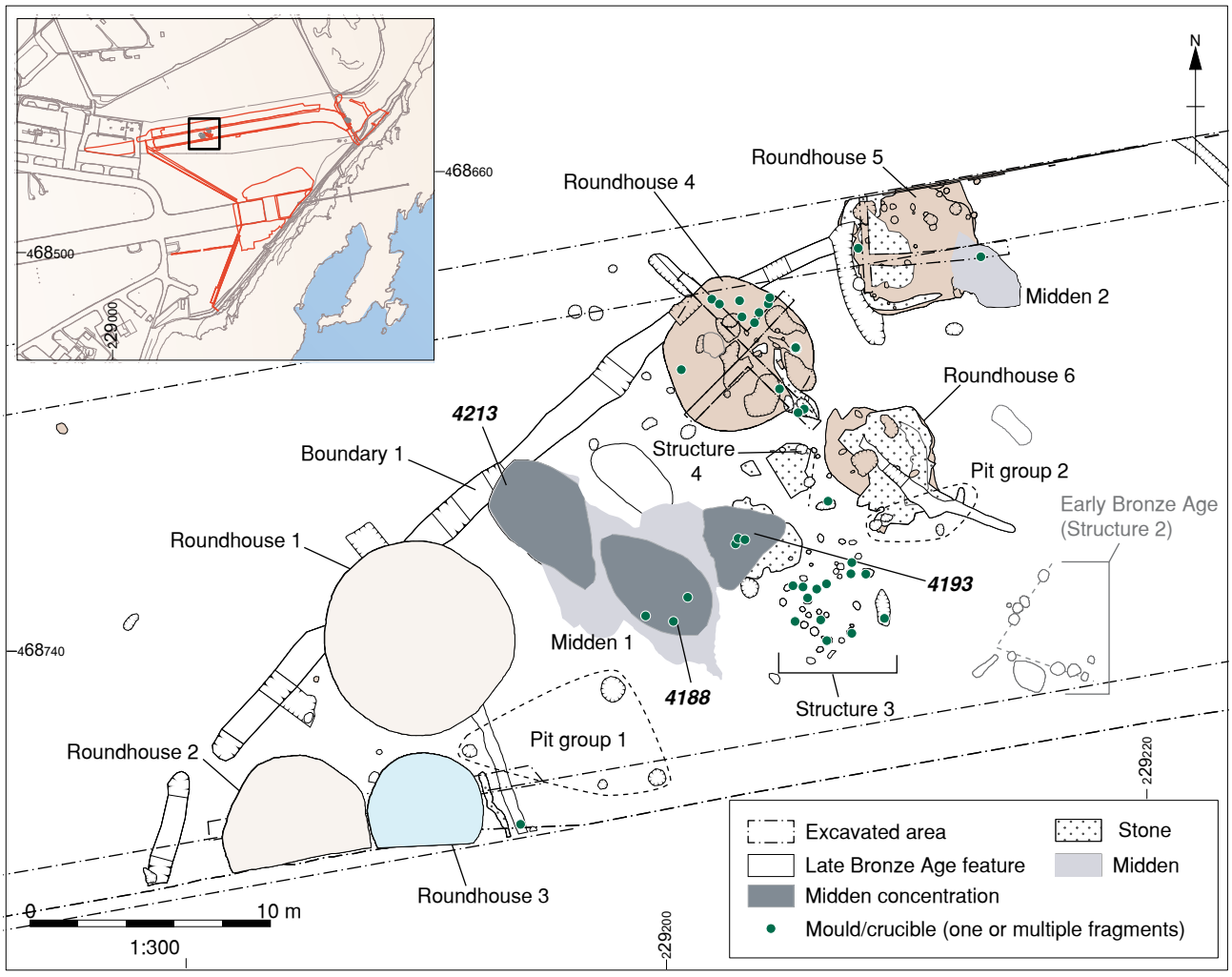


Figure 125: The distribution of ceramic mould and crucible fragments across the later Bronze Age settlement

provided by the large hearth in Structure 3 (*p 186*), almost certainly used in melting and casting bronze, together with the copper-alloy fragments from this structure, whilst similarly numerous metallic drips were found in Roundhouse 4 (*p 181*). These lead drips imply that both bronze casting and lead working occurred in this building.

Very few of these crucible and mould fragments were present in Midden 1; perhaps moulds were broken and discarded within the area of production, rather than being something which had to be systematically cleared away. The manner in which cast-metal objects are removed from multipart moulds means that these are usually broken into relatively small fragments (*eg* Hodges 1960), and it is quite easy to see that these were simply dropped at the workplace, tossed back into the hearth used for melting the metal, or trampled into the floor. This seems to have been the case in both Structure 3 and Roundhouse 4. In the former, the material was concentrated around the hearth, whilst in Roundhouse 4, there was a particularly dense concentration in its north-eastern quadrant, presumably indicating that activity was focused in this part of the building. It is also evident that the metalworking area was at the rear of the building, to the north-east of the central hearth, and also seems to have been bounded by the timber partition wall, defined by several postholes (*p 181*). It is therefore possible that this screened off the activity, or protected it from gusts of wind from the doorway on the south-eastern side of the building.

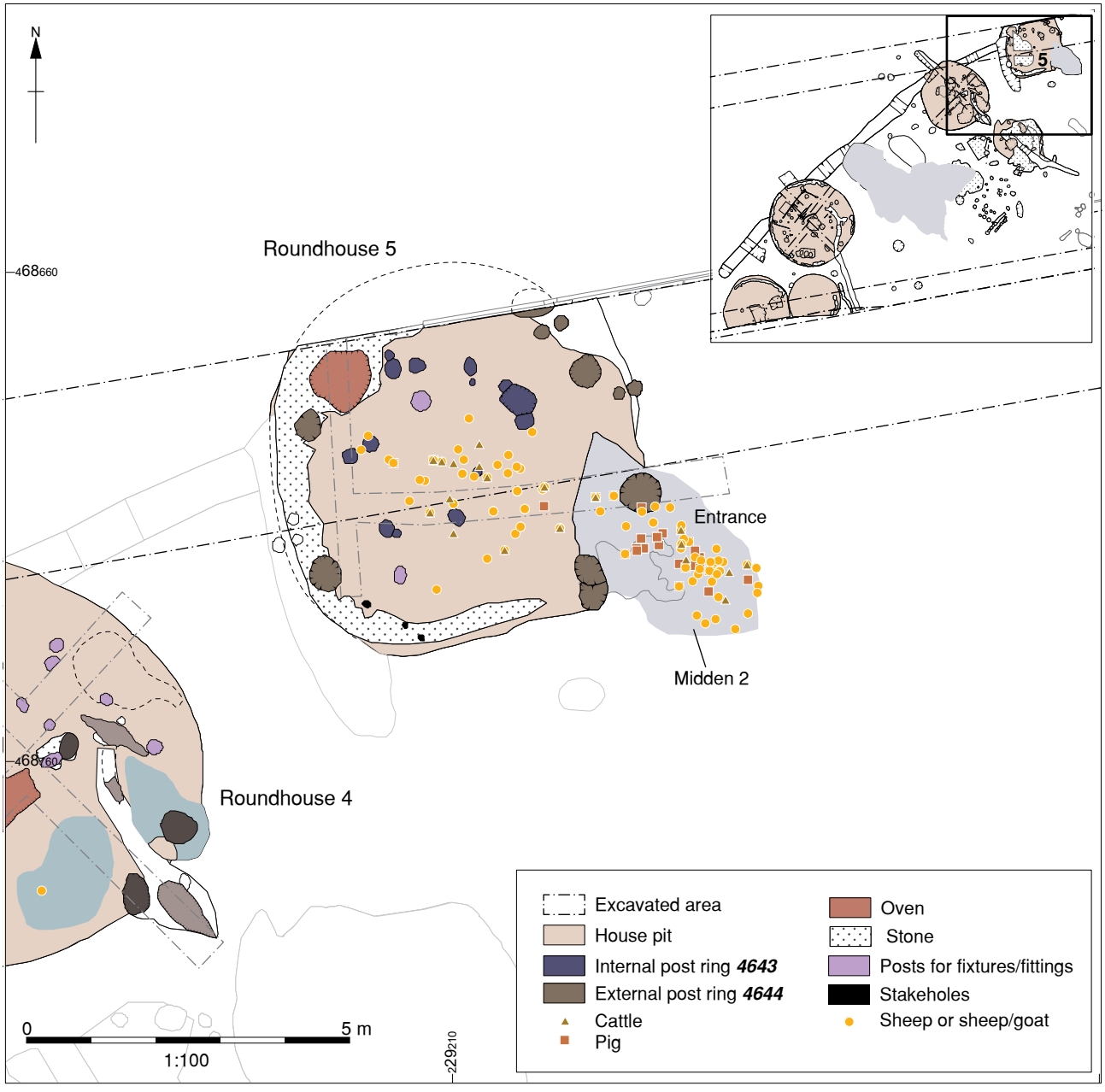


Figure 126: Distribution of animal bone within Roundhouse 5

The distribution of the palaeoenvironmental remains provides further insights into the functioning of the settlement. Unsurprisingly, much of the animal bone (*Ch 7, p 231*), was concentrated in the middens (*p 188, p 193*). However, a proportion also came from within Roundhouse 5 (Fig 126). Much came from demolition deposits (***4348***, ***4383***, and ***4457***; *p 192*), suggesting that this was material left in that house at the time of its demolition. The presence of these animal bones, and their general absence in the other roundhouses, might suggest that Roundhouse 5 had a strong connection with food processing. Moreover, it also contained a probable oven, which presumably could have been used to dry grain and/or bake bread. In fact, one tentative suggestion is that the apparent feasting (*p 193*) associated with Roundhouse 5, following its abandonment and the creation of Midden 2, which also seems to have contained animal bones redeposited from Midden 1 (*p 188*; *Ch 7, p 232*), was a way of commemorating the former function of this house.

The distribution of cereals (*Ch 7, p 246*), although conditioned by preservation, might also provide further evidence for the function of particular roundhouses. A fairly rich assemblage was recovered from Roundhouse 5, which again provides support for a connection with food. Others came from Roundhouses 1 and 2, providing evidence for the domestic use of these buildings. Roundhouse 6 also produced an assemblage of charred cereals, which, by implication, might suggest that this building had a domestic function.

Combining all the evidence, it seems likely that Roundhouse 1, which also seems to have been the primary structure, was domestic (Fig 127), primarily used for eating and sleeping, with some

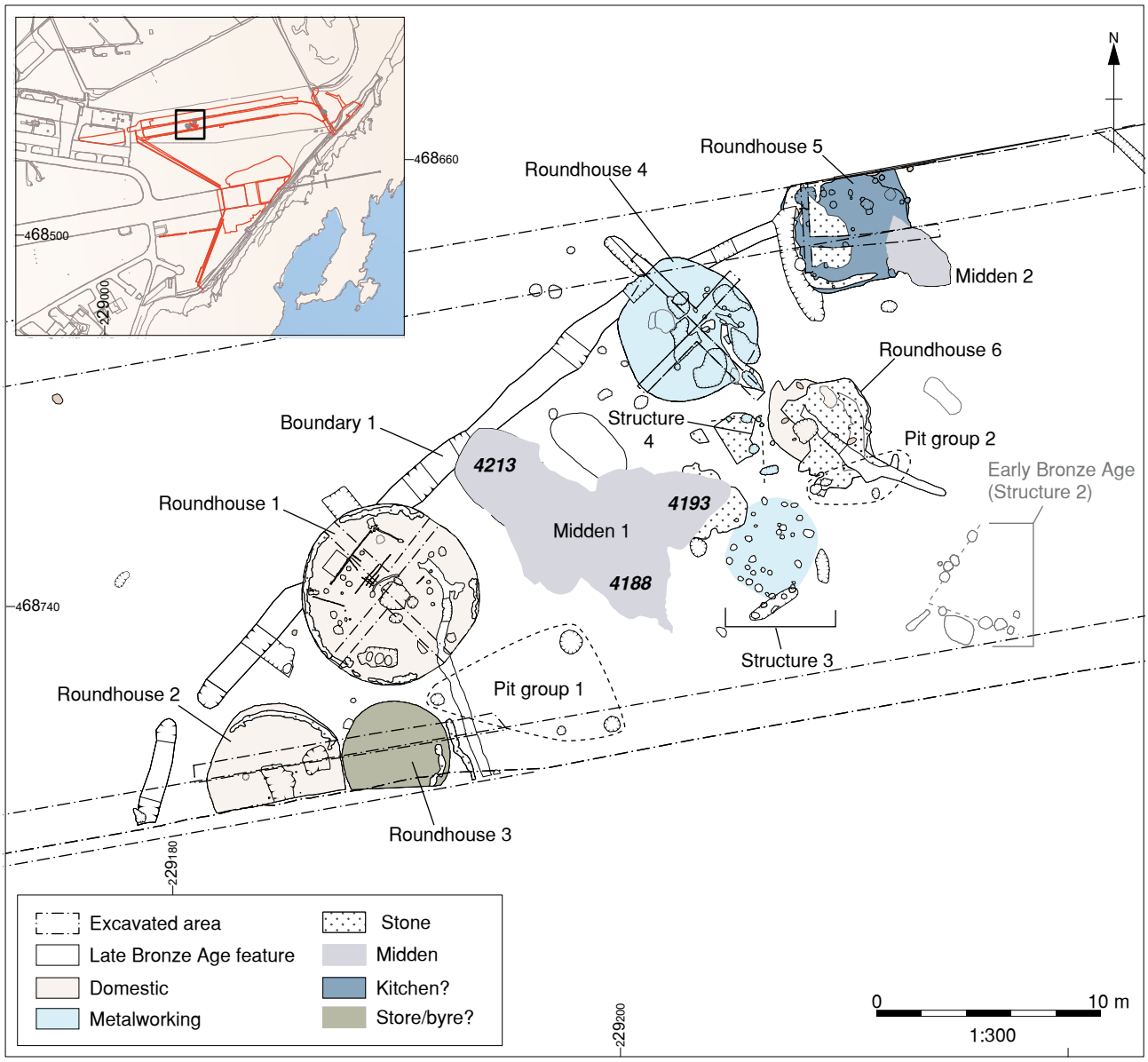


Figure 127: Possible activity areas in the later Bronze Age settlement

storage areas. Following the expansion of the settlement (*p 180*), Roundhouse 2 was also likely to have had a domestic use, and was linked to an ancillary building (Roundhouse 3). The general lack of internal features, as well as artefacts and ecofacts, suggests that the latter functioned as a byre or store. Within the expanded settlement, metalworking was undertaken in Roundhouse 4 and Structure 3, both of which were probably workshops, with Structure 3 involved in bronze casting, and Roundhouse 4 used for both bronze casting and the working of lead. The other elements of the settlement were Structure 4, the function of which remains unclear, and Roundhouse 5, which seems to have been a 'kitchen', since it was associated with food processing and perhaps baking. Following the demise of the main settlement, the small roundhouse (6; *p 194*) seems to have been domestic. It is worth stressing, however, that the excavated remains at Taxiway Alpha East only formed one small portion of a much larger settlement. Indeed, it seems quite likely that a large, later Bronze Age village was actually present at the airport, which extended between the main runway and the new taxiway at least. This village would have contained numerous roundhouses and ancillary buildings, comparable to those found at Taxiway Alpha East (*Ch 11, p 340*).

7

LATER BRONZE AGE FINDS AND ENVIRONMENTAL REMAINS

Andrew Bates, Dot Boughton, Ann Clarke, Antony Dickson, Denise Druce, Christine Howard-Davis, Rebecca Nicholson, Aidan Parker, and Ian Smith

One significant outcome of the excavations at Taxiway Alpha East was the recovery of a comparatively large assemblage of artefacts and ecofacts, clearly related to domestic life and activity within the later Bronze Age settlement (*Ch 6*). Although large quantities of Bronze Age artefacts had previously been recovered from the airport during the excavation of the Ronaldsway Village (*Ch 1, p 8*), the cultural material from Taxiway Alpha East differs in one major respect, in that the precise find spots have been recorded, both stratigraphically and spatially. This therefore allows items to be related to particular features within the settlement and, in turn, allows a more nuanced and enhanced understanding of the activities occurring within the settlement, together with the foci for some of the activities identified.

A good range of domestic material was found, including worked stone, pottery, and other ceramic objects, such as moulds and crucibles, along with metalwork. The palaeoenvironmental remains, animal bones and plant remains, were also comparatively rich, deriving from various features, including the middens associated with both the occupation and abandonment of the settlement, and from deposits and features associated with specific roundhouses.

Finds

Coarse-stone tools
A Clarke

A complete saddle quern and four quern fragments (Fig 128), all made from coarse-grained sedimentary rocks, were recovered from the later Bronze Age settlement. The complete quern (1884) was found in a stone setting (***4459***) in Roundhouse 1 (*Ch 6*; *p 177*), whilst two of the fragments (1354), from the same quern, came from pit ***4344*** (*Ch 6*; *p 188*), associated with Structure 4. Of the remaining fragments, one (185) came from Midden 1 (*Ch 6*; *p 188*), whilst the other (1701) was in a deposit directly above a hearth (***4453***; *Ch 6*; *p 180*) in Roundhouse 2.

The concave worked faces on the complete quern and the fragments from Midden 1 and pit ***4344*** are very shallow, and are worn right out to the edges. A comparable type of shallow saddle quern has been recovered from a site in Angus, Scotland, radiocarbon dated to the Middle Bronze Age (Gray and Suddaby 2010). In contrast, the other fragment (1701) appears to have a deeper and more asymmetrical working trough.

A perforated cobble (193) was also found in Midden 1, which appears to have been naturally produced, a sediment-boring bivalve presumably creating the perforation (Fig 129). However, it had clearly been deliberately collected and brought to the site, but whether this was for a practical purpose or something more esoteric is not known. It is worth noting that one complete perforated stone and two partially perforated examples were also found during the Ronaldsway Village excavations (Cubbon 1938; *Ch 1, p 8*), but without illustrations it is impossible to say whether they are similar to the example from Taxiway Alpha East.

One other possible later Bronze Age coarse-stone tool was discovered, presumably originally from the settlement. Although it was unstratified. This is a pounder/grinder, a fine tool made from an oval quartzite cobble. Smooth facets have been shaped on either end by grinding; on one end, three facets were ground across the width of the cobble, forming ridges, whilst on the opposite end, two ground facets form a central ridge. One of the flat faces has been worn smooth with a slight polish, and on the opposite face there is some smoothing with pecking damage.

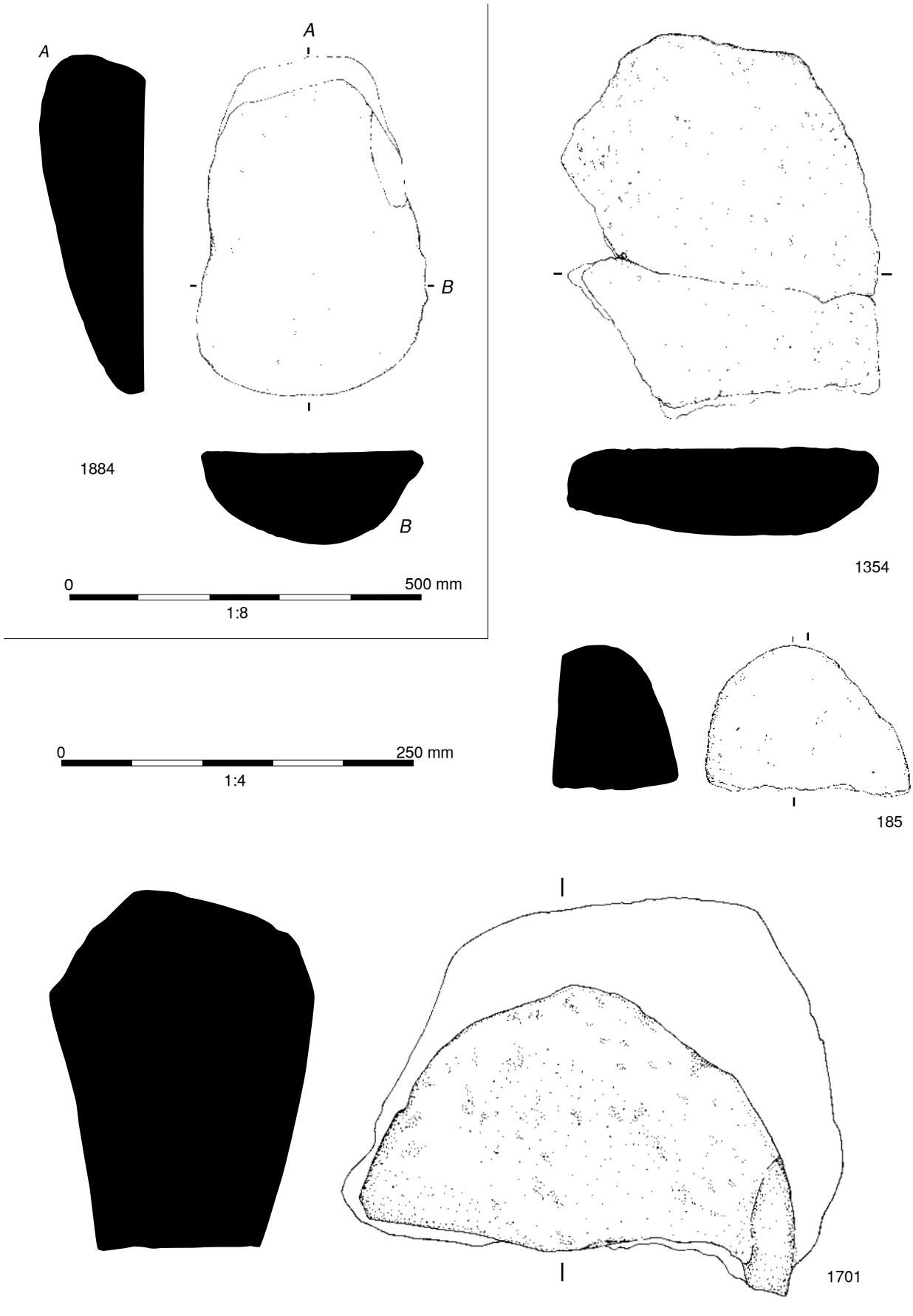


Figure 128: A complete saddle quern and quern fragments from the later Bronze Age settlement

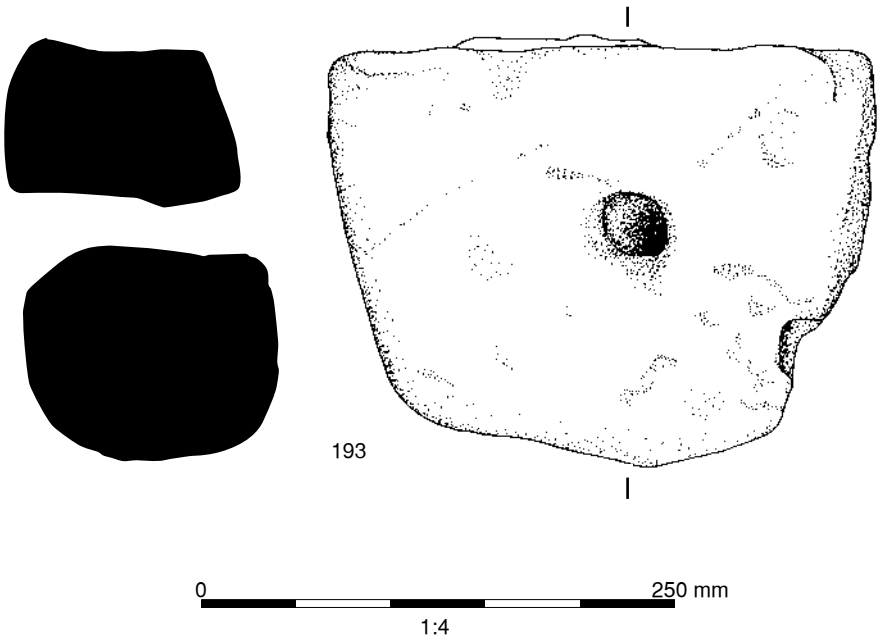


Figure 129: The cobble from Midden 1, with a natural perforation

Flaked lithics

A Dickson and A Parker

A small assemblage of flaked lithics was also recovered from the later Bronze Age settlement. This included several items that were clearly residual, as they were typologically Neolithic (*Ch 5, p 161*). In addition, 19 were unstratified, and eight flakes were natural thermal removals; these were not analysed. Of the 135 flaked lithics that were analysed, the majority probably date to the later Bronze Age, although some (such as the platform cores; *p 213*) could conceivably be from earlier periods.

Fifteen items came from the topsoil and disturbed natural deposits, whilst the remainder were stratified in the later Bronze Age settlement (Table 44). A few were associated with Phase 1 and 3 features, the former all from boundary ditch ***4151*** (*Ch 6, p 174*) and the latter from Roundhouse 6 (*Ch 6, p 194*). Small quantities

	Phase 1	**Phase 2**	**Phase 3**	**Phase 2/3?**	**Natural deposits**	**Topsoil**	***Total***	***% of total***
Broad blade	1	5		4		1	***11***	***8.1%***
Core		6	1	1	1	3	***12***	***8.9%***
Core tool		1		1			***2***	***1.5%***
Indeterminate chunk		13		5			***18***	***13.3%***
Indeterminate fragments		12					***12***	***8.9%***
Irregular flake		4				1	***5***	***3.7%***
Narrow blade		1		2			***3***	***2.2%***
Pebble		6	1	2			***9***	***6.7%***
Regular flake	1	32	2	4	1	3	***43***	***31.9%***
Retouched blade		3		2	1	2	***8***	***5.9%***
Retouched flake		6				1	***7***	***5.2%***
Utilised chunk		1			1		***2***	***1.5%***
Utilised flake		2		1			***3***	***2.2%***
Total	***2***	***92***	***4***	***22***	***4***	***11***	***135***	
% of total	***1.5%***	***68.1%***	***3%***	***16.3%***	***3%***	***8.1%***		

Table 44: The flaked lithics from the later Bronze Age settlement, by phase

	Phase 2							
						Midden 1		
	Roundhouse 1	Roundhouse 2	Roundhouse 4	Roundhouse 5	Structure 3	Midden concentration ***4188***	Midden concentration ***4193***	Midden concentration ***4213***
Broad blade			1	2			1	1
Core	1		3				2	
Core tool							1	
Indeterminate chunk	3		2	5			2	1
Indeterminate fragments	8		2	2				
Irregular flake	1		1	2				
Narrow blade				1				
Pebble	1	1		2			2	
Regular flake	8		8	4	1	2	8	1
Retouched blade			1			1	1	\
Retouched blake	1		1	2			2	
Utilised chunk							1	
Utilised flake							2	
Total	***23***	***1***	***19***	***20***	***1***	***3***	***22***	***3***
% of total	***25%***	***1.2%***	***20.6%***	***21.7%***	***1.2%***	***3.2%***	***23.9%***	***3.2%***

Table 45: The flaked lithics from the Phase 2 later Bronze Age settlement, by entity

were from Phase 2/3 deposits and pits/postholes beyond the structures and middens, classified as 'Ungrouped'. The majority were associated with the Phase 2 settlement (Table 45), from Roundhouses 1 (*Ch 6, p 176*), 2 (*Ch 6, p 180*), 4 (*Ch 6, p 181*), and 5 (*Ch 6, p 185*), Structure 3 (*Ch 6, p 186*), and Midden 1 (*Ch 6, p 188*). Of these, the largest quantity (*c* 30%) was found in Midden 1.

Most (97.5%) of the lithics had been produced on pebble flint, with very small amounts of chert (0.6%), quartz (0.6%), and material of indeterminate lithology (1.3%). Burnt lithics amount to *c* 10% of the total assemblage and the record of edge preservation among the debitage is good, with *c* 60% retaining relatively undamaged lateral edges. This may be an effect of the relatively low counts of burnt material, but also suggests insignificant impact on the majority of the assemblage from post-depositional processes. Furthermore, the pieces with good edge preservation were spread throughout the assemblage and no one context contained noticeable amounts of undamaged or, for that matter, damaged lithics.

At a gross level, the assemblage can be spilt into those lithics associated with primary technology and those which exhibit secondary technology. The former category comprised cores and related items, and blades and flakes, whilst the latter represents retouched tools and edge-utilised blades, chunks, and flakes.

Primary technology

At the settlement, pebbles, partially flaked chunks, and platform cores were used in the production of blade and flake blanks, and these can be divided into six core-classification categories (Table 46). Two are cores reduced from a prepared platform (SP/B-F and SP/F) and, similarly, 'core fragments' refers to fragments of platform cores, which are often too incomplete to classify further. The 'core-on-flake' category describes flake debitage that has been subjected to reduction. 'Flaked pebbles' form the fourth category, most examples from the settlement having numerous flake scars, and appear to represent the *ad hoc* flaking of nodules. The 'partially flaked chunks' are not diagnostic to any specific reduction strategy and probably also reflect the opportunistic flaking of small nodules. The latter two classifications dominate core technology and provide an insight into raw-material procurement, as well as the most commonly represented reduction strategy for Middle/ Late Bronze Age stone working at Ronaldsway.

	Phase 2					Phase 3	Phase 2/3?	Natural deposit	Topsoil	*Total*	*% of total*
	Roundhouse 1	Roundhouse 4	Roundhouse 2	Roundhouse 5	Midden 1 (concentration ***4193***)	Roundhouse 6	Ungrouped				
Core fragment					2		1			***3***	***13.6%***
Core on flake								1		***1***	***4.6%***
Flaked pebble	1		1	2	3	1	2			***10***	***45.4%***
Partially flaked chunk	1	3							1	***5***	***22.7%***
SP/B-F						1			1	***2***	***9.1%***
SP/F									1	***1***	***4.6%***
Total	***2***	***3***	***1***	***2***	***5***	***2***	***3***	***1***	***3***	***22***	
% of total	***9.1%***	***13.6%***	***4.6%***	***9.1%***	***22.7%***	***9.1%***	***13.6%***	***4.6%***	***13.6%***		

Note: SP= single platform; B= blade; F= flake

Table 46: The cores and flaked pebbles from the later Bronze Age settlement, by entity and sub-type/classification

Flaked pebbles and partially flaked chunks

Ten flaked pebbles were recorded (*eg* 1200; 1726; and 40013; Fig 130), forming the bulk of the core technology. Eight had five or more flake removals, suggesting a more deliberate approach to reduction beyond routine raw-material testing. In addition, average flake and blade scar sizes measure 18 x 17 mm and 20 x 7 mm respectively, smaller than the mean for the complete debitage (*p 215*). This suggests an improvised approach to reduction, whereby blanks were removed as and when needed for immediate use, rather than a pebble being completely reduced, in order that a range of blanks for different uses could be produced. It also hints at the possibility that knappers returned to these seemingly 'discarded' pebbles (*cf* Wickham-Jones and Holden 1999). Five partially flaked chunks (*eg* 1618; and 40031) were also associated with the settlement; there is not much difference between these chunks and the flaked pebbles in terms of size.

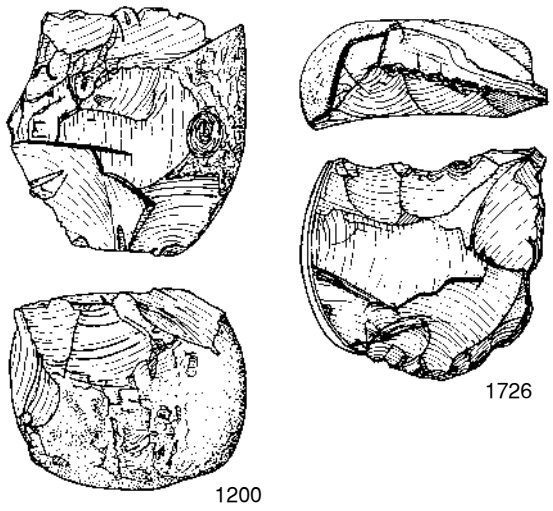
Both the flaked pebbles and the partially flaked chunks were reduced in a similar manner, whereby blades and flakes were removed from multiple directions, indicating that nodules were probably rotated as they were knapped, and blanks were struck from natural ridges, or the edges of earlier removals. The latter observation is backed up by the fact that no evidence for reduction from prepared platforms was identified on any of the pieces and, therefore, no traces of platform-edge preparation can be observed. The main difference between the flaked pebbles and chunks is the lack of cortical material remaining on the latter. Although this could be an indicator that the partially flaked chunks are nodules that have been reduced almost to exhaustion, the similarities in size to the pebbles appears to contradict this. Furthermore, the provenance of some of the flaked pebbles and the partially flaked chunks suggest that they had not been discarded as nodules, which had been deemed no longer useful. Of the 15 examples, eight came from roundhouses, suggesting that they had been curated for further use, and that they were associated with stone working within the structures. Furthermore, ten of the 15 pebbles and chunks show signs of having been recycled, evident from the presence of fresh flake scars that had cut through patinated, older removals.

Cores

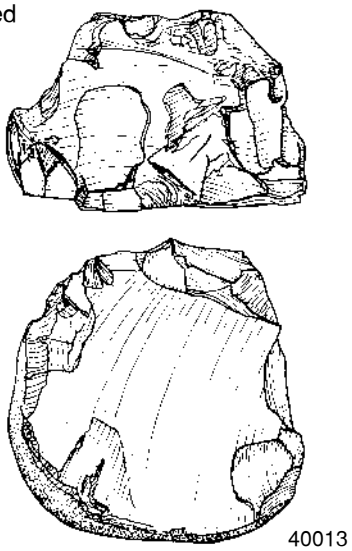
The assemblage contains three single-platform cores and three core fragments. The three fragments cannot be attributed to a specific reduction strategy, whilst the single-platform cores are sub-circular and conical in shape, and worked around 50% of their circumference, with less than 25% of the cortex remaining (*eg* 326 and 9; Fig 130). Analysis of the surface scars shows a bias towards flake removals. A comparison of the dimensions of the flake scars on these cores with complete flakes indicates that the former is on average smaller than the latter, suggesting that the cores may actually be representative of pre-Bronze Age lithic technologies. Additionally, a similar analysis of the blade scars with the blade debitage shows the blade removals on the cores to be significantly narrower. Another characteristic that indicates

Flaked pebbles

Midden 1 (***4146***)

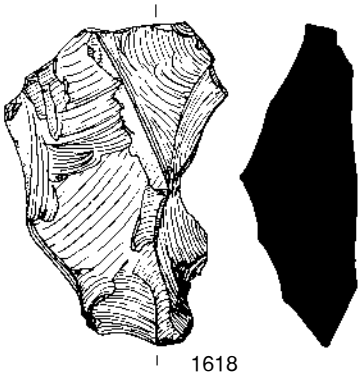


Ungrouped

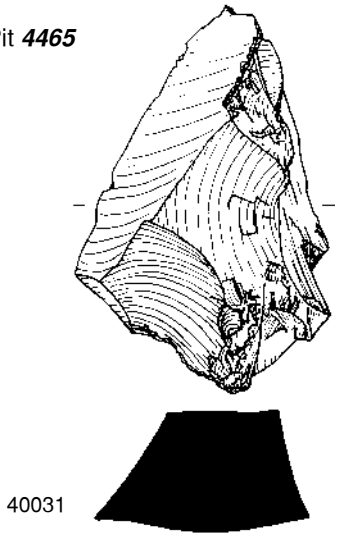


Partially flaked chunks

Roundhouse 4 Occupation layer ***4337***

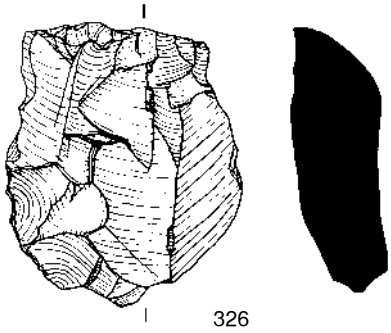


Pit ***4465***

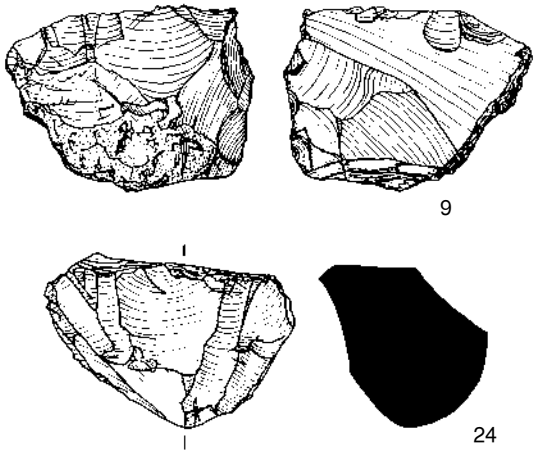


Single-platform cores

Roundhouse 6 Cairn ***4210***



Topsoil



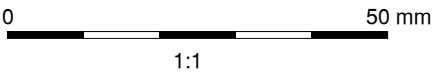


Figure 130: Core types from the later Bronze Age settlement

the single-platform cores belong to an earlier lithic technology is the evidence for platform preparation. Two out of the three cores exhibit evidence for platform-edge preparation, which is not a constant feature within the blade and flake debitage.

One core on flake is also present. This is a lightly patinated grey flint flake, measuring 37 x 37 x 11 mm, which has several flake scars on both the dorsal and ventral faces. On the ventral face, the bulb of percussion has been detached by a large flake removal, whilst a smaller flake scar emanates from the distal end in an opposed direction. On the dorsal face, there are two more opposed flake scars. This item probably represents another example of opportunistic raw-material use.

Blade, flake, and indeterminate debitage

Around a third of the debitage is complete, whilst the remainder is mainly represented by proximal, medial, distal, and indeterminate fragments (Table 47). Roundhouses 1, 4, and 5, and midden concentration ***4193*** (in Midden 1; *Ch 6, p 188*) contained relatively large amounts of debitage (10-16 pieces), there being a strong correlation with core technology (*p 213*). Although no specific knapping areas have been identified, it is probable that sporadic knapping was undertaken in these roundhouses, and also nearby, on the northern side of Midden 1, resulting in the expedient production of debitage, some of which was modified into more formal tools to complete daily tasks.

Several thermal flakes have been recognised, which have been utilised, highlighting the opportunistic nature of Bronze Age stone working. Complete flakes are mostly regular in form, with only three examples classified as irregular (139; 5933; and 300; Fig 131), whilst blade technology is mainly based on the production of broad forms (*eg* 1958 and 674), with only a single example of a complete narrow-blade present (40019).

Primary debitage is rare amongst the complete blades and flakes, with only two, both flakes, recorded. Whilst the lack of primary blades and flakes could suggest that nodule preparation took place away from the site, this is unlikely to be the case, as reduction strategies appear to have been geared towards the *ad hoc* production of blanks for immediate use, regardless of from what stage in the reduction sequence they derived. This is possibly further confirmed by the preponderance of secondary blades and flakes in relation to both primary and inner blanks. It should be noted, however, that, with only a small sample of complete debitage available for analysis, observations made about the nature of reduction remain highly speculative.

Analysis of platform morphology indicates that the use of bipolar reduction and/or a hard-hammer technology was possibly commonplace, which, perhaps significantly, was also a feature of the lithic assemblage from a large Middle Bronze Age settlement at Corrstown, Northern Ireland (*Ch 11, p 349*), and hence also perhaps of the Irish Sea zone (O'Hare 2012). Specifically, at Taxiway Alpha East, the relatively large number of blades and flakes with crushed butts (*eg* 933; 300; and 1958) possibly indicates that excessive force was used in percussive strikes. Furthermore, whilst this feature is common to secondary flakes, it is also present, although less frequently, on blanks from all stages of the reduction sequence. It is of note that incipient cones are a regular feature of platform morphology, found in association with all platform types, and across all blade and flake types from all stages of the reduction sequence. However, bulbs of percussion within the complete debitage are

	Complete	**Distal fragment**	**Indeterminate**	**Medial fragment**	**Proximal fragment**	**Split**	***Total***	***% of total***
Broad blade	6	1			4		***11***	***12%***
Indeterminate chunk			18				***18***	***19.6%***
Indeterminate fragments			12				***12***	***13%***
Irregular flake	4				1		***5***	***5.4%***
Narrow blade	1	1			1		***3***	***3.3%***
Regular flake	20	8	2	1	11	1	***43***	***46.7%***
Total	***31***	***10***	***32***	***1***	***17***	***1***	***92***	
% of total	***33.7%***	***10.8%***	***34.8%***	***1.1%***	***18.5%***	***1.1%***		

Table 47: Blade, flake, and indeterminate debitage from the later Bronze Age settlement, by lithic type and fragmentation type

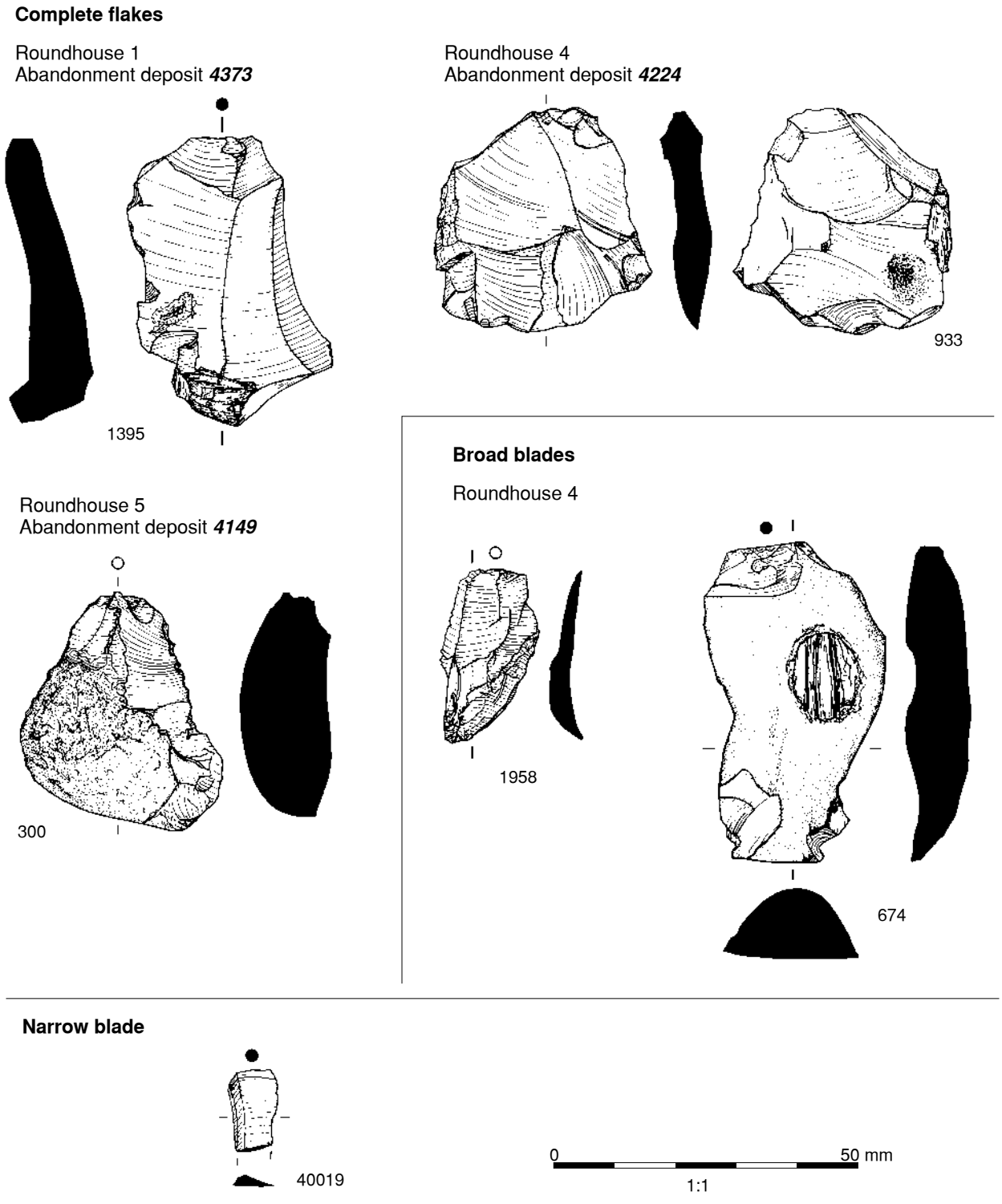


Figure 131: Blade, flake, and indeterminate debitage from the later Bronze Age settlement

predominantly diffuse in character, suggesting that the relationship between bulb size and hammer type is complex. Only one piece of debitage, a broad blade, exhibited evidence for platform preparation, which consists of simple abrasion, and it is possible that this was residual, reflecting an earlier technology.

The remainder of the debitage had no such preparation, which supports the evidence from the core technology (*p 213*), and has been recorded elsewhere during the analysis of later prehistoric lithic technologies (*cf* Ballin 2002). A range of platform sizes exists within the assemblage (Fig 132), although there is a peak within the 2-2.49 ratio range. The general range of sizes, with some examples significantly wider than they are thick (ratio 4:1 and above), appears to be a feature of the Middle/Late Bronze Age lithic technology employed at this site.

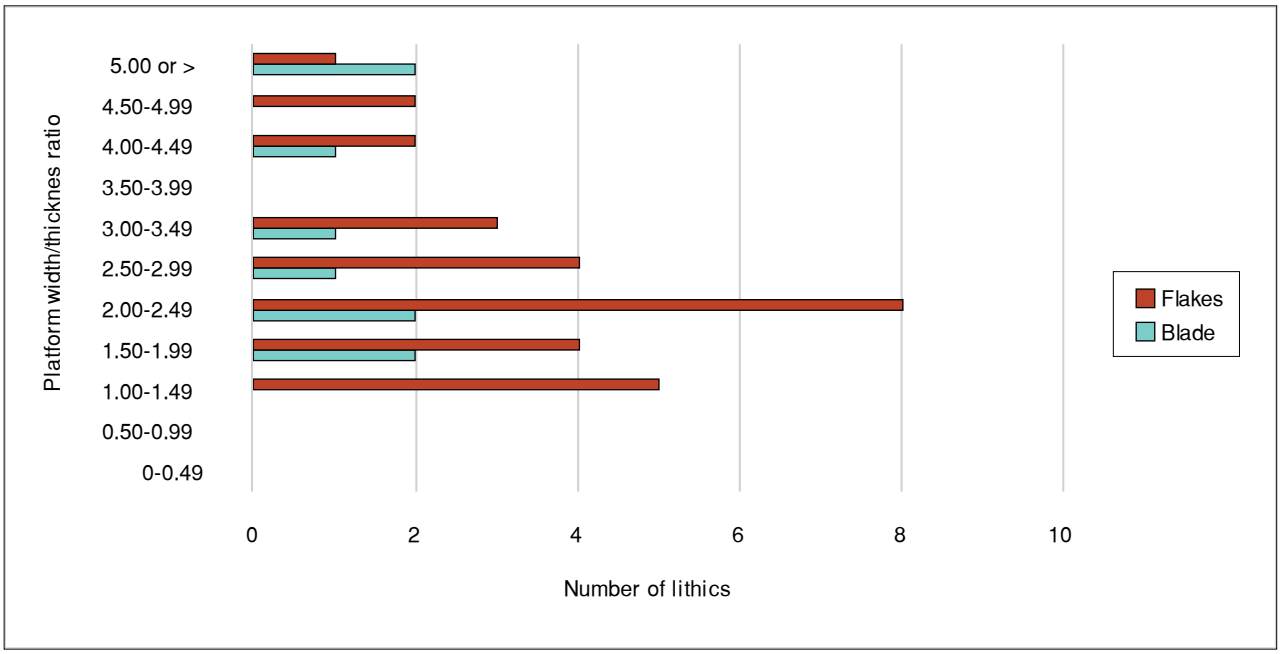


Figure 132: Thickness/width ratios of blade and flake platforms from the later Bronze Age settlement

Dorsal-face morphology indicates that most of the debitage was removed unidirectionally from nodules (Fig 133); considering that the bulk of the core technology is simple flaked pebbles, evidence for unidirectional working should probably be expected. Crossed and opposed dorsal scarring is also present on some of the debitage, and the cores do have evidence of this kind of reduction, with flake scarring at various angles recorded, though not necessarily crossing.

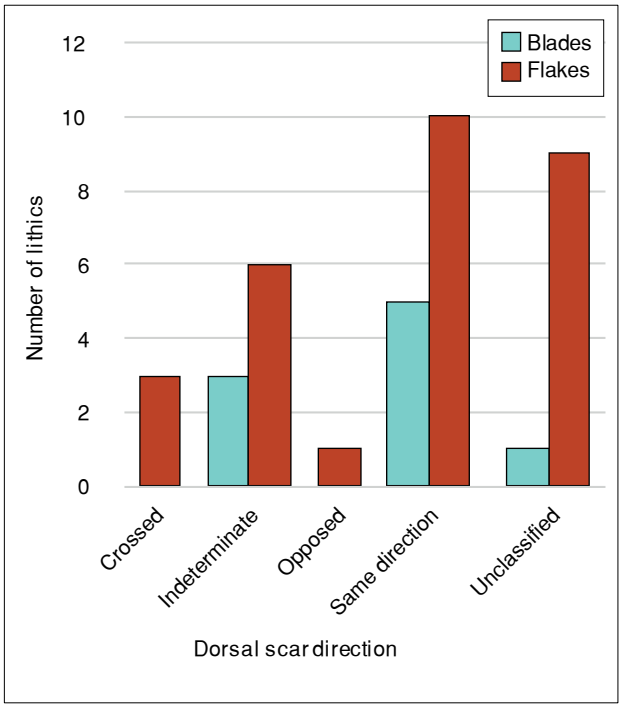


Figure 133: The dorsal negative-scar direction on complete blades and flakes from the later Bronze Age settlement

There was only a limited number of blades and flakes with hinge and abrupt terminals, which is surprising, as these termination types are a recognised characteristic of later prehistoric lithic technologies from mainland Britain (Humphrey and Young 1999, 59). In contrast, feathered terminations were much more prevalent (Fig 134).

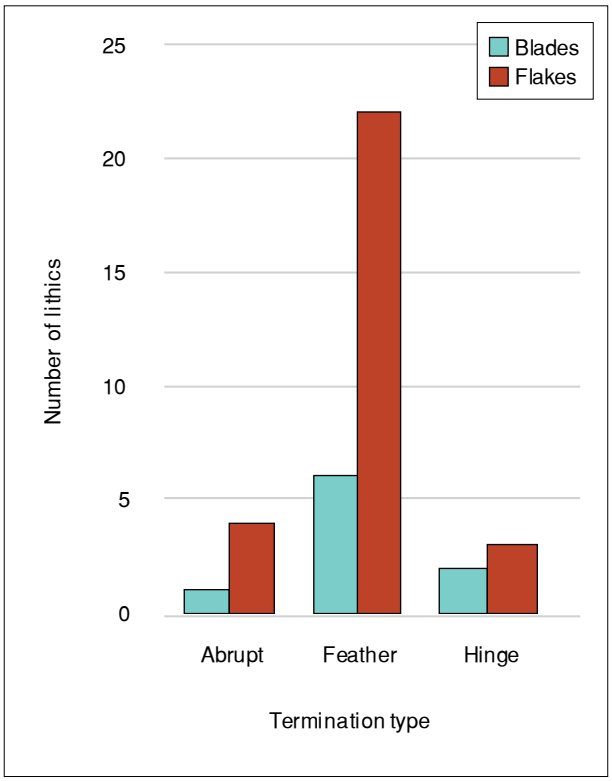


Figure 134: Distal terminations on complete blades and flakes from the later Bronze Age settlement

This, therefore, suggests that those working stone at the site had a certain level of skill. Moreover, a higher concentration of failed debitage terminations would indicate poor knapping ability and this is simply not the case, even considering the quality of the flint.

Flake debitage is more numerous, being almost three times that of blades. The majority of the flakes have a 1:1.49 length/breadth ratio, indicating an emphasis on the production of flakes that are short and squat. Analysis of the mean dimensions shows a gradation in size from larger primary flakes to smaller inner flakes, which is associated with the reductive process. It also confirms that nearly all the blades are of broad types, although some of these could be residual from early stone-working activity.

Secondary technology

One possible later Bronze Age core tool came from midden concentration ***4193*** (Midden 1; *Ch 6, p 190*), a flaked pebble with a battered surface, which suggests that it could have been used as a hammerstone. Another later Bronze Age tool is a side-and-end scraper (802; Fig 135), which was retrieved from an abandonment deposit (***4149***; *Ch 6, p 192*) associated with Roundhouse 5. This has irregular retouch forming its scraping edges, and is made on a thick secondary flake with a steep profile at one end.

The assemblage also included blades and flakes with miscellaneous retouch, some of which probably relate to later Bronze Age opportunistic use of material for expedient use, whilst others, such as those produced on blanks, would not be out of character with earlier

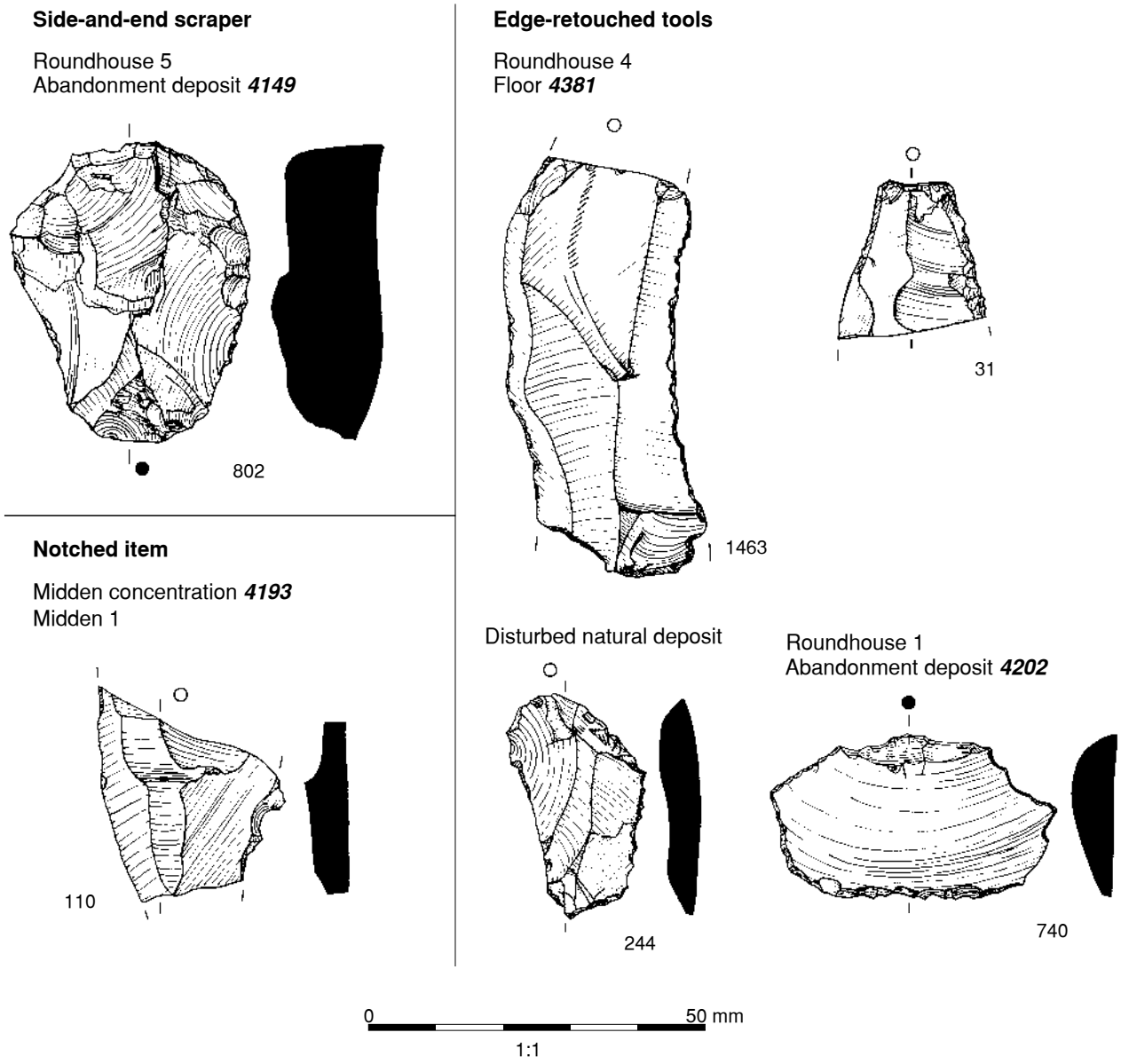


Figure 135: A side-and-end scraper, and other retouched tools, from the later Bronze Age settlement

stone-working technologies. These can be subdivided into pieces that have acute/semi-abrupt modification on their lateral edges (*eg* 1463 and 31; Fig 135), which can be sporadic in terms of its distribution and could either represent intentional retouch and/or, in some instances, edge damage from use or post-depositional processes. The remaining items represent a coherent collection of modified flakes with abrupt retouch, which can either be patchy or continuous along lateral edges. These appear to have been simple scraping tools (*eg* 244 and 740), and it is of note that at least two are associated with roundhouses (Roundhouses 1 and 4). In addition, there is also a heavily patinated blade, with possible edge damage, and a bipolar core with light retouch/edge damage on a lateral edge, though these items may be representative of an early stone-working tradition.

Two notched pieces again came from midden concentration ***4193***. One piece consists of a shallow retouched notch on the right-lateral edge of a broken flake. The second (110; Fig 135) is also broken and has two adjacent notches surviving on the left-lateral edge. These notches have been produced by a single removal, and they were subsequently modified further through small irregular flaking on their internal edges; however, it is unclear whether this was intentional modification or edge damage from use. Furthermore, it is probable that this piece is a fragment of a larger, irregular denticulate tool.

A few utilised chunks and flakes were identified with continuous small, irregular scarring along their lateral edges and prominent ridges. The flakes are potential evidence for use on their lateral edges, and one also shows edge damage extending across the distal termination. In the case of the chunks, edge-use has been identified on prominent ridges.

Pottery
C Howard-Davis

A comparatively large assemblage, comprising 3044 fragments of later Bronze Age pottery, with a total weight of 44.1 kg, was recovered from the settlement at Taxiway Alpha East. The size of the assemblage compares well with that from the earlier Ronaldsway Village excavations (*Ch 1, p 8*; Table 48) analysed by Jennifer Woodcock (1999; 2008), which produced some 4961 fragments, weighing 151.5 kg, particularly since a proportion of this latter assemblage might date to the earlier Bronze Age (*Ch 6, p 155*). The Taxiway Alpha East assemblage is approximately 62% of the size of the earlier assemblage by fragment count, but only 29% by weight, suggesting that, overall, sherd size/weight was considerably less, and by implication, that it was significantly more fragmented.

As a result of the extremely friable nature of the Taxiway Alpha East pottery, sherd size varied considerably, with many fragments being little more than crumbs, and many having lost one or both original surfaces. Nonetheless, there were also large fragments, and several vessels could be partially reconstructed. Unlike the earlier assemblage, there were very few body fragments with any form of decoration, with the majority of the decoration (almost exclusively applied or pinched cordons) lying close to the rim, and thus included in the rim count, rather than being quantified separately. What is noticeable in a comparison of the basic make-up of the two assemblages, in terms of 'body-parts', is that base fragments are very poorly represented in the Taxiway Alpha East assemblage, although the same recognition criteria were employed (*cf* Woodcock 1999), and the same *caveat* applies with regard to the misidentification of featureless base fragments.

Fabrics

The impossibility of defining separate fabrics in the conventional manner, by examining clean sections with the aid of a x10 hand lens, has been emphasised (Woodcock 1999, 124). This is because all of the pottery seems locally made, and thus incorporates the same range of inclusions, albeit with some variation in the density and size of individual fragments. Furthermore, it is clear that these vary considerably within individual sherds, and, by extension, vessels. Examination of a sample of the sherds from Taxiway Alpha East served to confirm the earlier definition of only two fabrics (Woodcock 2008, 108): a fineware (Fabric 1); and a coarseware (Fabric 2). The definition of these two fabric types is largely based on wall thickness, with Fabric 1 having a thickness of 10 mm or less, whilst Fabric 2 has a thickness greater than 10 mm.

	Base sherds	Percentage of total assemblage	Rim sherds	Percentage of total assemblage	Plain and decorated body sherds	Percentage of total assemblage	Total assemblage	Total weight (kg)
Ronaldsway Village	341	6.87	400	8.06	4220	85.07	4961	151.5
Taxiway Alpha East	52	1.71	163	5.35	2829	92.94	3044	44.1

Table 48: Comparison of the later Bronze Age pottery from Taxiway Alpha East with the Bronze Age pottery from the Ronaldsway Village

A selection of sherds from both fabrics was submitted for petrographic analysis (*Appendix 1*; following the research strands laid out in Morris and Woodward 2003), adding to the microscopic analyses previously carried out (by J R Senior) on the Manx Museum collection (Woodcock 1999, 132-3; 2008, 26-7). This suggested that both fabrics are closely related and probably share the same local provenance. They do, however, appear to have been made with a different paste recipe, with coarsewares containing abundant igneous-rock inclusions, whilst the finewares have less abundant basic igneous-rock fragments and a higher proportion of non-igneous inclusions.

Method of manufacture

It has not proved possible to reconstruct the sequence of manufacture for individual pots with as much detail as was the case for the earlier assemblage (Woodcock 1999, 128). It seems most likely, however, that these pots were made by using flattened rings (or straps) of clay to build up the vessel's walls (Pl 52), and on occasion, vessels have broken along the line of one of the coils, giving a 'false rim', regarded as a typical indication of this form of manufacture (*cf* Gibson and Woods 1990, fig 15). In addition, many of the sherds show a marked diagonal orientation to many of the larger inclusions, which although subjective, is probably an indication of the way in which the rings were joined, by dragging the clay from one ring down over the one below (*ibid*).



Plate 52: Evidence for coiling in a vessel from Midden 1 (spread **4146***)*



Plate 53: The extremely large inclusions in some sherds

Based on the position of breaks at or near the base of vessels, it has been suggested (Woodcock 1999, 128) that two construction methods were used, one raising the walls of the vessel on a flat disc of clay, which formed the base, the other that the walls were raised on a small 'pinched up' dish. Sherds suggesting one or other of the two options appear in the present assemblage in equal numbers, the difference perhaps simply reflecting the personal preferences of the potter. Based on anthropological evidence, many ring-built and coiled pots could have been made upside down, with the rim established on a flat surface, and the pot then built upwards, being eventually sealed with a flat slab to form the base (Gibson and Woods 1990, 39). In either case, the edges of the rings would have been smeared upwards and downwards to join each successive addition. It is also suggested (*ibid*) that this would be an easier method, seating each new ring into a prepared groove, rather than pushing it down onto the ring below, although modern ring-building techniques seem to indicate that this is not a particular problem (Parr 1977, 38-9). In addition, it removes the necessity for extra support when making round-based vessels.

There is no particular evidence in this group to suggest that pots were made upside down, but assuming a continuity of potting tradition from the round-based pottery of the Manx Neolithic culture (*Ch 5, pp 148-9*), it might be the case that the flat bases were the last thing to be added, and that vessels were not, perhaps, turned upright until partially dried (leather-hard). By then, the walls would be resilient enough to bear the weight of the pot without sagging, and surfaces could be burnished or otherwise decorated.

What is clearly evident is that there is a very large variation in the size of inclusions, with the largest ranging up to 10 mm in its maximum dimension, and often comprising the greater part of the wall thickness at any given point (Pl 53). Despite this, the potter has achieved well-burnished surfaces, both inside and out, which give the impression of a much finer fabric than is in fact the case.

The colour of the fabric is, as might be expected for prehistoric pottery that has been fired in relatively uncontrolled conditions, somewhat varied, ranging from oxidised pinkish-browns to dark, reduced greys, often on the same sherd, and certainly on the same vessel. It must also be borne in mind that pots like these would probably have been made at a craft level, in only small numbers at any one time, as and when new ones were required, and they could easily be fired in an open pit, surface bonfires (Gibson and Woods 1990, 54), or even a domestic hearth (*pers obs*). In general terms, the finewares tend to be more fully reduced (Woodcock 1999, 127), but whether

or not this was deliberate is a moot point, as open firing is effectively impossible to control (Gibson and Woods 1990, 49). As to the existence of a so-called redware amongst the material (*cf* Woodcock 1999, 124), very few sherds in the present group were of a similar bright red colour, and it seems more likely that they had been subject to subsequent, post-firing, oxidisation, perhaps as rubbish was burned, although this must remain speculation.

Forms

It has proved difficult to provide an estimate of the number of vessels represented in the assemblage. On one hand, there could (following Orton *et al* 1993) be a minimum number of six estimated vessel equivalents (EVEs), which is broadly commensurate with the eight measurable bases in the assemblage. This figure is without doubt a very conservative under-estimate, and if the differing rim cross-sections are each regarded as coming from different vessels, the number rises to at least 91 vessels (*below*). The true number, however, probably falls between these two figures, and the 65 rim fragments with enough surviving to determine a diameter probably provide a better estimate.

A further simplistic attempt has been made to estimate the potential weight of one of the better-preserved vessels, by assuming that the weight of the fragments that made up 19.4% of the rim, wall, and base could be used as a reasonably accurate indication of the total weight of the vessel. Interestingly, the notional pot proved to have been very heavy (*c* 9 kg), and if the overall pottery assemblage is divided by that weight, an absolute minimum of five (4.7) vessels is achieved, not dissimilar to that provided by a calculation of EVEs.

The nature of handmade pottery of this kind is such that, without an enormous input, cross-matches between plain fragments are difficult and time-consuming to find. Some have been achieved, however, especially where sherd groups were kept together during excavation, or where some other distinctive feature, such as colour-changes, the edges of sooting, or some other surface staining, could be used for guidance, but the constraints of the project meant that such joins were not exhaustively sought. Cross-matches, and matches between differing contexts, were, however, sought for all rim and base fragments, as an additional pointer to the number of vessels represented, as well as contributing to the understanding of taphonomic processes on the site.

Where reconstruction was possible, almost all of the vessels fell either into Woodcock's (2008) cordoned urn or plain/undecorated urn types, both well-known from earlier excavations at Ronaldsway Airport, and from other sites on the island, for the most part in a domestic context (*Ch 6*, *p 170*). The angle of one or two of the rim sherds, however, raised the possibility of open bowls.

Rims

In all, 163 rim sherds are present; however, some of these join others, and with some body sherds, produce the notional figure of 91 different vessels, though this estimate remains fluid, as the rim form and diameter of any particular vessel can vary quite considerably in different parts of the circumference. Similarly, the estimated circumferences must remain tentative, as few of the vessels are likely to have been perfectly round. In addition, the surviving rim fragments rarely exceed 10% of the total rim, and thus circumference estimates are probably not accurate. Jennifer Woodcock (1999, 127) suggests that, when less than 10% of the rim is present, the estimated diameter can 'vary by as much as 20 mm either way'. Diameters of vessel rims fall into an overall range between *c* 110 mm and *c* 500 mm. There is, however, a marked concentration (64%) of rims with diameters of between 200 mm and 300 mm, with 39% of the measurable rims falling in the 200-249 mm range, suggesting that this group was a favoured size or capacity for vessels used at the settlement, presumably, since many of them are heavily sooted, inside and/or out, as cooking vessels.

The rims associated with the estimated 91 vessels have been categorised according to the general typology (*op cit*, figs 4 and 5; types A-H; Table 49; Fig 136). Based on this, it is clear that rim type G is absent, and that rim type C represents more than half of the potential number of vessels present. Moreover, considered together, rim types A-C, clearly closely related, comprise 90.11% of the classifiable rims.

Bases

Five base forms have been defined (*op cit*, fig 6; A-E), all of which are slight variations on a simple flat base. All of the fragments from the later Bronze Age settlement on Taxiway Alpha East fit easily within this type series, but, as is the case with the rims, considerable variation would be expected in the basal angles in different parts of a single handmade base (Table 50; Fig 137). No complete bases were encountered, and several fragments are flat pieces from the sole plate, and thus do not preserve any evidence for the basal angle. It must be noted that the one fragment that falls, in terms of basal angle, into Woodcock's base form E is considerably larger than the vessels that she recorded.

Surface treatment and other decoration

Decoration was confined to applied horizontal cordons, often set immediately below the rim, but

		Rim form A	Rim form B	Rim form C	Rim form D	Rim form E	Rim form F	Rim form G	Rim form H
Boundary ditch ***4151***	Fill ***4140***	1							
Roundhouse 1	Abandonment deposit ***4144/4218***		2	1					
Roundhouse 3	Abandonment deposit ***4203***		1	1					
Roundhouse 4	Posthole ***4365***		1						
	Abandonment deposit ***4200/4212/4222/4224***	4	3	2					
Roundhouse 5	Robber trench ***4685***			1					
Structure 3	Posthole ***4363***		1						
Structure 4	Pit ***4344***			1					
Midden 1	Spread ***4146/7***	3	6	18		1			1
	Concentration ***4188***	4		19			2		
	Concentration ***4193***	1	2						1
	Concentration ***4213***			5	1	2	1		
Trample-deposit ***4206***			1	1					
Midden 2	Soil ***4443***			1					
Unstratified				1					
Totals		***13***	***18***	***51***	***1***	***3***	***3***	***0***	***2***
Percentage of total rims		***14.28***	***19.78***	***56.05***	***1.09***	***3.30***	***3.30***	***0***	***2.20***

Table 49: Entities/contexts containing specific rim forms



Figure 136: The different rim forms in the Taxiway Alpha East assemblage

		Base form A	Base form B	Base form C	Base form D	Base form E
Roundhouse 2	Hearth ***4453***				190 mm	
Roundhouse 4	Abandonment deposit ***4200/4212/4222/4224***				340 mm	320 mm
Midden 1	Spread ***4146/7***	110 mm	320 mm	230 mm		
	Concentration ***4188***	140 mm				
	Concentration ***4213***			300 mm		

Table 50: Entities/contexts containing specific base forms, with an estimated diameter

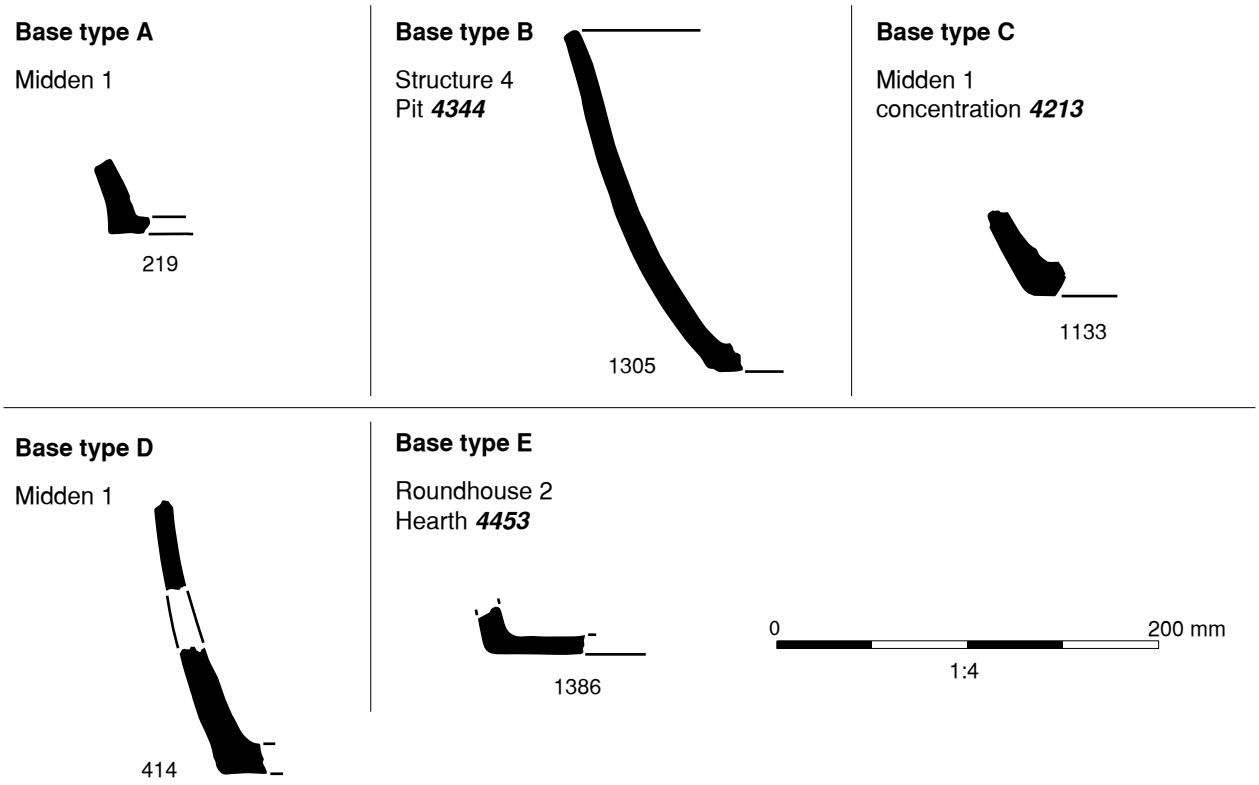


Figure 137: Examples of the different base types in the Taxiway Alpha East assemblage

on occasion slightly lower down the body wall; there was also one example where the cordon formed the rim of the vessel (Fig 138). Significantly, none of the vessels bore more than one cordon, although vessels from elsewhere on the island suggest that this was often the case (*cf* Woodcock 2008, fig 6). Cordons varied in size and definition, some being barely perceptible, whilst others were sharply defined, as if created by pressing a straight-edged tool, or perhaps even a template, into the wet clay directly above and below the cordon (Pl 54). It proved difficult, in many cases, to differentiate between pinched and applied cordons,

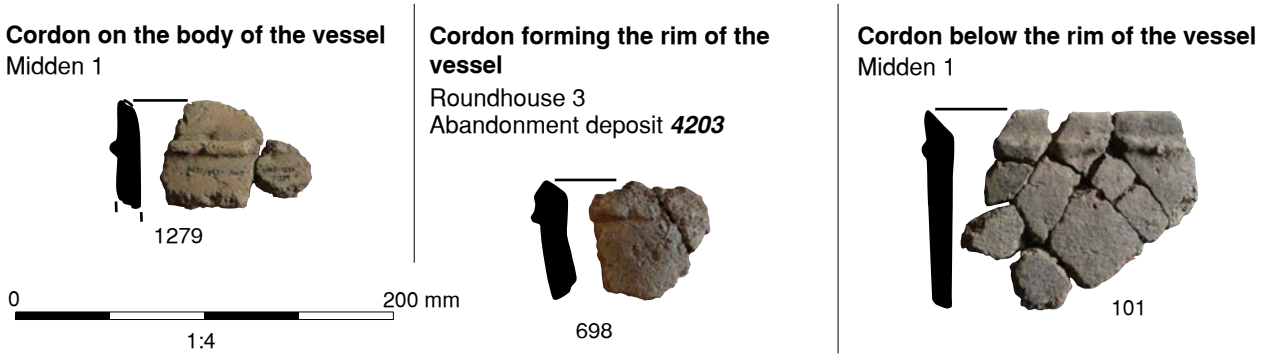


Figure 138: Sherds with applied horizontal cordons



Plate 54: Well-defined cordon from Midden 1 (spread **4146***)*

but on occasions these had been knocked off, leaving a well-defined scar, which might suggest that most were applied. Cordon profiles were not actively recorded, but there is no doubt that variations (as noted by Woodcock 1999, fig 7) were all present. A very rare variation has also been noted on vessels of this type (*op cit*, fig 8), with a swag or loop suspended from a horizontal cordon on one vessel, but none were seen in this assemblage.

Other decorative treatment is less obvious, although it is clear that some effort was made to finish the pots neatly. This was also noted on other vessels and 'it seems probable that the outside surface of some vessels was carefully smoothed with wet hands or fabric' (*op cit*, 127). Many of the sherds from the Taxiway Alpha East assemblage, however, bear a more systematic surface treatment, with a thin sandy slip or slurry seen over large parts of the pot, but not usually, as far as could be determined, going all the way down to the base, especially on the coarseware (Fabric 2; *p 219*). It appears to have been applied over a smooth, burnished, surface, and on occasion has flaked away (Pl 55). The sandy finish often shows numerous broadly parallel curving lines, as if wiped with a hand or a rough cloth, which has dragged individual grains. Sometimes, however, the lines are sufficiently well-defined and systematic as to suggest the use of a specific tool, perhaps the serrated edge of a relatively small bivalve shell, such as a cockle shell.

The surface is not always wiped in a consistent manner, but one vessel (Pl 56) from Midden 1 (layer ***4146***) has clearly been wiped horizontally, with drag-lines, like the cordon, running around the vessel's girth, whilst on some, the movement is from rim to base, and others are more random. The thinner-walled fineware (Fabric 1) vessels seem to have had a slightly different treatment, with the sandy slip giving an almost rusticated surface without the obvious striations.



Plate 55: Sandy surface treatment on a sherd from Midden 2 (top), and a body sherd (bottom) from Roundhouse 4 (pit **4474***), showing the sandy slurry or slip applied over a smooth base*

Sooting and other surface deposits

Many of the fragments are sooted, often quite heavily. It is not clear whether some of this might reflect the fact that two of the roundhouses (1 and 5) were destroyed by fire (*Ch 6, pp 191-2*), but in a number of examples, the sooting, concentrated on the upper part of the outside of the vessels, seems likely to have been the result of use over an open fire, with pots



Plate 56: Vessel from Midden 1 (spread **4146***), showing broadly horizontal wiping*

perhaps set in the embers. At least two of the handful of base fragments are heavily sooted on the inside, to the extent that there is a thick carbonised deposit. It seems likely that this too was associated with cooking in some manner, and might possibly represent the last remnant of burnt food (Soberl *et al* 2009). It could also be the case that an inverted vessel might have been used in a more complex procedure, like smoking small amounts of foodstuff, or even distilling.

Lipid analysis, undertaken on a limited number of fineware and coarsewares sherds from the Ronaldsway Village excavations, noted residues predominantly from vegetable sources, with small amounts of meat (Woodcock 2008, 109). Although not definitive, there is also some suggestion that finewares might have been used for cooking and coarsewares for storage. It is, however, difficult to see how vessels in both fabrics could have become heavily sooted, as if used for cooking, if the coarsewares were not used for this. Several other fragments from Midden 1 (layer ***4146*** and concentration ***4189***) now have a thick white deposit on their inner surface. Its origin and composition are not clear, however.

Fragmentation

The curation, or the deliberate selection, of sherds was also explored, albeit to a very limited degree, by considering the rim and base sherds. What is noticeable is that, relative to the size of the overall ceramic assemblage, there are few rim sherds (164), and still fewer base sherds (59), the two together only making up 7.3% of the assemblage by fragment count. Just what this means is not clear, although it is presumably an indicator that almost all, if not all, of the vessels in the assemblage were broken before deposition, and many of the fragments were either not cleared, or were trampled and broken into fragments sufficiently small that their origin could no longer be determined. By extension, the low average sherd weights from many of the contexts appear to indicate a considerable amount of trampling and disturbance, especially with regard to material within the footprints of the roundhouses.

Discussion

The later Bronze Age pottery from Taxiway Alpha East should be set within the context of the published overview of the Bronze Age pottery of the Isle of Man (Woodcock 2008). It clearly falls into Woodcock's 'cordoned urn' or 'plain urn' groups, which is hardly surprising, as these types were already well-represented at the airport, from the Ronaldsway Village (*op cit*, fig 4.6; *Ch 6, p 170*), and are also the most common Bronze Age vessel types found on the island (*op cit*, 35). It is worth noting that, in the absence of an obvious cordon on the sherd, there is scope for confusion between the two groups.

The available dating for these domestic vessel types has been detailed (*op cit*, 153), and they appear to be long-lived, starting in the Middle Bronze Age and persisting, on occasion, into the Early Iron Age. Four radiocarbon dates were obtained from carbonised deposits on sherds recovered by the 1935 excavations at the Ronaldsway Village, which indicated that they dated to the later Bronze Age, producing dates of 1500-1050 cal BC (3060±80 BP; OxA-4503), 1430-1030 cal BC (3010±75 BP; OXA-4502), 1380-900 cal BC (2905±75 BP; OxA-4054), and 1200-800 cal BC (2800±80 BP; OxA-4051). These seem wholly consistent with the radiocarbon dates from the later Bronze Age settlement at Taxiway Alpha East, which was occupied between the thirteenth and ninth centuries cal BC (*Ch 6, p 202*).

Clay moulds and crucibles

C Howard-Davis and D Boughton

Within the ceramic assemblage from the later Bronze Age settlement were 23 fragments (312 g) of fired clay, consisting of material from clay moulds used to cast copper-alloy objects. Elements of ten separate moulds were recovered, and a further four fragments appear to derive from thick-walled, shallow vessels with a distinctive, highly vitrified inner surface. This indicates that they were crucibles.

Moulds

The more recognisable mould fragments are of considerable importance, as, prior to this project, only one comparable clay-mould fragment was known on Man, from the Crawyn Brooghs on the north-west coast of the island (*Ch 6, p 170*). These moulds also add to the growing corpus from the British Isles, with examples being recorded from a smattering of later Bronze Age sites on the Scottish mainland and isles,

England, and Ireland (*cf* Cowie and Eremin 2008; Bradley 2019, 227, 242, 250; Ginn 2016).

Typological analysis suggests that the mould fragments are also later Bronze Age in date, which is supported by the dating evidence for the settlement (*Ch 6, p 202*). All of the fragments reflect the same technology, with the production of a two-piece mould, usually bivalve, made by pressing a metal or wooden original, or pattern, into fine clay, to produce a negative mould of each side of the object. Having been allowed to dry, the mould valves were fired, and then reassembled and an outer wrap of coarser, grittier clay used to register the mould elements, and hold them in place. On occasion, there is some evidence that the elements were also held together with organic thonging, or, in the case of longer, relatively flat items, such as swords, a wooden splint was set into the outer wrap, to provide a strengthening brace (Hodges 1960, 132-3). After casting, the mould would be broken away from the cast-metal object, and is thus always found in a fragmentary state.

All of the recognisable mould fragments are abraded, and the range of objects originally cast in them cannot be defined with complete certainty. They fall into two groups, fragments related to the production of relatively flat, or grooved and contoured objects, perhaps swords or spearheads, and those related to the production of other, more three-dimensional objects, for instance socketed axeheads. Very different fabrics were used to create the inner mould and the outer wrap. Generally, the inner envelope comprises a very fine silty clay fired to reduced dark grey-black, or an oxidised light orange-brown, which is usually rather patchy, whilst the wrap consists of a fine clay matrix, fired to a greyish-brown with rusty brown mottles, containing occasional large stone inclusions and chopped chaff impressions, less than 5 mm in size.

Catalogue

1 Two fragments from the same mould valve (Fig 139). Metal-contact surfaces do not survive, but the mould-contact surface is present on one side. The outer wrap survives only in places, as a coarser, more open fabric with voids, suggesting some organic content. Generally, it has a reduced, dark grey inner surface. Outer surfaces are oxidised to a light brownish-yellow. Both fragments have rudimentary evidence for both inner and outer clay envelopes, the fabric of the outer being rough and tempered with grit, sand, and small pebbles. The fabric of the inner envelope is much finer clay, tempered with sand and a few organic inclusions. The fragments join lengthwise, and it appears that the

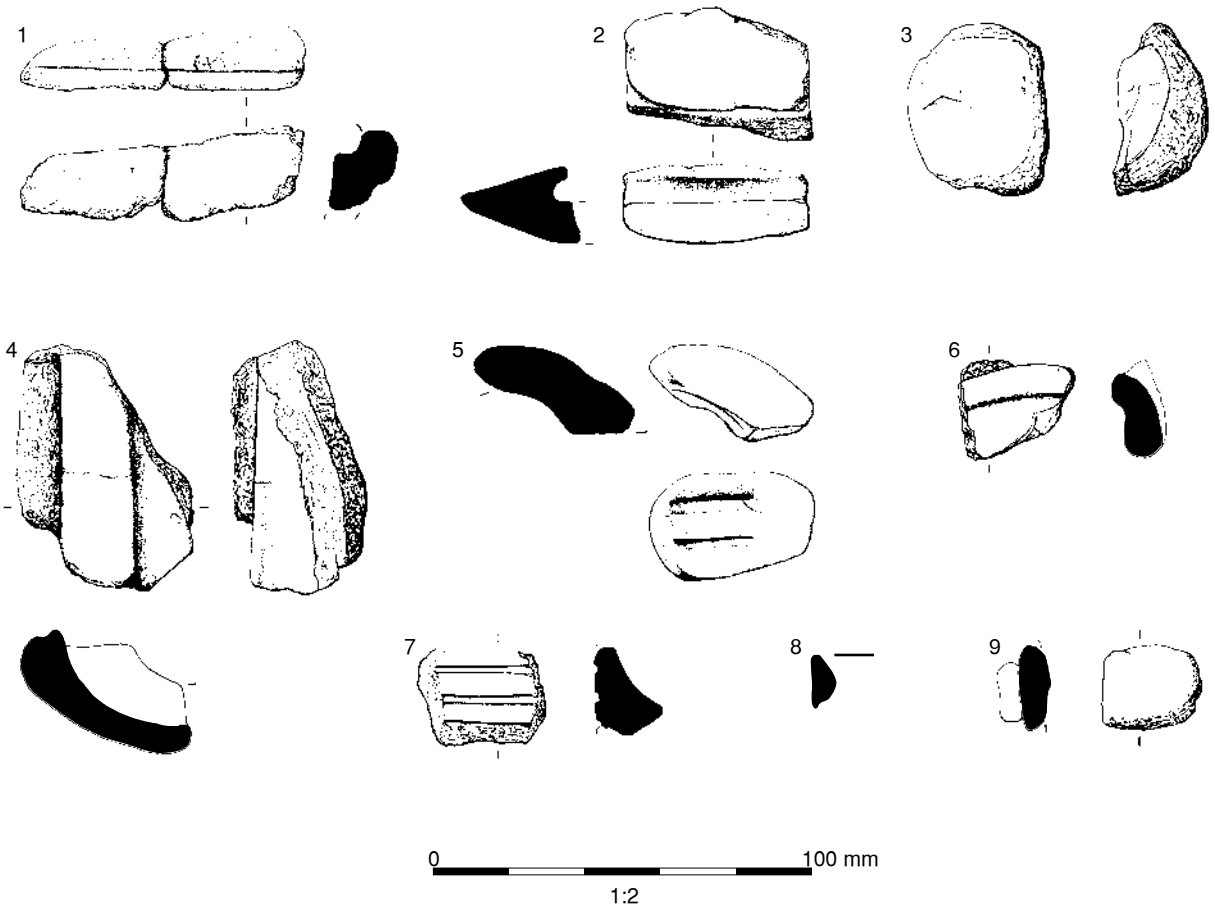


Figure 139: Clay moulds from Taxiway Alpha East

mould was probably used for casting plain socketed spearheads, most likely larger flame- or leaf-shaped specimens (Davis 2015, pls 1-66; Group II, Generic Type II A or B), which are part of the Wilburton metalworking tradition, dating from the mid-twelfth to early ninth century BC (*op cit*, pl 163).
L: 76 mm; W: 23 mm; Th: 16 mm; Wt: 37.51 g
Hearth ***4691***, fill ***4639***, Structure 3, OR 1947

2 Mould-valve fragment (Fig 139). Metal-contact surfaces do not survive, although a wide mould contact surface is present on one side, but possibly nothing of the internal mould-valve survives. Generally, the inner surface is reduced, dark grey, whilst the outer surfaces are oxidised to light pinkish-brown. There was possibly only one clay envelope originally, which had been used at least once. The fabric is very gritty and tempered with sand (including some larger pieces) and organic materials. The inside is a light/medium grey colour, the outside beige. The fragment, though large and well defined, shows a number of abrasions sustained when shaping the mould, and wear after the casting/breaking process. It is difficult to ascertain what kind of object would have been cast in it, but the overall lenticular shape suggests possibly a blade (sword?) or a spearhead, or else it formed part of the sprue assembly for casting a socketed axe, or palstave.
L: 49 mm; W: 30 mm; Th: 20 mm; Wt: 25 g
Spread ***4146/7***, above concentration ***4193***, Midden 1, OR 767

3 Mould-valve fragment (Fig 139). Neither metal-contact surfaces, nor any indication of the shape of the object, survives. The outer wrap is present around the outside, as a coarser, more open fabric, with voids suggesting some organic content, probably including straw, and sparse large stone fragments. It generally has an oxidised inner surface, which is pinkish-brown. The outer surfaces are oxidised to a light brownish-yellow, and there is evidence for the outer and inner clay envelopes. While the outer was made from a grittier fabric tempered with grit, sand, and organic materials, the inner envelope was made from softer, finer fabric, with only very small sandy inclusions. The colour of both envelopes is pink/orange, suggesting that it was never used to cast an object. The softer inside surface is abraded and heavily worn. The original shape is difficult to ascertain, but judging from the overall semi-lenticular shape of the mould fragment, it may have been for a spearhead or, more likely, a blade, possibly a sword. Indeed, similar mould fragments for casting swords were found at Jarlshof, Orkney (Hodges 1960, pls D and E).
L: 39 mm; W: 45 mm; Th: 23 mm; Wt: 32 g
Posthole ***4365***, fill ***4364***, Roundhouse 4, OR 1652

4 Mould-valve fragment. Metal-contact surfaces survive, but are abraded, and the wide-mould-contact surface is present on one side. The thick outer wrap survives as a coarser, more open fabric, with voids suggesting some organic content. It has a generally reduced inner surface, dark grey, whilst the outer surfaces are oxidised to light brownish-yellow. Part of the inner and outer envelopes are present. The fabric of the outer clay envelope is rough and tempered with grit, sand, and small pebbles. The fabric of the inner envelope is much finer, clay-tempered, with sand and few organic inclusions. It was probably a mould for casting plain socketed spearheads, most likely larger flame- or leaf-shaped specimens of Davis' (2015, pls 1-66) Group II, Generic Type II A or B, which are part of Wilburton metalworking tradition (*op cit*, pl 163).
L: 68 mm; W: 50 mm; Th: 17 mm; Wt: 57 g
Spread ***4146/7***, above concentration ***4193***, Midden 1, OR 278

5 Mould-valve fragment (Fig 139). The metal-contact surfaces are abraded, but surviving in part, whilst the mould-contact surface is present on one side. The outer wrap is present, and is visible as a separate layer, although it is very similar in fabric to the mould valve. Generally, the object is oxidised yellow, but the inner surface is pale grey. The fragment is made from very fine, sandy fabric, with hardly any inclusions. The colour of the clay on the inside is grey, whilst the outside is pink/orange, suggesting that the mould was used. The outside has a rough, uneven surface, whilst the inside shows clearly two large, curved ribs, probably a quarter of a socketed axe's two-mouth moulding, separated by a collar, about 5 mm high. The ribs are not straight, but deeper in the centre and shallower towards the sides, thus indicating the curvature of the mouth of the axe. The outline of the inside of the mould suggests that the axe had a square or rectangular mouth. Socketed axes with two-mouth mouldings are common in later Bronze Age metalwork assemblages, and those which provide good parallels for the axe cast by this mould include Everthorpe (Schmidt and Burgess 1981, pl 86) and South Eastern (*op cit*, pl 85), and Meldreth type axes (*op cit*, pl 83). which date from around the tenth-ninth century BC (*op cit*, pls 85-6).
L: 22 mm; W: 44 mm; Th: 17 mm; Wt: 21 g
Pit ***4540***, fill ***4541***, Structure 3, OR 1848

6 Two small mould-valve fragments (Fig 139). They do not join, but seem similar enough to be related. Metal-contact surfaces are abraded, but survive in part, although mould-contact surfaces do not. The outer wrap is present on one fragment, and is visible as a separate layer, a coarser, more open fabric, with voids suggesting some organic content, probably including straw. The fabric is generally oxidised pale orange, but the inner surface is pale grey. Given their size, it cannot be said with certainly what kind of object would have been cast in this mould. Four other very small ceramic fragments were recovered from this posthole, but it

seems likely that only one was from this mould.
L: 23 mm; W: 30 mm; Th: 12 mm; Wt: 7.01 g
L: 14 mm; W: 23 mm; Th: 9 mm; Wt: 3.57 g
Posthole ***4435***, fill ***4434***, Structure 3, OR 1490

7 Mould-valve fragment (Fig 139). This small fragment, in good condition, is largely amorphous, but with four wide, flat-bottomed parallel grooves. No outer wrap survives. It has been completely oxidised to a pale orange. The fabric is fine and sandy with few to no inclusions. The colour of the clay is pink/reddish on both the inside and outside, suggesting that the mould has not been used. The outside retains the remains of a ridge, whilst the inside has three deep parallel grooves. There is possible evidence for two clay envelopes, but the line between the two is very thin. The three ribs on the inside suggest that this was a mould for casting socketed axes. Mould fragments for similar socketed axes have been recovered from the settlement at Little Dunagoil, Isle of Bute (Schmidt and Burgess 1981, pl 104, no 1642), whilst a complete copper-alloy mould, with the same decoration as here, was present in a hoard from Roseberry Topping, North Yorkshire, that dates to approximately the tenth-ninth century BC (*op cit*, no 1608).
L: 34 mm; W: 24 mm; Th: 15 mm; Wt: 9.84 g
Posthole ***4365***, fill ***4364***, Roundhouse 4, OR 1626

8 Fragment in fabric of outer wrap (Fig 139). The triangular section and marked curvature suggests that this might be a 'gate' fragment, reminiscent of that illustrated by Stuart Needham (1980, fig 6, fragments 584/513), or possibly part of the pouring cup, regarded by Maikel Kuijpers (2008, 88) as indispensable in casting a socketed axe. It has a completely oxidised, sandy fabric. If originally circular, it has an estimated diameter of 70 mm, based on a surviving circumference of 35 mm.
Ht: 28 mm; W: 31 mm; Th: 12 mm; Wt: 10 g
Cairn ***4458***, OR 1801

9 Abraded mould fragment (Fig 139), now laminated along the joint between the mould and outer wrap. The fabric is oxidised to pinkish-brown, and made from gritty material, tempered with sand and organic materials. The hardened clay retains its pink/orange colour, strongly suggesting that this mould was never used. The fragment is small and very worn, with lines and grooves, and its flattened surface and curved outline strongly suggests that it was part of a mould for either a socketed axe/palstave, or a spearhead.
L: 27 mm; W: 22 mm; Th: 14 mm; Wt: 9 g
Posthole ***4365***, fill ***4364***, Roundhouse 4, OR 1627

10 Fragment in fabric of outer wrap (not illustrated). This is similar in form to **8** (*above*) and also possesses a triangular section and marked curvature. Therefore, it might also be a 'gate' fragment, or possibly part of a pouring cup. It has a completely oxidised, sandy fabric, which is again identical to **8**.
Ht: 24 mm; W: 37 mm; Th: 16 mm; Wt: 14 g
Deposit ***4200***, Roundhouse 4, OR 1919

Crucibles

Visual inspection of the fabric of the crucible fragments suggests that they were made in a very coarse and gritty fabric, with many sandy and gritty inclusions, that is very similar, if not identical, to the pottery from the later Bronze Age settlement (Fabric 2; *p 219*). This phenomenon is not, however, unusual, as it has been noted elsewhere, for instance in Scotland (Sahlen 2013).

The rim fragments from the crucibles all have a characteristic vitrified upper surface, on occasion discoloured to dark red, and in one case (**11**; *below*) small fragments of green corrosion products presumably indicate that the vessels have been used for melting copper alloy. The rims appear to derive from simple, shallow round vessels, with flat horizontal or slightly rounded rims, that are very similar to those recorded at the nearby Iron Age site at Ballacagen Lough, Site A (Bersu 1977, fig 32.3; *Ch 8, p 256*). It must be noted that the original analysis of these latter crucibles suggested that some were used for melting glass, although this seems unlikely, based on the probable date of the Ballacagen Lough site. Further afield, similar Bronze Age examples are known from Aldermaston Wharf, in Berkshire (Bradley *et al* 1980, fig 20) and Washingborough, Lincolnshire (Northover and Bridgford 2009, pl 4.9).

Where they can be estimated, the diameters of the crucible mouths from Taxiway Alpha East vary from 120 mm to 160 mm, although this can only be an approximate estimate as these are handmade vessels. No attempt was made at estimating the potential volume, which for the Bronze Age can vary considerably, with the largest holding up to 1.5 kg of molten metal (*op cit*, 74). Nothing in the small group suggested that tripod crucibles were being used, as have been reconstructed amongst the Late Bronze Age metalworking debris at Dainton, Devon (Needham 1980, fig 4).

11 Small rim fragment (Fig 140) from a thick-walled, shallow vessel with a flat, slightly rounded rim. The coarse and gritty fabric is highly vitrified and generally oxidised to a bright red; fragments of copper-alloy corrosion products are embedded in its vitrified upper surface. Overall, the surface is pitted and yellow/grey in colour. The colour and pitting suggest that great heat was sustained by the vessel on the inside. The inside of the profile, as well as the inside surface of the vessel, retains small flecks of copper alloy.
Ht: *c* 34 mm; Th (wall): 14 mm; Diam (max est): 160 mm
Floor ***4476***, Roundhouse 4, OR 1688

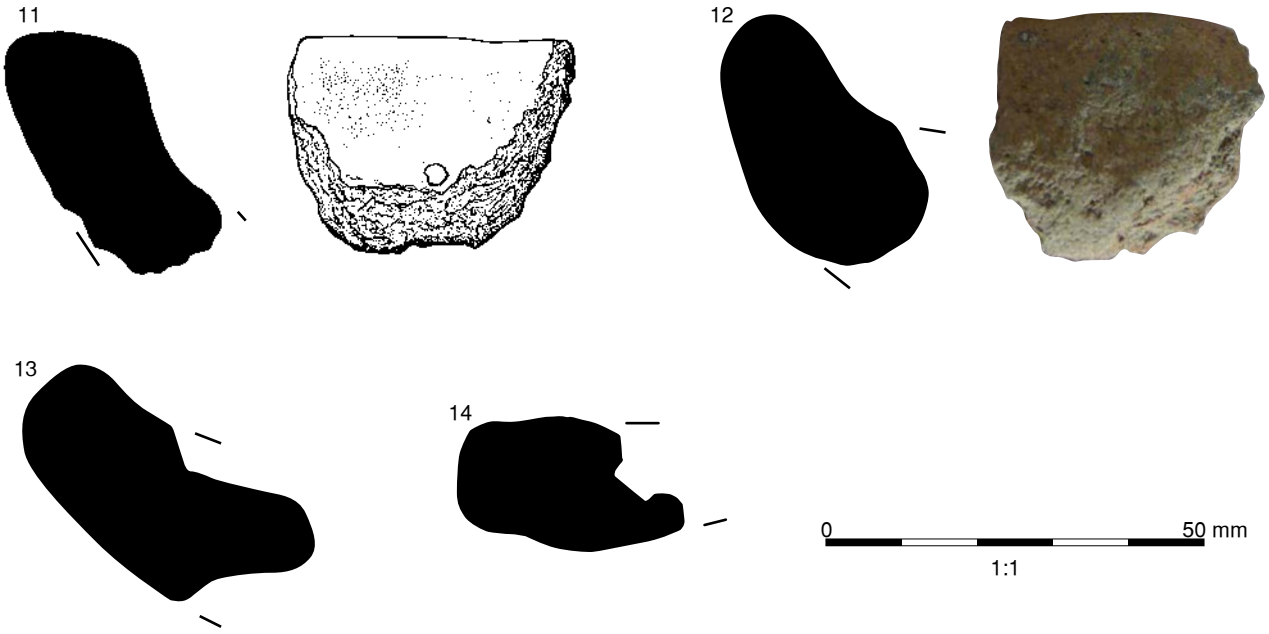


Figure 140: Crucibles from Taxiway Alpha East

12 Small rim fragment (Fig 140) from a thick-walled, shallow vessel, with a tapering rounded rim. The coarse and gritty fabric is highly vitrified, and deformed, generally oxidised to a brownish-red; fragments of copper-alloy corrosion products are embedded in the vitrified upper surface, which is a coppery-red colour. The rim and outside are fairly smooth to the touch, but the inside is damaged, with a chunk missing. Overall, the surface is pitted and yellow/grey in colour, and shows that great heat was sustained by the vessel, both inside and out.
Ht: *c* 33 mm; Th (wall): 14 mm; Diam (max est): 120 mm
Deposit ***4200***, Roundhouse 4, OR 1182

13 Small rim fragment (Fig 140) from a thick-walled, shallow vessel, with a flat, slightly bevelled rim. The coarse and gritty fabric is highly vitrified, and blistered, but is generally oxidised to a brownish-red. The fragment is fairly smooth to the touch, but the inside is damaged with a chunk missing. Overall, the surface is pitted and yellow/grey in colour, and shows that great heat was sustained both inside and out.
Ht: *c* 30 mm; Th (wall): 15 mm
Deposit ***4200***, Roundhouse 4, OR 721

14 Small rim fragment (Fig 140) from a thick-walled, shallow vessel with a slightly clubbed rim. The coarse and gritty fabric is highly vitrified, and deformed, but is generally oxidised to a brownish-red.
Ht: *c* 27 mm; Th (wall): 20 mm
Posthole ***4346***, fill ***4345,*** Structure 4, OR 1247

Amorphous fragments
There is a small collection of amorphous fragments in addition to the identifiable moulds and crucibles, in similar fabrics. Many of these are simply small, abraded fragments of fired clay, which probably, if their fabric is taken into account, contribute to the evidence for metalworking on the site. Although they are too small for any interpretation of their possible function, their spatial distribution (Table 51), along with the identifiable mould/crucible fragments, does allow foci for metalworking activities to be identified in specific parts of the settlement (*Ch 6, p 205*).

Discussion: moulds and bronzes
Although most of the mould fragments were too small to be assigned to a particular or general object type, specific fragments do indicate that the casting of spearheads, socketed axes, and swords was undertaken within the settlement, with the copper alloy being first melted within the crucibles recovered from the site. Spatially, these activities seem to have been focused on Structure 3 and Roundhouse 4 (*Ch 6, p 205*), which date to *c 1200-1000 cal BC* (*Ch 6, p 199*).

Four mould fragments are typologically informative. One (**3**) from Roundhouse 4 seems to have been the mould for a blade, which resembles several Late Bronze Age sword fragments from Jarlshof (*p 227*). Significantly, Late Bronze Age Ewart Park-type swords are published from the Isle of Man, from Berrag and Crogga (Davey *et al* 1999, nos 37-8), and a reworked blade was discovered at Foxdale (*op cit*, no 36; *Ch 6, p 172*), confirming the local manufacture of these types of bronzes in the southern part of the island.

A mould fragment (**4**) from Midden 1, adjacent to Structure 3 (*Ch 6, p 188*), was most likely used to cast a large, plain Late Bronze Age spearhead, probably a flame- or leaf-shaped specimen dating from the late twelfth- early ninth century BC (*p 227*). Interestingly,

		Number of fragments	Percentage of fired clay by fragment count	Weight (g)	Percentage of fired clay by weight
Roundhouse 1	Abandonment deposit ***4202***	1	1.23	37	8.35
	Hearth ***4464***	1	1.23	24	5.42
Roundhouse 2	Hearth ***4453***	8	9.89	21	4.74
Roundhouse 4	Posthole ***4365***	11	13.58	51	11.51
	Posthole ***4367***	3	3.71	15	3.39
	Occupation deposit ***4337***	7	8.64	8	1.81
	Abandonment deposit ***4200/4212/4222/4224***	11	13.58	80	18.06
Structure 3	Posthole ***4363***	1	1.23	13	2.93
	Gully ***4419***	2	2.47	12	2.71
	Posthole ***4346***	3	3.71	18	4.06
	Posthole ***4429***	1	1.23	4	0.90
	Posthole ***4598***	4	4.94	24	5.42
Structure 4	Posthole ***4346***	3	3.71	18	4.06
Midden 1	Spread ***4146/7***	2	2.47	22	4.97
	Concentration ***4188***	10	12.34	26	5.87
	Concentration ***4193***	12	14.81	73	16.47
U/S		4	4.94	15	3.39
Total		***81***		***443***	

Table 51: Entities/contexts containing amorphous fired clay and possible mould fragments

finds of Late Bronze Age spearheads on the Isle of Man are relatively rare, and no leaf- or flame-shaped spearheads are published (Davey *et al* 1999, 50-2). This mould fragment therefore expands the known types of spearheads from the island, and highlights that the bronzes represent an incomplete sample of those types that were used during the later Bronze Age.

Several mould fragments from Roundhouse 4 and Structure 3 relate to the casting of socketed, looped axeheads. Of these, one from Roundhouse 4 (**7**) was used to produce an axehead with three ribs, which seems to have been a common decorative feature associated with Late Bronze Age socketed axes dating from the tenth-ninth century BC (*p 228*). Another example (**5**), from Structure 3, was used to cast a socketed axehead with two mouth mouldings and, again, parallels can be found with Late Bronze Age axeheads dating to the tenth-ninth century BC (*p 227*).

Metalwork

C Howard-Davis and D Boughton

A small amount of probable later Bronze Age metalwork was recovered from the settlement. A small ring or ringlet fragment (OR 1744; Fig 141) came from posthole ***4435***, an element of Structure 3 (*Ch 6, p 188*). This is curved and appears to have one terminal that tapers slightly to a broken, flattish point, so if it was a ring, it is possibly one half of a scarf joint. Copper-alloy rings or ringlets are very difficult to date, because they occur in prehistoric as well as Roman and medieval contexts, but examination of the broken side of the ring suggests that it might have a ceramic core. Although such a core would be unusual in such a small object, later Bronze Age copper-alloy objects with ceramic cores are known from Britain, such as the copper-alloy rings from the Horsehope Hoard, Peebleshire (Piggott 1953). In addition, ten tiny droplets of solidified copper alloy,



Figure 141: The copper-alloy ring or ringlet from Taxiway Alpha East

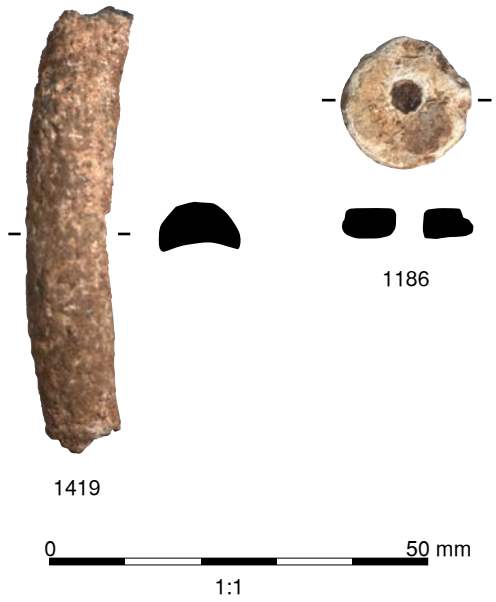


Figure 142: Lead artefacts from Taxiway Alpha East

presumably from casting, were found in Structure 3 (posthole ***4429*** and pit ***4544***; *Ch 6, p 188*).

A small group of lead ores, probably galena, and solidified lead drips, was recovered from Roundhouse 1 (three items) and Roundhouse 4 (four items), suggesting that lead was produced and/or used on the site, although in rather small amounts. The three drips from Roundhouse 1 came from abandonment layers ***4221***, ***4366***, and ***4422*** (*Ch 6, p 191*), whilst in Roundhouse 4, two drips came from abandonment deposit ***4200*** (*Ch 6, p 191*), one from posthole ***4365*** (*Ch 6, p 182*), with the fourth deriving from occupation deposit ***4337*** (*Ch 6, p 185*).

There was also a lead artefact (OR 1419; Fig 142) from abandonment layer ***4221*** in Roundhouse 1 (*Ch 6, p 191*). Although roughly made, it is a substantial curving bar with a triangular cross-section. A small disc of lead (OR 1186) also came from abandonment deposit ***4200*** in Roundhouse 4 (*Ch 6, p 181*). Its central perforation suggests that it was used as a spindle whorl, or, bearing in mind its size, it could have served as a large bead. Galena is relatively common on the Isle of Man (*Ch 6, p 172*), and lead can be produced from ore with ease, in the heat of a bonfire (Bayley *et al* 2008, 40). It is, of course, used in some copper alloys, and there are, in addition, increasing numbers of lead artefacts being recognised in early contexts, such as the string of beads from an Early Bronze Age burial in Peebleshire (Hunter and Davis 1994), and the lead used to repair a broken shale bangle from a Late Bronze Age site in Lincolnshire (Howard-Davis 2009).

Environmental Evidence

Animal bone
A Bates, with R Nicholson

A fairly large assemblage of faunal remains (7488 fragments of animal bone and teeth) was recovered from the settlement, comprising 2426 specimens that could be identified to species (number of identified specimens (NISP)). Although the material came from a range of features and deposits (Table 52), it was largely concentrated in Midden 1 (*Ch 6, p 188*), at the centre of the settlement area, and in Roundhouse 5 (*Ch 6, p 185*) and Midden 2 (*Ch 6, p 193*), relating to the abandonment of this house. Collectively, these three areas produced 97% of the animal bone from the settlement, though it is worth noting that a particularly large proportion of this material (68% of the total bone from the settlement) came from Midden 2. Given the Midden 1 assemblage also included 53 specimens from a deposit that dates to the Iron Age (*Ch 8; p 267*), 2373 NISP date to the later Bronze Age.

Overall, the preservation of the bone across the site was poor to moderate, with over 50% of the surface of the bones being eroded (Table 53). The only real

Phase	Feature	A	B	*Total*
1	Ditch ***4168***	7		***7***
2	Roundhouse 4	3	2	***5***
	Structure 3	25	17	***42***
	Midden 1 (concentration ***4193*** and associated deposits)	302 (249)	92	***393 (341)***
	Roundhouse 5	248	43	***291***
	Midden 2	1323	344	***1667***
3	Roundhouse 6	18	2	***20***
	Total	***1926 (1873)***	***500***	***2426 (2373)***

Note: the figures in brackets do not include the animal bone from Midden 1 dating to the Iron Age (*Ch 8, p 267*)

Table 52: NISP of the faunal remains from the later Bronze Age settlement identified to species or low-order group, by structure/feature

Preservation Category	Ditch *4168*	Roundhouse 4	Midden 1 (including Iron Age material)	Structure 3	Roundhouse 5	Midden 2	Roundhouse 6
Surface erosion	<50%	>50%	>50%	Variable	>50%	Variable	>50%
Robustness	Good	Poor	Moderate to poor	Moderate to poor	Moderate to poor	Moderate to good	Poor
Fragmentation of 'A' bones (% of potential number of zones)	-	-	34%	-	30%	37%	-
Butchered 'A' bones (%)	-	-	3.5%	-	-	1.6%	-
Burnt 'A' bones (%)	-	-	0.6	3.4	-	0.5%	-

Note: where 'A' bones number less than 30, fragmentaion has not been calculated

Table 53: Preservation and other taphonomic traits, by structure/feature

exceptions were the bones from ditch ***4168***, forming an associated/articulated bone group (ABG; *p 239*), and many of the bones from Midden 2, which were all in better condition. A small proportion (2.1%) of the individual bones from Midden 2 also exhibited varying levels of preservation, suggesting that they had been partially buried and partially exposed on the surface of this midden. In addition, it is possible that some of these bones had initially been dumped elsewhere and then incorporated into Midden 2, at a later date (*p 244*).

Principal domestic stock animals

Sheep

Sheep/goat or sheep were the most frequently occurring later Bronze Age species (Table 54), and these also dominated the assemblages from Roundhouse 5 and Midden 2. Within the sheep/goat category, where sheep and goats could be separated, they were all identified as sheep, which suggests that goats, although perhaps present at the site, were not one of the principal stock animals. Although taphonomic factors (*above*) could have skewed the survival/representation of the faunal remains, the high proportions of sheep and sheep/goat, compared with the other species recorded, could well indicate that sheep were, indeed, the more significant of the domesticated stock animals at the settlement.

Significantly, the assemblage of sheep and sheep/goat bone also contained various strands of data that allowed the types of breeds, pathology, butchery, sex, and the age at death of these animals to be considered. The biometric data were particularly informative as, in the first instance, they allowed the stature of the sheep to be established. Specifically, the breadth and length of the limb bones of sheep and sheep/goat were measured (Table 55; with one measurement

Entity	*Equus* sp	Cattle	Sheep/Goat	Sheep	Pig	Dog	Seal	Total
Ditch ***4168***				1				***1***
Roundhouse 4			2					***2***
Structure 3		14	8		3			***25***
Midden 1	1	60	96	6	79		7	***249***
Roundhouse 5	1	30	201	3	11	2		***248***
Midden 2		138	1022	38	63			***1261***
Roundhouse 6		9	5		1			***15***
Total	***2***	***251***	***1334***	***48***	***157***	***2***	***7***	***1801***
Principal Domestic Stock Animals (%)								
Roundhouse 5	0.4	12.1	82.3		4.4	0.8		
Midden 2		11.0	84.0		5.0			
Midden 1 (concentration ***4193***)	0.4	24.1	41.0		31.7		2.8	

Note: bones of the same individual counted as 1 NISP; sheep/goat and sheep have been totalled in the lower part of the table

Table 54: Total modified NISP of 'A' mammalian bones identified to species or low-order group, by structure/feature

Axis	Measurement	Element
Breadth	Breadth of proximal (Bp)	Radius
Breadth	Breadth of distal (Bd)	Tibia and astragalus
Breadth	Breadth of proximal fusion (BFp)	Metacarpal
Breadth	Breadth of distal fusion (BFd)	Metatarsal
Breadth	Breadth of trochlea	Humerus
Length	Greatest length (GL or GLl)	Radius, metacarpal, and astragalus
Length	Height of the trochlea	Humerus

Table 55: The breadth and length measurements used for the sheep/goat and sheep limb bones from the later Bronze Age settlement

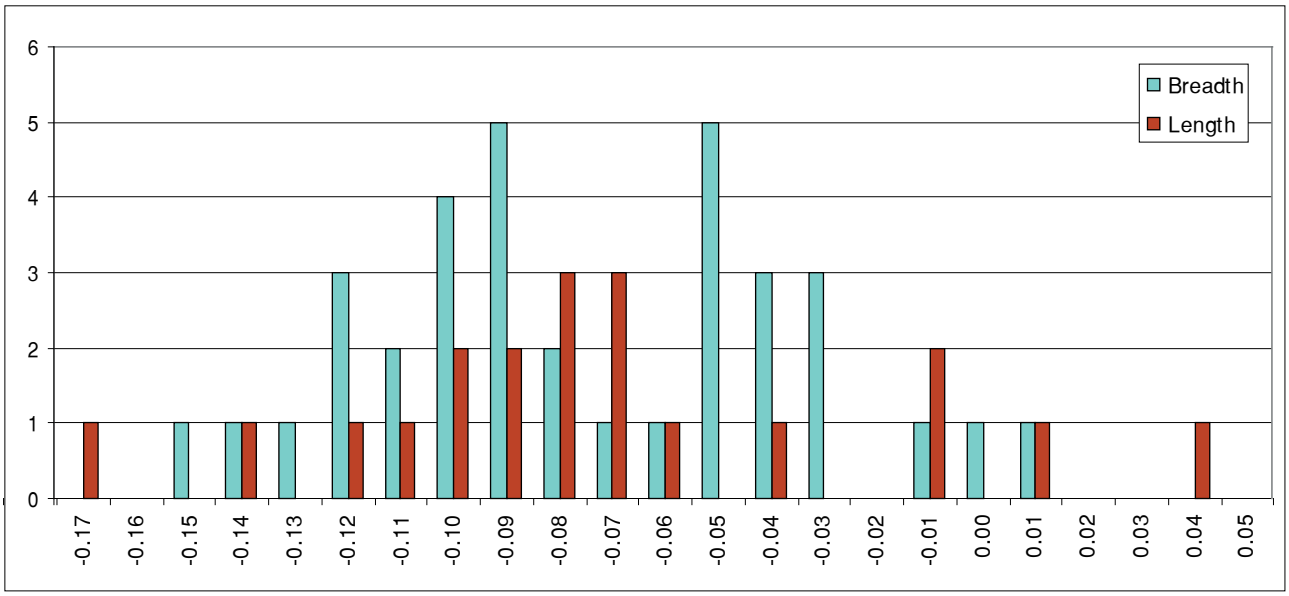


Figure 143: Comparison of sheep/goat and sheep limb-bone breadth and length measurements, compared to a standard Shetland ewe (0 value) using a log ratio

per element), and when plotted, using the log-ratio method, these produce a normal distribution (Fig 143). This distribution could then be compared with 'standard' measurements used by archaeozoologists, derived from modern adult Shetland ewes (Davis 1996). This comparison indicated that the Bronze Age sheep at Taxiway Alpha East were a shorter and less stocky breed than the modern Shetland breed.

Biometric information also provided insights into the potential breeds of Bronze Age sheep at the later Bronze Age settlement. These data were present in four sheep scapulae, the maximum length and width ranges of which could be estimated. These measurements were then compared with data from a study by Barbara Noddle (1978), which considered the length and width of the scapula of primitive short-tailed breeds, such as Soay, North Ronaldsay, Shetland, and Loaghtan (Table 56), that seem to be variations of the first domestic sheep introduced to Britain during the Neolithic period (Ryder 1981). Interestingly, the minimum and maximum values of the scapulae from Taxiway Alpha East most closely match those of the Loaghtan, the ancient short-tailed breed native to the Isle of Man, which seems to have developed from selective breeding of varieties of the Soay, North Ronaldsay (Orkney), and Shetland breeds (*op cit*, 402). These sheep (*lugh dhoan* or *lhosht dhoan* in Manx Gaelic) are mouse brown or burnt brown in colour (Wade-Martins 1990, 1-24), and are also multi-horned (polycerate; *cf* Ryder 1981). Although only

Breed/Sample	Index Range
Soay	100-147
North Ronaldsay and Shetlands	90-126
Loaghtan	88-113
Taxiway Alpha East	87.1-110.3

Note: Index Range= SLC/ASG*100 (ratio between the shortest distance from the base of the spine to the edge of the glenoid cavity (ASG) and the smallest length of the *collum scapulae* (SLC)

Table 56: Index range for sheep from the later Bronze Age settlement, compared to primitive breeds (after Noddle 1978)

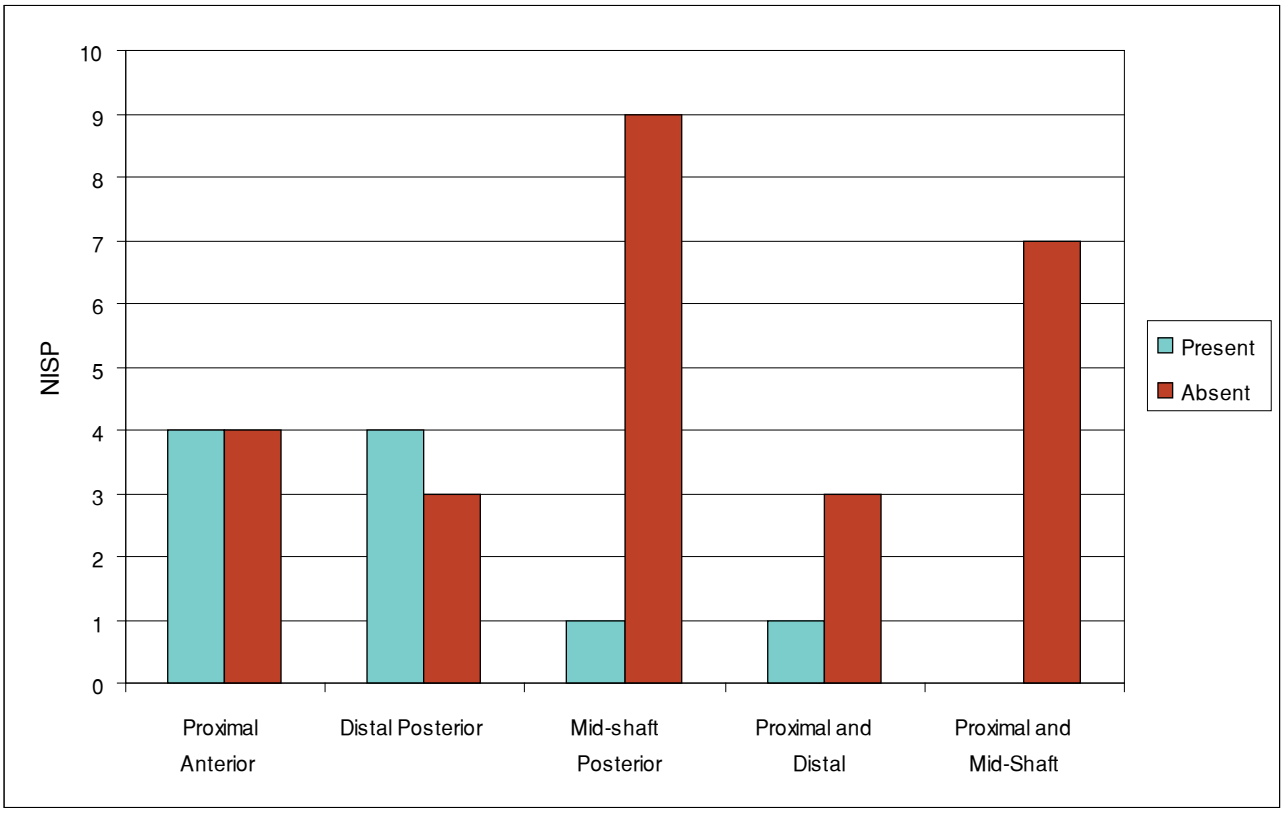


Figure 144: The position of nutrient foramen on sheep femurs

fragments of sheep skull were recovered from the later Bronze Age settlement, making it difficult to determine the number of horns that these sheep possessed, some of the femur bones did exhibit a congenital trait common to the Loaghtans (*cf* Noodle 1978). Specifically, this comprised a nutrient foramen (hole/opening) at the distal end of four femur fragments (Fig 144). An additional specimen, with the distal end absent, was recorded, which did not have a foramen at the proximal or mid-shaft position; therefore, as the foramen is normally present somewhere on the bone, it is not unreasonable to assume that it would have been present at the missing distal end. Four of the specimens had foramen at the proximal end of the bone, and one also had a foramen at the distal end.

One of the sheep bones, a radius from Midden 2 (soil ***4443***; *Ch 6, p 194*), also revealed a pathological condition (osteomyelitis) related to an infection within the marrow cavity, early in the animal's life, though it was clearly not life threatening (*cf* Baker and Brothwell 1980, 151). This was evidenced by a cavity on the medial side of the proximal diaphysis (central part of the radius, closest to the body) that had healed, with no sign of infection, and another similar, very small and almost healed, cavity on the posterior surface of this bone.

It was also evident that sheep were used for food in the later Bronze Age settlement, given the presence of butchery marks on several bones (identified as sheep or sheep/goat; Table 57). Specifically, transverse chop marks were recorded on an axis, associated with the decapitation of one of these animals, whilst dismembering marks were evident on the scapula (shoulder), distal humerus and proximal radius (elbow), proximal femur (hip), and proximal metacarpal and metatarsal (wrist and ankle).

Species	**Chop Marks**			**Cut Marks**			***Total***
	Skull	**Dismemberment**	**Vertebra**	**Dismembering**	**Filleting**	**Other**	
Sheep/Goat		2		6	3		***11***
Sheep				2	2		***4***
Sheep/Goat/Roe Deer			13				***13***
Medium Mammal					3	1	***4***
Total	**-**	***2***	***13***	***8***	***8***	***1***	***32***

Table 57: Chop- and cut marks on sheep, sheep/goat, and possible sheep bones

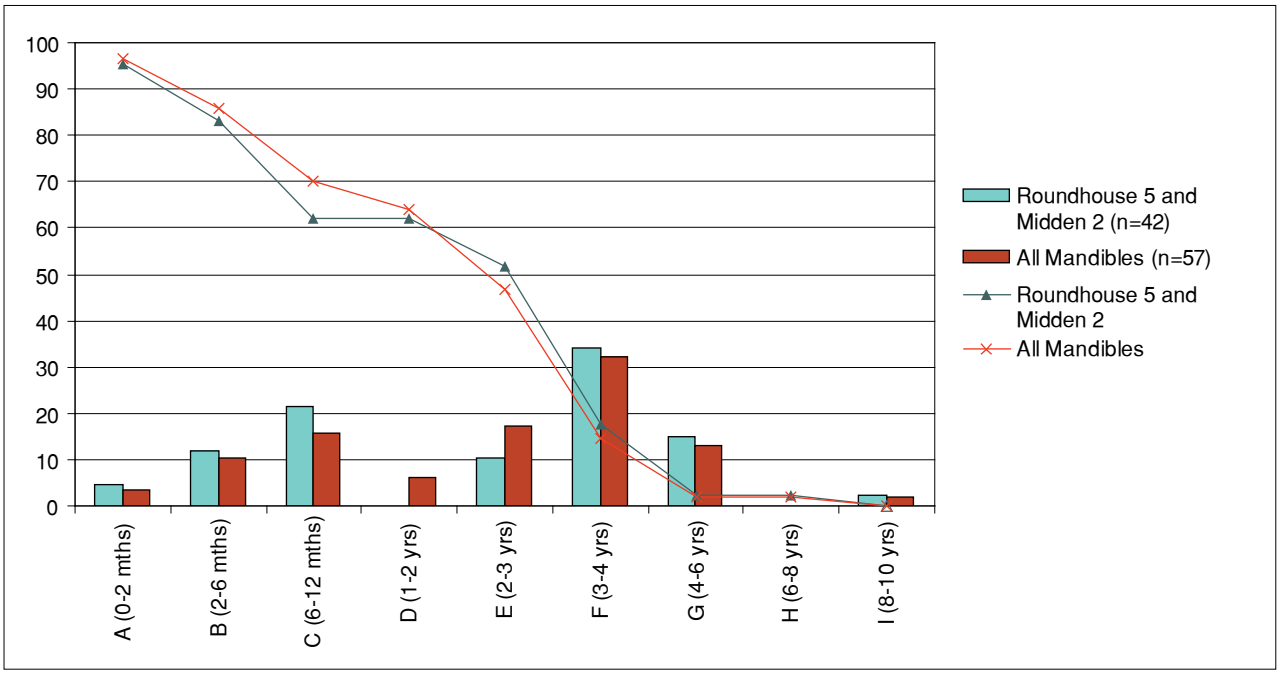


Figure 145: Percentages and cumulative percentages of sheep/goat and sheep in age classes according to tooth wear

Other evidence for butchery comprised a metatarsal from a young animal that had been chopped partly through the distal half of the shaft of the bone. The rest of the bone had presumably been broken off to remove the foot from the shank of the animal, but this had been obscured by fresh breaks. Filleting marks were also recorded on a metacarpal and a metatarsal, whilst several sheep/goat/roe deer vertebrae from Midden 2 demonstrated chop marks, including one cervical, nine thoracic, and four lumbar vertebrae. The bones were almost certainly of sheep, and two of the thoracic vertebrae had transverse chops separating the spinal column along its length, whilst two of the lumbar vertebrae had been split longitudinally, dividing the spine into roughly two equal halves, as if producing steaks. Seven of the thoracic vertebrae had also been chopped longitudinally through the body, shaving off one side and removing the transverse process and rib slab. Finally, butchery marks were recorded on several bones from medium-sized mammals, and it is feasible that these were also sheep, given the large number of their bones at the site. These bones included a thoracic vertebra spinous process with knife marks, probably a result of the removal of the tenderloin.

The assemblage of sheep and sheep/goat bones contained suitable specimens (mandibular teeth and pelves), which allow an assessment of the age at death (Grant 1982; Zeder 2002). Most of these were associated with the abandonment of Roundhouse 5 (*Ch 6, p 192*), being derived from such deposits and the overlying cairns, and from Midden 2. The evidence of tooth wear suggested that only around 50% of the flock survived beyond three years of age, and that over three to four years, only *c* 15% of the flock was maintained (Fig 145). In contrast, the epiphyseal fusion data (from the pelves) suggested a much more rapid decline in age, with only *c* 20% of the flock being maintained beyond 6-18 months old (Fig 146). It seems probable, however, that these discrepancies are due to the fragmentation of the mandibles, which have skewed results towards slightly older animals. Indeed, large numbers of molars were recovered, which could not be assigned to a wear stage (as it was not clear which molar they represented), whilst significant numbers of loose dp4s had to been excluded from the dataset, as the age stages they potentially belonged to were too broad to be useful (D to G; Fig 145). Hence, it seems that the sheep at the settlement would have comprised significant numbers of young animals, slaughtered as lambs or hoggets (a sheep up to the age of one year) for their meat. Possibly as few as 20% of the animals were slaughtered when older, with a second peak occurring at three to four years of age, and presumably these animals would have been used for breeding. It is also likely that these older animals provided wool and milk, though the relatively sparse numbers suggest that the economy was not explicitly geared to exploiting these resources in an intensive way.

The sex of a proportion of the sheep could also be deduced, from 15 pelves (Table 58). The majority of these were female animals, suggesting a male:female ratio of 3:13. A further four illial fragments of pelvis were not attributed to sex; two of these were of young animals, one a newborn, and one neonate. If many animals were slaughtered at an early age, it is also

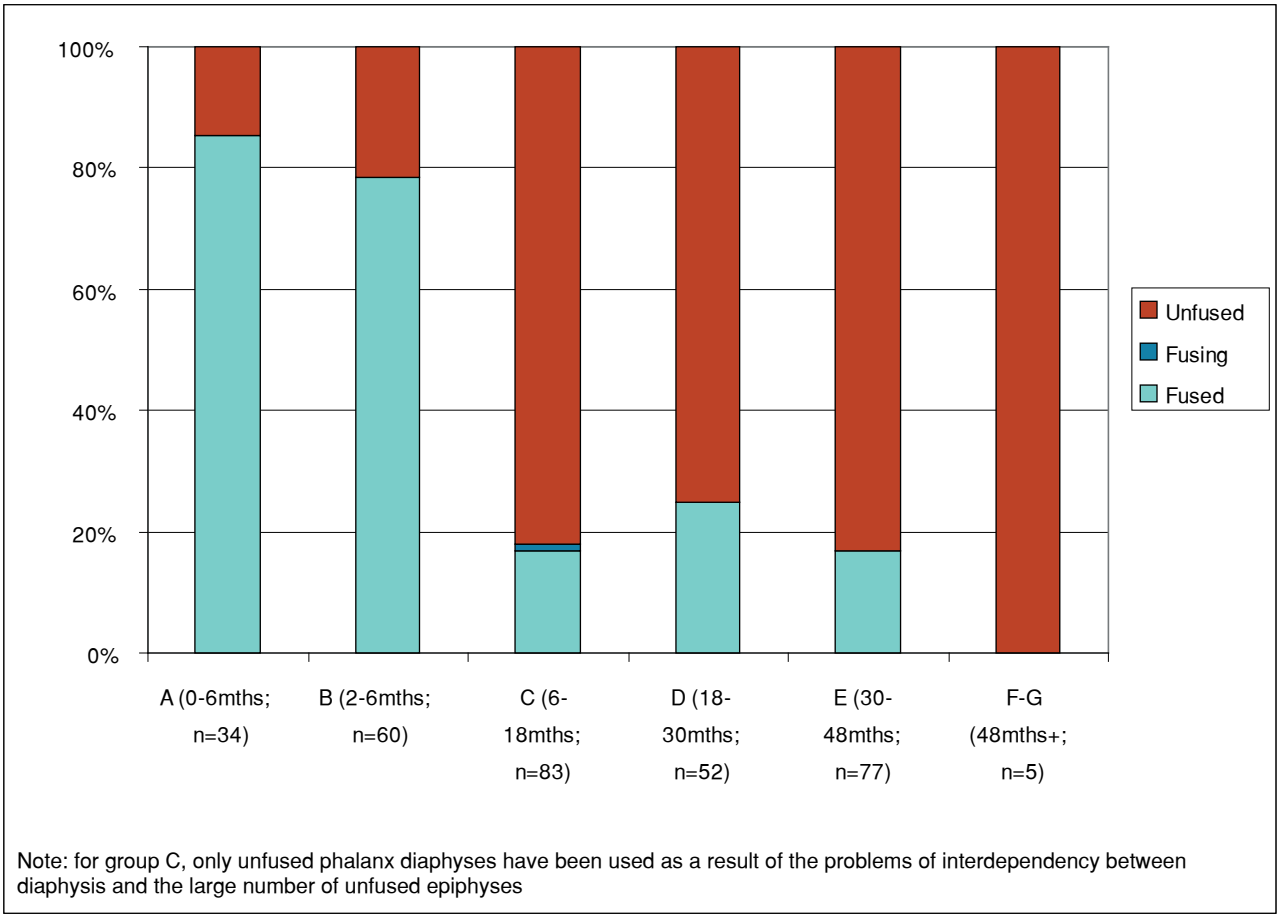


Figure 146: Percentage of sheep/goat and sheep epiphyseal fusion in age class and fusion state

Sex	No
Female	9
Possibly female	4
Male	2
Possibly male	1

Table 58: Sheep/goat and sheep attributed to a sex

quite feasible that the males are under-represented in these results, with only the small older and largely female population being identifiable to sex; most male pelves may have been more highly fragmented, or totally destroyed.

Cattle and pig

Cattle and pig were the other two main domesticated animals at the settlement. Although the frequencies of NISP for these species was considerably less than that for sheep, some did contain evidence relating to stature/size, congenital traits, pathology, and butchery.

The biometric data were confined to the teeth (first, second, and third molars) of the pigs. Due to variations in the length of the snout, the first and second molars were grouped together and measured (Fig 147), whilst the third molars were examined and measured separately (Fig 148). Using the length (GL) and width of the anterior cusp (Wa) standard (Albarella 2004), and the same log-ratio method employed on the sheep/goat bones (*above*), the data were then compared with the domesticated pig teeth from Durrington Walls, Wiltshire, which represent a large and coherent prehistoric (Neolithic) dataset (*ibid*). This demonstrated that the pig teeth from Taxiway Alpha East were smaller than those from Durrington Walls, which in turn suggests that small, domesticated pigs were present on the island.

Possible congenital traits were apparent in several of the cattle mandible, though the sample was too small to assess whether these were regular occurrences within the population. They included one mandible with a congenitally absent second premolar, and one example of an abnormally reduced hypoconulid (the cusp of a lower molar). Another molar (a mandibular third molar) also had very uneven wear across its occlusal surface because of the imperfect positioning (malocclusion) of the upper and lower teeth, which is a congenital defect in the morphology of the mandible (Baker and Brothwell 1980, 140).

One pathological cattle specimen was also recorded from Midden 2. This was a first phalanx with an extra

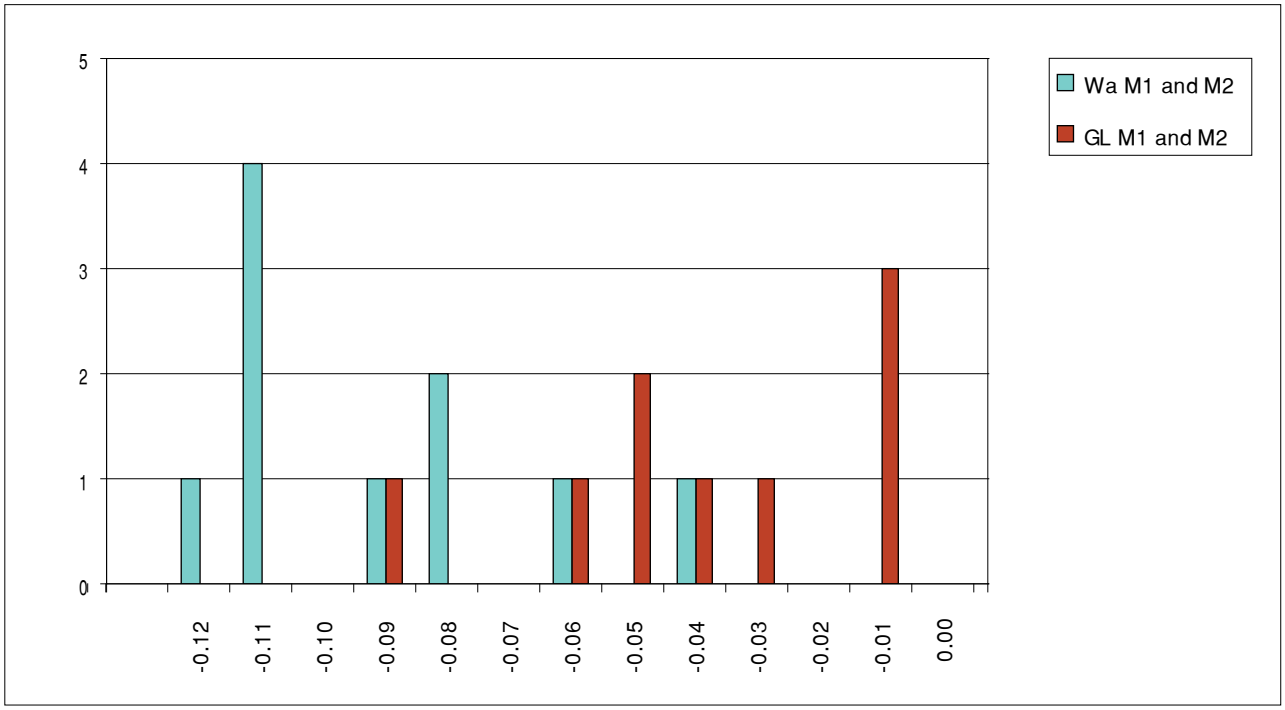


Figure 147: Comparison of first and second molar width (Wa) and length (GL) in the pigs to a standard Neolithic domestic pig (0 value), using log ratios

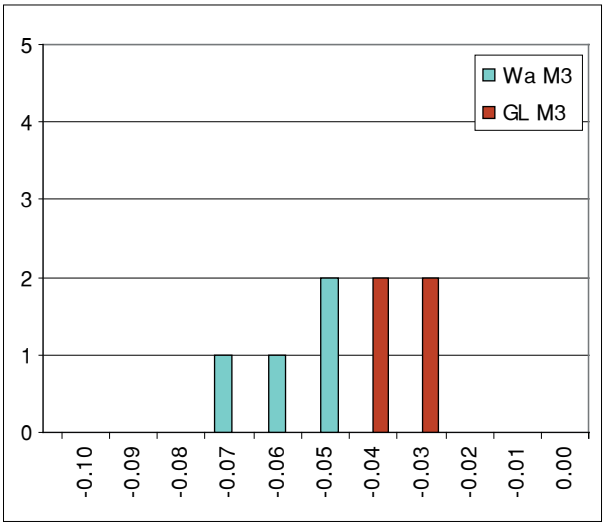


Figure 148: Comparison of third molar width (Wa) and length (GL) in the pigs to a standard Neolithic domestic pig (0 value), using log ratios

growth of bone (exostoses) on the distal diaphysis, just above the articulation, on the lateral side of the bone. Although the cause of distal exostoses on phalanges is difficult to determine, it is tempting to attribute this to stress on working animals. That said, the same pathology is also known in the skeletal material of wild aurochs and may simply be the result of age (Johannsen 2005).

Evidence for butchery was apparent on four of the pig bones (Table 59). This comprised a longitudinal chop mark on an axis, probably from splitting the skull into two halves, with the upper two vertebra still attached; chop marks on a scapula, from the dismemberment of the shoulder; and cut marks on two distal humeri from the dismemberment of the elbow joint. In addition, it is also possible that the medium-sized mammal bones with butchery marks were from pigs.

Slightly more cattle bones (ten in total) displayed evidence for butchery, which included a chop mark

Species	**Chop Marks**			**Cut Marks**			***Total***
	Skull	**Dismemberment**	**Vertebra**	**Dismembering**	**Filleting**	**Other**	
Cattle	1	3		3	2	1	***10***
Pig			1	3			***4***
Cattle/Red Deer		2		1			***3***
Medium Mammal					3	1	***4***
Large Mammal					3		***3***
Total	***1***	***5***	***1***	***7***	***8***	***2***	***24***

Table 59: Chop- and cut marks on cattle and pig, and possible cattle and pig, bones

on a fragment of the occipital-condyle of the skull, aimed along its length, made during an attempt to split the skull in half. Dismemberment marks were also recorded on a scapula, distal humerus, proximal radius, pelvis, and a proximal metatarsal, whilst filleting marks were recorded on a radius and femur. A small chop mark was also present on a second phalanx, probably made during the skinning of the animal. In addition, two mandible fragments, almost certainly cattle, had chop and knife marks consistent with the removal of the jaw from the skull. Three large mammal-bone fragments also had knife marks, and it is possible that these were also from cattle.

Meat weights

A representation of meat produced by the principal stock animals has been attempted (Fig 149), from older or younger animals, using meat weights published by Barbara Harvey (1993, appendix 2, table B). Hence, the total NISP of fused and unfused bones within Stage B for cattle (12-18 months), Stage C for sheep (12-18 months), and Stage A for pig (one year) were used, with most of the data deriving from Roundhouse 5. This suggested that the meat from lambs or younger animals outweighed that of mutton. It also appears that, despite the small number of cattle bones recovered, beef and veal outweighed that of the other domestic stock, whilst pork, being a heavier adult animal compared to sheep, also made a higher contribution than might be expected from the raw bone counts.

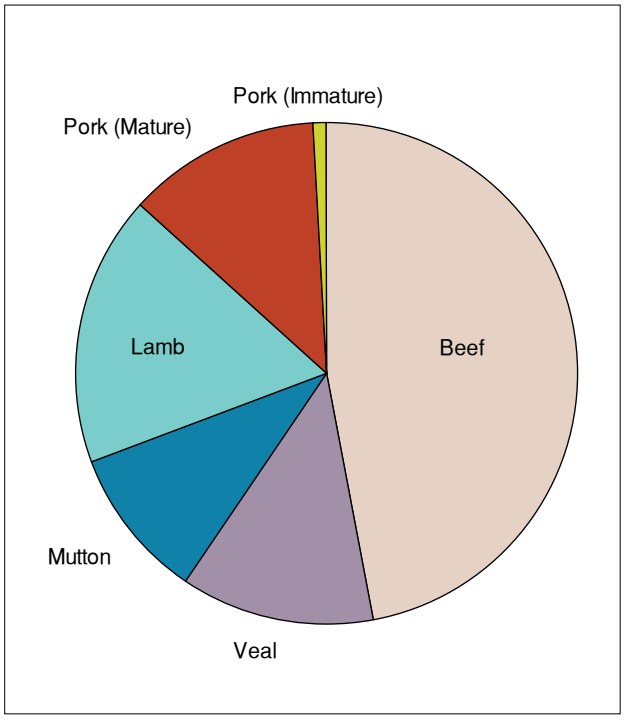


Figure 149: Estimated meat weights based on fused and unfused bones in Stage B (cattle), Stage C (sheep), and Stage A (pig), as a proportion of the modified NISP

Other mammals

Equus *sp*

Two equid bones were recovered, which, given that the donkey is considered to be a Roman introduction to the British Isles (Clutton-Brock 1992, 117), are likely to be from horses. They comprise a fragment of femur from Roundhouse 5 (cairn ***4382***; *Ch 6, p 192*), and a loose mandibular canine from Midden 1 (concentration ***4193***; spread ***4146***; *Ch 6, p 189*). These may have been ridden, used as pack animals, or could even have pulled wheeled vehicles (Bendrey 2012). They might also have been used as food, though perhaps providing only a small input into the diet of the inhabitants of the settlement.

Dog

Two dog bones were recovered from an abandonment deposit (***4348***) in Roundhouse 5 (*Ch 6, p 192*). These were diaphysis fragments from a left and a right radius, most probably from working animals, used for managing livestock, hunting, or as guard dogs.

Mouse

Midden 2 (soil ***4443***) produced a left mandible of a field or wood mouse (*Apodemus sylvaticus*), which was complete, apart from a missing M3. An eroded mouse-sized tibia and a small mammal metapodial in very good condition also came from this soil, together with an indeterminate fragment. Unlike the house mouse (*Mus domesticus*), which seems to have first appeared in Britain in the Late Bronze Age (Yalden 1999), the field or wood mouse has been present since at least the Cromerian Interglacial (563-478 ka years ago; *ibid*) and is one of the few small mammals recorded on the Isle of Man.

Seals and other marine mammals

A few seal bones were excavated from trample ***4413*** and spread ***4146*** associated with Midden 1 (concentration ***4193***; *Ch 6, p 190*). The fragments from deposit ***4413*** were all from the same skull and included the maxilla and premaxilla with incisors, canine, premolars, and the first molar, either within the skull or loose. In addition, part of a pelvis was recovered from spread ***4146***.

Although the species of seal could not be identified from these fragments, the bones are probably from grey (Atlantic) seals, which can be seen off the island today, throughout the year (Hanley *et al* 2012), particularly as the other species of seal in Manx waters, the common/harbour seal, is presumed to be 'a very recent arrival as a breeding species' (Tomlinson and Pooley 2006, 299). Presently, grey seals have a large breeding colony or pupping site on the Calf of Man (Garrad 1990, 89-90), though other smaller pupping sites have been recorded around Maughold, on the east coast, and between Bradda Head and Stroin Vuigh on the west

coast (Hanley *et al* 2012, 5-7). There are also larger numbers of haul-out sites used by seals around the coast, including the rocks off the Langness peninsula adjacent to Ronaldsway Airport (*op cit*, 10).

In addition to these seal bones, eight fragments, most probably the remains from a single large bone, came from Midden 2 (soil ***4443***), which probably derive from a marine mammal larger than a seal (*ie* dolphin, porpoise species, or whale species). Four of the fragments were charred and three had scorch marks upon them.

Bird bones
Midden 2 (soil ***4443***; *Ch 6, p 194*) also produced several bird bones, all derived from wild rather than domesticated species. These were from brent goose, cormorant, great auk, and blackbird (Table 60). The wing and leg bones of the cormorant seem to be from the left and right side of the same bird, one being radiocarbon dated to *1040-770 cal BC* (*SUERC-79961*; *Ch 6, p 200*). Similarly, the blackbird carpo-metacarpi are of opposing sides and could conceivably derive from the same individual.

No butchery marks were observed on these remains, but all may have been used for food. With this in mind, cormorants are permanently resident around the coast of Man, and would have been available all year round (Holden and Cleeves 2006, 74). Two cormorant bones have been recovered from previous excavations at Ronaldsway, which have been dated to the Late Neolithic period (Bruce *et al* 1947, 8). Blackbirds are also common on Man, and could have been caught at any time of the year (Holden and Cleeves 2006, 21). Brent goose, on the other hand, is a winter migrant which visits the island between October and April (*op cit*, 20).

The great auk became extinct in the mid-nineteenth century, but a small number of archaeological finds, pictorial evidence, and oral history suggest it once bred in the coastal areas around the island during the summer months (Fisher 1997). Two other archaeological finds of the bird are known from the island, two bones being excavated from Castle Rushen Stores, in Castletown, directly to the west of the airport (McCarthy 1996), comprising a tibio-tarsus attributed to the seventeenth century, and an undated humerus. Two to three specimens also came from the coastal site at Perwick Cave, *c* 8 km west of the airport, comprising a femur, furcula, and possibly part of a pelvis. The cave contained a midden with a number of similarities to those at Taxiway Alpha East, although its dating is problematic (Garrad 1978). Local tradition also has it that the rocks of Perwick were once visited by the 'Big Uig' (Garrad 1972), possibly breeding on the flat rocks of Kallow Point (A Kaye *pers comm*).

Fish
Only one identifiable fish-bone fragment, a dermal denticle (thorn), was recovered from Midden 2 (soil ***4443***; *Ch 6, p 194*). The thorn is eroded and consequently cannot be identified beyond being from a ray (Rajidae), although it is likely that it came from one of the skates (*Raja* sp; based on identification criteria from Gravendeel *et al* 2002).

Associated or Articulated Bone Groups (ABGs)
Ditch **4168**
The remains of a single partial sheep skeleton (***4155***) were excavated from the upper part of ditch fill ***4166***, within boundary ditch ***4168*** (*Ch 6, p 174*). These comprise limb bones from the right side of the body, a single bone from the left side of the body, and some vertebra (Fig 150). None of these bones displayed any evidence for butchery and, therefore, assuming that this was once a largely complete animal, much of the skeleton has been lost. Epiphyseal fusion data suggest it was a hogget, over 12-18 months and younger than 3-3.5 years of age (Zeder 2002).

Roundhouse 5 and Midden 2
Numerous fragments of animal bone were recovered from deposits and features associated with the abandonment of Roundhouse 5 (Table 61). These were

Element	Brent Goose	Cormorant	Great Auk	Blackbird	*Turdus* sp	Unidentified Bird	*Total*
Humerus		1		1		1	***3***
Radius		2					***2***
Ulna		2		2	1		***5***
Carpo-metacarpus		2			2		***4***
Femur			1				***1***
Tibio-tarsus	1	2				1	***4***
Tarso-metatarsus		2					***2***
Phalanx						2	***2***
Total	***1***	***11***	***1***	***3***	***3***	***4***	***23***

Table 60: NISP of bird bones from deposit **4443** *(Midden 2), by element and species*

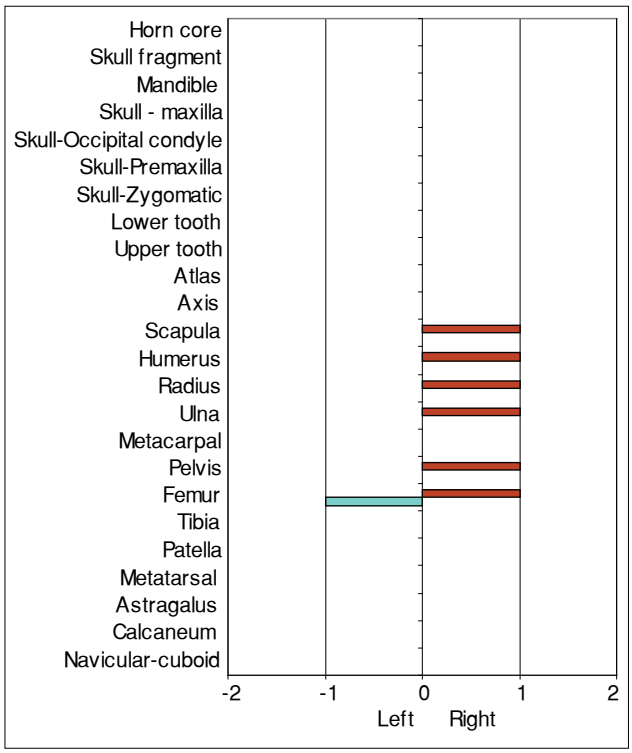


Figure 150: MNE of sheep **4155** *from ditch* **4168**

derived from demolition deposits (***4348***, ***4383***, and ***4457***), an abandonment deposit (***4149***), and the cairn (***4382***; *Ch 6, p 192*) constructed within the former house. Most fragments were collected by hand, only ten specimens being identified (nine teeth and a humerus fragment), all of sheep/goat, from a single 40 litre soil sample.

After the house had been abandoned, the cairn (***4458***; *Ch 6, p 192*) established over its former entrance was covered by Midden 2 (soil ***4443***; *Ch 6, p 194*). Both were associated with animal bone, though it is likely that the material from the cairn actually derived from Midden 2 (soil ***4443***), with animal bone from the midden percolating down into the cairn, through the voids in its fabric. During excavation, the animal bone from this cairn and midden were collected by hand, though soil from the midden and cairn was also sieved in its entirety, with the explicit aim of recovering animal bone. This had the advantage of recovering many smaller elements, such as small tarsal bones and phalanges, which often have low-recovery levels in hand-collected samples.

There were 11 instances of articulating bones, or where long bones could be identified as pairs from the same animal, all from soil ***4443*** in Midden 2. Much of this material, especially the sheep/goat and sheep bones, is likely to be from the same animals.

The ratios of the principal stock animals are generally consistent between all of the deposits from the roundhouse and midden, with large numbers of sheep/goat and smaller numbers of cattle and pig. The exception is the material from cairn ***4458***, where slightly higher

	Roundhouse 5					**Midden 2**		
Species	Posthole ***4457*** (ES 393)	Demolition deposit ***4348*** (ES 376)	Demolition deposit ***4383***	Cairn ***4382***	Abandonment deposit ***4149***	Cairn ***4458*** (ES 439)	Midden ***4443*** (ES 425)	***Total***
Mammal Bone								
Equus sp				1				***1***
Cattle		9	9	3	8	3 (1)	(134.5)	***167.5***
Pig		4	5		2	30 (1)	(32)	***74***
Sheep/Goat	(1)	64 (9)	90	14	23	44 (4)	(974.5)	***1223.5***
Sheep			2		1		(38)	***41***
Dog		2						***2***
Cattle/Red Deer		1				3	(6)	***10***
Sheep/Goat/Roe Deer		1					(70)	***71***
Medium Mammal		1				2	(81)	***84***
Large Mammal			1			1	(14)	***17***
Small Mammal							(2)	***2***
Marine Mammal							(9)	***9***
Mouse							(1)	***1***
Rodentia sp							(1)	***1***
Bird Bone								
Brent Goose							(1)	***1***
Cormorant							(11)	***11***

Table 61: Modified NISP by group and deposit for all 'A' bones from abandonment and cairn deposits from Roundhouse 5 and Midden 2

	Roundhouse 5					Midden 2		
Species	Posthole ***4457*** (ES 393)	Demolition deposit ***4348*** (ES 376)	Demolition deposit ***4383***	Cairn ***4382***	Abandonment deposit ***4149***	Cairn ***4458*** (ES 439)	Midden ***4443*** (ES 425)	***Total***
Great Auk							(1)	***1***
Blackbird							(3)	***3***
Turdus sp							(3)	***3***
Unidentified Bird							(3)	***3***
Other Bone								
Fish							(1)	***1***
Total	***(1)***	***82 (9)***	***107***	***18***	***34***	***83 (6)***	***(1386)***	***1726***
Principal domestic stock animals (%)								
Cattle		10.3	8.4			4.5	10.6	***10.5***
Pig		4.6	4.7			35.3	2.5	***4.6***
Sheep/Goat		85.1	86.9			60.2	86.9	***84.9***

Note: bones of the same animals counted as 1 NISP; sheep/goat and sheep have been totalled in the lower part of the table; numbers from environmental samples (ES) in brackets

Table 61: Modified NISP by group and deposit for all 'A' bones from abandonment and cairn deposits from Roundhouse 5 and Midden 2 (cont'd)

numbers of pig remains were present. The minimum number of individuals (MNI) of the main domesticates from Midden 2 and two of the demolition deposits from Roundhouse 5 were also calculated (Table 62) and, although these show consistently low values, it can be suggested that approximately 22-44 sheep were present within the midden. Combining all the sheep/goat and sheep bones from Midden 2, with the underlying deposits and features, results in a MNI of 23 and a maximum value of 45; including the bones from the abandonment and cairn deposits from this area results in an MNI of 26 and a maximum number of 49 animals.

Midden 1

Animal bone was present in several of the deposits associated with Midden 1 (Table 63), and within these deposits, several groups of animal bone were also present. These included a small group of seal bones;

Entity	Deposit	Cattle	Sheep/goat	Pig
Midden 2	***4458***	1	3	2
	4443	4 (13.8%)	22 (75.9%)	3 (10.3)
Roundhouse 5	***4348***	1	5	1
	4383	1	5	1

Table 62: MNI of the principal domestic stock animals from deposits associated with Roundhouse 5 and Midden 2

Species	Midden deposit ***4394***	Midden deposit ***4377***	Trample ***4413***	Midden spread ***4146***	***Total***
Equus sp				1	***1***
Cattle	1	4	1	54	***90***
Pig	42	20	2	15	***87***
Sheep/Goat	4	16	3	73	***109***
Sheep		1		5	***7***
Seal			6	1	***8***
Total	***47***	***41***	***12***	***149***	***302***
Principal domestic stock animals (%)					
Cattle	2.1	9.7		36.7	***30.7***
Pig	89.4	48.8		10.2	***29.7***
Sheep/Goat	8.5	41.5		53.1	***39.6***

Note: bones of the same animal counted as 1 NISP; sheep/goat and sheep have been totalled in the lower part of the table

Table 63: Modified NISP by deposit for all 'A' bones from the Midden 1

Context	Description
Spread ***4146***	Four conjoining fragments of a cattle pelvis
	Articulating cattle navicular-cuboid and external cuneiform
	Two conjoining fragments of a sheep/goat radii
	Two conjoining fragments of a sheep/goat mandible
	Two conjoining fragments of a sheep/goat or roe deer pelvis acetabulum
	Three articulating sheep/goat or roe deer thoracic vertebra
	Two conjoining fragments of a pig scapula
Midden deposit ***4377***	Conjoining cattle proximal tibia epiphysis and diaphysis
Midden deposit ***4394***	Two conjoining fragments of a pig pelvis
	Conjoining proximal femur epiphysis and diaphysis of a pig
Trample ***4413***	Two conjoining seal skull fragments and five teeth

Table 64: Associated bone fragments of the same animal associated with concentration **4193** *(Midden 1)*

a collection of predominantly sheep/goat and sheep bones and teeth, covering an area of *c* 1.5 x 1 m in the central part of the midden; and a group of pig bones in its eastern corner. Although within each of the groups, there is no evidence that separate elements of the same individuals were present, there were 11 instances of conjoining bone fragments distributed amongst the midden deposits (Table 64), suggesting that articulated/associated bone groups may have been present.

Body-parts in the middens

Midden 1

The total number of bones per element, per species, is too low for detailed body-part analysis; however, the elements have been recorded for each of the principal stock animals. Overall, most parts of cattle, sheep, and pig carcasses were represented, including the skull (Fig 151), suggesting that most body-parts were dumped into the midden, which at times may even have included whole animals.

Midden 2

Midden 2 (cairn ***4458*** and soil ***4443***) contained sufficient quantities of sheep bones to undertake body-part analysis. Accordingly, to assess the presence or absence of different parts of sheep carcasses, the recorded 'A' bones (*Ch 1, p 25*) were quantified by their frequency and completeness. Their frequency was measured by minimum number of elements (MNE; *Ch 1, p 25*), and the completeness by the number of diagnostic zones, with over 50% present as a percentage of the potential number of zones, if the bones had been complete.

When placed in ranked order, the bones have a smooth overall trend, with proximal radii, distal radii, and distal humeri the most frequently occurring elements (Fig 152). There is also a high positive correlation between the %MNE value and fragmentation, excluding tarsal bones and phalanges (rs=0.605, p=0.01; Fig 153).

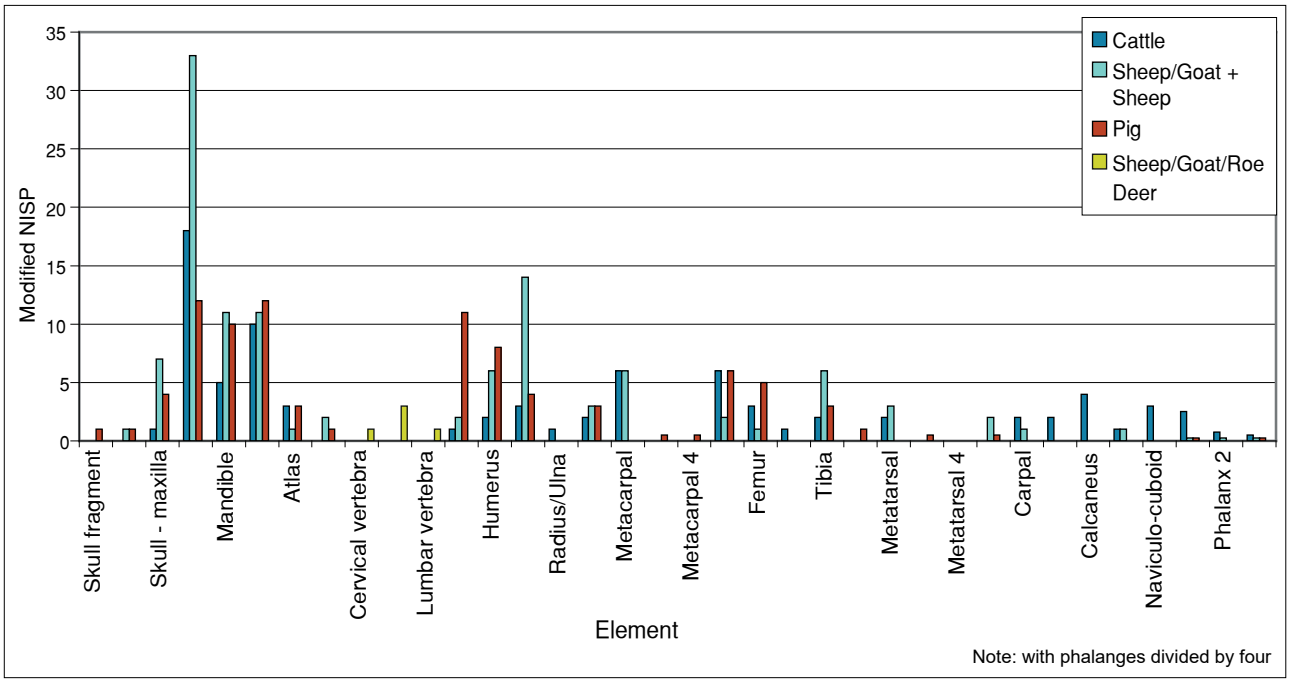


Figure 151: Modified NISP of the phalanges of cattle, sheep/goat and sheep, and pigs from Midden 1

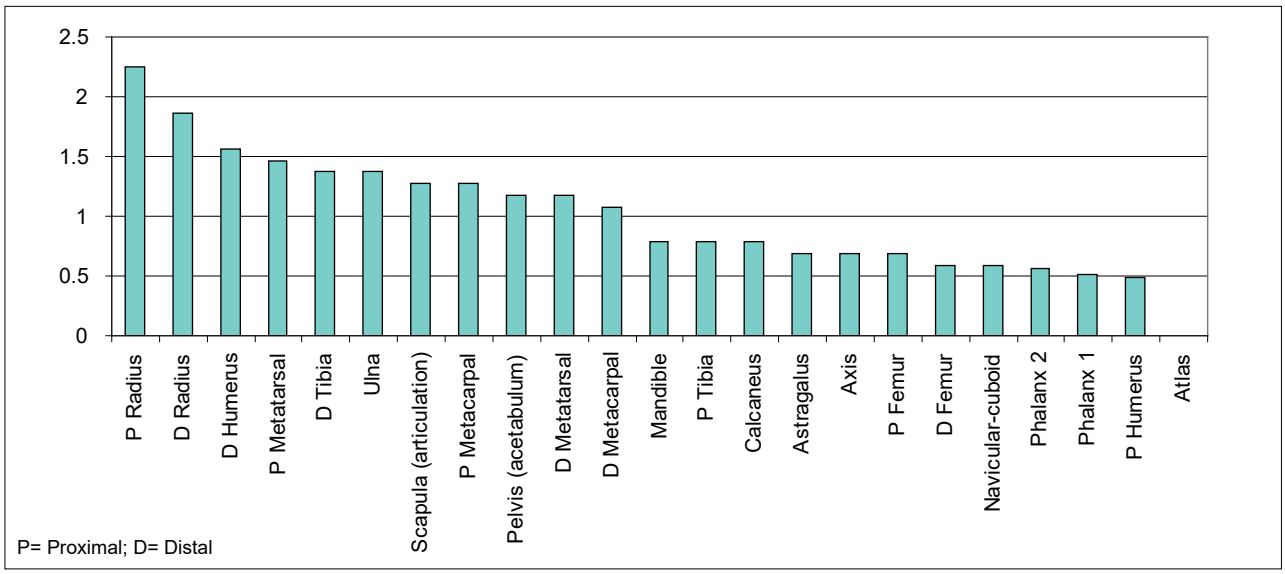


Figure 152: The representation of anatomical parts of sheep/goat and sheep bones from Midden 2, in rank order (n=268 (MNE); SD=0.51; one sigma range=0.49-1.51)

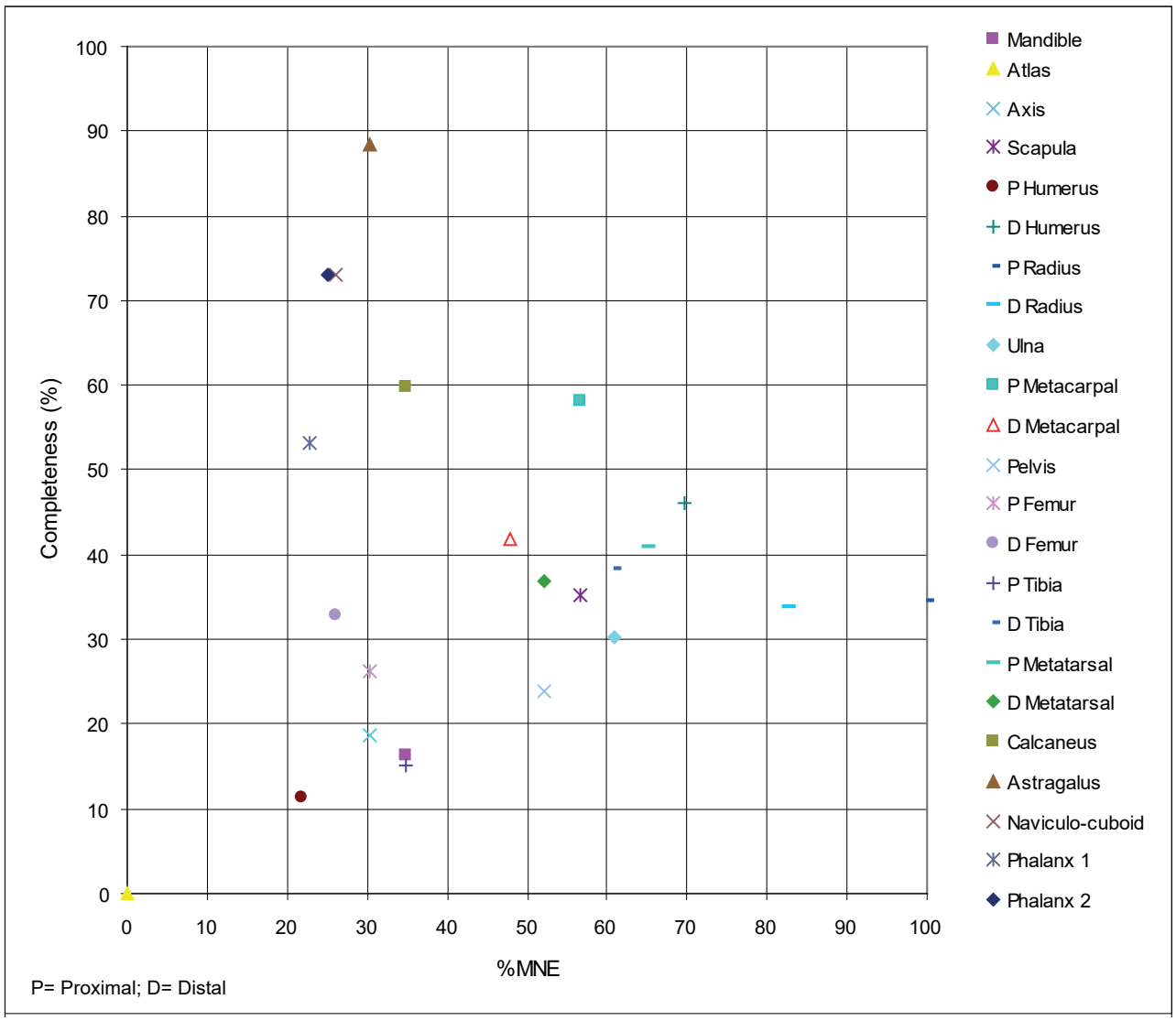


Figure 153: Sheep/goat and sheep remains from Midden 2 (%MNE (=MNE as a precentage of MNI) against completeness (%))

Taphonomic factors seem, however, to have significantly affected the composition of the sheep/goat and sheep assemblage and, despite the sieving of these deposits (*p 240*), the quantities of phalanges and tarsal bones were still relatively low. Several body parts were also absent from Midden 2, including the skull, vertebrae (other than the atlas and axis), and ribs. Indeed, only eight left and four right maxillary third molars were recovered, and the percentage of vertebra fragments and rib heads, including 'B' bone records, was also low (Table 65). Whilst this loss of bone might be due to attritional processes, it also seems likely that significant numbers of vertebrae, ribs, and sesamoids were not originally deposited within this midden. In addition, it might also be expected that there would have been a larger number of mandibles, which are normally the most commonly occurring bone in NISP counts (Brain 1981, 21-4); however, it seems that the sheep/goat and sheep mandibles from Midden 2 are comparatively low and have also been highly fragmented, with typically only one or two diagnostic zones present, which has affected its MNE count. This is possibly a result of the age profile of these animals (*p 235*), with the mandible of younger animals being more susceptible to fragmentation than those from older adults (*ibid*). An MNE produced from loose teeth as opposed to zones suggests that the mandibles were deposited, but in a fragmented state.

Other factors also appear to have played a part in the formation of the sheep/goat and sheep assemblage within this midden. Specifically, the range of body parts and their completeness suggests that many of the bones might have initially accumulated in another midden (perhaps Midden 1?; *Ch 6, p 188*), prior to their disposal in Midden 2. These acts of secondary deposition might also explain the absence/low occurrence of some elements (*eg* smaller sesamoids and possibly the vertebrae and fragmented ribs). Based on the low occurrence of loose maxillary teeth in comparison to mandibular teeth, it also seems unlikely that many skulls, even in a fragmented state, were deposited in the first instance.

MNE values from cattle (Fig 154) and pig bones (Fig 155) proved too low to be useful for body-part analysis, although in both species there is little evidence of their vertebrae being deposited within

Element	Observed	Number per carcass	%
Left Maxillary Third Molar	8	1	34
Cervical Vertebrae	28	7	17
Thoracic Vertebrae	38	13	23.5
Lumbar Vertebrae	28	7	17
Ribs Heads	61	26	10

Table 65: Percentage of sheep/goat and sheep maxillary third molars, and medium-sized mammal vertebrae (excluding atlas and axis) and rib heads, including 'B' bone records, calculated from an MNI of 23 animals

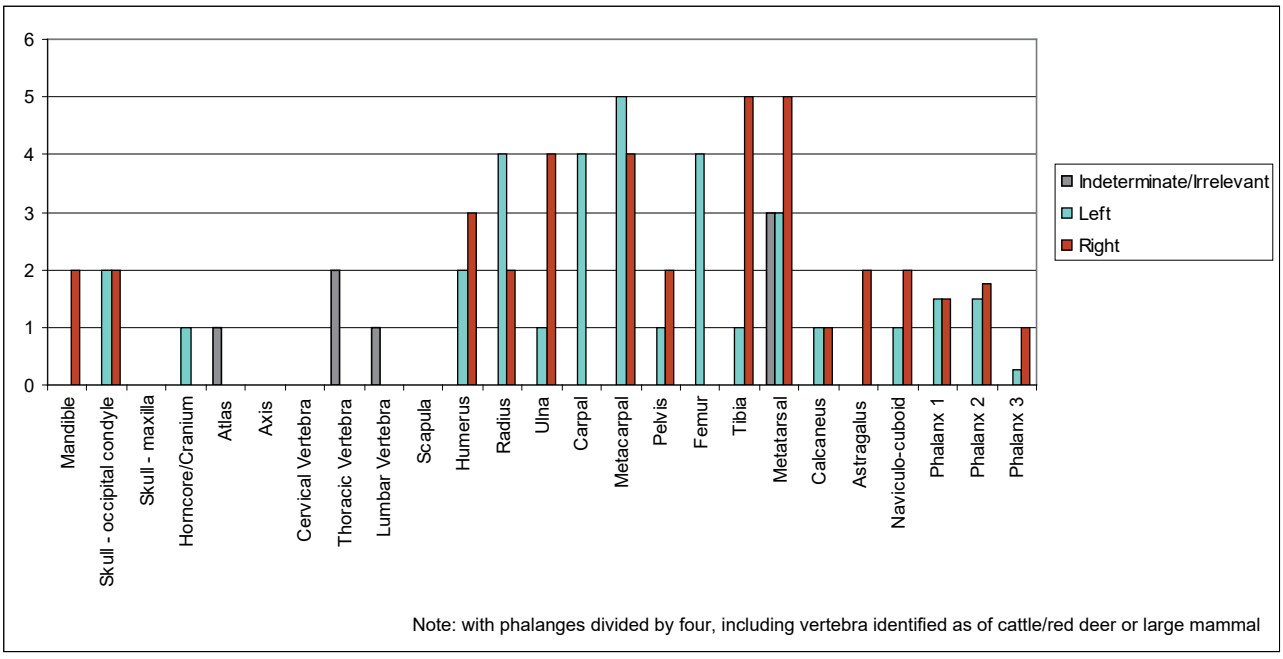


Figure 154: Modified NISP of cattle 'A' bones from Midden 2

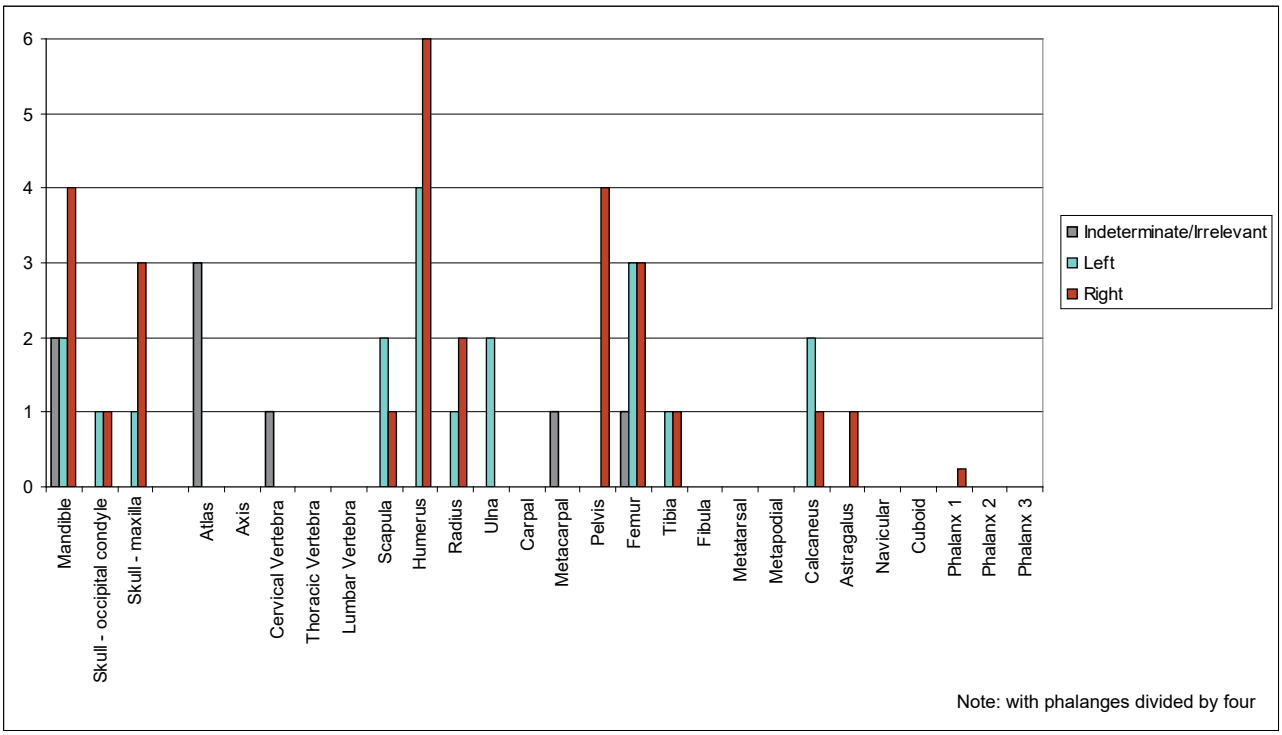


Figure 155: Modified NISP of pig 'A' bones from Midden 2

Midden 2. In addition, whereas in cattle, most other parts of the carcass are represented, bones from pigs' feet are largely absent. It is therefore quite likely that this medium-sized mammal had suffered the same taphonomic issues which affected the sheep-bone assemblage (*above*).

Marine mollusca
I Smith

Both later Bronze Age middens (Middens 1 and 2) at Taxiway Alpha East contained shells (Table 66), which were both hand-collected and recovered from a series of whole-earth samples extracted from these middens. The shells from Midden 1 (7.99 kg) were derived from layer ***4146*** (*Ch 6, p 189*), material deposited when the Phase 2 settlement was in use, whilst those from Midden 2 (4.25 kg) came from soil ***4443***, and seemed to relate to abandonment activities that occurred at the end of this settlement's life (*Ch 6, p 194*). In addition, small quantities of shell (14 g) were recovered from abandonment deposit ***4149***, which had been dumped over Roundhouse 5 (*Ch 6, p 192*). It is highly likely, however, that these shells were contemporary with those from nearby Midden 2, which had formed on a cairn constructed following the abandonment of this same house, over its former entrance (*Ch 6, p 193*).

Common limpet (*Patella* sp) and common periwinkle (*Littorina littorea*) were present in all three deposits, whilst the flat-top shell (*Gibbula umbilicalis* sp) was also found in Middens 1 and 2. This is a type of marine mollusc which is currently only found on the western shores of Britain and Ireland (Hayward and Ryland 1995). There was, however, a preference for consuming limpets and periwinkles, which make up almost all of

Context	Species	Weight (g)
Midden 1 (layer ***4146***)	Common limpet (*Patella* sp)	7345
	Common periwinkle (*Littorina littorea*)	651
	Flat-top shell sp (cf *Gibbula umbilicalis*)	3
Midden 2 (soil ***4443***)	Common limpet (*Patella* sp)	1241
	Common periwinkle (*Littorina littorea*)	3004
	Flat-top shell sp (cf *Gibbula umbilicalis*)	4
	Unidentifiable	5
Abandonment deposit ***4149***	Common limpet (*Patella* sp)	10
	Common periwinkle (*Littorina littorea*)	4

Table 66: Shells from Middens 1 and 2, and abandonment deposit **4149**, *by species and weight*

the weight within the combined assemblage. This is perhaps not that surprising, though, as these represent the 'most common shells recovered on archaeological sites in northwest Europe' (Somerville *et al* 2017, 215).

All of these species are edible (Hayward and Ryland 1995), and they were probably foodstuffs, thus providing some additional details on the diet of the later Bronze Age people at Taxiway Alpha East. These could either be eaten raw, or cooked, though given they were collected and brought back to the settlement, the latter option may have been more appropriate (Bell and Godden 2014). They would have been present on the rocks and stones on the coastline and sub-littoral fringe, and would undoubtedly have been in plentiful supply during the later Bronze Age, representing an easily collectible wild-food resource (*ibid*).

Plant remains

D Druce

The excavations at the later Bronze Age settlement produced a moderate-sized assemblage of charred plant remains and charcoal, collected from a series of bulk soil samples. Following assessment, the plant remains from 18 of these samples were analysed in detail.

Cereals

Several features associated with Roundhouses 1, 2, and 4-6, and Structure 3, contained frequent to abundant cereal grains (Fig 156). Although many of these cereal grains were severely charred, and therefore indeterminate, several different types were identified.

Many of the barley (*Hordeum* sp) grains were poorly preserved; however, both symmetrical and 'twisted' grains were evident, indicating the presence of a probable six-row variety (Jacomet 2006). A few also had rounded backs, with blunt ends, and wavy markings on their surface, characteristic of the naked variety (*ibid*). A naked barley (*Hordeum* sp var *nudum*) grain from hearth ***4453***, from Roundhouse 2, provided a radiocarbon date of *1130-940 cal BC* (*SUERC-53402*; *Ch 6, p 199*), which is consistent with its cultivation in the rest of Britain and Ireland during the later Bronze Age (Huntley and Stallibrass 1995; McClatchie 2014). A tentatively identified hulled barley (*Hordeum vulgare*) grain from hearth ***4451***, from the same roundhouse, provided a date of *1190-1000 cal BC* (*SUERC-53403*; *Ch 6, p 199*).

Wheat was also present in a number of the Bronze Age features and, although morphological overlaps and local variations in strains of crops can mean the positive identification of wheat grains to species can be problematic, some showed characteristics consistent with a glumed variety. The presence of caryopses with measurements consistent with spelt (*Triticum spelta*) and emmer wheat (*Triticum dicoccum*; Jacomet 2006), along with the positive identification of spelt-wheat glume bases and *cf* emmer-wheat glume

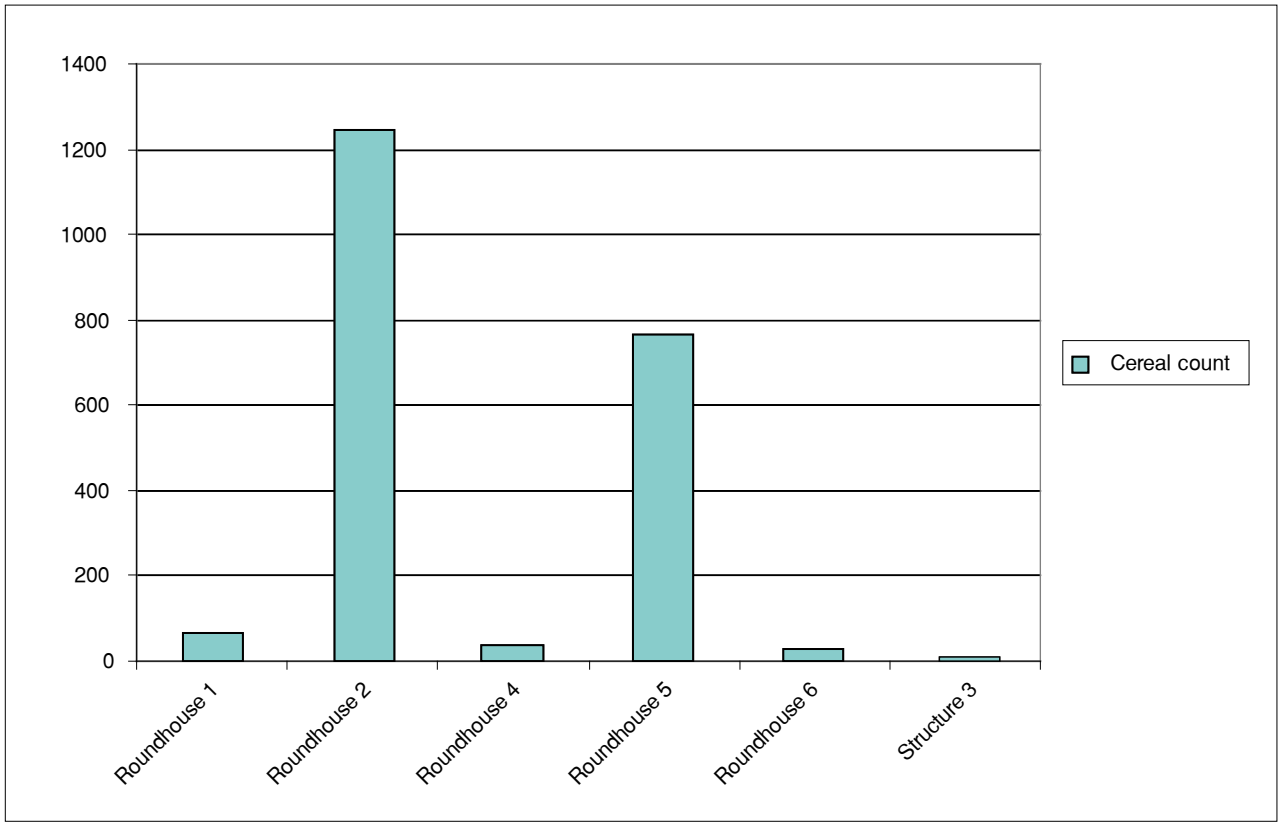


Figure 156: Cereal counts from the later Bronze Age settlement at Taxiway Alpha East

bases, suggests that both varieties were present. An example of a possible glumed wheat grain from demolition deposit ***4366*** in Roundhouse 1, which also produced five spelt-wheat glume bases, provided a date of *1180-1010 cal BC* (*SUERC-53391*; *Ch 6, p 199*). A possible emmer-wheat grain from posthole ***4470*** in Roundhouse 5 returned a slightly later date of *1070-910 cal BC* (*SUERC-53394*; *Ch 6, p 200*). The rounded, plump nature of some of the wheat grains from Roundhouses 2 and 5 may also indicate the cultivation of a free-threshing variety. A *cf* bread-wheat-type (*Triticum aestivum*-type) cereal grain, from a demolition deposit (***4348***) within Roundhouse 5, produced a radiocarbon date of *1090-910 cal BC* (*SUERC-53393*; *Ch 6, p 200*); its identification is tentative, however.

Evidence from sites in northern England suggests that emmer wheat and naked barley were the predominant crops during the Bronze Age (Huntley and Stallibrass 1995). It is still unclear, however, at what stage other crops, such as spelt wheat and hulled barley, were introduced (*ibid*; Greig 1991). Evidence from many sites in Britain, including Scotland, suggests that hulled barley, with its higher yields, generally superseded naked barley during and after the Late Bronze Age (Godwin 1975; van der Veen 1992; Huntley and Stallibrass 1995; Hastie 2010). Earlier examples have, however, been recorded alongside a predominant crop of naked barley, associated with Middle Bronze Age roundhouses in Glanfeinion, Powys (Britnell *et al* 1997), and at Irby, Wirral (Huntley 2010), which may represent the first introduction of this variety into these areas. Evidence from Scotland and Ireland suggests that naked barley did, however, continue to be grown as a major crop well into the Late Bronze Age and, indeed, into the Iron Age (Hastie 2010; McClatchie 2014). Similarly, it is generally considered that, throughout Britain, spelt wheat was first cultivated at the beginning of the Late Bronze Age, according well with the evidence from Roundhouse 1, which produced five spelt-wheat glume bases (*above*). That said, a potentially Early Bronze Age spelt-wheat glume base has been recorded at a site near to Carlisle (Parcel 9 at CNDR; Brown *et al* 2023), whilst spelt-wheat grains have been recovered from an earlier Neolithic site excavated at Kintore, Scotland (Bishop *et al* 2009, 88). It is possible though that, at these two sites, these grains were intrusive ecofacts.

Similarly, the history of bread-wheat-type in Britain is poorly understood and, although a few examples have been found in Neolithic deposits, it is not thought to have become a crop in its own right until the late Roman or early medieval period (van der Veen 1992). Given this, the discovery of a possible free-threshing wheat-type grain dated to the later Bronze Age at Ronaldsway (*above*) may be significant, suggesting the much earlier use of this crop. Indeed, some support for this is provided by the presence of a possible free-threshing cereal grain at Haughey's Fort, Co Armagh, from deposits dated to the Late Bronze Age, which may also indicate its early presence in Ireland. However, it has been stressed (McClatchie 2014), that the absence of any free-threshing chaff at the site precludes its positive identification.

Posthole ***4522***, from Roundhouse 6, produced a naked barley grain dated to *980-820 cal BC* (*SUERC-53401*; *Ch 6, p 200*), which may indicate the continuation of its cultivation during this period of crop transition. It is also possible, however, that the remains represent a remnant crop, which persisted in arable fields amongst the main crops. This posthole also produced two *cf* emmer-wheat glume bases, which, if being cultivated during this period, could be considered quite late.

Other charred remains

As well as the cereal remains, the samples analysed from Roundhouses 1, 2, and 5 also contained charred seeds (Fig 157), including those from plants of cultivated, waste, or open ground, such as fat-hen (*Chenopodium album*); brome (*Bromus* sp); black nightshade (*Solanum nigrum*); ribwort plantain (*Plantago lanceolata*); knotgrass (*Polygonum aviculare*); and pale persicaria (*Persicaria lapathifolia*). Sheep's sorrel (*Rumex acetosella*), which grows on heathy open or cultivated ground on acid sandy soils, was also frequently recorded. In addition, a wet/heathland component was present in the form of sedges (*Carex* sp), blinks (*Montia fontana*), heath (*Erica* sp), and heathgrass (*Danthonia decumbens*), and heather (*Calluna vulgaris*). The charred-seed assemblages from Roundhouses 1 and 5, specifically from demolition deposit ***4366*** (*Ch 6, p 191*) and hearth ***4457*** (*Ch 6, p 192*), also contained a strong grassland component, including corn-spurrey (*Spergula arvensis*), a calcifuge, which usually grows on sandy cultivated ground (Stace 2010), and lesser stitchwort (*Stellaria graminea*). Abundant grass (Poaceae) seeds were also present, including small oat grains. The latter lacked the marked embryo of cultivated oat, and were therefore most likely to be the wild variety, *Avena fatua*. Deposit ***4366*** also contained abundant cereal culms, possibly indicating straw.

Charcoal

The relative quantifications of charcoal types were recorded (Fig 158), showing that oak (*Quercus* sp) dominated the assemblages from all the roundhouses. In particular hearths ***4451*** (Roundhouse 2; *Ch 6, p 180*) and ***4357*** (Roundhouse 4; *Ch 6, p 182*), demolition deposits ***4366*** (Roundhouse 1; *Ch 6, p 191*) and ***4383*** (Roundhouse 5; *Ch 6, p 192*), and posthole ***4423*** (Structure 3; *Ch 6, p 188*) produced assemblages overwhelmingly dominated by oak. Alder/hazel (*Alnus*/*Corylus*) and positively identified alder were also well-represented, in hearths ***4451*** (Roundhouse 2) and ***4356*** (Roundhouse 6; *Ch 6, p 195*). Other taxa, recorded in small quantities, included hawthorn-type (Maloideae), blackthorn-type (*Prunus* sp), ash (*Fraxinus excelsior*), elm (*Ulmus*), and ericaceous

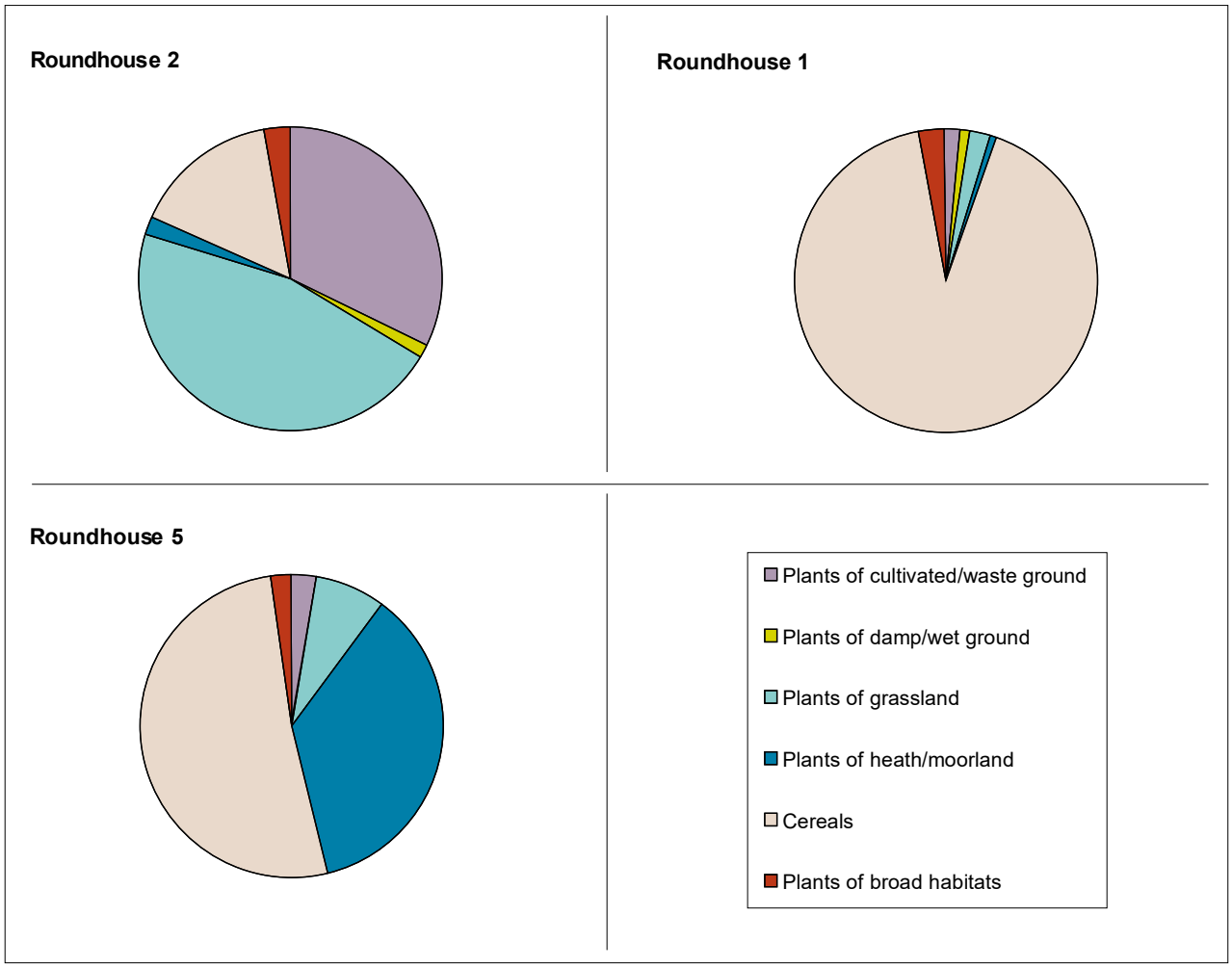


Figure 157: Relative quantifications of types of charred plant remains from the later Bronze Age settlement

wood (heather/heath). The latter was particularly prevalent in demolition deposit ***4383*** (Roundhouse 5; *Ch 6, p 192*). Common ericaceous charcoal and heath/heather seeds and buds were also recovered from a posthole from the same roundhouse.

Discussion

The macrofossil data from Taxiway Alpha East suggest that the later Bronze Age inhabitants were cultivating a diverse range of crops, including naked barley, emmer, and spelt wheat. The tentative identification of hulled-barley grains and a free-threshing variety of wheat may also indicate the cultivation of these crops, perhaps during a period of experimentation and diversification. This evidence is certainly consistent with the idea that the Isle of Man 'was probably privileged by its position (in the Irish Sea) to play an important role in regional trading circuits and cultural exchange' (Frieman 2008, 143). It is highly plausible, for example, that some agricultural communities in more marginal locations, such as those at Ronaldsway Airport, may have experimented with a range of crops as a failsafe way of ensuring viable harvests. However, in the absence of abundant identifiable (and datable) chaff, or techniques such as Infrared spectrometry (*cf* McLaren 2000), the current evidence must be treated with some caution.

It appears that oak provided the main fuel wood for most activities. This is no surprise, however, given that seasoned oak is one of the best fuel woods (Edlin 1949). It is probable that oak was locally available, and the pollen data suggest that oak (and elm) were well established during this period, having first rose to prominence in the second half of the eighth millennium cal BC (*Ch 2, p 34*; Chiverrell *et al* 2023).

Both the charred plant remains and charcoal evidence suggests that some of the activities taking place within the Bronze Age settlement involved the use of moor/heathland vegetation. The abundant charred heath/heather remains from Roundhouse 5 were possibly the remains of structural and/or some other functional material. Records from the northern uplands indicate that moorland has been a significant component of the upland landscape throughout the last 6500 years (Chiverrell *et al* 2004). The evidence also suggests that forest clearance of wooded areas increased considerably during the Bronze Age, which

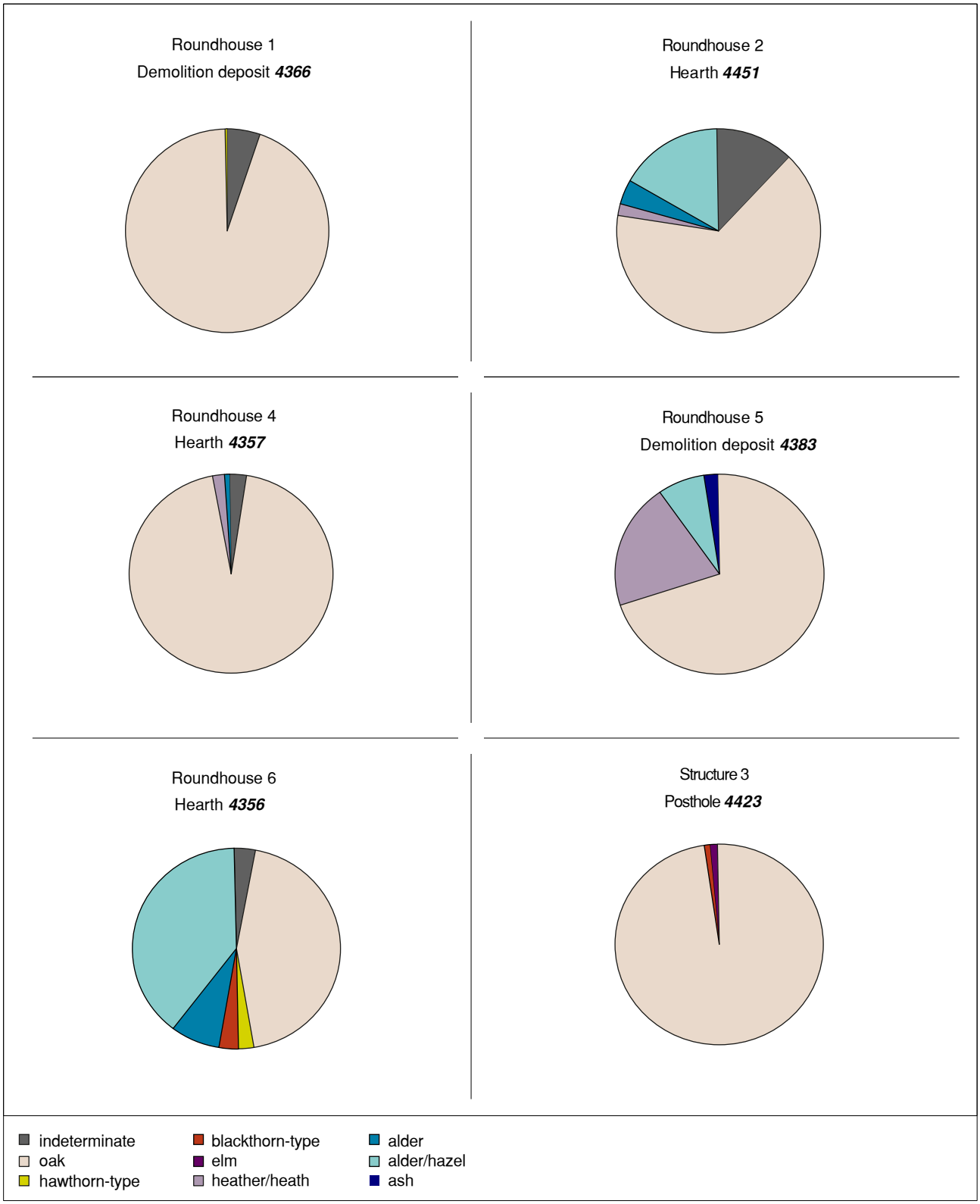


Figure 158: Relative quantifications of charcoal types from the later Bronze Age settlement

coincided with increases in agricultural activity (*ibid*; *Ch 6, p 169*). At many wetland sites, this corresponds to a reduction in wetland trees such as alder and willow (*Salix*), and an increase in values of sedges, grasses, and ericaceous plants (*ibid*). An increase in herbaceous plants and heath vegetation growing on the mire surface would have provided rich grazing land. In addition, as evident from the later Bronze Age settlement at Taxiway Alpha East, such environments would have provided valuable resources in the form of sedges, rushes, grasses, and heather, which could have been used for a variety of purposes.

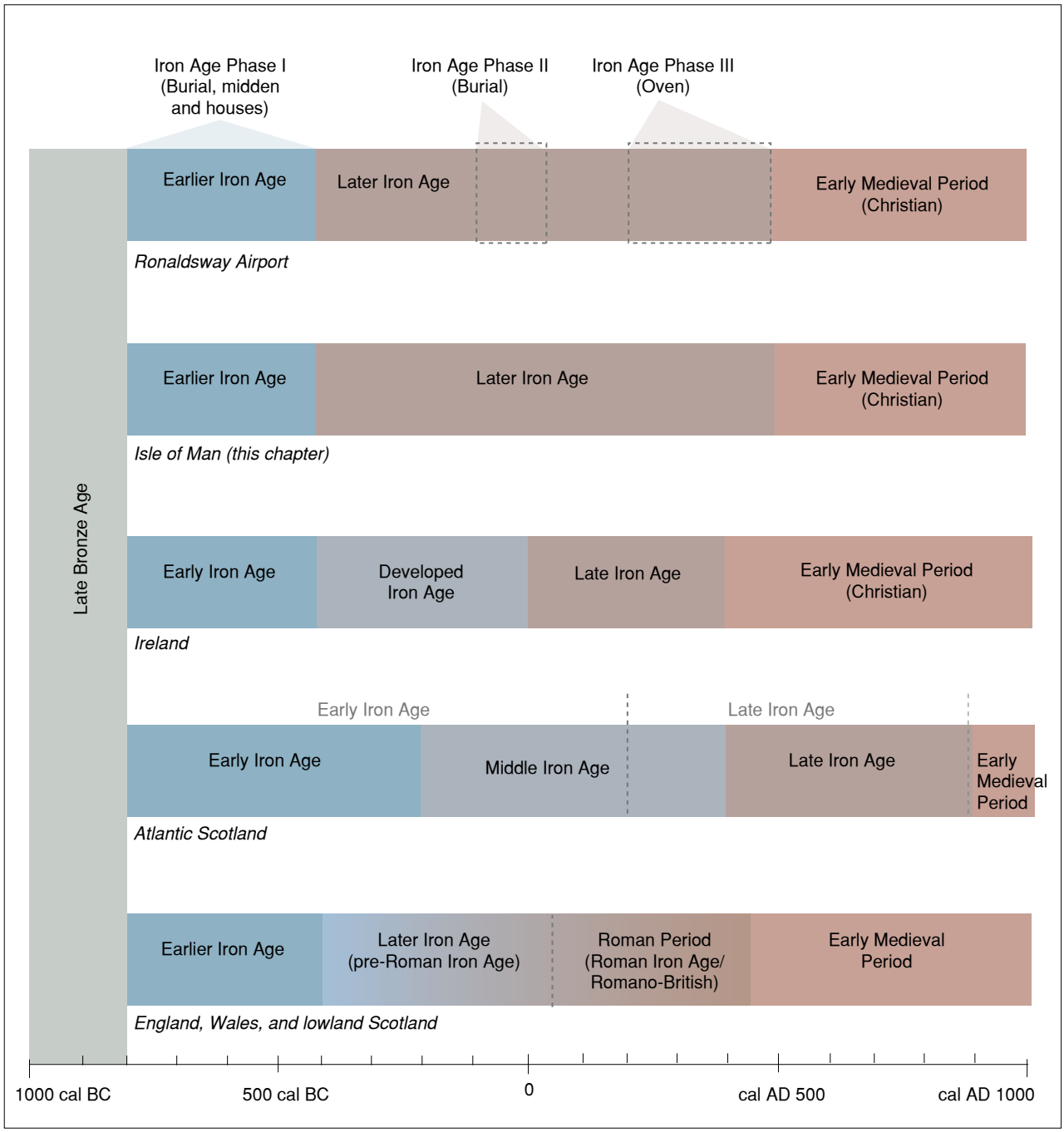


Figure 159: Iron Age chronologies

8

LIFE AND DEATH IN THE IRON AGE

Richard A Gregory, with Andrew Bates, Dot Boughton, Denise Druce, and Helen Webb

In addition to the extensive Bronze Age settlement (*Ch 6*), the project also produced remains associated with the Iron Age, effectively the 'terminal' period of prehistory. Within the British Isles and Ireland, this period probably began around 800 cal BC (Haselgrove and Pope 2007, 4), and in most parts of England and Wales it extended up to the arrival of the Roman military in the latter part of the first century AD (Haselgrove and Moore 2007, 2). After this date, in the militarised areas of Britain (*ie* northern England and North Wales), rural settlement can be classified as part of the Romano-British cultural tradition, though, in many respects, this was a broad continuation of that established in the Iron Age, effectively representing a 'Roman' Iron Age (*cf* Haselgrove *et al* 2001, 3). In other parts of the British Isles, however, such as the Atlantic coasts and northern Scotland, the Isle of Man, and Ireland, which lay beyond the influence of the Roman Empire, its chronology is much more extended (Fig 159). This extended Iron Age continued into the first millennium AD, 'imperceptibility', merging into the medieval period (Armit 1997, 15). Given this imperceptibility, there is no universally accepted end date for the Iron Age in these areas, and, therefore, on the one hand, some envisage a 'long' Iron Age, especially in areas such as Atlantic Scotland, extending into the second half of the first millennium, ending with the advent of Viking settlement in *c* AD 900 (*cf* Harding 2017, 3; ScARF 2012a, 9). In this scheme, the Early Iron Age would extend from *c* 800-200 cal BC; the Middle Iron Age from *c* 200 cal BC-cal AD 400; whilst the Late Iron Age would cover the period cal AD 400-900 (Parker Pearson and Sharples 1999, 359). Alternatively, the 'long' Iron Age can be simplified into an 'early' Iron Age and 'late' Iron Age, with the division between the two lying in the second quarter of the first millennium AD (Harding 2017, 3).

The introduction of Christianity could also be viewed as an appropriate end date for both the Iron Age and prehistory, as this roughly equates with the beginnings of a literate society. Therefore, in the case of Ireland and parts of Scotland, and also Man, this may well fall in the fifth century AD, and it is this chronological scheme which is favoured in this chapter. In Ireland, an end date of AD 400 is preferred (Waddell 1998, 4), though for Man and Scotland, *c* AD 500 probably forms a more appropriate boundary (Davey 2002; Frieman 2008, 142; ScARF 2012a, iii). As with the 'long' Iron Age (*above*), this shorter chronological scheme can also be broadly divided. For example, the Irish Iron Age has been split into three periods termed 'Early' (*c* 700-400 BC), 'Developed' (400 BC-1 BC/AD), and 'Late' (1 BC/AD-AD 400; Becker *et al* 2008, 17).

Although these three broad phases may well be relevant to the Iron Age on the Isle of Man, this period in the island's history is associated with limited amounts of chronologically sensitive material that can be classified as Iron Age. Specifically, the island appears to have been aceramic from the later Bronze Age to *c* AD 1000, and diagnostic material culture is rare (Davey 2002). In addition, as many probable Iron Age sites were excavated between the 1940s and 1960s, these are generally not associated with radiocarbon dates, and hence very few have secure chronologies. With those sites that do have radiocarbon dates, there is also the problem of the radiocarbon calibration curve, which flattens across the mid-first millennium BC, producing calibrated dates with fairly wide date ranges (*cf* Haselgrove and Pope 2007, 1). Therefore, given this, it is considered more appropriate, as with the simplified scheme for the 'long' Iron Age (*above*), to split this into an 'earlier' and 'later' Iron Age, with the division between the two falling at *c* 400 cal BC. This division also has the advantage of being broadly in line with the later and earlier Iron Age in other regions of the British Isles and north-west Europe (Haselgrove and Moore 2007, 2), though in the case of the Isle of Man, the later Iron Age is extended outwards by some 400 years, effectively encompassing the 'Roman Iron Age' in northern and western Britain.

Two main strands of evidence exist for Iron Age activity at Ronaldsway Airport. One relates to habitation, whilst the other reflects ritual practice, specifically the burial of the dead. There is also evidence for discrete Iron Age middens, which, given their placing and context, also seems more likely to relate to 'ritual', as opposed to purely domestic activity. Chronologically,

radiocarbon dating (*Ch 1, p 29*) indicates that these remains fall into three broad phases of activity. The earliest (Phase I) dates to the earlier Iron Age (*ie c* 800-400 cal BC), and comprises roundhouses, a burial, and a midden, which were broadly contemporary, though it is difficult to be more chronologically precise given the problems with the radiocarbon calibration curve for this period (*p 251*). The next two phases both lie within the later Iron Age, and comprise another burial (Phase II), interred either at the close of the first millennium cal BC, or the start of the first millennium cal AD, and a oven (Phase III) that dates to the very end of the later Iron Age.

The Iron Age of the Irish Sea Basin

In its strictest sense, the initiation of the 'Iron' Age in the Irish Sea area relates to the adoption of iron to produce weapons and tools. It seems quite likely, however, that this adoption was based more on necessity, being an outcome of a shortage in the supply of copper in *c* 800 cal BC (Needham 2007). Naturally, in this context the main advantage of iron is that, in many areas fringing the Irish Sea, iron ores could be obtained locally, from either surface outcrops, or recovered as bog iron from the many wetland areas (Bayley *et al* 2015, 3).

The other defining feature of the Iron Age in the Irish Sea area, and indeed across all of the British Isles, is the emergence and proliferation of distinctive forms of settlement, which seems to have been associated with an increase in woodland clearance and agricultural production (*cf* Bradley 2019, 276-7). It is notable that this evidence seems to dominate the archaeological record for this period, and other aspects of Iron Age activity, such as formal burial, are rare, especially in western Britain (*cf* Harding 2016; *Ch 11, p 361*).

Although in northern and western Britain the settlement types and patterns that had been established in the latter half of the Bronze Age were retained (for instance, open settlements of Middle and Late Bronze Age type (such as that at Taxiway Alpha East; *Ch 6, p 173*); Late Bronze Age hilltop and palisaded settlements; *Ch 6, p 168*), it does appear that other components of Iron Age settlement became, to all intents and purposes, monumentalised. This might entail the construction of substantial, and at times elaborate, boundaries around the settlement area, and/or the construction of substantial houses; whilst defence may have been one driving force behind this, it is equally possible that display was also at the forefront (*cf* Bowden and McOmish 1987). Perhaps significantly, in relation to Britain as a whole, it has been noted that the causal factor for this switch of emphasis might, in a similar way to the adoption of iron, have been a result of declining supplies of bronze entering Britain from the Continent (*above*); hence, as prestigious metalwork declined, display and status became more focused on settlement and food production (*cf* Thomas 1997).

It is also worth noting that the initiation of the Iron Age seems to have been during a marked deterioration in the climate, which became much colder and wetter. This climatic downturn, which has been recognised in proxy-climatic data across Europe, probably dates between *c* 850 cal BC and *c* 650 cal BC, and has been termed the '2.6 ka event' (*cf* Brown 2008, 14). Its effects, if any, are poorly understood, but perhaps the subsequent improvements in climate in the later first millennium cal BC may have been a driving factor in the expansion of agriculture and a concomitant increase in population (*cf* Gregory 2001a).

The Iron Age of Man

Given the fairly sizable body of information that exists for Iron Age settlement in the areas fringing the Isle of Man, perhaps unsurprisingly, prior to the RESA project, the evidence for Iron Age activity on the island also predominantly related to settlement and agriculture. Moreover, the evidence seems to embody some of the different facets of Iron Age settlement encountered in other parts of the Irish Sea basin (*Ch 11, p 368*).

Three hillforts are known on the island (Fig 160), all of which are contour forts, the origins of which may have been in the later Bronze Age (*Ch 6, p 168*). Two are in the south of the island, one close to the coast, near Ronaldsway, at Chapel Hill (Bruce and Bersu 1974; Lock and Ralston 2017), whilst the other is at South Barrule (Gelling 1970a; 1972; Lock and Ralston 2017), situated in a very commanding position (Pl 57). Excavation there indicated that the inner rampart was associated with a 'modest' setting of upright timbers, or *chevaux-de-frise* (Gelling 1972, 289; Harbison 1971, 206-8), linking it architecturally to other similarly defended hillforts along the Atlantic seaboard (Bradley 2019, 294-5). The third large hillfort on the island is Cronk Sumark, overlooking the Northern Plain (*Ch 1, p 1*), which, although undated, seems to be defined by a series of ramparts enclosing a prominent rocky outcrop (Lock and Ralston 2017). One of the ramparts also contained evidence for vitrification, which provides a link with several 'vitrified forts' in south-west Scotland (*cf* Feacham 1977, 129-30).

Small promontory 'forts' (most likely homesteads or enclosures) seem to have been a major component of the island's Iron Age settlement pattern (although



Figure 160: The distribution of Iron Age forts and settlements mentioned in the text

direct dating evidence from most is admittedly slim). These sites are numerous, with 24 examples directly on the coast, and two examples set slightly back from the modern coastline (Lock and Ralston 2017). Several have been excavated and these, along with identifiable surface remains at some of the unexcavated sites, suggest that, whilst the origins of these forts are in the Iron Age, many were later reoccupied in the early medieval period (*Ch 9, p 280*). There is also a significant cluster of promontory forts in the vicinity of the airport, along the island's south-eastern coastline, namely Close ny Chollagh, to the south-west; Langness Point and Hango Broogh, to the south, at either end of the Langness peninsula; Cass ny Hawin (Pl58) and Santon Burn, immediately north-east of the airport; and Purt ny Ceebagh and Cronk ny Merriu, further to the north-east. Four of these sites (Close ny Chollagh, Hango Broogh, Cass ny Hawin, and Cronk ny Merriu; *ibid*) have been investigated and three (Cronk ny Merriu, Close ny Chollagh, and Cass ny Hawin) have produced definitive or probable Iron Age remains, along with evidence for later reuse (Gelling 1952; 1958; 1959).



Plate 57: South Barrule hillfort (courtesy of the GDB Jones aerial archive)



Plate 58: The Cass ny Hawin promontory fort (courtesy of the GDB Jones aerial archive)

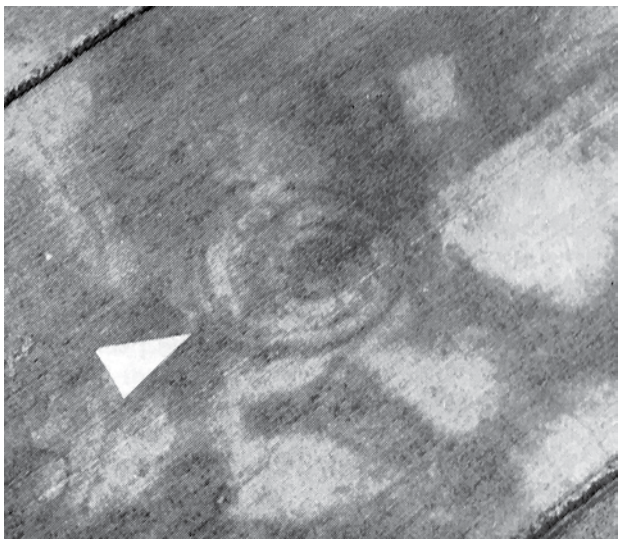


Plate 59: A multivallate curvilinear settlement seen as a cropmark, close to Dog Mills (courtesy of the GDB Jones aerial archive)

Away from the coast, Iron Age enclosed settlement is also known in the form of slight earthworks, or have been detected by remote sensing (aerial photography and geophysical survey). This seems to comprise palisaded settlements and those enclosed by banks and ditches. All of these sites are curvilinear, and some are enclosed by multiple boundaries (*cf* Higham and Jones 1982; 1984; Jones and Higham 1988); these show strong parallels with the multivallate and univallate later Iron Age settlements recorded in south-west Scotland, in Dumfriesshire (*cf* RCAHMS 1997; Gregory 1998; 2001a). On Man, concentrations of these sites have been recorded on the Northern Plain, with good examples at The Dog Mills (Pl 59; Fig 160), north of Ramsey, and also at the southern end of the island, on the Plain of Malew (*Ch 1, p 2*).

Significantly, four excellent examples have been recognised on the Plain of Malew close to Ronaldsway Airport. These are The Broogh (Fig 161), immediately

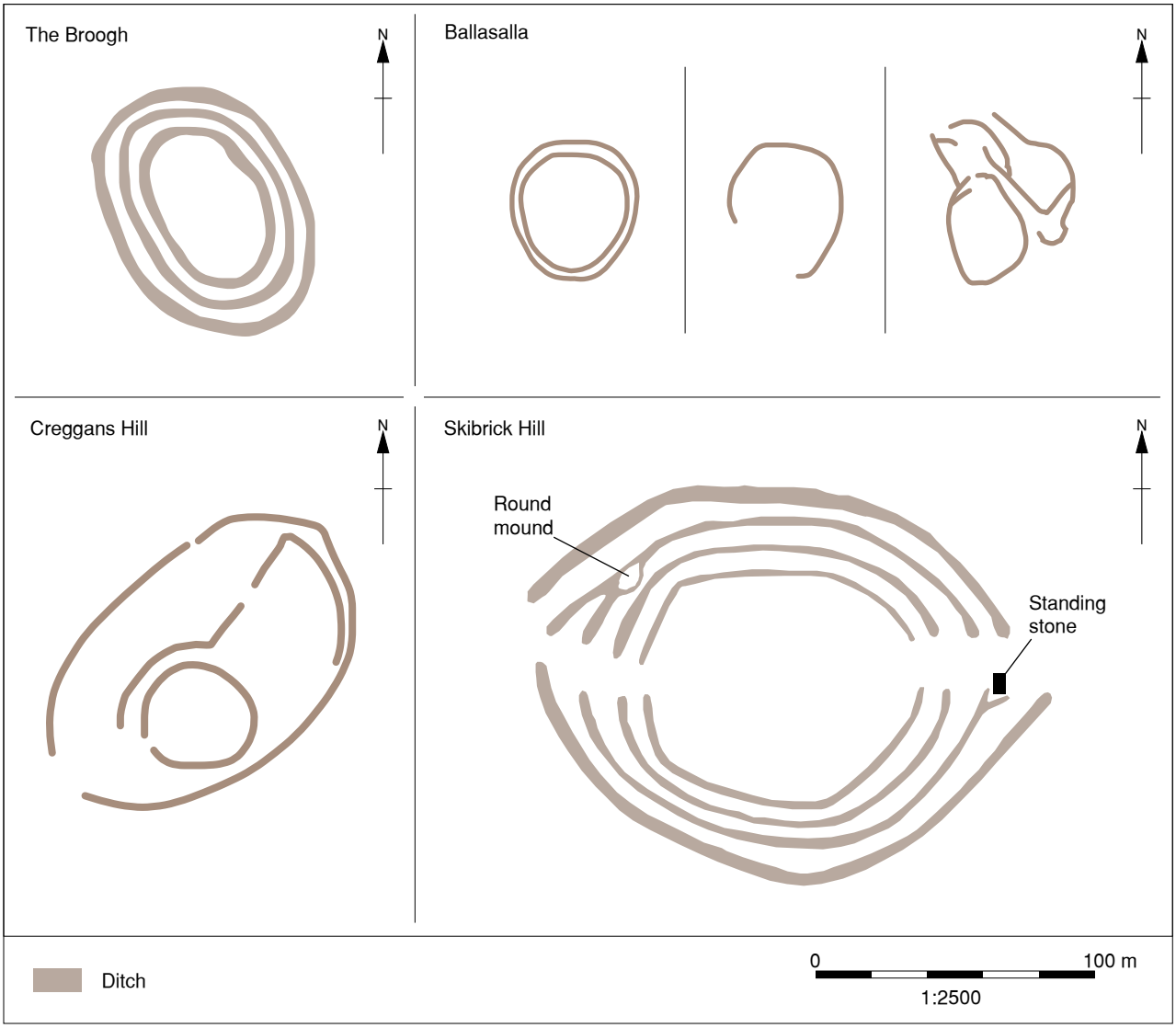


Figure 161: Enclosed Iron Age settlements in the immediate environs of Ronaldsway Airport

north of the Airport, which is enclosed by three closely spaced concentric ditches, on a low hillock (*c* 45 m aOD) overlooking the coastal plain. To the west, another smaller multivallate settlement has also been recorded, set within a dense swathe of cropmarks forming the Ballasalla cropmark complex (*Ch 1, p 12*); this settlement is bounded by two parallel ditches and seems partially to overlie an earlier field system. Two other curvilinear ditched enclosures are known, which may again be Iron Age settlements, one linked to a series of compounds or enclosures. The third multivallate enclosure is on Creggans Hill (*Ch 1, p 13*), just to the north-west (Pl 60). Geophysical survey indicates that this consists of a circular ditched enclosure surrounding the summit of the hill, contained within a larger irregular-shaped ditched enclosure, and these two elements are further enclosed by a large oval-shaped enclosure (OA North 2015).

The site has been the subject of trial trenching, which has produced useful results (OA North 2016a), indicating that the ditch surrounding the summit had been recut, following silting, charcoal from this recut being radiocarbon dated to 770-430 cal BC (2469±34 BP; SUERC-67654), suggesting that the boundary dates to the earlier Iron Age. In addition, a midden was identified on the summit of the hill, which contained butchered animal bone and shells from marine molluscs, implying occupation, or perhaps feasting; it also produced fired clay, a copper-alloy object, and a flint core. The midden seemed to cover a series of large sandstone boulders, which might have formed the remains of a cairn. Charcoal from the midden produced a later Iron Age date of cal AD 80-240 (1853±34 BP; SUERC-67653), implying that the site was revisited (and perhaps venerated?) during this period.

The fourth curvilinear multivallate site is approximately 2 km to the west of Ronaldsway, taking in the 30 m aOD summit of Skibrick Hill. This site was also identified by aerial photography and then surveyed by geophysics and trial trenching (Laughlin 1997; Russell and Darvill 1999). It has a quadruple-ditched enclosure, animal bones from its inner, and outer two, ditches (all derived from middle fills), from a single trial-trench across these boundaries, producing comparable radiocarbon dates broadly spanning the earlier Iron Age (*c* 750-400 cal BC; Russell and Darvill 1999). It is thus broadly contemporary with the inner enclosure at Creggans Hill.

There is also another distinct class of enclosed Iron Age settlement on the island, found next to wetland areas (perhaps former lakes), which share many similarities with the crannogs/loch-side settlements of Scotland (*cf* Crone 2012; 2024; Crone and Carvers 2015; 2019). One such example is at Port y Candas, in the Central Valley dividing the island's Upland Massif (*Ch 1, p 1*). This dates to the second to first century cal BC and comprises a palisaded settlement, containing timber roundhouses, established on an artificial platform (Mytum 2014). Other comparable enclosed settlements seem to be the sites at Ballacagen and Ballanorris, to the west of Ronaldsway Airport, excavated by Gerhard Bersu in the 1940s (Bersu 1977; *Ch 1, p 9*).

At Ballacagen, two adjacent and enclosed circular platforms (Sites A and B) both contained a multitude of *in-situ* timber posts and postholes, relating to sequences of timber structures, which can be interpreted in a number of ways (*ibid*; Harding 2009, 66-8; Mytum 2014); however, based on current knowledge of Iron Age roundhouses in northern and western Britain, these were probably comparable to the palisaded settlement at Port y Candas (*cf* Mytum 2014, 663). Therefore, Site A may have contained two successive, central roundhouses, enclosed within

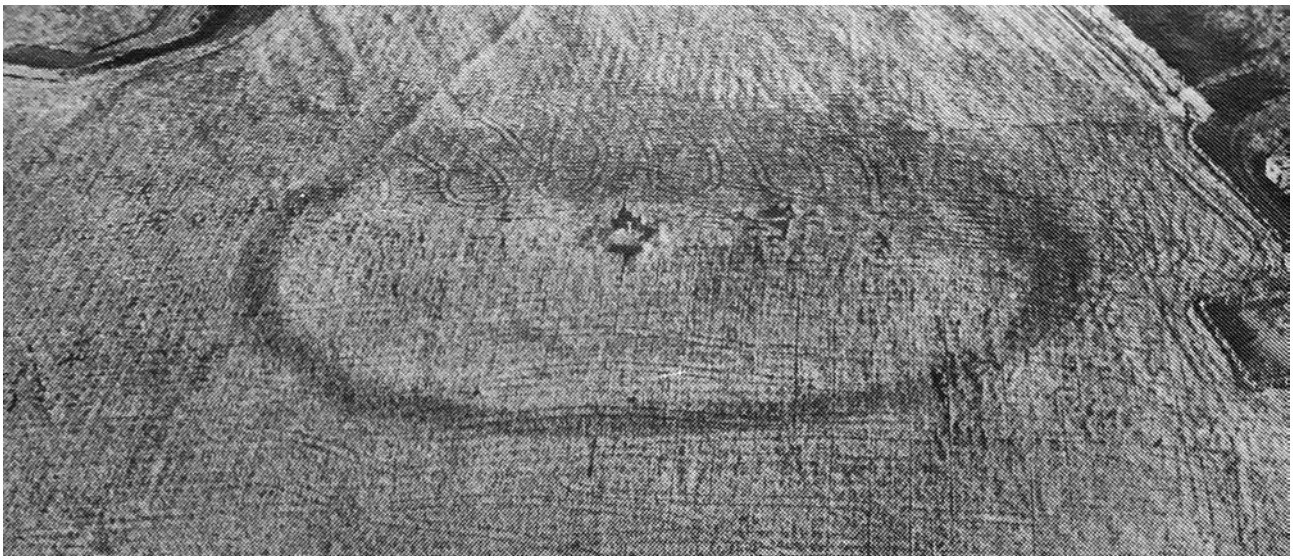


Plate 60: Creggans Hill, with the outermost ditch of the multivallate settlement visible as a cropmark (courtesy of the GDB Jones aerial archive)

double palisades, which were eventually replaced by three roundhouses, also enclosed within a palisade (Fig 162). Material from the earliest phases of occupation has been radiocarbon dated to 390-1 cal BC (2155±75 BP; UB-2027; Pearson 1977).

Similarly, Site B probably comprised two successive roundhouses surrounded by palisades, with material from the earliest occupation providing a radiocarbon date of 400-200 cal BC (2235±45 BP; UB-2028; *ibid*). The settlement at Ballanorris also seems largely comparable, in that it was established on a platform, and contained successive post-built roundhouses surrounded by a palisade and a low wall (Bersu 1977). Significantly, Ballacagen and Ballanorris also produced a good range of artefactual materials (*ie* metalwork, glass, and amber, worked stone, pottery, crucibles, and moulds; Bersu 1977, 60-83), including two Late La Tène/Roman-period brooches from Ballacagen Site B, which may have arrived on the island via traders sailing from the Iron Age emporium at Meols, on the Wirral, which has produced comparable material (Stewart 2016; Griffiths *et al* 2007).

Billown Quarry, close to Ronaldsway Airport (Fig 160), has also produced evidence for Iron Age settlement, though this seemed unenclosed, comprising roundhouses and other structures (Darvill 1996; Darvill *et al* 2000). At least three Iron Age buildings were found in the north-eastern corner of the site, all defined by ring-groove construction trenches, and hence they were consistent with buildings from other parts of the Irish Sea zone (*Ch 11, p 365*). This settlement was adjacent to a contemporary field system, which was seemingly

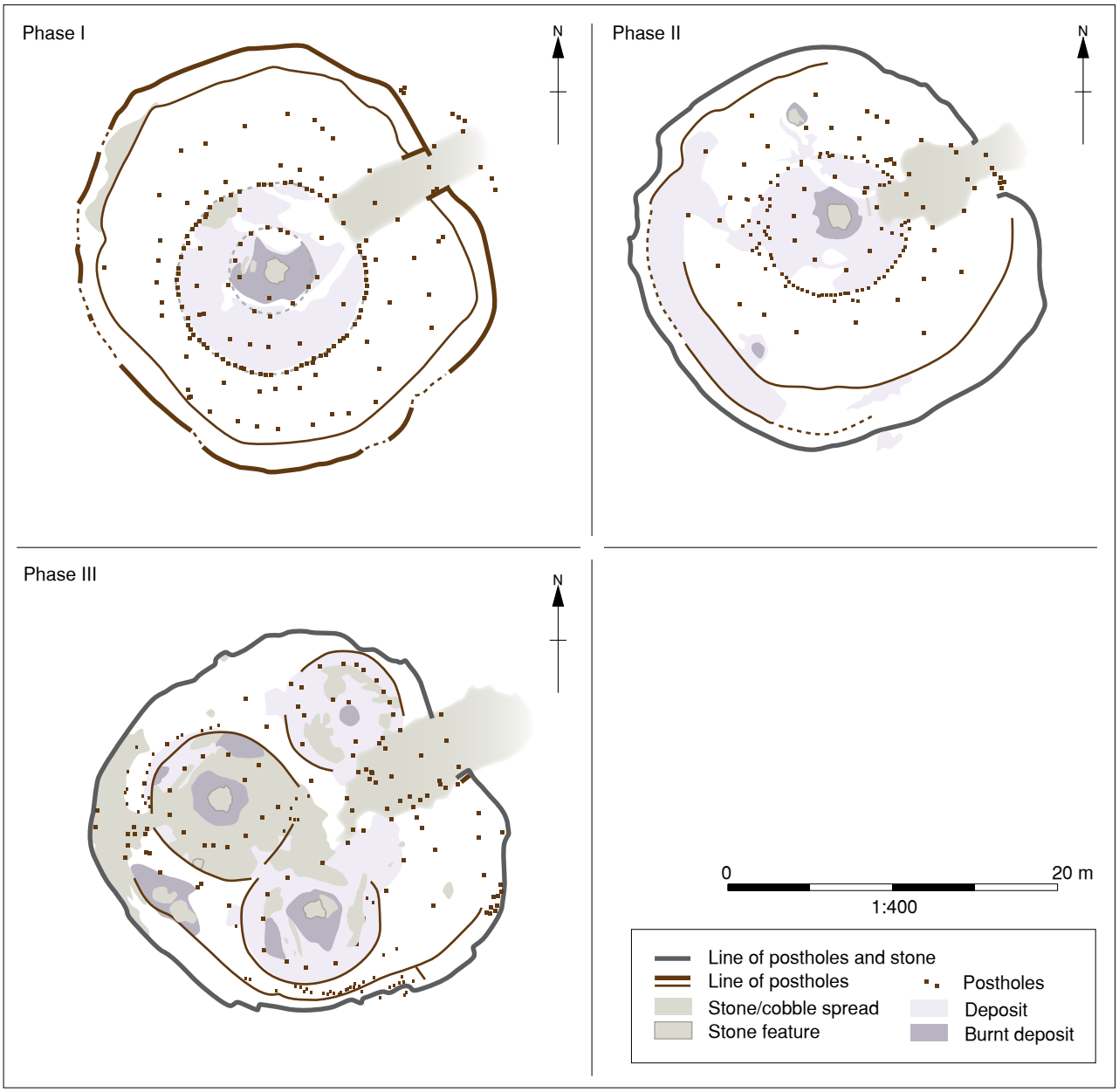


Figure 162: The Phase I-III remains at Ballacagen Site A, recorded by Gerhard Bersu

added to fields established during the later Bronze Age (*Ch 6, p 171*). The evidence suggests that the expanded system was defined by ditches, set in a co-axial arrangement, with some enclosures more than 100 m across (Bayliss *et al* 2011b, 554). On the strength of the radiocarbon dates, this may have been established in the earlier Iron Age, the ditches gradually silting throughout the rest of the first millennium cal BC and early centuries cal AD (*op cit*, 557).

Billown Quarry has also revealed other Iron Age features, though these were much later in date. They include a pit containing grain and a quern, and a hearth, both dating to the second quarter of the first millennium cal AD (Darvill *et al* 2005). In addition, a keyhole-shaped oven contained charcoal, a fragment of which provided a radiocarbon date of cal AD 380-640 (1560±60 BP; Beta-110689; Bayliss *et al* 2011b, 557). It is also possible that this oven was associated with a group of postholes forming a rectangular structure (Darvill *et al* 2005).

Another strand of evidence that has often proved useful in other parts of the Irish Sea area, is pollen, which can be used to determine the scale of agriculture and farming. On the island, the pollen data relevant to the Iron Age landscape are patchy at best, though it does seem that, in the Northern Plain (*Ch 1, p 1*), forest clearance was a feature of this period (Chiverrell *et al* 2006a, 309). Slightly more detailed pollen evidence is available from the Northern Uplands (*Ch 1, p 1*), which indicates that some areas experienced increases in clearance during the period 400-170 cal BC, associated with arable agriculture, which continued throughout the remainder of the Iron Age (*op cit*, 326).

Iron Age Activity at Ronaldsway Airport

Prior to the RESA project, there was no direct evidence for Iron Age activity at Ronaldsway Airport. The evidence for such activity recovered during the RESA project, which, based on the radiocarbon-dating evidence, covers three distinct phases (Iron Age Phases I-III; *p 251*), is therefore highly significant, particularly as it includes both evidence for domestic structures, and very rare Iron Age burials.

Iron Age Phase I activity

Earlier Iron Age roundhouses at the Control Tower

To the north-west of the airport runway, a strip-and-record investigation revealed Iron Age remains within the footprint of the new air-traffic control tower (Fig 163; subsequently named the Control Tower site; *Ch 1, p 18*). These were excavated in detail, indicating that there were two probably

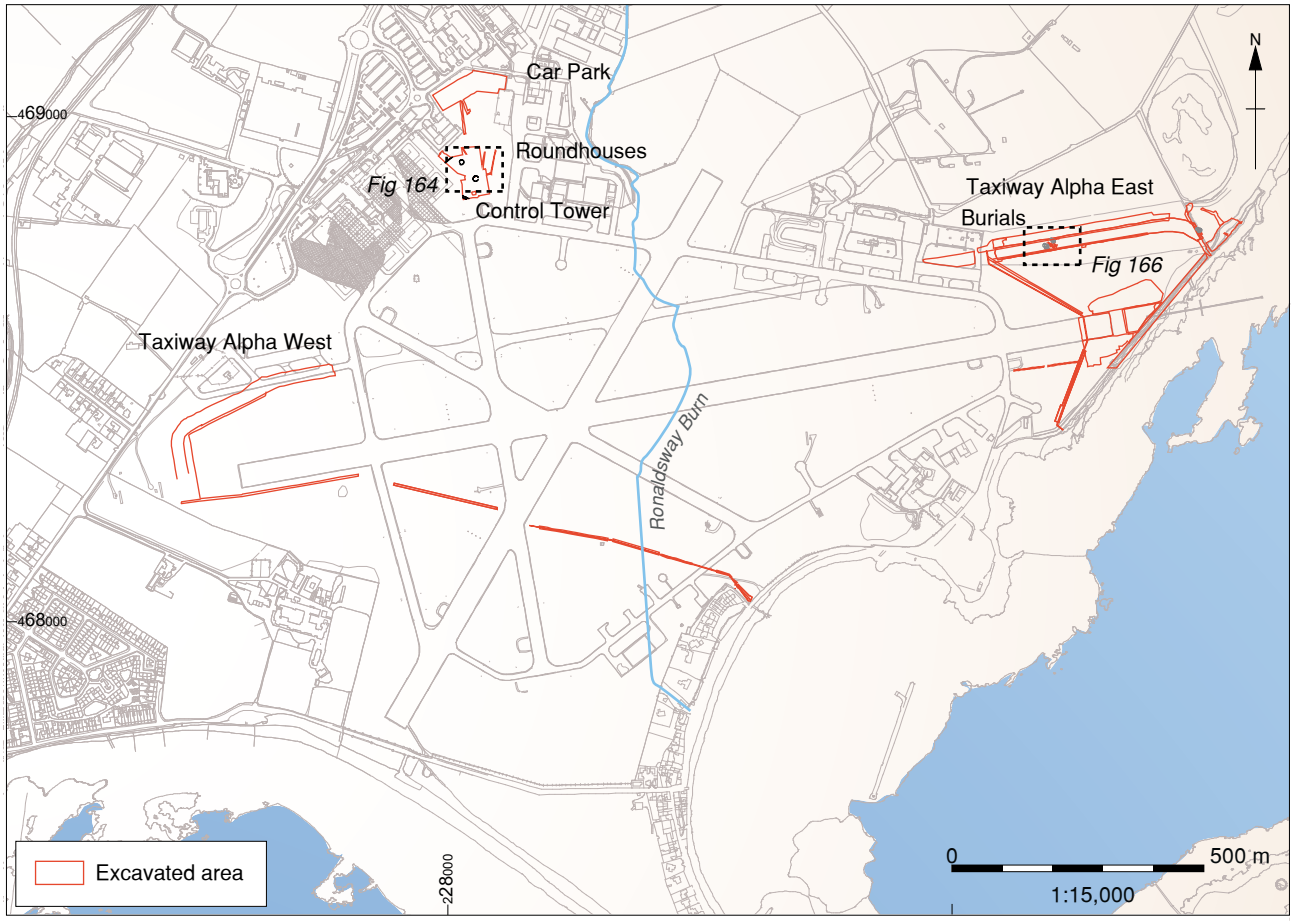


Figure 163: Iron Age remains at Ronaldsway Airport

earlier Iron Age roundhouses (Roundhouses 7 and 8). Both were also extensively sampled for palaeoenvironmental material, though, following processing and assessment, it was evident that the survival of plant remains was poor.

The roundhouses were located immediately east of Creggans Farm (*Ch 1, p 6*), on the same low ridge as the Taxiway Alpha East later Bronze Age settlement (*Ch 6*), close to the 10 m contour, and west of the Ronaldsway Burn. Significantly, this area was also close to the possibly contemporary earlier Iron Age hilltop settlement at Creggans Hill (only 450 m distant; *p 256*).

Although the remains of the two structures had been disturbed by post-medieval improvement and ploughing, details relating to their respective size, form, and architecture were revealed, both apparently having used timber in their designs. Roundhouse 7, the southernmost, was defined by a ring-groove (***5035***; Fig 164), *c* 10 m in diameter (Pl 61). This was *c* 0.2 m wide, 0.2-0.3 m deep, and would have secured the outer wall, which probably supported the roof. It contained a dark grey friable silty sand and fairly abundant quantities of charcoal, consisting of a mixed assemblage of oak (*Quercus* sp) and alder/hazel (*Alnus*/*Corylus*; hazel was positively identified), heath/heather (*Erica* sp/ *Calluna vulgaris*), and willow/poplar

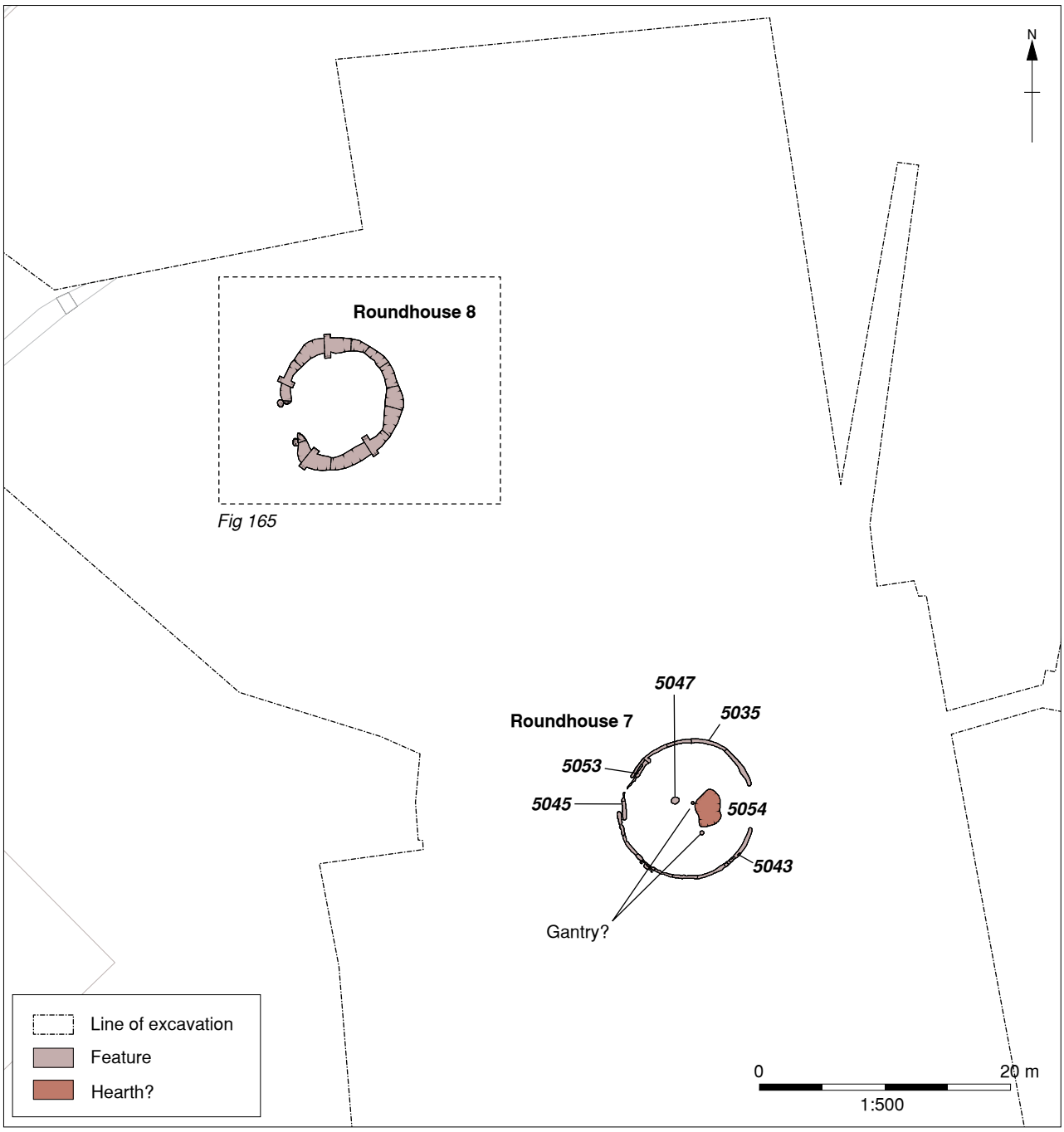


Figure 164: The Iron Age roundhouses at the Control Tower site



Plate 61: Roundhouse 7 during excavation

Charred cereal grains		
Hordeum sp (hulled)	hulled barley	1
Indeterminate cereal grains		5
Charred weed seeds/fruits		
Chenopodium album	fat-hen	11
Fabaceae	pea family	1
Persicaria lapathifolia	pale pericaria	2
Plantago lanceolata	ribwort plantain	2
Polygonum convolvulus	black-bindweed	2
Rumex acetosella	sheep's sorrel	1
Indeterminate seeds/fruits		7
Other		
Charcoal fragments	includes ericaceous wood	100+

Table 67: The charred plant remains from Roundhouse 7 (gully **5035***)*

(Salicaceae) roundwood. It also contained a very small assemblage of charred plant remains, comprising six cereal grains, including hulled barley (*Hordeum* sp), and weed seeds, which are indicative of waste or cultivated land (Table 67).

The form of the ring-groove indicates that, originally, Roundhouse 7 had two opposing east/west entrances, which were comparatively wide, measuring *c* 2.5 m across. At a later date, however, the western doorway was blocked, which entailed the digging of two construction trenches (***5053*** and ***5045***) across it, which probably secured timber uprights, perhaps forming elements of two separate wattle-and-daub panels, or plank walls.

There were several features in the interior, including a posthole (***5047***), *c* 0.4 m in diameter, close to the centre of the structure, which may once have formed a load-bearing roof support. To the east was a sub-circular pit, ***5054***, measuring 0.6 x 0.5 m, containing dark brown silty sand and small amounts of charcoal, probably the remains of a hearth. It also contained two pebble-flint lithics (an edge-retouched flake and an indeterminate fragment), with two other pebble-flint lithics (an indeterminate chunk and flake) recovered from its vicinity. On its western side, there were two small postholes at its corners, probably marking the position of a fixture or fitting, perhaps a gantry used to suspend a cooking pot over the fire. Taken together, it seems likely that the roundhouse was primarily domestic.

Its date was established by two radiocarbon dates, one from a hulled barley grain from the ring groove (SUERC-53411), and the other from an indeterminate cereal grain from the putative hearth (SUERC-53412; Table 68). Both dates were statistically consistent, and when placed in an OxCal phase and subjected to modelling they suggest that the house dated to the period *730-410 cal BC*.

The other roundhouse (Roundhouse 8) was located 32 m to the north-west of Roundhouse 7, and, although it remains undated, it may well have been contemporary. It was, however, defined by a much more substantial ring-gully (***5034***), which was 0.6-1 m wide, and *c* 8 m in diameter (Fig 165; Pl 62). Based on the size and form of this gully, it was probably a drainage ditch, enclosing a house site, as opposed to a narrower construction trench securing a wall, as was

Location	Sample	Material	Uncalibrated date BP	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence)	Chi-square test	*Modelled date (95% confidence)*
Gully ***5043***	SUERC-53411	Charred barley (*Hordeum* sp; hulled) grain	2420±30	-23	750-400 cal BC	Passed: T'=0.2, T'(5%)= 3.8; v=1; A_{comb}= 117.3%(An= 50%)	*730-410 cal BC*
Pit/hearth ***5054***	SUERC-53412	Charred indeterminate cereal grain	2427±30	-21.7	750-400 cal BC		*730-410 cal BC*

Table 68: Radiocarbon dates from Roundhouse 7 and results of the chi-square test

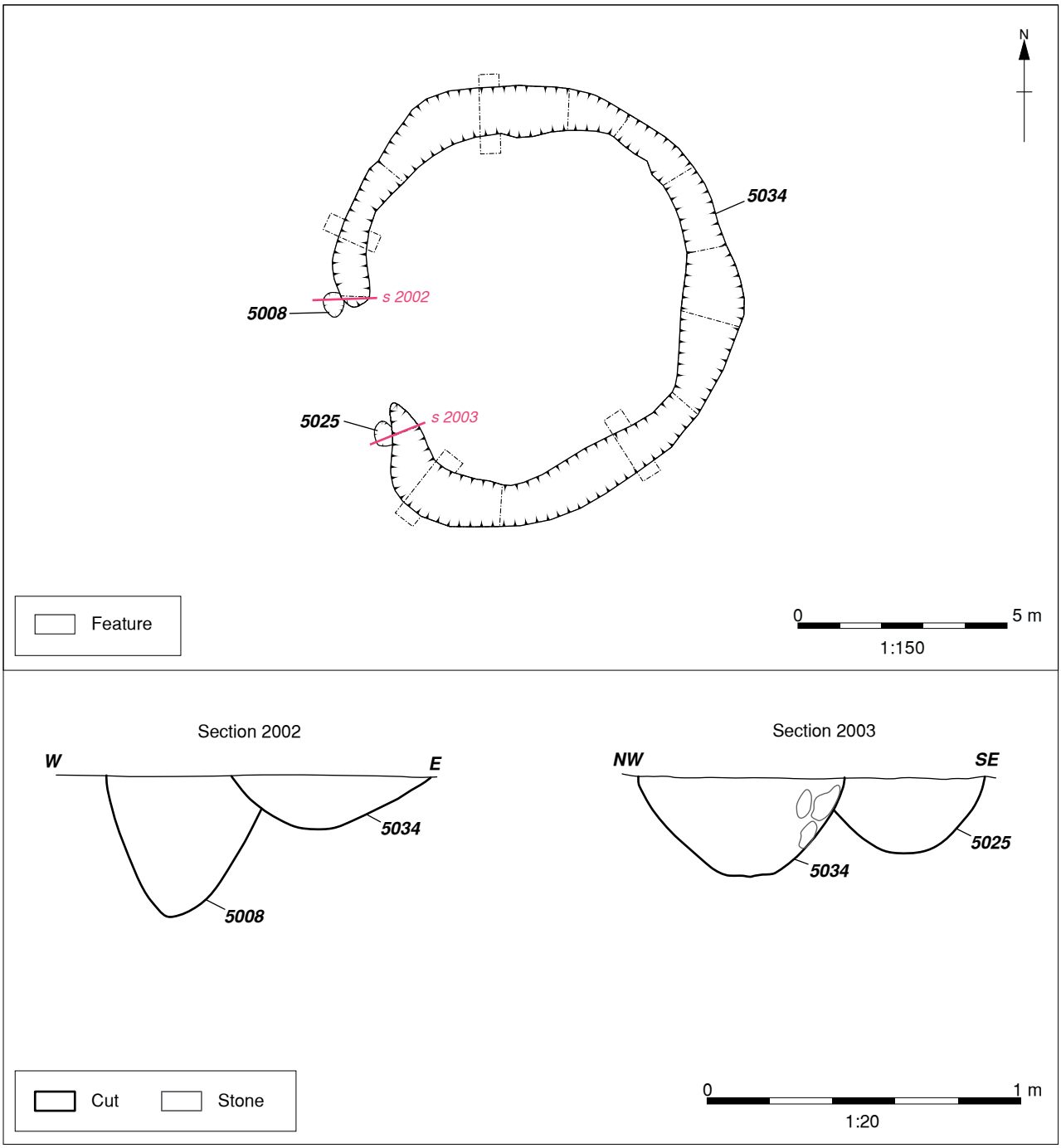


Figure 165: Roundhouse 8



Plate 62: Roundhouse 8 during excavation

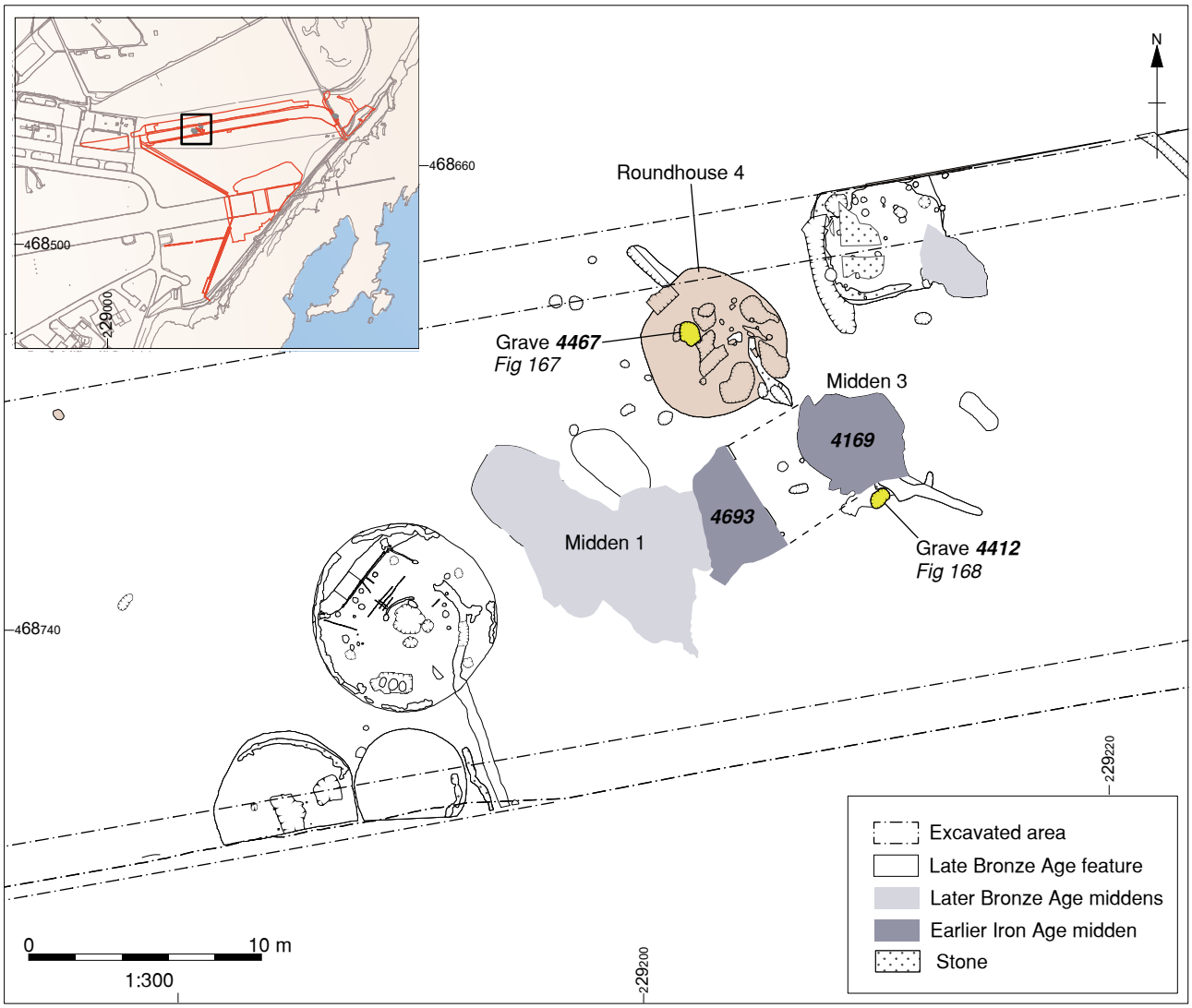


Figure 166: Graves **4467** *and* **4412***, and the earlier Iron Age midden (Midden 3)*

the case with the neighbouring structure (*p 259*). It is also evident that this gully gradually became choked with silty sand, though, importantly, it did contain some occasional patches of clay, perhaps deriving from the structure that it presumably enclosed (*Ch 11, p 368*). In some parts, this primary silty fill also lay beneath a secondary deposit of redeposited natural material, mixed with possibly windblown sand. This upper deposit seems, therefore, to relate to a later episode of intentional backfilling, perhaps occurring when the structure was finally abandoned.

The entrance into Roundhouse 8 was on its south-western side, *c* 2.5 m across, and was defined by the termini of the ditch, and also by a pair of postholes (***5008*** and ***5025***), at the ends and on the western edges of the termini, which probably secured a porch (Fig 165). Sections across these features provide some details of the way the roundhouse was constructed, as it appears that initially the entrance posts were erected, followed by the digging of the ditch, which partly cut through the sides of the postholes. No features were present inside the structure and the absence of a hearth seems to suggest that it was not domestic *per se*. Perhaps tellingly, there was also an absence of artefacts, though, at the entrance, the northern ditch terminus did contain a cache of ten white quartz pebbles, perhaps representing an intentional deposit or offering made during the erection of the structure.

Earlier Iron Age burials at Taxiway Alpha East

One of the more surprising and highly significant discoveries made during the RESA project relates to three Iron Age bodies found at Taxiway Alpha East, within the confines of the later Bronze Age settlement (Fig 166). These were contained in two graves, one (***4412***) containing a single corpse, dating to the later Iron Age (*p 268*), and the other (***4467***) the remains of two skeletons, which radiocarbon dating indicates belong in the earlier Iron Age. All of the skeletal remains were the subject of detailed osteological analysis (*Ch 1, p 24*).

The earlier Iron Age grave (***4467***) was oval, measuring some 0.8 x 1.1 m, with a depth of 0.3 m, its long axis aligned roughly north/south. It is probably no coincidence that this grave had been dug through abandonment deposits that sealed late Bronze Age Roundhouse 4, suggesting that this abandoned and commemorated house (*Ch 6, p 191*), and indeed, the wider abandoned settlement area, still exerted influence on later communities occupying the Ronaldsway area.

Within this grave, initially an adult (***4375***) was interred in a tightly crouched position on their right side (facing east), with the elbows flexed and the hands under the chin, with the head orientated to the south (Fig 167; Pl 63). Indeed, there seems to have been a degree of thought and consideration when placing this individual into the grave, with the body being carefully placed into the foetal position. It is quite possible that the corpse was bound in some manner to achieve this placement (*Ch 11, p 361*).

Once the corpse had been laid in the grave, a line of four large stones was placed across it, which were most probably salvaged from one of the nearby cairns covering the later Bronze Age houses (*ie* from the sites of Roundhouses 5 or 6; *Ch 6, p 185, p 194*). These stones included a large limestone block (measuring *c* 0.25 m square), which was placed on the individual's flexed knees, whilst a similar-sized limestone block was placed to the rear of the corpse's head (Pl 64). In between these, were two smaller sandstone cobbles, which had been placed across the corpse's torso. Once these cobbles had been positioned, the body of a juvenile (***4374***) was placed above them (Pl 65), seemingly as a secondary burial. However, the remains of this juvenile were very poorly preserved (*below*) and those that did survive formed a confused scatter of bone fragments and hence the precise positioning of this corpse could not be firmly established.

A radiocarbon assay on a fragment of bone from the primary burial provided a modelled date of *740-410 cal BC* (*OxA-30359*; Table 69). Perhaps significantly, this indicates that the burial of the adult could have been made when the roundhouses at the Control Tower were in use (*p 260*), though admittedly both sets of modelled dates span many centuries, due to the plateauing of the radiocarbon calibration curve (*p 251*). Although it has not been possible to radiocarbon-date the juvenile because it was so fragmentary, it was probably buried not long after the interment of the adult, as the grave must have been known to those who were responsible for this secondary act of burial (assuming the grave was not marked in some way). Indeed, it is quite possible that both bodies actually formed part of the same burial rite, with the adult and child being buried together at the same time, which may have been wholly appropriate if they were linked in life by a familial or other close connection.

Osteological analysis of skeletons **4374** *and* **4375**
H Webb

The juvenile skeleton (***4374***) was less than 25% complete, comprising six deciduous teeth, two right and one left thoracic vertebral arches, a right cervical vertebral arch, and the anterior arch of the atlas (the uppermost vertebra in the neck). This skeleton was assigned condition Grade 1, meaning that only slight, patchy surface erosion was present (McKinley 2004, 16). The root of the left mandibular canine was between half and three-quarters complete, indicating that this was a young child, probably 1-2.5 years of age. No pathological conditions were observed.

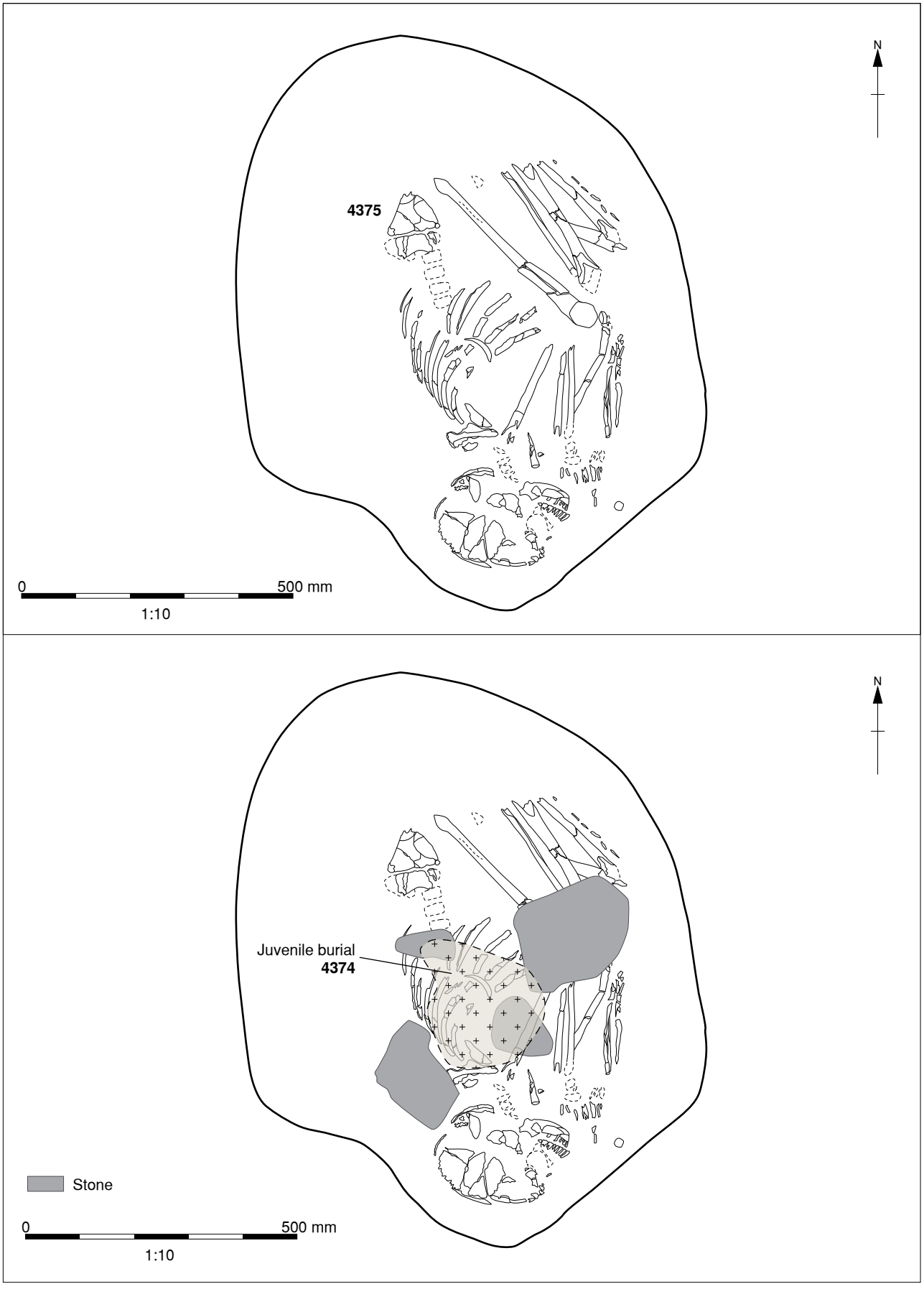


Figure 167: The primary and secondary burials in grave **4467**



*Plate 63: The primary burial (**4375**) in grave **4467***



Plate 64: The two limestone blocks placed near the head and across the knees of the primary burial



Plate 65: The partially exposed sandstone cobbles and overlying juvenile burial

Sample	Material	Uncalibrated date BP	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence)	*Modelled date (95% confidence)*
OxA-30359	Human bone	2457±24	-20.02	755-415 cal BC	*740-410 cal BC*

Table 69: Radiocarbon date from skeleton **4375**

In contrast, the adult skeleton (***4375***) was around 50% complete. Most regions (except for the right foot) were represented, but fragmentation was extremely high, as was the level of erosion. The majority of bones exhibited Grade 5 erosion, which is heavy erosion across all surfaces of the bones, although the left arm and some of the ribs were slightly less eroded (Grade 4; McKinley 2004, 16). The trabecular-rich regions of the skeleton, such as the pelvis and long-bone ends, had suffered particularly heavy erosion, and none of the vertebral bodies had survived at all.

Given the poor preservation of this skeleton, only the level of dental attrition could be used to estimate the age at death. This indicated that the individual had died in young or prime adulthood, probably between 22 and 35 years of age (Brothwell 1981; Miles 1962). Estimation of sex was also hampered by the poor preservation and subsequent lack of diagnostic features, though the occipital bone exhibited no evidence for a marked nuchal crest, and the long-bone shafts were notably small/gracile. These latter observations very tentatively suggest that it was female.

Although the number of observable non-metric traits was also limited because of the poor preservation of the skeleton, a few were seen. For example, a large cranial suture ossicle (Inca bone) was observed at the lambda. In addition, at least 13 smaller ossicles were present; however, these were loose fragments, because of the considerable fragmentation of the skull, so it is not known where they were originally situated, though it seems likely that most had come from the lambdoid suture. Variations in the sutures of the skull, such as this, have been proven to be under significant genetic control (Torgersen 1951a; 1951b; 1954; Sjøvold 1984; 1987). A parietal foramen was also observed on a fragment of right parietal bone.

The only pathological lesions observed involved the dentition. The right mandibular molars exhibited small deposits (flecks) of calculus (mineralised plaque) and a small carious lesion was observed on the occlusal surface of the right mandibular second molar. Although eroded, the crowns of the mandibular second premolars displayed single, linear defects, known as dental enamel hypoplasia (DEH). Such defects reflect

an interruption of the enamel development, resulting from prolonged episodes of illness and/or malnutrition during childhood. As such, DEH may be used as an indicator of non-specific physiological stress during this period of sub-adulthood (Hillson 1996, 166). The location of the DEH suggests a period of physiological stress at around five to six years of age.

The absence of evidence for skeletal pathology may result from the heavy erosion and incompleteness of the bones, particularly in the regions of the joint surfaces. That said, multiple joint surfaces of the spine were observable, and these exhibited no evidence for pathology, as would be expected in a fairly young individual.

Midden 3 (deposit ***4693***)	Cattle carpal bones (magnum and unciform) articulate
	Pair of two newborn cattle third phalanges
	Conjoining seal proximal humerus epiphysis and diaphysis
	Two conjoining fragments of a sheep/goat radius

Table 70: Conjoining animal bones from Midden 3



Plate 66: Knife marks on the proximal posterior surface of a seal humerus

The earlier Iron Age midden at Taxiway Alpha East

It was also evident that a small midden had accumulated during the Iron Age (Midden 3; Fig 166). This was immediately south of the Bronze Age settlement area (*Ch 6, p 176*), and had been created by dumping organic material on the north-eastern side of Midden 1 (*Ch 6, p 188*), which had clearly remained an upstanding feature in the first millennium cal BC, forming the focus for the earlier Iron Age activity.

Midden 3 measured some 4 x 9 m and was defined by a spread of dark brown friable sandy clay. This could be seen as two deposits, one (***4169***) covering a cairn erected following the abandonment of a later Bronze Age roundhouse (Roundhouse 6; *Ch 6, p 195*), whilst the other (***4693***) covered an adjacent cairn, which had been established at the edge of later Bronze Age Midden 1 (*Ch 6, p 188*). Animal bone was present in both deposits, including two sheep/goat bones (a calcaneus and scapula) from deposit ***4169***, with a slightly larger assemblage in deposit ***4693***, which comprised conjoining cattle, sheep, and seal bones, possibly from a grey seal (Table 70). It was also notable that filleting marks were present on a seal humerus, in the form of cut marks at the proximal end of the diaphysis on the posterior and medial surfaces (Pl 66).

The date of this midden was established by radiocarbon dating the two sheep bones from deposit ***4169***. These dates were statistically consistent, and when placed in an OxCal phase they returned modelled date ranges of *740-410 cal BC* (*SUERC-79967*) and *700-400 cal BC* (*SUERC-79968*; Table 71). Both dates are therefore comparable with that from the burial to the north (*p 263*). Given this, one possibility is that this small midden was intimately connected with the burial, perhaps relating to feasting as part of the burial rite, or at the very least, before or after the burial had been made, at a site that was in some way deemed ritually charged, because of the earlier settlement. An alternative possibility is that the midden related to domestic occupation, though this seems less likely,

Location	**Sample**	**Material**	**Uncalibrated date BP**	**$\delta^{13}C$ (‰)**	**Calibrated date range (95% confidence)**	**Chi-square test**	***Modelled date (95% confidence)***
Deposit ***4169***	SUERC-79967	Sheep/goat bone	2446±28	-21.0	750-400 cal BC	Passed: T′= 1.27, T′(5%)= 3.8; v= 1; A_{comb}= 97.7%(An= 50%)	*740-410 cal BC*
	SUERC-79968	Sheep/goat bone	2398±27	-21.5	730-400 cal BC		*700-400 cal BC*

Table 71: Radiocarbon dates from Midden 3 and the results of the chi-square test

since no structures of this period were present within the excavation.

Iron Age Phase II Activity

It seems that the abandoned later Bronze Age settlement and earlier Iron Age burial site at Taxiway Alpha East retained its ritual significance and was revisited on at least one occasion, possibly at the very end of the first millennium cal BC; this involved another interment. This burial involved the digging of an oval-shaped grave (***4412***; Fig 166) through the earlier Iron Age midden (*p 267*) and into an underlying later Bronze Age cairn (***4210***), which had been established over the abandoned later Bronze Age Roundhouse 6 (*Ch 6, p 197*).

This grave, which measured some 0.65 x 0.95 m, and was *c* 0.3 m deep, contained an adult skeleton (***4438***: Fig 168; Pl 67), with its head to the south-west, which has been radiocarbon dated to *50 cal BC-cal AD 80* (*OxA-30308*; Table 72). The individual had been laid with their back flat on the base of the grave, their arms slightly flexed at the elbows, with the hands over the abdomen region. Both legs, which were leant over to the right-hand side of the body, were very tightly flexed at the knees, so that the foot lay close to the rear of the thigh. The left leg was at a rough right-angle to the torso, and below the pelvis, whilst the right knee was pulled up much higher and was positioned close to the



Plate 67: Skeleton **4438**, *with the arms flexed at the elbows*

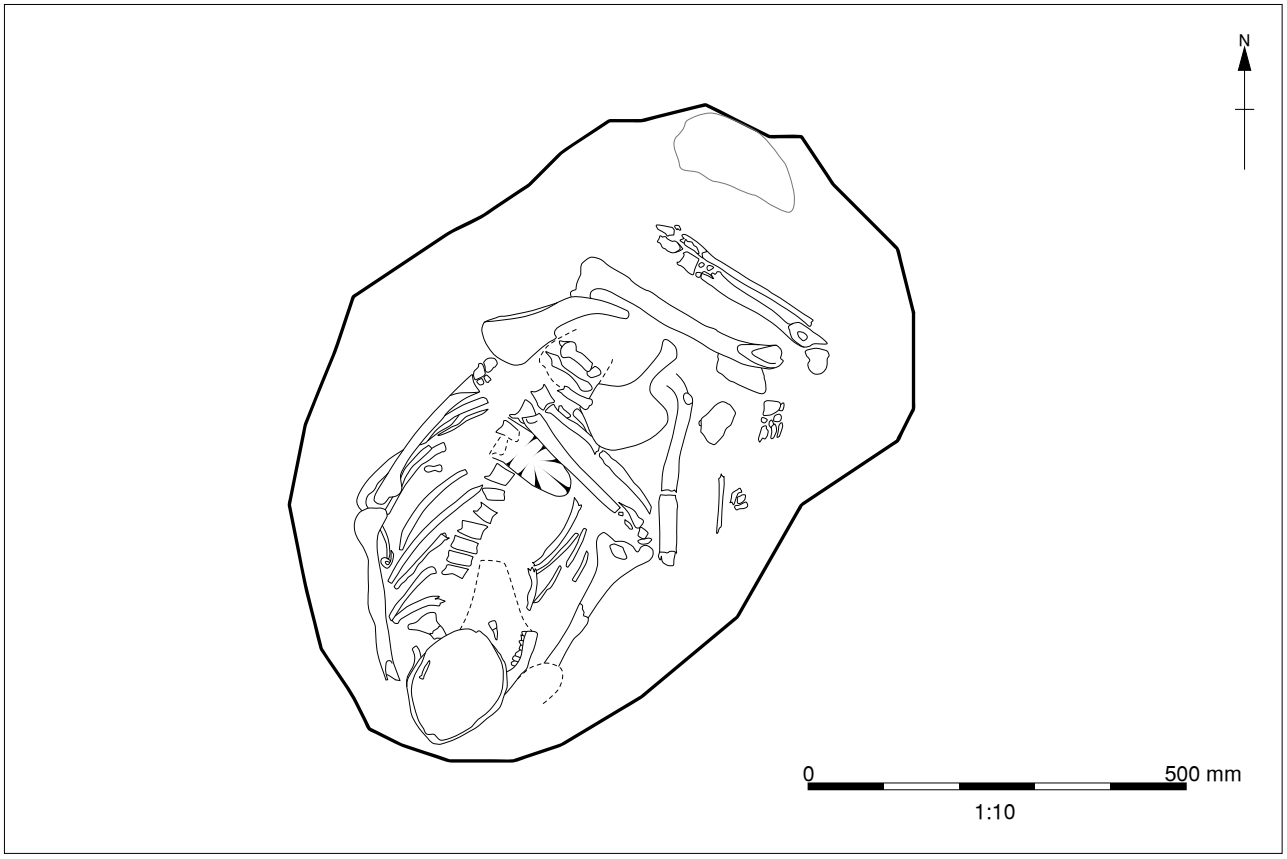


Figure 168: Skeleton **4438** *in grave* **4412**

Sample	Material	Uncalibrated date BP	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence)	*Modelled date (95% confidence)*
OxA-30308	Human bone	1972±29	-21.08	40 cal BC-cal AD 80	*50 cal BC-cal AD 80*

Table 72: Radiocarbon date from skeleton **4438**

right elbow. The positioning of the body seems less than formalised, and slightly haphazard, particularly when compared with the careful placement of the earlier Iron Age adult skeleton in the other grave at Taxiway Alpha East (*p 263*). One other major difference was that the later corpse was wearing an iron arm-ring around its left upper arm (*p 272*).

An anterior fragment of the right mandible of a field or wood mouse, with only the incisor and M1 present, together with a loose M2, was also found in the grave. Presumably though, these remains had entered the grave serendipitously, perhaps during backfilling.

Osteological analysis of skeleton *4438*
H Webb

Skeleton ***4438*** was around 75-80% complete, although highly fragmented, and had suffered fairly heavy erosion. The majority of the bones were assigned to condition Grade 4, meaning that all surfaces had been affected by erosive action, although the depth of modification was not uniform across all surfaces (McKinley 2004, 16). The right shoulder and left foot had suffered higher levels of erosion, and were assigned condition Grade 5 (*ibid*; *Ch 1, p 24*).

Several indicators of age were observable, including dental attrition, partial auricular surfaces, and two fragments of sternal rib ends. All of these indicated an individual who was a young or prime adult at the time of death, probably 20-35 years of age. Multiple features of the skull and mandible enabled an estimate of the sex of the individual, all of male, or probable male, morphology. The sciatic notch of the pelvis was also observable, and this was in keeping with a male morphology. Similarly, the general robusticity and size of the bones suggested that the skeleton was of a male individual.

Two non-metric traits were observed. The left femur exhibited a third trochanter, and the left patella exhibited a vastus notch. The third trochanter is a rounded tubercle on the posterior surface of the proximal femur shaft, at the top of the gluteal crest (Finnegan and Faust 1974, 9), which provides an attachment area for the gluteus maximus and is therefore associated with mechanical forces involving this muscle (Bolanowski *et al* 2005, 169). A vastus notch, on the supero-lateral border of the patella, relates to the insertion of the vastus lateralis tendon (Finnegan and Faust 1974, 13), and also relates to mechanical factors operating on the bone.

Very few measurements could be taken because of the high level of fragmentation, but the subtrochanteric diameters were available, from which the platymeric index could be calculated. This calculates the level of flattening of the proximal femur shaft, and a score of less than 84.9 indicates platymeria, an anterior-posteriorly flattened shaft. The platymeric index was 70.97 (same left and right), indicating a markedly flattened shaft. Various causes for platymeria have been suggested, some (*eg* Buxton 1938) associating it with nutritional deficiencies, whilst associations with muscle pull, notably from the gluteus maximus muscle, have also been posited (*cf* Capasso *et al* 1999, 114).

Dental pathology was observed in the form of calculus deposits, which affected almost all of the teeth, although they were generally only slight (*cf* Brothwell 1981). DEH were also observed, affecting the mandibular incisors and the right, second maxillary premolar. Two distinct episodes of physiological stress were suggested by these linear defects, one at two to three years of age, and another at five to six and a half years.

Aside from this, the only pathology observed was Schmorl's nodes, which were present on two thoracic vertebrae. These appear as indentations on the vertebral end plates and are essentially pressure defects arising from herniation of the intervertebral disc (Rogers and Waldron 1995, 27). Disc herniation is usually a gradual process in adults, in connection with the age-related weakening of the posterior longitudinal ligaments of the spine, but it may also occur as a result of an injury, such as a fall or a jump from height, sending sudden impact through the legs and spine (Lovell 1997, 159). Schmorl's nodes in adolescence are thought most likely to relate to activity or trauma (Jurmain 1999, 165), and these are the more likely causes in the case of young to prime-adult skeleton ***4438***.

The most interesting lesions observed in this skeleton, however, were those relating to peri-mortem trauma. Sharp-force blade trauma was present on the left forearm and hand, the chest, and the left leg. The left distal radius and ulna exhibited slice marks, running longitudinally through the posterior surfaces (Fig 169). In addition, two of the proximal hand phalanges, probably the third and fourth, had oblique chop marks in the dorsal surfaces. Given the location and inferred trajectory of the slice/chop marks in these bones, it seems likely that they were all caused by a

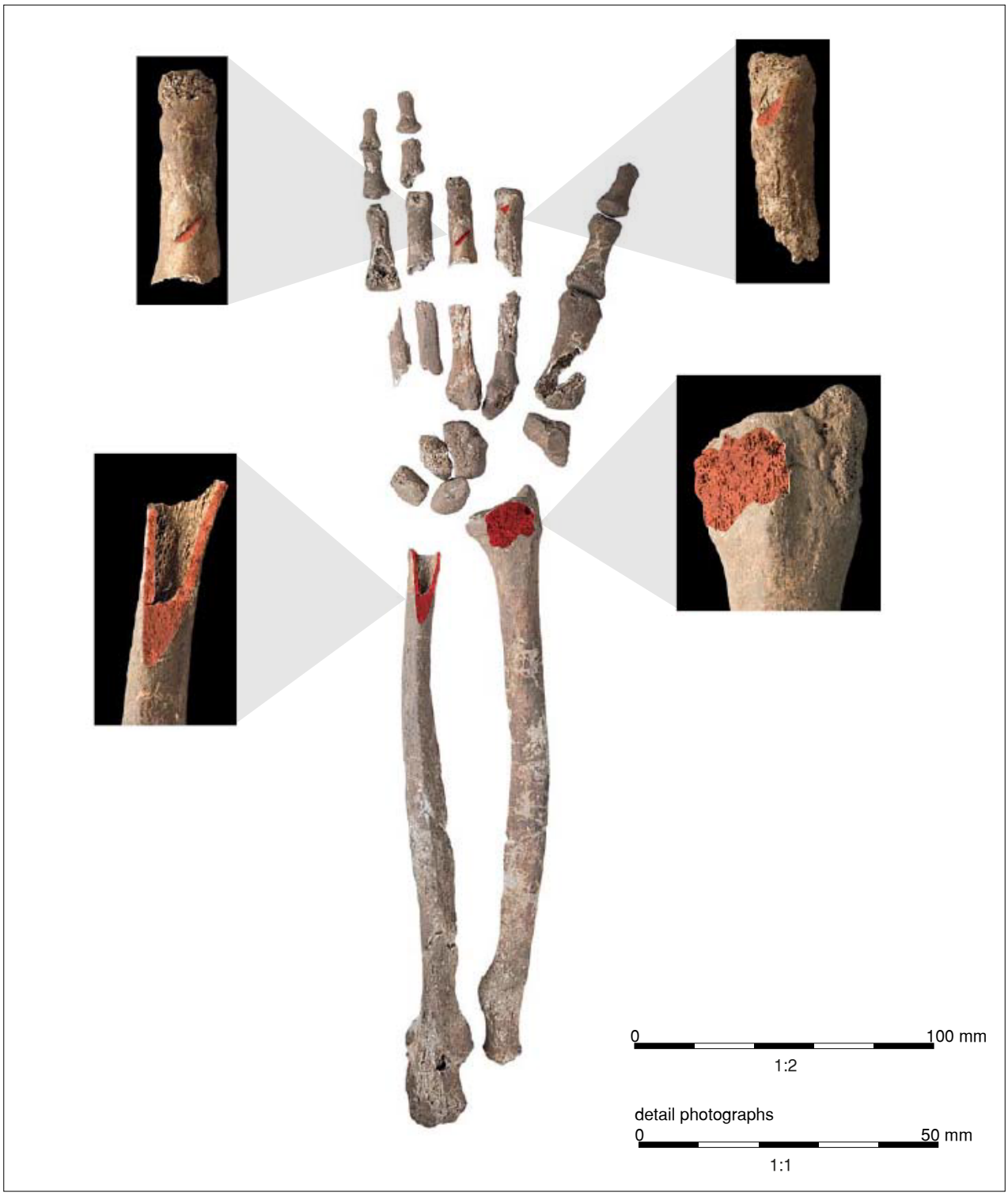


Figure 169: The evidence of trauma on the left forearm of skeleton **4438**, *caused by a blow from an edged weapon*

single, glancing blow to the back of the forearm/hand, with the blade slicing through the wrist region and halting at the hand.

In the chest, a left rib, probably the sixth or seventh, exhibited a cut mark through the inferior border (Fig 170). In addition, two thoracic vertebral arches, possibly the third and fourth, exhibited sharp-force injuries (Fig 171). One vertebra (?fourth thoracic) had a linear cut mark to the anterior surface of the arch, indicating that the blade must have penetrated the chest from the front. In the other vertebra (?third thoracic), the superior margin of the superior articular facet had been sliced off, and the superior margin of the lamina had been sliced through. The angles of the two lesions in this vertebra differed from that in the third, probably indicating two separate blows. The former appeared as though the blade had travelled



Figure 170: Peri-mortem *sharp-force wound to the sixth or seventh left rib of skeleton* 4438

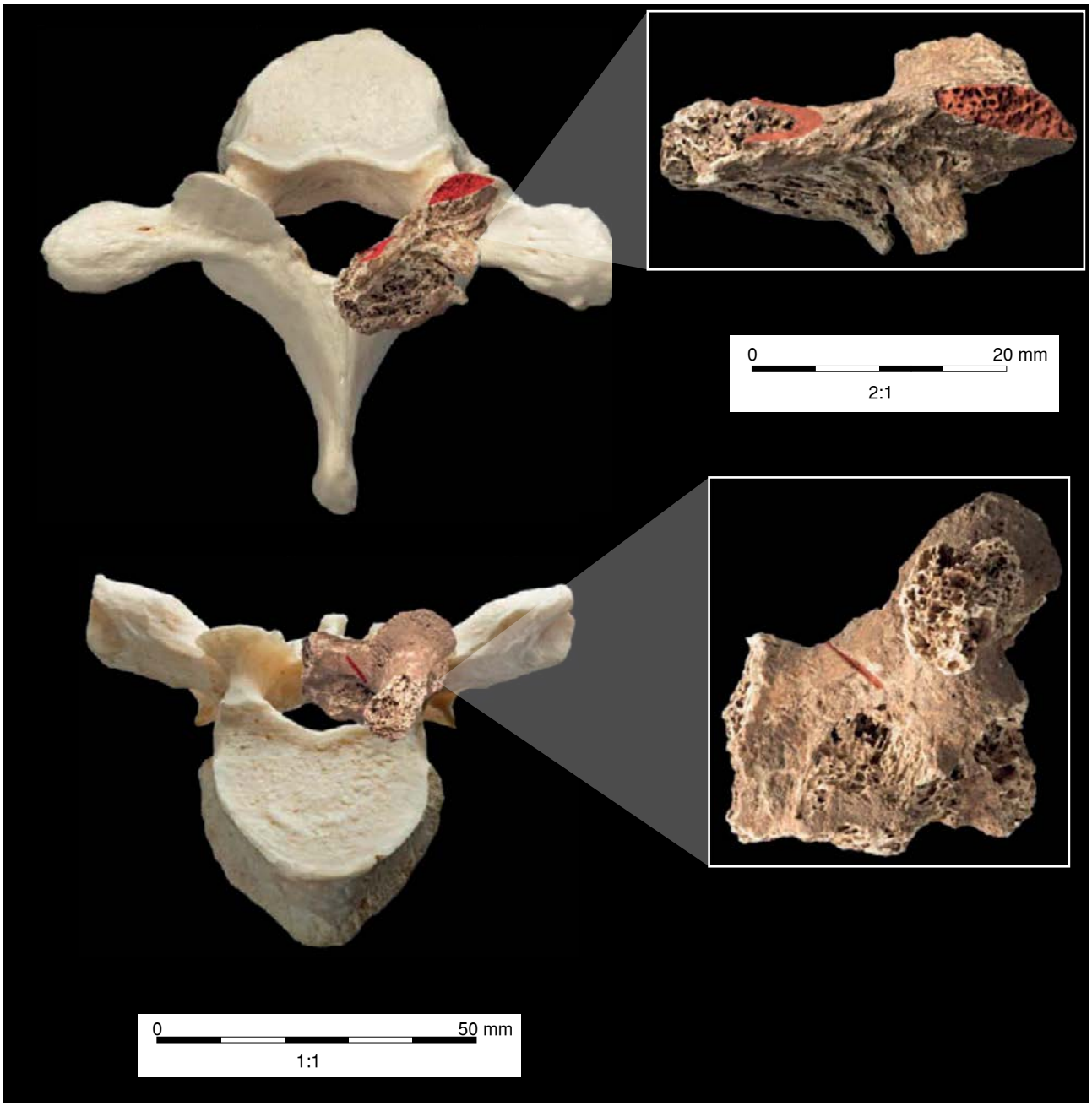


Figure 171: Two thoracic vertebrae arches from skeleton 4438 *exhibiting peri-mortem sharp-force injuries*

in a posterior-anterior direction, and the latter in an anterior-posterior direction. It is possible that the cut mark to the anterior surface of a vertebral arch had been inflicted by the same anterior-posterior blow. Assuming that the blade had travelled through the chest at an angle (*ie* towards the left side), this blow may also have caused the cut mark on the rib.

In the lower body, the superior aspect of the left patella (kneecap) exhibited a possible peri-mortem chop mark, with an almost triangular-shaped area of bone loss. This lesion would have been inflicted by a weapon travelling downwards. A small fragment of long bone from the left leg had also been sliced through, possibly by two separate blows from a bladed weapon. The fragment was not positively identified, but it probably formed part of the distal femur or proximal tibia. If indeed the distal femur, the trauma may have been caused by the same blow that chopped into the patella.

The first lumbar vertebra exhibited a probable peri-mortem fracture, travelling completely and almost horizontally through the arch, from the inferior to the superior articular facets. There was no indication of sharp-force trauma to this, or the adjacent vertebra, indicating that this may have been the result of a blunt-force trauma. The location of the fracture line is similar to those described as 'Chance fractures' (Galloway 1999, 99-100). These can occur in the lumbar spine when the body is thrown against a fulcrum, that is, when the pelvis and lower spine are secured, whilst the remainder of the body is thrown forward (*op cit*, 99). Given this, it is reasonable to suggest that this fracture, and the sharp-force wounds, occurred during the same violent episode.

The iron arm-ring
D Boughton

When buried, skeleton ***4438*** was wearing an iron arm-ring (Pl 68). This is a single ring of iron, *c* 77 mm in diameter, and survives almost complete (as two fragments) with only a *c* 17 mm length of the hoop missing. The object displays advanced iron corrosion, but overall it is in very good condition. In addition, possible mineral-preserved leather was present in the corrosion products, which might reflect the clothing worn by the individual.

Originally, the diameter of the iron rod would have been 4-5 mm, as can be seen from the breaks on either side of the hoop (Fig 172). The hoop appears to have been plain with no additional decorative incisions. This was rounded, with tapering, flattened terminals on both sides, effectively creating a scarf joint (overlapping ends). This still survives on the larger of the two fragments. A small copper-alloy ring (with one-and-a-half loops creating a spiral) is now fused to the iron hoop. Additional rings/spirals



Plate 68: The iron arm-ring worn by skeleton **4438**

(copper-alloy and iron) also survive, but these were not attached, being recovered from the vicinity of the hoop in the backfill. These are represented by two small iron fragments, which together make up one half of a flat iron ring, and a small fragment of a copper-alloy ring, also flat-sectioned. Given this flatness, it may be suggested that they were part of possibly narrow, tightly wound spirals/coils that were decorative elements of the iron arm-ring, in the manner of the copper-alloy ring that is still attached.

Stylistically, the closest parallel to this object is an iron arm-ring, with two comparable iron- and copper-alloy ring attachments, from an inhumation burial, dated to cal AD 210-390 (1755±30 BP; SUERC 38652), from Barabhas Machair, Isle of Lewis, Outer Hebrides

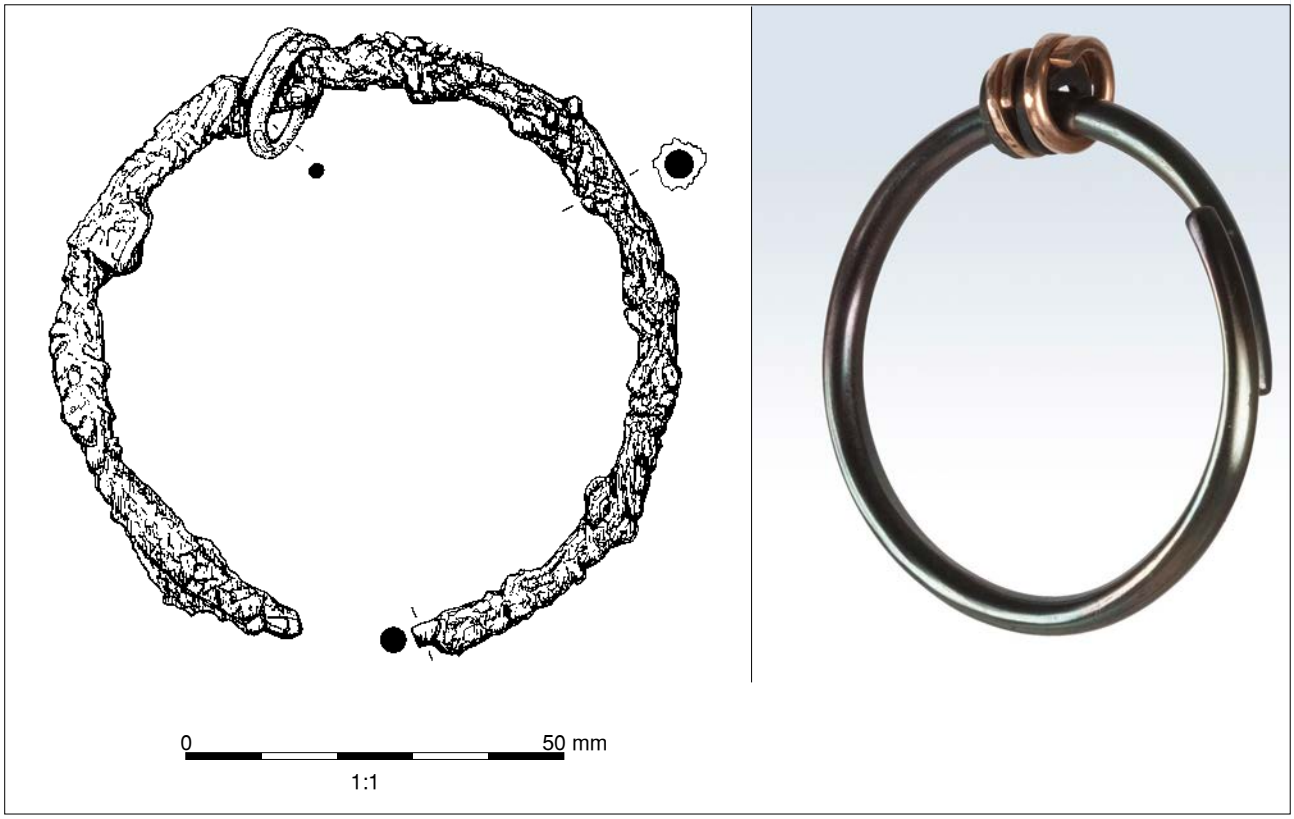


Figure 172: The iron arm-ring, and a modern replica produced for MNH

(MacLeod Rivett 2012; Hunter nd). In this instance, however, the arm-ring was placed at the head of an adult woman, who was buried in a long cist, in a prone position (MacLeod Rivett 2012).

Iron Age Phase III Activity

It is apparent that the area containing the earlier and later Iron Age burials at Taxiway Alpha East witnessed an additional, though much later, phase of Iron Age activity. This was also markedly different from the earlier episodes of burial, in that it seems to have been associated with apparently more mundane agricultural activities, evidenced by the construction of a small oven (***4318***; Fig 173) to the east of Midden 3 (*p 267*).

This oven measured *c* 1.5 x 0.5 m and had a figure-of-eight-shaped plan, with a circular chamber, at the north-western end, containing a small patch of heat-affected natural material, and a slightly larger oval-shaped chamber at the south-eastern end; a narrower channel lay between and joined the two chambers (Pl 69). The lower fill produced an assemblage of cereals dominated by oats (*Avena* sp) and barley (Table 73) and, although no diagnostic oat floret bases were recovered, the large size and marked embryo scar of many of the grains suggests that they were a cultivated variety. It is notable that the structure was solely associated with oak charcoal, indicating that this species of wood was the favoured fuel type. One of the oat grains returned a radiocarbon date of cal AD 390-540 (1611±30 BP; SUERC-53389), indicating that the structure dates to the very end of the Manx Iron Age.

The structure appears to have been a grain-drying oven, comparable to Roman and medieval key-hole/figure-of-eight corn-drying ovens from those damper parts of western Britain where the growing season is short, and it was therefore necessary to dry corn before storing it (Morris 1979, 10-12; Brunskill 1987, 96-7; Holden 2006). Indeed, if this were the case, the main body of the oven would have been in the circular chamber, which perhaps, given the absence of stone, had a wattle-and-daub or turf superstructure. Within this, a suspended platform of wooden poles would have been present, overlain by straw or cloth, onto which the layer of damp grain could be spread, ready for drying. The fire would have been set at the narrow end of this chamber, and the other, larger oval chamber would have been open, forming a rudimentary flue and rake-out area (Holden 2006, 106-7).

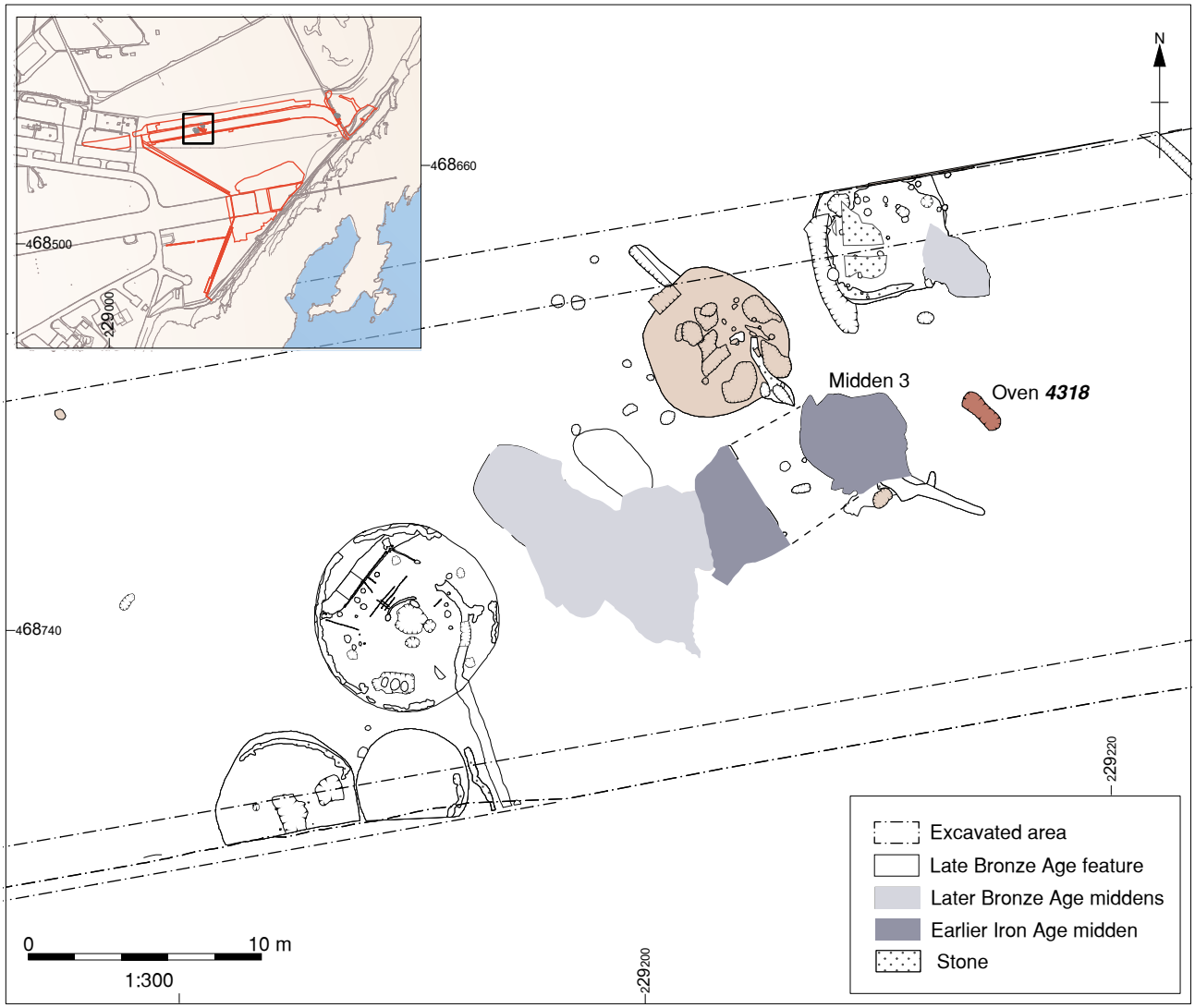


Figure 173: The location of oven **4318**



Plate 69: Oven **4318**

Charred cereal grains		
Avena sp	wild/cultivated oat	48
Hordeum sp (hulled)	hulled barley	20
Indeterminate cereal grains		9
Indeterminate cereal fragments		6-25
Charred weed seeds/fruits		
Carex sp (trigonous)	sedge	1
Caryophyllaceae	pinks family	2
Chenopodium album	fat-hen	9
Danthonia decumbens	Heath-grass	1
Polygonum sp	knotgrass	2
Silene sp	campion	1
Other		
Charcoal fragments		100+

*Table 73: The charred plant remains from the lower fill (***4319***) of oven* **4318**

9

THE HISTORIC LANDSCAPE

Richard A Gregory, with Denise Druce and Helen Evans

The Medieval and Post-medieval Background

Early medieval period

The beginning of the historic period on the Isle of Man broadly corresponds to the introduction of Christianity to the island, and the wider Irish Sea area, around AD 500. It is traditionally presumed (*eg* Goodwins 2011) that the adoption of Christianity was a result of the arrival of Irish missionaries, of which St Maughold (the patron saint of the island), an Irish prince, who was converted to Christianity by St Patrick, was potentially the first. Details relating to Maughold were documented in the seventh century, in Muirchú's *Life of Patrick*, which suggest that he was expelled from Ireland by St Patrick, in 447, after which he arrived on Man (called then 'Evonia') as part of a penitential journey (Hood 1978, 93-4). Although the veracity of this account, in relation to fifth-century events, is questionable, Maughold's name was applied to the medieval church and parish in the north-eastern part of the island (Fig 174); based on the sculptured stone from the church, with the historical references, it appears that an early monastic community was in existence there, potentially one of the earliest on the island (Trench-Jellicoe 2002a). Other links with early Irish Christianity may also include the use of 'St Patrick' within several Manx place-names, such as Ballakilpherick, in the south-west of the island, St Patrick's Isle, a small island off the western coast, adjacent to the modern settlement of Peel, and the dedication to Patrick of two parishes on the west coast, Patrick and Jurby (*cf* Thomson 2002, 28; Steinforth 2018, 88). In addition, the use of 'donagh/doonee' elements in names (*eg* Knock y Doonee at the north-west tip of the island) also reflects the presence of early Christian chapels (*cf* Flanagan 1984). It is quite possible that during this period these were constructed in timber, with one possible example having been excavated at Ballaquayle, within an early medieval cemetery (Cubbon 1996).

Of the first 'written' language on the island, at least six ogham inscriptions are known, carved onto large stone slabs or boulders, which seem to date to *c* 460-600, the period when the island first became Christianised (*cf* Macalister 1945; Cubbon 1971; Ziegler 1994). It seems from these that the Brythonic (British) branch of the Gaelic languages was in use, as well as the Goidelic of Ireland, the latter surviving throughout the later Viking Age (*p 277*) as the base language of the island (Wilson 2008, 101). Ogham was still in use in the later Viking Age, though at some stage in the seventh or eighth century, Anglo-Saxon runes made an appearance; however, by the tenth and eleventh centuries Scandinavian runes were exclusively used (*op cit*, 19).

Following the introduction of Christianity, it seems possible that up until the later ninth century, domestic life, at least, largely continued as it had done in the Iron Age, with perhaps a similar range of settlement types being occupied, or in some cases being reappropriated (*Ch 8, p 252*), with perhaps the landscape being divided and used in a similar fashion. For example, early medieval craft activity, dating to the seventh century, and perhaps also the early part of the eighth century, has been detected at the Iron Age lakeside settlement at Port y Candas (*Ch 8, p 256*), suggesting that this site was reoccupied and modified during this later period (Mytum 2014). Similarly, seventh-century craft activity is known at Kiondroghad (Gelling 1969), and at this site the structural remains (palisade and possible timber-built roundhouse) are reminiscent of those associated with certain Iron Age settlements (particularly those at Ballacagen Lough and Ballanorris; *Ch 8, p 256*). Both Kiondroghad and Port y Candas also produced imported pottery from France ('E' ware), suggesting high-status occupation.

In addition to settlements, other early medieval sites reflect changing attitudes towards the burial of the dead. It was, for instance, during this period that these were placed, without grave goods, in supine positions, within simple stone cists (lintel graves) or uncoffined shallow graves, as exemplified by the early Christian (pre-tenth century) cemetery on St Patrick's Isle, which contained both styles of burial (Freke 2002, 62). It is perhaps worth noting that the use of uncoffined graves, at least, seem to



Figure 174: Early medieval sites mentioned in the text

reflect a continuation of earlier burial traditions (*eg* the uncoffined Iron Age burials at Taxiway Alpha East; *Ch 8, p 263, p 268*), whilst the cist burials seem novel, with parallels in the early medieval long-cist graves of Scotland (*cf* Cowie 1977) and northern England (for instance, at Eaglesfield, Cumbria; Cowen 1967). These lintel graves on Man are also often associated with slabs inscribed with simple Christian designs, such as those at St Patrick's Isle (Trench-Jellicoe 2002b) and also Ronaldsway (Cubbon 1938; *p 293*).

The scant historical sources also provide some cursory details on the politics of this age. These indicate that during the early seventh century the Isle of Man was nominally under the control of the Northumbrian king, Edwin (616-32; Griffiths 2010, 20), after which it was, at least by the early ninth century, ruled by the Welsh kings of Gwynedd (Steinforth 2018). This was, however, followed by a period of both radical political and cultural change, as a result of the arrival of Vikings on the island.

The Viking Age

Traditionally, it has been considered that Viking settlement on Man first occurred in 902-37, following the expulsion of the Viking population from Dublin in 902 (*cf* Griffiths 2010, 21), although it has been suggested that the island was perhaps settled slightly earlier, in *c* 870, by Viking groups, also from Dublin (Steinforth 2018). After the arrival of these first-generation settlers, a process of cultural assimilation and fusion between Viking and Manx communities seemingly occurred, with the Vikings on Man becoming fully established, and largely converted to Christianity, by the middle of the tenth century. During this period, the island was ruled by a series of Vikings, from Ireland, culminating, in 1079, in Godred Crovan (of the house of *Ívarr* of Dublin) becoming King of the Isles (comprising the Isle of Man, the Hebrides, and the islands of the Firth of Clyde), and establishing a dynasty that lasted some 200 years, until 1265 (*op cit*, 91; Davey 2013, 33). It seems, however, that at times the political situation was fraught, as witnessed by several documented events. One, in 1098, relates to the Norwegian king Magnus Barefoot arriving at St Patrick's Isle, with 160 ships, in order to reassert Norwegian authority over the island, and he subsequently built a series of fortresses across Man (Freke 2002, 442). The local dynasty was, however, eventually re-established in the reign of Olaf I (possibly beginning in 1113; Cubbon 1983, 23), who was succeeded by his son Godred II, following Olaf's murder by his nephews in 1153 (Davey 2013, 33). During Godred's reign, following his defeat in a sea battle in western Scotland in 1156, the Kingdon of the Isles was divided between Godred and the Norse-Gaelic lord, Somerled, with Godred retaining Man; however, in 1158 Somerled attacked the island, with Godred only being reinstated as ruler following Somerled's death in 1164 (*ibid*).

Political turmoil revived in the early part of the thirteenth century, when Reginald I (1187-1228; *ibid*) fought with his brother Olaf over the kingship of Man and the Isles (Harrison 2002, 16). Olaf initially chose Ronaldsway as a landing place to begin his campaign, as chronicled in 1224, though he subsequently used St Patrick's Isle as his main naval base. Then, in the winter of 1228, Reginald sailed from Galloway with five ships and set fire to his brother's ships at St Patrick's Isle, after which he sailed around the island to Ronaldsway, where he moored for some 40 days, seeking a truce with his brother (*ibid*). It seems that this historic event is also preserved in the Ronaldsway place-name, which translates as 'Reginald's Way' (*Ch 1, p 3*). This act was followed by Reginald drawing the islanders in the southern part of Man to his cause, whilst Olaf gathered the people in the northern part of the island (*ibid*). Ultimately, though, it was Olaf who succeeded in taking the kingship (becoming King Olaf II: 1228-37), following the slaying of his brother close to Tynwald (*p 282*; Davey 2013, 33; Neely 1940, 80).

Archaeological evidence is critical when considering the Viking Age on the island, on the one hand comprising the numerous decorated stone monuments and metalwork hoards, and on the other archaeological sites containing either Viking-age burials and/or structural remains relating to buildings and fortifications (Fig 175). Viking-age burial sites are particularly informative, acting as clear cultural markers, indicating that initially, pagan burial practices, in the Scandinavian tradition, predominated, gradually being eclipsed by Christian-type burials. In total, 25 pagan Viking burial sites are known on the island, comprising single burials, accompanied by grave goods, including weapons, riding equipment, tools and utensils, combs, and metalwork derived from clothing (Steinforth 2018). These burials were either placed beneath mounds or within flat cemeteries (Wilson 2008, 27), though, interestingly, both styles of burial are sometimes found within earlier lintel-grave cemeteries, implying continued use of particular burial grounds, and in turn cultural reappropriation or assimilation. Mounds were also used to cover boat burials (*ibid*), with one such burial, excavated by Gerhard Bersu (*Ch 1, p 10*), at Balladoole, on Chapel Hill, close to Ronaldsway (Bersu and Wilson 1966; Bruce and Bersu 1974; Pl 70). This possibly dates to 875-925 and contained an adult man (accompanied by a shield, some personal items, and riding equipment), who may have been one of the first pagan Viking settlers on Man, perhaps having taken land in the Ronaldsway area (Bruce and Bersu 1974).

The stone sculpture comprises one of the best-known early medieval monuments, 100 or so sculptured cross-slabs, known as the Manx Crosses, being known, which are thought to date from between 925 and 1000 (Wilson 2008, 62). Although many are fragmentary, incorporated into later walls, and nearly all have clearly been moved from their original positions, they seem to have been erected as Christian memorial stones, in public or private places (Wilson 1983). Numerous Viking-age metalwork hoards have also been found on the island, buried for some reason but never retrieved. Predominantly, these contain silver coins (minted outside the island), and other precious metal objects (including silver currency rings), with David Wilson (2008, 80) recording 22 coin hoards, as well as four coin-free hoards, though their numbers continue to grow as a result of metal-detecting (A Johnson *pers comm*). It seems that such coins, and other items of precious metalwork, were used as bullion for trade around the Irish Sea area and beyond (Bornholdt Collins *et al* 2014; Bornholdt Collins 2015).

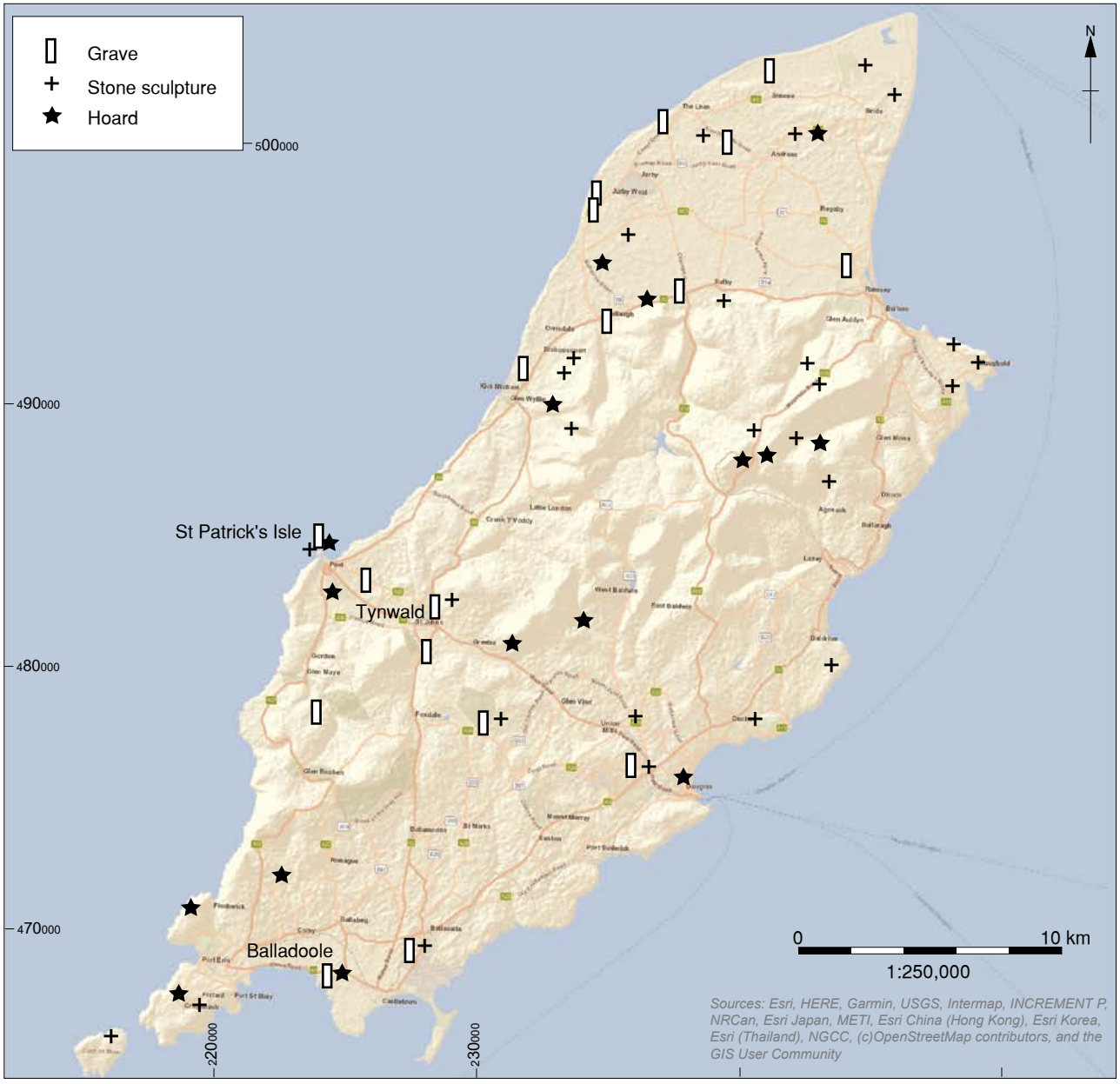


Figure 175: Viking-age burials, stone sculptures, and hoards



Plate 70: The Iron Age fort at Chapel Hill, with the Balladoole Viking burial site marked by the stone 'boat' in the foreground, and the keeill in the background

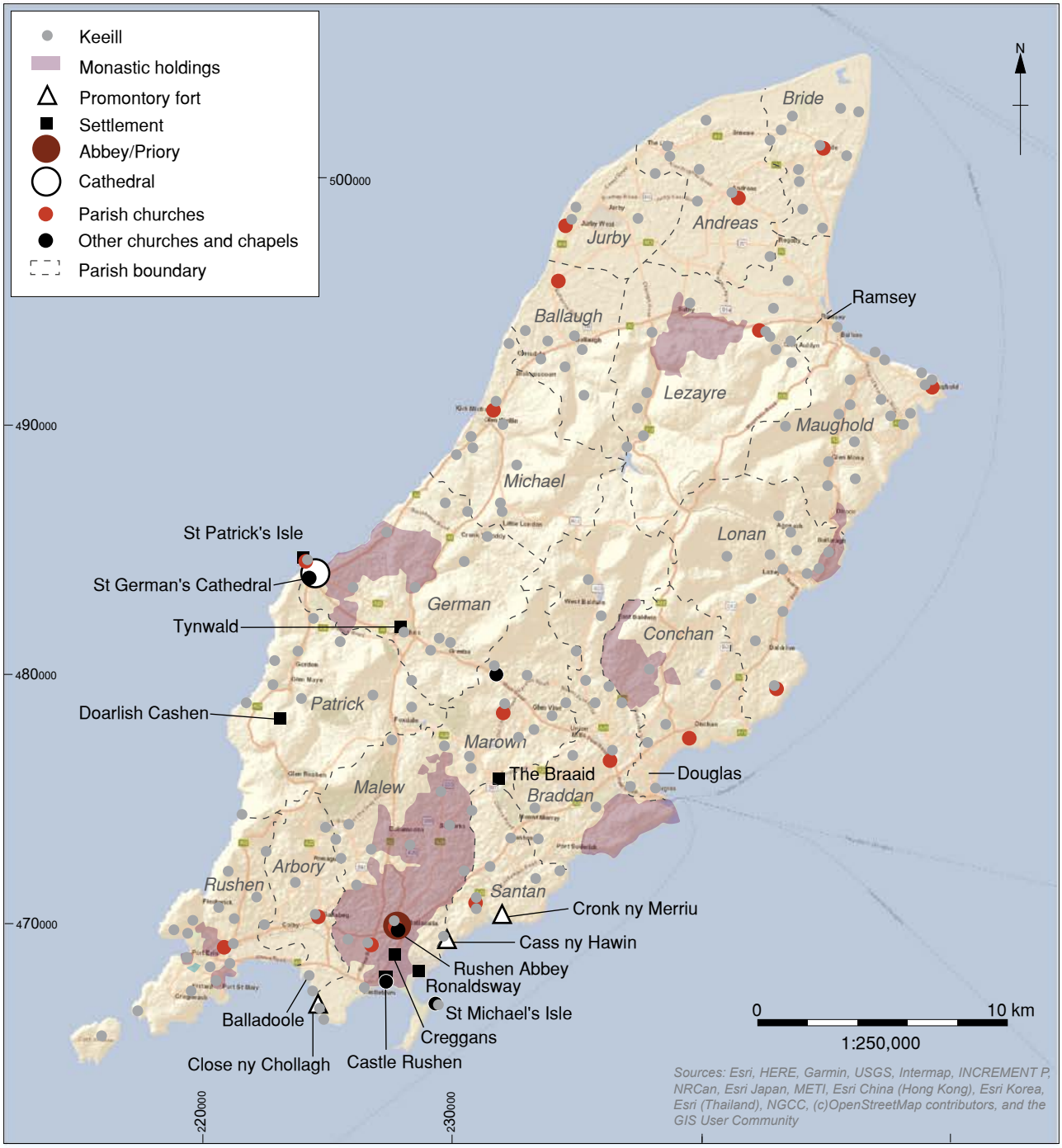


Figure 176: Viking-age settlements, keeills, monastic holdings, parishes, churches, and other sites

Some of the best-known, and studied, buildings of this period on Man are the keeills, with around 174 examples known (Fig 176; Cubbon 1983, 22). These are small rectangular stone buildings (Pl 71), often associated with burial grounds (rhullicks), and were simple chapels or oratories, which may even have served as accommodation for a visiting priest (*cf* Bruce 1968; Lowe and Reilly 1988; Wilson 2008, 130; Johnson 2023). It was initially thought that keeills pre-dated the Viking colonisation of Man (*eg* Bersu 1968; Kermode 1907), but on balance it seems more likely that the majority were constructed following the Viking settlement of the island, and, by extension, following their conversion to Christianity in the tenth century (Cubbon 1983, 22). For instance, an excavated keeill on St Patrick's Isle, built within an early Christian cemetery, seems to date to the tenth or eleventh century (Freke 2002, 133), lying within an important ecclesiastical centre, seemingly associated with a monastery (Davey 2013, 94). Evidence for this comprises the nearby St Patrick's Church and an Irish-style round tower, both of which could conceivably have been contemporary buildings (Freke 2002, 441; Radford 2004).

Therefore, monasteries and their holdings also formed an important component of Viking-age settlement on



Plate 71: An excavated keeill at Druidale, in the Sulby Valley

the island, with one important example being located close to Ronaldsway. This was at Rushen, where in 1134, the then Savignac abbey of Furness, in south Cumbria, established a daughter house on land granted by King Olaf I (*p 277*; Davey and Roscow 2010, 1). Significantly, excavation also suggests that an earlier monastic settlement may have existed at this spot (Davey 2013, 95). It is also worth noting that at the end of Viking rule on the island, Furness Abbey was granted the mineral rights on Man by King Harald I (1237-48), a 'messuage', consisting of a house and store, being established at 'Rakenaldwath', which, based on a rental agreement dating to 1539, seems to have lain directly within Ronaldsway Airport (*cf op cit*, 120-1; *Ch 11, p 372*). Apart from monastic buildings and places of worship, other religious structures were constructed in the twelfth and thirteenth centuries, including several Romanesque chapels, one of which was built close to Ronaldsway, on St Michael's Isle, which is still partially extant (*op cit*, 73). During this period, it is also quite likely that many of the parish churches on the island were constructed, as the parish system was probably established in the early twelfth century during Olaf I's region (Wilson 2008, 91); however, the dating of these churches is difficult as many were rebuilt in the eighteenth and nineteenth centuries (*cf* Davey 2013, 74). It also seems at least one of these parish churches, at Maughold, was established at location that contained an earlier church dating to the tenth-eleventh century (*ibid*), which, significantly, was also a site that housed an earlier monastic community (*p 275*).

Other types of archaeological sites containing Viking-age buildings include some of the Iron Age promontory forts, which, as with the earlier burial sites, also appear to have been reappropriated in the early medieval/Norse period. For instance, the Iron Age promontory forts at Close ny Chollagh, Cass ny Hawin, and Cronk ny Merriu (*Ch 8, p 253*), close to Ronaldsway Airport, all contained presumed Viking-age longhouses (Pl 72), though that at Close ny Chollagh has been suggested to date to the twelfth/thirteenth, or even fourteenth, century (*cf* Johnson 2002). However, it might also be that none of the buildings at these three forts were domestic dwellings *per se*, but instead were occupied on a temporary basis and were associated with a system of coastal defences, akin to the later documented 'watch and ward system', which was designed to monitor those parts of the coastline that were susceptible to landings by raiders (*ibid*), with Ronaldsway being one such location.

The evidence for early medieval longhouses is not, however, confined to these promontory forts, as other 'unenclosed' examples are also known from the island, such as that from Doarlish Cashen (Gelling 1970b), and associated with the Viking-age homestead at



Plate 72: The Viking-age longhouse at Cronk ny Merriu

The Braaid, Marown (Fleure and Dunlop 1942). At this latter site, two massive longhouses were identified, which lay directly adjacent to an earlier roundhouse, suggesting the continuation of occupation at, or reappropriation of, an earlier settlement (Gelling 1964).

In a similar vein, it also seems possible that the Iron Age hilltop settlement at Creggans Hill, to the north-west of the airport (*Ch 8, p 256*), was reoccupied, or at least reused, when the island was under Viking influence. Two shallow inhumation burials were discovered, close to the summit of the hill (OA North 2016a), the better preserved being dated to cal AD 1120-1230 (873±30 BP; SUERC-68435). It was clear that this individual had been laid in a supine position, although unusually with the hands folded, or perhaps bound, behind the back, which could suggest an execution (Pl 73). Immediately to the south-east of the hill, a possibly contemporary settlement area was defined by a gully and three pits, one of which has been dated to cal AD 1020-1160 (968±32 BP; SUERC-67655). These were set within a large, ditched (defensive?) enclosure, which might be contemporary, though its date has yet to be established (*ibid*).

One of the most important early fortified sites is at St Patrick's Isle, the site of a Viking keeill, and church and tower (*p 279*). Excavation has suggested



Plate 73: The inhumation burial from Creggans Hill, with hands bound behind the back

that, following the demolition of the keeill in the mid-eleventh century, the site briefly functioned as a secular fortified settlement, possibly a substantial royal fortress for Magnus Barefoot (*p 277*), established during his campaign on the island in 1098 (Freke 2002, 442). However, the ecclesiastical importance of this site was then again reasserted, with twelfth-century modifications to St Patrick's Church (Radford 2004) and then the construction of St German's Cathedral (cathedral for the Manx Diocese of Sodor and Man), probably in the first half of the thirteenth century (Freke 2002, 443).

The re-establishment of St Patrick's Isle as an ecclesiastical site probably occurred at the same time as the construction of a fortress at Castle Rushen on the other side of island, at the mouth of the Silverburn, to the south-west of Ronaldsway Airport, on a site that would later form the heart of Castletown. Documentary evidence indicates that this castle was certainly in existence by 1265 (*below*), though it is presumed, on architectural grounds, that the keep was probably first constructed in the late twelfth century (O'Neil 1951), and it is possible that this was surrounded by the ditch that was exposed during excavation of the site (Freke 1996, 8). Given this, Castle Rushen may have been established by Reginald I (*p 277*), who shifted his power base from St Patrick's Isle to the south-eastern part of the island (Davey 2013, 63).

Inevitably, any discussion of the Viking Age in the Isle of Man must also include reference to Tynwald Hill, at St John's, near Peel, where the Manx Parliament still meets today at Midsummer (Goodwins 2011). This assembly site contains a thing or moot mound, which has clear Scandinavian parallels (Wilson 2008, 123). The thing mound is also adjacent to a Bronze Age barrow, and at some stage a rectangular enclosure was created around both mounds. It also appears that a burial ground and keeill were present, immediately to the east, by the tenth century, as well as a runic stone that had been erected within the confines of the cemetery (*op cit*, 124-5).

Later medieval period

It was during the latter part of the thirteenth century that the Viking Age in Man effectively ended. Initially, in 1266, Alexander III of Scotland gained control of the island following the death of the last Viking king, Magnus (1252-65), at Castle Rushen (Davey 2013, 33). The signing of the Treaty of Perth also gave him control over the Viking 'Southern Isles' (Campbell 1999). Although the Scots nominally ruled Man after this date, this was only effectively established in 1275, following the quashing of a rebellion at Ronaldsway, by Godred, son of the last Viking king, in which 537 Manxmen were killed (Cubbon 1938, 153-4; Neely 1940, 80). After this, in *c* 1290, Edward I imposed English rule on the island, though it was recaptured by the Scots, under Robert the Bruce, in 1313 (Barrow 2005). It was briefly back in English hands in 1314, after which it passed back and forth between these two feuding medieval kingdoms for a decade or so (MacLeod Barron 1914). Then, in 1333, Man was once again in English hands, with Edward III granting its kingship to William de Montacute, Earl of Salisbury (Davey 2013, 34), and, despite some initial opposition, and later Scottish interference (MacLeod Barron 1914), the island has been firmly tied to England since that time.

It was during this era of political turmoil that both Castle Rushen (Fig 177) and St Patrick's Isle (*above*) were substantially remodelled. At the latter site, which by this date was dominated by St German's Cathedral, an earth bank was raised over the Viking defences (*above*), probably in the fourteenth century (Freke 2002, 443), and a series of freestanding stone towers and bastions was also constructed, thus transforming it into Peel Castle (Davey 2013, 51; Pl 74). Although the site by then principally functioned as an ecclesiastical centre, the turbulent political situation meant that 'the interests of the Church were considered secondary to those of the military' (Freke 2002, 443).

Based on the surviving architectural remains, it seems that the keep at Castle Rushen was slighted, perhaps by Robert the Bruce in 1313, to put the fortification out of action and prevent the English gaining control (Davey 2013, 63). However, once English dominance had been reasserted, four further phases of building occurred, probably during the fourteenth century, which added projecting towers to the keep, and culminated in the construction of a curtain wall and barbican, along with ancillary buildings in the outer ward (*cf op cit*, 64; Freke 1996: Pl 75).

Other fortified sites that may have been a product of the political turmoil in the early fourteenth century include a small motte-and-bailey castle at Cronk Howe Mooar, which was excavated in the early part of the twentieth century (*cf* Davey 2013, 41-4; 47). Although it has been argued that this may have been constructed in the Viking period by Magnus Barefoot (*p 277*; *cf* Smith 2004), it does not fit comfortably as a Norse-style fortification and 'is more likely to owe its existence to the period of dispute between the English and Scots' in the early part of the fourteenth century (Freke 2002, 443). The sites of several other motte-and-bailey castles have been suggested, though none of these are entirely convincing (*cf* Davey 2013, 45-7). There is also one other known later medieval fortified site on the island: the tower house at Bishopscourt. This also dates to the fourteenth century, probably constructed at the end of that century by Bishop Duncan as a fortified residence (Davey 2013, 91).

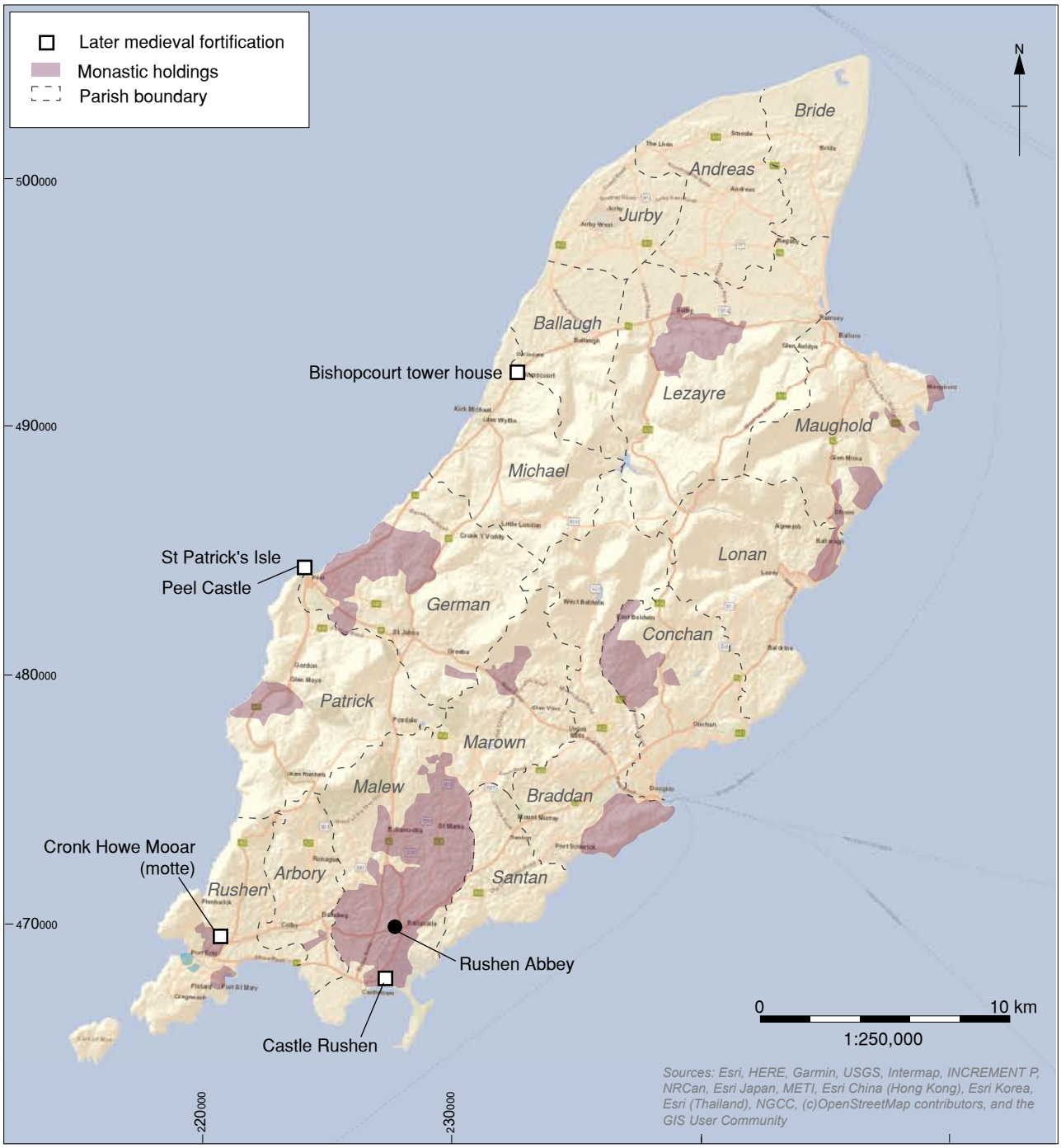


Figure 177: Later medieval fortifications and monastic holdings

With the political instabilities of the fourteenth century finally at an end, the beginning of the fifteenth century marked a momentous time in the later medieval history of the island as, in 1405, Henry IV granted its kingship to Sir John Stanley, which in 1406 was extended to Sir John's heirs, and, significantly, after 1422 any laws passed at the Tynwald also needed their direct approval (Goodwins 2011; Davey 2013, 34). The Stanleys were an influential family from England, with extensive landholdings in Lancashire and Cheshire, whose main residence was to the north-east of Liverpool, at Lathom House (Liverpool City Council 2005, 106). After securing the indefinite kingship of Man, Sir John Stanley created a fortified residence in Liverpool, known as The Tower, adjacent to the Mersey foreshore, effectively acting as a military base, akin to a Royal Castle, which effectively secured an embarkation point to the island (Kermode *et al* 2006, 71; Gregory *et al* 2014, 28). The political clout of the Stanleys was further enhanced in 1485 following their acquisition of the earldom of Derby (Coward 1983), and Thomas Stanley then became the first of ten earls of Derby to rule Man (Goodwins 2011).



Plate 74: St Patrick's Isle and Peel Castle

The earls also adopted the title of Lord of Man in 1504 (abandoning the earlier title of king; Goodwins 2011), and they had a residence, the Earl of Derby's house, within Castle Rushen (*p 282*), at Castletown (Freke 1996), though in reality they were largely absent from the island. Hence, during this period, the island was under the rule of governors, assisted by local Manx administrators, with the castle forming the main administrative centre until the nineteenth century, when Douglas succeeded Castletown as the capital (Goodwins 2011).

It was also during the later medieval period that religious institutions held considerable sway over the island, with monasteries representing a very important feature of the later medieval landscape, as they seem to have been in the Viking Age (*p 279*), up until their dissolution in 1540 (*op cit*, 94-122; Davey and Roscow 2010). The most important of these was Rushen Abbey, *c* 2 km to the north-west of Ronaldsway Airport, which had been established by the Savignac house of Furness in the early twelfth century (*p 280*). The Savignac Order was absorbed by the Cistercians in the mid-twelfth century, and the Abbey then became the most influential religious foundation on the island, controlling an extensive estate in Malew parish that 'ranged from the sea at Hango Hill to the slopes of South Barrule and included within it the most productive land in the island' (Davey and Roscow 2010, 1). In addition to its land in Malew, it had various other landholdings across the island. The ruins of the abbey are still visible to the west of Ballasalla, and excavation and building survey have identified a church, a cloister,



Plate 75: Castle Rushen

claustral building ranges, and a tower (Pl 76), the abbot's lodgings, and a pigeon tower, as well as industrial and other stone buildings, all of which were in existence in 1540 (Davey and Roscow 2010, 33-43). Excavation has also produced a substantial collection of medieval artefacts (Davey 2013, 111).

The abbey's demesne farm was also within the Malew estate (Davey and Roscow 2010, 77), and its extent and composition, together with the wider landholdings in Malew parish, have been reconstructed from sixteenth-century court records, from just after the dissolution of the abbey in 1540, as well as from rent books



Plate 76: The tower at Rushen Abbey

dating from the early sixteenth- to mid-nineteenth century (*cf op cit*, 63). From these, it is evident that the demesne farm comprised a large block of land between Ballasalla and Castletown, including the western half of Ronaldsway Airport (Fig 178), which provided the abbey with direct access to Castletown Bay (*cf op cit*, 79).

A further, highly significant, finding in the rent books is that, by 1540, Ballasalla contained several individual holdings occupied by cottagers who predominantly had Manx names (Davey 2013, 137). This also indicates the presence of a nucleated settlement immediately east of the Silverburn, which probably developed 200-300 years before (Davey and Roscow 2010, 85). It formed part of the abbey's holdings, though it lay beyond the demesne farm, and is the only later medieval village yet recognised on the island, the presence and growth of which was undoubtedly a result of the existence of the nearby abbey (*ibid*).

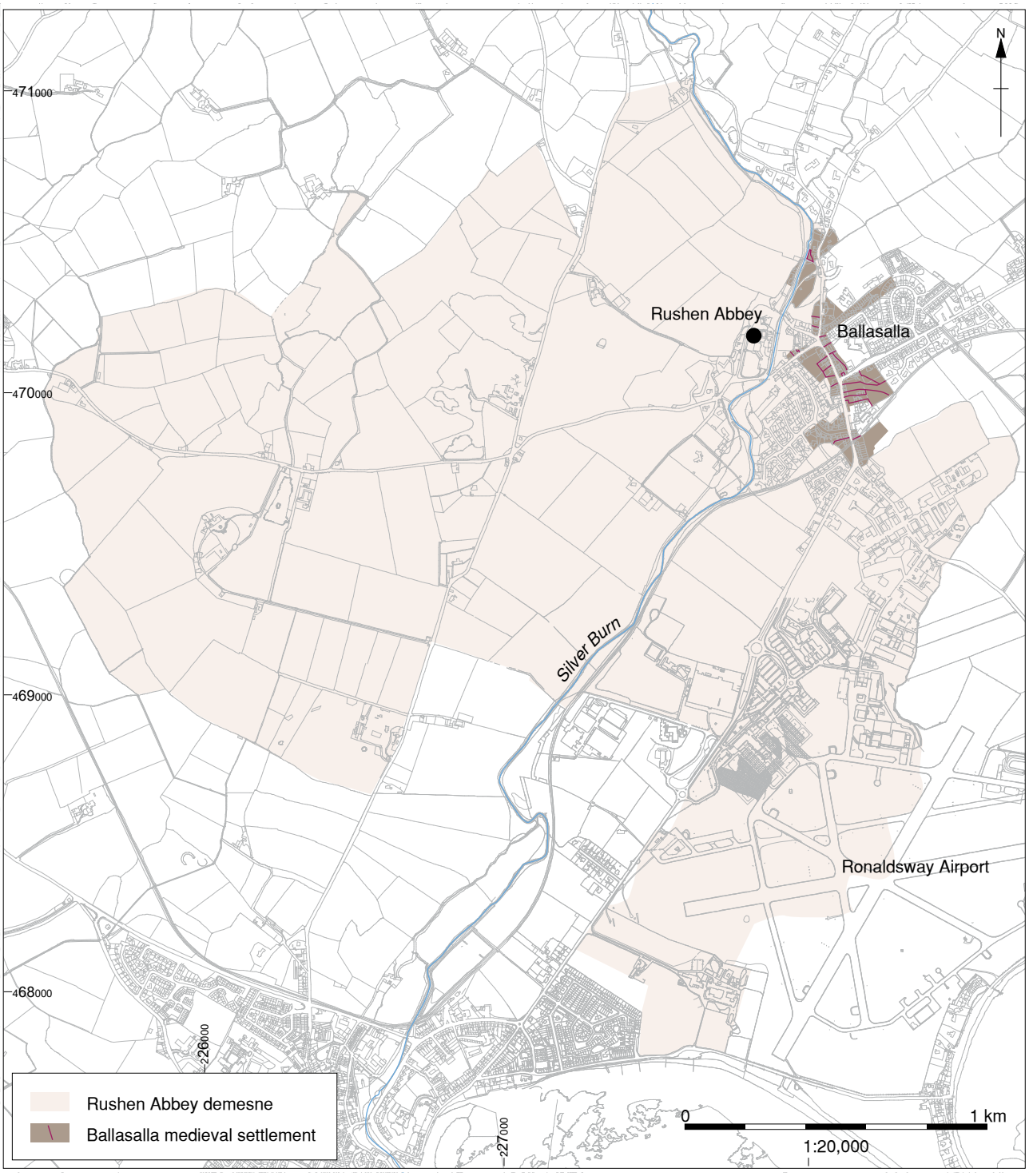


Figure 178: The Rushen Abbey demesne farm, and the possible extent of the later medieval settlement of Ballasalla

Indeed, it has been suggested that 'in the absence of, or following the demise of, a lay brother system at the abbey', the people at Ballasalla would have 'provided the labour necessary to work the demesne farm of well over 1000 acres' (Davey 2013, 137).

Whilst some excavation and survey have occurred at Rushen Abbey (*p 284*), Ballasalla (*p 287*), St Patrick's Isle (*p 275; p 281*), and Castle Rushen (*p 282*) more generally, the later medieval period in the island has been relatively unexplored, at least archaeologically, when compared to earlier periods. Hence, given the limited amount of excavation, very little is known about later medieval settlement in both rural and urban contexts (towns, villages, manor houses, farms, tithe barns; *op cit*, 123). It does, however, seem probable that Castletown, surrounding Castle Rushen, emerged during this period, on the basis of limited excavation and documentary evidence, seemingly a product of the early fifteenth century, the growth of which was stimulated by the appearance of administrators and soldiers from north-west England in the service of the Stanley family (*p 283*; *op cit*, 130). The origins of the island's other urban centres of Peel, Douglas, and Ramsey are unclear, though test-pitting in Peel has revealed an occupation layer containing thirteenth- or fourteenth-century pottery, as well as the remains of buildings (clay floors and hearths) associated with pottery dating from the thirteenth century onwards (*op cit*, 130-3). The evidence for rural settlement is equally sparse, as no later medieval farms have been subjected to large-scale excavation, though presumably a good proportion of the known post-medieval farms have at least later medieval origins (*op cit*, 139).

One of the thornier issues associated with the archaeology of Man relates to the origins of the island's very particular system of land division, which documentary evidence indicates was firmly in place by the sixteenth century. This system broadly divided the landscape into productive, low-lying agricultural land, held from the Lords of Man, and common land, which was for the most part situated in the uplands (Davies 1956). Within the low-lying agricultural areas, the treen formed the primary unit of land, perhaps representing family lands, the boundaries of which were defined by topography, such as a watercourse or watershed (*ibid*). By the time of the earliest complete rent books for the island, dating to just after 1500, the treens had also been subdivided into smaller quarterlands (*ibid*), with usually, but not always, four quarterlands to the treen. These quarterlands were also similar, though smaller, than the English medieval township and Irish townlands, being 'between 20 and 73 ha (most normally about 36.5 ha)' (Megaw 1999, 261). In addition, by, at least, the beginning of the sixteenth century, the island's most powerful tenants were also gaining control of separate holdings of treen-land (either the whole of a treen, quarterlands in other treens, or parts of quarterlands that had been subdivided; Davies 1956). It is worth noting that, during the later medieval period, the barony and abbey lands (private estates not held directly by the Lords of Man) were separate from the treen-lands, though these had also been subdivided into quarterlands (*ibid*). In addition to the treens, there were also areas of marginal land (either higher ground between the treens and commons, marshy areas, or meadows) and, although some of this was subjected to improvement ('intacking'), which allowed tenants to take control of extra land (under licence and through the payment of additional rent), it was never fully integrated into the contiguous treen-lands (*ibid*).

Whilst this system of land-holding was clearly in place by the end of the later medieval period, much debate has centred on the origins of the treens and qauterlands, with some considering these to date from the Viking Age, or perhaps even earlier, based on their apparent similarities with the early Welsh system of landholding (*cf* Moore 1999; Davey 2013, 144); however, presently, there is no direct evidence for this and, as David Wilson (2008, 118) notes, based on the lack of direct evidence, 'considerable caution' is required in extrapolating these later medieval systems of land division back into earlier periods.

The same also appears true for the establishment of the field systems contained within the treens and quarterlands, and also any boundaries used to separate these. Indeed, prior to the work as part of the RESA investigations, relatively little archaeological investigation had occurred into these landscape features, though later medieval boundaries have been identified in two marginal upland areas, beyond the limit of modern arable cultivation (*cf* Davey 2013, 140-1). It also seems from documentary evidence that artificial boundaries (for instance, Manx turf-built 'hedges' or ditched boundaries) were in existence by the late thirteenth century, which were potentially used, along with natural boundaries (*eg* watercourses), to separate estates (*op cit*, 143).

Post-medieval period

Between the mid-sixteenth- and mid-eighteenth century, the Stanleys remained the dominant political force on the island. It was also during this period that the coastal defences were strengthened, resulting in the construction of a round fort on St Michael's Isle (Fig 179) that was designed to protect Derbyhaven and Ronaldsway from invading forces (Davey 2013, 34). This fort was later modified in the mid-seventeenth century, during the Civil Wars (*p 289*), and forms one of the more spectacular post-medieval monuments on the island. After becoming the Lords of Man, the Stanleys continued to rule largely uninterrupted until 1736, when the last of the Stanley-family rulers, James



Figure 179: Post-medieval sites mentioned in the text

Stanley, the tenth Earl of Derby, died without a male heir, after which Man passed to his first cousin, James Murray, the Duke of Atholl (Goodwins 2011).

Initially, after the Dissolution of the Monasteries in 1540, the ownership of the monastic estates and their revenues were vested with King Henry VIII's administration, and it was not until 1647 that the Stanleys finally acquired complete control of the former monastic landholdings (Davey and Roscow 2010, 30; Davey 2013, 35). The seventeenth century was, however, a tumultuous political time on the island for other reasons, in that it was characterised on the mainland by the strife caused by the Civil Wars, and on the Isle of Man by a series of disputes between the locals and the Lords of Man over land tenure. These disputes began when James Stanley (1607-51), then Lord Strange, who became Lord of Man in 1627, and finally the seventh Earl of Derby (in 1642), latterly known by the Manx *Yn Stanlagh Mooar* (the Great Stanley), attempted to alter the tenure system to his own advantage by instigating leases, which required tenants to give up their customary inheritance rights (Moore 1900). This resulted in a

political showdown led by members of a powerful Manx family, the Christians.

Initially, the conflict was with Edward Christian (1600-61), a successful seafaring merchant from Maughold, who had been appointed governor in 1628 (*ibid*). Although initially favoured, Edward Christian was dismissed from office in 1639 for reputedly abetting pirates, though it was more likely that this resulted from his support for the local landowners over tenancy rights (*ibid*). With the outbreak of the Civil Wars in 1642, James Stanley joined the Royalist cause, and Edward Christian was reinstated as commander of the Manx forces. However, in 1643, he attempted to overthrow the Manx government and repeal any laws not in the interest of the Manx people, then being imprisoned in Peel Castle by James Stanley (*ibid*).

The leadership of the local insurrection passed to another member of the Christian family, William Christian, otherwise known in Manx as *Illiam Dhone* ('Brown William'), whose family lands included Ronaldsway Farm, within the area now covered by Ronaldsway Airport (*Ch 1, p 5*). In 1648, William Christian was appointed as the island's Receiver General, but, following James Stanley's departure to the mainland to fight for the Royalists, he was left in charge of the Manx militia (Harrison 1877). James Stanley was taken prisoner by the Parliamentarians in 1651, following the Battle of Worcester, and his wife, Charlotte de la Tremoille, offered to surrender the island to Cromwell in return for her husband's life (Stenning 1978). This decision resulted in a rebellion in October of that year, which was probably fuelled by the changing systems of tenure introduced by James Stanley, with William Christian gathering some 800 militia members at Ronaldsway (Harrison 1877). This force then seized the island's strongholds and opened negotiations with Parliamentary forces, with leading landowners agreeing to surrender the island if they could retain their ancient rights and liberties (Stenning 1978). With the victory of the Parliamentarians on the mainland, the island was placed under the control of Colonel Robert Dukenfield (1619-89), and William Christian initially remained as Receiver General, but was then appointed as Governor in 1656. In 1660, following the Restoration of the British Monarchy, William Christian was arrested, and in 1663, with the return of the Stanleys to Man, he was executed at Hango Hill, just to the south-west of the family estate at Ronaldsway (*ibid*).

The issues of landowners' rights brought into focus by the Civil Wars, and culminating in the Manx rebellion of 1651, ultimately led to the Act of Settlement, negotiated in 1703 between the tenth Earl of Derby, and a group of aspiring Manx landholders (Goodwins 2011). Significantly, the Act of Settlement passed many of the rights of land ownership from the Lords of Man back to the farmers who worked it, including re-establishing their customary rights (*ibid*). The next significant political event came in 1765, when the British Parliament passed the Isle of Man Purchase Act, known as the Revestment Act, reabsorbing the Lordship of Man into the English Crown (*ibid*). Many Parliamentary Acts followed the transference of ownership, most designed to raise taxes and curb smuggling, which had become a notable feature of the island's eighteenth-century economy (*ibid*).

Some indication of the development of the Manx landscape is provided by historical mapping dating to the eighteenth and nineteenth centuries. This indicates that during these centuries the rural landscape contained a patchwork of field systems (some presumably the product of medieval activity) and intermingled farmsteads, with the major areas of 'urban' settlement comprising Castletown, Peel, and Douglas, which seem to have developed their urban characteristics from the sixteenth century onwards (Davey 2013, 125-35).

Archaeologically, however, this period remains relatively unexplored. For example, little excavation has taken place of post-medieval rural settlement (*cf op cit*, 137-8), with only very limited investigations into some extant field systems of possible post-medieval date. This latter work includes a survey of extant boundaries at Billown, which indicated that the stone walls in this area were probably less than 200-years old, whilst some of the more substantial earth (sod) boundaries were potentially earlier (Nunn 2003). Several field boundaries were also excavated during the construction of a gas pipeline between Peel and Douglas, with the subsequent radiocarbon-dating of buried peat that lay beneath these boundaries (Johnson 2004). The dates obtained from three of these boundaries spanned the ninth to seventeenth centuries cal AD, but as these merely provide a *terminus post quem* for their construction, it may be that all date to the post-medieval period (*cf* Davey 2013, 141-3).

Similarly, the larger of the island's post-medieval urban settlements have also only been subjected to comparatively limited archaeological investigation. This latter work includes test-pitting at Peel (*p 275*), which produced a few sherds of local fifteenth-sixteenth-century, and mid-sixteenth-century, pottery, representing both local products and those produced in Britain and the Continent (*cf op cit*, 130-3). Other structures and finds recorded during this investigation dated from the eighteenth century onwards (*ibid*). A series of small excavations was also undertaken in Castletown in the 1960s, which produced pottery dating between the fifteenth and nineteenth centuries, the majority of which was eighteenth-century in date (*cf op cit*, 125). In addition, a larger excavation, at the Castle Rushen Stores, was

completed in the early 1990s, which indicated that Castletown had most probably been substantially developed as a planned urban settlement in the late fifteenth- or early sixteenth century, based on the presence of sixteenth-century occupation layers and a substantial boundary (Higgins 1996). Significantly, the urban plots established during this period also seem to have been preserved in the present-day layout of the town. The excavations at the Castle Rushen Stores also produced the largest assemblages of post-medieval urban artefacts yet recovered, which included locally produced items, as well as 'exotic' objects indicative of the presence of a mercantile class, such as pottery from north-west England, and glass from London, Antwerp, and Venice (*ibid*; Davey 2013, 127).

Medieval and Post-medieval Archaeology at Ronaldsway Airport

The 'Ronaldsway Village'

Although no definitive early medieval or Viking-age remains were identified during the RESA project, the earlier campaigns of archaeological work at Ronaldsway Airport, during the establishment of the

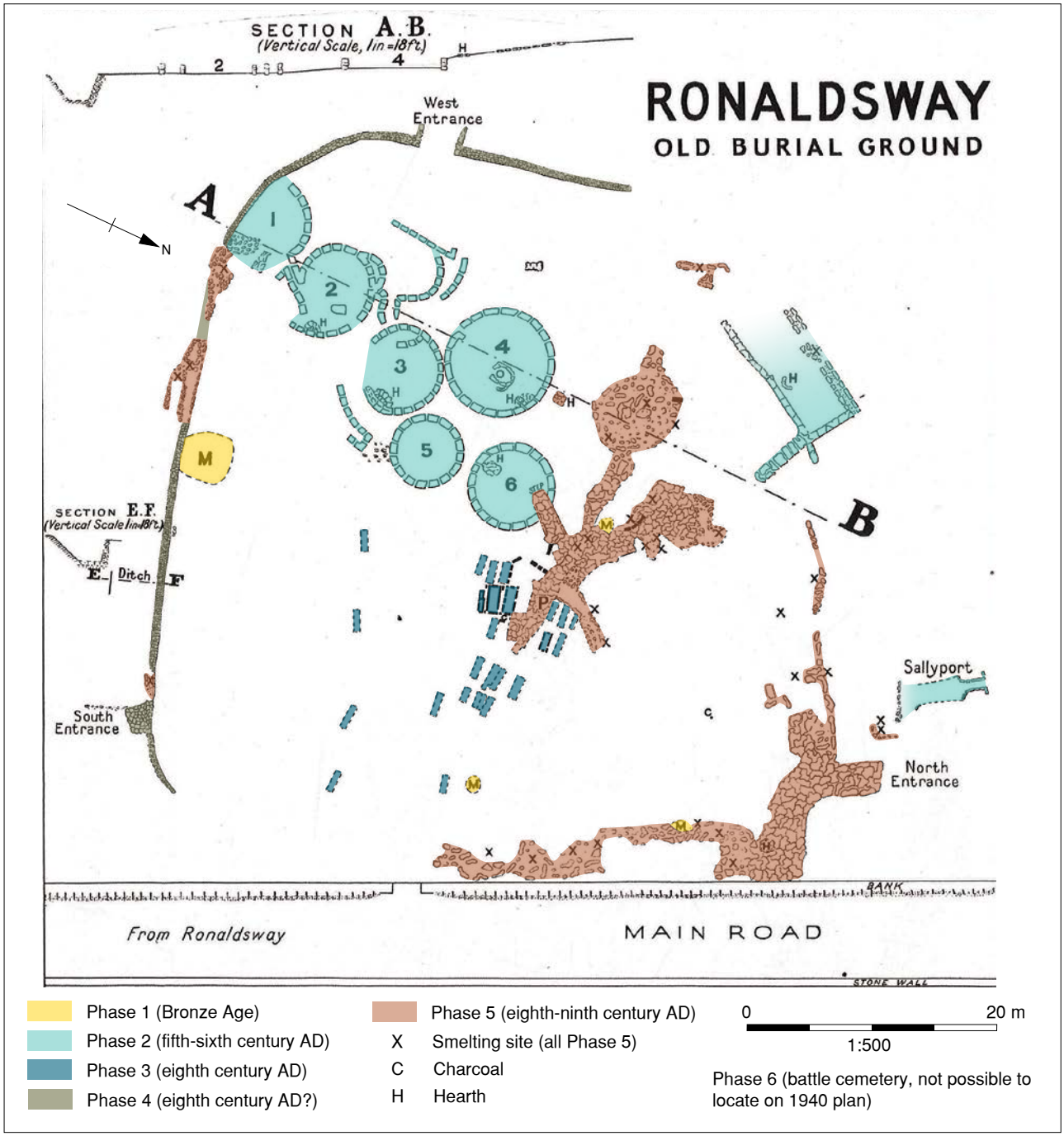


Figure 180: The Laings' (1987) proposed phasing of the Ronaldsway Village, as recorded by Neely (1940)

first airfield (*Ch 1, p 6*), indicated that the area was a significant locale for activity dating to the earlier part of the medieval period. These excavations produced a range of features and artefacts on a small hillock, which, with hindsight, can typically be associated with the early medieval and Viking periods.

The evidence is, however, difficult to untangle, given the circumstances of discovery and the level of recording that was undertaken (Cubbon 1938; Neely 1940). Given the insufficiencies in Neely's account, particularly in terms of the site's stratigraphy and also the provenance of the artefacts, in the late 1980s, Lloyd and Jennifer Laing reconsidered the evidence and suggested six main phases of activity at the site, five of which were viewed as potentially relating to early medieval and Viking-age settlement and burial (Laing and Laing 1987). Whilst the first of these suggested phases related to Bronze Age occupation (*Ch 6, p 170*), during a second phase (possibly including two sub-phases), a small unenclosed settlement was established (Fig 180). It was argued that this settlement was possibly fifth-sixth-century in date, and was defined by circular houses and a possible rectangular building, all stone-built, at least in terms of the foundations, and a corn-drying oven or souterrain (an underground chamber/passage), classified by Neely (1940) as a 'sallyport' (a controlled entrance way; Laing and Laing 1987).

During a third phase of activity, it was suggested that the site had been used as a burial ground in the eighth century, in the form of a long-cist (lintel grave) cemetery (*p 276*). A fairly substantial ditched boundary formed a fourth phase, measuring *c* 4 m wide and *c* 1.2 m deep, the inner edge of which was revetted with a stone wall, which was traced around the southern and western sides of the hillock (the eastern side had been obliterated by a modern road; Pl 77). Significantly, one of the stones incorporated into its revetment had been incised with a simple cross, suggesting that it was a grave marker associated with one of the earlier graves (Neely 1940, 76). This enclosure also had a causewayed entrance to the west, and another to the south.

It was suggested that a fifth phase of activity was responsible for disturbing many of the earlier remains at the site, relating to metalworking (principally ironworking) in the eighth or ninth century, and possibly later (Laing and Laing 1987). The remains associated with this comprised a series of paved areas and around 30 smelting hearths (Neely 1940). It was also suggested that this metalworking activity could be divided into two sub-phases, with the earlier being defined by structures in the central part of the enclosure, whilst the later related to workshops established around the edges (Laing and Laing 1987). During the final, sixth phase of activity, the site was once again used as a burial ground, a series of graves being described by G J H Neely (1940, 71) as 'rough unoriented burials containing iron fragments', overlying the earlier lintel graves (Cubbon 1938). In addition, ironworking may have continued to be a feature of the site (Laing and Laing 1987; Garrad 1992).

Early medieval cemetery and shrine

It has now been possible to refine and present a slightly different interpretation of the Ronaldsway Village to that envisaged by the Laings (1987). It seems highly unlikely that the roundhouses relate to an early medieval settlement, as they were identical in form and design to the later Bronze Age roundhouses excavated at the nearby Taxiway Alpha East site (*Ch 6, p 173*), and given the presence of the large assemblage of later Bronze Age pottery from the village, which has also been radiocarbon dated to the later Bronze Age (*Ch 7, p 225*), it seems more probable that these houses formed additional elements of that settlement (*Ch 11, p 356;* Fig 181). The presence of the middens associated

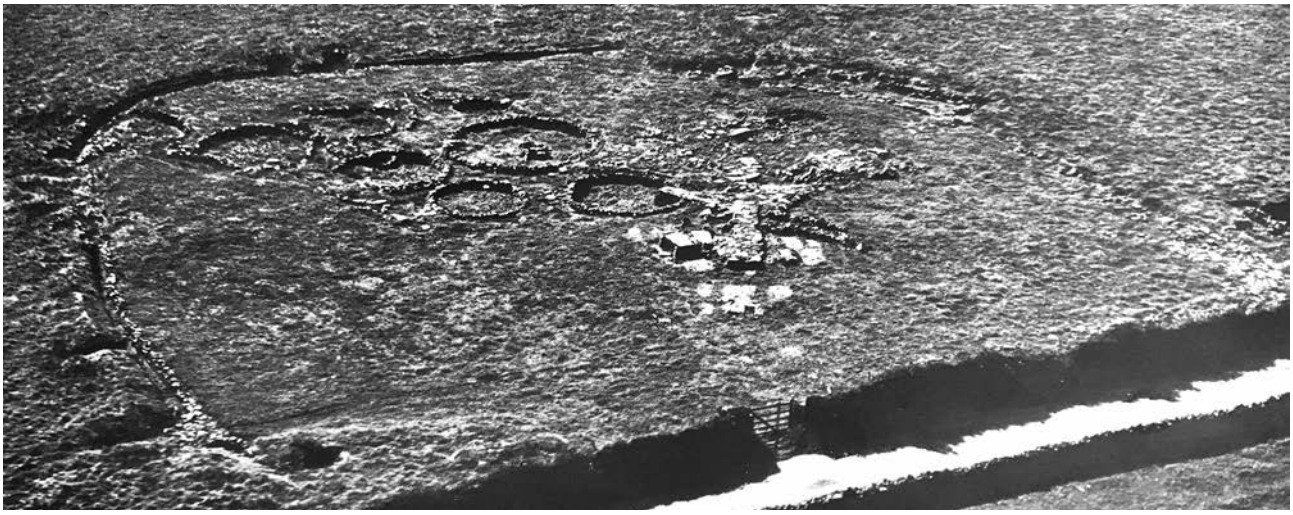


Plate 77: The boundary around the Ronaldsway Village

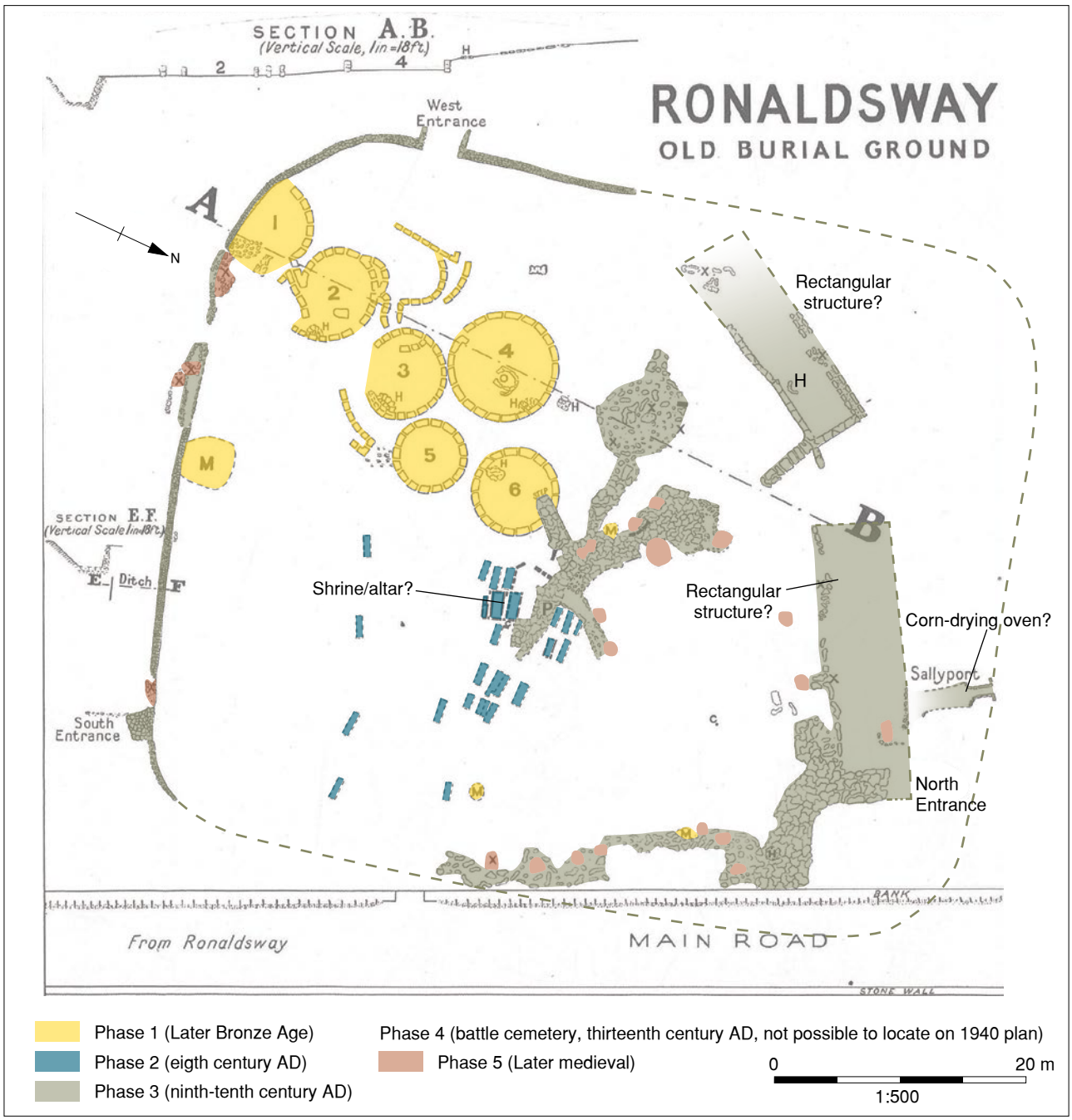


Figure 181: An alternative scheme of phasing for the Ronaldsway Village, as recorded by Neely (1940)

with these houses would also fit comfortably with the evidence from the Taxiway Alpha East site. If this is the case, the first use of the site in the earlier medieval period (Phase 2) would have been as a burial ground, containing at least 25 lintel graves, all aligned east/west, with extended adult inhumation burials, and also some child burials (*cf* Neely 1940).

Two of these burials at the centre of the hillock were also singled out for special treatment, as, directly above the burial chambers, two massive stone-slab structures had been constructed, with external buttresses (Pl 78). It has been argued (Lowe 1987, 165) that these were freestanding structures, akin to the early Christian *leachta* from Ireland, and hence would have functioned as open-air altars or shrines. Both were filled with white quartz pebbles, with a surface composed of identical quartz pebbles surrounding them, covering the crown of the hillock (Cubbon 1938). Significantly, an eighth-century altar slab, decorated with a marigold pattern and three Tau crosses, had also been incorporated into one of the structures (Neely 1940; Pl 79). Initially, this was thought to represent a reused altar slab derived from an undiscovered *keeill* (Bruce 1968, 30), though it could well be an original feature (Lowe 1987, 168). Furthermore, it is quite likely that these shrines/open-



Plate 78: The possible open-air altar or shrine excavated at the Ronaldsway Village, with a lintel grave for a child in the foreground



Plate 79: The decorated eighth-century altar slab from the Ronaldsway Village

air altars (or at least significant burials) formed the original focus of the cemetery, which would therefore imply that many of the other lintel graves also date to the eighth century, perhaps continuing into the early ninth century.

Viking activity

It is then probable (as the Laings (1987) suggest) that the next phase of activity related to the establishment of the ditched boundary (Phase 3), which seems to post-date the cemetery on the basis of the possible earlier grave marker incorporated into its design (*p 292*). This boundary certainly extended around the southern and western sides of the hillock, though potentially, as Neely (*op cit*, 76) suggests, it was probably also associated with a low bank that seems to have enclosed the whole of the hillock. Based on the recorded portions of ditch and other remains from the site, it is possible that the ditch and bank enclosed a sub-square area measuring some 75 m across.

Although the Laings (1987) viewed the paved areas inside the enclosure as relating to a later phase of activity (*p 291*), there is actually no reason to assume that this was the case, and it seems more likely that they were contemporary elements. Two substantial paved areas are noted on Neely's site plan, one apparently heading towards a possible northern entrance into the enclosure, which was associated with evidence for a gate, suggesting that the enclosure and paved areas were indeed contemporary (Neely 1940, 74). It also seems that a stone-walled structure recorded in the north-western part of the site was also contemporary with the paved areas and enclosures, particularly as this had 'a footway leading towards the central paved area' (*op cit*, 76). It therefore would not have formed an element of a fifth/sixth-century settlement, as suggested by the Laings (1987). This structure had a rectilinear plan, measuring *c* 16 x 5 m, and also contained a hearth. Moreover, it does not seem to have existed in isolation, as another possible rectilinear structure was found directly to the east, the southern side of which was defined by a fragmentary stone wall, composed of limestone blocks (*op cit*, 74), whilst its north-eastern end was respected and outlined by one of the areas of stone paving. Based on this evidence, it seems, therefore, to have been identical in both size and form to the structure to its west. Immediately to the north was the structure described as a 'sallyport' by Neely (*op cit*, 76), which, as the Laings (1987) correctly suggest, was more likely to have been a corn-dryer or even a souterrain (Pl 80), although its function as the



Plate 80: The 'sallyport' at the Ronaldsway Village, more probably a corn-drying oven

latter seems less likely given that no other souterrains are known from the island (A Johnson *pers comm*).

Considering all of this evidence together, it seems possible that a 'settlement' existed, established following the abandonment of the eighth-early ninth-century Christian cemetery. This was associated with rectangular structures, one of which contained a hearth, possibly suggesting that it had a domestic function, with paved areas, and a corn-drying oven, and its extent was defined on its southern and western sides by a ditched boundary, and probably also by a bank, which may have enclosed its entire perimeter. Another suggestion, however, given the clear religious importance of this locale during the earlier medieval period (*p 292*), is that the enclosure and structures were not a domestic settlement *per se*, but instead defined a pilgrimage site, comparable to those from Ireland, also dating to the early medieval period (*cf* Johnson 2020, 31, 35; 2023, 21-3; A Johnson *pers comm*).

It is probable then that, aside from the Bronze Age pottery and flaked lithics, a good proportion of the other artefacts from the site related to this phase of activity, and significantly, the style of some of these, along with the presence of the rectilinear structures, implies that it was of the Viking Age. The finds were varied and included jet and lignite armlets; millstones and whetstones; glass beads; bone combs, pins, and needles; copper-alloy pins, rings, brooches, and a pair of chain links, as well as two ornamented pieces of copper alloy; and iron nails, tools, and weapons, and items relating to dress (*cf* Neely 1940, 81-6). In addition, several items are highly informative in terms of the date, origin, and status of the settlement. One is a Viking brooch pin that was almost certainly produced in Ireland (*cf* Laing and Laing 1987, 401-4), and has very close parallels with examples from Carraig Aille, Co Limerick, and Kilmainham-Islandbridge, Co Dublin (*cf* Steinforth 2018, 85-6). These are an early style of Viking brooch, which was later replaced by Viking/Irish-style 'ringed pins as the dress-fastener of choice' (*op cit*, 86), of which numerous examples are known from Man (Fanning 1983). The others are a balance-beam and lead weight, forming part of a set of weighing scales. The beam is a straight copper-alloy bar (90 mm long), with the carved head of a bird or dragon-like mystical beast at each end, whilst the lead weight is conical in shape with a copper-alloy ring (Skinner and Bruce-Mitford 1940). It was reported that during the excavations this item was recovered from 'above the south end of a lintel grave' (Neely 1940, 77), and so was clearly related to activity post-dating the cemetery. Balances and weights such as these are most often found at ports, trading towns, royal or elite sites, and often with high-status burials throughout the Scandinavian world and in Britain, with the Viking strongholds of Dublin and York having the most numerous collections (Kruse 1992).

Medieval battle cemetery and bloomery

At some stage, the Viking enclosure was abandoned, and the function of the site changed. Both Neely (1940) and the Laings (1987) suggested that later phases of activity comprised metalworking and burial, though it is difficult to determine the precise sequence. In terms of the burials, William C Cubbon (1938) indicated that some were clearly Christian inhumation burials, aligned broadly east/west, that had been placed in shallow uncoffined graves. Some also overlay the earlier lintel graves, and hence were clearly later in date than the eighth-century cemetery, whilst Neely (1940, 73) also indicated that these burials were later than the areas of paving within the settlement (*p 295*), and hence also post-dated this domestic phase of occupation. He noted that this group included 'several hastily buried unorientated skeletons' (*op cit*, 73). The nature of this evidence led both Cubbon (1938) and Neely (1940, 80) to argue that they formed a battle cemetery, which they thought related to that occurring at Ronaldsway in October 1275, between the Scots (under Alexander III) and Manx forces, which resulted in the deaths of 537 Manx troops (*p 282*). Although difficult to prove, this does seem at least plausible. The site of this battle is erroneously denoted as '*Site of Battle between Magnus and the Manx AD 1250*' on the OS map of 1870, though Cubbon (1938) suggested that this battle (which actually took place in 1275), involving Magnus, the last Viking king of Man, was fought on St Michael's Isle, at the north-eastern end of the Langness peninsula, where there are a later medieval chapel (*p 280*) and post-medieval fort (*p 288*).

The metalworking evidence at the Village comprised 'thirty…smelting places', scattered across the former settlement area '…in roughly built angles or channels in the stones of broken up pavement, and at other times in a mere depression in the ground' (Neely 1940, 80). These features were also associated with (tap) slag derived from the smelting of iron, and it is therefore probable, through analogy with excavated sites from north-west England (*cf* Gregory *et al* 2021, 226-9), that the 'smelting places' formed the bases of clay-walled smelting furnaces, which would also have had an associated tapping pit, indicating that at some stage the site functioned as an iron bloomery. In addition, through analogy (*ibid*), it is also possible that a proportion of the 'smelting places' might have been reheating hearths, where the iron blooms, extracted from the furnaces, were heated and then compacted into iron billets. Although the date of the bloomery site is unknown, it certainly post-dated the Viking-age settlement, and the remains do seem to suggest that it relates to medieval iron production (*ibid*). The quantity of recorded furnace bases and hearths also seems to suggest that there was some longevity to this activity, and as such it may have occurred both before the later use of the site as a cemetery, and perhaps also after.

RESA Project: later medieval and post-medieval boundaries, enclosures, and agricultural activity

During the RESA project, several features were excavated that probably relate to later medieval and post-medieval activity on the airport site, some of which could also be related to historical mapping, whilst others might conceivably be contemporary with the later phases of activity at the Ronaldsway Village site, particularly that relating to iron smelting (*above*). These remains were excavated at the 26 End site, at the Car Park and the Control Tower sites, at Taxiway Alpha East and Taxiway Alpha West, and within two drainage runs leading from these latter two taxiways (Fig 182).

It was during the later medieval period that the ownership of the land now covered by the airport was divided into three. One portion, west of Ronaldsway Burn, which contained the Car Park and the Control Tower sites, Taxiway Alpha West, and part of the linked drainage run, was owned by Rushen Abbey (*p 280*), whilst land to the east of this watercourse (containing the 26 End site, Taxiway Alpha East and its drainage run, and part of the drainage run joining with Taxiway Alpha West) was partly owned by Furness Abbey, the mother house of Rushen Abbey, which had established a 'messuage' at Ronaldsway (*p 280*), and partly by the island's English overlords, who from 1405 onwards were the Stanley family (*p 283*). The western part of the airport, within the Rushen Abbey lands, was directly within the abbey's demesne farm, which at least by the end of the later medieval period was farmed by the villagers of Ballasalla (*p 288*). After the Dissolution of the Monasteries, by the mid-seventeenth century, all the island's former monastic holdings, including the land held by Rushen and Furness abbeys, had passed into the hands of the Stanleys (*p 289*), the entire landscape then being owned by the Lords of Man.

The land on which Ronaldsway Airport was built was then divided between three farms: Ronaldsway, to the east of Ronaldsway Burn; and Ballagilley, and Creggans (*cf* Francis 2006), to the west of this stream. In the mid-eighteenth century, maps were produced which showed the landholdings associated with each (Fig 183): a map of the land held by Ronaldsway Farm dated to 1733 (MNHL P.3488ML7L); a map of the Creggans Farm holdings dated to 1765 (MNHL P.173LMS24); and a map of Ballagilley Farm dated to 1768, based on a transcription produced by the Rev E H Stenning in 1944, which also forms the earliest in a series of other transcribed historical maps of this estate (MNHL P.1721/a-f). These three maps indicate that, by the mid-eighteenth century, the fields

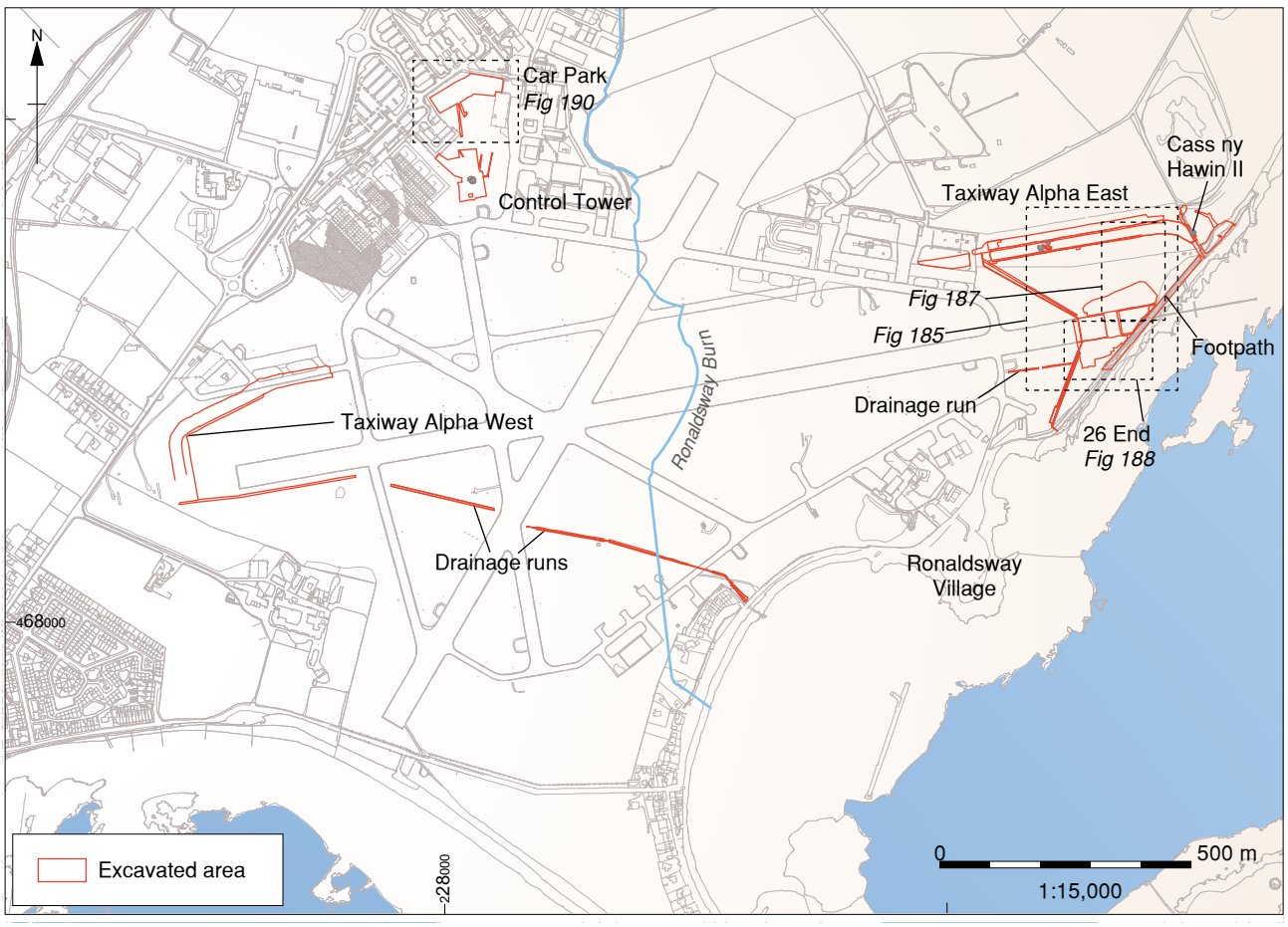


Figure 182: The excavated RESA areas containing medieval and post-medieval archaeology

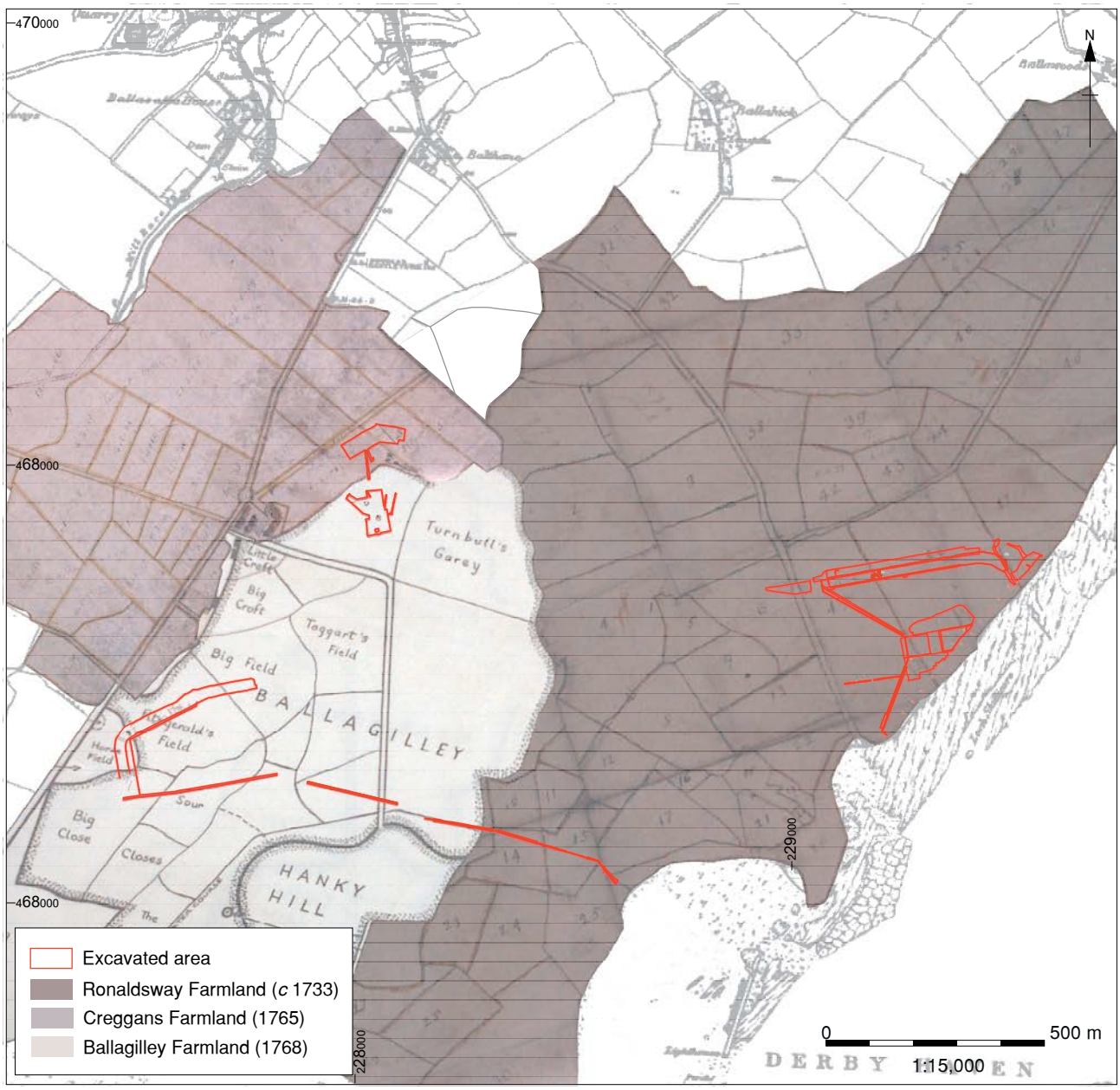


Figure 183: The excavated sites superimposed onto eighteenth-century mapping

associated with Ronaldsway and Ballagilley farms were, on the whole, small, irregular, and sinuous in form, suggesting that they related to early landscape division prior to agricultural improvement. In contrast, the land associated with Creggans Farm had been divided into a series of regular fields, including several that were large, indicating a landscape that had been subjected to agricultural improvement. However, it is evident from later mapping that, by the time of the publication of the OS map of 1870, approximately 100 years later, the land associated with both Ronaldsway and Ballagilley farms had also been improved, evidenced by the rationalisation of the earlier fields into larger and more regular forms. Indeed, in terms of the Ballagilley landholdings, the sequence of maps compiled by Stenning (*ibid*) indicates that this process of improvement had partially been completed by 1800. Further details can be gleaned from James Woods' (1867) atlas, based on the 1841 Tithe Plans and 1860s Asylum Plans, which indicate that this process of improvement had occurred by the mid-nineteenth century. Woods' (*ibid*) map also classifies the lands to the east of Ronaldsway Burn, as of traditional 'quarterland' status, and straddling two larger 'treens' (*cf* Davies 1956, fig 5). By the time the Asylum plans were surveyed, Ronaldsway consisted of half of the treen of Conessary (Ronaldsway quarterland), and the whole of the treen of Logh (forming a single quarterland; IMG: GR Asylum Plans: Parish of Malew, plan 310, plan 293; Fig 184). In 1863, the Ronaldsway estate was in the possession of John Taubman, a Manx politician, who also held the Langness quarterland in the treen of Conessary. Ronaldsway Farm had previously been in the hands of the Christian family

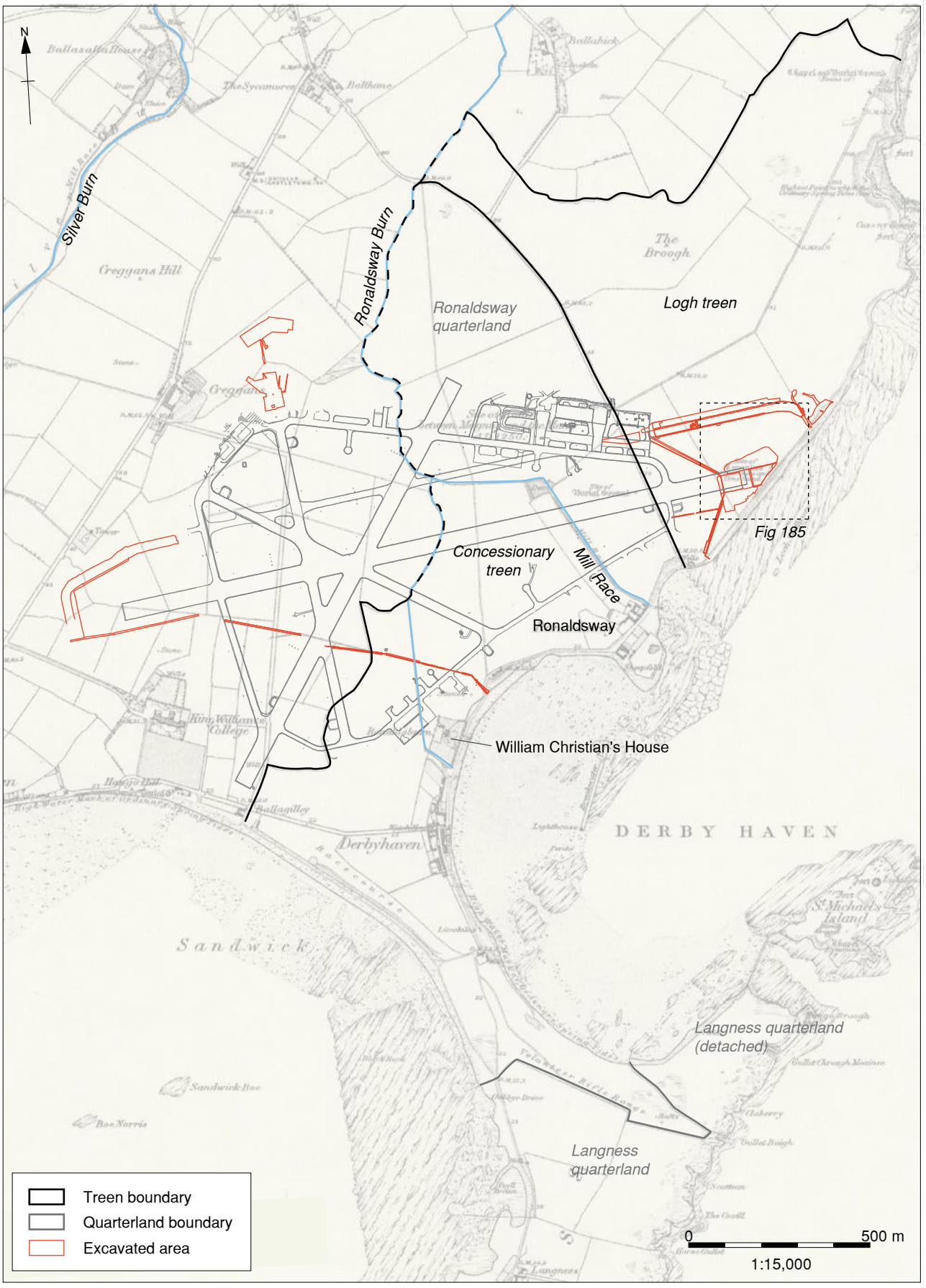


Figure 184: The extent of the Ronaldsway estates within the treens of Logh and Conessary, superimposed on the OS map of 1870



Plate 81: Ronaldsway Farm prior to demolition, c *1930 (MNH PGN 01491)*

(*p 290*), and, by 1863, a mill race had been constructed, from Ronaldsway Burn, to power a small waterwheel associated with one of the farm buildings. Historical photographs of this farm indicate that it contained a large high-status house (Pl 81), with gabled chimneys and many windows, suggesting an early eighteenth-century date, and there were also other buildings and barns. The photographs also show an eighteenth- or early nineteenth-century farm-range, to the south of the house. During the nineteenth century, several private properties also existed within the Ronaldsway quarterland, one of which, to the south-west of Ronaldsway Farm, was in the possession of William Christian (IMG: GR Asylum Plans: Parish of Malew, plan 294), indicating that the Christian family, although no longer resident at the farm, still maintained property in the Ronaldsway area. Indeed, this plan demonstrates that William Christian was still one of the island's wealthier inhabitants, as his residence is depicted as a mansion with a fashionable circular driveway.

Land to the east of Ronaldsway Burn: 26 End, Taxiway Alpha East, and the western and eastern drainage runs

Four of the sites investigated by the project lay within land to the east of Ronaldsway Burn, which during the later medieval period was held by Furness Abbey and the Lords of Man (*p 297*). The features excavated at the 26 End site and Taxiway Alpha East that dated from this broad period were the most coherent and were also detected as clear magnetic anomalies during the geophysical survey (*Ch 1, p 14*).

Those at the 26 End site, south of the runway, comprised a north-west/south-east-aligned ditched boundary, which was also partly exposed in the eastern drainage run. Potentially, the earliest manifestation of this boundary was a highly disturbed and hence shallow (0.07 m-deep) ditch (***8119***; Fig 185), which was 0.4 m wide and was traced for a distance of 16 m (Pl 82).

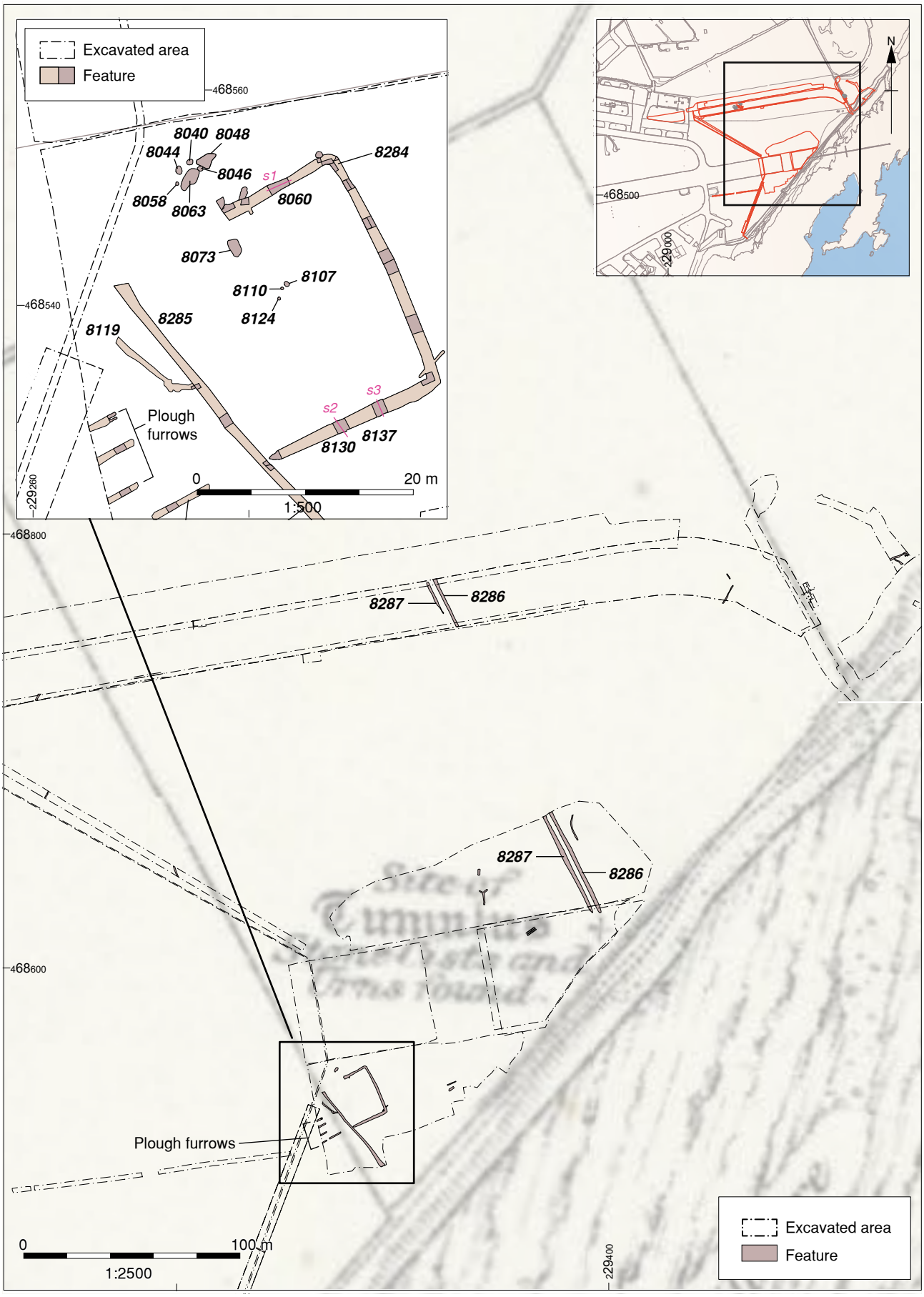


Figure 185: The excavated remains at the 26 End site, superimposed on the OS map of 1870



Plate 82: Ditches **8119** *(right) and* **8285** *(left), looking south-east*

After this ditch had become choked with silt, it was replaced by a more substantial boundary (***8285***), which corresponded to a field boundary shown both on the earliest known map of Ronaldsway area, dating to 1733 (MNHL P.3488ML7L), and the OS map of 1870, and had remained extant until the airfield was created (*Ch 1, p 6*). A 43 m-long stretch of this boundary was exposed, south of the runway, which was between 0.3 m and 1 m wide, and 0.18-0.6 m deep, being both wider and deeper at its southern end, close to the shore. It was also evident that it had been actively maintained, as it had been recut on at least one occasion. Both the primary ditch and its later recut were filled with stones seemingly derived from field clearance, suggesting that both related to a primary phase of agricultural improvement. No dating evidence came from either ditch, however, though, based on the cartographic evidence, they were probably created prior to the eighteenth century.



Plate 83: Enclosure **8284**, *looking west*

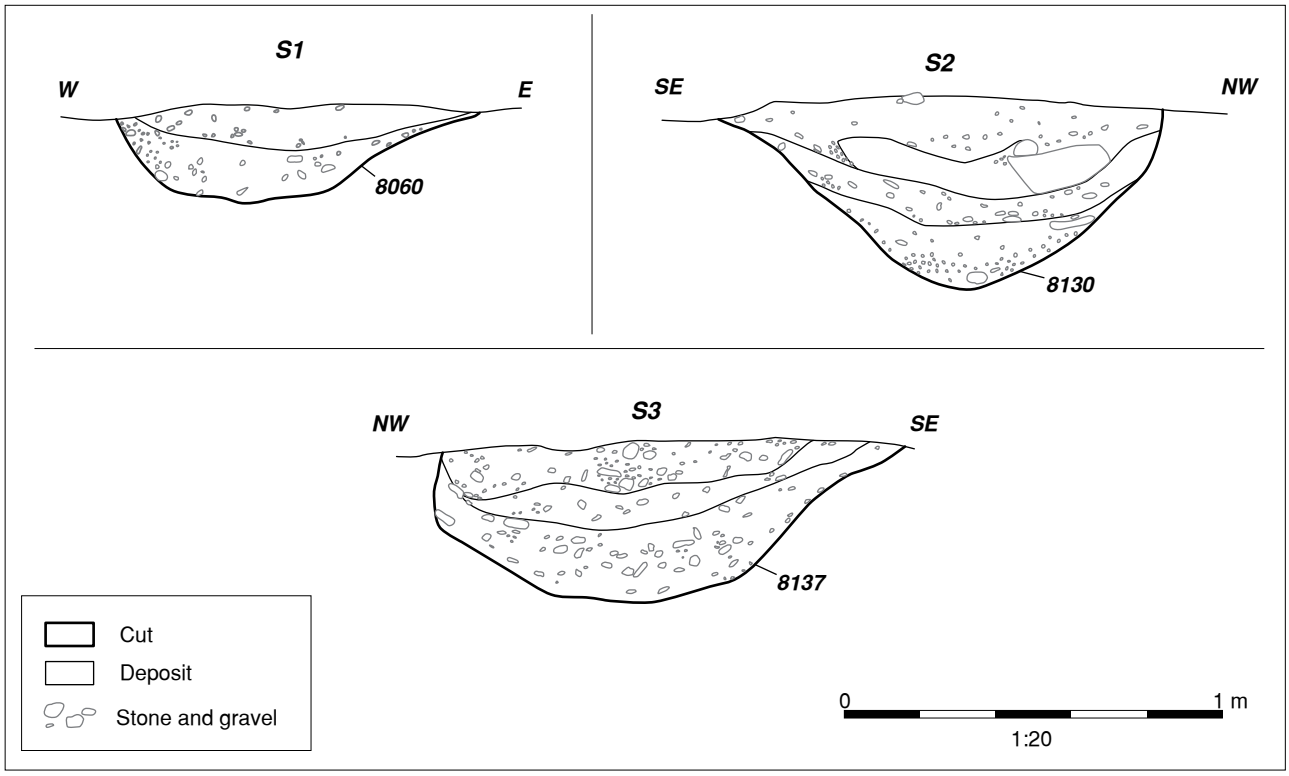


Figure 186: Sections across the ditch of enclosure **8284**

Several features were also found directly adjacent to boundary ***8285***. Four plough furrows to its west were at right-angles to the boundary, whilst of greater significance were the remains of a small sub-rectangular enclosure, ***8284***, immediately to the east, which had an internal area of 0.04 ha (Pl 83). This enclosure was clearly later than ditch ***8285***, though, significantly, it is not depicted on the 1733 map (or indeed any later mapping), indicating that by the early eighteenth century it was no longer visible in the landscape. A group of three postholes (***8107***, ***8110***, and ***8124***) formed part of a small structure within it, and there was also a modern cow burial (***8073***). The general absence of features, however, seems to suggest that it was an agricultural enclosure, perhaps a livestock corral.



Plate 84: Oven **8063**, *following half-sectioning, looking south*

The enclosure was defined by a ditched boundary (***8060*** on the north, ***8130*** on the east, and ***8137*** on the south), measuring between *c* 0.7 m and 1.2 m wide, and 0.2-0.5 m deep (Fig 186). The ditch had gradually filled over time, though the section defining the eastern side also contained relatively frequent, but sporadic, large angular stones at its base and within its upper fills, probably resulting from *ad hoc* field clearance, comparable with the evidence from ditched boundary ***8285*** (*p 302*). A corroded iron nail was also recovered from the upper fill; however, of greater significance was a deposit containing a rich assemblage of charred plant remains from the ditch defining the northern side (***8060***) of the enclosure. This assemblage almost certainly represented dumped material derived from a small corn-drying oven found immediately adjacent to this northern boundary, indicating that the ditch was open when this oven was in operation.

The oven (***8063***; Fig 185) was defined by a shallow oval pit, measuring some 1 x 2 m, containing several large stones (Pl 84). Three of these stones were flat and lay at the base of the oven, probably forming the remains of its floor, and above these were three larger boulders that might have been dumped into the oven at the end of its life. It also contained a series of successive charcoal-rich layers, fragments of unidentifiable animal bone, and a further assemblage of charred plant remains,

concentrated at its northern edge and relating to its use. These layers were sealed by a more substantial deposit of silty sand and gravel, which had been dumped into the structure on its abandonment. Immediately adjacent to, and surrounding, its northern side were the remains of a structure, probably a contemporary screen or windbreak. This was defined by four postholes (***8040***, ***8044***, ***8046***, and ***8058***), one of which (***8040***; 0.13 m deep, with a diameter of 0.44 m) contained burnt material, which, in a similar fashion to the oven, included a rich assemblage of charred plant remains and charcoal.

The charred plant remains from oven ***8063***, posthole ***8040***, and the northern enclosure ditch (***8060***) were comparable, containing very abundant cereal grains and chaff, and weed seeds, wholly consistent with waste material produced in the corn-drying oven (Table 74). In particular, posthole ***8040*** contained very abundant cereal grains and weed seeds, as well as

		Feature	Oven ***8063***	Posthole ***8040***	Ditch ***8060***
		Sample volume (L)	50	10	50
		Flot volume (ml)	175	310	70
		% flot analysed	100	100	100
Charred plant remains					
Cereal caryopses					
Triticum sp	Wheat		6		
Triticum cf aestivum	*cf* Bread wheat		134	1769	300
Hordeum vulgare	Barley		13	70	20
Hordeum vulgare	Barley (hulled)			6	
Avena sp	Oat		6	131	10
cf Secale cereale	cf rye		1		
Indeterminate cereals			353	1472	298
		Total charred cereals	***513***	***3448***	***628***
Indeterminate cereals	Cereal grain fragments		(5)	(5)	(4)
Cereal chaff					
Triticum aestivum	Bread wheat rachis segment			28	
Triticum aestivum	Bread wheat rachis node		19	133	23
Triticum aestivum	Bread wheat rachis internode			58	
Avena sativa	Cultivated oat floret base			6	
Indeterminate cereals	Cereal culm nodes			37	
		Total charred cereal chaff	***24***	***267***	***26***
Avena sp	Oat awn fragments		(1)	(5)	(1)
cf Avena sp	*cf* oat lemma/palea fragments			(4)	
Herbs					
Waste and cultivated ground		**Habitat after Stace (2010)**			
Agrostemma githago	Corncockle	Major crop weed		19	
Anthemis cotula	Stinking chamomile	Major crop weed	4	82	9
Glebionis segetum	Corn marigold	Major crop weed	3	114	
Rumex obtusifolius	Broad-leaved dock		1	29	
Grassy places					
Bromus sp	Brome	Also arable, rough/ waste ground and coastal places.	1	16	

Table 74: The charred plant remains from ditch **8060**, *oven* **8063**, *and posthole* **8040**

		Feature	Oven ***8063***	Posthole ***8040***	Ditch ***8060***
		Sample volume (L)	50	10	50
		Flot volume (ml)	175	310	70
		% flot analysed	100	100	100
Poaceae 2-4 mm	Grass family		1	30	
Poaceae <2 mm	Grass family		3	133	
Rumex acetosa	Common sorrel		1	16	
Rumex acetosella	Sheep's sorrel		1	21	
Damp, wet ground					
Juncus sp	Rushes		3	32	
Carex sp biconvex nutlets	Sedges with biconvex nutlets			21	
Carex sp trigonous nutlets	Sedges with three-sided nutlets			28	
Eleocharis palustris	Common spike-rush		1	21	
Broad ecological groupings					
Fabaceae <4mm	Pea family		1	31	1
Ranunculus repens -type	Creeping buttercup			46	
Other charred plant remains					
Ercia sp	buds			7	
Poaceae culm fragments	Grass culm fragments		(1)	(3)	
Charcoal			(5)	(5)	(4)
Charcoal notes			Dominated by *Erica/Calluna vulgaris* round wood	Dominated by *Erica/Calluna vulgaris* round wood	Mixed assemblage with *Quercus*, *Fraxinus excelsior*, and Leguminosae

Note: numbers without brackets = actual counts; numbers with brackets = scale of abundance where (1) = 1-5, (2) = 6-25, (3) = 26-100, (4) = 100-500, and (5) = >500 items

Table 74: The charred plant remains from ditch **8060**, *oven* **8063**, *and posthole* **8040** *(cont'd)*

cereal chaff, including oat (*Avena* sp) awns and lemma/palaea fragments, and grass (Poaceae) culm fragments. In addition, many of the cereals appeared to have daub residue adhering to them, probably deriving from the superstructure of the nearby oven (***8063***).

The cereals from the combined assemblage were dominated by wheat grains, including a short, plump variety of probable free-threshing wheat. Oat and barley (*Hordeum* sp) were also recorded. The cultivation of free-threshing wheat and common oat (*Avena sativa*) was supported by the occurrence of bread-wheat (*Triticum aestivum*) rachis and floret bases of cultivated oat. Apart from the notable absence of rye (*Secale cereale*), all the crops are consistent with cereals that were cultivated in mainland Britain from the later medieval period onwards (Greig 1991).

The seed assemblages from posthole ***8040*** and ditch ***8060*** also included typical crop weeds, such as corncockle (*Agrostemma githago*), stinking chamomile (*Anthemis cotula*), and corn marigold (*Glebionis segetum*). Although on the mainland these are thought to be Roman introductions, the latter two rarely appear in plant assemblages before the medieval period in northern Britain (Huntley 1999). A wet/heathland component is represented by charred seeds of sedges (*Carex* sp), spike-rushes, (*Eleocharis* sp), rushes (*Juncus* sp), and heathgrass (*Danthonia decumbens*) from oven ***8063*** and posthole ***8040***, the latter also producing club-rush (*Isolepis* sp) seeds, blinks, ericaceous buds and leaves, and moss (Bryophyte) stem fragments. Ditch ***8060*** also produced rare heathgrass and marsh-marigold (*Caltha palustris*) seeds, the latter typical of wet conditions, often found growing beside ponds and streams (Stace 2010).

The charcoal assemblages from oven ***8063*** and posthole ***8040*** were dominated by heath/heather (*Erica* sp/*Calluna vulgaris*) roundwood. That from the northern enclosure ditch (***8060***) appeared more mixed, and contained oak, ash, and Leguminosae

fragments. Given the anatomical variability of the Leguminosae genera/species (Hather 2000), however, the material could represent several different taxa, with varieties native to the Isle of Man, including broom (*Cytisus scoparius*), petty whin (*Genista anglica*), dyer's greenwood (*Genista tinctoria*), and gorse (*Ulex* sp; Stace 2010). The Isle of Man also has its own, native, variety of gorse: western gorse (*Ulex gallii*), whilst documentary records suggest European gorse (*Ulex europaeus*) was planted by farmers to provide shelter, fuel, and fodder (Tomlinson *et al* 2006), although its exact time of arrival and spread on the island is unclear (P Tomlinson *pers comm*).

Another major landscape feature was identified to the north of enclosure ***8284*** and boundary ditch ***8119***/***8285***. This was a linear feature defined by two parallel ditches (***8286*** and ***8287***; Fig 187) spaced 2 m apart, the easternmost (***8286***) having been recut on several occasions, following silting. It is highly probable that

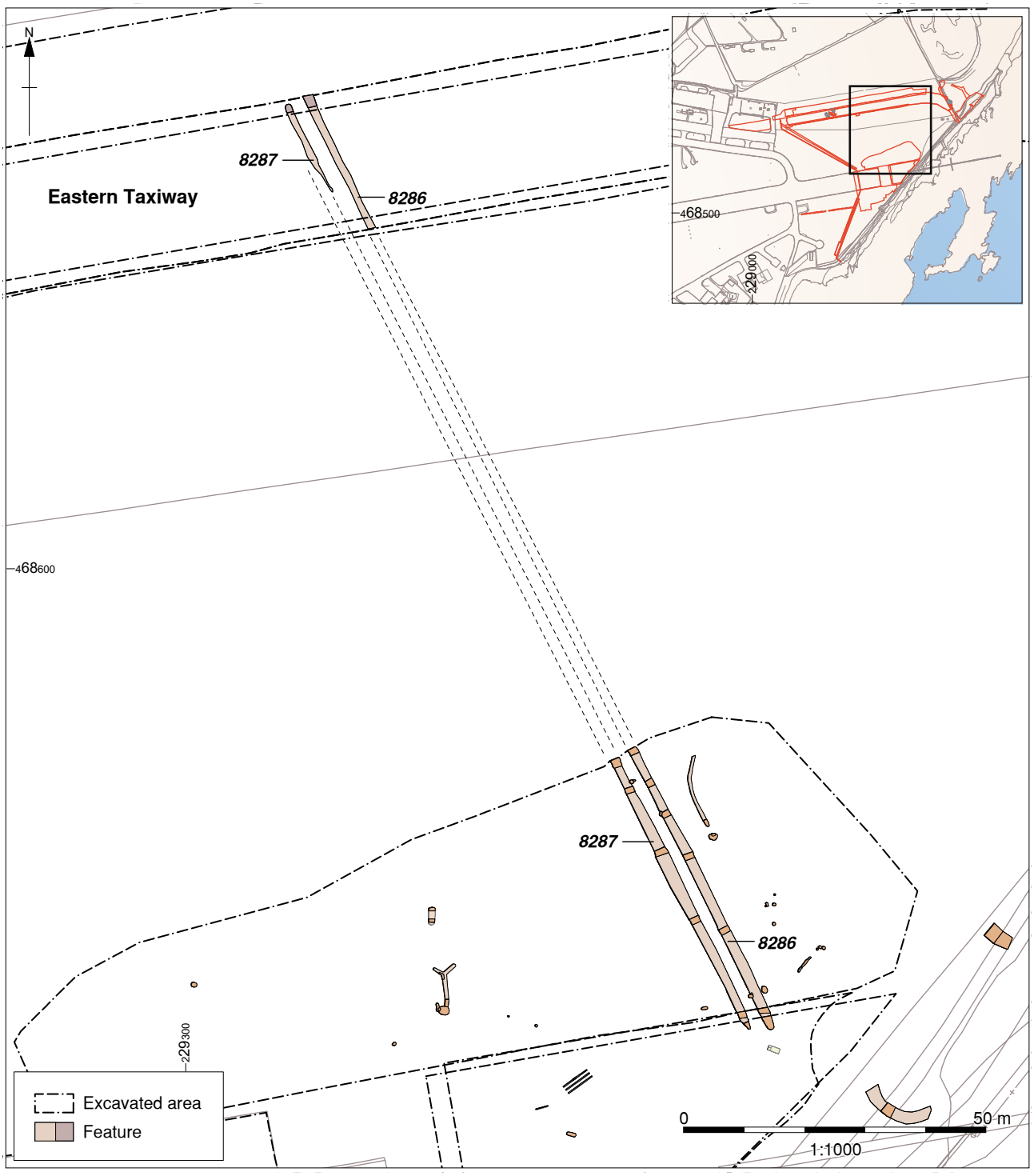


Figure 187: Parallel ditches **8286** *and* **8287**



Figure 188: Parallel ditches **2016**, *superimposed on the OS map of 1870*

these two parallel ditches were constructed on either side of a bank, forming a sod field boundary. This was recorded in part of the 26 End site, to the north of the runway, and also crossing Taxiway Alpha East, and it is evident from these, and the geophysical survey, that it continued up to the coast, east of boundary ***8285***, on a similar north-west/south-east alignment. Significantly, its position is marked on the Asylum Plan of the Ronaldsway estate of 1863 (IMG: GR Asylum Plans: Parish of Malew, plan 293), which, when taken in consideration with other historical mapping, indicates that it dates to the later eighteenth- or early part of the nineteenth century. This boundary had, however, been removed by 1868, as it is not depicted on the OS map of 1870, which was surveyed in that year.

Other boundaries east of the Ronaldsway Burn were encountered in the eastern and western drainage runs, extending from Taxiway Alpha East and Taxiway Alpha West, respectively. Those in the eastern drainage run comprised two parallel ditches (***2016***), set *c* 8 m apart, which may well denote the position of an early trackway (Fig 188). They are not depicted on any historical mapping, however, suggesting that they might pre-date the eighteenth century, perhaps being of a similar period to boundary ***8119/8285*** and enclosure ***8284*** to their east (*p 303*).

Within the western drainage run, also known as Drainage Orchid, which extended for *c* 770 m, three sections were stripped and examined, though it was only the easternmost of these that produced any archaeological features, all apparently dating to the later medieval or post-medieval period. These comprised a 1 m-wide ditch (***2503***; Fig 189), which was orientated north/south. Following silting, a stone-lined and capped drain was inserted into this earlier boundary (Pl 85), measuring some 0.6 m wide, the upper fill of which

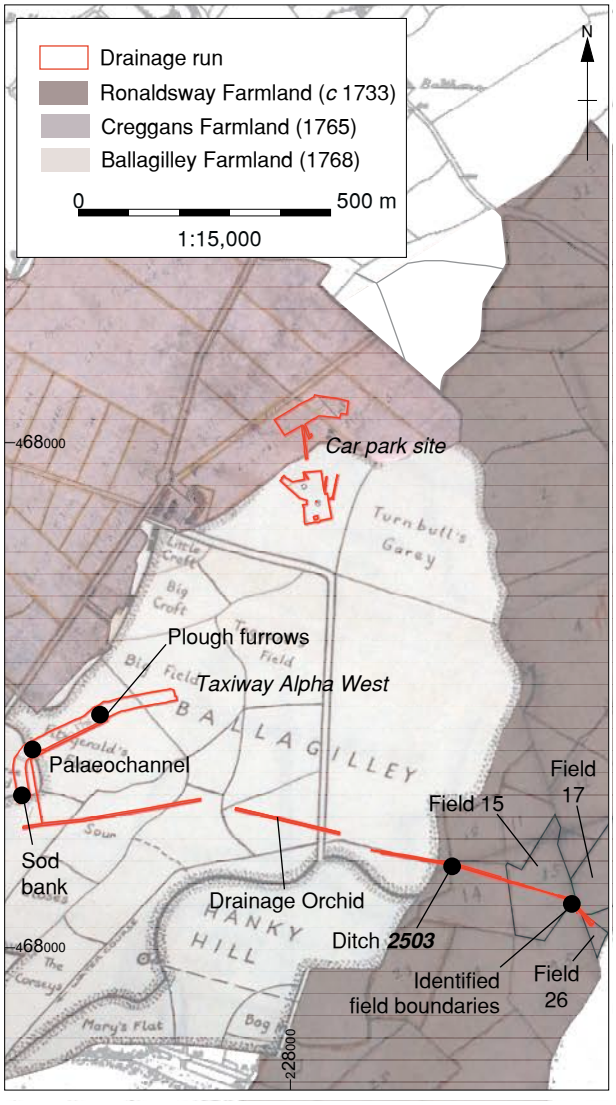


Figure 189: The boundaries and other agricultural features in Taxiway Alpha West and Drainage Orchid, superimposed onto eighteenth-century mapping



Plate 85: Ditch **2503**, *and the later stone-lined drain, looking north*

produced a fragment of post-medieval clay tobacco pipe. Significantly, the line of the ditch seems to have marked the suspected later medieval boundary between the lands held by Rushen Abbey, to the west, and those held by the Lords of Man (or perhaps Furness Abbey) to the east, which is depicted on historical mapping (*p 297*), and it might therefore date to this period. At a later date, this feature also formed the boundary separating Ronaldsway and Ballagilley farms (*p 297*), and was next to a palaeochannel marking the earlier course of the Ronaldsway Burn, and, perhaps, then, the later stone drain was installed at this time.

Three inter-connecting ditched field boundaries were also identified towards the eastern extent of the western drainage run, *c* 25 m to the north of Derbyhaven. Although these were only exposed in plan, they corresponded to the boundaries separating three fields depicted on the map of Ronaldsway dating to 1733, numbered as 15, 17, and 26 (MNHL P.3488ML7L). Of these, field 17 contained the remains of a medieval lead-smelting site recorded by Stenning (*cf* Davey 2013, 121), which was probably on land then held by Furness Abbey (*p 280*).

Land to the west of Ronaldsway Burn: Taxiway Alpha East and Car Park site

Several agricultural features were encountered on the two sites examined on land to the west of the Ronaldsway Burn. All probably date to the post-medieval period and were on farmland that had been associated with Creggans and Ballagilley farms (*p 297*).

A series of plough furrows was also encountered on Taxiway Alpha West, within land formerly associated with Ballagilley Farm. These were concentrated in an area some 150 m west of the eastern end of the taxiway, and were comparable in size to those at the Car Park site (*below*). These furrows seem to have related to ploughing within a field named 'Fitzgerald's Field' on the 1768 map of the farm's holdings, transcribed by Stenning (MNHL P.1721/a-f).

Several other features were excavated that could also be related to another field depicted on the 1768 map, to the south-west of the furrows (*ibid*). This was triangular, adjacent to the Ballasalla to Castletown road, and named 'Horse Field'. It was also classified as 'intack' in Woods' (1867) atlas, indicating that it was reclaimed land (probably

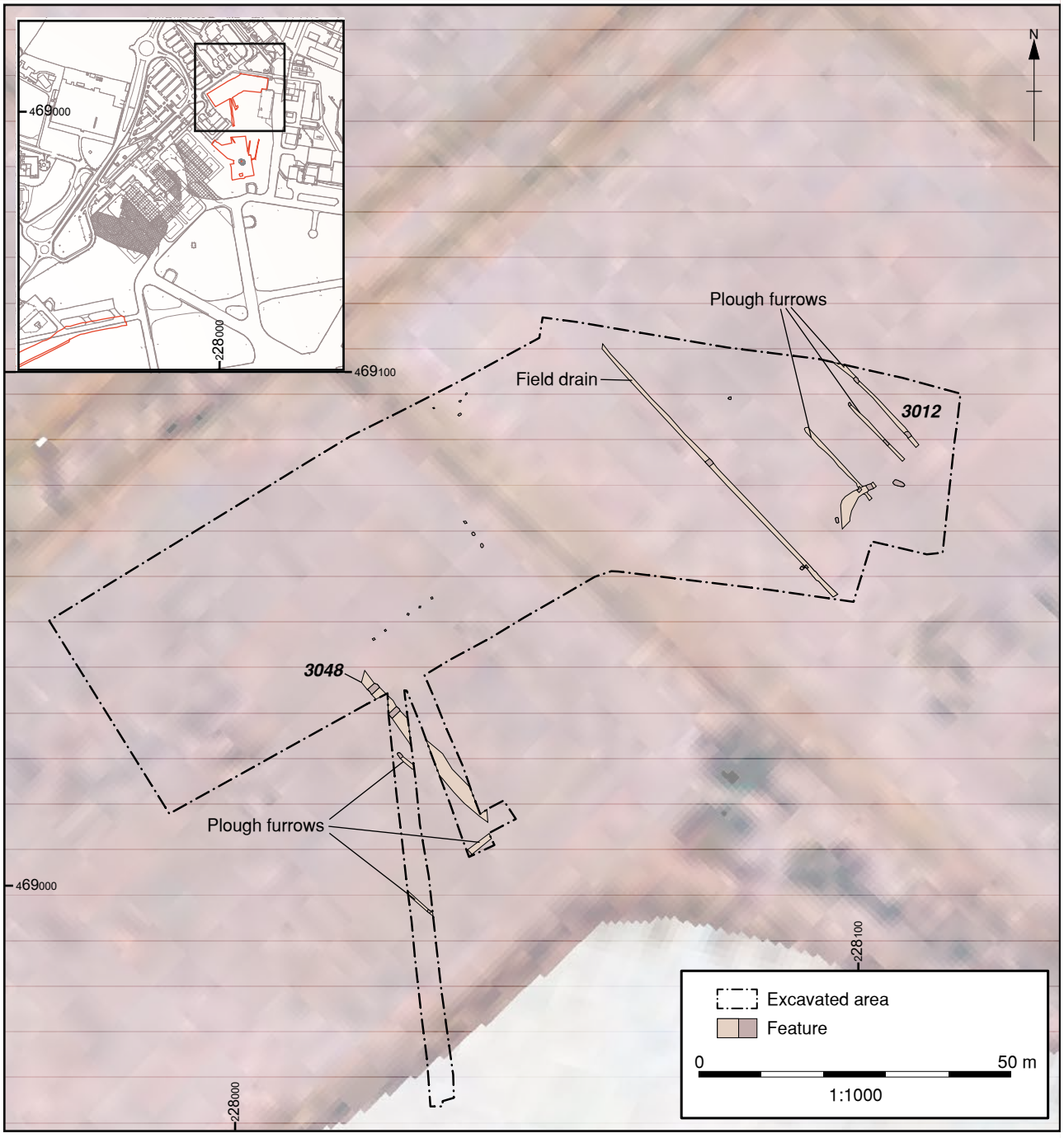


Figure 190: Boundary ditch **3048** *and plough furrows in the Car Park site, superimposed on the map of 1765*

a boggy/moorland area). The excavated features associated with this included a small palaeochannel, the western boundary of this field being defined by this small watercourse, and a sod bank, which formed its southern boundary.

On the land forming part of Creggans farm, the features comprised a series of plough furrows, typically *c* 0.1 m wide and *c* 0.1 m deep, at the Car Park site (Fig 190). These were orientated north-west/south-east, parallel with the field boundaries depicted on eighteenth-century mapping, apparently a product of agricultural improvement. One furrow (***3012***) also produced a retouched flint blade, clearly residual. A ditched boundary (***3048***) was also aligned north-west/south-east, and was *c* 1.6 m wide, with a maximum depth of 0.5 m. Although this boundary aligned with eighteenth-century field boundaries, its position is not depicted on the 1765 map of Creggans Farm (MNH P.173LMS24), or indeed on later mapping, and as such was probably an earlier boundary removed as part of the rationalisation of the farm's holdings in the mid-eighteenth century.

10

PIONEERS AND SETTLERS

Richard A Gregory and Fraser Brown

It was always suspected that any archaeological work at the airport would produce significant results, based on the earlier excavations of Ronaldsway Airport during the creation of the airfield in the 1930s, and the construction of the runways in the 1940s, and the discovery of the Ronaldsway Village (*Ch 1, p 8*) and Ronaldsway House (*Ch 1, p 8*). However, what was not anticipated at the outset of the RESA project was the quality and quantity of the archaeological remains that would be unearthed during the groundworks relating to the extension of the runway. In essence, the project has furnished an outstanding range of prehistoric remains, as well as somewhat more piecemeal evidence for use of the landscape through the millennia, which also holds significance for a wider understanding of landscape development in this part of the Plain of Malew.

The prehistoric remains were, however, the key findings from the project, which relate to all phases of the island's prehistory, and include a fairly extended, and largely unrivalled, sequence of structures, in various places across the airport: these seem, by and large, to represent 'houses', and comprise a small Mesolithic dwelling, as well as evidence for other contemporary and slightly later Mesolithic activities; Neolithic and earlier Bronze Age structures, which were again possibly domestic in function (or at least embodied concepts of domesticity; *p 329*); an extensive later Bronze Age settlement area, containing dwellings, ancillary buildings, and workshops (which together perhaps formed an element of a large agglomerated settlement/village; *Ch 11, p 356*); and two Iron Age roundhouses (*Ch 11, p 365*). In addition, the project also recorded Iron Age burials and associated ritual 'feasting' deposits, though again these seem to have a 'domestic' slant, being located on (and probably referencing) the by then abandoned later Bronze Age settlement (*Ch 11, p 360*).

All of this evidence is of great importance, having regional significance and, arguably, great importance in terms of the wider prehistoric archaeology of the British Isles. The Mesolithic house, in particular, provides valuable data on both the earliest occupation of Man and also the wider character of Mesolithic life and the pattern of movement and settlement in northern and western Britain during the late ninth millennium cal BC. In terms of settlement and burial evidence from the North West, the Neolithic structure, later Bronze Age settlement, and Iron Age burials also arguably represent some of the best evidence for domestic life and approaches to death during these periods. In addition, all remains, from all periods, highlight the clear links that these early communities had with others who inhabited northern Britain and its western seaboard, as well as Ireland. It is also worth noting that, while the evidence derived from the RESA project is important in itself, it has allowed a re-evaluation of those remains that were uncovered during the development of the airport (*above*), and also from the adjacent Mesolithic site at Cass ny Hawin I (*Ch 2, p 36*). Both these sites have figured so prominently in earlier discussions of the archaeology of Man (*inter alia*; Davey 1978; 1999; Davey and Finlayson 2002), and the RESA project has allowed them to be viewed in a new, and more considered, light.

Mesolithic Pioneers

Marking the land: an initial scouting/ pioneering party?

Cass ny Hawin II is a highly significant site in that it now offers the earliest evidence for human activity on the Isle of Man, dating to the late ninth millennium cal BC, which is some 800 years earlier than the radiocarbon-dated lithic scatter at Ballacregga that prior to the RESA project was the earliest known Mesolithic site on Man (*Ch 2, p 39*). Following a review of the Mesolithic chronologies, this evidence would also fall at the very beginning of the British Middle Mesolithic period, which is seen as extending between the eighty-second and seventieth centuries cal BC, and so the evidence also sheds some light on this stage, which seems more generally associated with particular innovations and changes in hunter-gatherer lifestyles (Conneller 2022, 172-243).

It also provides important evidence on the potential character and nature of this earliest activity. It seems,

for instance, from both the stratigraphic and radiocarbon-dating evidence, that the earliest activity at Cass ny Hawin II occurred in *8300-8200 cal* BC (*Ch 2, p 48*), which might, in turn, reflect that undertaken by the first human colonisers of the island. Precisely how these people arrived on Man is difficult to ascertain, but around the Irish Sea the sea levels in the late ninth millennium cal BC would have been lower and the coastlines probably very different from those that greet the present-day visitor to the island. It is therefore possible, depending on the route taken, that these early colonisers partly walked to the island across land that is now submerged. It is likely that by this date any land bridge linking the Isle of Man to the mainland had been severed (Sturt *et al* 2013), which would mean that part of the journey would also have required a boat (*Ch 2, p 33*). Such craft were possibly wooden-framed structures, covered by stretched seal skins, as opposed to dug-out canoes (*cf* Saville 2004, 191, 204).

In all likelihood then, the first Manx men (and, almost certainly, women and children) were competent seafarers (Tolan-Smith 2008, 151), who were well adapted to their environment, and who arrived with the intention of settling the island. Indeed, the use of marine travel seems to be a clear (and perhaps defining) feature of the Middle Mesolithic period, an era associated with rising sea levels, with other islands being colonised and settled at this time, such as the islands of Western Scotland and the Channel Islands, indicating that such groups were indeed knowledgeable seafarers (Conneller *et al* 2016b; Conneller 2022, 181). Furthermore, as Sinéad McCartan (2004) has pointed out, the geographical position of Man, in the centre of the Irish Sea, would have made it pivotal in networks of connection around this zone, and it is unlikely that the colonists would have been divorced, by their new circumstances, from communities elsewhere (Warren 2015).

In any event, once on Man its seems that these earlier colonisers visited Cass ny Hawin II and one of their initial acts involved the digging of a substantial pit (Pl 86), into which was probably intentionally placed a pecked stone, that might have been used as an anvil during stone working (Fig 191). This pit was then rapidly backfilled with gravels and a collection of narrow-blade microliths and lithic waste. Once the pit had been backfilled, a series of hollows was dug, which were also intentionally backfilled with material, suggesting the deliberate selection and deposition of



Plate 86: Excavating the large Mesolithic pit at Cass ny Hawin II

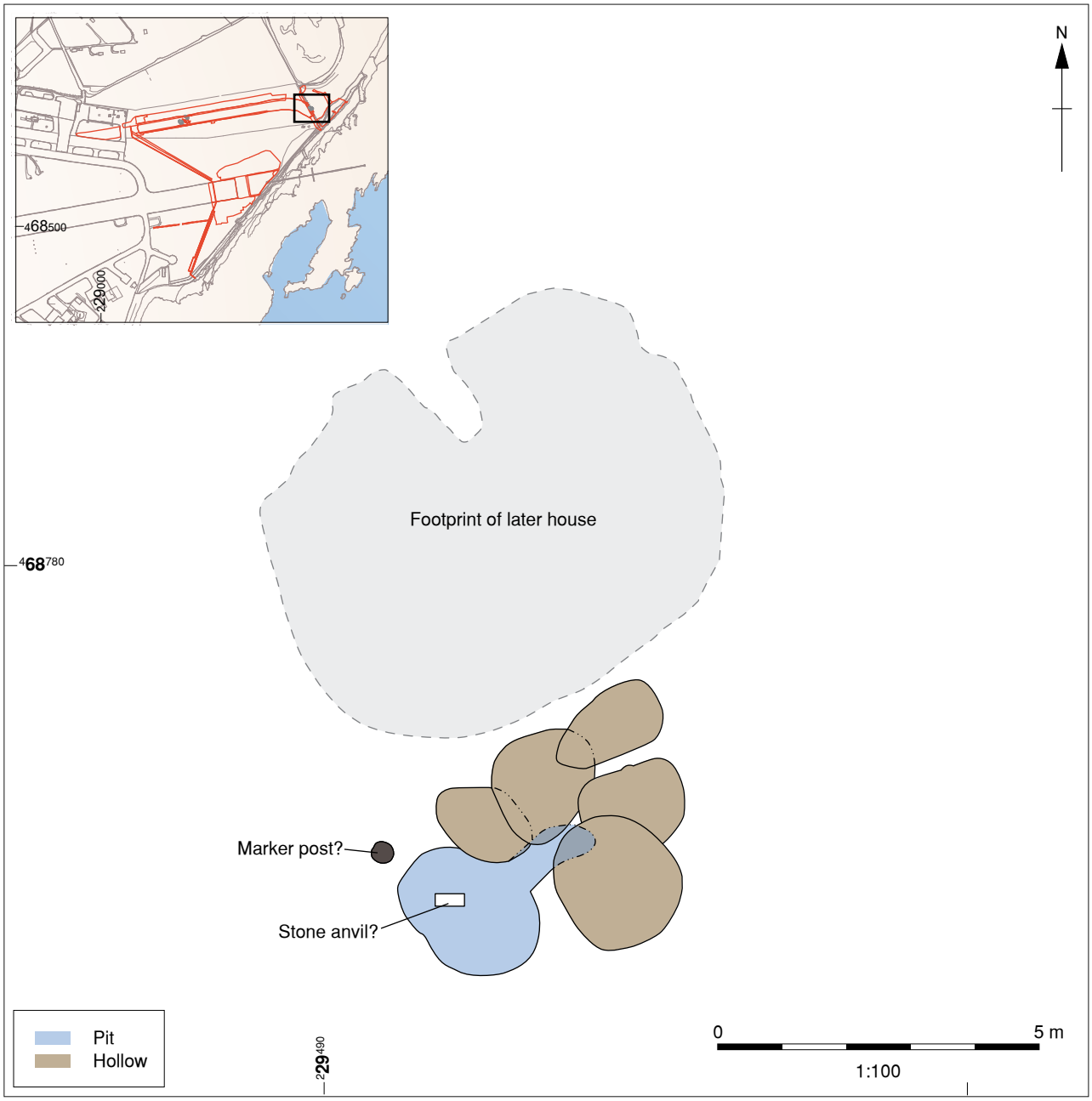


Figure 191: The features at Cass ny Hawin II potentially associated with a Mesolithic scouting party

waste associated with the initial stages of narrow-blade lithic production. Small amounts of contemporary lithic waste and burnt plant remains also seem to have been scattered outside these features, which eventually became incorporated into later features, created when the site was revisited at a slightly later date (*p 314*).

These early features are highly important on several levels. They indicate that the initial visit to this site was probably a temporary affair, and one which may have been of a very short duration, witnessed by the digging and rapid backfilling of the pit, and the seemingly intentional deposition of selected items. Although the duration between the backfilling of this feature and the digging of the hollows is unknown, these were either created during the same visit to the site, or might even represent a subsequent visit to this locale at a later time, though perhaps only a season or so after the first visit. One possibility therefore is that all of these features reflect the presence of a scouting or pioneer party (*cf* Woodman 2012, 14), perhaps the first human visitors to the island. Indeed, it is highly possible that this location, on the Plain of Malew, formed a very suitable place for initial exploration of the island's coastal and inland resources, and part of this initial exploration phase entailed the production of narrow-blade lithics and the selective deposition of lithic waste. It is even possible that after the pits and hollows had been dug and backfilled these visitors left the island and returned back to the mainland.

In this respect, it is interesting to note that similar narrow-blade-using groups were certainly active on the Cumbrian coastline, at least, at an identical time to that when the pit and hollows at Cass ny Hawin II were created, as evidenced at Netherhall Road, Maryport, where narrow-blade activity has been dated to around or just before 8200 cal BC (Clarke and Kirby 2022).

Importantly, this tradition of Mesolithic pit digging and deposition is not particularly unusual, and seems to have been one of the 'new' Mesolithic practices that would come to define the Middle Mesolithic period (*cf* Blinkhorn *et al* 2017; Conneller 2022, 172). Many similar pits are now known from Britain and Ireland, which were filled in a variety of different ways. This filling material might include cremated human remains; burnt materials (plants and lithics) derived from hearths; and lithic waste generated by nearby knapping episodes, including lithics that were deliberately selected for deposition (Blinkhorn *et al* 2017). Clearly, the pit and hollows from Cass ny Hawin II relate to this latter type of 'lithic waste' deposition, which is in itself interesting, as it has been noted that generally the deposition of hearth debris is a feature of northern Britain, whilst the deposition of deliberately selected lithic material seems to have been more important in southern Britain (Conneller 2022, 174).

Of course, it is also possible that, as with depositional practices that are often associated with early Neolithic pits (Garrow 2007), material that was intentionally selected for deposition held some 'special' significance, beyond merely relating to the disposal of waste (*cf* Blinkhorn and Little 2018; Mithen 2019). At Cass ny Hawin II, this certainly seems to be borne out by the anvil at the base of the pit, which may have been carefully placed into this feature. Indeed, one suggestion is that the pits/hollows and associated materials held some deeper connection, which conceivably related to the marking of this site, and perhaps also the surrounding 'virgin' landscape, as an auspicious hunter-gatherer locale, suitable for future visits (which is certainly evidenced by the construction of a later pit-house at this site; *below*). There is also one piece of additional, though tentative, evidence that could form part of this 'marking' activity. This was an isolated posthole (***9178***; Fig 191), which lay directly adjacent to the pit and, based on its location and its apparent separation from any later structures and features, might have been contemporary, relating to the initial phase of activity at the site. Indeed, if this were the case, it may have secured a timber upright that perhaps acted as marker post, or perhaps even something akin to a totem pole (*cf* Allen and Gardiner 2002), providing a visible testament to the importance of this spot in hunter-gatherer geographies. Indeed, the use of marker posts would not be out of place in this period, as again these seem to be an increasingly common feature found on Mesolithic sites in Britain and Ireland (Blinkhorn *et al* 2017). Tellingly, it seems that freestanding posts were also erected at another Middle Mesolithic island site, at Kinloch, on the isle of Rùm (Wickham-Jones 1990). Similarly, these posts (probably dating to the earlier eighth millennium cal BC) were also associated with a series of deliberately backfilled pits and hollows, containing lithics and burnt materials, and again, as at Cass ny Hawin II, they seem to relate to the marking of an area as a significant location for later occupation.

Cass ny Hawin II: Man's first home

After the initial visit and, perhaps, 'marking' of the site, and probably not too long after this, Mesolithic people returned to Cass ny Hawin II, in *8200-8100 cal BC* and built a very distinctive Mesolithic structure, which can be classified as a 'pit-house' (*Ch 2, p 45*; Pl 87). The siting of this house was almost certainly dictated by the slightly earlier activity, and its discovery was a highly significant, if not the most significant, finding made by the RESA project. Its late ninth millennium cal BC date also makes it the earliest known structure on the island, and also one of the few houses known from northern Britain dating to this period (*cf* Conneller 2022, 180-2). In fact, in terms of the island's Mesolithic archaeology, this house is some 1500 years earlier than the only comparable structure on Man, from just up the coast at Cass ny Hawin I (Woodman 1987; *Ch 2, p 36*).

As far as can be ascertained, the structure, which may have resembled a large domed tent or tepee (*Ch 2, p 67*; Pl 88), formed the focus for a range of domestic activities (cooking, sleeping, food storage, craft activities, and tool production) and hence was a 'house' in the strictest sense of the word (*cf* Mithen and Wicks 2018, 87). Moreover, the existence of a substantial (by the standards of the time and indeed later prehistory) house, associated with the earliest phases of colonisation of the island, does suggest that an investment in Man, as a place, indeed a *home*, had been made at this very early point in its history, seemingly following a slightly earlier 'recce' by a pioneering/scouting party (*above*). It could also reflect that, practically and conceptually, the house was a fundamental technology of colonisation and probably also of social organisation. In light of this, it is interesting to note that a similar situation seems to have prevailed in Ireland, where several successive houses at Mount Sandel, Co Derry, provide some of that island's earliest evidence for human activity, dating to the middle centuries of the eighth millennium cal BC (Bayliss and Woodman 2009).

The materials used to construct the Cass ny Hawin II house will almost certainly have been sourced on

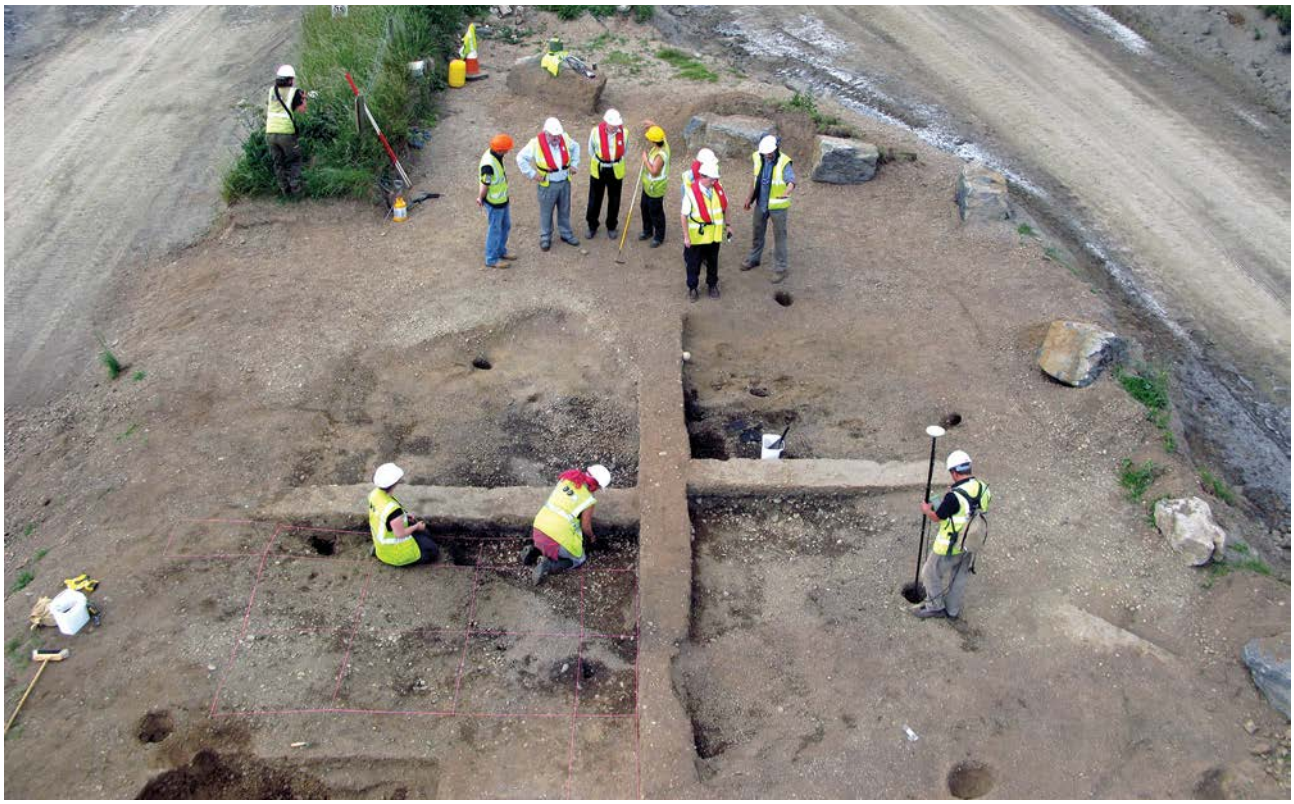


Plate 87: Excavating the Mesolithic 'pit-house' at Cass ny Hawin II



Plate 88: A reconstruction of the Mesolithic house at Howick, Northumberland, which was probably architecturally comparable to the house at Cass ny Hawin II (photograph by Andrew Curtis)

Man, although it is possible that some may have been reclaimed and repurposed from a boat, or have been transported to the island by boat, or as driftwood. As the house had burnt down (*p 321*), the charred palaeobotanical evidence from it (*Ch 3, p 71*) is plentiful, suggesting that hazel and hawthorn-type wood, particularly short-lived roundwood, formed a major structural component. Hazel may have been used in the construction of the superstructure, and bundles of rods from hazel and hawthorn (presumably thorn-free varieties of the latter) were used as a floor to line and insulate a large part of the house cavity (*cf* Ulkestrup I, Zealand, Denmark; Andersen *et al* 1982; Grøn 2003); it is possible that they may also have been woven into hurdle panels, forming part of the superstructure.

The hole dug for the house would have provided upcast gravel, which may have been banked around the base of the superstructure, helping to bed it down. Some of this material was also used to form a platform, which, along with the two hearths and evidence of partitions, played an explicit role in structuring the organisation of space within it (*cf* Grøn 2014). Indeed, detailed spatial analysis of the artefacts and ecofacts (which appear to derive from a single phase of occupation; *Ch 2, p 44*) suggests that part of the platform in the rear north-eastern part of the building was used as a 'passive' sleeping area (Fig 192), with a potential food-storage and kitchen area adjacent to the doorway, and another store (seemingly containing some of the coarse-stone tools) on the other side of the dwelling. In between were two hearths, surrounded by a more dynamic zone, associated with tool production and other craft activities, evidenced by an important collection of coarse-stone tools and the presence of a sizeable narrow-blade lithic assemblage. The coarse-stone tools included edge-ground stones, which appear fairly unique within the context of Mesolithic settlement, and other more familiar types, such as bevelled pebbles, with parallels at other Mesolithic structures; these have been interpreted as tools used

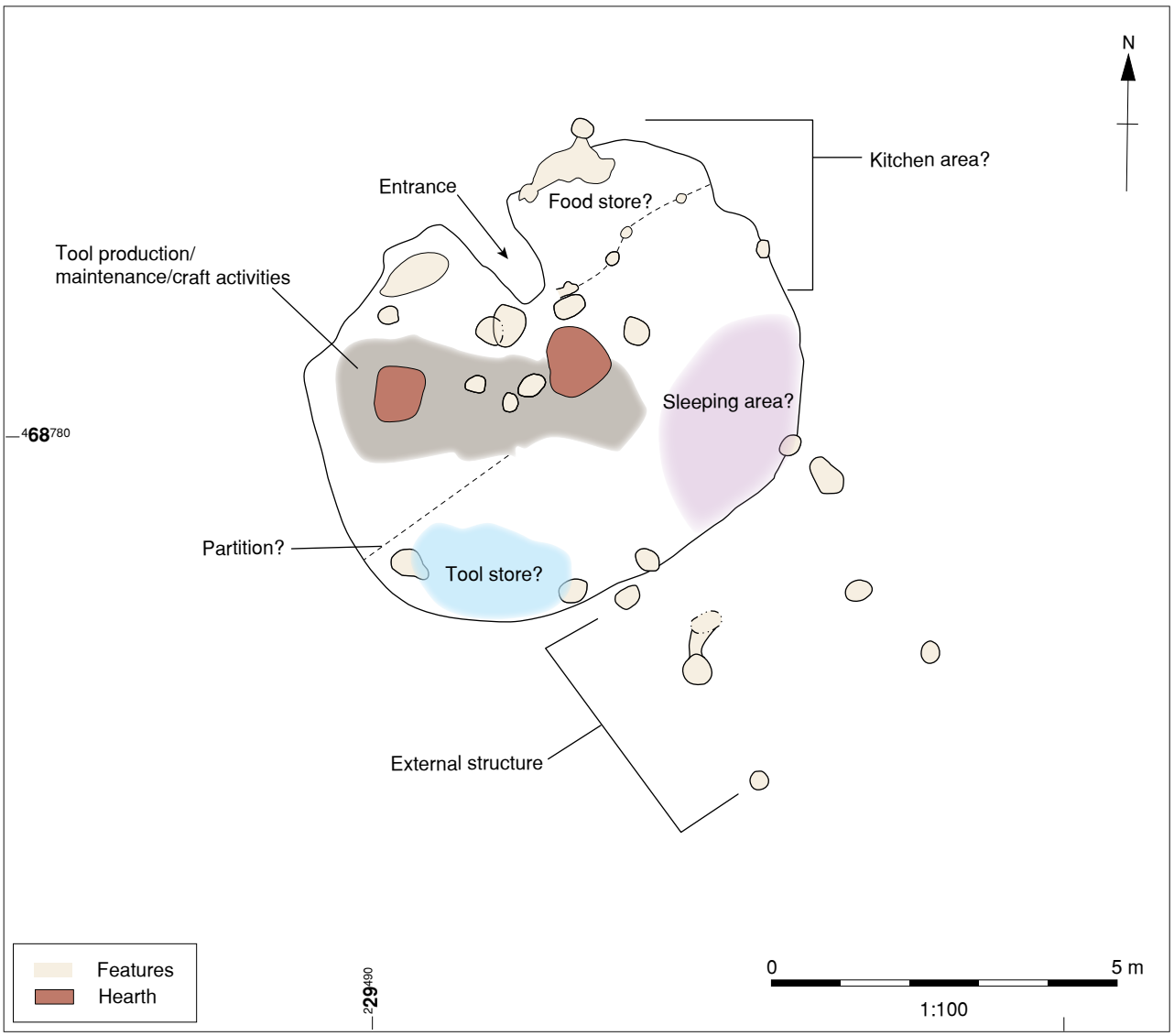


Figure 192: Organisation of space at the Cass ny Hawin II house

during processing animal hides, possibly seal skins, and/or as limpet hammers (*cf* Conneller 2022, 193). The lithic industry focused on the production of blades and narrow flakes from single-platform cores, and from these a variety of both microlithic and other tools were manufactured, the former using the microburin technique, which was probably employed in a variety of tasks relating to hunting and fishing, the processing of raw materials, and craft activities (*Ch 3*).

There is, therefore, an understandable logic to the spatial layout within the house, with the sleeping area in the rear, darker and warmer, portion of the house, which perhaps also acted as a personal/private space (*cf* Binford 1983, 163-4), a food-storage area tucked away by the side of the entrance, with the kitchen/food-preparation area in front, an opposing partitioned area, perhaps used to store tools, on the other side of the dwelling, and the hearths in the front part, acting as the focus for waking activities associated with tool production/maintenance and craft activities. Other activities, which perhaps needed to be performed beyond the domestic space, could have been associated with the timber structure that was erected at the rear of the house. Perhaps significantly, this spatial layout also chimes with elements of organisation recorded within other Mesolithic dwellings from the North Sea area, such as those from southern Scandinavia. These include Mesolithic houses dating to the Maglemose period (*c* 9000-6400 cal BC), several of which are similar in date to Cass ny Hawin II, and other near-contemporary narrow-blade house sites from Britain (*p 319*), along with those associated with the later Kongemose (*c* 6400-5300 cal BC) and Ertebølle cultures (*c* 5300-3950 cal BC; Grøn 1995; 2003; 2021). Some of these dwellings also exhibit similar structural details to Cass ny Hawin II, including artificial pits and hollows, defining the house footprint, circular post settings, floors composed of bundles of branches, raised earthen platforms, and internal hearths (Grøn 2003; 2011). Some have also produced large flaked-lithic assemblages, which are often concentrated in discrete accumulations adjacent to hearths, consisting of material from all stages of the reduction process, and relating to stone working within the building (Grøn 2003).

Based on this information, and through ethnographic study, it has been suggested that the spatial organisation within the Scandinavian dwellings, or within the 'dwelling place', was carefully structured in very specific ways (*ibid*; Grøn 1999; 2021). For the Maglemose dwellings, it has been observed that hearths appear in one or two sets. In the case of those dwellings with two hearths, each related to a separate family unit, with a diagonal separation of the dwelling space between these units, with male and female positions and activities occurring within each side of the 'divided' house. Given this, it is possible that the Cass ny Hawin II house, with its two hearths, also housed two family units, and was thus a multi-family dwelling, though if this was the case, the diagonal separation of space between these two potential units is difficult to substantiate, particularly given the presence of the suspected sleeping area and storage area in the eastern part of the house, with more dynamic activities occurring on the opposite side (*Ch 2, pp 68-9*).

It could well be, however, that a potential two-family house may have been arranged more in line with the spatial patterning observed in some of the Kongemose/Ertebølle dwellings, containing sleeping platforms (Grøn 2003), which also seem to have parallels with the way the modern-day Evenk organise their dwellings; these Siberian hunter-gatherer groups live in comparable tepee-type dwellings to that which was seemingly present at Cass ny Hawin II (*cf ibid*). It seems that the 'Kongemose/Ertebølle people operated with male and female sides of the dwelling, but that the couples slept together on the female side on the platform, at night' (*op cit*, 701). Within this model, during the daytime the men sat next to each other on the brushwood floor, engaged in knapping and other 'dirty' activities (Grøn 2021), whilst the female space was to the rear on the platform (Fig 193). This scenario could also be applicable to the Cass ny Hawin II dwelling. Interestingly, in the case of the modern-day Evenk, the female side of the house contained the kitchen/food-storage area, with the store being positioned just inside the entrance (normally to the left), whilst the male side lay in the opposing part of the house and contained hunting equipment *etc*, with some items 'stored against the wall further back in the tent in the men's side' (Grøn and Kuznetsov 2003, 217). In this case, the male side of the house was linked with hunting and the female side with food preparation, though as Ole Grøn (2003, 701) astutely notes, it is also quite normal that 'women hunt – even big game – and in some families the wife is actually the family's main hunter'. In the case of the Evenk, the organisation within the dwelling is also conditioned by their cosmology, specifically their creation myth, which effectively provides the 'rules' for how the domestic space should be arranged (Grøn and Kuznetsov 2003, 218).

Given all of this, it is quite striking that there is good evidence for this bipartite division within the Cass ny Hawin II house, with that side containing the sleeping area, food store, and kitchen area representing the female side, whilst the opposing side, containing the hearths, tool/craft-production areas, and possible tool store, was possibly in the male side of the dwelling. As with the Evenkian

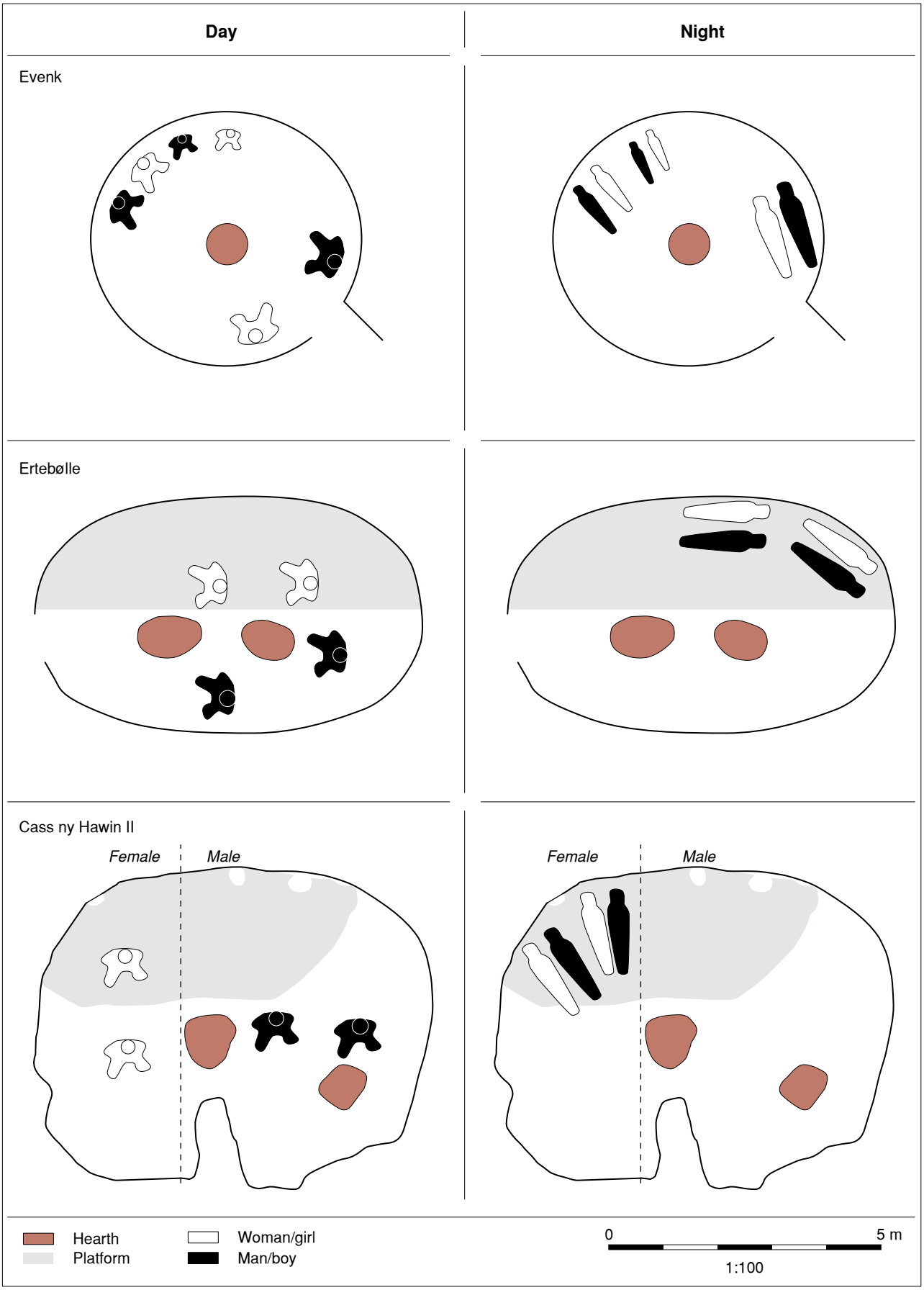


Figure 193: The daytime and night-time use of space in the Evenkian tent, and possibly in the Ertebølle dwellings and the Cass ny Hawin II house

tents, it is also possible that during the day any skins covering the house were partially lifted to allow daylight to enter that part of the house where knapping and craft activities were occurring (Grøn 2011). Whilst such ideas of male and female division applied to a *c* 10,000-year-old house, particularly based on modern ethnographical parallels, may seem rather fanciful, the key point is that the domestic space within the Cass ny Hawin II house was certainly structured in a predetermined way, which almost certainly drew on pragmatic, and perhaps also wider cosmological, rules and concepts.

The Cass ny Hawin II house in context

On Man, the Cass ny Hawin II house has clear similarities with Cass ny Hawin I to the north-east of the airport (Woodman 1987; *Ch 2, p 36*). At this latter site, a near-identical arrangement was discovered, comprising an artificially dug hollow lined by angled posts, which contained a central hearth (Fig 194), and a large assemblage of narrow-blade lithics. Although this site has been described as a 'structure', not used for habitation (Mithen and Wicks 2018; *Ch 2, p 37*), it would seem, in the light of Cass ny Hawin II, that it was indeed a house site, though smaller and perhaps less robust, with a probable diameter of 4 m, as opposed to the more substantial *c* 7 m-diameter at Cass ny Hawin II, which was some 1500 years earlier.

Significantly, the Cass ny Hawin II house also has several close morphological and chronological parallels with other Mesolithic sites excavated in Ireland, north-eastern England, and south-eastern Scotland, particularly Mount Sandel, Co Derry (Woodman 1985), Howick, Northumberland (Waddington 2007), East Barns, East Lothian (Engl and Gooder 2021), and Echline Fields, Midlothian (Robertson *et al* 2013). Despite their geographical distance from Man, these are perhaps just as relevant to Cass ny Hawin II as the later Cass ny Hawin I house. These 'pit-houses' (Mithen and Wicks 2018; *Ch 2, p 45*) are morphologically similar, and substantial, with diameters of *c* 6-7 m; they are all radiocarbon dated to the end of the ninth millennium/first half of eighth millennium cal BC, and therefore seem largely contemporary with the Cass ny Hawin II house. They are also associated with palaeoenvironmental and artefactual assemblages that resemble those from Cass ny Hawin II; notably, hazelnuts occur in great numbers and the very numerous lithic artefacts are technically similar, being characterised by narrow blades and geometric microlith forms (*Ch 3, p 83*). The British sites tend to favour Mesolithic coastal locations, and faunal evidence indicates that both marine and terrestrial species were hunted (Engl and Gooder 2021; Bailey and Milner 2007), whilst the single site from Ireland, at Mount Sandel, was on the estuary of the River Bann, with faunal evidence again indicating the exploitation of terrestrial and, in this instance, riverine species (Woodman 1985). It may also be significant that seal bones were recovered from both East Barns and Howick (Engl and Gooder 2021; Bailey and Milner 2007), indicating that these marine mammals formed an important resource for Middle Mesolithic coastal communities, which was probably also true for those occupying Cass ny Hawin II, given its coastal location and the absence of large terrestrial prey on Man (*Ch 2, p 34*).

In terms of parallels, the house at East Barns is particularly noteworthy as it shares many similarities with the Cass ny Hawin II house (Engl and Gooder 2021). This was also occupied in the last two centuries of the ninth millennium cal BC (*op cit*, 75), and contained evidence for an internal platform, positioned to the left of the entrance, which was associated with a notable absence of lithics, perhaps suggesting that it was also used as a sleeping area (in a 'passive' zone of the house). Indeed, more concentrated areas of lithics were recovered from around its three central hearths, which also lay, as at Cass ny Hawin II, on the centre line of the house, and to the right of the entrance. Microwear analysis suggested that the lithics surrounding the hearths were used in a variety of tasks, including 'primary manufacture, butchery, hide working, and tool/ornament maintenance and manufacture' (*op cit*, 75), and thus again relates to a more 'active' part of the structure. These close similarities suggest evidence for a commonality in the use of space (and by extension practices/concepts/cosmologies; *above*) in Middle Mesolithic houses, at least those more substantial examples found in western and northern Britain that were occupied by narrow-blade-using groups in the late ninth/early eighth millennia cal BC.

The Cass ny Hawin II house does, however, differ in one respect from the other pit-houses in northern Britain, in that it seems to have been provided with an additional square, post-built, structure that was appended to its southern side. That said, Middle Mesolithic freestanding post-built structures are known, which are broadly similar in form, such as the small sub-square structures from Daer Reservoir and Fife Ness, both in Scotland (Ward 2012; Wickham-Jones and Dalland 1998). Therefore, in this respect, the Cass ny Hawin II house seems to incorporate other Mesolithic architectural traditions into its design. It may also be significant that the structure at Cass ny Hawin included one posthole containing coarse-stone tools used as post-packing. One suggestion is that these former domestic/functional items were deliberately chosen and incorporated into the foundations of this structure,

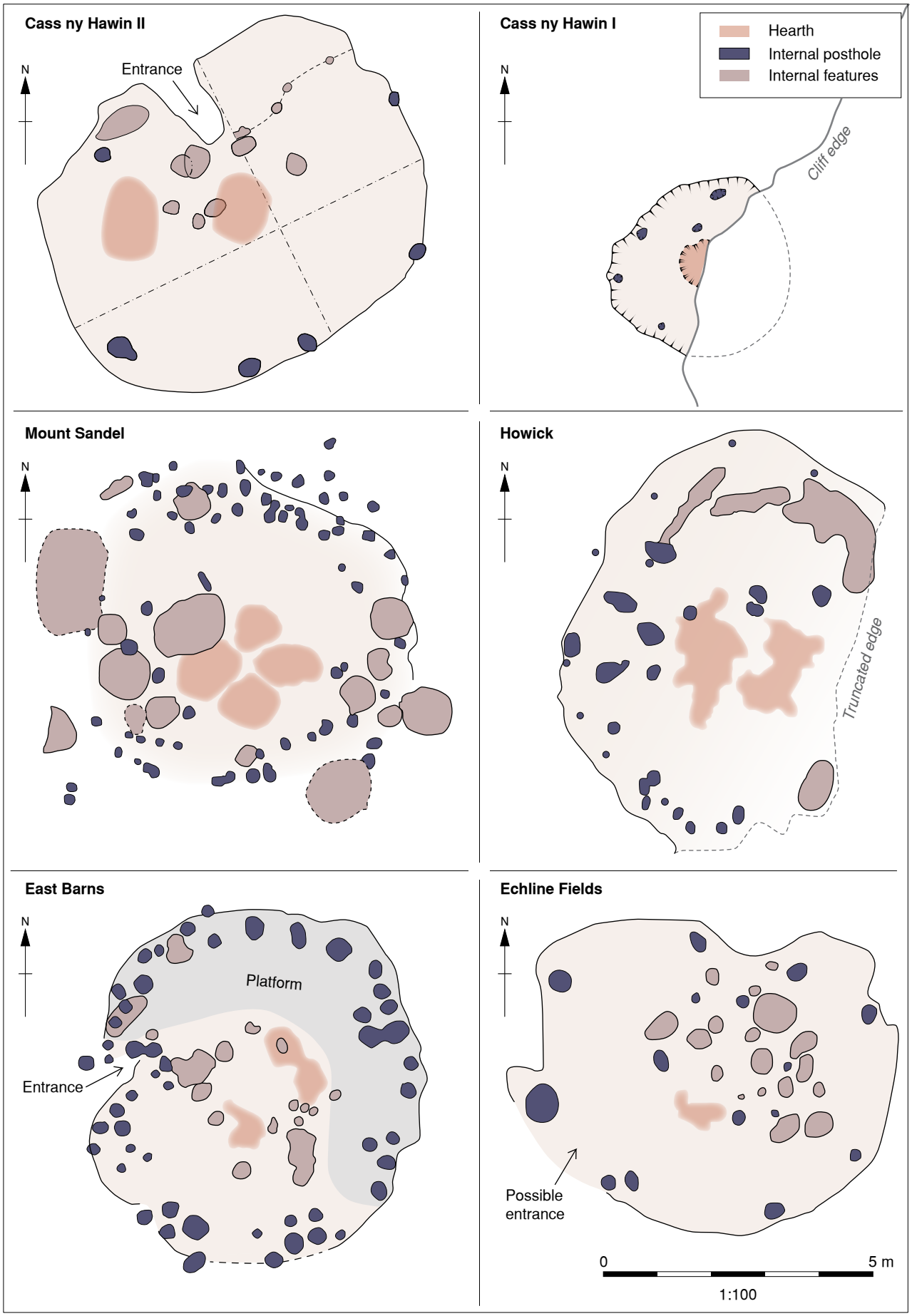


Figure 194: 'Pit-houses' from the Isle of Man and northern Britain and Ireland

acting as a symbol of some description that perhaps imbued the structure with properties that extended beyond the mundane.

On the basis of the radiocarbon evidence (*ie* the occupation spans created through Bayesian analysis), and the substantial character of the structures, it has been argued that the pit-houses were possibly permanent structures associated with extended residence, and in turn, a degree of sedentism (*cf* Waddington *et al* 2007; Baylis and Woodman 2009; Robertson *et al* 2013). An alternative view, however, which uses the radiocarbon evidence to produce 'activity events', and is also based on ethnographic parallels, is to see these houses as relating to intermittent occupation, with the structures initially being constructed, then left to fall into disrepair after a short period of occupation, after which they were later revisited and rebuilt after a lengthy period of abandonment (*cf* Mithen and Wicks 2018, 106). With this latter view, it has also been posited that it is possible that the original 'houses' may have functioned as ceremonial centres/territorial markers that were then used for domestic activities during the later phases of occupation (*op cit*, 105). A third suggestion fuses these two opposing views, and sees the houses as being related to short periods of partial or full sedentism, followed by abandonment, and then reoccupation (*op cit*, 106).

Naturally, the evidence from Cass ny Hawin II provides additional insights into this debate. The stratigraphical and structural evidence, the distribution and quantity of the palaeoenvironmental remains, together with the spatial analysis of the lithics, and the comparative analysis of technological attributes, indicates that occupation was probably limited to a single phase of occupation (*Ch 2, p 44*). Similarly, this was probably also the case at East Barns (*p 319*), where the radiocarbon evidence implies a single phase of occupation over a relatively short duration (modelled at between 75 and 150 years; Engl and Gooder 2021, 75). Moreover, at Cass ny Hawin II, the spatial organisation of activities utilising lithic material, including generalised reduction through to the use of tools, and probably unmodified debitage, appears to remain relatively static, which is again suggestive of a single phase of occupation. Thus, it does seem that the house was only occupied on a single occasion and was not revisited, rebuilt, and reoccupied at a later date following a period of abandonment.

However, the exact duration of occupation is still difficult to ascertain, based on the radiocarbon evidence. At most, this suggests that the occupation and destruction (*below*) of the house occurred in a 100-year span, in *8200-8100 cal BC* (*Ch 2, p 50*). Whilst, on this evidence alone, it is possible that the house was a relatively permanent structure, occupied in a sustained manner, perhaps by a generation or more, in contrast, the size of the lithic and hazelnut assemblages, the lack of evidence for any refurbishment, and use of organic materials that would have had limited its lifespan, seems to imply a more fleeting occupation (*Ch 2, p 52*). Hence it is more likely that its occupation was a fairly temporary affair, used for a comparatively short duration, which may only have extended across a single season. This would indicate that a degree of sedentism, in the strictest sense, was not a feature associated with the pioneer Mesolithic people who first occupied and colonised the island, and that they were indeed a highly mobile group.

The end of occupation at the house is also noteworthy, in that it was marked by rapid destruction as the result of a conflagration. The fact that the Cass ny Hawin II house burned down is, from an archaeological perspective, fortuitous, as fire can paradoxically be preserving, and, in this case, it seems to have fossilised the house and provided a 10,000-year-old snapshot of Mesolithic life and domestic organisation (*p 314*). Yet, while this does not necessarily undermine the veracity of this snapshot, this seems rather indefinably suspicious. There is a nagging sense that the house may have been deliberately burnt down and its contents abandoned; certainly, there is no evidence that wholesale salvage was attempted, although portions of the roof may have been deliberately removed prior to the house's destruction. Whilst establishing this beyond doubt is probably not possible, it does at least raise the possibility that deliberate burning was a tradition associated with this type of Mesolithic dwelling, perhaps when a house site ceased to be propitious and was left for the final time, or to mark a transitional point in the lives of its inhabitants.

This, however, was not the end of the story, as the site was revisited, on at least one further occasion, which resulted in the digging of a small pit, which contained a small amount of lithic waste (Fig 195). It seems then, although destroyed, the site of this former house may still have held some significance for Mesolithic groups on the island, perhaps still resonating as an important (ancestral?) location. This theme of remembrance/veneration is not, however, unique to Cass ny Hawin II, and may have been relatively common. At Mount Sandel, for example, a series of 'little' and 'big' pits was probably dug following the abandonment of the main pit-house, which also contained cultural materials, including lithic waste (Woodman 1985, 123-50; Bayliss and Woodman 2009).

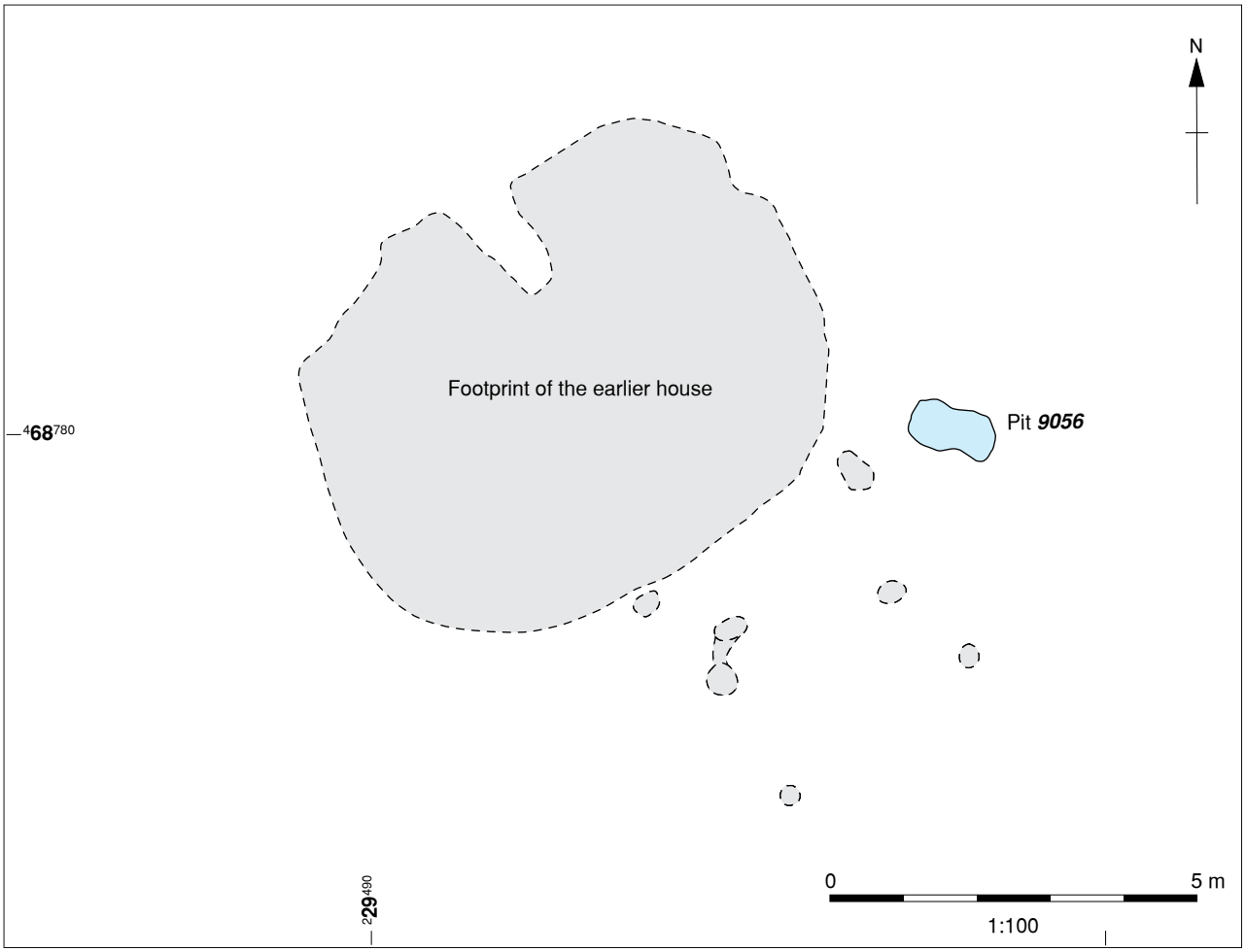


Figure 195: The last Mesolithic pit at Cass ny Hawin II

Cass ny Hawin II and shifting Mesolithic geographies

The Cass ny Hawin II house dates to a broad period that witnessed some dramatic changes in the Mesolithic landscapes of north-western Europe. Initially, at *c* 8500 cal BC, although Ireland had already become separated from Britain, and Man was also (or at least in the process of becoming) an island (*Ch 2, p 33*), mainland Britain was still connected to Europe by a land bridge extending from East Yorkshire southwards, joining with Germany and the Low Countries (*cf* Sturt *et al* 2013, fig 6). This land bridge has been termed 'Doggerland' in the archaeological literature and would undoubtedly have been home to Mesolithic groups, who fringed the then North Sea basin (*cf* Coles 1998). After this date, sea levels began to rise dramatically, progressively submerging this land bridge, and in turn contracting and altering the form of this Mesolithic landscape, which had completely disappeared by *c* 5500 cal BC, with the British Isles, more or less, attaining its present-day form (*cf* Sturt *et al* 2013, fig 6).

Given these dramatic changes to the Mesolithic landscapes and geography, it has been argued (Waddington 2015; Waddington *et al* 2007) that the loss of territory in Doggerland, as it was inundated, and the concomitant pressures this would have placed on resources, resulted in some of the Doggerland Mesolithic communities pushing westwards, in a secondary Mesolithic colonisation of Britain. It is further argued that these communities were attracted by improving environments, including a rise in the availability of animal and fish resources at coastal locations on the British mainland, and also the first appearance of hazel, and that they brought with them a distinctive cultural package, which is expressed archaeologically by narrow-blade lithics and substantial pit-houses (Waddington 2015).

This rather neat argument was based on the radiocarbon dates available in 2013 (*ibid*), from the excavated pit-houses from northern Britain and Ireland, and other narrow-blade sites (*Ch 3, p 84*). From these, Clive Waddington (2015) proposed a scheme of possible movement and colonisation initially out from Doggerland and then to other parts of the British Isles (Fig 196).

Within this scheme, it was initially envisaged that a first wave of colonisation out of Doggerland dated

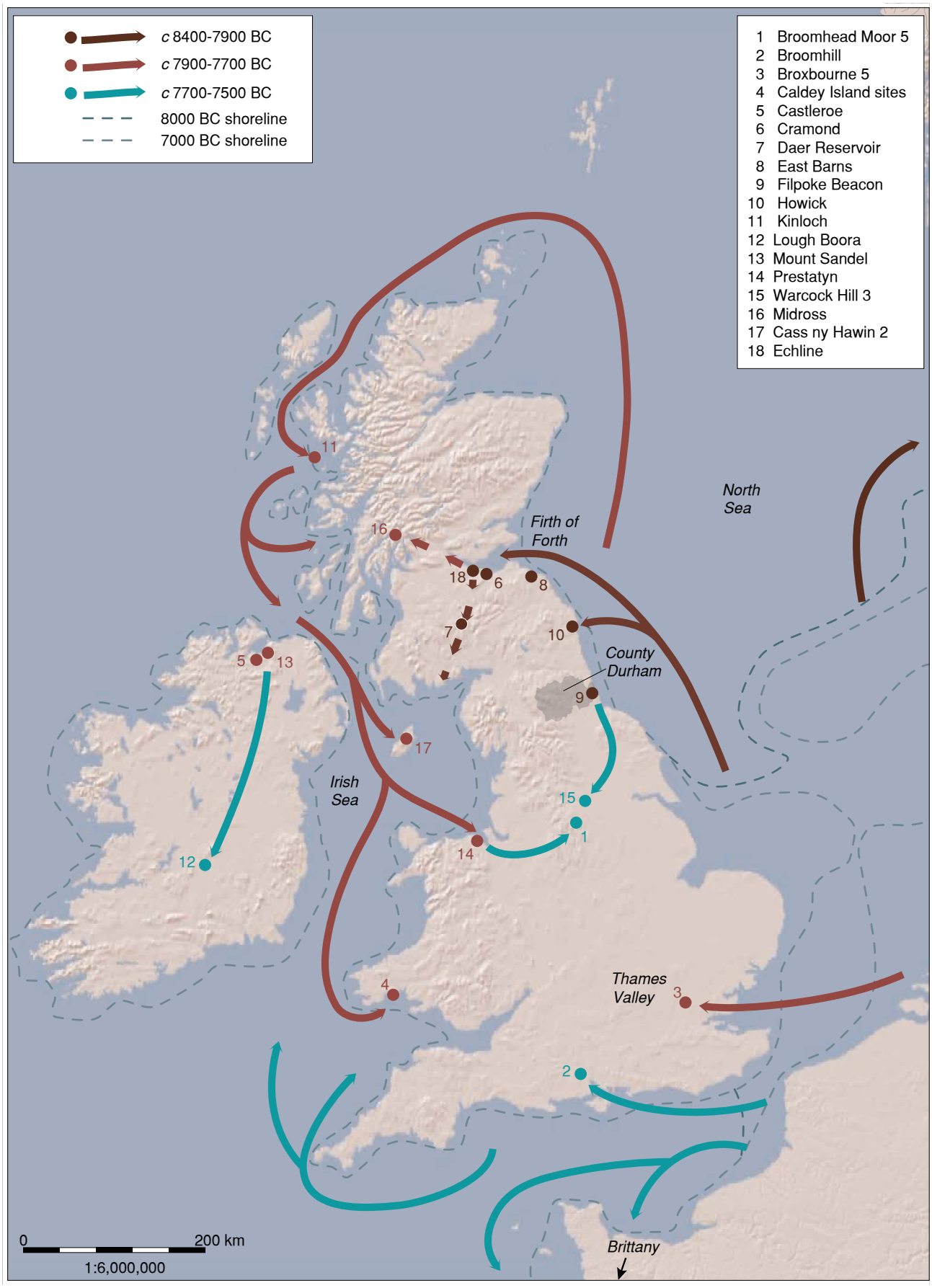


Figure 196: The possible pattern of Mesolithic narrow-blade colonisation of Britain, as proposed by Clive Waddington (2015)

to *c* 8400-7080 cal BC, and saw Mesolithic settlers entering into coastal areas along north-eastern Britain, extending between County Durham and the Firth of Forth. These settlers were associated with the pit-houses at Howick (with 33 radiocarbon dates spanning the period 8260-7140 cal BC; Bayliss *et al* 2007), East Barns (with three radiocarbon dates spanning 8290-7650 cal BC; Gooder 2007), and Echline Fields (with four radiocarbon dates relating to its initial occupation spanning 8460-8230 cal BC; Robertson *et al* 2013, 76). It should be noted, however, that Waddington (2015) only had access to the provisional results from East Barns and Echline Fields. More refined, and tighter, dating is now possible at East Barns, based on 11 modelled radiocarbon dates, which span the period 8280-7950 cal BC (Engl and Gooder 2021), whilst at Echline Fields it is now evident that, apart from the pit-house, there were other contemporary structures, again associated with narrow-blade lithics. These comprised an oval posthole structure with an adjacent 'ring-groove' (which together produced three radiocarbon dates spanning 8430-8230 cal BC; Robertson *et al* 2013).

Other dated sites thought to be part of this initial diaspora included Cramond, close to Echline Fields, which formed the earliest of Waddington's narrow-blade sites (with six radiocarbon dates spanning 8690-8230 cal BC), though no structures were present (*cf* Waddington 2015; Waddington *et al* 2017); however, based on the typology, there is some debate as to whether this was a true narrow-blade site *per se*, and it is possible that it produced a unique transitional and hybrid assemblage, which contained both Early and Middle Mesolithic lithic types (Conneller *et al* 2016a; Conneller 2022, 24). Another site viewed by Waddington as forming part of this first wave was Filpoke Beacon, Cleveland, which has been dated to 8270-7540 (8760±140 BP; Q-1474; *cf* Waddington 2015), though again no structures were found at this site. A further eastern site is Low Hauxley, which contained a Mesolithic structure, producing radiocarbon dates spanning the period *c* 7950-7250 cal BC (Waddington and Bonsall 2016). Based on all of these sites, it was also evident that the Firth of Forth was seemingly the epicentre of the earliest colonisation (represented by Cramond and Echline Fields). Waddington (2015) does, however, note that another potentially early narrow-blade site is known at Daer Reservoir, South Lanarkshire, where a structure (*p 319*) associated with a narrow-blade knapping site produced a date of 8250-7970 cal BC (9075±80 BP; AA-54960; Ward 2010; 2012). Perhaps notably, the inland location of this site is slightly at odds with the general thrust of the proposed initial colonisation of the north-eastern British seaboard, though this could be explained in other ways (*p 326*).

Following this initial phase of colonisation, it was suggested that the colonising groups in north-eastern Britain spread during the period *c* 7900-7700 BC, via the northern seaways (Waddington 2015). The groups moving around the north of Scotland, then down its western seaboard into the Irish Sea, occupying coastal areas, including the Isle of Man. The dating for this seems to have been largely based on the radiocarbon evidence derived from the Northern Irish site at Mount Sandel (dating to the middle centuries of the eighth millennium cal BC; Bayliss and Woodman 2009), the western Scottish site at Kinloch (suggested to contain occupation dating to the first half of the eighth millennium cal BC; Wickham-Jones 1990), and the North Wales site at Prestatyn (with two dates spanning the period 8200-7540 cal BC; *cf* Waddington *et al* 2007, 211). In slight contradiction to this, though, it was also suggested (Waddington 2015, 223) that narrow-blade groups had probably reached the west coast of Scotland, the Isle of Man, and also North Wales by *c* 8200-8000 cal BC.

Naturally, this proposed scheme of initial colonisation and subsequent spread was based on a fairly limited dataset, which can now be added to by the discovery and dating of several other early narrow-blade sites, of which Cass ny Hawin II is one. It seems, then, based on the dating evidence from Cass ny Hawin II (*Ch 2, p 47*), that Mesolithic people using narrow-blade lithics had reached Man by *8300-8200 cal* BC, constructing a pit-house, another potential facet of the Doggerland 'cultural package' (*p 322*), at a slightly later date, in *8200-8100 cal BC*. In addition to Cass ny Hawin II, there are two other dated sites from western Britain, which hold great relevance (Fig 197). At Criet Dubh, Isle of Mull, two phases of activity have been identified, based on the radiocarbon dates, the earliest dating to *c* 8320-8230 cal BC, on charred hazelnuts from a posthole and an adjacent pit (Mithen and Wicks 2018, 91). The posthole also produced small-fraction and indeterminate lithic debitage (*op cit*, 97) and, although it is difficult to be entirely sure, it is conceivable that this material was associated with the production of narrow blades. The later phase of activity dates to *c* 7100-6580 cal BC, when post-defined structures were built, associated with internal features, and more confidently narrow-blade lithics, with the site potentially being visited on five separate occasions during this period (*op cit*, 91-2, 96).

The other important narrow-blade site is at Maryport, where a three-phase narrow-blade site, associated with scatterings of pits, has been discovered (Clarke and Kirby 2022). Modelling of the radiocarbon dates suggests that the first activity dates to *c 8200 cal BC* or just before, whilst the second phase of activity dates to *c 8200-8100 cal BC*, or possibly slightly later (*ibid*). These dates are therefore consistent with those from Cass ny Hawin II and, although it has been suggested that at Maryport no definitive structures were present,



Figure 197: Early narrow-blade sites in western Britain

the pits might define the footprints of possible post-built structures (as opposed to pit-houses), which seem to have some parallels with the earlier post-defined structures identified at Echline Fields (*above*), and also the external structure appended to the Cass ny Hawin II house (*p 317*). Such structures, as well as the pit-houses, seem then to have been associated with the earliest narrow-blade groups, though both types of structure continued to be a feature of later Mesolithic settlement, the former, seen at Criet Dubh, dating to the late eighth/seventh millennia cal BC (*p 324*). It could also be argued that Cass ny Hawin I was a later continuation of the pit-house tradition (*contra* Mithen and Wicks 2018), although perhaps smaller and less robust in form (*p 319*), occupied in the mid-seventh millennium cal BC (Woodman 1987; *Ch 2, p 38*). Indeed, Rob Engl and John Gooder (2021, 75) have arrived at a very similar conclusion, also suggesting that a later, less robust, tradition of 'pit-houses' was in existence in the seventh millennium cal BC, based on the presence of several probable smaller pit-houses in Scotland, principally those at Newton, Islay (McCullagh 1989), Staosnaig, Colonsay (Mithen and Finlay 2000), and Lilliehill Bridge, Ayrshire (MacGregor and Donnelly 2001; Fig 198).

What these sites do seem to suggest is that the appearance of narrow-blade users in western Britain and the Irish Sea area actually occurred at a near-identical time to many of the early eastern sites, such as Howick, East Barns, and Filpoke Beacon (*p 324*). Indeed, it is also possible that narrow-blade activity at Cass ny Hawin II and Criet Dubh was actually slightly earlier than at these sites. Of course, the dates from the Firth of Forth (Cramond and Echline Fields) do pre-date the western sites by, perhaps, a century or so, which does still seem to suggest that the earliest narrow-blade sites so far known are those in the east. Based therefore on the present dating evidence, it seems possible that the Firth of Forth was the first hub of secondary colonisation, which was followed by a subsequent spread into areas further south, along the east coast, and simultaneously into western Britain and the Irish Sea area. Whilst movement in the east could well have been maritime, the dating evidence now available seems slightly to dismantle the idea that any movement into the Irish Sea area was along the Northern seaways and then down the west coast of Scotland, since it might be expected that Ireland would have been reached prior to Man and north-west England, which was evidently not the case,

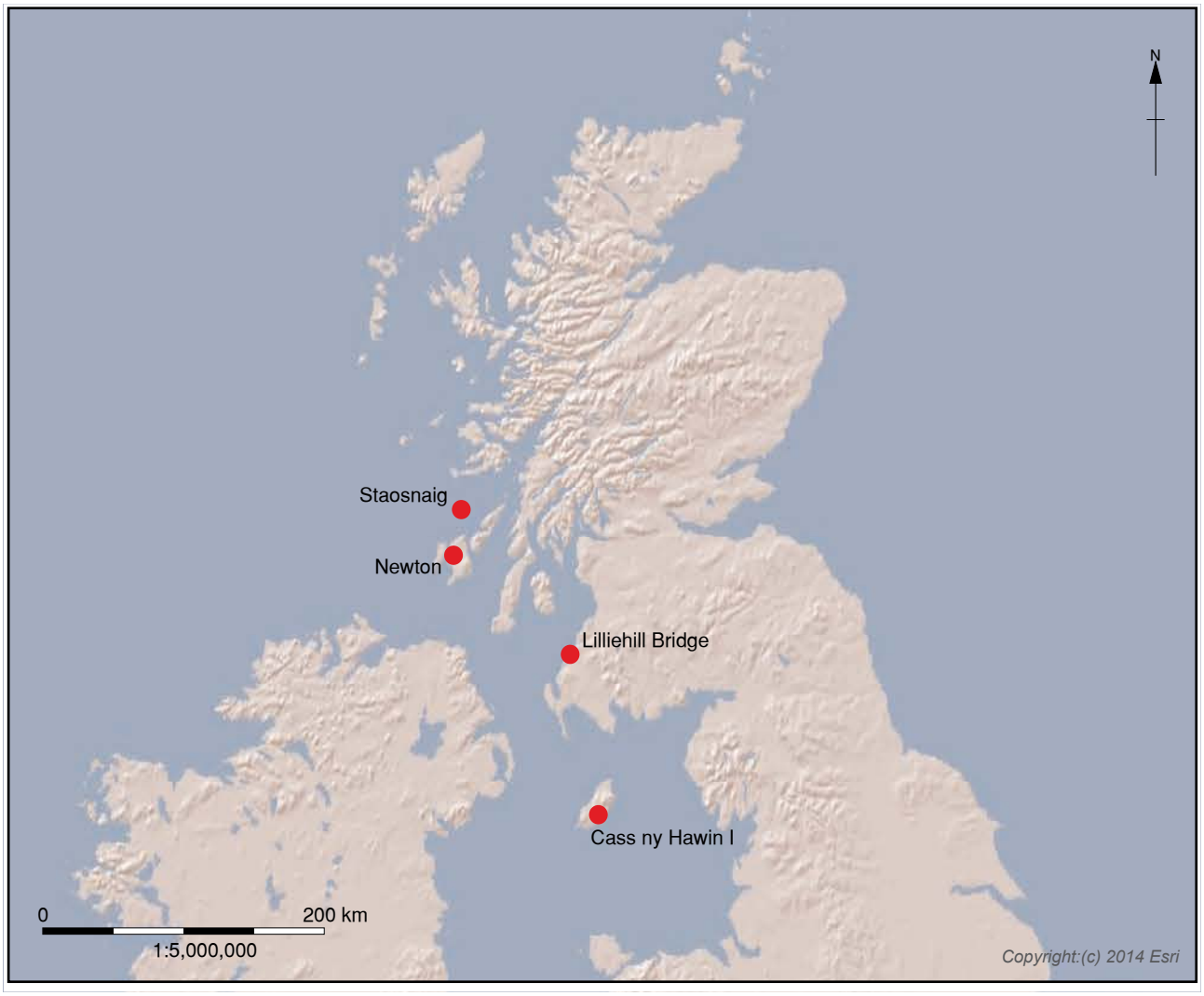


Figure 198: Sites in northern Britain with evidence for smaller and less robust Mesolithic 'pit-houses'

at least based on the dating evidence from Mount Sandel (Bayliss and Woodman 2009). Another possible explanation would be that rapid inland movement occurred from the Firth of Forth to the west in two directions. One route may had headed north-west towards Criet Dubh, whilst another may have been across the Southern Uplands and into the Solway Firth area, and then into north-west England, Man, and eventually Ireland, which also might explain the early narrow-blade site at Daer Reservoir (Ward 2010; 2012).

This dating evidence seems to be hinting at a pattern of movement, 'colonisation', and adoption of narrow-blade 'culture' that was complex, and theories will undoubtedly change following the discovery and dating of new Mesolithic sites; in reality, it was probably multi-directional. Indeed, there might even be an argument for suggesting that there were various movements of people out of Doggerland, including one towards the east coast (Waddington 2015), with another contemporary thrust across southern England, and into western Britain, and then on to Ireland. As Peter Woodman said (2012, 11), in relation to the initial Mesolithic settlement of Ireland,

> the idea that Mesolithic settlement was initially in the north-east and that people first arrived from Scotland has no more validity than any other possible route…initial visitors or settlers [to Ireland] could equally have started from western Scotland, from the Isle of Man basin, and/or from north or south Wales.

The appearance of narrow-blade lithics, and by extension the associated settlement forms, in the latter part of the ninth millennium cal BC, at least across Britain (and also presumably Doggerland), might equally be a product of changes in hunting strategies, in response to a changing ecology brought about by improving climatic conditions, as opposed to specific movements of refugees out of Doggerland (*cf* Conneller *et al* 2016a; Conneller 2022, 172). It has been argued, for instance (Myers 1986; 1989; 2015), that prior to this period, Mesolithic hunting strategies were focused on the predictable autumn migration of large prey, such as

red deer, into the uplands. However, in the latter part of the ninth millennium cal BC, this migratory pattern was disrupted as the seasons became less extreme and the landscape became increasingly vegetated, and hence, in response to these changing circumstances, lithic technologies altered as a new range of procurement strategies was adopted. This resulted in the appearance of narrow-blade tools geared towards opportunistic and encounter-based hunting and trapping, designed to guarantee tool consistency, whilst coping with increased variability in the quality of the lithic raw materials, increasingly acquired expeditiously from whatever raw material was available.

Moreover, it was also predicted by Andrew Myers (1986) that later Mesolithic residential camps would, on the whole, have been smaller in scale, less permanent, and would have used the landscape in a more general way, as subsistence patterns adjusted towards more evenly distributed, less seasonally structured, resources, and logistical mobility decreased. To redress the lack of storable winter meat provided by predictable intercept hunting, it was also suggested (*ibid*) that other strategies were developed to increase the chances of encountering game. These included the creation of deliberate clearances in the woodlands, the burning of vegetation to encourage browsing, traps, and the collection and deployment of fodder in certain locations. Dogs could also have helped track and run down quarry. Some communities may have become more reliant on low-risk resources, such as shellfish, available during the winter at coastal locations. It is also possible that energy and resources may have been increasingly allocated to the gathering and storage of plant crops, such as hazelnuts, for winter food, and that reliable fish migrations may have become more important.

This shift in strategy could therefore explain the appearance of many of the near-contemporary narrow-blade sites across northern and western Britain, which perhaps reflect a simultaneous technological, economic, and cultural response to the changing environmental circumstances that suddenly presented themselves, with innovation being spread through pre-existing Mesolithic networks. This strategy could also have been adopted by pre-existing hunter-gatherer groups (*ie* broad-blade users, operating *c* pre-8500 cal BC), who were already in northern Britain at this time (*cf* Reynier 2005; Conneller *et al* 2016a). Indeed, it may also explain why some narrow-blade sites, such as that at Maryport, also seem to have been established in an area which had previously seen activity by those using broad-blade lithic technology (Clarke and Kirby 2022). Of course, this is not to say that Mesolithic people were not leaving Doggerland and entering into the Britain at this time, but this would not be the only vector for change in this scenario, together with the adoption of narrow-blade lithics and other associated cultural trappings. Such an idea might also explain why previously less hospitable/inaccessible areas such as the Isle of Man and Ireland were deemed suitable for colonisation and settlement by narrow-blade groups, as conditions in these landscapes was now ideal, particularly if the adoption of new maritime technology also coincided, which made such journeys more feasible. In the case of the Isle of Man, once colonisers had arrived, they would have had the correct technology, as well as the right economic and cultural 'mindset', to allow them to focus their subsistence strategies on key marine resources, such as grey seal, fish, and shellfish, perhaps also birds, as well as hazelnuts. Indeed, that the earliest evidence for the settlement of Man seemingly coincided with the appearance of hazel on the island may not be coincidence, but could also reflect hunter-gatherer perceptions of habitat viability.

Other Mesolithic activity at Ronaldsway

It has become evident that the houses at Cass ny Hawin I and II were just part of the Mesolithic activity along the coast at Ronaldsway. Indeed, it now seems probable that most of the coastline between the Santon Burn and Ronaldsway Farm contains evidence of Mesolithic activity, comprising lithic scatters associated with narrow-blade assemblages, indicating activity areas, particularly as five such scatters were recorded at the airport (*Ch 4*). The excavations also demonstrated that other sites were present in this Mesolithic coastal zone. One such site was at the 26 End site, otherwise known as Cass ny Hawin III, which contained evidence for the digging of pits on two separate occasions, in the mid-eighth millennium cal BC (*Ch 4, p 132*). In other words, following the abandonment of the Cass ny Hawin II house, Mesolithic occupation continued into the centuries following the initial colonisation, perhaps being continuous from the early ninth millennium cal BC onwards.

The Cass ny Hawin III pits are highly significant in that these may well, as with earliest pit and hollows at Cass ny Hawin II (*p 311*), relate to the 'marking' of a location that was considered to hold some significance for Mesolithic groups on Man. If this was the case, it implies that this style of 'marking' (and associated intentional deposition; *p 328*) introduced by the earliest colonising groups continued to form a persistent feature of Mesolithic practice some 500 or so years later. At Cass ny Hawin III, perhaps the most obvious reflection of this is the fact that three of the pits, in one of the groups (IIIa), seemingly formed a short alignment, continuing in a north/south direction for 6 m, which on the strength of the radiocarbon dates also represents the first feature created in this area. Within this alignment, the two terminal pits were left open, whilst the central pit was rapidly backfilled. In a sense, this might therefore have formed an early style of 'monument', there certainly being other Middle Mesolithic precedents for this in

northern Britain, though on a much grander scale (Fig 199).

These include two sites close to the River Dee, in north-eastern Scotland, one of which, at Warren Field, is represented by a clearly defined north-east/south-west pit alignment consisting of 12 large pits and several smaller examples (Murray and Murray 2014). Although this alignment extends for some 60 m, importantly, not all of the pits were dug at the same time, as the radiocarbon dates for these span a lengthy period (8200-7000 cal BC), and hence at all stages the visible alignment would have been much shorter. Perhaps, then, the alignment at Cass ny Hawin III represents the first stages in the process of creating an alignment/monument, which was never subsequently embellished, at least in linear form. The presence of the other pits surrounding the alignment do, however, indicate that this locale was revisited at a later date, which also involved a similar set of actions, particularly as radiocarbon dating indicates that the group of pits to the south-east of the alignment (IIIb) was demonstrably later in date, though not separated by any great distance in time. Two of the pits directly adjacent to the alignment were left open, whilst the group to the south-east were all deliberately backfilled, as was an outlying pit positioned some 30 m to the north-west. When taken together, the looser and more scattered distribution of all the pits at the site echoes more closely the other site next to the River Dee, at Milltimber, which was similarly associated with a more erratic distribution of pits (Dingwall *et al* 2019). There are also other similarities between Cass ny Hawin III and these 'monuments' on the Dee, in that at both Warren Field and Milltimber most of the pits were left open, as was also the case with the two pits forming elements of the Cass ny Hawin III alignment. Therefore, perhaps such open pits were surrounded by mounds of upcast, which was designed to emphasise their presence further (*cf* Conneller 2022, 184).

The material used to backfill some of the pits at Cass ny Hawin III is also significant. This included lithics, a large proportion of which had been burnt, with the largest concentration deriving from a single pit (***8251***; *Ch 4, p 133*) located to the south-west of the alignment (*p 327*). It is evident, however, that these lithics were not burnt *in situ*, which suggests that their physical condition, or the events behind their burning, could have influenced their selection for deposition. Given this, it is possible that either the material was derived from hearths or middens (or a mixture of both) associated with a nearby settlement, or that it was intentionally burnt, potentially as part of a series of actions associated with its deposition. Whatever the reason, it does seem that this material was intentionally selected, and perhaps even deliberately altered (both physically and perhaps conceptually) if the latter scenario is correct, and then deliberately deposited at a specific location, as another component of the 'marking' activity. This style of deposition is not unusual during the Middle Mesolithic period in Britain and Ireland (*p 314*), and certainly fits a wider pattern involving the deposition of burnt material deriving

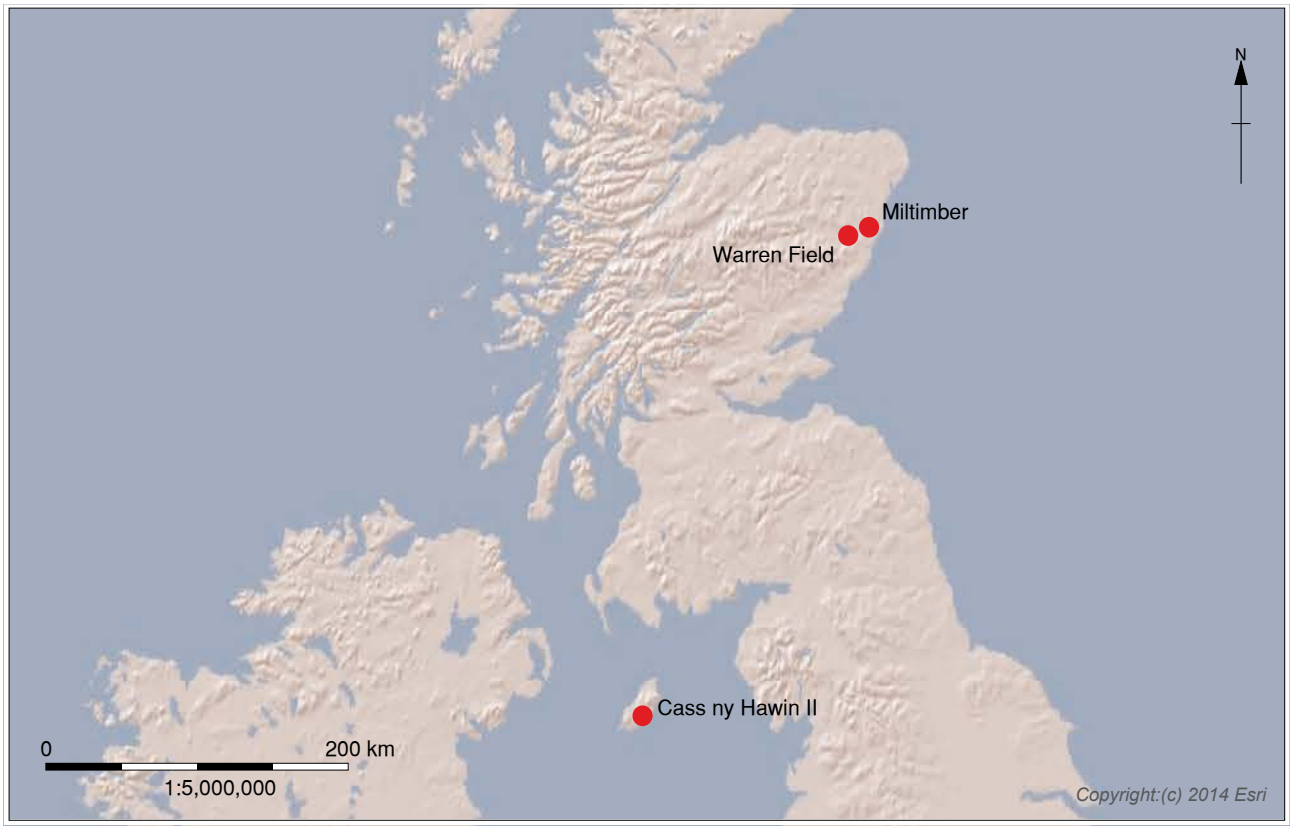


Figure 199: Mesolithic pit alignments in northern Britain

from hearths, which was particularly prevalent in northern Britain (*cf* Blinkhorn *et al* 2017; Conneller 2022, 172, 174; *p 314*). Following Graeme Warren (2005, 127) and Steven Mithen (2019), it is even possible that such material was selected precisely because it was burnt and was a direct link to the symbolic and social importance that may have been assigned to fire (and fireplaces) by Mesolithic groups. Finally, it is worth stressing that this Mesolithic practice, involving the intentional deposition of 'significant' material into pits, which accordingly formed an important part of hunter-gatherer life, would be carried right through into the Neolithic period, and would similarly form a prominent feature associated with the initiation and rise of agriculture on both the island and across Britain more generally (Anderson-Whymark and Thomas 2012).

Neolithic and Earlier Bronze Age Farmers

Neolithic 'houses'

The identification of both earlier Neolithic and earlier Bronze Age structures at Ronaldsway, probably representing two timber buildings, is significant in many ways for an understanding of Manx prehistory. Although both periods are well represented on the island (*Ch 5*), through the presence of burial sites and other ritual monuments, as well as a variety of artefacts, together with palynological evidence for agricultural clearance, and arable and pastoral farming, comparatively little is known about contemporary settlement. Hence, these structures offer a rare glimpse into one of the fundamental elements of prehistoric life on the island.

The earlier Neolithic structure (Structure 1) at Taxiway Alpha East seems to have been a small rectangular timber 'house', which, on the basis of the single radiocarbon assay, dates to sometime between the thirty-fourth and thirty-second century cal BC (*Ch 5, pp 158-60*). This date is highly significant, as the structure is the earliest Neolithic timber building from the island so far discovered. Its date range also places it in the Middle Neolithic, a period that on Man equates with certain other innovations that might be more generally associated with the maturing of this culture. These include the appearance of flat cemeteries and the first use of Ronaldsway pottery (*Ch 5, p 147*), all of which could broadly equate with the cessation of building chambered tombs (and conceivably the dwindling influence of earlier styles of pottery), which were perhaps associated with the initial stages of the Neolithic period.

Although the structure at Taxiway Alpha East was conceivably a domestic dwelling, occupied by a family unit, another possibility is that it represented a conceptually different type of 'house', being one that functioned as a small communal meeting place, or perhaps even a ritual space, effectively a domestic 'monument' (*cf* Smyth 2014, 12). Regardless of function, it is possible that it was a permanent structure that was used for some considerable time, or it might have been a more transient building, occupied for a short time, that was connected with a shifting pattern of agriculture and transhumance; however, even if it was a 'temporary' building, it might have been revisited and reoccupied on a seasonal basis and, as such, could have formed an enduring feature in the landscape. No obvious structural repairs were evident (in the form of intercutting postholes) which may suggest that, once built, it was viewed as a 'finished' and 'finite' structure, that could not be altered, or even demolished, perhaps confirmed by the fact that its posts were left to rot *in situ*.

Some other evidence does exist in the wider Ronaldsway area for the Neolithic people that may have been responsible for constructing Structure 1. For instance, possibly contemporary activity is known at Billown Quarry (*Ch 5, p 147*), in the form of pit digging, cooking, and artefact deposition, which has produced radiocarbon dates falling in the latter half of the fourth millennium cal BC (Bayliss *et al* 2011b, table 11.5; Table 75; Fig 200).

Sample	Laboratory code	Radiocarbon age (BP)	Calibrated date range (95% confidence)
Carbonised residue on a sherd of decorated pottery recovered from a pit	OxA-10203	4510±45	3370-3020 cal BC
Two charred barley grains and charred residues on a sherd of Neolithic pottery from a hearth, within a partially infilled shaft	OxA-10300	4570±65	3520-3090 cal BC
	OxA-10222	4575±55	3500-3090 cal BC
	OxA-10202	4600±45	3510-3120 cal BC
Charcoal from a hearth in a scoop/hollow, containing six leaf-shaped arrowheads, a scraper, and around 40 worked flint flakes and blades	Beta-140097	4600±70	3630-3090 cal BC
A charred barley grain from a pit	OxA-10140	4495±40	3360-3020 cal BC
Two charred barley grains, from a scoop or pit containing Neolithic pottery	OxA-10245	4440±45	3340-2910 cal BC
	OxA-10244	4465±45	3360-2920 cal BC
Charcoal from a hearth in a large hollow	Beta-129973	4650±150	3710-2910 cal BC

Table 75: Later fourth millennium cal BC radiocarbon dates from Neolithic features at Billown Quarry

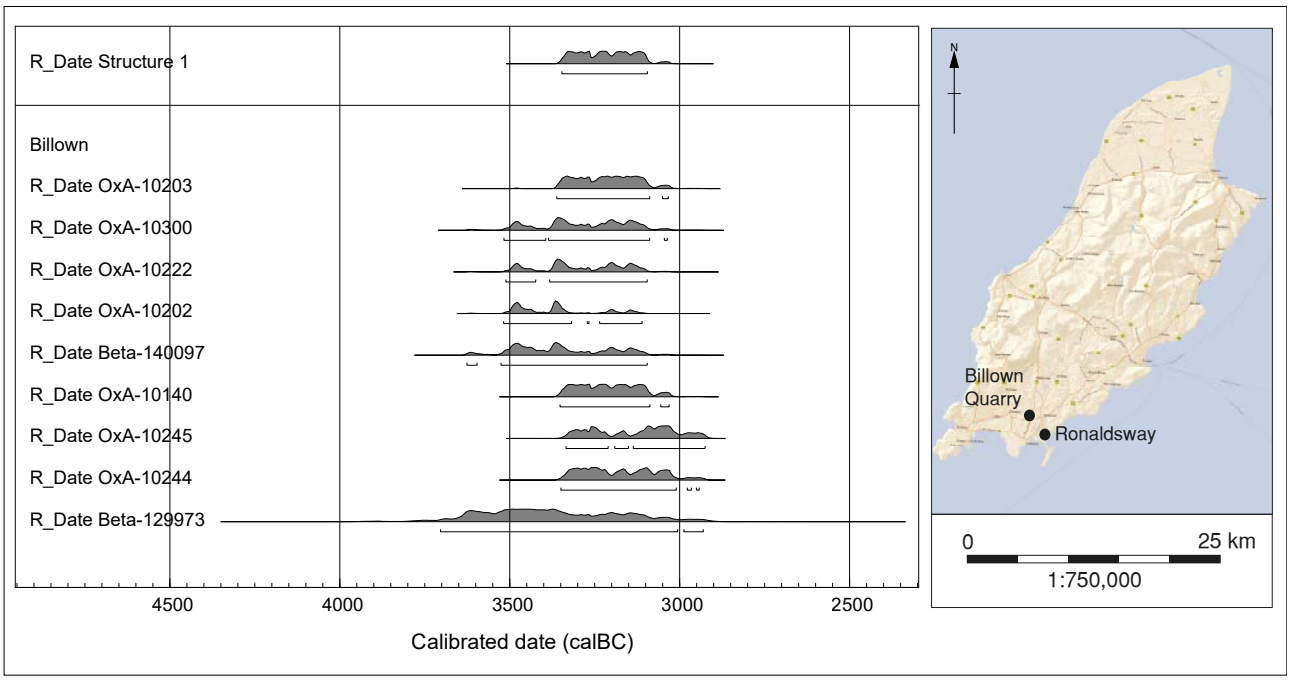


Figure 200: Probability distributions of the calibrated radiocarbon date from Structure 1, and other broadly contemporary radiocarbon dates from Billown Quarry

Given the date and character of the evidence from Billown Quarry, it could be suggested tentatively that it was used for congregation and feasting, with related activities, and as such provided a valuable social arena for dispersed Neolithic communities in, at least, the southern part of the island. Moreover, the importance of places such as Billown could have potentially increased in the latter part of the fourth millennium cal BC, if this corresponded to a period when the importance and influence of the island's chambered tombs, and the ideas they embodied, was dwindling (*p 329*). Perhaps then, within this social landscape, Structure 1 was a dwelling (*p 329*) used by one small group of farmers, who periodically travelled to Billown to meet and engage with other Neolithic peoples on the island.

It also seems, based on the evidence from Billown, that such people had occupied and farmed the fertile Plain of Malew (*Ch 1, p 2*) for a considerable period, at least from the thirty-eighth or thirty-seventh century cal BC, if not slightly earlier (Bayliss *et al* 2011a, 808). By the time that Structure 1 was in existence, it seems, from the charred cereals from one of its postholes (*Ch 5, p 159*), and also based on the dated cereals from Billown, that barley and emmer wheat were the dominant crops, consistent with the evidence from northern Britain and Ireland indicating that naked barley (along with a hulled variety) and emmer wheat were particularly important crops (Bishop *et al* 2009; Whitehouse *et al* 2014). Based on the evidence from Structure 1, free-threshing wheat was also grown at Ronaldsway, which is again a cereal type that has been recorded at Neolithic and early prehistoric sites in northern Britain (Robinson 2000; Pelling *et al* 2015). It has been argued, however, that, in Ireland at least, following the uptake of agriculture, there was an initial 'boom' in cereal cultivation in the mid-fourth millennium cal BC, which was then followed by a decrease, or 'bust', in cereals between *c* 3400 cal BC and 3100 cal BC (Whitehouse *et al* 2014). Therefore, chronologically, Structure 1, and the fairly intensive activity at Billown Quarry, were on the cusp of the 'boom' and 'bust' in cereal farming.

Although a fairly large collection of rectangular timber houses is now known within the Irish Sea area, most are earlier than Structure 1, dating to a fairly tight period in the thirty-eighth/thirty-seventh century cal BC, which accordingly has been termed the 'house horizon' (*ibid*; Smyth 2014, 41). This period relates to the 'boom' in cereal farming (*above*). Most of the houses so far excavated are in the east of Northern Ireland and the Irish Republic, and it is evident that, whilst many are comparable in size to Structure 1, measuring 6-8 m long and 4-7 m wide (*op cit*, 27), the majority are architecturally different (being constructed using a combination of trenches, securing plank walls, and earthfast posts, with fairly regular and formalised ground plans). Indeed, only four examples are known that were built wholly using earthfast posts, similar to the construction of Structure 1, though none of these seem to be of an identical design (*op cit*, 36, fig 3.11). Several other Neolithic houses from Ireland, dating to the mid- and late fourth millennium cal BC, have also been excavated, though, again, these are superficially different from Structure 1, being fairly irregular in plan, and comprising both sub-rectangular and oval or circular examples; architecturally, they also differ in that most used small slots in their designs, or were

defined solely by scatterings of small stakeholes (*op cit*, figs 5.8-9, 5.12). In terms of these Irish Sea comparanda, Structure 1 seems therefore to be unique.

There is, of course, another important Neolithic house that invites comparison. This is the Ronaldsway House, excavated in the 1940s (*Ch 1, p 8*), found a mere 360 m south-west of Structure 1. This and Structure 1 have many similarities (Fig 201). They are identical in size, share a very similar alignment, and used earthfast posts, both in their wall lines and in their interiors. Structurally, the main difference is that the

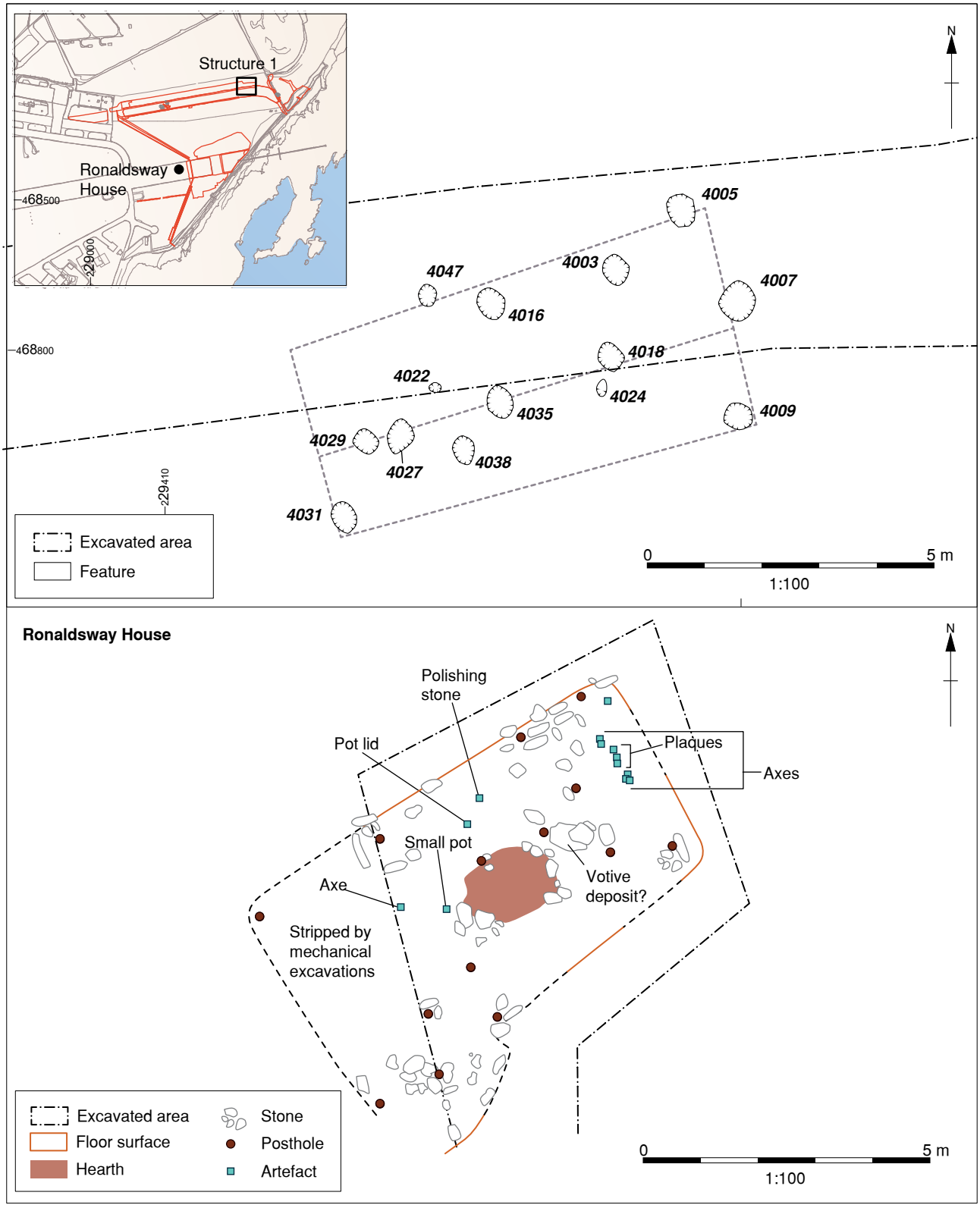


Figure 201: Structure 1 and the Ronaldsway House

Ronaldsway House was built within an intentionally dug hollow (Pl 89), creating a 'pit-house', and this probably explains the better survival of interior features, such as the central hearth and possible votive deposit of ox long bones (*Ch 5, p 152*). It is not impossible, however, that Structure 1 also originally contained a central hearth, but that this, along with any shallow postholes and occupation deposits, was lost through later disturbance. One major difference, however, is that the Ronaldsway House produced a large quantity of artefactual material, including pottery, and stone axes and plaques (*Ch 5, p 152*). The Late Neolithic date of the pottery, at least, is confirmed by three radiocarbon dates, derived from charred residues, of 2560-2290 cal BC (3925±35 BP; OxA-5328), 2620-2350 cal BC (3985±35 BP; OxA-5329), and 2860-2340 cal BC (4010±55 BP; OxA-5330; Burrow and Darvill 1997).

There seems then to be a chronological dichotomy between these two houses at Ronaldsway. On the one hand, an argument could be made, based on the similarities of their ground plans and design, that they were broadly contemporary. Hence, both could date to the later centuries of the fourth millennium cal BC, based on the radiocarbon date from the presumed foundation deposit of parched cereal 'waste', seemingly placed in one of Structure 1's postholes (*Ch 5, p 159*). Alternatively, the artefactual material from the Ronaldsway House could be viewed as being intimately related to its occupation, which would place its construction a minimum of 250 years and maximum of 1000 years later, perhaps indicating that similar building styles were employed over a long period of time (Fig 202).

A resolution might, however, exist. It has been noted (Burrow 1997), for example, that the position of artefacts in the Ronaldsway House suggest two phases of use, one associated with occupation, the other with the later dumping of material (*Ch 5, p 152*). If this is the case, the Ronaldsway pottery could relate to a later phase of 'dumping', as opposed to material that was directly associated with the use and occupation of the building. Furthermore, it has been pointed out (Thomas 1996b, 12; Crellin 2014, 290-1) that the character of the artefactual assemblage from the Ronaldsway House is suggestive of a 'structured' ritual deposit, particularly given that the Ronaldsway pots, if complete, would have filled over a third of the standing structure, in addition to the pristine nature of some of the axe blades, the presence of unusual stone plaques, and also a human femur (*Ch 5, p 152*). Again, this seems to suggest that much of the artefactual material, including the pottery that has been radiocarbon dated, might actually relate to a second phase of deposition, following the abandonment of the building.



Plate 89: The south-western corner of the Ronaldsway House exposed during Bruce's excavation

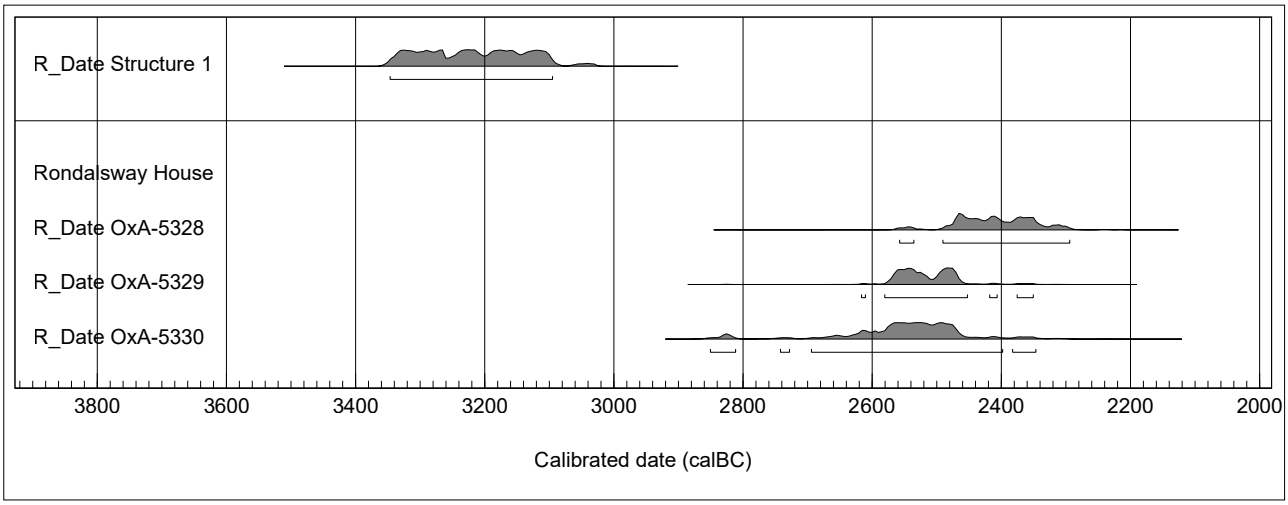


Figure 202: Probability distributions of the calibrated radiocarbon dates from Structure 1 and the Ronaldsway House

One pottery vessel, however, does seem to have been directly associated with the occupation of the house. This is a small flat-based Grooved Ware vessel, possibly an ochre mortar, that was placed into a pit next to the hearth, together with the long bones of an ox (*Ch 5, p 152*). This could therefore represent a foundation deposit made when the house was first constructed, or during its use. Based on the modelled radiocarbon dates from the Late Neolithic settlement at Barnhouse, Orkney, Scotland, flat-based Grooved Ware vessels seem to have appeared first in this area in *c* 3100 cal BC (Richards *et al* 2016), and have a widespread distribution, reaching southern England by *c* 2800 cal BC (Gibson 2002, 84; Garwood 1999). It then became the dominant Late Neolithic pottery type across much of the British Isles from around 2700 cal BC (Cummings 2017, 167-71). Given this chronology, and the seemingly progressively and rapid southward expansion in its use, it is conceivable that the Grooved Ware vessel from the Ronaldsway House, and perhaps the other items of Grooved Ware and the inscribed plaques, date to the very end of the fourth millennium cal BC, or the beginning of the third millennium cal BC, placing the construction of the Ronaldsway House closer in time to Structure 1 (potentially some 50-100 years later).

Therefore, one tentative scenario is that Structure 1 and the Ronaldsway House were part of a similar tradition of Neolithic domestic architecture, which began in the Middle Neolithic and extended into the Late Neolithic period. This, involving the construction of small rectangular post-built buildings, with a square or rectangular hearth, could represent a broader tradition extending across other parts of Britain and Ireland, though there is a suggestion that it was peculiar to the island, as on present evidence there are no comparable buildings dating to the mid-late fourth millennium cal BC from the wider Irish Sea area (*p 330*). Similarly, most Late Neolithic buildings in Britain and Ireland associated with Grooved Ware also appear different in plan form (circular or oval buildings), though, that said, many also have square or rectangular hearths, which may therefore have been a key feature in buildings dating to this period (*cf* Smyth 2014, fig 5.13; Bradley 2019, 92, 115). In fact, there is only one potential timber building, associated with Grooved Ware, from north-east Scotland which has been suggested to share some similarities with the Ronaldsway House (Cummings 2017, 181). This is a rectangular post-defined building at Raigmore, Inverness, Scotland, sealed beneath a Clava-type cairn, which, in a similar way to the Ronaldsway House, had a central rectangular hearth (Simpson 1996); however, this building was slightly larger in size (measuring some 10 x 5 m) and it also seems to have possessed curving ends, making it similar in morphology, although smaller in size, to the substantial oval-ended stone buildings from Barnhouse and the Ness of Brodgar, Orkney, and the timber building at Balfarg, eastern Scotland (*cf* Bradley 2019, 114-15), all associated with Grooved Ware, suggesting it formed part of this particular style of Late Neolithic building.

It seems possible that after the abandonment and decay of the Ronaldsway House, its site was not forgotten, and the hollow created by the pit in which it was originally set was much later selected as a suitable site for ritual deposition, perhaps by the same group who left the Late Neolithic stray finds at the airport (*Ch 5, p 161*), and who also buried the earthfast jars (*Ch 5, p 149*). Indeed, this style of ritual deposition, within an existing hollow, would certainly chime with the earlier Neolithic depositional practices observed at Billown Quarry (*p 329*), suggesting that these formed a persistent feature of both earlier and later Neolithic life in the Ronaldsway area. It might also be the case that the decision to focus on the hollow left by the Ronaldsway House was conditioned by a generational memory that an 'ancient' site existed there. This may have been a common theme throughout the prehistory

of the island, as there are numerous instances where 'ancient' sites seem to have been incorporated into 'contemporary' ritual practices, as seen in other parts of Ronaldsway Airport (*Ch 8, p 263*), Billown Quarry (*cf* Bayliss *et al* 2011b), and Killeaba (Crellin 2015). Another important point is that, when combined in OxCal, and subjected to the chi-square test, the radiocarbon dates from the Ronaldsway pottery (*p 332*) from the house site are statistically consistent (T'=2.16; T'(5%)=5.9; v=2; A_{comb}=81.4%(An= 40.8%), implying that they date to the same period. The process of ritual deposition may therefore have occurred over a short-period, perhaps as a one-off event, involving the ritual deposition of pottery vessels, and other items of Neolithic material culture.

An Early Bronze Age house?

The excavation of Structure 2 at Taxiway Alpha East, perhaps dating to the first two centuries of the second millennium cal BC, is also highly significant for understanding the earlier Bronze Age occupation on the island, particularly as no comparable structures are known. Again, it seems possible that this was domestic and, if only some of this structure survived, the postholes can be interpreted as elements of either a small square or circular building (*Ch 5, p 165*). In northern Britain and Ireland, domestic structures dating to this period are extremely rare, and so few parallels exist. However, small rectilinear buildings dating to this period are known from western Ireland, on Omey Island, Co Galway, where a rectangular structure was recorded, associated with two circular structures and a midden (O'Keeffe 1993). Small circular post-built houses probably also existed in the Early Bronze Age on the eastern side of the Irish Sea, based on an example from near to Carlisle, which dates to 1900-1690 cal BC (3485±35 BP; SUERC-32724; Brown *et al* 2023). Significantly, if the postholes at Taxiway Alpha East can be interpreted as the remains of a circular building, this latter example is a good comparator in that it had a similar diameter of *c* 4.7 m, defined by a post-ring (Fig 203). Such small, circular

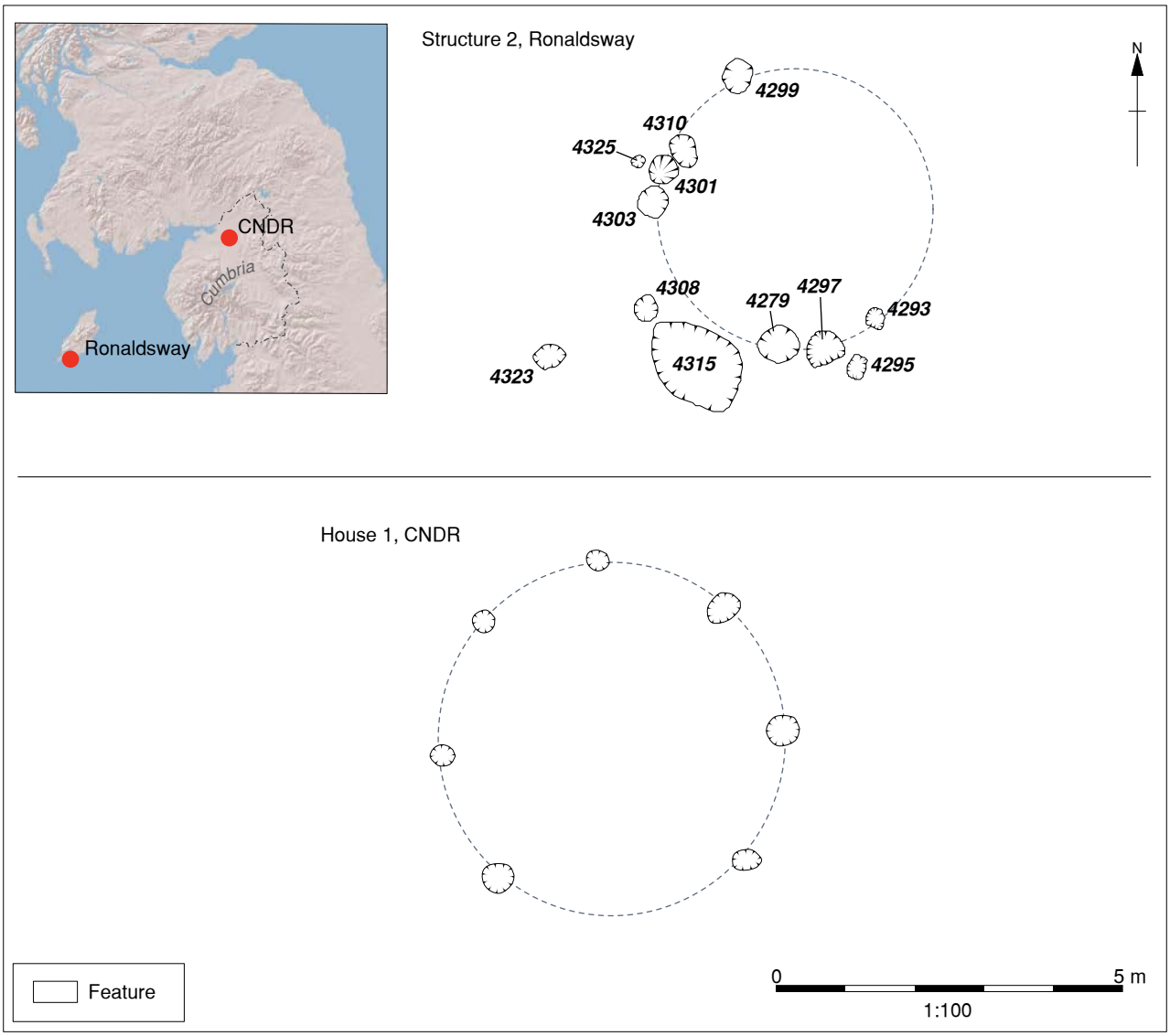


Figure 203: Structure 2 and the Early Bronze Age post-built house from the CNDR scheme, Carlisle

post-built houses also conform well with the wider, albeit also limited, evidence for Early Bronze Age buildings from other parts of the British Isles (Bradley 2019, 187).

The other highly important aspect of Structure 2 was the sherds from a Collared Urn recovered from it. Across northern Britain, this pottery type is normally associated with funerary sites (*Ch 5, p 153*; *cf* Longworth 1984), and hence its association with a possible domestic building is highly significant. It is not entirely unique, though, as very occasionally Collared Urn sherds have been found in association with domestic material, such as at Manchester Airport, where 64 of these vessels were found in a midden deposit within a hollow-way (Allen 2007, 62-5), and Stackpole Warren, Dyfed, South Wales, where a roundhouse dating to the first half of the second millennium cal BC produced 17 Collared Urns (Benson *et al* 1990). In addition, a complete Collared Urn was discovered as a 'stray find' on the Isle of Man, within a potential area of Bronze Age settlement on the north-west coast (*Ch 5, p 155*).

Importantly, the radiocarbon date from Structure 2, and by association the Collared Urn, is broadly contemporary with the radiocarbon dates (1960-1690 cal BC; 3515±45 BP; GrA-29940) obtained from the Collared-Urn funerary site at Staarvey, in Isle of Man's Southern Uplands, which was also associated with a Cordoned Urn (*cf* Woodcock 2008, 152). Therefore, the combined evidence indicates that Collared Urns were active elements of both domestic occupation and funerary practice during the first few centuries of the second millennium cal BC. In addition to the Collared Urn sherd, another sherd of probable Early Bronze Age pottery was also recovered from a pit, *c* 12 m north-west of Structure 2 (*Ch 5, p 165*), and this might also relate to domestic occupation in this area.

It also worth considering Structure 2 in its landscape setting (Fig 204), as this appears to provide good evidence for different zones and types of earlier Bronze Age activity in and around Ronaldsway Airport. It is clear, for instance, that this apparently domestic structure was integrated within a landscape also extensively used for burial. For instance, three burial mounds may have existed in the airport area, recorded in the eighteenth and nineteenth centuries (though no surviving evidence for these was recovered during excavations at the far end of the runway, at the 26 End site; *Ch 1, p 18*), and to the south, on the coast, a potential round mound has also been located at Hango Hill (*Ch 1, p 7*; Pl 90), an area

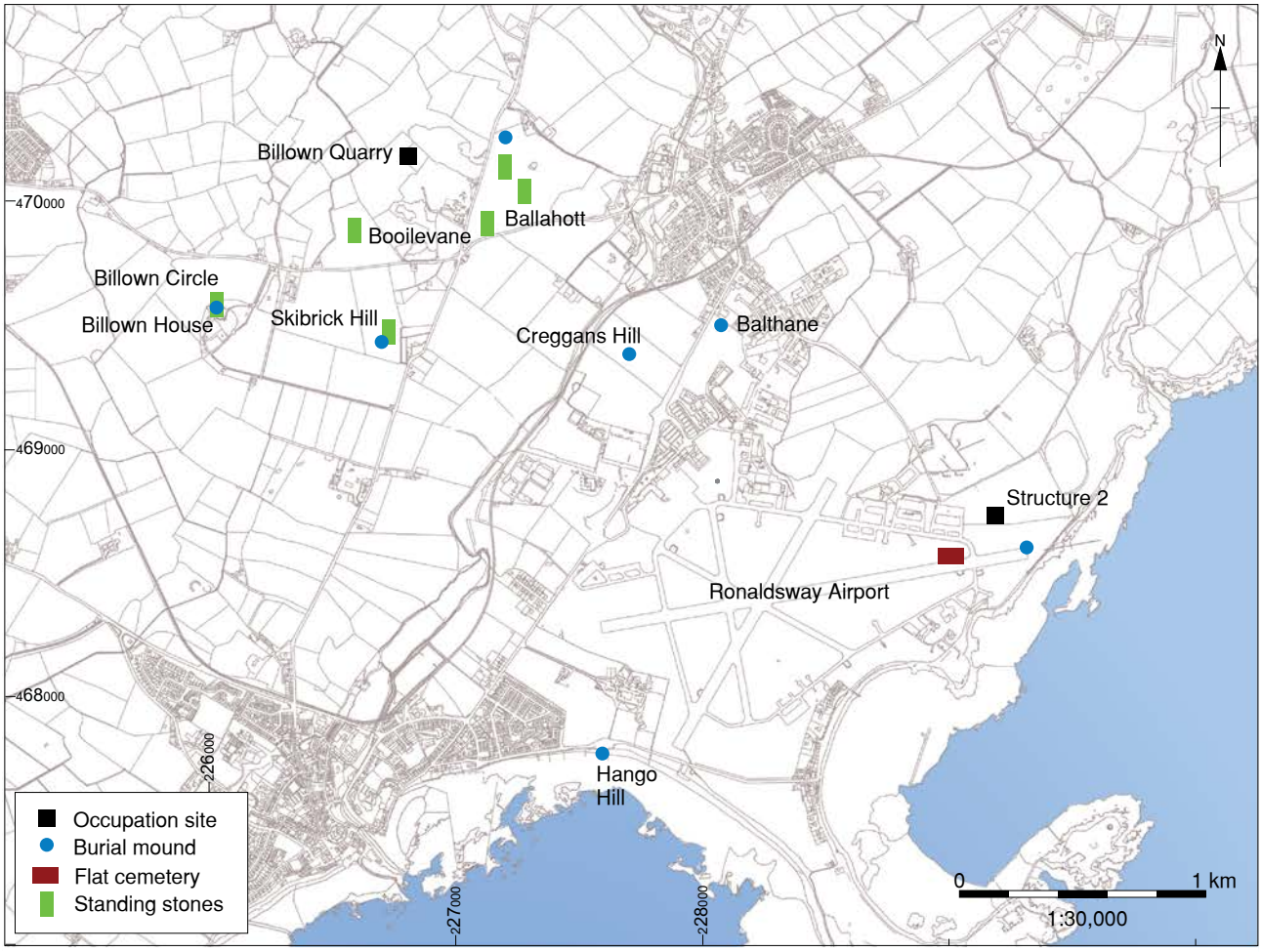


Figure 204: The location of other potential earlier Bronze Age sites in the environs of Structure 2



Plate 90: The Bronze Age round mound at Hango Hill, used as a platform for a post-medieval summerhouse (photograph by Andrew Johnson)

which has produced a bronze flat axe, dating to the last centuries of the third millennium cal BC (*Ch 5, p 155*). To the north, burial mounds have also been recorded on Creggans Hill and at Balthane (OA North 2015), whilst several other round mounds are known slightly further north-west, in the Billown area (*cf* Darvill *et al* 2004, ill 24). One of these, at Billown House, seems to have been constructed adjacent to the Billown stone circle (*Ch 5, p 150*), though the stone circle itself could also represent the remains of another round mound, whilst others include those at Ballahott (Cubbon 1932) and Skibrick Hill (Darvill *et al* 2004). It seems that earlier Bronze Age flat cemeteries (*Ch 5, p 155*) were also a feature of the Ronaldsway landscape, which again could have been contemporary with Structure 2. One of these, containing perhaps as many as 30 burials, was discovered during the creation of the airfield in the 1930s, and lies fairly close to Structure 2 (Cubbon 1938; *Ch 5, p 155*).

Other potential small-scale ritual sites include three standing stones to the north-east of the airport, in the Billown area, some of which might have been the focus for Bronze Age burial, based on the evidence from Bishop's Demesne, where a cist burial associated with standing stone has been radiocarbon dated to the early second millennium cal BC (Woodcock 2008, 152). The standing stones in the Billown area comprise two white quartz stones, on Skibrick Hill and at Booilevane (Pl 91), a granite standing stone at Billown, with three granite standing stones, east of Billown Quarry, at Ballahott (Laughlin 1996).

Billown is clearly important, as it could have been associated with an earlier Bronze Age settlement excavated as part of the archaeological investigation at the quarry (*Ch 1, p 12*). The situation remains unclear, however, though unidentified charcoal from the site has produced an earlier Bronze Age date of 2040-1780 cal BC (3590±40 BP; Beta-125766; Bayliss *et al* 2011b, table 11.5), seemingly from the recut of a short linear feature (described as ditch F127), which also produced an underlying date of 2470-2150 cal BC, derived from a charred barley grain (3855±40 BP; OxA-11084; *ibid*). Confusingly, however, this short ditch segment appears to have truncated a more extensive ditch, part of a D-shaped enclosure (originally thought to form part of a Neolithic enclosure; *Ch 5, p 147*), which has produced an earlier Bronze Age date of 1690-1490 cal BC (3300±35 BP; GrA-31541; *ibid*). Given this, it



Plate 91: The Booilevane quartz standing stone (photograph by Andrew Johnson)

is likely that the material from the ditch segment is residual, though it does seem to point to clearance, agricultural activity, and/or settlement approximately contemporary with Structure 2.

Therefore, the landscape in the Ronaldsway area may have been dominated by burial sites at this time, potentially established by different groups of people, with limited areas of clearance associated with small timber domestic structures; however, towards the end of the earlier Bronze Age, ditched boundaries seem to have been established (perhaps including some of those detected at the airport by geophysical survey; *Ch 1, p 14*). This could have related to a more formalised system of tenure, with home ranges or territories, and agricultural areas, being more explicitly defined and marked, which may, in turn, have been a precursor to the establishment of more substantial settlements and boundaries in the Middle/ Late Bronze Age.

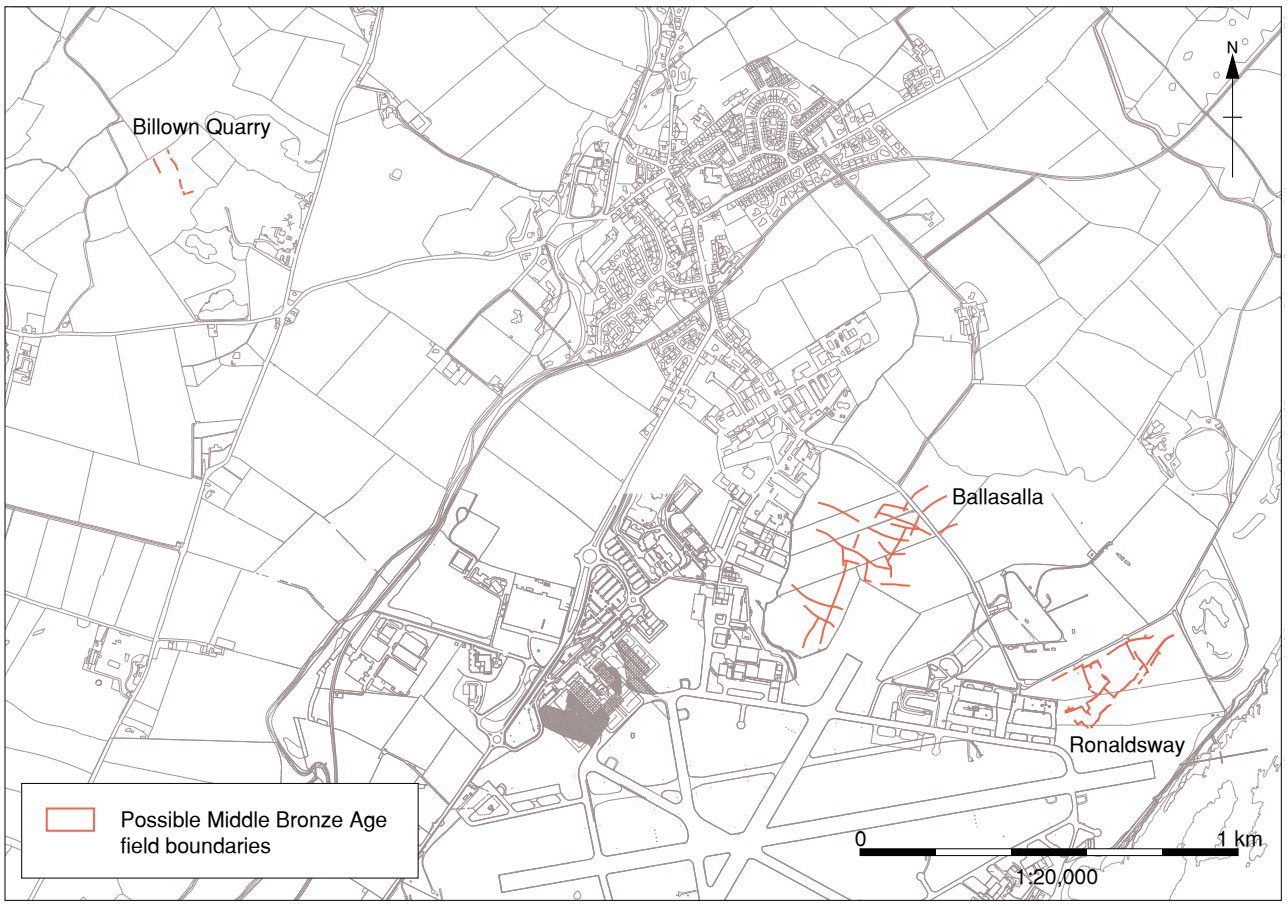


Figure 205: The potential Middle Bronze Age field system extending across the Ronaldsway, Ballasalla, and Billown areas

11

VILLAGERS AND WARRIORS

Richard A Gregory, with Helen Evans and Helen Webb

Taxiway Alpha East produced one of the largest, and arguably most dramatic, swathes of archaeology encountered during the RESA project, forming elements of a later Bronze Age field system, settlement, and Iron Age burial ground. The undeniable value of the later Bronze Age and Iron Age archaeology in this area was its coherence, and the fact that the remains provided an excellent insight into life within a later prehistoric settlement, its development, eventual abandonment, and reuse. Other important Iron Age remains, relating to settlement, were also discovered at the Control Tower site, with some additional evidence for historic-period land-use and activity scattered across the airport, which all contribute to an overall understanding of landscape development on this part of the Plain of Malew.

Dividing and Enclosing the Later Bronze Age Landscape

During excavation at the later Bronze Age settlement at Taxiway Alpha East, it became clear that three of the roundhouses overlay an infilled ditch forming elements of an earlier boundary. The available dating evidence indicates that this boundary was established immediately prior to *c* 1200 cal BC, most probably in the initial centuries of the later Bronze Age (*Ch 6, p 174*), and the suspicion is that it formed just one element of an extensive field system, which, based on the geophysical and cropmark evidence, seems to have extended across the airport and perhaps even into the Ballasalla area to the north-west (Fig 205; Pl 92).

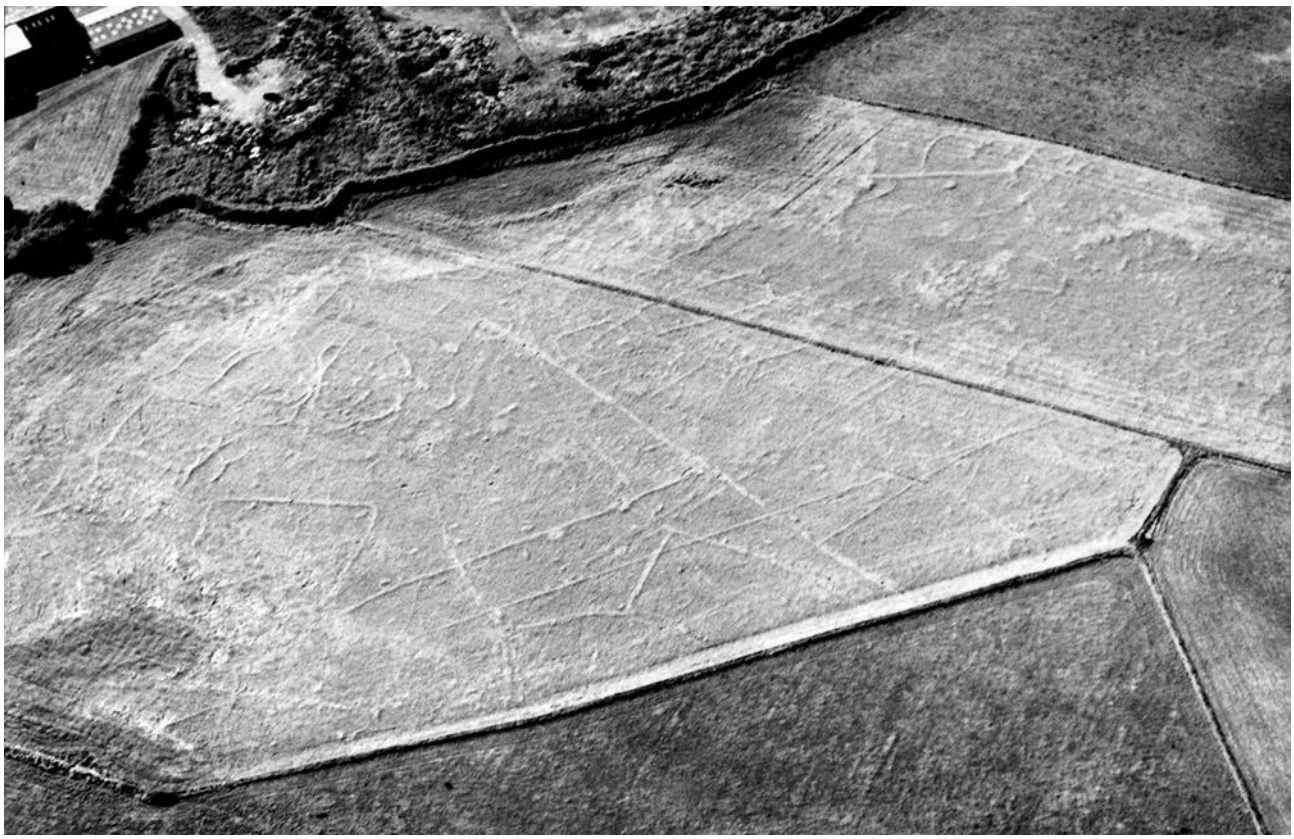


Plate 92: The palimpsest of cropmarks at Ballasalla, dating to various periods, including the possible Middle Bronze Age field system

It was also evident from the layout of the settlement that this ditch continued to form an important landscape feature, as its associated earthen/turf bank probably survived; indeed, it may even have provided shelter for the settlement.

The form of the field system, as far as can be ascertained, shares some similarities with the 'coaxial' systems of this period in mainland Britain, defined by small rectangular or square enclosures, aligned parallel with, or at right-angles to, a dominant boundary (Historic England 2018a). Indeed, the excavated feature at Taxiway Alpha East could well represent one such principal boundary, forming the main axis for the fields to its north and north-west. The suspected importance of this boundary might also explain why it was singled out for the burial of a complete sheep carcass (*Ch 6, p 174*), immediately prior to the establishment of a later Bronze Age settlement (*Ch 6, p 176*).

It certainly seems that the Ronaldsway/Ballasalla field system, and also another excavated at nearby Billown Quarry (even, perhaps, another element of the same system; *Ch 6, p 171*), reflects a considerable investment in manpower, with the aim of dividing and enclosing large swathes of the lowland coastal landscape, which lies within one of the most agriculturally fertile parts of the island (*Ch 1, p 2*). Although it seems possible, based on the evidence from Billown Quarry, that the initial process of landscape division began in the earlier Bronze Age (*Ch 10, p 336*), the evidence from Ronaldsway and Ballasalla would imply that its scale and extent dramatically increased during the middle centuries of the second millennium cal BC (*ie* traditionally, the Middle Bronze Age), presumably as a result of increases in population, changes to agricultural practice, and perhaps also markedly different attitudes to the division and tenure of the landscape (*cf* Yates 2007, 134-8). This first major division of the landscape would probably also have created the physical and conceptual framework for later schemes of prehistoric enclosure. This certainly seems the case at Billown Quarry, where the Middle Bronze Age field system was probably expanded during the Iron Age, through the establishment of additional enclosures (*Ch 8, p 258*), effectively then becoming an 'accreted field system' (Historic England 2018a).

Of course, the creation of such extensive field systems in the Middle Bronze Age (*c* 1500-1100 cal BC), and the concepts and functions that they embodied, are a common trait of this period (*cf* Bradley 2019, 226) and, in this sense, they 'anchor' Man into the wider Bronze Age world. Notably though, coaxial field systems of this type are normally associated with landscapes in southern, eastern, and south-western England (*ibid*; Yates 2007), with one example being present at St David's Head, in south-west Wales (Darvill and Wainwright 2016, 183); at present there is little evidence for chronologically similar field systems in the Irish Sea area, North Wales, north-west England, south-west Scotland, and Ireland. These areas seem instead to contain physical evidence for clearance and enclosure, both earlier and later than the Middle Bronze Age, in the form of earlier Bronze Age cairnfields in the uplands, and later prehistoric field systems in both lowland and upland areas (*cf* Davies and Lynch 2000; RCAHMS 1997; Quartermaine and Leech 2012), with only very piecemeal evidence for Middle Bronze Age landscape division. This is represented, for example, in the whole of the Solway area by just one ditched boundary, close to Carlisle (Brown *et al* 2023). At one level, this might suggest that there was a stronger link between those communities on Man with more distant coastal communities that operated in areas such as south-western England and south-west Wales during the mid- and late second millennium cal BC. Whilst this link, based on the presence of morphologically similar fields systems, might seem overblown, it is perhaps notable that a similar connection can also be made between the later Bronze Age domestic architecture, and settlement layout and functioning, in these geographically separate areas (*p 351*).

A Later Bronze Age 'Village'

Domestic buildings and the use of space

Fortuitously, the position of Taxiway Alpha East allowed an apparently large slice of the later Bronze Age settlement to be exposed (Pl 93), where it seems that, initially, a primary dwelling (Roundhouse 1; *Ch 6, p 176*) was established, perhaps just after *1250 cal BC*, which, based on its size (*c* 7.8 m in diameter; Pl 94), was probably home to a single family. Following this, the settlement area was expanded, in *1200-1100 cal BC*, with the creation of a second probable dwelling (Roundhouse 2; *Ch 6, p 180*) that also might have housed a single household. Both houses were probably in use at the same time, and were next to each other, presumably primarily used as living areas, where eating and other waking activities, and sleeping, took place, along with the storage of foodstuffs and other materials. Finally, after the abandonment of these two houses (*p 358*), another probable dwelling (Roundhouse 6; *Ch 6, p 194*) was constructed, probably around *1000-900 cal BC*, though this was markedly smaller than the earlier dwellings.

The radiocarbon evidence indicates that these houses had lengthy 'biographies', with Roundhouse 1 being occupied for the longest, potentially covering a 250-year span, Roundhouse 2 being potentially used for up to 200 years, whilst, similarly, Roundhouse 6 was



Plate 93: Excavation of the later Bronze Age settlement at Taxiway Alpha East



Plate 94: The excavated footprint of Roundhouse 1. The people to its rear provide an indication of its scale

perhaps occupied over a 200-year period. However, given that there was no firm evidence for repeated rebuilding or renewal at any of them, such durations are probably over-extended, and it seems more likely that occupation was much more compressed, perhaps covering just one generation, or perhaps, in the case of Roundhouse 2, at a push two generations. Such contracted periods of occupation seem to be a common feature of settlement dating to this period, at least in southern Britain (*cf* Brück 2001).

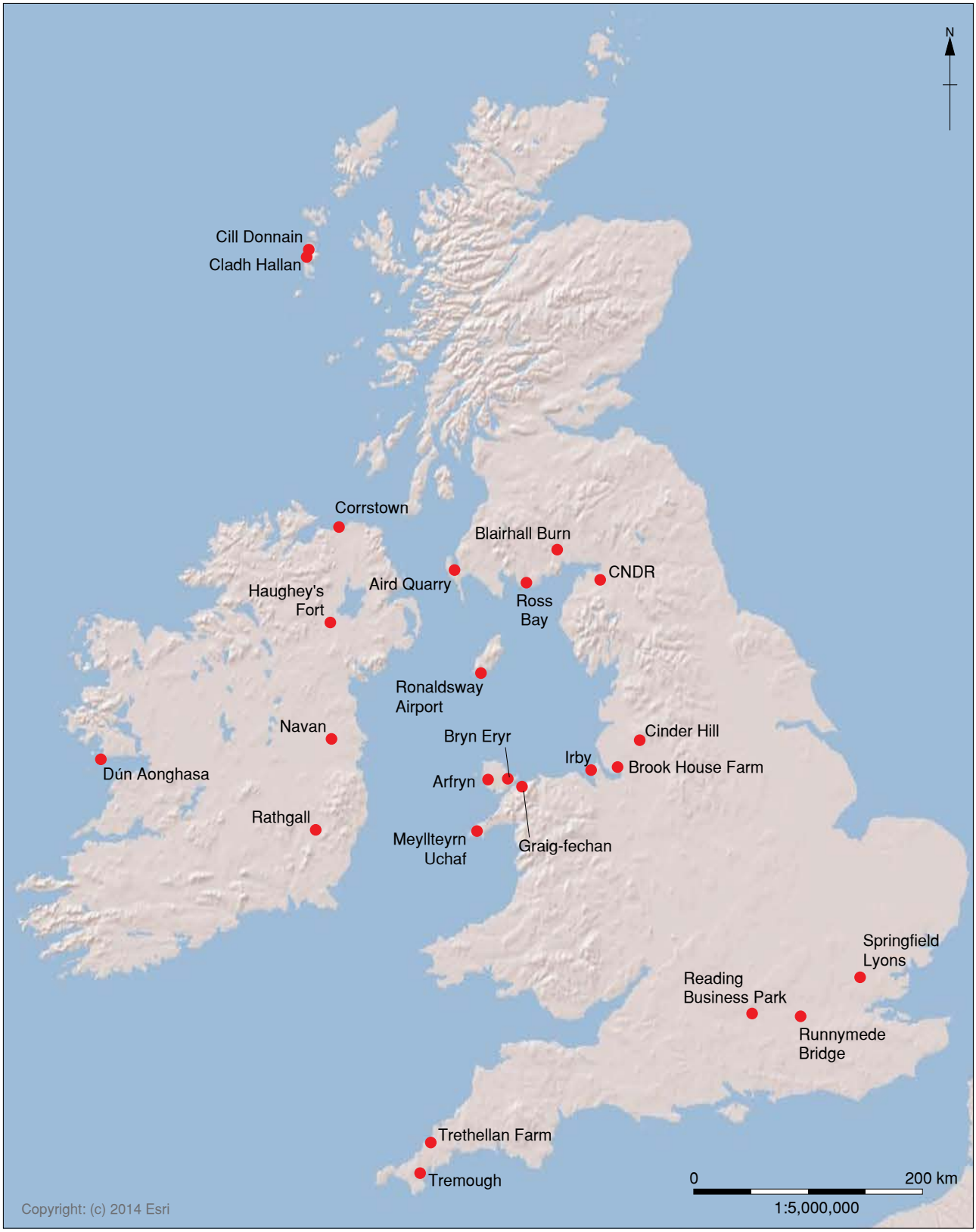


Figure 206: Later Bronze Age sites mentioned in the text

It has been suggested elsewhere that the layout of domestic space was carefully structured and ordered, through reference to wider cosmological beliefs (*cf* Fitzpatrick 1994; Parker Pearson 1999; Parker Pearson and Sharples 1999), within other excavated later Bronze Age settlements, such as those at Cladh Hallan on the Outer Hebridean island of South Uist (Parker Pearson *et al* 2004, 69-73; Fig 206), and also within later roundhouses dating to the first millennium cal BC (*ie* the Iron Age). Indeed, it has been argued that the movement of the sun from east to west was of fundamental cosmological importance, and has been used to explain why many later Bronze Age and Iron Age roundhouses were provided with (often elaborate) easterly/south-easterly entrances, referencing the rising sun, particularly at the equinoxes and mid-winter solstice (*cf* Parker Pearson 1996; Oswald 1997; although see Pope (2007) for alternative suggestions, based on the availability of natural light). It has further been suggested that the clockwise movement of the sun around a central hearth was associated with structured domestic space, with daytime activities, such as food preparation, eating, and weaving, being undertaken in the southern portion of the house, thus mimicking the position of the sun, whilst night-time activities, principally sleeping, occurred in the northern half (Fitzpatrick 1994). In addition, it has been argued that, aside from daily activities, the movement of the sun in relation to the architecture of the house also embodied longer timescales, specifically a person's lifecycle from birth to death, with birth being associated with the south-east (daytime/light) portion of the house, and death being linked to its north-east (night-time/dark) quadrant (Parker Pearson 1999). Some supporting evidence for this was discovered at Cladh Hallan, where dog and human burials, including mummified and curated remains, were predominantly placed in the north-eastern part of the roundhouses (Parker Pearson *et al* 2004, 74; Parker Pearson *et al* 2005).

It is therefore informative to consider whether the layout of Roundhouses 1 and 6, the most complete of the dwellings, conforms from the standpoint of this cosmological 'model'. One obvious point of similarity is that the entrances were orientated east (Roundhouse 1) and south-east (Roundhouse 6), though this positioning may well have been pragmatic, given that the prevailing wind direction at the airport is westerly for almost ten months of the year, and from the south, for two months during the spring (Weather Spark 2022).

Entrances aside, the organisation of the larger Roundhouse 1 is, however, highly informative (Fig 207). For instance, when moving into this house, the first thing that would have been encountered was a screen, protecting the central hearth from any strong gusts of wind blowing through the entrance, therefore effectively creating a 'fire guard'. The position of this screen meant that movement into this house would only be possible in a clockwise direction, which again seems to chime with the idea that roundhouse architecture embodied sunwise movement. In this case, this movement would only allow access into the southern part of the house. According to the model, this area should relate to daytime activities, such as eating, food processing, and craft activities. It is therefore significant that the central hearth was surrounded by four structural posts that may also have secured a possible gantry, supporting a cooking pot over the fire, and that because of the screen at the entrance (*above*) and a second screen on its northern side (*below*), the easiest access to the hearth and gantry would be from the south-east. The southern side also contained a pot stand, which may have held vessels containing drinking water.

It does seem then that the southern side of the house, particularly its south-western quadrant, was associated with eating, fitting well with the suspected underlying structuring of space. According to the model, the northern side of the house would be given over to sleeping and, indeed, it does seem feasible that in Roundhouse 1 a sleeping area was situated in the north-western quadrant of the house, between the hearth and a screened-off storage area under the northern eaves. Furthermore, this would probably explain why a second screen or fire guard had been erected on the north-western side of the hearth, effectively blocking access to the fire from this passive area, and perhaps also protecting those sleeping from any sparks from the fire, as well as dimming the light emanating from the hearth. It might also be the case that this side was deemed suitable for other passive activities, which would explain the position of the storage area beneath the northern eaves. There is some precedent for this, as it has been argued that sleeping and storage areas were at times spatially linked within some later prehistoric roundhouses (such as the Iron Age brochs of Atlantic Scotland), both being placed in the drier parts of the house (Parker Pearson 1999). Interestingly, the well-preserved roundhouses at Must Farm, Cambridgeshire, dating to the mid-ninth century cal BC, also contained 'empty' (passive) areas in their north-western quadrants, perhaps denoting sleeping areas, which suggests some commonality in the structuring and use of domestic space during the later Bronze Age (*cf* Knight *et al* 2024, 166-7). It is also quite possible that a broadly similar pattern was followed in Roundhouse 6, although this building had a much smaller footprint. In this instance, the hearth was located in the southern portion of the house, suggesting a connection with an eating/living area, with a possible sleeping area to the north.

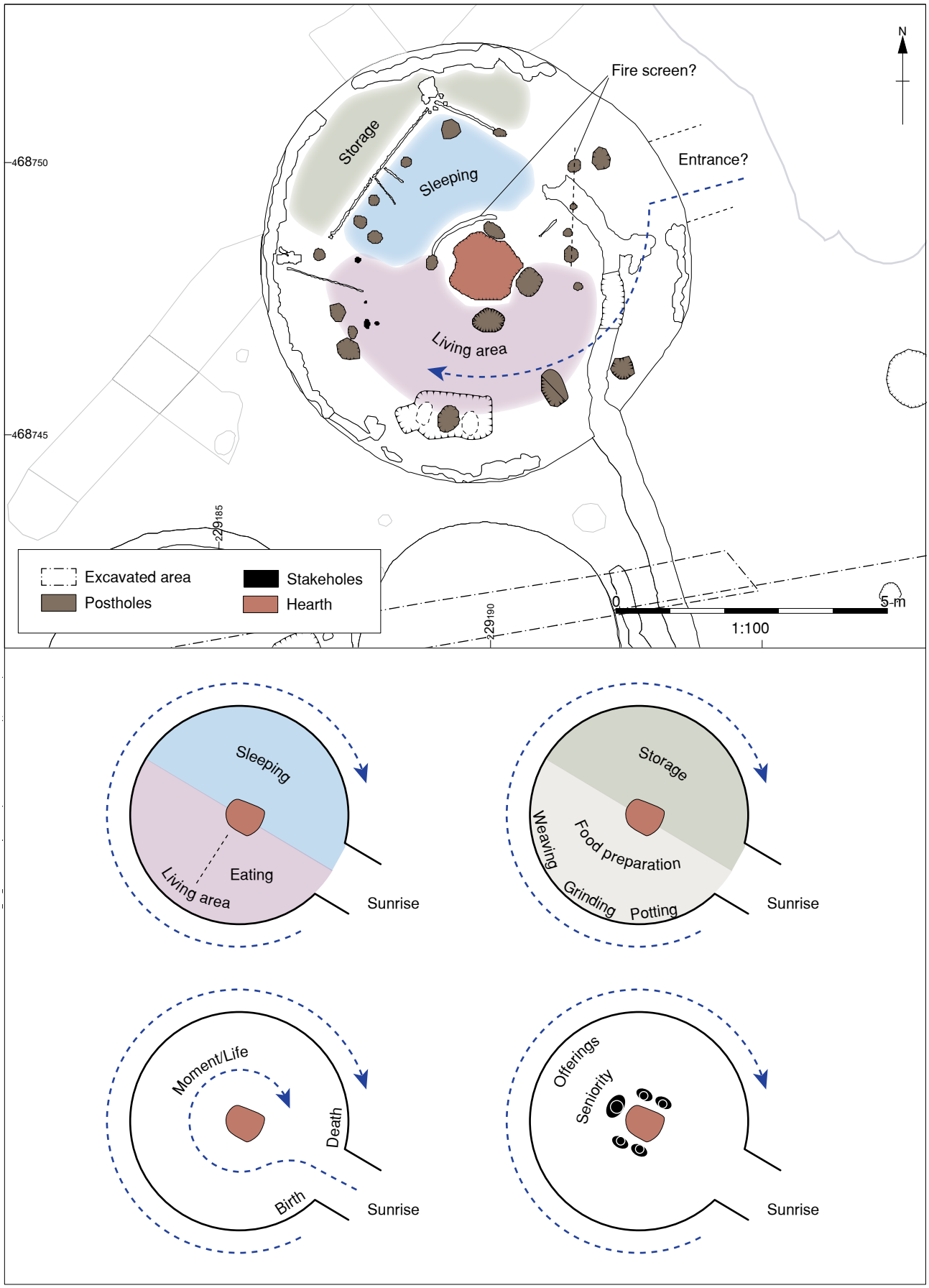


Figure 207: Roundhouse 1 and the cosmological internal ordering of later prehistoric roundhouses proposed by Fitzpatrick (1994), and Parker Pearson and Sharples (1994)

Taking all of this into consideration, a very good case can therefore be made that the internal layout, particularly within Roundhouse 1, fitted quite closely with Andrew Fitzpatrick's (1994) and Mike Parker Pearson's (1999; Parker Pearson and Sharples 1999) ideas relating to the cosmological organisation of space within British later prehistoric dwellings. Thus, space within this dwelling, and probably also the other domestic buildings at the site, in a similar way to the Mesolithic house at Cass ny Hawin II (*Ch 10, p 317*), may well have adhered to some underlying principles that seemingly exerted a pervasive influence during the later Bronze Age across large parts of Britain, influencing the design and use of many later prehistoric dwellings.

Specialised buildings and the midden

Several other buildings were constructed (Fig 208) during the expansion of the Taxiway Alpha East settlement in *1200-1100 cal BC* (*above*), which, when compared with the domestic roundhouses, may have had more 'specialised' functions. Although it is perfectly feasible that domestic occupation did, at times, occur within these buildings (*cf* Brück 1999), or was concomitant with the activities within them, they do seem to have served the settlement in slightly different ways, providing focuses for other activities that were firmly embedded within the domestic sphere. This apparent differentiation of functional space is extremely important, as the use of buildings from this period, at least in the Irish Sea area, has normally proved difficult to determine, and hence Taxiway Alpha East, and also nearby Billown Quarry (*Ch 6, p 171*), provide a valuable, and currently unique, insight into the organisation of a later Bronze Age settlement.

One of these 'embedded' buildings at Taxiway Alpha East (Roundhouse 3; *Ch 6, p 181*), devoid of any internal

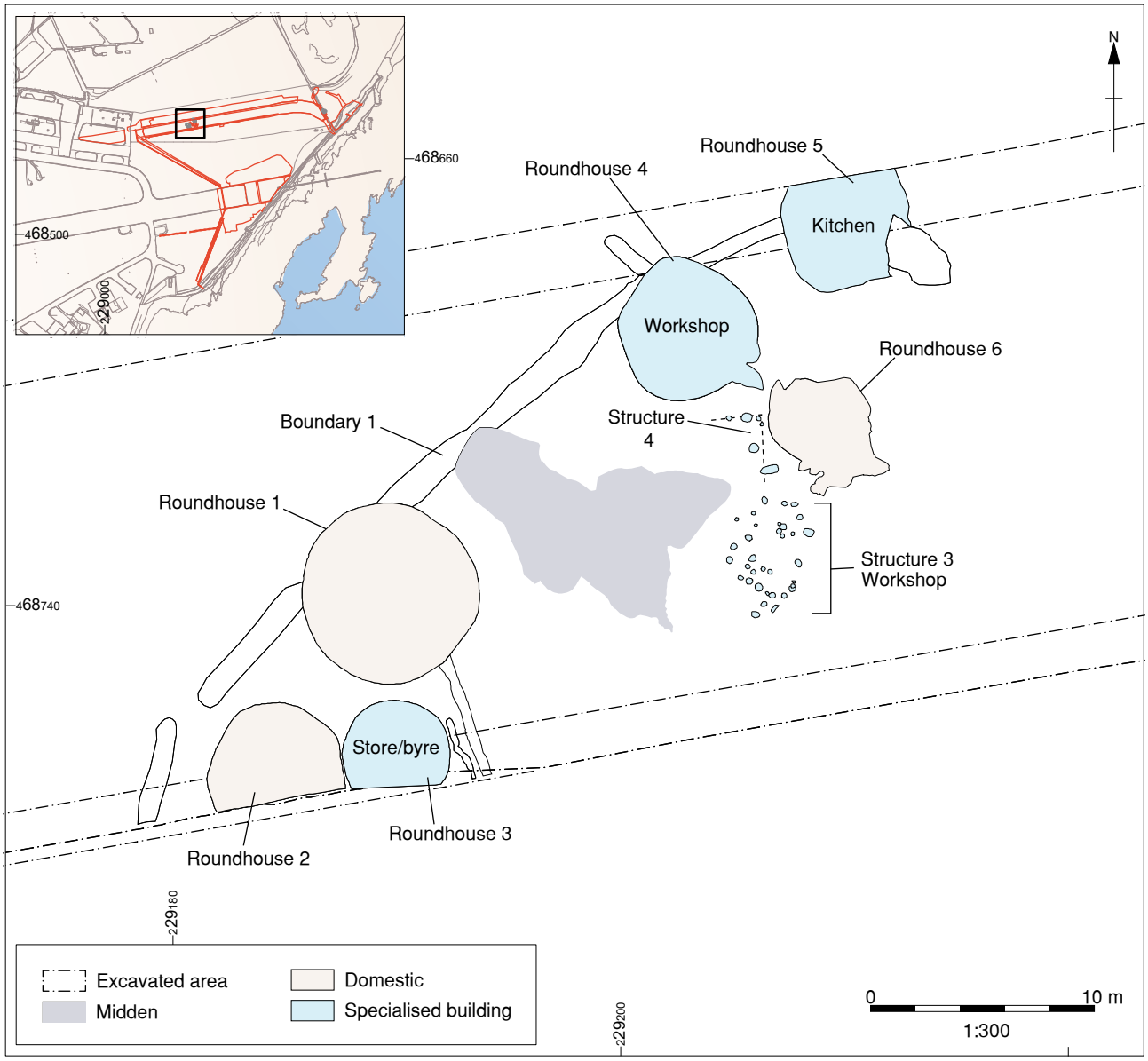


Figure 208: Specialised buildings in the later Bronze Age settlement at Taxiway Alpha East

features, was probably a store or byre immediately adjacent to one of the dwellings (Roundhouse 2). Another, Roundhouse 5 (*Ch 6, p 185*), had a strong association with food, in that it produced large amounts of animal bone and contained an oven. This building was therefore probably associated with the cooking and processing of food, perhaps akin to some later medieval kitchens, in that it formed a separate, dedicated building, set apart from the residential quarters. It also seems to have been an important structure, in the wider settlement, as the radiocarbon evidence (*Ch 6, p 202*) suggests that it may have continued to be used beyond the abandonment of the nearby dwellings. Whilst it had the typical south-eastern entrance (*p 343*), spatially it was quite different from the nearby structures. For instance, there was no evidence for a central hearth, which seems to have been one of the defining features associated with the domestic buildings, and the oven was situated in the rear, northern part of the house, an area which in the domestic buildings (at least in Roundhouse 1) seems to have been used for sleeping and storage (*p 343*). It is also worth noting that it seems to have been an 'auspicious' structure, given the way it was treated following its abandonment (*p 358*).

In addition to the houses and putative kitchen, the settlement also contained two probable workshops, engaged in metalworking. One (Structure 3; *Ch 6, p 186*) was probably an open-sided 'shed', containing a timber platform and a large hearth used for the smelting/casting of bronze. In contrast, the other had the more familiar form of a roundhouse (Roundhouse 4; *Ch 6, p 181*) associated, in this instance, with both bronze- and lead working/casting. In a similar way to the putative kitchen, this building had a south-eastern entrance, but also had a large hearth, close to the centre of the building, and hence was clearly similar to the domestic structures. Spatially, it seems possible, from the distribution of artefacts, specifically crucible/mould fragments (*Ch 6, p 205*), that metalworking was largely undertaken in the north-eastern quadrant, an area that also contained a scattering of postholes and pits. Of course, in a similar way to the dwellings, activity within this building may also have been influenced by deeper-rooted cosmological perceptions, and this could suggest that such metalworking activity, involving the transformation of molten metal into finished objects, and the connotations that this carried, needed to be confined to the darker/night-time parts of the building.

One further feature worthy of comment is the large midden at the centre of the excavated area (Pl 95). As no buildings or structures were discovered beneath it, it seems highly probable that it was a designated area of disposal from the outset (probably initially receiving waste from the primary dwelling, Roundhouse 1),



Plate 95: Excavation of Midden 1, with the cairn covering Roundhouse 6 visible in the background

and then influenced the layout of the settlement as it expanded. In the later Bronze Age, it was probably a very conspicuous feature, covering an area of *c* 12.5 x 7 m, at its maximum extent, and could feasibly have stood to some height.

The position of a midden at the heart of the settlement is also interesting, particularly as it was practically adjacent to the primary domestic structure, the entrance to which also seems to have faced it directly. It appears therefore that there was a close juxtaposition between refuse and this dwelling. Whilst this does at one level seem to relate to pragmatic considerations, with waste from the interior of the roundhouse being conveniently swept out of its entrance directly onto the midden (*Ch 6, p 205*), it does also appear, from other later Bronze Age settlements, that living next to, or sometimes even within, refuse formed an important element of domestic life. For example, at Sumburgh, Shetland, one particularly striking feature of the Middle and Late Bronze Age houses was the incorporation of midden material directly into the walls (Downes and Lamb 2000).

Based on these juxtapositions, it is therefore possible that 'refuse' partly functioned as a positive cultural material rather than merely being regarded as waste. Indeed, it has been noted that there were positive aspects to 'refuse' during the later Bronze Age (Brück 2001, 154), and that 'it may be that the accumulation of refuse was another way of signifying status, by providing visible evidence of animal ownership, high levels of craft production and of substantial consumption of food, pottery and other artefacts'. Given this, the midden at Taxiway Alpha East perhaps also embodied such concepts, which, given its size and composition, further imply that those living next to this midden were a relatively high-status group.

Another idea is that those middens directly adjacent to houses were viewed as 'living entities' by later Bronze Age communities, being partly associated with notions of fertility and reproduction (Robinson 2013). In this sense, they might therefore contain spent materials that were still deemed important to the activities and histories of the nearby households. Following this line of reasoning, it might be further expected that such significant midden materials could be reappropriated and used in other ways (*p 359*).

Architecture

Architecturally, the buildings at Taxiway Alpha East were built in similar ways (Table 76). All, for instance, were constructed in a shallow pit/hollow and hence, as with the much earlier house at Cass ny Hawin II (*Ch 10, p 314*), can be loosely classified as pit-houses (Fig 209). In most cases (Roundhouse 4 aside), these pits were lined with drystone retaining walls. These were almost certainly load-bearing, though there are two possibilities for how these were used. One is that they formed low features, effectively a stone platform, with the rafters of the house resting directly on them. This technique could well have been used in the case of Roundhouses 1-3. In contrast, those associated with Roundhouses 5 and 6 contained settings for upright timber posts, which probably formed an outer post-ring, supporting a ring-beam, with the stone providing additional support. Hence, in these cases, the wall and post-ring would have been positioned beneath, and would have supported, the eaves of the house.

In three cases (Roundhouses 1, 5, and 6), an internal post-ring was also present, again supporting a ring-beam that functioned as a further load-bearing element designed to support the roof, which in the case of the largest (Roundhouse 1) was further supported by a square setting of posts at the centre of the building. The roof of one roundhouse (Roundhouse 4) was seemingly only supported by a central load-bearing post, and in this case no internal post-ring was present. This probably indicates that it originally did possess a drystone wall, functioning in a similar way to that associated with Roundhouses 1-3, but this had been removed at a later date. There are also two instances (Roundhouses 2 and 3), in which no internal posts were seemingly present, though both contained a retaining wall (*above*). In these cases, this would have supported the entire weight of the roof, with the rafters forming a conical structure, probably lashed together in a self-supporting tepee-style arrangement. Other associated structural features comprised stone-lined drains, with three examples (associated with Roundhouses 1 and 6,

Roundhouse	Pit-house (diameter)	Kerb wall	Internal post-ring (diameter)	External post-ring (diameter)	Centre post(s)	Post-built fixtures and fittings	Drain
1	7.8 m	X	5.8 m		X	X	X
2	6 m	X				X	
3	4.8 m	X					
4	5.8 m				X	X	X
5	5.4 m	X	2.6 m	5.4 m		X	
6	4 m	X	2.4 m				X

Table 76: Architectural features associated with the later Bronze Age roundhouses at Taxiway Alpha East

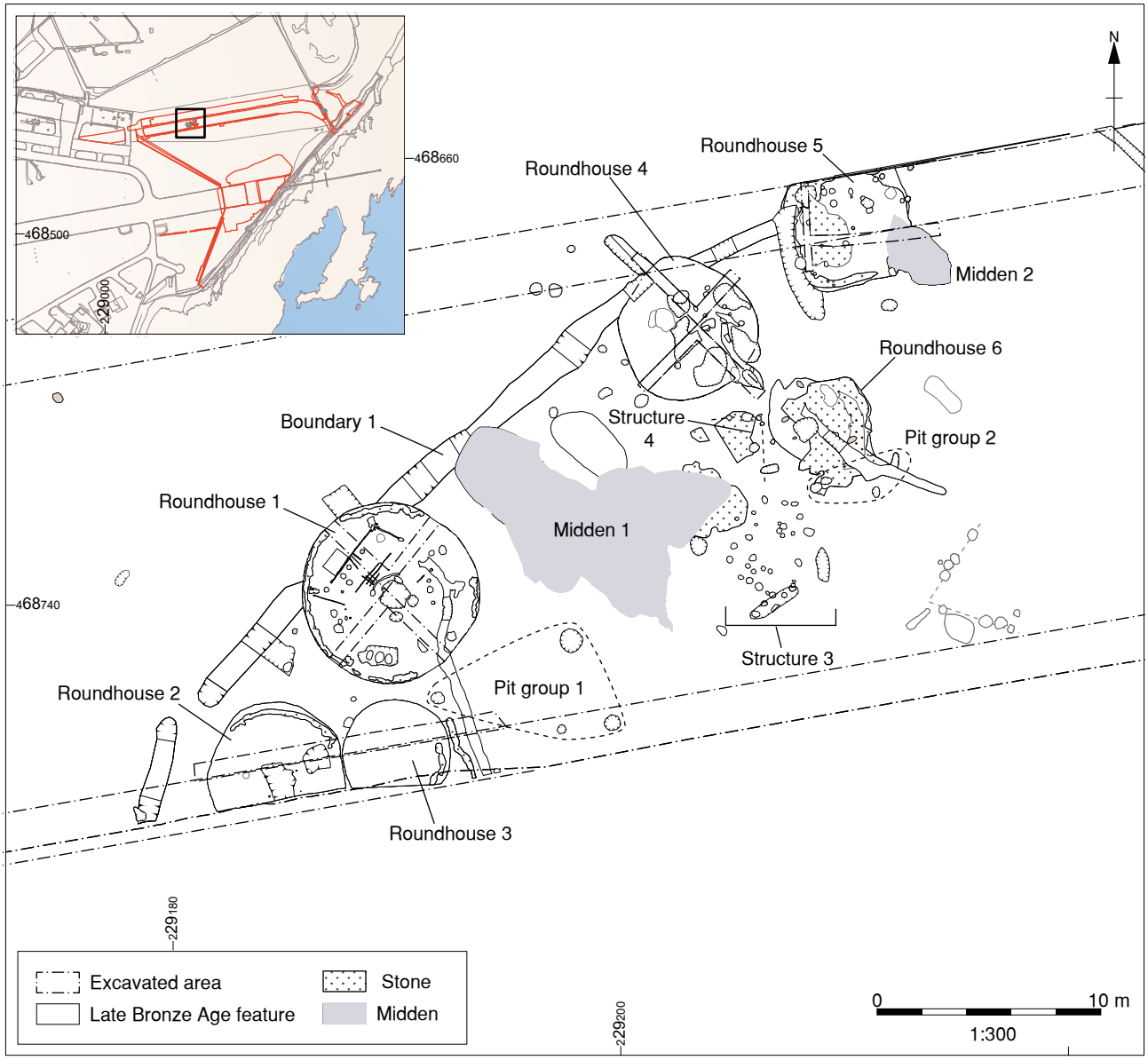


Figure 209: Roundhouses 1-6 at Taxiway Alpha East

which seem to have been dwellings, and Roundhouse 4, which may have been a workshop; *p 345*).

On the Isle of Man, good parallels for these buildings are known at Billown Quarry, where several similar-sized roundhouses have been excavated, also dating to the same chronological period (Darvill *et al* 2003; *Ch 6, p 171*). These were also situated within hollows, terraced into the slope, adopting a pit-house approach. Some also employed drystone walling, together with external post-rings, to support the roof, and two were provided with stone-lined drains. It also seems that another set of comparable later Bronze Age roundhouses were located at Braddan, Douglas, which were in the process of being excavated in the autumn of 2024 (P Dunn *pers comm*). This seems to suggest that such buildings typify the local later Bronze Age vernacular architecture on Man. These buildings are also important regional examples in the wider Irish Sea area, and form comparanda to later Bronze Age buildings in north Wales, north-west England, south-west Scotland, and Northern Ireland. Some date to the latter half of the second millennium cal BC, whilst others date to the first centuries of the first millennium cal BC.

Most of the examples dating to the later second millennium cal BC were of timber, defined by either single or double post-rings, forming part of a widespread Bronze Age tradition of post-built roundhouses in northern Britain. These, on current dating evidence, appeared around 1800 cal BC and continued into the early first millennium cal BC (Pope 2015; Brown *et al* 2023). Many are also associated with unenclosed sites, as is the Ronaldsway settlement, though some examples in north Wales were enclosed.

These include a possible double post-ring roundhouse at Arfryn, Anglesey (Fig 210), with a porched eastern entrance and a diameter of 5.6 m, which was situated within a circular enclosure (Hedges 2016). It has also been suggested that this could have been clay-walled, incorporating timber uprights, with the wall lying beyond the outer post-ring. Other timber and clay-walled roundhouses of this design are known nearby at Mellteyrn Uchaf, on the Llŷn peninsula, which were within a circular enclosure, suggesting a distinct regional later Bronze Age building tradition (*ibid*; Ward and Smith 2001).

Two post-built house sites are also known from the Mersey Basin, one at Cinder Hill, Cutacre, Greater Manchester, dating from slightly earlier than those at Ronaldsway, at *c* 1480-1260 cal BC (Gregory *et al* 2021, 222), and containing a single house defined by a single post-ring, with a diameter of *c* 7 m, supporting the roof and acting as the outer wall (Fig 210). This also had a porched south-eastern entrance and a drip-gully, indicating that the eaves overhung the outer wall by some 2 m. The other Mersey Basin site is at Irby, in the Wirral, and this contained one or more structures dating to *c* 1500-1120 cal BC (Philpott and Adams 2010). The site contained a scattering of postholes that are difficult to interpret, though these might relate either to a single large roundhouse (Structure 27), with a diameter of *c* 15 m, defined by a double post-ring, or three structures (Structures 27A, 27B, and 28): two consecutive single post-ring houses (Structures 27A and 27B), each with a diameter of *c* 14 m and a south-western porch, with another house with a similar diameter (Structure 28) immediately to the south-west.

Several roundhouses, dating to the mid-second millennium cal BC, have also been excavated around the Solway Firth. In Cumbria, these comprise four examples recorded during the construction of the Carlisle Northern Development Route (CNDR; Brown *et al* 2023). One (House 2; Fig 210) was a small, single post-ring structure, with a diameter of *c* 4.6 m, radiocarbon dates placing its establishment/use at 1500-1415 cal BC. In contrast, the other three post-built roundhouses (Houses 4-6) were found in a discrete Middle Bronze Age settlement. All were double post-ring structures, with internal diameters in the range of *c* 8.4-9.4 m, again with porches. This settlement initially contained a single roundhouse (House 5), which was then replaced by two contemporary houses (Houses 4 (Fig 210) and 6), dating to 1500-1400 cal BC.

On the northern side of the Solway, a very similar double post-ring roundhouse was found at Blairhall Burn, close to Dumfries (Strachan *et al* 1998). This (Structure 2; Fig 210) had a diameter of *c* 7.5 m and dated to the second half of the second millennium BC. A slightly earlier Bronze Age house of comparable, double post-ring design was also found, dating to the second quarter of the second millennium cal BC (*ibid*), adjacent to an oval-shaped house, partly defined by a curving foundation trench (a 'ring groove' slot) and a scattering of pits/postholes, that was built on a terraced platform, akin to those Bronze Age houses associated with 'unenclosed platform' settlements in the uplands of northern Britain (*ibid*; Pope 2015). This oval house was radiocarbon dated to the middle centuries of the second millennium cal BC (Strachan *et al* 1998), though the use of a ring-groove in securing an outer wall line places it in a slightly different building tradition from the other Middle Bronze Age post-built roundhouses in northern Britain (Pope 2015).

A ring-groove construction slot was used in Bronze Age roundhouse designs in the Irish Sea region in the middle centuries of the second millennium cal BC, for instance, in Kirkcudbrightshire, where an excellent example, dating to *c* 1530-1250 cal BC, was excavated at Ross Bay; this had a diameter of *c* 10 m, with an internal post-ring, and a south-eastern porched entrance (Ronan and Higgins 2005; Fig 210). This house type is also found in Northern Ireland, together with houses in the post-built tradition (*cf* Doody 2000), for instance, at Corrstown, Portrush, Co Londonderry, where 74 roundhouses were mostly occupied simultaneously between 1370 cal BC and 1250 cal BC (Ginn and Rathbone 2012; Rathbone 2013). Structurally, these could be divided into two main types (Ginn and Rathbone 2012, 14-16). Type 1 was the more prevalent, typically characterised by an outer segmented ditch, probably a drainage feature, within which was an inner post-ring forming the external wall of the house, which also supported the roof. Inside this post-ring, and within the house, some of the Type 1 houses also contained an inner segmented ditch, concentric with the outer ditch, and it is possible that in some cases a bank existed between the two ditches, forming the base for a non-load-bearing wall associated with the outer post-ring (*ibid*; Fig 210). Some of the Type 1 houses also contained an inner post-ring, providing additional support for the roof, and many had elaborate, often porched, south-eastern entrances. The diameters of these houses ranged between 6 m and 11 m (*op cit*, 197) and, in essence, segmented ditches aside, these buildings are largely comparable to the post-built Middle Bronze Age roundhouses on the eastern side of the Irish Sea (*above*). The second house type (Type 2) was larger in size, with diameters of *c* 10-13 m, with a ring-groove slot, defining the perimeter and probably supporting a continuous timber wall, topped by a beam, which would have supported the roof. These also contained an inner post-ring, again designed to support the roof of the structure (*op cit*, 201).

Several slightly later houses, dating to a similar period as the houses at Taxiway Alpha East (*c* 1200-800 cal BC),

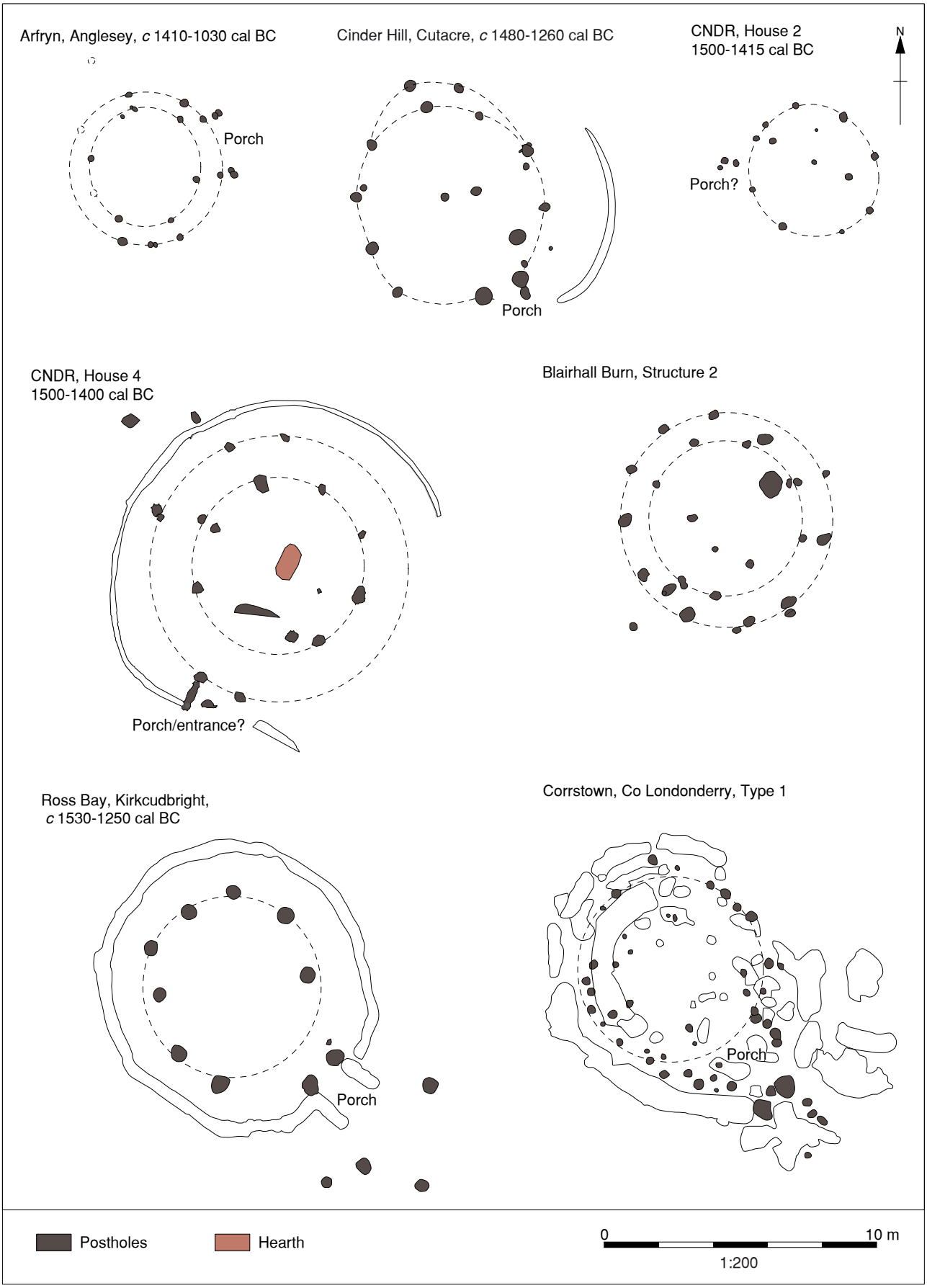


Figure 210: Examples of Later Bronze Age roundhouses from the Irish Sea area

are also known from around the Irish Sea, though some were found in enclosed settlements, were larger in size, perhaps suggesting that they formed communal buildings, and more often employed ring-groove wall trenches in their design. In north Wales, for instance, the local tradition of clay-walled roundhouses continued, as at Bryn Eryr (*p 349*), Anglesey, where a large (12.3 m in diameter) example was identified, which seems to have been established at the end of the second or the beginning of the first millennium cal BC (Longley 1998; Waddington 2013, 145).

It is also possible that a large stone-walled roundhouse, with a diameter of *c* 11 m, of similar date was present at Graig-fechan, Conwy, depending on how the rather confusing evidence from this site is interpreted (*cf* Manley 1991; Ghey *et al* 2007). However, large timber ring-groove buildings were also constructed in this area at that time, with a possible example, 15 m in diameter and with an internal post-ring, being discovered at the centre of a Neolithic henge monument (Lynch and Musson 2001). Directly adjacent to this building was a smaller roundhouse, *c* 7 m in diameter (*ibid*), defined by a double post-ring, indicating that the post-built roundhouse tradition continued in this area, and probably in other parts of the Irish Sea zone.

In north-west England, ring-groove buildings probably dating to the first two centuries of the first millennium cal BC are known from Brook House Farm, Bruen Stapleford (Fairburn 2002), surrounded by substantial drainage gullies, though these seem to have been unenclosed. Two of these buildings also seem to have been comparatively large, with diameters of *c* 10 m. Similar ring-groove buildings dating to the early centuries of the first millennium cal BC are also a feature of south-west Scotland, one example being uncovered at Aird Quarry, close to Stranraer (Cook 2006). Again, this was a large building, with a diameter of *c* 12 m, though, in contrast to those at Brook House Farm, it contained an internal post-ring, later repaired, and other posts relating to fixtures and fittings. Overall, it is therefore apparent that a tradition arose during the early first millennium cal BC that involved the construction of sizable ring-groove houses.

It seems that in terms of size, at least, the Taxiway Alpha East roundhouses are largely comparable with those post-built Bronze Age houses scattered around the Irish Sea, dating to the middle centuries of the second millennium cal BC, including those from Northern Ireland, where segmented ditches were a feature of their design (*p 349*). As with the Taxiway Alpha East houses, most were under 9 m in diameter, and although larger post-built roundhouses did exist, as evidenced by the large house, or houses, at Irby (*p 349*), these may have been communal buildings, serving several family groups (Cowell 2010, 168), or even meeting or ceremonial spaces. Some of the Taxiway Alpha East houses also have other architectural similarities to these small post-built houses, in that some also contained internal post-rings (Roundhouses 1, 5, and 6), and one (Roundhouse 5) also had both an internal and external ring of posts, effectively creating a double post-ring structure. In this sense, therefore, these houses form just another expression of this broader architectural tradition, which seems to have been used by most communities around the Irish Sea, perhaps suggesting a strong commonality between these peoples.

There are, however, also some clear differences, in that the Taxiway Alpha East houses were situated within an intentionally dug hollow, which in most (and perhaps all) cases was also lined with a load-bearing stone wall that supported the roof (*p 347*). Significantly, there are some excellent parallels for this style of later Bronze Age house, although these are some 350 km away in Cornwall. There, for instance, around 20 roundhouses have been excavated, found in small settlements, and similarly built within pits (termed as 'hollow-set type' houses; Jones *et al* 2015), normally with internal post-rings, and, in some instances, drystone walls (*inter alia*; ApSimon and Greenfield 1972; Nowakowski 1991; Gossip and Jones 2008).

Indeed, the apparent similarities between these Cornish houses and those from Taxiway Alpha East are striking. At Trethellan Farm, close to Newquay, seven unenclosed roundhouses were arranged across the site in a linear fashion (Nowakowski 1991), as at Ronaldway (Fig 211). The settlement broadly dates to 1500-1000 cal BC, though the roundhouse occupation probably dates to the period 1420-1290 cal BC (*op cit*, 39) and hence was a century or so earlier than at Ronaldsway Airport. Three were thought to have been residential throughout their entire histories, and two of these (2001 and 2222) were fairly well preserved. The more stratigraphically complex (2001; *op cit*, 14) contained evidence for three phases of occupation, though its general architectural arrangement remained consistent throughout. This house was constructed within a shallow pit, had a diameter of 9 m, with a southern entrance, and was of a double-post ring construction. There was also some evidence for a drystone wall on the northern side of the pit, though it is unclear if this originally extended around the entire perimeter. Other features were a central hearth, pits, and postholes relating to internal fixtures. The other better-preserved dwelling (2222; *op cit*, 37) also lay within a pit, 9.5 m in diameter, and had a southern entrance, but only exhibited one major phase of building, with some limited evidence for the replacement of timber elements. It had a substantial wall, probably originally extending around most of

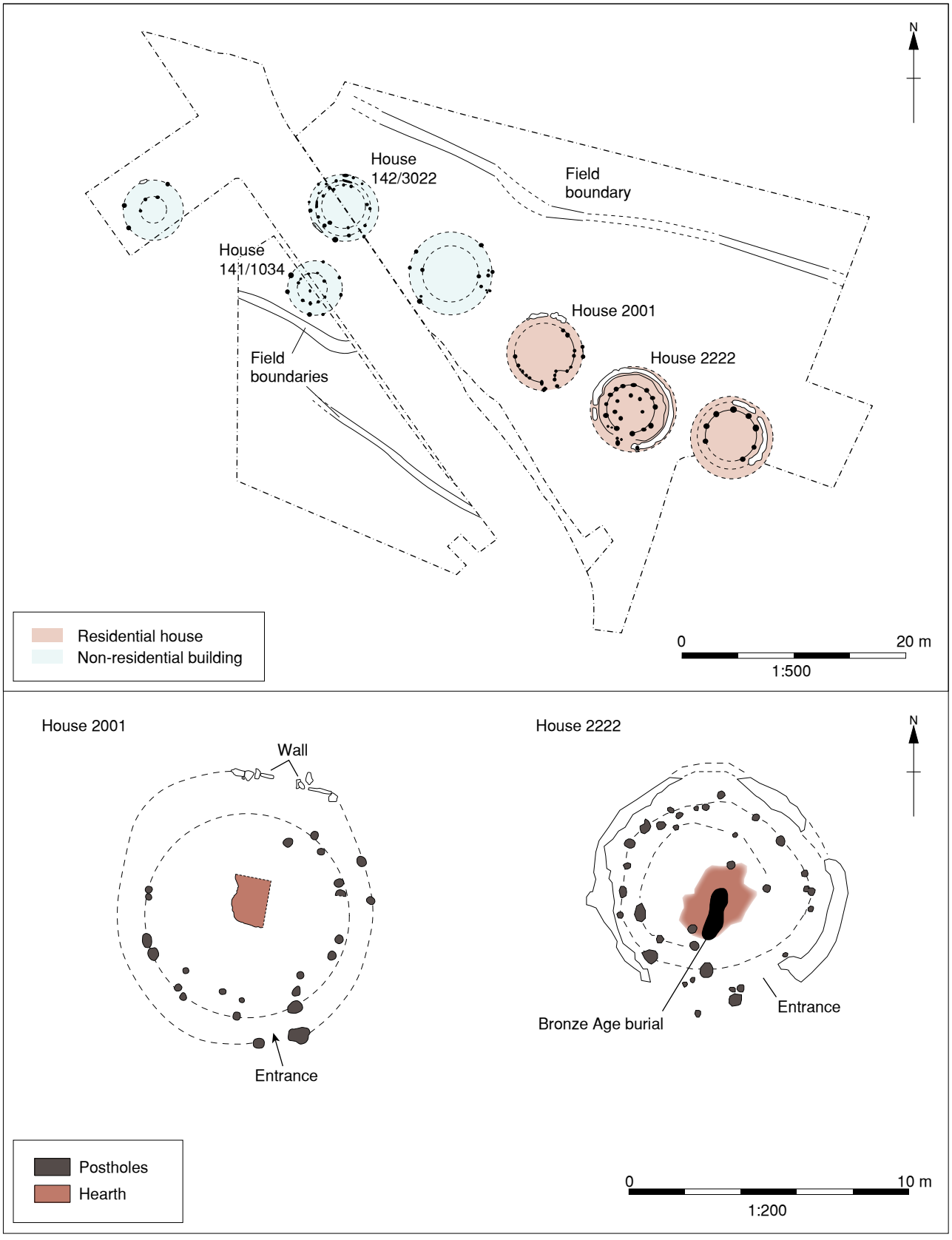


Figure 211: The later Bronze Age settlement at Threthellan Farm, Cornwall

the perimeter, which braced the roof of the structure, with a break at the entrance. Further support for the roof was provided by a double post-ring, and there was also a ring of stakeholes along the inner edge of the wall, which suggested hurdles being used in its construction. The interior contained a central hearth

and fire pit, numerous pits, and a scattering of stakeholes relating to fixtures and fittings. Intriguingly, the body of an adult male had been buried close to the hearth, during the time when the house was occupied.

The four other roundhouses at Trethellan Farm, although mostly similar in size, design, and build to the residential buildings, seemingly did not have a domestic function, but were apparently used in different ways. This again has strong parallels with the Taxiway Alpha East settlement (*p 345*), and also those at Billown Quarry (*Ch 6, p 171*), in that activities were spatially separated between different structures. Of these buildings, one (142/3022; *op cit*, 48) was associated with baked clay weights and a possible loom, and perhaps functioned as a workshop associated with craft activities, whilst another (141/1034; *op cit*, 60) contained a large assemblage of charred cereals (mainly barley), and was thought to have been associated with food processing. Functionally then, this latter building seems to chime with Roundhouse 5 at Ronaldsway, which also seems to have been associated with food processing and preparation (*p 346*).

Given these similarities, there seems to have been some link between Man and south-west Britain during the later Bronze Age. Indeed, these similarities extend much deeper when considering approaches to the abandonment of later Bronze Age settlements in these two areas (*p 360*). Presumably, then, these peoples were culturally similar, in that they approached building and the use of settlement space in near identical ways. Indeed, it is quite possible that communities fringing the western seaboard were tightly connected, effectively representing, at least culturally, the same peoples, with the binding factor perhaps lying with later Bronze Age metalworking and the exchange networks that this required (*p 378*).

Plants, animals, and pottery

Of course, it is not only roundhouse architecture and function that provides links with other distant communities, but the artefacts and ecofacts also seem to bind the settlement at Ronaldsway with others from around the Irish Sea and beyond. At one very prosaic level, it seems that this settlement is comparable to many similar sites, in that it was reliant on a mixed farming economy, involving the cultivation of cereals (*Ch 7, p 246*) and the rearing and husbandry of sheep (or sheep and goats), with some pigs and cattle (*Ch 7, p 232*). These sheep were a derivative of the primitive short-tailed breeds that were introduced into Britain during the Neolithic period, and, rather interestingly, they seem to have shared many similarities with the Loaghtan sheep (Pl 96), the ancient short-tailed breed native to the Isle of Man (*Ch 7, p 233*), implying that this breed was perhaps present by the later Bronze Age, if not earlier. Horse and dog bones were also present, with the former potentially being used for transport and perhaps another food source, whilst dogs may have been used as working animals assisting with animal husbandry and protection. However, it also seems that the people at Ronaldsway still hunted, given the discovery of wild sea birds and seal bones in the midden, which indicate the continued importance of coastal resources, and also emphasised by the recovery of edible marine molluscs that had been collected from the foreshore (*Ch 7, p 345*).

This community was also seemingly growing a wide range of cereals, including naked barley, emmer, and spelt wheat, and possibly also hulled barley and a free-threshing variety of wheat. Access to this comparatively wide range of crops again suggests that the community at Ronaldsway had strong links with other comparable crop-growing communities along the western seaboard, similar ranges of cereals having been recovered from the later Bronze Age settlement at Irby, just across the Irish Sea on the Wirral peninsula (Huntley 2010). Furthermore, it is also possible that the range of cereals at both the airport and Irby reflects experimentation in these 'marginal' cereal-growing environments, undertaken to ensure viable harvests.

The pottery from the settlement provides other clues to the cultural links between later Bronze Age Man and other parts of western Britain. Essentially, the assemblage from the taxiway (and also from the nearby Ronaldsway Village site; Woodcock 1999) indicates that two slightly different pottery types were present, one in the Cordoned Urn tradition (which emerged from an earlier Bronze Age Cordoned Urn tradition, explicitly associated with the use of these as funerary vessels; *Ch 5, p 153*), whilst the other relates to a plain urn tradition. The latter type was probably fairly ubiquitous across northern Britain, having been found on some later Bronze Age settlements in the North West (*cf* Gregory *et al* 2021, 225; Brown *et al* 2023), and seems to represent a northern expression of the Deverel-Rimbury pottery tradition from southern Britain, with many of these plain vessels possessing a barrel/bucket-shaped form (*cf* Morrison 1968; Gibson and Woods 1990, 104;



Plate 96: Manx Loaghtan sheep (photograph by Chris Bramhall)

Allen 2007; ScARF 2012b). During her study of the pottery from the Ronaldsway Village site, which is effectively part of the same assemblage as that from Taxiway Alpha East, Jennifer Woodcock (2008, 47-8) also noted that comparable plain domestic pottery has been recovered from Haughey's Fort, Co Armagh, and Navan, Co Meath. This might suggest some connections with, and perhaps influence from, Ireland during the later Bronze Age.

As far as can be ascertained, later Bronze Age settlements with Cordoned Urns (which, as at Ronaldsway, also used plain wares) are more geographically restricted and essentially seem to be a feature of north-western Britain and Ireland. For example, rare examples of Cordoned Urn settlements are known from western Scotland (such as Cill Donnain, South Uist; Parker Pearson and Zvelebil 2014), whilst the pottery from the later Bronze Age settlement at Irby, on the Wirral peninsula, also seemed to show strong similarities with Cordoned Urns (Woodward 2010). Slightly later Cordoned Urn settlements have also been discovered in Ireland (*cf* Grogan and Roche 2009), principal amongst these being that at Corrstown, Co Londonderry (*p 349*), which, to date, has produced the largest assemblage of later Bronze Age pottery in Ireland. Significantly, this has many parallels with the Taxiway Alpha East assemblage, in that it was composed of plain vessels (386 in total), together with 97 vessels that were also in the Cordoned Urn tradition (Roche and Grogan 2012). The two assemblages are therefore very similar, and whilst it has been suggested that the evidence from Corrstown, together with several other later Bronze Age sites in Ireland, indicates that domestic Cordoned Urns were in use up until *c* 1200 cal BC (*ibid*), it is now evident, from Taxiway Alpha East, that this type of pottery was also used later in the second millennium cal BC, and into the initial century of the first millennium cal BC, lengthening its chronology even further into the later Bronze Age.

It therefore seems that this style of domestic cordoned pottery may provide a cultural link between Man and these other western areas, particularly Northern Ireland. If it is considered in relation to the architectural similarities of the roundhouses from Taxiway Alpha East and south-west Britain (*p 351*), a pattern begins to emerge of Man having strong links and shared cultural traits with other communities along the western seaways, with the later Bronze Age inhabitants adopting and amalgamating various traits and features from many disparate parts of western Britain and Ireland.

Metalworking

There is another important line of evidence that can be pursued when considering these possible connections: the metalwork. This seems to have been produced directly within the Taxiway Alpha East settlement in two workshops (Roundhouse 4 and Structure 3; *p 346*), both involved in bronze casting, evidenced by the recovery of ten bivalve clay moulds and four clay crucibles (*Ch 7, p 225*). Lead working also occurred in Roundhouse 4, and a small copper-alloy ring and droplets from casting were recovered from Structure 3 (*Ch 7, p 230*). The identifiable items being produced in the moulds included socketed spearheads, most likely larger flame- or leaf-shaped types, socketed axes/palstaves, and swords (Pl 97; *Ch 7, p 229*), which relate chronologically to the Wilburton metalworking tradition, probably dating from the mid-twelfth to early tenth century BC (Needham's (1996) Period 6). The focus of production seems therefore to have been at least partly geared towards weapon production. This emphasis is not, however, out of place for this period, as based on the metalwork and the appearance of enclosed 'forts' and settlements, this is characterised by a more overt preoccupation with defence, warfare, and display.

At one level, the discovery of bronze casting within a later Bronze Age settlement area is highly significant and is a phenomenon that has only rarely been identified archaeologically. For instance, only a few 'settlements' dating to the end of the second and early centuries of the first millennia cal BC have produced direct evidence for metalworking. In Britain, these include the large 'ringforts' or 'ringworks', specifically that at Springfield Lyons, Essex, which contained clay moulds associated with weapon production (Buckley and Hedges 1987; *Ch 6, p 168*), and island sites, such as Runnymede Bridge, where evidence for metalworking was also present (Needham 1991). It is unclear, however, precisely how these sites functioned, and if they represented domestic settlements *per se* (Bradley 2019, 238, 242). Some evidence is also forthcoming from Ireland, where it has been noted that many Late Bronze



Plate 97: An example of a later Bronze Age sword, from Berrag, near Jurby

Age crannogs (artificial island sites) have produced moulds for making weapons (Fredengren 2002), whilst metalworking was also present at several of the Irish later Bronze Age hillforts (*Ch 6, p 168*; *eg* Dún Aonghasa and Rathgall; *cf* Bradley 2019, 254). Again, however, it is possible that these did not strictly function as domestic sites, but instead may have been the focus for other types of activities. Indeed, if the evidence from later Bronze Age roundhouse settlements similar to Taxiway Alpha East are considered, in terms of western Britain, there are only three comparable published examples clearly associated with the production of copper-alloy objects: Cladh Hallan; Corrstown; and Tremough (*below*).

Cladh Hallan, in the Outer Hebrides, on South Uist, is an important later Bronze Age settlement (Parker Pearson *et al* 2004; *p 343*). There, clay moulds for producing copper-alloy weapons and ornaments were initially associated with a Middle Bronze Age cremation cemetery, which was found directly beneath a timber house established in *c* 1400 cal BC, perhaps suggesting that people buried in this cemetery had a strong connection with bronze working (*op cit*, 62). This house was succeeded by an episode of pit digging and the construction of a small building, and then a row of conjoined (terraced) roundhouses, with sunken floors (hence in one sense also pit-houses), which were continually occupied from *c* 1100 cal BC to 200 cal BC (*op cit*, 66; Parker Pearson *et al* 2005). Three of these houses were completely excavated and the central one, which also possessed a forecourt, had a clear connection with copper-alloy casting, as it was littered with fragments from clay moulds used to cast swords, spearheads, and other items, such as razors, pins, and adornments (Parker Pearson *et al* 2004, 76). Perhaps then, this house, as with that at Taxiway Alpha East (Roundhouse 4), was a workshop, or was at least occupied by those connected with metalworking.

The second site producing moulds and associated with domestic roundhouses is the large later Bronze Age settlement at Corrstown, Northern Ireland (*p 349*), though there four stone moulds were used to cast copper-alloy palstaves, chisels, and lozenge-sectioned rods (Grogan 2012). One mould had also been reused as a plaque or pendant. It is unclear, however, whether these indicate the presence of metalworking areas or workshops within the settlement, such as those at Ronaldsway, as all were found in different parts of the site and might even have formed deliberate 'offerings', placed within particular features. One, for example, came from immediately north of a roundhouse, within an isolated pit or posthole; a second was found in the construction trench for a roundhouse; whilst the other two had been incorporated into paths (*ibid*). Indeed, a tradition of making deliberate offerings of certain objects with perceived significance could well have been a common theme within later Bronze Age settlements in the Irish Sea area, since at Taxiway Alpha East, a ceramic vessel had been intentionally placed into a pit, on top of which quern fragments had been laid (*Ch 6, p 188*).

The site at Tremough, in Cornwall, is interesting, given the strong similarities that seemingly existed between this area and Man (*p 351*). There, two Middle Bronze Age roundhouses were identified, one being comprehensively excavated (Jones *et al* 2015). This was dated to *c* 1500-1300 cal BC and was another example of a Cornish pit-house (*p 351*), with a diameter of 9 m and a south-eastern entrance. It is possible that the pit was originally lined with a kerb wall, which had been removed after abandonment, and it contained a familiar internal post-ring used to support the roof, as well as two hearths in the northern part of the structure. Significantly, though, as with Roundhouse 4 and Structure 3 at Ronaldsway, it produced a small collection of clay moulds used for casting copper-alloy objects, in this case socketed tools, chisels, and ring-headed pins, as well as several finished copper-alloy items, including a pin and a spiral finger ring. In this instance, the emphasis for production does not seem to have been focused on weapons, which could be explained by the earlier date of this site, when, for whatever reasons, warfare and display seem to have been less of a priority. Although the moulds at Tremough seem to have been dumped when the building was abandoned (a practice that also seems to have extended to the placing of copper-alloy objects in other Cornish Middle Bronze Age roundhouses; *op cit*, 193), it is likely that this act commemorated the building's original function, particularly as droplets of copper-alloy were found inside the building. It seems therefore to have been another example of a metalworking workshop, perhaps with domestic occupation occurring in the adjacent, unexcavated roundhouse.

The manufacturing of copper-alloy objects seems to have been deeply embedded within the activities that occurred at these settlements, which is at odds with earlier ideas that saw bronzes being produced by itinerant metalworkers (Childe 1930, 45). Although these sites, based on current evidence, are rare, it does seem highly plausible that such 'embedded' workshops were in fact a common feature of later Bronze Age settlement (*cf* Carey *et al* 2019), at least along the western seaboard of Britain. Notably, it seems that after 1400 cal BC, the major source of copper in the earlier part of the later Bronze Age had been largely exhausted, and that old and broken bronze items instead moved along these routes, which were recycled and cast into new objects (*Ch 6, p 168*), with Man forming a key hub within these western maritime networks. It is worth noting that the settlement lay

next to good harbourage, and a small beach, and could therefore have been a valuable maritime 'haven' where exchange could take place between different, and at times distant, later Bronze Age groups, who travelled the western seaways (*cf* Bradley 2019, 259; 2022).

A village in the making?

It is quite clear that only one part of a larger later Bronze Age settlement was excavated at Taxiway Alpha East, particularly as the geophysical survey detected circular anomalies extending to either side of the taxiway, which almost certainly represent other roundhouses. To these can also be added the six roundhouses excavated at the Ronaldsway Village site (*Ch 1, p 8*), close to the present runway, which were identical to those at Taxiway Alpha East, suggesting that they were also later Bronze Age structures (Fig 212; Pl 98; *Ch 9, p 292*). Indeed, the radiocarbon dates from

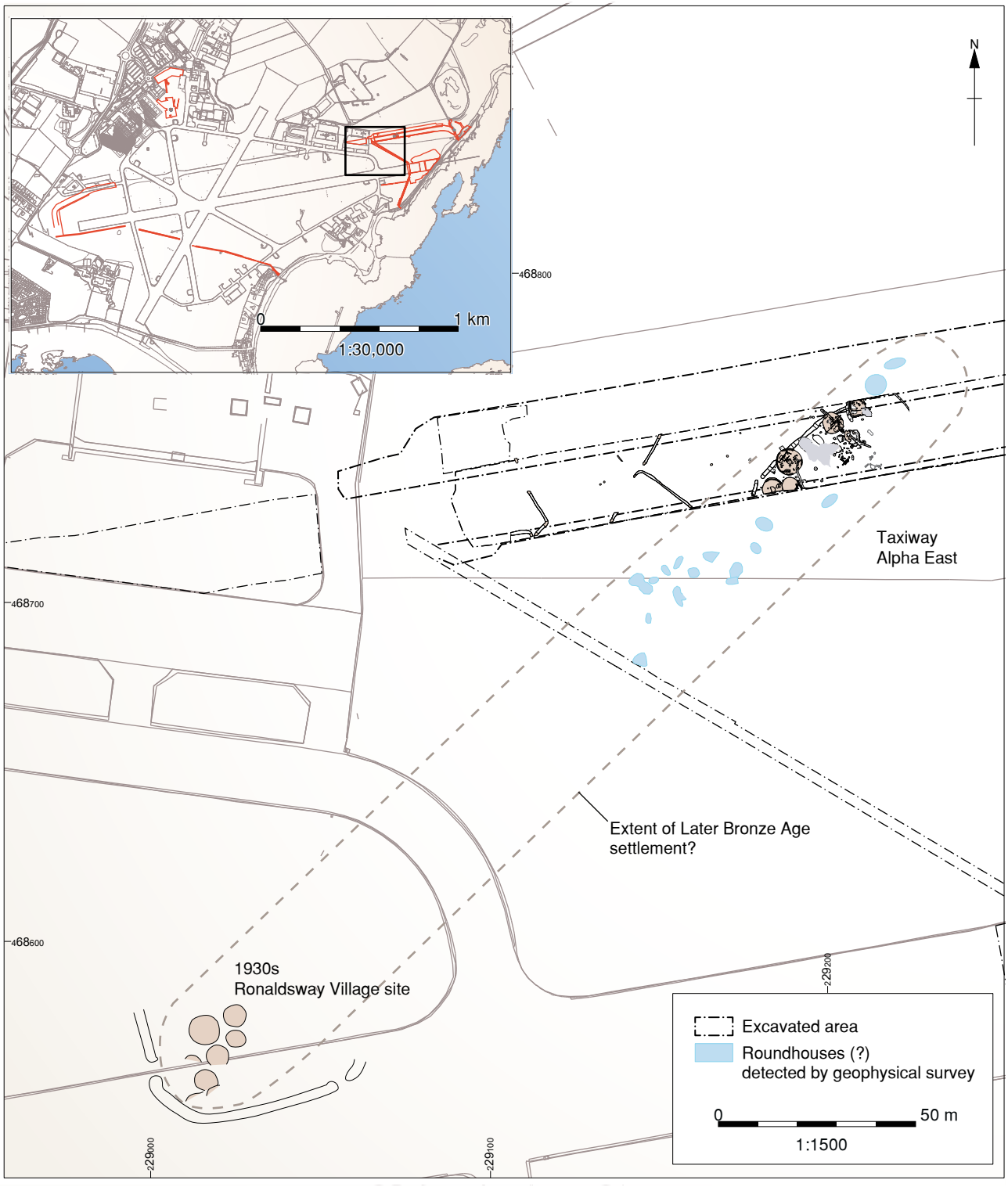


Figure 212: The possible extent of the later Bronze Age 'village' at Ronaldsway Airport



Plate 98: One of the probable later Bronze Age houses (House 2) excavated at the Ronaldsway Village

residues on the pottery from this excavation support this (Woodcock 2008). Four dates (*Ch 7, p 225*) broadly span the period 1500-800 cal BC; however, this can be refined when these are combined in OxCal, using the chi-square test (Ward and Wilson 1978; *Ch 1, p 27*), to see if any are statistically consistent (Table 77). This suggests that the radiocarbon dates may relate to two separate phases of activity, with one, represented by three statistically consistent dates, dating to 1390-1050 cal BC, and the other to 1200-800 cal BC. Perhaps significantly, these two phases have broadly similar date ranges to the two phases of settlement activity detected at Taxiway Alpha East, the earlier of which (*1250-1000 cal BC*) was associated with two domestic buildings and a range of ancillary structures (*p 340*), the later (*1000-800 cal BC*) by a single domestic roundhouse. Potentially, therefore, there was an unenclosed, ribbon settlement at Ronaldsway, which extended in a north-east/south-west direction for at least 200 m, following the alignment of a slightly earlier Middle Bronze Age field boundary (*p 339*).

Based on this evidence, it therefore appears that there were at least 26 roundhouses in this ribbon settlement, though this number should probably be doubled if it is assumed that the same density of houses was present in the unsurveyed area under the modern runway and to its north. However, it is unlikely that all 50 or so of these potential roundhouses were occupied at the same time, and it must also be assumed that only a proportion of these may have functioned as residential units (households), others presumably being ancillary buildings. Another possibility is that this was a 'wandering' settlement, where, over time, a small residential unit gradually drifted across the landscape, with houses being abandoned and rebuilt at different locations. Whilst this is possible, the radiocarbon-dating evidence from the Ronaldsway Village site and Taxiway Alpha East (*above*) does seems to imply that roundhouses separated by some 200 m were similar in date, probably forming components of the same contemporary and linked settlement.

It is therefore possible, based on this suspected density, that this ribbon settlement contained the maximum 50 buildings, possibly including around 26 contemporary households, in the period 1250-1000 cal BC, based on the density of buildings in the taxiway (*ie* two

Phase (?)	Lab Code	Radiocarbon age (BP)	χ^2 test	Calibrated range (95% confidence)
1	OxA-4052	3010±75	T=2.1; T'(5%)=6.0; υ=2; Agreement n=3; A_{comb}= 84.2%(An= 40.8%)	1390-1050 cal BC
	OxA-4053	3060±80		
	OxA-4054	2905±75		
2	OxA-4051	2800±80		1200-800 cal BC

Table 77: Radiocarbon dates from the Ronaldsway Village

contemporary households in a 15 m-long corridor), which may have halved in the period 1000-800 cal BC. Therefore, this nucleated settlement, at its peak, was feasibly of village-size proportions (*below*), its success and scale probably being at least partly a result of its location in an agriculturally productive landscape, adjacent to rich coastal resources, together with the adoption of specialised buildings for cooking and food processing (such as Roundhouse 5; *p 346*), and perhaps also because of its focus on bronze working, which tied into the valuable trading networks of western Britain and Ireland.

Set in a wider context, the existence of at least one large, nucleated settlement on the Isle of Man in the later Bronze Age, effectively the island's first known village, does have some parallels, though admittedly such settlements, containing large numbers of contemporary houses which were permanently occupied, are extremely rare. The evidence for such villages in Britain and Ireland has been collated (Rathbone 2013), where (following modern rural settlement studies) a 'village' is defined as a settlement containing over 20 contemporary households, though there is a 'hazy blurring' between a large hamlet and a small village (*op cit*, 40). Given this ambiguity, in the context of prehistoric settlement, the term 'village' could probably also be applied to those large hamlets with over ten contemporary residential households.

Based on this admittedly loose definition, it seems that, aside from Ronaldsway, of the small handful of other 'villages' identified, there is one Middle Bronze Age site at Reading Business Park, Berkshire, which at its maximum extent may have contained 14 contemporary paired roundhouses (Moore and Jennings 1992; Brossler *et al* 2004). However, given that these paired houses might only represent seven households, this site is more akin to a large hamlet, and was probably much smaller than Ronaldsway (Rathbone 2013, 50). Other settlements may also have existed in northern and western Britain, for example, in the Scottish borders, where unenclosed platform settlements are known, containing multiple house platforms, which seem to date to the early and mid-second millennium cal BC (*ibid*; Jobey 1980; Terry 1995), whilst in western Britain, some later Bronze Age villages on Dartmoor could have contained up to 50 buildings, though none have been subjected to large-scale excavation (Rathbone 2013, 48). However, perhaps the real issue in defining these upland settlements as villages is whether they were occupied permanently, or whether in fact they were seasonal settlements relating to transhumant farming.

These settlements were clearly the exception rather than the norm, the only firm example being found in the Irish Sea area, in Northern Ireland, at Corrstown, Co Londonderry (Ginn and Rathbone 2012; *p 349*). This contained 'over 70 roundhouses generally grouped into pairs or small rows that were linked by narrow cobbled pathways running from doorway to doorway' (Rathbone 2013, 48). This settlement appears to have considerably exceeded the 20-household threshold for a true village and it seems possible that Ronaldsway may have been similar in size (*above*). Whilst Corrstown is a little earlier than the roundhouses at Ronaldsway, it clearly demonstrates a regional precedent for large-scale settlement aggregation, which may suggest that this was a feature of the later Bronze Age around the Irish Sea.

Waving the settlement goodbye

One of the more striking features of the later Bronze Age settlement at Ronaldsway was the way that its houses were eventually abandoned. This abandonment was undertaken in a very systematic and structured fashion, and clearly the 'death' of each house was a very significant event that was undoubtedly marked by some form of ceremony and physical acts of commemoration. It is also quite possible, when considering the evidence at a broader level from Britain, that such acts related to significant life events (*ie* death, birth, marriage, *etc*), which might suggest that 'houses were conceptualised as living entities with lifecycles intimately related at both a practical and symbolic level to those of their inhabitants' (Brück 2001, 152).

The lack of evidence for rebuilding seems to indicate that all of the buildings were comparatively short-lived structures, and so their abandonment could well relate to an event in the life, or death, of an important member of the household which built and occupied the structure. Roundhouse 1, for instance, the primary domestic structure, might possibly (based on the radiocarbon-dating evidence) have been occupied for up to two generations, and the same might also be said for Roundhouse 5 (a 'kitchen'; *p 346*), whilst most of the other roundhouses may have been in use for no more than a single generation.

It is therefore interesting to note that the process of abandonment was at its most obvious in the two longer-lived roundhouses (1 and 5). In both cases, these were first burnt down, probably deliberately, though Roundhouse 1 seems to have been abandoned for a short period prior to this act. After burning, the site of Roundhouse 1 was intentionally backfilled, whilst two stone cairns were created within Roundhouse 5, using material robbed from the kerb wall, with one cairn being placed over the entrance (Pl 99) and the other in its interior. The actual function of this building, as a kitchen and food-processing area, also seems to have been commemorated, as the two cairns then became the focus for cooking and feasting. Animal



Plate 99: The cairn covering the entrance to Roundhouse 5

bones were probably removed from the midden at the heart of the settlement area, and were then deposited on the cairn that covered the entrance of Roundhouse 5, again perhaps commemorating the significance of this important structure through the reappropriation of suitable material.

Similar, though less dramatic, abandonment processes also occurred at Roundhouses 2-4, which at the end of their lives were perhaps deliberately dismantled, with the resulting pits then being intentionally backfilled. Acts of commemoration were also apparent at Roundhouse 6, the last later Bronze Age domestic structure in the excavated area (*p 340*), which involved dismantling it, and then creating a stone cairn across its footprint (Pl 100). As part of this process, the central midden also seems to have been commemorated, as another cairn was constructed partially covering its eastern edge.

The burning and/or backfilling and burial of the houses, along with the creation of cairns, indicates that there was a strong link with earlier concepts of Bronze Age death and burial, which involved a similar set of practices (*ie* cremation of the dead and the erection of burial mounds; *Ch 5, p 153*). Indeed, the similarities of the backfilled houses with these earlier Bronze Age round cairns are pronounced, and it was even thought, during the initial stages of the excavation, that these houses may have been kerbed cairns containing earlier Bronze Age burials.

Whilst the houses seem to have 'died', the same also seems true of the midden, which suffered a similar fate at the end of the settlement, perhaps providing further evidence that such features were considered as 'living' entities, within an active settlement area (*p 347*). Although such metaphysical concepts of abandonment were potentially commonplace in the later Bronze Age (Brück 2001, 151), there are few exact parallels for this precise style of abandonment. On Man, the same processes seem to have been occurring at Billown Quarry, where a large stone cairn was erected over the site of later Bronze Age roundhouses (*Ch 6, p 171*), suggesting that there was a strong local precedence for this style of abandonment. Elsewhere in the Irish Sea zone, there is a distinct lack of evidence for similar practices, at least in terms of the burial of houses and their commemoration, although two of the roundhouses at Corrstown may have been deliberately burnt down as part of the abandonment process (Ginn and Rathbone 2012, 249).



Plate 100: The cairn covering Roundhouse 6

The only area which has produced near-identical evidence for roundhouse abandonment is, again, Cornwall. There, the best evidence for planned abandonment is at Trethellan Farm (*p 351*), where, following abandonment, the roundhouses were deliberately buried and concealed. This involved backfilling the house pits with levelling deposits, and in some instances deliberately destroying the stone kerb walls, in an identical way to the processes connected with the abandonment of the roundhouses at Taxiway Alpha East. In other cases, the houses at Trethellan Farm were filled with midden material, with one house then being used as a cooking area, which again shows strong similarities with Taxiway Alpha East, particularly Roundhouse 5. Middle Bronze Age sites in Cornwall are also known where roundhouses were abandoned and then 'monumentalised' through the construction of mounds and stone cairns (*cf* Jones *et al* 2015, 184); again, the parallels with Taxiway Alpha East are striking. It seems then that the physical process of planned roundhouse abandonment was very comparable in both Cornwall and the Isle of Man, seemingly providing further evidence for strong links between these two areas. Indeed, these links were not just confined to the later Bronze Age, but also seem to have continued, as seen in the burial evidence from Taxiway Alpha East (*below*).

Iron Age Warriors

Burials

Helen Webb and Richard A Gregory

The two Iron Age burials were another surprising discovery at Taxiway Alpha East, particularly as both were found within the confines of the abandoned later Bronze Age settlement, being dug directly into the abandonment deposits covering two of the former roundhouses (*p 258*). One, dating to *740-410 cal BC* (*OxA-30359*), contained a possible young or prime adult female (***4375***), together with a young child (***4374***; *Ch 8, p 263*), whilst the other, dated to *50 cal BC-cal AD 80* (*OxA-30308*), contained a young or prime adult male (***4438***; *Ch 8, p 268*; Table 78). Significantly, the earlier burial was also potentially contemporary with a midden (Midden 3; *Ch 8, p 267*) at the end of the large later Bronze Age midden, and also covering a cairn in this area, suggestive of feasting, involving the consumption of cattle, sheep, and seal. Although it is difficult to link the midden deposit and burial directly, it seems possible that this act of consumption may have formed part of the burial rite. Alternatively, it perhaps relates to a separate act which, in a similar way to the burial, was directed towards the

Skeleton	Completeness	Fragmentation	Surface condition (*cf* McKinley 2004, 16)	Age	Sex	Non-metric traits	Pathology
4374	<25%	High	1	Young child (1-2.5 years)	/	None	None
4375	26-50%	High	4-5	Young-prime adult (22-35 years)	??F	Cranial: sutural ossicles (including Inca bone); parietal foramen	Dental pathology: calculus; caries; DEH
4438	75-100%	High	4-5	Young-prime adult (20-35 years)	M	Post-cranial: third trochanter (L femur); vastus notch (L patella)	Dental pathology: calculus; DEH Skeletal pathology: Schmorl's nodes; peri-mortem sharp-force trauma

Key: ??F = possible female; M = male; L = left; DEH = dental enamel hypoplasia

Table 78: The osteological evidence for the Iron Age skeletons at Taxiway Alpha East

veneration of the abandoned settlement, perhaps prior to, or after, the bodies had been interred.

Although the human remains from Ronaldsway Airport form a very small assemblage, they are extremely important, as they represent the first securely dated Iron Age burials to be discovered on Man. Indeed, prior to their discovery the only other human remains suggested to date to this period comprised a partial skeleton within a possible midden at Perwick Cave, in the south-western part of the island (Fig 213); however, the remains of this individual, interpreted as a shipwreck victim, can only be very tentatively, and broadly, dated to the later Iron Age on the basis of radiocarbon assay from a bulk sample, taken from elsewhere in the midden, which returned a date of 350 cal BC-cal AD 540 (1880±150 BP; Birm-271; Garrad 1978).

Beyond the island, the two burials from Taxiway Alpha East also hold additional significance, particularly when considering the associated health, mortality, and burial practices. Iron Age burials are comparatively rare in Western Britain and Ireland, the greatest concentrations being from eastern Yorkshire, and south-western and south-eastern England, and therefore they make a significant contribution to understanding burial during this period (*cf* Whimster 1981; Harding 2016, 2; Historic England 2018b, 3).

Set in a broader chronological context, as far as can be ascertained, the principal method for disposal of the dead during the earliest part of the Iron Age (*ie* eighth- to sixth century cal BC) was cremation, with remains buried, either urned or unurned, in cemeteries (Cunliffe 2005, 543-4). From the fifth century cal BC, however, inhumation became the favoured rite, though in some parts of Britain (*ie* south-eastern England) this was replaced by cremation in the first century cal BC; in other areas, specifically south-western England (Devon and Cornwall), inhumation continued to be practised up until the mid-first century cal AD (*op cit*, 544-59; Harding 2016, 8). Given these variations, the dates of the inhumation burials from Taxiway Alpha East seem to fit comfortably with the wider dating evidence for Iron Age inhumation burial. Indeed, the continuation of inhumation into the late Iron Age might be a distinctive 'regional' feature of burials in western Britain. Some other similarities with the Iron Age inhumations from south-west England are apparent, again suggesting that these two areas were culturally 'linked'. Specifically, a feature of burials in Cornwall was the use of abandoned later Bronze Age settlements as burial grounds, as at Taxiway Alpha East. Indeed, the best example for this is found at Trethellan Farm, Cornwall, a near-identical later Bronze Age settlement to that at Taxiway Alpha East (*p 351*). There, 21 Iron Age graves, dating between the third century BC and first century AD, were discovered, some cut into the abandonment deposits covering the former Bronze Age roundhouses (Nowakowski 1991).

In common with the many other Iron Age inhumation burials from the British Isles (*cf* Cunliffe 2005, 544-59), the possible female (***4375***; Pl 101) from Ronaldsway Airport was buried in a crouched position, with her arms and tightly flexed legs being drawn closely towards the body. Generally, tightly crouched body positions have led to the suggestion that some bodies may had been tightly bound, possibly bagged, or even mummified before burial (Lambrick *et al* 2009, 310-11; Parker Pearson *et al* 2005, 534; *p 343*). Although there was no clear evidence for mummification in

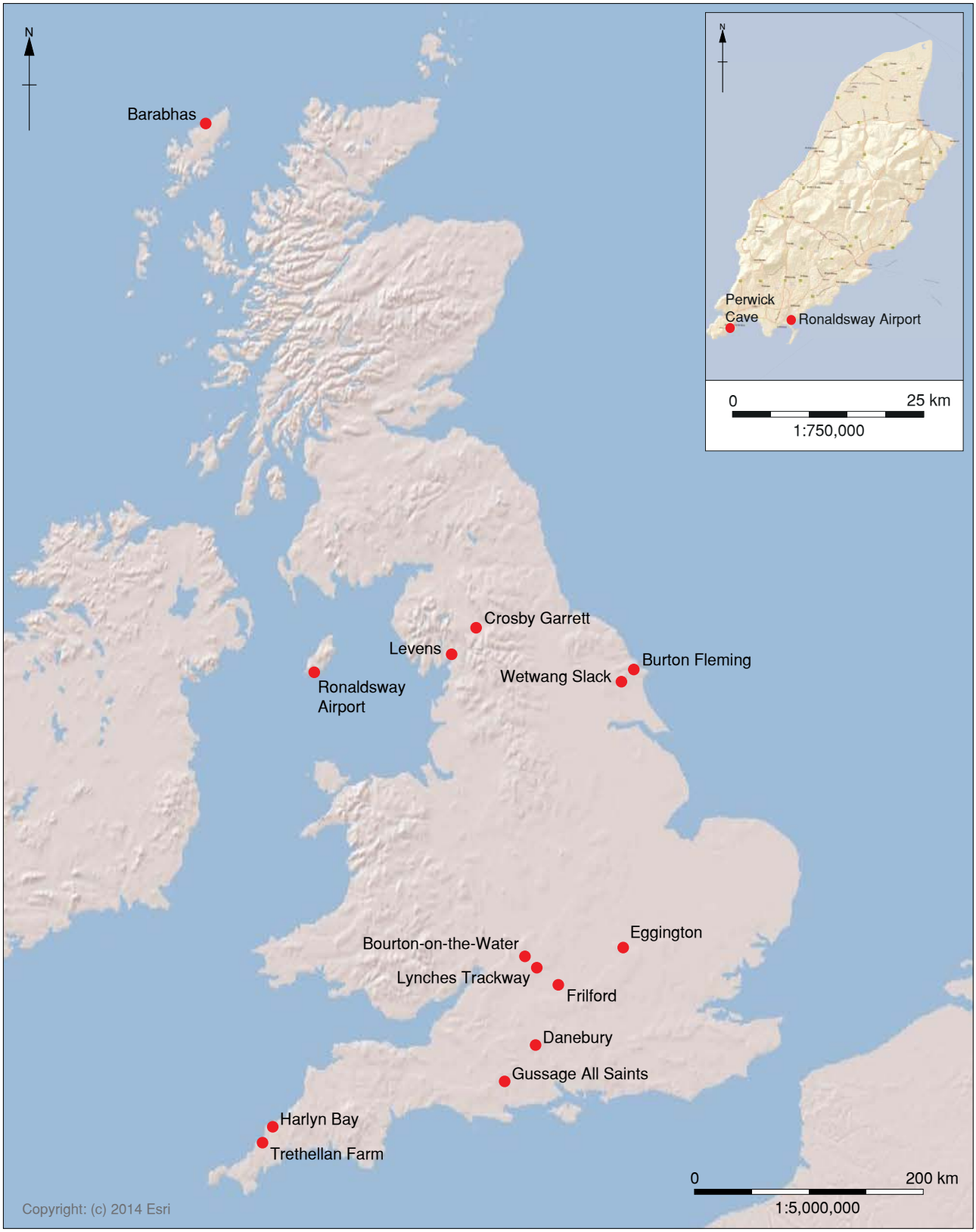


Figure 213: Iron Age burials mentioned in the text

the skeleton (T Booth *pers comm*), it is certainly possible that this body was bound or bagged. Other examples of Iron Age inhumations, for which the use of bindings or bags has been suggested, include an isolated burial of a young adult male at the Lynches Trackway, near Cirencester (Mudd *et al* 1999, 76), an adolescent skeleton at Frilford, Oxfordshire (Harding 1987, 7, 17), and an elderly adult female at Bourton-on-the-Water, Gloucestershire (Nichols 2006, 60; Fig 213).



Plate 101: Recording the adult skeleton **4375**

The other prime adult (***4438;*** Pl 102) was buried in a more contorted position, with the arms in a lower position, with the right leg tightly flexed and pulled up to the chest, whilst the left leg, although also tightly flexed, was lower and positioned below, in a kneeling position. It is of course possible that the differing, less formalised, position may reflect a different type of binding or bag, or alternatively this burial was more rushed, or, perhaps, less emphasis/respect was given to the positioning of this body, which may in some way relate to the traumatic causes of death (*below*).

The ante-mortem dental and skeletal pathological conditions observed in the adult skeletons (caries, calculus, dental enamel hypoplasia (DEH), and Schmorl's nodes) are amongst those commonly observed in other Iron Age populations, and, indeed, in all other periods, and are thus not remarkable. Whilst the small size of the assemblage precludes any useful data on prevalence, it is interesting to note that these dental conditions appear to have been more generally prevalent in the Bronze Age (Roberts and Cox 2003, 100). The decline of these dental conditions in the Iron Age therefore perhaps reflects better oral hygiene, and/or less consumption of fermentable carbohydrates, in the case of caries and calculus, and it has also been suggested that the decline in DEH may reflect intensification of agriculture and a better diet, or possibly a lower disease load in the population (*ibid*).

Of much greater interest was the peri-mortem trauma observed in skeleton ***4438***, comprising sharp-force



Plate 102: Excavating skeleton **4438**

blade wounds to the left forearm and hand, the chest, and left leg, and a fractured lumbar vertebra (*Ch 8, p 269*). There is evidence for other Iron Age burials showing weapon injury (Boylston 2000, 366-7, table 1), which include cases of healed and unhealed sharp- and blunt-force trauma, as well as projectile injuries. The latter group includes two skeletons from Burton Fleming, East Yorkshire, with projectile points embedded in the bones (Stead 1979; Fig 213). The cases of sharp-force trauma include unhealed cuts on the left ilium of an unsexed adult skeleton from Danebury, Hampshire (Hooper 1984), a wound to the occipital bone of a young adult male from Wetwang Slack, East Yorkshire (Dent 1982), and unhealed cuts to the cranium and face of a skeleton from Harlyn Bay, Cornwall (Whimster 1981, 64). A partially healed, but then infected, cut was present on the right tibia of a young adult male from Eggington, Bedfordshire, and sharp-force wounds were seen on the skull and left forearm of a young adult male from Gussage All Saints, Dorset (*op cit*, 227, 204). For the vast majority of cases, the wounds were caused by bladed weapons, presumably swords, and it seems likely that the wounds on skeleton ***4438*** were also created in this way.

It is also evident from the examples of bodies with weapon injuries (Boylston 2000) that a larger number of males seemingly suffered weapon injuries; this, in turn, may indicate that men were far more frequently involved in episodes of interpersonal violence than women (Roberts and Manchester 1995, 80). Skeleton ***4438*** is clearly another example of an adult male involved in an episode of interpersonal violence or conflict; the injuries to his hands and forearm would have arisen when his arms were raised for protection, or when warding off a blow from a raised weapon or object (Novak 2000; Schmidt 2010, 2), certainly fitting with a futile attempt at defence against an attacker. It is notable that the bones of the left arm and hand were involved, which is consistent with assaults made by a right-handed attacker (Schmidt 2010, 2). Although it is not possible to determine the sequence in which the blade wounds were inflicted, a possible scenario is that the injuries to the leg were an attempt by the assailant/s to incapacitate the victim before inflicting the fatal injuries to the torso.

Although in Yorkshire, and a few outlying areas, some male inhumations were buried with weapons, so-called 'warrior burials', and some individuals were buried in chariots (*cf* Stead 1979; 1991; Dent 1982; 1985: Boyle *et al* 2007), there was normally an absence of grave goods associated with Iron Age inhumations; when present, these included dress fittings, such as pins and brooches, and personal ornaments (*cf* Harding 2016, 173). The arm-ring associated with skeleton ***4438*** falls within the latter category, its closest parallels being a very similar arm-ring associated with a later Iron Age grave in Barabhas, Isle of Lewis, in this instance, an adult female (*Ch 8, p 272*). Other similar items of personal adornment in burials include bangles/bracelets and leg-rings, and together with arm-rings, it is quite possible that 'the number, location, or combination may well have signified something regarding the status of the individual, not necessarily in terms of relative position in a social hierarchy so much as marital status or status within the kin group' (*op cit*, 175).

The presence of a double burial at Taxiway Alpha East is also noteworthy, as generally in Britain, multiple inhumations of this time are rarely found (*op cit*, 38). The interment of adult women with infants, or young children, as seems to be the case with skeletons ***4374*** and ***4375***, is, however, a practice that has been noted at several sites in Yorkshire, Norfolk, and Oxfordshire (*ibid*; Lambrick *et al* 2009, 323; Whimster 1981, 182), and perhaps more significantly in Cornwall. Adult and infant burials were present at Harlyn Bay (on the northern Cornish coast), alongside double child burials and double adult burials (and probably also severed heads), whilst, at Trethellan Farm, young children (up to ten years of age) had been buried with adults (Whimster 1981, 281-3; Nowakowski 1991, 219). Although in all of these cases, as with skeletons ***4374*** and ***4375***, it is not possible to determine the relationship between the adult and juvenile or infant skeletons, they might have been mothers and children, perhaps dying of natural causes around the same time, even though it is possible that such individuals were not related at all. For instance, there are later examples of the bodies of young children being buried with unrelated women who had died at around the same time (M Cox *pers comm*), and there is no reason to think that this could not have occurred in earlier periods. It may also be that multiple inhumation burials, indicative of simultaneous death, could represent cases of ritualised killing, either execution or sacrifice (Lambrick *et al* 2009, 323), and it is possible that in these examples a child was killed following the death of the adult (Nowakowski 1991, 219). However, that said, there is rarely any osteological evidence (in the form of peri-mortem trauma) to support this (*ibid*).

Another interesting, and seemingly unique, feature of the double burial at Taxiway Alpha East was the fact that the possible female was buried first, and a line of large stones were then placed across the torso, with the juvenile being placed above these. The significance of this act of 'sealing' part of the adult's body, and separating it from the child, is difficult to determine. These stones may have been merely placed on the adult to act as a 'platform' onto which the child could be easily placed. There might, however, have been a deeper meaning to this act, which may, for instance, have reflected the living relationship between the two individuals (*above*), with the separation between the two perhaps denoting some form of separation in life (for instance, being unrelated, from separate families).

Both the burials at Ronaldsway had been placed in small shallow, sub-oval pits. Again, this seems a normal feature in Iron Age inhumation, as, apart from some sites in southern and eastern England, where corpses were placed in disused storage pits (*cf* Cunliffe 2005, 553), the placement of the body in a shallow grave, in some cases lined with stone to create cists, seems to have been the favoured grave type (*cf* Harding 2016, 78, 164, 167). Such burials could occur in isolation, with some being inserted into infilled enclosure ditches (*cf op cit*, 108), or were grouped within small cemeteries, containing no more than five graves. These latter cemeteries certainly seem to have been a feature of Iron Age burial in the areas fringing the eastern side of the Irish Sea, as evidenced by their discovery at Levens and Crosby Garrett, both in Cumbria (Whimster 1981, 169, 403; OA North 2004; Fig 213). It is unclear whether the two Iron Age burials at Ronaldsway were isolated, or whether other burials lay beyond the excavated area. It is certainly possible that the graves formed part of a larger burial ground, which might explain the apparent chronological gap of at least 500 years between the two. If this was the case, it seems quite plausible that the former settlement of the living was actively converted into a 'settlement' for the dead, which itself may have been linked with the site's perceived ancestral connections, or alternatively, that the infilled roundhouses were 'misidentified' as earlier burial monuments.

Settlement

Richard A Gregory

Another unexpected outcome of the RESA project was the discovery of a small Iron Age settlement at the Control Tower site, to the north of the runway and taxiways, particularly as, prior to excavation, there was no indication that any such remains existed in this area. In one sense, these remains are unremarkable, relating to a small and typical unenclosed settlement, dating to the earlier Iron Age (*730-410 cal BC*; *Ch 8, p 258*), and containing two roundhouses, at least one of which (Roundhouse 7) had a domestic function. The people living in this small settlement seem to have been partly engaged in the cultivation of hulled barley, and they may well have used the field systems that had been established much earlier, in the later Bronze Age (*p 339*). It is also likely, though, that they had a deeper 'historical' comprehension of this landscape, as they were almost certainly connected, either directly or generationally, to those who feasted and buried the dead within the confines of the abandoned later Bronze Age settlement (*p 360*), which at this time was probably an area 'charged' with some form of ritual/ancestral power (*above*).

One further possibility is that this settlement was contemporary with two of the multivallate forts in the Ronaldsway area, at Creggans Hill and Skibrick Hill, as both also seemingly date to the earlier Iron Age (*Ch 8, p 256*). If this were the case, this could be highly significant, as elsewhere in the Irish Sea area (such as Dumfriesshire, south-west Scotland) it has been suggested that these larger enclosed Iron Age settlements may have formed 'estate' centres inhabited by local elites (*cf* Gregory 2001a; Halliday 2002; Mercer 2018). In turn, such estates may have held sway over various lesser households within their estate areas, which are often associated with large systems of land division. Therefore, one tentative suggestion, based on proximity, is that the earlier Iron Age unenclosed settlement at the Control Tower site and the burials at Taxiway Alpha East formed part of one such 'estate' associated with the large Creggans Hill enclosure, whilst the Iron Age unenclosed settlement and field systems at nearby Billown may, in turn, have been associated with another adjacent 'estate' centred on Skibrick Hill.

In many ways, the architecture of the houses at the Control Tower site followed 'standard' Iron Age designs (*cf* Harding 2009). This is especially the case with Roundhouse 7, a 'ring-groove' structure, in which a circular construction trench was dug to secure a low timber outer wall, composed of either posts or planks, on top of which a beam that supported the rafters for the roof was probably fixed. Internally, additional support for the roof seems to have been provided by a single post close to the centre of the structure. In northern and western Britain, the origins of such 'ring-groove' buildings resides in the later Bronze Age (*p 349*), the Iron Age examples forming a clear continuation of this architectural tradition, which was often associated with the construction of comparatively large houses (*ibid*). The example from the airport had a diameter of *c* 10 m, and would have been quite a large structure, noticeably bigger than the houses associated with the later Bronze Age settlement to the south-east (*p 347*); hence, it could well have been home to a larger social group, perhaps comprising more than one family.

Whilst this type of timber-built, ring-groove, roundhouse is commonplace in the areas fringing the eastern side of the Irish Sea, several comparable examples are also known from the island. These include several close to Ronaldsway Airport, such as a single example (Hut 1) from Close ny Chollagh coastal promontory fort (Gelling 1953; 1958; *Ch 8, p 253*). This seemingly formed the earliest roundhouse at this fort, with its outer wall line being secured by a stone-lined construction trench; it was eventually replaced by two conjoined roundhouses (Huts 2 and 3) with substantial drystone walls, internal hearths, and stone-covered drains (Fig 214). Indeed, in style and materials, these latter houses are strongly reminiscent of those Iron Age drystone roundhouses in western Scotland associated with the 'Atlantic' roundhouse tradition (*cf* Harding 2017, 145-75; Armit 1990; Toolis 2015, fig 1). Following abandonment, midden deposits accumulated in both of these houses (*op cit*, 98), echoing the sequence of abandonment

recorded at the later Bronze Age settlement at Taxiway Alpha East (*Ch 6, p 358*), although these were clearly Iron Age in date.

Three ring-groove houses at Billown also formed part of an unenclosed settlement (Darvill 1996; Darvill *et al* 2000), as at the Control Tower. One building had a diameter of *c* 11 m, similar in size to Roundhouse 7, with a probable eastern entrance, the ring-groove containing upright timber planks, which had been burnt *in situ*. This was initially interpreted as a 'shrine' (Darvill 1996, 26), though presumably it could simply have been the remains of a large domestic roundhouse. The plateau in the radiocarbon curve during the Iron Age means that two timbers could date anywhere between 750 cal BC and 1 cal BC (*cf* Bayliss *et al* 2011b, 557, Beta-89310 and Beta-89311). Immediately to the east was a smaller ring-groove structure, with a diameter of 7.5 m and a probable western entrance, which was again perhaps a house, and immediately to the north of this were two further gullies and a scattering of posts. Beyond these was another well-preserved ring-groove structure, *c* 6 m in diameter, with a north-western entrance (Darvill *et al* 2000, 14-15). Near its centre was a dished clay hearth, or furnace, with a vitrified lining, around which was a concentration of metalworking debris in the form of slag, waste, crucibles, and moulds, relating to copper casting and iron smithing (Doonan *et al* 2000, 24). These suggest that the structure was a workshop, comparable to those identified at the later Bronze Age settlement at Taxiway Alpha East (*Ch 6, p 346*). Radiocarbon assay indicates that this structure dates to the first millennium cal BC and was perhaps contemporary with the larger ring-groove building to the south. (*cf* Bayliss *et al* 2011b, 557).

Further away, on Man's western coast, other examples have been excavated at St Patrick's Isle, which might have been within a coastal promontory fort (Freke 2002, 48-51; Lock and Ralston 2017). Two successive ring-groove houses had been built on the same spot, the earlier with a diameter of 7.5 m, whilst the later was larger, at 10.5 m in diameter, and hence similar to Roundhouse 7 and the largest house at Billown. With the abandonment of the larger ring-groove house, the area continued to be the focus for activity, including the construction of a roundhouse defined by stakeholes, with a diameter of 9 m, dating to 400-200 cal BC (2250±50 BP; GI-2522); this produced an abundance of charred spelt wheat, with smaller quantities of emmer wheat and barley, leading to the suggestion that it had been a granary (Freke 2002, 51). Once abandoned, a series of smaller timber structures was constructed, defined by stakes and postholes, together with other features (*ibid*).

Whilst generally of 'bog-standard' design, Roundhouse 7 possessed one unusual architectural feature, in that it

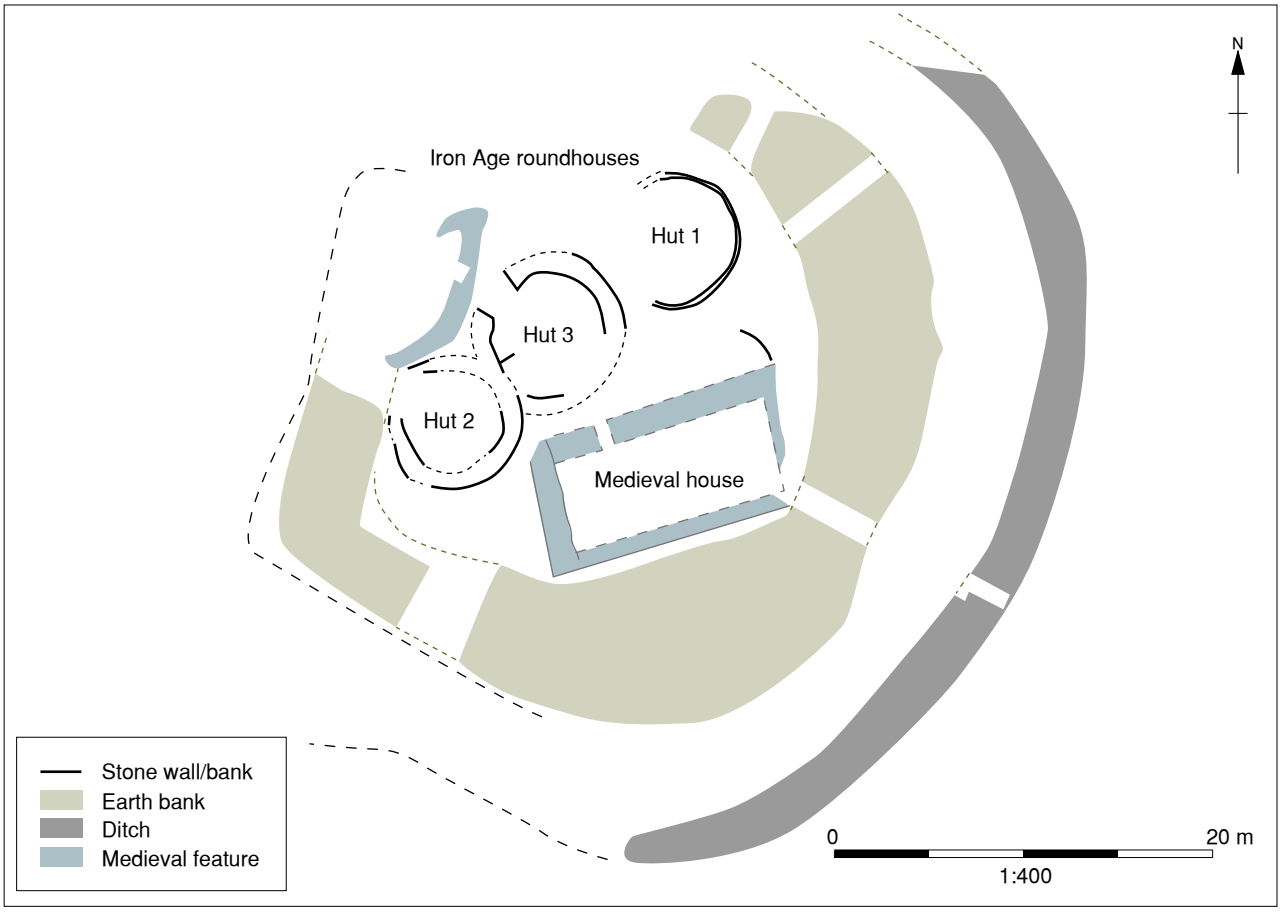


Figure 214: The excavated remains at Close ny Chollagh, recorded by Peter Gelling

had two opposing entrances. The main doorway was on the eastern side, which was a favoured position in later prehistoric roundhouses, perhaps linked to deeper cosmological concerns (*p 343*). It seems that cooking may have occurred in the southern part of the building, given the position of the hearth and cooking gantry, in accordance with the proposed model for the internal ordering of later prehistoric houses (Fitzpatrick 1994; Parker Pearson and Sharples 1999), and following the pattern noted in the nearby later Bronze Age houses at Taxiway Alpha East (*p 344*). The other entrance was to the west, and it is perhaps significant that this was subsequently blocked, by two wattle-and-daub panels, though the reasons for this are unclear. Such double-entranced roundhouses are rare, although they seem to be associated with a small number of comparable Iron Age ring-groove houses, which have a notable concentration in south-west Scotland (*cf* Gregory 2001b, 43; Harding 2009, 81), at Rispain Camp, Wigtownshire (Building 1; Haggarty and Haggarty 1983), Carronbridge (Building 1), and Hayknowes, both slightly further east in Dumfriesshire (Johnston 1994; Gregory 2001b; Fig 215; Pl 103). It is possible, therefore, that this architectural peculiarity reflects some form of cultural connection between south-western Scotland and the Isle of Man during the Iron Age (perhaps also witnessed in the wider Iron Age settlement record from this area; *below*), though notably all the examples from Scotland are later in date,

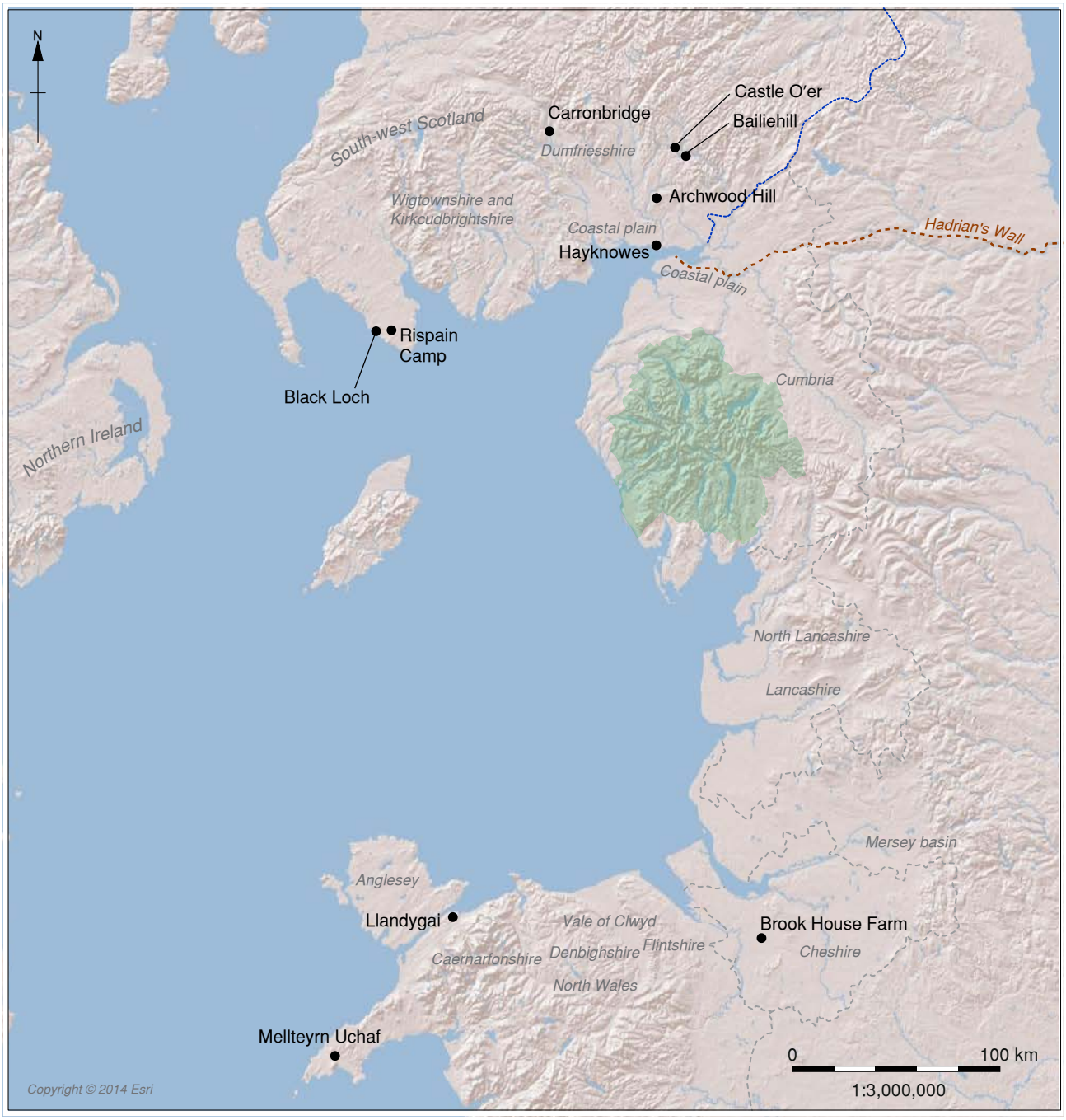


Figure 215: Iron Age and Roman-period settlements fringing the Isle of Man, mentioned in text



Plate 103: The double-entranced ring-groove roundhouse at Hayknowes Farm, Anan, Dumfriesshire

with that from Hayknowes probably dating to the last two centuries cal BC/first century AD, and those from Carronbridge and Rispain Camp being constructed at some point between the first- and the start of the fifth century cal AD.

The architecture of the other house (Roundhouse 8) from the Control Tower site is slightly more perplexing. Its site was defined by a substantial circular ditch that probably formed a drain surrounding the house, rather than being a structural feature supporting a wall. The use of such drains in later prehistoric roundhouse design is not uncommon in the Irish Sea area, with substantial circular drainage gullies associated with roundhouses being recorded in south-west Scotland, again at Carronbridge (surrounding Building 6, dating to the first two centuries AD; Johnston 1994), and in north-west England, at Brook House Farm, Bruen Stapleford (Structures 3 and 6, dating to the Late Bronze Age; Fairburn 2002; *p 351*). In both these examples, however, construction slots were contained within the area surrounded by the drainage gullies, whereas the only evidence for structural remains at Roundhouse 8 were two postholes where the drainage gully was broken by the entrance, which may have supported a porch.

Although the interior of Roundhouse 8 was completely devoid of structural evidence, a clue to its architecture was found in the form of lumps of clay within the drainage gully, which might have derived from the structure (*Ch 8, p 263*), presumably from a wattle-and-daub wall. Another suggestion, however, given the absence of post- or stakeholes to support a wall of that type, is that this material instead derived from a solid clay or turf wall, resting directly on the ground. Such a wall would probably need to be at least 1 m thick (Kenney 2008, 91), which would mean that internally the house had a diameter of *c* 5 m, if the wall lay directly on the inner edge of the drain (*below*). This would make it a small structure, and the absence of a hearth does suggest that it may have been an ancillary building, as opposed to domestic, so size may not necessarily have been a limiting factor (*Ch 8, p 263*).

Good architectural parallels beyond Man for this type of house can be found in north Wales, where a tradition of clay-walled roundhouses has been identified, dating to both the later Bronze Age (*p 349*) and the Iron Age (Waddington 2013, 57). As with Roundhouse 8, these normally had arcing, and often substantial, drainage gullies, such as that associated with the later Bronze Age clay-walled houses at Mellteyrn Uchaf (Ward and Smith 2001) and the earlier and later Iron Age examples at Llandygai (Parc Bryn Cegin), Caernarfonshire, where they were described as 'storm gullies', situated adjacent to the base of the wall (Kenney 2008, 76). Importantly, at this latter site, 'the features used to define clay-walled roundhouses... were, therefore, concentric curvilinear gullies defining a circular area with few or no structural postholes' (*ibid*). It may be significant that, to date, most Iron Age clay-walled roundhouses seem largely confined to north-west Wales and Anglesey (*ibid*; Ghey *et al* 2007; Waddington 2013), hence their possible presence on Man would suggest a cultural link (at least architecturally).

The two roundhouses from the Control Tower site are also important, in that they complement and confirm the known Iron Age settlement types from the island. When considering all of the evidence now available, it is apparent that Iron Age settlement on Man consisted of several distinct components (*Ch 8, pp 252-8*), including: large hillfort settlements (*ie* South Barrule, Cronk Sumark, and Chapel Hill); small enclosed promontory forts/homesteads (*eg* Close ny Chollagh); lakeside/wetland defended settlements (*ie* Ballacagen Lough, Ballanorris, and Port y Candas); single and multivallated curvilinear enclosed settlements (*eg* The Broogh, Skibrick Hill, and Creggans); and unenclosed roundhouse settlements (*eg* the Control Tower site and Billown). It is also worth noting that some of these settlements were also associated with distinctive architectural forms, such as a very unique form of defensive obstacle, termed *chevaux-de-frise* (*ie* South Barrule; Harbison 1971), fairly substantial drystone-walled roundhouses (*eg* Close ny Chollagh), large post-built roundhouses (*eg* Ballacagen Lough and Ballanorris), and timber ring-groove (*p 365*) and possibly clay-walled houses (*above*).

Although many of these types of settlement echo those found in other areas fringing Britain's western seaboard (*cf* Henderson 2007), it does seem that one area in particular, south-west Scotland, possesses a near identical range of Iron Age settlement types. For instance, small promontory and inland forts/homesteads, some with vitrified ramparts, are a common feature of Iron Age settlement in this area, along with multivallated hilltop and lowland settlements, at least one of which was also associated with *chevaux-de-frise* (Feacham 1977; RCAHMS 1997; Gregory 1998; 2001a; Toolis 2015; Harbison 1971). Moreover, some of these multivallated sites (particularly those in eastern Dumfriesshire; *eg* Hayknowes, Archwood Hill, Castle O'er, and Bailiehill) show striking parallels with those surrounding the airport (Fig 216), at The Broogh,

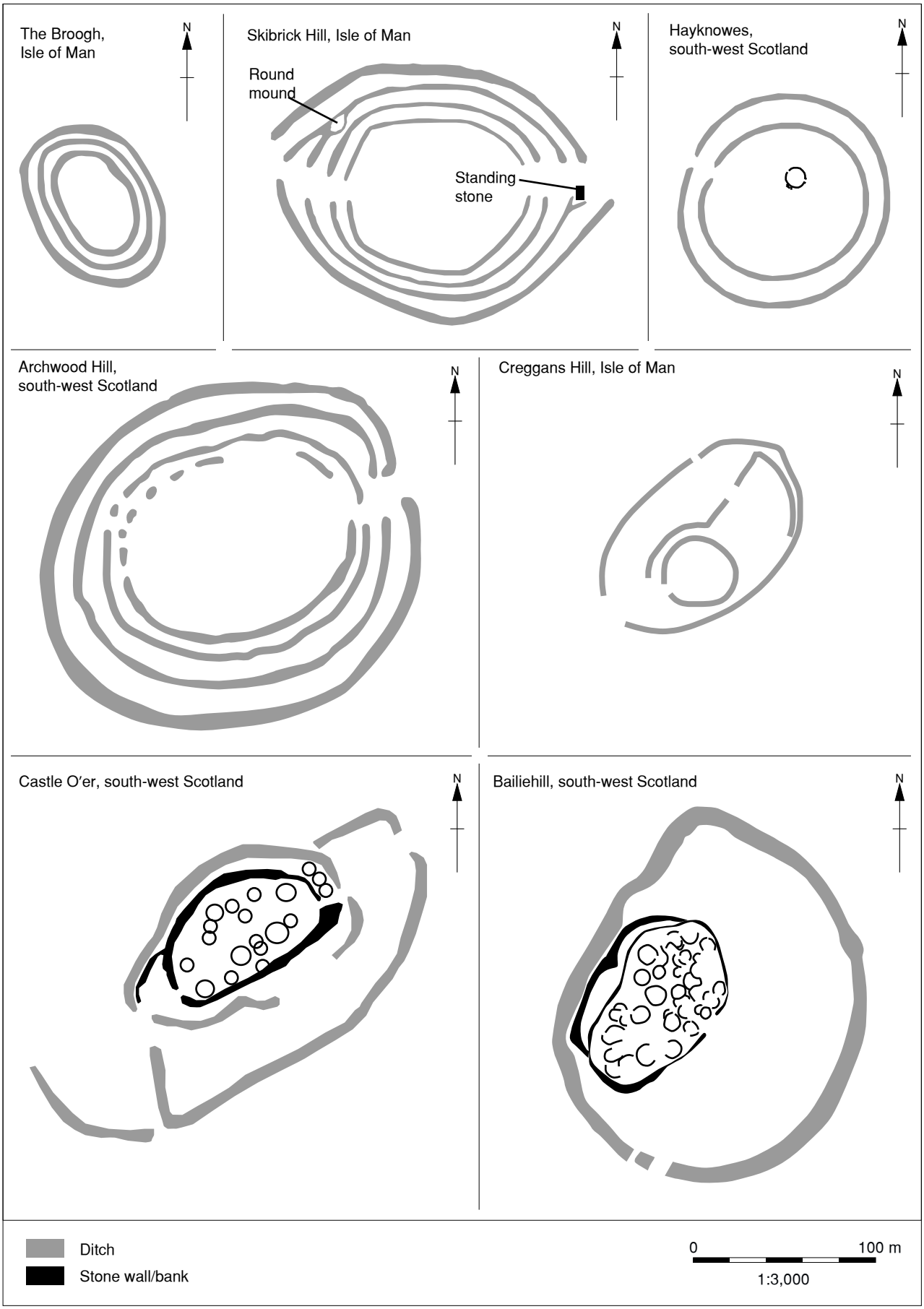


Figure 216: Examples of multivallate Iron Age settlements from the Isle of Man and south-west Scotland

Skibrick Hill, and Creggans Hill (*p 368*; RCAHMS 1997; Gregory 2001a; Mercer 2018). Notably, crannogs and loch-side settlements are also a feature of Iron Age settlement in south-west Scotland (*eg* Black Loch of Myrton; Crone 2024), comparable to those wetland/lakeside settlements on Man, whilst unenclosed settlements also existed, some associated with ring-groove houses (*eg* Dunragit; Bailie 2021). There does seem then, on this evidence alone, clear cultural connection between these two areas. In this context, it is probably worth stressing that south-west Scotland is the nearest mainland area to Man, being a mere 30 km sailing distance north of the island, meaning the potential flow of people and ideas between them was highly feasible, and hence they could well have been within the same broad Iron Age 'cultural sphere'.

Historic-period Burial, Settlement, and Farming

Richard A Gregory and Helen Evans

Ronaldsway Airport has produced a range of archaeological remains dating to the early and later medieval, and post-medieval periods, which were recorded both during the construction of the pre-war airfield in the late 1930s and as part of the more recent investigations. It is clear that the area was a significant place by at least the eighth century, resulting in the creation of a possible outdoor altar or shrine that formed the focus for a lintel-grave cemetery, at a prominent spot, which, when excavated in the late 1930s, became known as the Ronaldsway Village (*Ch 1, p 8*;Pl 104; Fig 217). These features were placed over the site of a Bronze Age settlement (*p 356*), the remains of which could well still have been visible, and it is tempting to suggest that the area retained an historical resonance, which singled it out as a suitable site for burial and worship. This therefore closely replicated the earlier mortuary acts of positioning Iron Age burials within the confines of the later Bronze Age settlement area at Taxiway Alpha East (*p 360*). Indeed, this process of utilising 'ancient' sites for Christian burial seems to have been a common feature on the island, as it also occurred to the west at nearby Chapel Hill, where a potentially contemporary lintel-grave cemetery was established within the confines of an Iron Age contour fort (Bersu and Wilson 1966). It is also quite likely that, at Ronaldsway Airport, some form of contemporary settlement was close to the burial ground, perhaps even within the airport area itself, though to date no evidence for this has been recovered.



Plate 104: The cemetery excavated at the Ronaldsway Village, containing lintel graves (marked by upright slabs of stone) and other graves (marked by quartz pebbles)



Figure 217: Early medieval and Viking-age sites, surrounding Ronaldsway Airport, mentioned in the text

At some point after the eighth century AD, the burial ground was eventually abandoned and subsequently selected as a locale for Viking-age activity. Although the remains relating to this activity, excavated during the construction of the original airfield (*Ch 1, p 8*), can be interpreted in several ways, one suggestion is that during this period this area was enclosed by a sub-square boundary with a stone-revetted ditch on its southern and western sides, and that it contained at least two rectangular structures (one containing a hearth), areas of stone paving, and a possible corn-drying oven (*Ch 9, p 295*). This enclosure also produced a range of Viking-age artefacts, which strongly suggest that it was associated with high-status activity, though its precise function is slightly ambiguous. Whilst it could feasibly represent a domestic settlement, another suggestion, given that the locale was previously associated with an early Christian shrine and burial ground, is that the enclosure and structures related to a pilgrimage site, which therefore enabled the site to retain its religious significance (*Ch 9, p 296*). In any event, function aside, given that the Viking settlers were culturally different incomers to the island, it may be no coincidence that they seemingly chose to appropriate a place that held deep-rooted religious significance for the local population. Such cultural appropriation also seems apparent in the placement of the Balladoole boat burial on Chapel Hill, on the site of the earlier lintel-grave cemetery (*p 370*), this probably being the burial of one of the more prominent members of the initial Vikings who settled on the Plain of Malew.

Significantly, it is also clear from the documentary sources that Derbyhaven was highly suitable for the beaching of Viking ships (*Ch 9, p 277*), and the coast

at Ronaldsway would have formed an ideal landing point. Indeed, another suggestion, is that the Viking-age enclosure, forming the Ronaldsway Village, was in some way related to an adjacent beach-market, comparable to that at Meols on the Wirral Peninsula (Griffiths *et al* 2007). Furthermore, it is 'ringed' by several Iron Age promontory forts, at Close ny Chollagh, Cass ny Hawin, and Cronk ny Merriu (Fig 217), which seem to have been reused at this time, as they contain Viking-style buildings (*Ch 9, p 280*). In addition, at Hango Broogh, a suspected Iron Age promontory fort at the northern tip of the Langness peninsula, a charcoal-filled pit in its interior has been radiocarbon dated to the late ninth/early tenth century (Doonan *et al* 2001). Together, these sites may have provided protection for the Viking-age enclosure and beach market, at Ronaldsway, perhaps acting as look-out posts (Johnson 2002; *Ch 9, p 280*). The latter fort may also have protected St Michael's Isle, a significant place of Viking-age Christian worship, at the twelfth/thirteenth-century chapel (*Ch 9, p 280*). This may also have replaced an earlier *keeill*, dating to a period (mid-tenth century?) when Christianity was adopted by the island's Viking settlers.

If a port (or more accurately a beach market) did exist at Ronaldsway, it would have been engaged in the trade of items from the island and also from around the wider Irish Sea area (*cf* Griffiths *et al* 2007). Part of this trade may have involved precious metals and coins, since a balance-beam was found during the excavation of the Ronaldsway Village (*Ch 9, p 296*), an item that was used to weigh such highly valued materials. Indeed, this item, together with the large amount of currency so far found (*Ch 9, p 277*), suggests that the island, and perhaps Ronaldsway, was a central hub, along with other sites such as Meols (*above*), in a Viking trading network which encompassed the Irish Sea and the wider Atlantic seaboard (*ibid*; Downham 2007; Skre 2008; Bornholdt Collins *et al* 2014).

The longevity of the activity associated with the Viking-age enclosure at Ronaldsway Airport is unclear, though it was possibly comparatively short-lived. Indeed, it had probably been abandoned by the mid-thirteenth century, if a series of later graves within its interior area really contained some of those 537 men killed in the battle at Ronaldsway in 1275, between the Manx and Scots (Cubbon 1938; Neely 1940, 80). One tentative suggestion is that any settlement in this area then shifted *c* 1 km westwards to Creggans, as archaeological evaluation within an enclosure to the south-east of Creggans Hill has produced evidence of eleventh-twelfth-century activity (OA North 2016a; *Ch 9, p 281*). If this is correct, this latter site would probably also pre-date the construction of Castle Rushen to the south, possibly in the late twelfth century (*Ch 9, p 282*), which became the main defensive site in the area, and probably also the main focus for medieval settlement in the latter part of the Viking Age (Fig 217).

After the battle at Ronaldsway in 1275 (and perhaps also prior to it), the Ronaldsway Village site appears to have functioned as a bloomery, engaged in iron smelting, given the presence of numerous furnace bases and tap slag (*Ch 9, p 296*; Fig 218). There is also some archaeological and documentary evidence that may provide an indication for the broad date of this and also those responsible for its operation. An early thirteenth-century charter indicates that Furness Abbey, in Cumbria, held land in the area of the airport (*Ch 9, p 280*), as part of their exploitation of the island's mineral rights, on which they were allowed to build a 'messuage', comprising a house and stores (*cf* Davey 2013, 120). It has been suggested that this lay some 500 m south-west of the Ronaldsway Village, next to the coast, also within the area now covered by the airport, as in 1935 (*Ch 1, p 8*), a lead-smelting furnace and buildings were discovered, associated with medieval pottery (Stenning 1938; Megaw 1960). If this was the case, the bloomery may have formed an ancillary works also operated by the Abbey. Indeed, this possibility is given added credence by Furness Abbey's strong links with iron production on the mainland (Bowden 2000, 77), and the suspected bloomery could have been part of wider mineral exploitation and metal-processing on the island.

The RESA project also identified other remains potentially dating to this period, in the 26 End site, comprising a corn-drying oven, directly adjacent to a sub-rectangular enclosure, probably a stock corral, which was appended to a two-phased ditched boundary that had been maintained into the post-medieval period (*Ch 9, p 303*). Although the oven and enclosure remain undated, the cartographic evidence indicates that the enclosure pre-dated the eighteenth century, whilst the form of the oven and the associated assemblage of charred plant remains from it, as well as from an associated windbreak and the northern ditch of the enclosure, suggest a later medieval date (*Ch 9, p 304*). By extension, the boundary, at least in its earliest form, which was clearly in existence when the enclosure was established, might be of similar date.

If this is the case, some of these features could in theory represent further elements of Furness Abbey's activity (*above*), particularly as these were a mere 260 m east of the bloomery at the Ronaldsway Village site. Indeed, the boundary may have defined the north-eastern extent of the Furness Abbey land, with the kiln and enclosure falling just beyond their holdings, and thus relating to activities within a separate medieval landholding. Based on this premise, the Abbey's land may have covered an area of some 200 x 700 m, on the shores of Derbyhaven, though it does seem

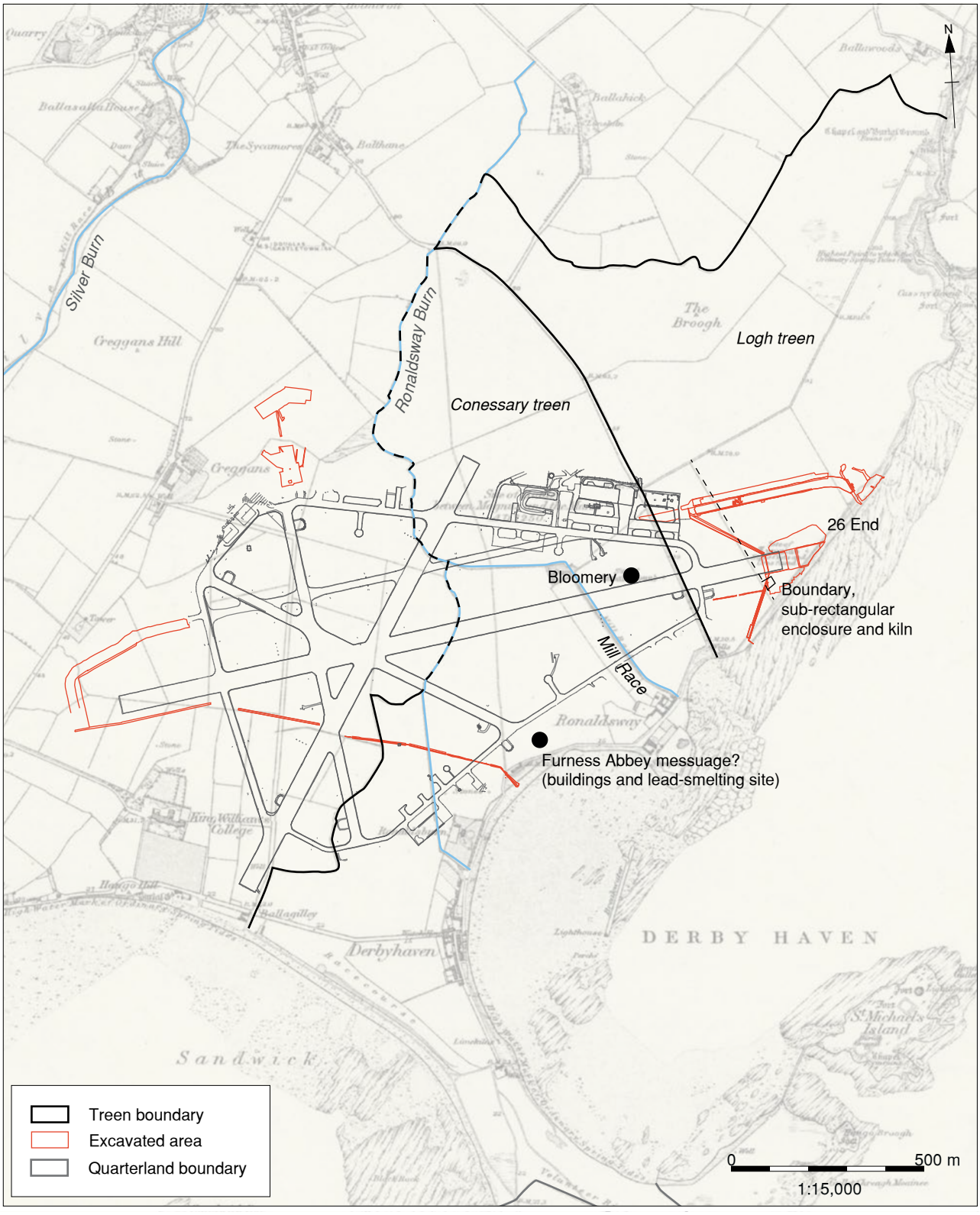


Figure 218: The thirteenth-century and other later medieval sites at Ronaldsway Airport, superimposed on the OS map of 1870

from a rental agreement dating to 1539, immediately prior to the dissolution of the monastery, that these holdings were confined to a much smaller parcel of land (*cf* Davey 2013, 120), perhaps representing a contraction of the original holding.

Of course, the oven, enclosure, and boundary may have been established after the dissolution of the monastery, being related to the division and exploitation of the landscape in the early post-medieval period. Indeed, this may provide a better explanation for the boundary,

or at least its later manifestation, which was maintained right up until the airport was constructed in the 1930s. If this was the case, however, these features probably still related to Ronaldsway Farm/Estate, which, during the sixteenth and early part of the seventeenth century, was in hands of the Samsbury family, who, by 1507, were in possession of the whole of the treen of Logh, an adjacent quarterland, forming half of the treen of Conessary, as well as a quarterland within the treen of Kyrkemychell, next to Santon Burn, separated from the treen of Logh by two intervening quarterlands (Moore 1906; A Johnson *pers comm*).

By the mid-seventeenth century Ronaldsway was in the possession of the Deemster Ewan Christian, who in 1643 passed it to his son, William Christian (or *Illiam Dhone*; *Ch 9, p 290*), who signed a lease for three lives, and became the property's most famous inhabitant (Moore 1906). By the early eighteenth century, most of the property had been sold to Sir James Somerville of Dublin, who, in 1720, passed it to William Murray (*ibid*), who was probably responsible for constructing the substantial early eighteenth-century house visible on historical photographs (Pl 105), to replace an earlier farm occupied by the Christian family. Then, during the earlier part of the nineteenth century, the estate was in the possession of the Manx politician John Taubman (*Ch 9, p 298*). Thus, the boundary, and the associated enclosure, could have been created when the Samsbury or Christian families held Ronaldsway, the boundary being actively maintained during the eighteenth and nineteenth centuries by later owners of the estate.

The form of the medieval and early post-medieval landscape surrounding this potential early boundary and stock enclosure is largely unknown, though manorial records from the late seventeenth century suggest that much of Ronaldsway (*ie* the treen of Logh and the adjacent Ronaldsway quarterland in the treen of Conessary; Fig 218) was laid down to pasture and meadow (*ibid*). By the eighteenth century, the cartographic evidence indicates that the landscape contained a patchwork of fields, which were both irregular and regular in shape, and which probably reflect different episodes of enclosure (Fig 219). These fields were defined by either stone or sod walls, with a trench or ditch on either side (*cf* Quayle 1794; Page 2002), and the smaller and more irregular fields could, in theory, reflect the earliest phases of enclosure, potentially pre-dating the eighteenth century. Moreover, some of the field boundaries recorded by the RESA project could also relate to these potentially early fields, such as those at the eastern end of the western drainage run (*Ch 9, p 307*), which could have marked three irregular fields within the Ronaldsway estate, and the remains of a sod wall used to enclose a reclaimed area of waste,



Plate 105: The early eighteenth-century farmhouse at Ronaldsway, as seen on a photograph dating to c *1930*

that by the mid-eighteenth century was used as a paddock owned by Ballagilley Farm (*Ch 9, p 309*).

The fields with more regular shapes, were generally larger than the irregular fields, and based on their size and morphology these perhaps reflect later agricultural improvement, dating to the later part of the eighteenth century. Given this, the subtantial boundary identified at Taxiway Alpha East and the 26 End site (*Ch 9, p 307*), which seems to have been a sod wall, with ditches on either side, probably relates to this period of improvement, as part of a reorganisation of farmland to the north-east of Ronaldsway Farm. This period also saw improvements at Ronaldsway Farm, including the removal of many of the small, irregular fields to the south-west (*above*), and their replacement with larger, more regular fields. Other improvements included the construction of a mill race to serve the farm (Fig 220) and also the construction of additional farm buildings, creating a model farm typical of this period (*cf* Wade-Martins 2002). It is worth noting, however, that more generally, such regular and larger fields, associated with agricultural improvement, are a rare feature of the Manx landscape, where for the most part sinuous boundaries still prevail (A Johnson *pers comm*). Indeed, those in the vicinity of Ronaldsway Farm principally reflect the presence of its more well-to-do and powerful occupants, who could actively invest in agricultural improvement and some reorganisation of field systems (*cf* Page 2002).

The cartographic evidence also indicates that a similar process involving the rationalisation of fields was occurring at the adjacent Ballagilley Farm in the late

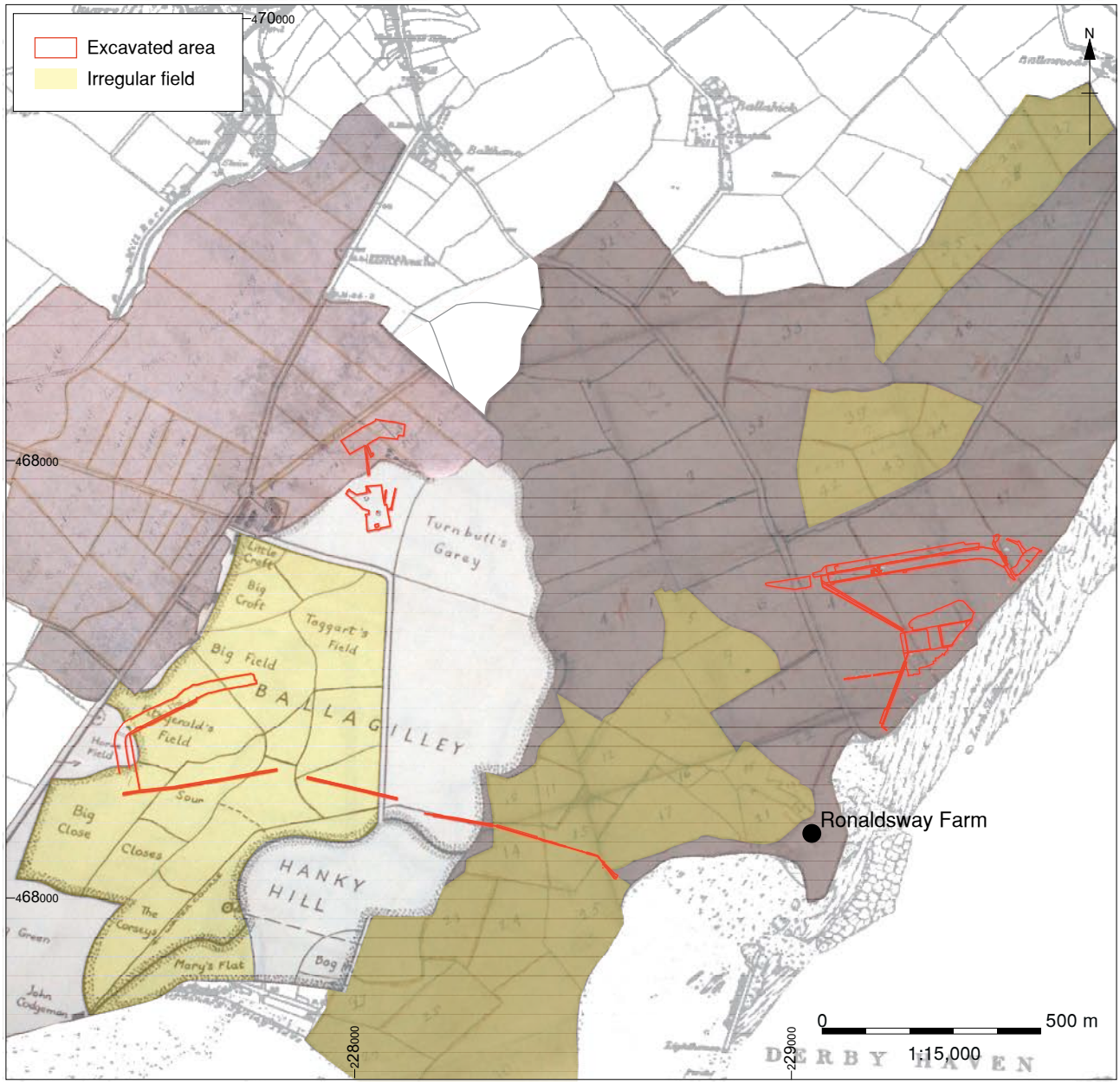


Figure 219: Irregular fields depicted on eighteenth-century mapping

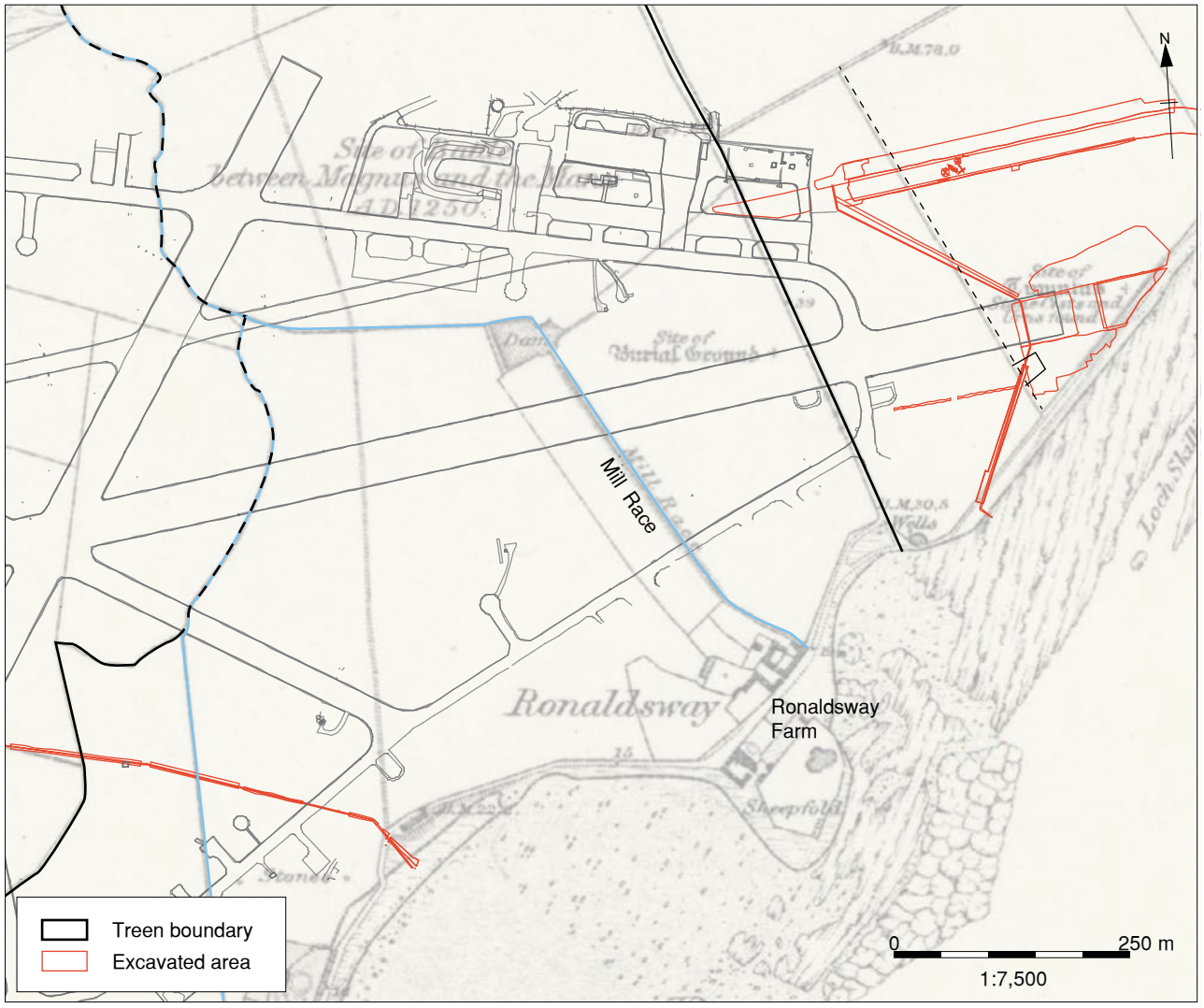


Figure 220: The mill race serving Ronaldsway Farm, as shown on the OS map of 1870

eighteenth and early nineteenth centuries (Pl 106; MNHL P.1721/a-f). Similarly, evidence for eighteenth-century agricultural improvement/rationalisation was also evident at the Car Park site (*Ch 9, p 309*), associated with Creggans Farm, comprising the removal of an early field boundary, to create a series of regular fields, probably dating to the mid-eighteenth century, within which ploughing then occurred. Perhaps significantly, the then landowner, John Quayle, was the father of Basil Quayle, born at Creggans in 1765 and author of *A general view of agriculture of the Isle of Man, with observations on the means of its improvement* (Quayle 1794), which provides detailed insights into late eighteenth-century farming practices on the island.

Conclusions: Backwards and Forwards

Back in 1938, William C Cubbon, who had just discovered the Ronaldsway Village site at the airfield during improvements (*Ch 1, p 8*), astutely noted that,

> Ronaldsway would, therefore, be a most important haven for much of the shipping and traders from the South, possibly as far off as the Mediterranean, and from the North as well; we, therefore, should not be surprised if we found evidence of occupation over a very long period of time (Cubbon 1938, 153).

With the discoveries at the airport reported here, as part of the RESA project, the latter part of this statement is completely validated, with evidence for activity at Ronaldsway now known to extend across a rather surprising and spectacular 10,000-year period, which is probably much longer than Cubbon anticipated when writing back in the 1930s. The archaeological findings now available from the airport also present a vivid picture of the connectedness and importance of Man since people first settled the island. Indeed, long-range connections with other areas fringing the Irish Sea, and beyond, can now be seen to be a defining feature of Man, extending right back to the earliest part of its post-Glacial history.

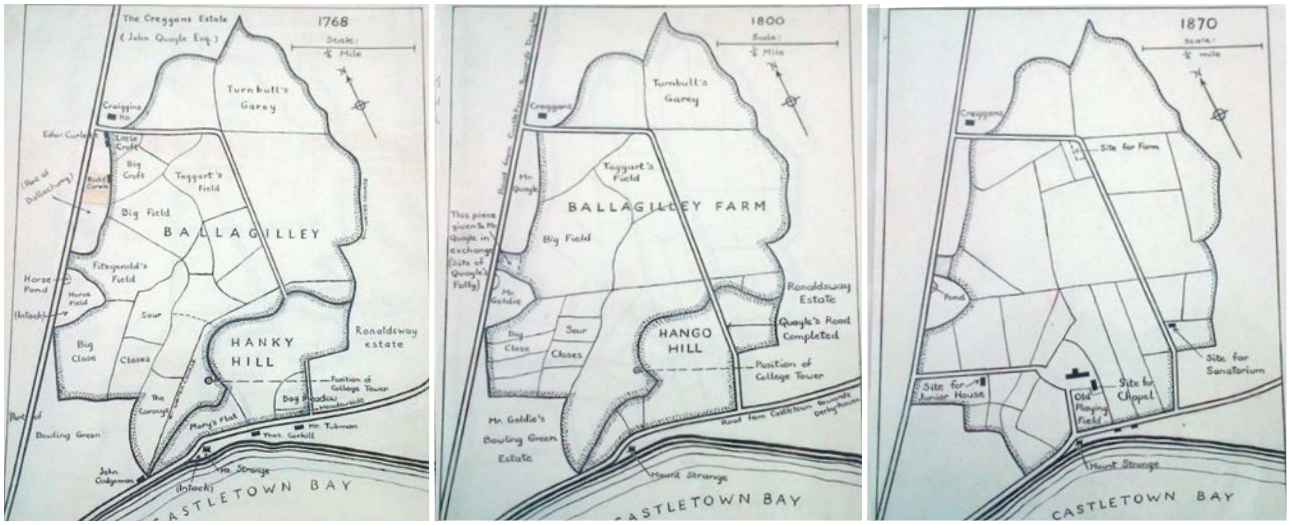


Plate 106: The gradual rationalisation and modernisation of the field systems associated with Ballagilley Farm, as witnessed on maps dating to 1768, 1800, and 1870, transcribed by Stenning in 1944 (MNHL P.1721/a-f)

Cass ny Hawin II (*Ch 2*), the island's earliest house, graphically illustrates this point, indicating that the early post-Glacial 'island' formed an extremely important hub for hunter-gatherer communities around the Irish Sea. These people either adopted lithic tools in the narrow-blade tradition and other associated cultural traits, such as pit houses, in the last centuries of the ninth millennium cal BC, or were groups that moved and colonised the area, as a response to changing geographies to the east, in the North Sea basin. As far as can be ascertained, Man seems to have been first settled by such groups, offering a newly accessible and suitable environment for settlement, based on advances in marine technology and the adoption of new economic and cultural strategies that could make the most of the coastal landscape at Ronaldsway. It is quite possible, given the radiocarbon evidence, that these communities arrived from north-west England, or perhaps western Scotland, after which Man might feasibly have formed a springboard for the first Mesolithic groups moving into Ireland (*cf* Woodman 2012). In this sense, Man was of central importance to narrow-blade groups in the region and, once settled, formed an important landscape for hunter-gatherers throughout the remainder of the Mesolithic period.

The importance of the island to prehistoric communities did of course continue. Hence, during the Neolithic period, the island formed a central hub that absorbed many cultural traits and practices associated with the wider earlier Neolithic culture of the Irish Sea, though from the outset, the Neolithic people on the island also created their own insular culture, apparent in the earlier stages from the unique burial monument on Mull (Meayll) Hill, and the adoption of Meayll Hill pottery, seemingly followed by the appearance of several unique artefacts (for instance, Ronaldsway jars, schist plaques, and distinctive stone axes), which were first identified at Ronaldsway Airport (*Ch 5*). It is also evident from both the RESA project and earlier excavations at the airport, that rectangular timber structures (or 'houses') were another feature of this 'Manx Neolithic', two examples now being known from the airport, perhaps both dating to the later centuries of the fourth millennium cal BC. Whilst such structures are a common feature of the earlier Neolithic period, most seem to date to a slightly earlier time in the thirty-eighth/thirty-seventh century cal BC (*cf* Smyth 2014; Thomas 2013), and hence their use on Man at a later date might reflect another peculiarity of this culture.

The evidence from the airport indicates that this theme of prehistoric connectedness continued into the Bronze Age, which in many ways was a golden age for long-range contacts. Although the discovery of a small earlier Bronze Age timber structure at Taxiway Alpha East holds great significance (*Ch 5*), given the rarity of such structures, and also its association with 'domestic' Collared-Urn ceramics, it is the spectacular later Bronze Age settlement in the same area that provides excellent evidence for long-distant contacts during the late second and early first millennia cal BC (*Ch 6*). The excavated part seems to have formed one element of a large agglomerated 'village', containing multiple households, and workshops engaged in the casting of bronze objects, including tools (axes/palstaves) and weapons (spearheads and swords), as well as lead items (*Ch 7*). Effectively, therefore, it seems to have been, at least in part, a distinctive metalworkers' settlement, perhaps initially created to exploit the nearby mineral resources, on Langness, of copper, and lead, and the position of the island as a maritime 'crossroads' on Britain's western seaboard (*cf* Bradley 2019, fig. 1.9;

Fig 221). It is probably no coincidence then that the settlement was close to Derbyhaven, which could have functioned as a 'port', allowing direct access to these maritime routes. These factors, along with the prime agricultural land in which it stood, seemingly intensively farmed and divided from at least the Middle Bronze Age, fostered the conditions required for a village settlement of this apparent size, though one which may have been comparatively short-lived.

During the later Bronze Age, easily accessible maritime routes could also have linked this settlement with additional sources of raw materials (copper and tin, or existing bronze objects that could be recycled and recast) and allowed finished bronzes to be exchanged across a wide maritime area. Such networks undoubtedly linked Man with other areas fringing the Irish Sea Basin, evidenced by the recovery of Cordoned-Urn ceramics from Taxiway Alpha East and the Ronaldsway Village, as this is a style of domestic pottery that has been recovered from a restricted number of later Bronze Age settlements in Ireland, north-west England, and western Scotland. However, it also seems that direct connections with other later Bronze Age communities extended much further south, right down to the tip of western Britain. Indeed, the settlement at Taxiway Alpha East is near-identical in form to later Bronze Age settlements excavated in Cornwall, an area also rich in mineral resources important for Bronze Age metalworking (*ie* tin). Furthermore, these similarities, in settlement, at least, are so exact that some direct maritime contacts probably existed between these western communities (with perhaps the tip of Pembrokeshire, south Wales, acting as a convenient maritime stopping point between the two areas), given the very similar approaches to roundhouse architecture, use, and abandonment. All in all, the evidence from Taxiway Alpha East seems to highlight the extent and direct influence of maritime routes and long-range contact during the later Bronze Age, with areas such as Man and south-west England forming important components in the wider framework of Atlantic Europe during this period (*cf* Henderson 2007, 283).

It is possible that such wide-ranging connections between Man and other distant communities in south-western Britain continued during the Iron Age. Again, the direct evidence from Taxiway Alpha East, in the form of the burials, seems to hint, for instance, at a continued shared identity with communities in Cornwall, particularly because abandoned later Bronze Age settlements there were also viewed as suitable areas for the burial of certain individuals, at Ronaldsway including one 'warrior', whose death was a result of sword blows inflicted during an act of interpersonal violence (*Ch 8*). Whilst it is possible that these deep-rooted and probably 'traditional' cultural contacts were maintained, these could well have been more occasional and were perhaps of lesser significance to the functioning of wider Iron Age society, presumably a result of the declining importance in the trade of bronze metalwork during this period, with the adoption of iron (Kristiansen 1998, 211-12).

In contrast, the evidence for Iron Age settlement now available on Man (*Ch 8*) seems to suggest that a more parochial and inward-looking culture developed in this period, particularly as the settlement evidence from the island shares many similarities with that from south-west Scotland (*p 351*), with easy maritime access between the two areas being via the head of the Solway Firth, suggesting, in turn, a refocusing of Manx culture and identity on the northern part of the Irish Sea zone. Moreover, it has been suggested (Henderson 2007, 285-7) that south-west Scotland (and by extension Man) was part of a wider 'outer' Iron Age cultural zone that encompassed Atlantic Scotland and western Ireland, distinct and isolated from an 'inner' zone comprising south-west England, Wales, and Armorica (the Brittany peninsula, in northern France), which had stronger links with west-central Europe.

In the early historic period, Man's contacts and connectedness with the wider Irish Sea zone were actively maintained, most graphically witnessed, first by the appearance of Christianity and later by its integration into the Viking-age world (*Ch 9*). This allied the island with other Viking communities in Ireland and north-western Britain, and eventually resulted in the formation of a hybridised Christian/Viking culture on Man. It seems that Ronaldsway was important during this period, perhaps the location of a Viking settlement or pilgrimage site, next to a 'port' or beach market, a crucial locale in the wider Viking trading network around the Irish Sea. Such connections with other Irish Sea communities continued into the later medieval period, with Ronaldsway being particularly important to Furness Abbey, in Cumbria, as a site associated with metalworking. Ronaldsway then continued to hold great significance to the island's local history, being the home of *Illiam Dhone*, one of its most famous seventeenth-century sons.

It is therefore clear that the evidence from Ronaldsway Airport, generated both by the archaeological work as part of the RESA project, and during the earlier development of the airfield, provides an unrivalled picture of life on the island, throughout the entire span of human history, since humans first came to Man. Indeed, the evidence is of immense archaeological significance, not only for providing information on the character and development of settlement on the Isle of Man, but also for understanding its culture and long-standing connections with the Irish Sea, and a much wider part of western Britain.

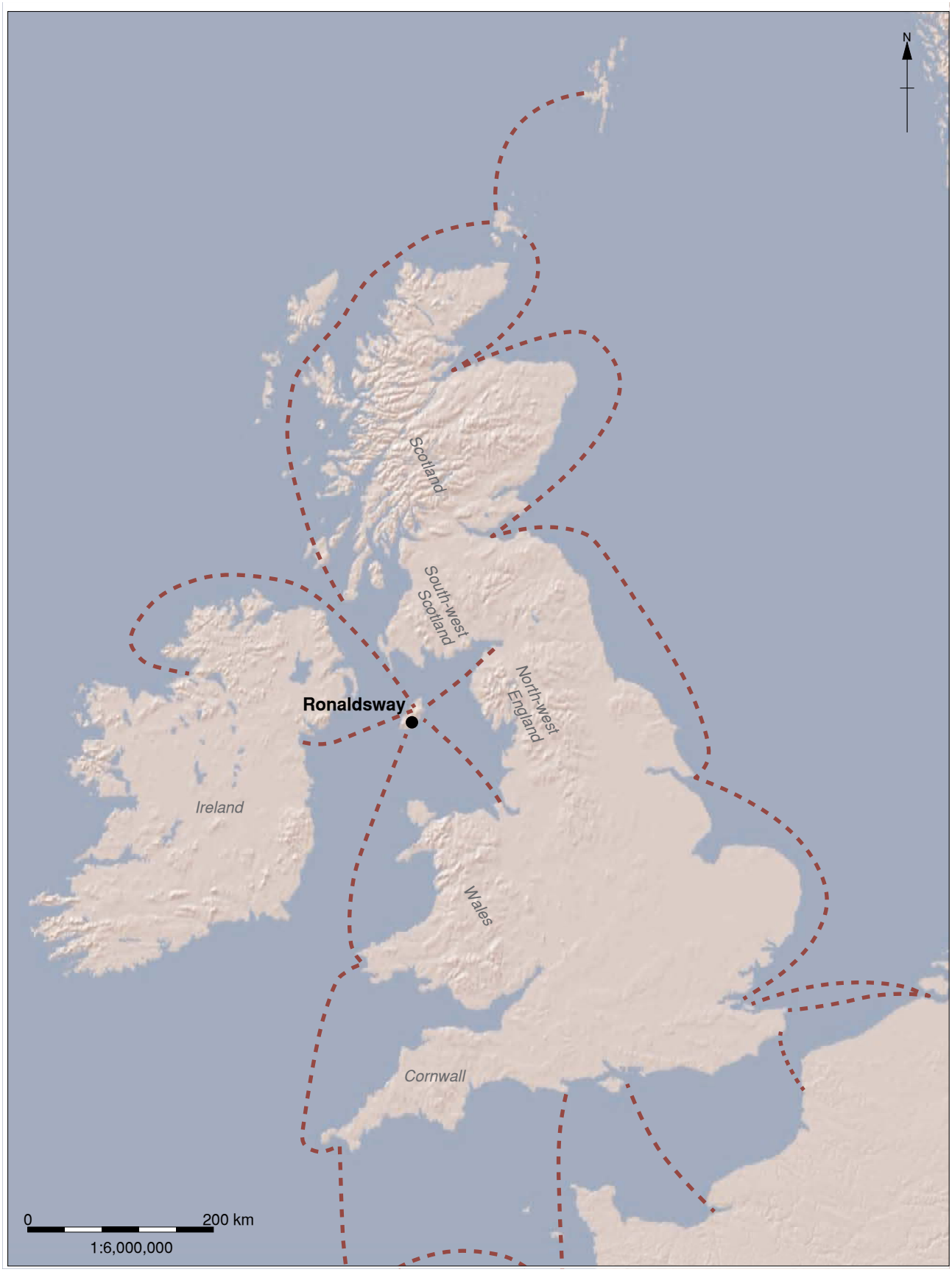


Figure 221: Possible later prehistoric maritime routes along the western seaways and beyond (after Bradley 2019, fig 1.9)

APPENDIX 1: PETROGRAPHIC ANALYSIS OF THE BRONZE AGE POTTERY

Patrick S Quinn

Seven sherds of pottery (sherds 1-7) from the later Bronze Age settlement at Taxiway Alpha East (*Ch 6*) were subjected to petrographic analysis. This formed a complementary study to the typological analysis of the Bronze Age pottery assemblage (*Ch 7, p 219*), to investigate provenance and manufacturing technology.

Methodology

Initially, small samples of the sherds were impregnated with epoxy resin and prepared as standard 30 μm petrographic thin sections at the Institute of Archaeology, University College London. The seven thin sections were then analysed petrographically, using a polarizing light microscope, and compared to one another in terms of the main components of their ceramic fabric. Finally, the samples were interpreted in terms of their constituent raw materials and manufacturing technology, and the likely provenance of the ceramic samples was assessed by comparing their petrographic fabric with the local geology of the Isle of Man (Stone *et al* 2010) and the petrographic analysis of contemporaneous pottery from the Ronaldsway Village site (Woodcock 1999, 132-3; 2008, 26-7; *Ch 7, p 219*).

Results and Discussion

This analysis indicated that the selected sherds could be subdivided into two main groups (1 and 2) in terms of their petrographic fabric in thin section, and that these equate with Fabrics 1 (finewares) and 2 (coarsewares) identified by Jennifer Woodcock (1999; *Ch 7, p 219*). These two fabrics are closely related to one another and may share the same provenance, but appear to have been made with a different paste recipe.

Group 1: coarseware (Fabric 2)

Five of the selected sherds (1-3, 5, and 6) have a common petrographic fabric in thin section that is characterised by the presence of abundant igneous-rock inclusions of basalt composition. The fabric is very coarse-grained, with the largest inclusions in the prepared thin sections reaching almost 10 mm in size. Nevertheless, there is a wide range of inclusion sizes in all of the samples, including very small mineral inclusions, giving the samples a unimodal poorly sorted grain-size distribution. The inclusions have an equant and elongate shape and are rounded to angular, with a tendency for higher angularity in the smaller mineral inclusions.

Nearly all of the inclusions in the Group 1 samples can be attributed to a single rock type. This can be interpreted from the large and, in some cases, very fresh (*eg* sherd 1) fragments that are visible in thin section, as a fine-grained basic igneous rock, composed of plagioclase feldspar, olivine, clinopyroxene, and iron. The grain size of the rock, based on the abundant feldspar laths, and disregarding the large olivine phenocrysts that occur in some examples (*eg* sherd 2), varies from fragment to fragment, but is always less than 1 mm, suggesting that the rock should be classified as basalt. Jennifer Woodcock (1999) also recorded black volcanic-rock fragments in Bronze Age pottery from Ronaldsway Village, which were interpreted as olivine dolerite in thin-section. Whilst the results from Taxiway Alpha East suggest that the rock fragments in the analysed samples are mostly too fine to be classified as dolerite, it is likely that they are the same material that was reported by Woodcock (*ibid*).

The plagioclase feldspar laths in the basalt are, in most cases, randomly orientated (Pl 107), but in some fragments can have a radiating arrangement, or parallel alignment, that is suggestive of flow (Pl 108). The euhedral feldspars are partially enclosed by clinopyroxene crystals, giving the rock a sub-ophitic texture (Pl 109).

Large, usually equant olivine phenocrysts are also present in many examples, though are weathered in many cases. Some plagioclase microphenocrysts are also present in some examples. Fine equant opaque iron crystals are present throughout the rock. The



Plate 107: Randomly orientated plagioclase feldspar laths in sherd 2 (image width 2.9 mm)

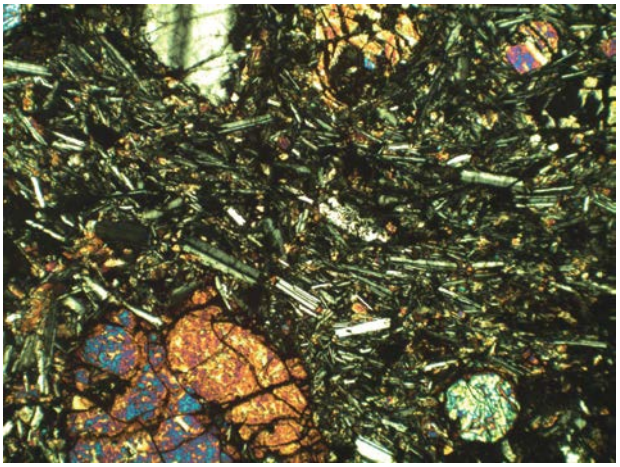


Plate 108: Plagioclase feldspar laths arranged in parallel alignment in sherd 1 (image width 2.9 mm)

olivines have broken down to varying degrees, to orange-red iddingsite and perhaps serpentinite (Delvigne 1998, 110-13), but can be well preserved (Pl 110).

It is not clear whether basalt-rock inclusions in Ronaldsway sherds 1-3, 5, and 6 were naturally occurring in the clay that was used to manufacture these ceramics, or whether they were added as temper. Woodcock (1999, 132) suggests that 'freshly crushed igneous rock' was added as temper and cites the angularity of the inclusions in the samples as evidence for this. Whilst the basalt inclusions are certainly fresh in many cases, they have a more rounded shape in the samples analysed in this study, which appears to rule out crushing. The wide grain-size distribution may also provide evidence against the notion of tempering; however, it is possible that loose, weathered, poorly sorted, and, perhaps, partially transported basalt sand could have been added. A few inclusions of non-basalt origin are present in some of the thin sections. Sherd 2 also contains a sand-sized polycrystalline quartz inclusion. In addition, several similar inclusions are present in sherd 3 (Pl 111), which appear to exhibit some sort of foliation and may therefore be of metamorphic origin.

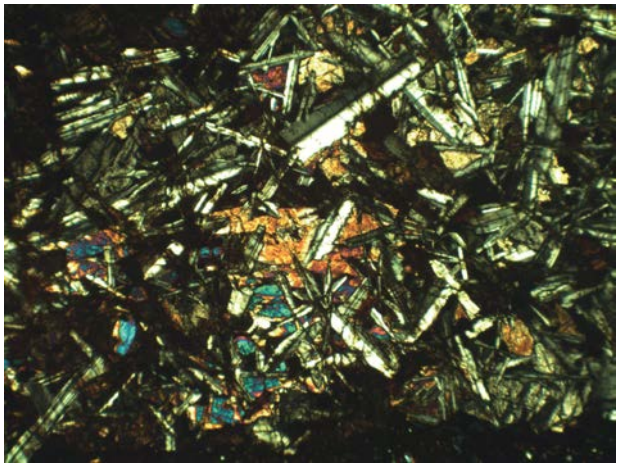


Plate 109: The sub-ophitic texture of sherd 6 (image width 2.9 mm)

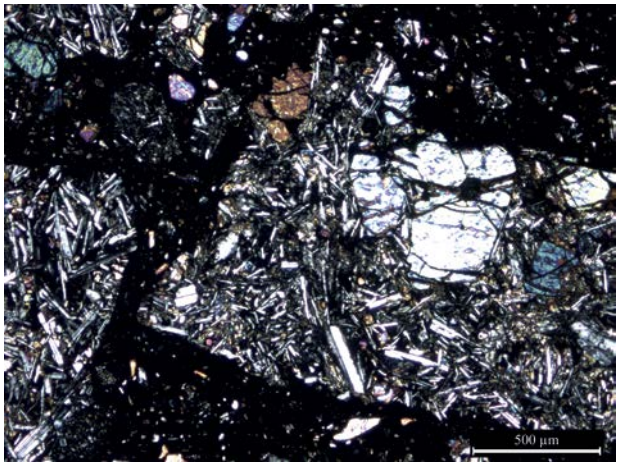


Plate 110: Well-preserved olivines in sherd 1 (image width 5.8 mm)

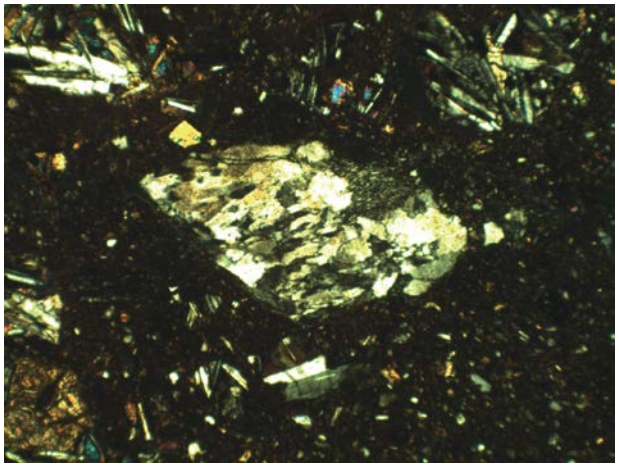


Plate 111: Large equant olivine phenocrysts in sherd 3 (image width 2.9 mm)

Isolated mineral inclusions of plagioclase, clinopyroxene, fresh and weathered olivine and opaque iron occur in all samples. These clearly derive from the basalt and are likely to have been present in the clay source that was used to manufacture the ceramics. The very small proportion of quartz, or other non-basalt-derived material, in the samples suggests that the clay source was likely to have been residual, forming *in situ* on basalt bedrock. The abundance of fine, colourful ferromagnesian minerals in the samples is particularly suggestive of a minimally transported clay source, as these minerals weather quickly and would not be expected to be present in true sedimentary clay deposits.

The samples have an iron-rich, non-calcareous clay matrix. They have generally low porosity formed of elongate crack-like voids (*eg* sherd 5) and vughs. Some of the larger basalt inclusions have ring voids from the shrinkage of the clay matrix during drying and/or firing.

It was not possible to determine the orientation of the sherds relative to their parent vessels, so a confident interpretation of the method of forming cannot be made; however, the large inclusions have a somewhat random orientation relative to the vessel walls and one another, suggesting that the vessels may have been coiled. The sherds appear to have been fired at less than 850°C, in a weakly oxidising to neutral atmosphere. The iron-rich nature of the clay matrix may also be responsible for its dark colour in some samples, meaning that insufficient oxygen was present to oxidise it all.

Sherd 5 appears to have a fine, clay-rich external layer in places (Pl 112). This contains abundant silt-sized inclusions similar to those in the main body of the samples. It is not clear whether this layer is some sort of surface treatment, encrusted material from the burial of the sherd, or perhaps an artefact of the thin-sectioning process.

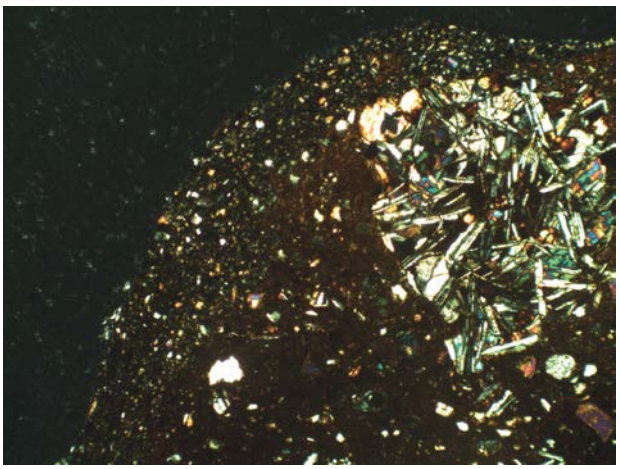


Plate 112: Fine, clay-rich external layer on sherd 5 (image width 2.9 mm)

A source of basalt occurs immediately south of Ronaldsway Airport at Derbyhaven. This is mapped as a Late Carboniferous tholeiitic basalt dyke-swarm (Stone *et al* 2010). The same lithology also outcrops further round the coast near Castletown. Microgabbro dikes occur close to the site on St Michael's Isle, as do isolated occurrences of metamorphic rock; this is texturally very similar to dolerite and it is therefore highly likely that basic igneous rock of basalt and dolerite composition, and texture, was available very close to the Taxiway Alpha East Bronze Age settlement. It is also possible that small amounts of metamorphic rock could find its way into a residual clay source formed on basalt or dolerite.

Based on the strong match between the petrography of sherds 1-3, 5, and 6 and the geology close to the site, it is likely that the ceramics were locally made. This confirms the conclusions of Jennifer Woodcock (1999) on contemporaneous ceramics from Ronaldsway Village. In this previous study, all of the 50 sherds analysed in detail were found to have the same fabric. The potters of ancient Ronaldsway seem to have intentionally obtained clay, and perhaps temper, from the basalt/dolerite outcrops in this part of the island. Aside from forming good clay deposits, because of the high proportion of feldspars, this rock type may have had some special significance. It has been claimed that dolerite is 'inherently less stable than other available fillers at high temperatures' (*op cit*, 133), and that this might imply 'detailed knowledge of the qualities of the material; sophisticated and well-regulated firing conditions and a well-organised production effort' (*ibid*).

Group 2: fineware (Fabric 1)

Two sherds (4 and 7) are petrographically related to the Group 1 sherds, but have less abundant basic igneous-rock fragments and a larger proportion of non-igneous inclusions. Most of the igneous-rock inclusions, which like the other samples vary significantly in terms of size and shape, appear to have derived from olivine basalt with abundant plagioclase, pyroxene, and iron. They vary in their preservation, but can be very weathered, especially in sherd 4 (Pl 113) in which the olivines are altered to iddingsite. One fragment, in sherd 4, appears to feature an infilled vesicle, suggesting that it came from amygdaloidal basalt.

In addition to the basalt inclusions, sherd 7 also contains several fragments of coarser weathered igneous rock, composed of randomly oriented, altered plagioclase feldspar laths, iron, and orange to green alteration products (Pl 114). The latter might have formed from the weathering of either olivine or

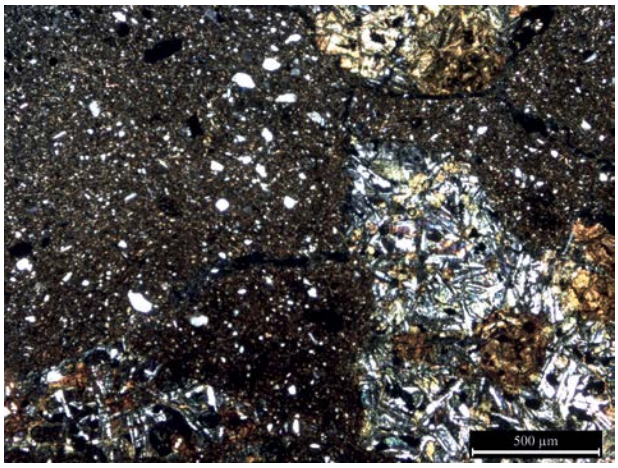


Plate 113: Weathered igneous-rock inclusions in sherd 4 (image width 5.8 mm)

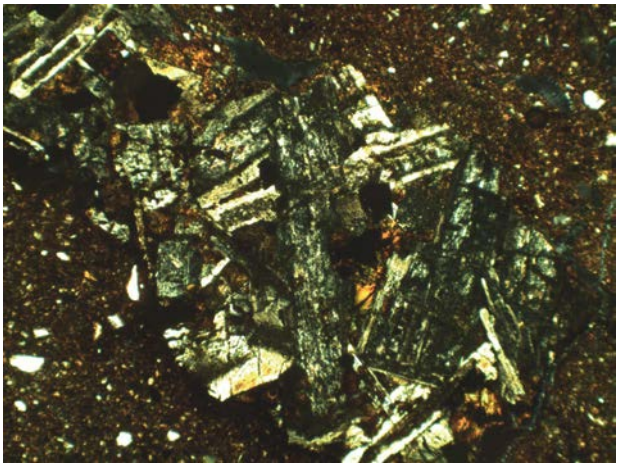


Plate 114: Randomly oriented altered plagioclase feldspar laths, iron, and orange to green alteration products in sherd 7 (image width 2.9 mm)

pyroxene, suggesting that these coarser igneous rock fragments derived from dolerite. They are texturally distinct from the igneous material in this and all other analysed samples, suggesting that they may have derived from a different body of rock.

Sherds 4 and 7 contain a significant proportion of non-basic igneous rock inclusions. These include sub-angular to rounded sand and silt-sized quartz, and polycrystalline quartz, and, in sherd 4, a fragment of phyllite composed of white mica and quartz (Pl 115). These other inclusions suggest that sherds 4 and 7 may have been made with a more sedimentary source of raw materials than the other five. This material could have been part of a transported clay source,

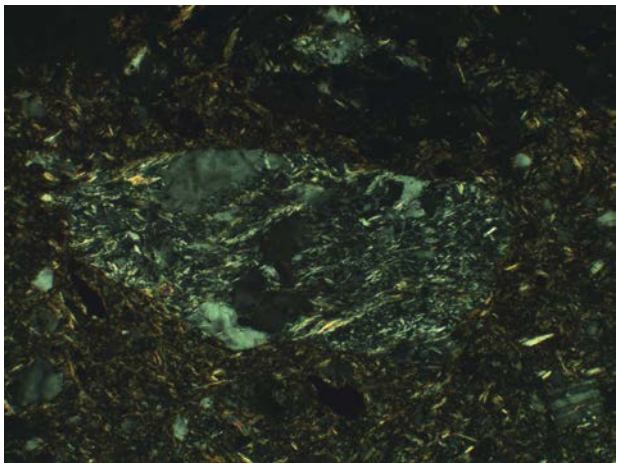


Plate 115: A fragment of phyllite, composed of white mica and quartz, in sherd 4 (image width 2.9 mm)

or eroded clasts in a polymict sand that was added as temper.

In comparison to the Group 1 sherds, the Group 2 examples have a more bimodal grain-size distribution, with large basic igneous-rock fragments contrasting against the finer, more abundant sand and silt-sized inclusions, of which a significant proportion are quartz. This might be taken to indicate that weathered basalt and dolerite sand was added as temper to a transported clay source, containing material derived from basic igneous rock and other lithologies. This different source of raw materials and method of paste preparation may therefore set these two samples apart from the others, despite them sharing common petrographic characteristics, namely, the presence of large basic igneous inclusions in a non-calcareous clay matrix.

Sherds 4 and 7 may also have been made with raw materials weathered and, perhaps, transported from the basalt dikes that occur close Taxiway Alpha East. The coarse, dolerite-like inclusions in sherd 7 may have derived from the nearby microgabbro, though it is possible that the basalt dikes are coarser-grained in places. Too few inclusions of phyllite material are present for a comparison with the metamorphic material on St Michael's Isle. This rock is described as metamafic rock (Stone *et al* 2010) and, as such, might be expected to be poor in quartz. This does not fit with the few metamorphic rock fragments in sherds 2, 3, and 4, though this may not rule out the possibility that these inclusions derived from the metamorphic rocks local to the site.

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