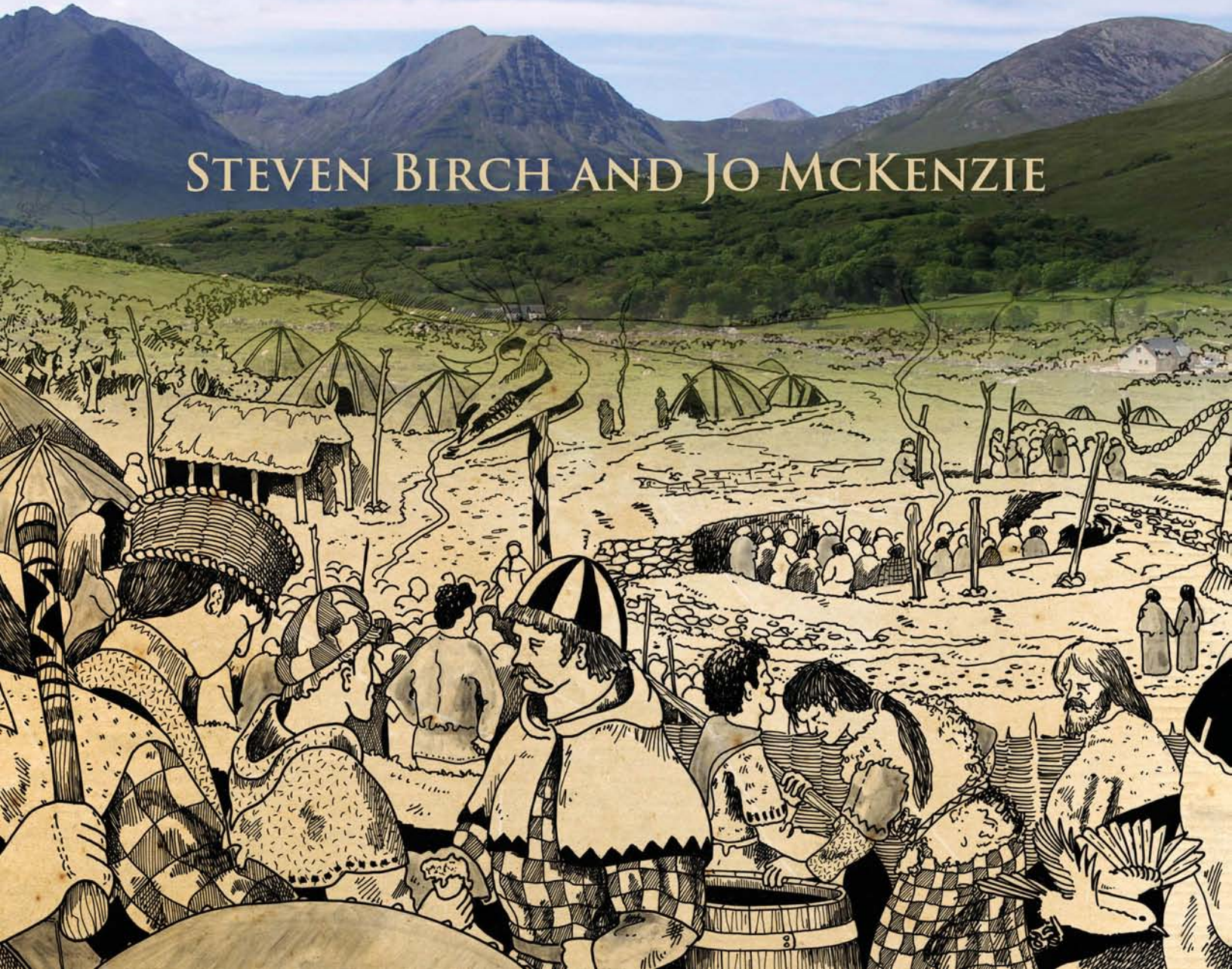
HIGH PASTURE CAVE

Ritual, Memory and Identity in the Iron Age of Skye

Steven Birch and Jo McKenzie



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by

STEVEN BIRCH AND JO MCKENZIE

with contributions by
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OXBOW | books
Oxford & Philadelphia

Published in the United Kingdom in 2025 by
OXBOW BOOKS
81 St Clements, Oxford OX4 1AW

and in the United States by
OXBOW BOOKS
1950 Lawrence Road, Havertown, PA 19083

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Hardcover Edition: ISBN 978-1-78570-950-0
Digital Edition: ISBN 978-1-78570-951-7 (epub)

A CIP record for this book is available from the British Library

Library of Congress Control Number: 2024951627

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Printed in the United Kingdom by Short Run Press

Typeset in India by Lapiz Digital Services, Chennai.

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Front cover: Artist's reconstruction drawing of the High Pasture Cave site and image showing the view from the site over the settlement of Torrin to the Cuillin Mountains.
Back cover: Top to bottom: Socketed Iron Adze SF17.001/1; Antler Points from Cache SF6.189a-g; Iron Loop-Headed Pin SF6.91; Fine Bone Needle SF6.286.

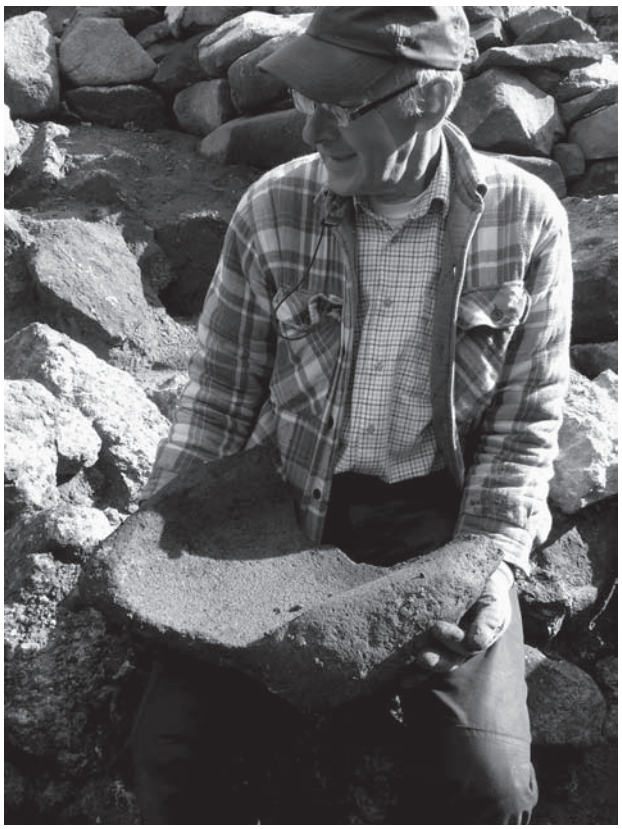
The publishers acknowledge with gratitude a grant from Historic Environment Scotland towards the production costs of this book, and for providing funding to make it available open access



HISTORIC ENVIRONMENT SCOTLAND | ÀRAINNEACHD EACHDRAIDHEIL ALBA

To Martin Wildgoose, gifted archaeologist, interpreter of historic landscapes, and co-director of the High Pasture Cave & Environs Project; and to George Kozikowski, generous, kind and dedicated, and wonderful ambassador for High Pasture. We shared many amazing days, exploring and surveying the wonderful archaeological and natural landscapes of Skye, and of course, digging in the dirt!

Steven Birch



Martin Wildgoose



George Kozikowski

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Acknowledgements

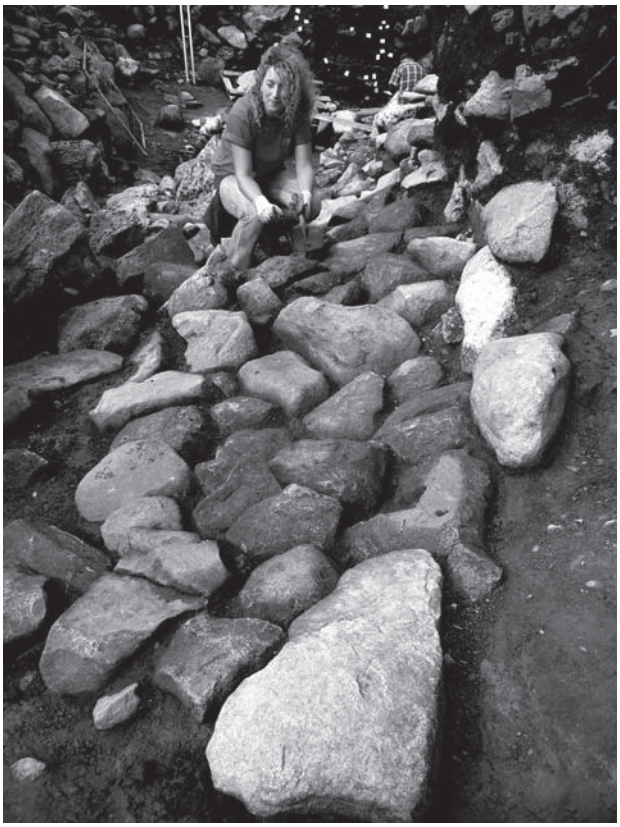
Throughout the duration of the High Pasture Cave and Environs Project, many individuals and institutions have contributed their valuable time and services. However, we are particularly grateful for the support of Noel Fojut and Patrick Ashmore of Historic Scotland (now Historic Environment Scotland) and Fraser Hunter of National Museums Scotland, whose encouragement in the early stages of the project was invaluable. In particular, Noel oversaw the creation of the High Pasture project, and the vital funds which enabled it to move forward, while Fraser, in conjunction with NMS colleagues, provided essential in-kind support in both analysis and storage of the growing artefact assemblages. The excavation, post-excavation programme, and this publication were funded by Historic Environment Scotland, and we are indebted to our management team over the years, most particularly for the wise guidance and endless patience of Lisa Brown, Rod McCullagh, and Kevin Grant, and the help and support of Catherine Parker and Kirsty Owen. Additional funding was granted through the Society of Antiquaries of Scotland, and we are most grateful for the support of Society Director, Simon Gilmour; along with the Highland Council, Highland 2007 Fund, and Skye & Lochalsh LEADER+.

The 2004–2010 excavations involved a huge number of volunteers, both from local Skye communities and from across Scotland, with the team augmented by undergraduate students from the UK, France, Holland, Spain, America, and Canada. They provided invaluable services, expertise, and encouragement over long fieldwork seasons, through all weathers, and in the face of the onslaught of voracious midges and cleggs! Too many to list by name here, but without them the project could not have succeeded in its aims. Thank you all, and especially to the core project team who helped drive High Pasture forward both during and outwith the excavation seasons.

The late Martin Wildgoose co-directed the project from its inception in 2004. His leadership and experience stood at the heart of the project, the latter gained through his extensive fieldwork carried out on the island of Skye and in his native Derbyshire. Martin, a fine archaeologist, and keen interpreter of historic landscapes was always eager to share his enthusiasm and understanding of Skye's rich heritage. He devised the project recording systems, oversaw essential site infrastructure, and more importantly, managed protection of the site and its fragile, complex archaeology through the long seasons and the harsh winter months. During the later stages of the project, Martin, accompanied by George Kozikowski, Steph Glover, and a team of dedicated volunteers, directed the detailed archaeological surveys of the wider landscape surrounding High Pasture Cave, along with trial excavations at a number of the recovered sites. He is much missed, as an archaeologist, as an enthusiast, and as a friend.

The late George Kozikowski also joined the project at its beginning and provided a vital role from the start, manning the wet-sieving apparatus while Martin and Steve undertook the first extraordinary excavations within the cave. As Steve recalls, what a joy it was to return to the surface to finds trays full of artefacts and environmental materials, recovered from those sticky sediments! Over time, George's role developed into that of excavator, photographer, landscape survey assistant, and much more besides. George, loyal, unique, and sometimes mischievous, was also a great ambassador for the site, always willing to assist with guided tours and in displaying the wonderful acoustics of the underground cave passages. He too is greatly missed, and the High Pasture project is lucky to have had him on board.

Steph Glover joined the project in 2006 as a volunteer with a burning ambition to become an archaeologist. Her determination and talent saw her become essential to the running of High Pasture: excelling in her assistance on site, willingness to get stuck in and dedication to the fieldwork – at the end of which, along with Martin, she undertook much of the gruelling backfilling of the site by hand: well in excess of 120 tons of material. We also wish to acknowledge the almost daily attendance of Sally Parry of Dunan, who provided her irreplaceable support and enthusiasm at the wet-sieving apparatus



Steph Glover

from 2006 to the end of fieldwork in 2010. Often the coldest and most laborious element of the on-site work, Sally was often the person to take the first glimpse of artefacts that had not seen the light of day since its Iron Age deposition.

The post-excavation programme ran from the end of the first fieldwork season in 2004 to 2021. Although primary funding for this work was provided by Historic Environment Scotland, we are grateful to so many institutions and individuals for their support throughout.

National Museums Scotland, under the direction of Fraser Hunter, oversaw work on the immense artefact assemblage, initially assisted by Dawn McLaren, now of AOC Archaeology Group, and the late Alan Saville, and then, for the majority of the post-excavation programme, Gemma Cruickshanks of NMS.

A huge debt of thanks is owed to Gemma for her expert analysis, management, and advice, and ultimately, invaluable contribution to both the overall post-excavation programme and the final artefact analysis and interpretation. Involved in every aspect of the High Pasture programme from volunteering during the excavation itself, the synthesis and interpretation of the unique High Pasture assemblage presented at Chapter 12 is primarily the result of Gemma's dedication, insight, and expertise.

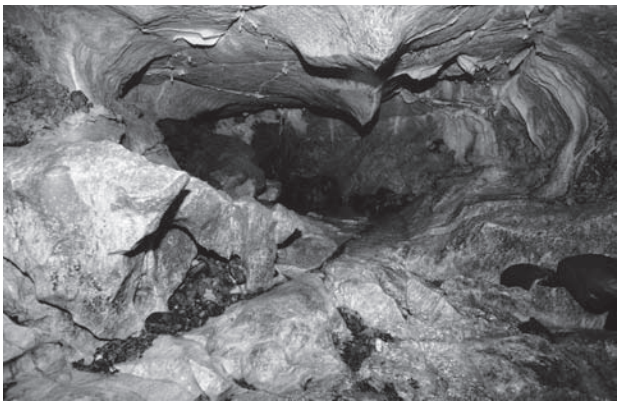
Many individuals based across the UK have been incredibly generous with their time and expertise, including Peter Rowley-Conwy, Carrie Drew, Janet Montgomery, Mandy Jay and Emma Horton at the University of Durham; Kath McSweeney, Laura Sinfield, Sheena Fraser, Anthony Newton, Sandra Pratt, Fiona McGibbon and Julia Gerken of the University of Edinburgh; Ian Armit of the University of York, Carl Heron of the British Museum, Julia Beaumont, Valerie Steele and John Summers of the University of Bradford; Zoe Outram of Historic England, Rob Batchelor and Fiona Shapland of the University of Reading; Ann MacSween and Ruby Ceron-Carrasco of Historic Environment Scotland; Graeme Lawson of the University of Cambridge; John Purser of Sabhal Mòr Ostaig; Mike Cressey and Mhairi Hastie of CFA Archaeology Ltd; Jane Evans of NERC Isotope Geosciences Laboratory; Derek Hamilton and Gordon Cook of SUERC; Katharina Dulias and Ceiridwen Edwards of the University of Huddersfield (Katharina lately of the Department of Civil Engineering, Technische Universität Braunschweig, Lower Saxony, Germany); Chris Gleed-Owen of CGO Ecology Ltd; Torben Ballin; Tim Lawson, Ivan Young, Lynne McKeggie of Highland Archaeology Services; and AOC Archaeology Group - especially Graham Cavers, Anne Crone, Ciara Clarke, Natalie Mitchell, Gretel Evans, Sam O'Leary, Lindsey Stirling, and Mary Peteranna, for X-ray and conservation assessment of the artefact assemblage, laser scanning, and preparation of illustrations for this monograph.

No project can be brought to life without visual representation, and we are so grateful for the expert contributions of a number of illustrators: to Alan Braby for his superb reconstruction illustrations of the site, to Marion O'Neill of NMS for her artefact illustrations, and to John Musgrove of CFA Archaeology Ltd for his wonderful digital illustrations of stone, bone and antler tools.

We would also like to thank Scottish Natural Heritage for permitting excavation on a *Site of Special Scientific Interest*; Norman & Biddy Stoddart of Kilbride House, tenants of the working farm where High Pasture Cave is located; *Dualchas* (Museum's Service) Skye; and Highland Council's Historic Environment Team, Inverness. We are also grateful to Marion Dowd for her invaluable comments on Irish Caves and rockshelters. Fraser Hunter and Gemma Cruickshanks would like to thank Mary Davis for SEM analysis of the glass beads; Mandy Jay would like to acknowledge Olaf Nehlich at the University of British Columbia in Vancouver for analysis of the sulphur isotope

ratios, and he is thanked for both his technical input and general discussions on the interpretation of $\delta^{34}S$ data and the comparison of the SUERC sulphur data with those from the Vancouver labs. Katharina Dulias was supported by a Leverhulme Doctoral Scholarship, while her genetic research was funded by NBAF Pilot Scheme (NBAF685).

Finally, we are grateful to Julie Gardiner and the staff at Oxbow Books for assistance and advice in preparing the draft manuscript, and for her patience while bringing it to fruition. Most especially, we are indebted to the work of Colin Haselgrove, who provided comment and guidance on preliminary drafts of the publication during the peer review process. His positive feedback and encouragement were invaluable to the final stages of bringing this manuscript to publication.



Mainstream passage in High Pasture Cave, upstream of Bone Passage

Summary

On Scotland's wild western seaboard, near the small crofting township of Torrin and in the shadow of the spectacular Black and Red Cuillin mountains, Uamh an Ard Achadh (*Cave of the High Field* or *High Pasture Cave*), was discovered in 1972. Excavations at High Pasture between 2004 and 2010 revealed a monumental complex, rich with evidence for repeated use of the cave and its environs as a venue for significant events for over 900 years: a hub of activity for the people of Iron Age Skye and beyond, with a legacy into the Early Bronze Age, if not before.

A major discovery for Scottish archaeology, High Pasture Cave's dramatic setting and its rich assemblages inspired immediate interest: the mysterious cave with its absence of domestic dwellings, the profusion of artefacts, the curious butchery evidence, the human remains. Seemingly defying chronological or typological classification, it was clear that only an ambitious excavation and analytical programme would do the site justice. Project directors Steven Birch and Martin Wildgoose succeeded not only in this, but also in creating a unique community endeavour which is to date the most extensive investigation of a cave and its environs in Scotland.

The subterranean heart of the High Pasture complex is a dry, fossilised cave passage above an underground stream. Initial excavation through disturbed archaeological material in what became aptly known as 'Bone Passage' revealed deep, finely stratified layers of midden, before extending outwards and upwards to reveal a complex suite of features: stone-built walkways and stairwells to access the cave, and an external precinct peppered with stone-built hearths, often one upon another, rich with the waste of feasts and evidence for a wide range of activities. The rich assemblages deposited at High Pasture testify to its repeated use as a special place in the prehistoric landscape of Skye; a venue for spectacular ceremonies featuring feasting, fire, crafts, and the symbolic deposition of a plethora of artefacts, environmental materials, and human remains. High Pasture Cave makes a vital contribution to understanding of the role of caves and natural places in prehistoric worldviews – on Skye, through Atlantic Iron Age Scotland, and beyond.

As elsewhere in Britain, Scottish archaeological research has traditionally focused on monuments, occupation sites, and human modified landscapes. But the past two decades have seen an awareness of natural place archaeology informing intellectual and curatorial approaches to the archaeological record. The aesthetic and historic-ecological value of caves are therefore well established and appreciated but their archaeological properties are more difficult to characterise. In Scotland, the wealth of data from almost 200 years of cave and rockshelter excavation is limited by a lack of material synthesis and radiocarbon dates, with a lack of diagnostic artefact typologies limiting understanding of cave use during the 1st millennium BC. Meanwhile, European research into cave use typically focused on particular time periods, individual sites, or specific regions – with a resultant gap in wider contextualisation of the often unusual material record from caves: human remains, high value objects, and unusual or ritualised forms of deposition. In particular, it has been common for any presence of 'domestic' artefacts within a cave assemblage to determine interpretation, with little consideration of a wider potential interpretative framework exploring the materiality of intertwined artefactual, environmental, and osteological deposition in caves, and the significance of (perhaps especially) domestic objects within Iron Age ritual practice.

Recent British and European research has seen a resurgence of interest in caves, and more holistic approaches to understanding the place of these enigmatic sites in the worldviews of later prehistoric communities. Consideration of cave morphology, location, and their wider social, environmental, and landscape context indicates that similar cave types seem to have been used in similar ways. In particular, karst caves displaying complex morphology, multiple chambers, and especially an underground stream, appear to have attracted intensive, long-standing focus, with patterns of activity and materials selected for deposition likely reflecting elements of shared cosmological belief across Britain and into continental Europe. It is now proposed that many caves, including High Pasture, were used as the arenas for performative acts involving the preparation and

display of human remains and the deposition of selected objects and organic materials, and thus had a significant role in the cosmology of prehistoric communities.

High Pasture Cave offers a unique window into the diversity and complexity of such performances and practices during the Iron Age, demonstrating the dramatic monumentalisation of a natural feature into a multi-level complex, representing generations of activity. Few cave sites in Europe have produced such diverse and structured artefact and environmental assemblages, and few the evidence for recurrent use over such a time period: High Pasture is perhaps the most enduring human place in the landscape of Skye.

The High Pasture archive is a resource with great potential for future research, and this publication should be viewed as a first step towards a better understanding of human activity in caves and underground spaces in later prehistory.

Geàrr-chunntas

Air cladach siar na h-Alba, faisg air baile beag croitearachd nan Torran agus fo sgàil Beinn na Caillich is Blà Bhèinn, chaidh Uamh an Àrd- Achaidh a lorg ann an 1972. Lorg cladhach airceòlasach eadar 2004 agus 2010 làrach aibheiseach san robh am pailteas fianais air dian-chleachdadh na h-uamha, agus na h-àrainn timcheall oirre, ann an deas-ghnàthan cudromach thar aon 900 bliadhna: cridhe do bheatha muinntir Linn an Iarainn, às an Eilean Sgitheanach agus na b' fhaide thall, le dìleab o Linn an Umha, mura b' ann na bu thràithe.

B' e lorg chudromach a bh' ann ann an airceòlas Albannach. Phiobraich àrainn dhrùidhteach agus fuighleach Uamh an Àrd-Achaidh ùidh sa mhionaid: uamh dhìomhair anns nach robh aitreabhan còmhnaidh, fuigheall lìonmhor, fianais air bùidsearachd, tìodhlacan daonna. Leis cho annasach agus a bha an làrach, a thaobh ruith-eachdraidh agus seòrsachadh gnè-eòlasach, bha e soilleir gum feumte sgrùdadh airceòlasach agus prògram rannsachaidh a chur air chois airson fìrinnean na làraich a thoirt am follais. Chan e a-mhàin gun do shoirbhich le stiùirichean a' phròiseict, Steven Birch agus Martin Wildgoose, le seo, ach gun do chuir iad air bonn obair shònraichte coimhearsnachd as e an sgrùdadh as coileanta de dh'uamh agus a h-àrainn ann an Alba gu ruige seo.

Tha uamh thioram fhosailichte aig cridhe na h-àrainn aig an Àrd-Achadh, 's i a' laighe os cionn allt fo-thalamh. Lorg a' chiad chladhach, tro stuth measgaichte airceòlais ann an àite air an tugte "Trannsa Cnàmha", sreathan mìne domhain òtraich, mus do leudaicheadh an obair a-mach agus gu h-àrd a nochdadh àireamh thoinnte de dh'fheartan: staran agus staidhrichean cloiche mar dhoras dhan uamh, agus àrainn a-muigh anns an robh leacan teinntein, tric air muin a chèile, pailteas sgudail chuirmean agus fianais air farsaingeachd ghnìomhan. Bha am fuighleach seo na theisteanas air dian-chleachdadh na làraich mar àite air leth ann an àrainneachd ro-eachdraidheil an Eilein Sgitheanaich; ionad anns an tachradh deas-ghnàthan iongantach le fèistean, teine, ceàird, agus tìodhlacadh samhlachail fhuighleach, stuthan àrainneil, agus iarmad daonna. Tha Uamh an Àrd-Achaidh a' cur ris an tuigsinn againn air an dòigh anns an robh uamhan agus ionadan nàdarra air am mothachadh anns an t-saoghal ro-eachdraidheil – anns an Eilean Sgitheanach, air feadh taobh siar na h-Alba anns an Linn Iarainn, agus na b' fharsaing.

Coltach ris a' chòrr de Bhreatann, tha airceòlas Albannach gu tradaiseanta air taobhadh ri bhith a' sgrùdadh làraichean, fàrdaichean, agus àrainnean a thàinig fo bhuaidh chlann nan daoine. Thar an fhichead bliadhna a dh'fhalbh, tha mothachadh ùr air nochdadh ann an airceòlas àrainnean-nàdarra, agus sin air buaidh a thoirt air an dòigh sam bithear a' mìneachadh a' chlàir airceòlasaich ann an sgoilearachd agus ann an taisbeanaidhean. Ge fada o chaidh uamhan a thuigsinn mar àrainnean eachdraidheil, tha am feartan airceòlasach uaireannan nas duilghe rin cur an cèill. Ann an Alba, tha am beairteas fianais bho chòrr is 200 bliadhna de sgrùdadh agus cladhach ann an uamhan agus còsan creige air a chuingealachadh le gainnead deiteadh rèidio-charboin, rannsachadh stuthach, agus beàrn ann an gnè-eòlas a' fàgail dìth coileantachd anns an tuigse againn air na dòighean san robhas a' cleachdadh uamhan anns a' chiad mhìle bliadhna ro Chrìosd. Aig an aon àm, bha rannsachadh Eòrpach ga chuimseachadh gu h-ìre mhòr air linntean, làraichean, no sgìrean fa leth – a' fàgail nach robhas a' coimhead ann an dòigh fharsaing iomlan air an stuth a thigeadh à uamhan: iarmad daonna, buill luachmhor àrd-inbheach, agus tìodhlacan annasach no deas-ghnàthach. Gu sònraichte, bha e uair cumanta gun toireadh làthaireachd sam bith de dh'fhuighleach "dachaigheil" buaidh dhìreach air mìneachadh làraichean, gun cus feairt ga thoirt air mar a dh'fhaodadh mìneachaidhean eile a bhith ann, stèidhichte air co-làthaireachd thìodhlacan àrainneil no cnàmhach eile ann an uamhan, agus mar a dh'fhaodadh fuighleach dachaigheil a bhith mar phàirt de dheas-ghnàthan ann an Linn an Iarainn.

Tha ùidh às ùr ga nochdadh ann an uamhan an cois rannsachaidh Bhreatannaich agus Eòrpaich, agus thathar a' gabhail ri modhan-obrach na b' iomlan ann am mìneachadh nan làraichean seo fo shealladh nan coimhearsnachdan ro-eachdraidheil. Le bhith a' toirt for air gnè-eòlas uamhan a thaobh cruth agus suidheachadh, cuide rin co-theacsan àrainneachdail, cruth-tìreil, agus sòisealta, tha e coltach gun robh uamhan coltach gan

cleachdadh ann an dòighean coltach. Gu sònraichte, bha uamhan *karst*, anns am bi cruthan toinnte le grunn sheòmraichean, agus gu h-àraidh allt fo-thalamh, air daoine a thàladh thar ùine mhòir, le pàtrain gnìomhachd agus stuthan tìodhlaichte 's dòcha nam faileas de chreideas co-roinnte ann am Breatann agus a-steach dhan Roinn Eòrpa. Thathar dhen bheachd an-diugh gun robh iomadh uamh, a leithid Uamh an Àrd-achaidh, air a cleachdadh ann an deas-ghnàthan co-cheangailte ri ullachadh agus taisbeanadh chorp daonna, stuthan taghta, agus buill nàdarra, agus gun robh pàirt chudromach aca ann an creideamh nan coimhearsnachdan ro-eachdraidheil.

Bheir Uamh an Àrd-achaidh sealladh gun choimeas dhuinn air eugsamhlachd agus iom-fhillteachd nan gnìomhachdan agus nan deas-ghnàthan sin ann an Linn an Iarainn, a' dearbhadh mar a bhathar a' toirt inbhe mhòralach ri feartan nàdarra tro bhith gan ath-chruthachadh mar aitreabh iom-fhillte fo chomhair gnìomhachd thar-ghinealach. Cha lìonmhor na làraichean uamhach anns an Roinn Eòrpa a nochd na h-uimhir de stuth airceòlasach agus àrainneachdail a tha gach cuid eugsamhlach agus structaraichte. Agus cha phailt an fhianais airson dian-chleachdadh làraich thar ùine cho mòr. 'S dòcha gur e Uamh an Àrd-achaidh an t-àite daonna a bu mhaireannaich anns an Eilean Sgitheanach.

Tha tasglann Uamh an Àrd-achaidh na ghoireas luachmhor a dh'fhaodadh rannsachadh ùr a phiobrachadh fhathast, agus bu chòir coimhead air an leabhar seo mar a' chiad cheum gu ruige tuigsinn nas iomlan air gnìomhachd dhaonna ann an uamhan agus aitreabhan fo-thalamh bho Linn Ùr na Cloiche sìos.

Translator: Liam Alistair Crouse

Résumé

Sur le littoral sauvage de l'ouest de l'Ecosse, près de la petite bourgade de micro-exploitations agricoles de Torrin et à l'ombre des monts Black and Red Cuillin, le site de Uamh an Ard Achadh (*Grotte du Haut Champs* ou *Haut Pâturage – High Pasture* en anglais) a été découvert en 1972. Les fouilles de High Pasture, menées entre 2004 et 2010, ont révélé un complexe monumental, riche de témoignages d'utilisations multiples de la grotte et de ses environs comme lieu de réunion en lien avec des événements importants pendant plus de 900 ans : un centre d'activité pour les gens de l'âge du Fer de l'ile de Skye et au-delà, avec un héritage remontant à l'âge du Bronze, voire avant.

Découverte majeure pour l'archéologie écossaise, la grotte de High Pasture, avec son cadre spectaculaire et ses riches assemblages, a suscité un intérêt immédiat : la grotte mystérieuse dépourvue d'habitats domestiques, la profusion de mobilier archéologique, les curieux témoignages de boucherie, les restes humains. Semblant défier toute classification chronologique ou typologique, il était clair que seul un programme ambitieux de fouilles et d'analyses pourrait rendre justice au site. Les directeurs du projet, Steven Birch et Martin Wildgoose, ont non seulement atteint cet objectif, mais ont également réussi à créer une initiative de recherche participative unique, représentant à ce jour la plus grande étude d'une grotte et de ses environs en Ecosse.

Le cœur souterrain du complexe de High Pasture est un couloir sec, fossilisé, situé au-dessus d'un cours d'eau souterrain. Les premières fouilles dans les niveaux perturbés de ce qui fut rapidement appelé le « Couloir des Os » ont mis au jour de profondes couches finement stratifiées de déchets culinaires, avant de s'étendre vers l'extérieur et vers le haut pour révéler un ensemble complexe de vestiges : une allée et un escalier de pierre permettant d'accéder à la grotte, et une enceinte extérieure parsemée de foyers en pierre, souvent établis les uns sur les autres, et riches en déchets de festins et en témoignages d'activités très variées.

Comme ailleurs en Grande-Bretagne, les recherches archéologiques écossaises se sont traditionnellement concentrées sur les monuments, les sites d'habitat, et les paysages modifiés par l'homme. Cependant, au cours des deux dernières décennies s'est développée une archéologie des lieux naturels qui a enrichi les façons de penser et de conserver le patrimoine archéologique. Les valeurs esthétiques et historico-écologiques des grottes sont ainsi bien établies et appréciées, mais leurs propriétés archéologiques sont plus difficiles à caractériser. En Ecosse, la richesse des données provenant de presque 200 années de fouilles en grottes et abris est limitée par le manque de synthèses et de dates radiocarbones, ainsi qu'un manque de typologies des mobiliers diagnostiques, restreignant notre compréhension de l'utilisation des grottes pendant le 1er millénaire AEC. Entre-temps, les recherches européennes sur l'utilisation des grottes se sont concentrées sur des périodes spécifiques, des sites particuliers, ou des régions spécifiques – créant ainsi des lacunes dans la contextualisation plus générale des témoignages les plus inhabituels découverts dans les grottes: restes humains, objets de haute valeur, et formes inhabituelles ou ritualisées de dépôts. En particulier, la présence de mobiliers "domestiques" dans les assemblages des grottes a souvent déterminé leur interprétation, sans considérer un possible cadre interprétatif plus large examinant la matérialité des dépôts mobiliers, environnementaux et ostéologiques entrelacés dans les grottes, et la signification des objets (en particulier) domestiques dans les pratiques rituelles de l'âge du Fer.

Les recherches britanniques et européennes récentes témoignent d'une résurgence d'intérêt pour les grottes, et les approches plus globales permettant de comprendre la place de ces sites énigmatiques dans les représentations du monde des communautés de la fin de la Préhistoire. L'étude de la morphologie des grottes, de leur emplacement, et de leur contexte social, environnemental et paysager plus large indique que des types similaires de grottes étaient utilisées de façon semblable. En particulier, les grottes karstiques présentant des morphologies complexes, des chambres multiples, et notamment des cours d'eau souterrains, semblent avoir attiré un intérêt

intense sur le long-terme, avec des activités récurrentes et des matériaux sélectionnés pour les dépôts reflétant certainement des éléments de croyances cosmologiques partagés à travers la Grande-Bretagne et l'Europe continentale. Nous proposons ici que de nombreuses grottes, dont High Pasture, étaient utilisées comme des scènes pour la tenue de performances impliquant le traitement et l'exposition de restes humains, et le dépôt d'objets et de matières organiques sélectionnés, et jouaient ainsi un rôle important dans la cosmologie des communautés préhistoriques.

La grotte de High Pasture ouvre une fenêtre unique sur la diversité et la complexité de telles performances et pratiques durant l'âge du Fer, montrant la spectaculaire monumentalisation d'un espace naturel et sa transformation en un complexe multi-niveaux, représentant des générations d'activités. Peu de grottes en Europe ont livré des assemblages mobiliers et environnementaux aussi divers et structurés, et peu témoignent d'utilisations répétées au cours d'une longue période : High Pasture est peut-être le lieu humain le plus persistant dans le paysage de l'ile de Skye.

Les archives de High Pasture constituent une ressource au grand potentiel pour les recherches futures, et il faut voir cette publication comme une première étape vers une meilleure compréhension des activités humaines dans les grottes et les espaces souterrains durant la préhistoire récente.

Traduction: Guillaume Robin

Zusammenfassung

An der wilden Westküste Schottlands, in der Nähe der kleinen Siedlung Torrin und im Schatten der spektakulären Black and Red Cuillin Mountains, wurde 1972 die Höhle Uamh an Ard Achadh (Cave of the High Field oder High Pasture Cave) entdeckt. In den zwischen 2004 und 2010 durchgeführten Ausgrabungen in der High Pasture Höhle wurde ein monumentaler Komplex freigelegt, in dem sich zahlreiche Belege für die wiederholte Nutzung der Höhle und ihrer Umgebung als Schauplatz bedeutender Ereignisse während eines Zeitraums von mehr als 900 Jahren fanden: ein Aktivitätszentrum der Bewohner von Skye in der Eisenzeit und darüber hinaus, mit einem kulturellen Erbe, dass bis in die frühe Bronzezeit, wenn nicht sogar noch weiter zurück reicht.

Die High Pasture Höhle ist eine wichtige Entdeckung für die schottische Archäologie. Die dramatische Lage und das reichhaltigen Fundmaterial weckten sofort das Interesse: die geheimnisvolle Höhle mit ihrem Fehlen häuslicher Besiedlungsspuren, die Unmenge an Funden, die merkwürdigen Schlachtabfälle sowie die menschlichen Skelettteile. In Anbetracht der unüberwindbar scheinenden Schwierigkeit einer chronologischen oder typologischen Einordnung war klar, dass nur ein ehrgeiziges Ausgrabungs- und Analyseprogramm dem Fundplatz gerecht werden konnte. Den Projektleitern Steven Birch und Martin Wildgoose gelang nicht nur dies, sondern sie realisierten auch ein einzigartiges Gemeinschaftsprojekt, das bis heute die für Schottland umfassendste Untersuchung einer Höhle und ihrer Umgebung darstellt.

Das unterirdische Herzstück des High Pasture-Komplexes ist ein trockener, fossilisierter Höhlengang über einem unterirdischen Wasserlauf. Die anfänglichen Ausgrabungen durch gestörtes archäologisches Material in dem Bereich, der treffend als „Bone Passage“ bekannt wurde, förderten tiefe, fein stratifizierte Abfallschichten zutage, bevor eine sich nach außen und oben hin erweiternde komplexe Befundabfolge freigelegt wurde: aus Stein gebaute Gänge und Treppen, die den Zugang zur Höhle ermöglichten, sowie ein äußerer Bereich, der mit aus Stein gebauten, oft übereinander liegenden Feuerstellen übersät war, die eine Fülle von Festmahlabfällen und Hinweise auf zahlreiche weitere Aktivitäten enthielten. Das reichhaltige Fundmaterial, das in High Pasture deponiert wurde, bezeugt die wiederholte Nutzung der Höhle als besonderer Ort in der prähistorischen Landschaft von Skye; ein Schauplatz für spektakuläre Zeremonien mit Festen, Feuer, Handwerk und der symbolischen Deponierung einer Unmenge von Funden, ökologischem Material und menschlichen Überresten. High Pasture Cave leistet einen wichtigen Beitrag zum Verständnis der Rolle von Höhlen und natürlichen Orten in prähistorischen Weltbildern – auf Skye, im atlantischen eisenzeitlichen Schottland und darüber hinaus.

Wie auch anderswo in Großbritannien hat sich die archäologische Forschung in Schottland traditionell auf Denkmäler, Siedlungsplätze und vom Menschen veränderte Landschaften konzentriert. In den letzten zwei Jahrzehnten hat sich jedoch ein Bewusstsein für die Archäologie natürlicher Orte entwickelt, das den intellektuellen und denkmalpflegerischen Umgang mit dem archäologischen Denkmalbestand beeinflusst. Der ästhetische und historisch-ökologische Wert von Höhlen ist daher gut bekannt und wird gewürdigt, aber die Charakterisierung ihrer archäologischen Eigenschaften gestaltet sich schwieriger. In Schottland ist der Nutzen des Datenreichtum aus fast 200 Jahren Ausgrabung von Höhlen und Abris durch einen Mangel an Materialsynthesen und Radiokarbondaten begrenzt, wobei das Fehlen diagnostischer Fundtypologien dem Verständnis der Höhlennutzung während des 1. Jahrtausends v. Chr. Abträglich ist. In der Zwischenzeit konzentrierte sich die europäische Forschung zur Höhlennutzung in der Regel auf bestimmte Zeiträume, einzelne Fundstätten oder bestimmte Regionen – mit einer sich daraus ergebenden Lücke hinsichtlich der breiteren Kontextualisierung der oft ungewöhnlichen materiellen Hinterlassenschaften aus Höhlen: menschliche Überreste, hochwertige Objekte und ungewöhnliche oder ritualisierte Formen der Deponierung. Insbesondere das Vorhandensein von „häuslichen“ Artefakten in einem Höhlenfundkomplex war häufig ausschlaggebend für die Interpretation, ohne dass ein breiterer potenzieller Interpretationsrahmen in Betracht

gezogen wurde, der die Materialität der miteinander verflochtenen fundspezifischen, umweltbedingten und osteologischen Deponierungen in Höhlen und die Bedeutung von (vielleicht vor allem) häuslichen Objekten innerhalb der rituellen Praxis der Eisenzeit untersucht.

In jüngster Zeit ist in der britischen und europäischen Forschung das Interesse an Höhlen wieder aufgelebt und es wird ein ganzheitlicherer Ansatz verfolgt, um den Stellenwert dieser rätselhaften Stätten in der Weltanschauung von Gemeinschaften der jüngeren Vorgeschichte zu verstehen. Die Berücksichtigung der Höhlenmorphologie, der Lage und des weiteren sozialen, ökologischen und landschaftlichen Kontexts zeigt, dass ähnliche Höhlentypen offenbar auf ähnliche Weise genutzt wurden. Insbesondere Karsthöhlen, die eine komplexe Morphologie, mehrere Kammern und vor allem einen unterirdischen Wasserlauf aufweisen, scheinen seit langem intensiv genutzt worden zu sein, wobei die Aktivitätsmuster und die für Deponierungen ausgewählten Materialien wahrscheinlich Elemente eines gemeinsamen, in ganz Großbritannien verbreiteten und bis auf das europäische Festland reichenden kosmologischen Glaubens widerspiegeln. Es wird nun angenommen, dass viele Höhlen, darunter auch High Pasture, als Schauplätze für performative Handlungen genutzt wurden, die die Präparation und Zurschaustellung menschlicher Überreste und die Deponierung ausgewählter Objekte sowie organischer Materialien beinhalteten und somit eine bedeutende Rolle in der Kosmologie vorgeschichtlicher Gemeinschaften spielten.

Die High Pasture Höhle bietet einen einzigartigen Einblick in die Vielfalt und Komplexität solcher Darbietungen und Praktiken während der Eisenzeit und zeigt die dramatische Monumentalisierung eines natürlichen Merkmals in einen mehrstufigen Komplex, der Generationen von Aktivitäten repräsentiert.

Nur wenige Höhlen in Europa haben derartig vielfältige und strukturierte Bandbreite von Funden und ökologischen Materialien hervorgebracht, und bei nur wenigen lässt sich eine wiederholte Nutzung über einen so langen Zeitraum belegen: High Pasture ist der vielleicht beständigste menschliche Ort in der Landschaft von Skye.

Das Fundarchiv von High Pasture ist eine Ressource mit großem Potenzial für zukünftige Forschungen, und diese Publikation sollte als ein erster Schritt zu einem besseren Verständnis der menschlichen Aktivitäten in Höhlen und unterirdischen Räumen der jüngeren Vorgeschichte betrachtet werden.

Übersetzung: Jörn Schuster
(ARCHÆOLOGICALsmallFINDS)

Guide to geological and archaeological terms and abbreviations

Calcareous – formed from or containing a high proportion of calcium carbonate in the form of calcite

Calcite – mineral that is the crystalline form of calcium carbonate and is one of the commonest of minerals in association with both igneous and sedimentary rocks

Carbonate – a salt of carbonic acid

Clast – any individual constituent grain or fragment of a sediment or rock produced by mechanical weathering of a rock mass

Clastic rocks – mechanically redeposited remains of eroded older rocks; rocks formed of fragments, or clasts, of pre-existing rocks

Doline – a shallow usually funnel-shaped depression of the ground surface formed by solution in limestone regions and sometimes containing a cave entrance

Dyke – a type of sheet intrusion referring to any geologic body that cuts discordantly across other rock types. Some are more resistant to weathering than the surrounding rock and stand up like walls, while others weather faster and form long narrow depressions

Facies – the sum of the lithological and faunal characters of a sediment is its facies. Lithological facies involves composition, grain size, texture, colour, as well as such mass characteristics as current bedding, nature of stratification, ripple marks, etc.

Intrusion – body of igneous rock that has crystallized from molten magma below the surface of the Earth

Lithology – a description of the physical characteristics of a rock unit visible at outcrop, in hand or core samples or with low magnification microscopy, such as colour, texture, grain size, or composition

Magnetite – an oxide of iron which crystallises in the cubic system. It is attracted by a magnet but does not attract iron itself

Marble – a fine to coarse-grained granoblastic calcium carbonate that effervesces in dilute hydrochloric acid. Often banded with various colours and sometimes veined

Metamorphism – the solid state recrystallisation of pre-existing rocks due to changes in heat and/or pressure and/or the introduction of fluids, i.e. without melting

Moraine – a glacially formed accumulation of unconsolidated debris which can occur in currently glaciated and formerly glaciated regions, such as those areas acted upon by a past ice age

Phreatic – the phreatic zone, saturated zone, or zone of saturation, is the part of an aquifer, or cave passage, formed below the water table

Pleistocene – the geologic epoch which lasted from about 2,588,000 to 11,700 years ago, spanning the world's recent period of repeated glaciations

Skarns – or tactites are coarse-grained metamorphic rocks that form by replacement of carbonate-bearing rocks during regional or contact metamorphism

Speleothem – a formation by mineral deposits that accumulate over time in natural caves. Speleothems most commonly form in calcareous caves due to carbonate dissolution reactions. They can take a variety of forms, depending on their depositional history and environment. Their chemical composition, gradual growth, and preservation in caves make them useful paleoclimatic proxies. Includes stalactites and stalagmites

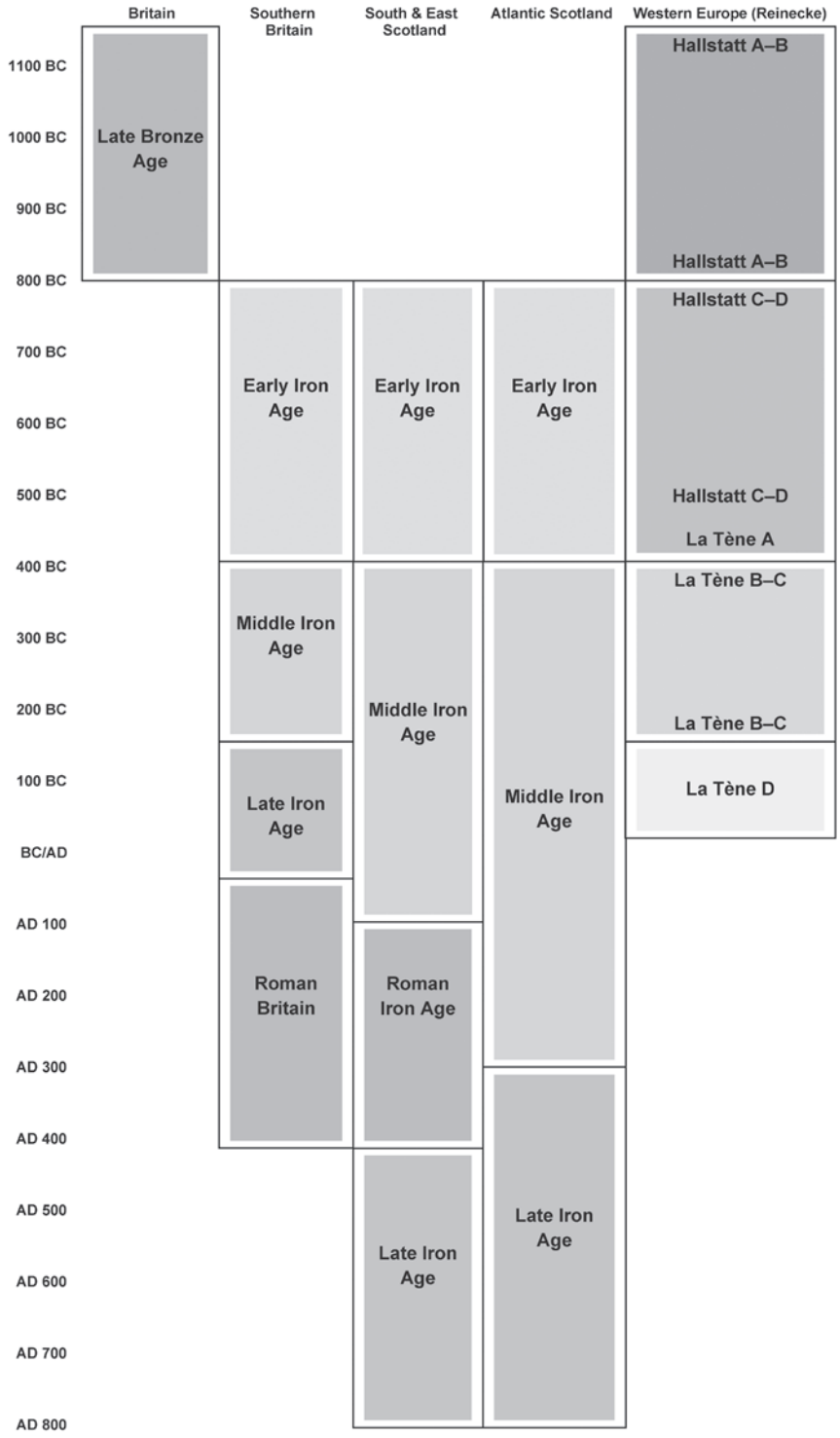
Structure – a major construction, made of an individual or set of features

Transhumance – is a type of pastoralism or nomadism, a seasonal movement of livestock between fixed summer and winter pastures

U/Th-series dating – a radiometric dating technique used to determine the age of calcium carbonate materials such as speleothem or coral

Vadose – in contrast to the flooded phreatic zone of a cave, the 'vadose' zone is one where water flows freely along the floor of air-filled passages, although flooding may raise the water-level to roof level

Summary of chronological schemes



Abbreviations used in tables

C	context	Perf	perforation
D	diameter	Ph	phase
G	grinder	SB	stratigraphic block
H	height	SF	small find
Ha	hammer	Sh	sharpener
HPC	High Pasture Cave	SL	strike-a-light
HR	hide rubber	T	thickness
L	length	TR	trench
MNI	minimum number of individuals	U/US	unstratified
N	number	V	vessel
NISP	number identified to species	W	weight
P	pounder	Wh	whetstone
Pal	palette	WS	work surface

All measurements in tables are in mm unless stated otherwise

Part I

Introduction to the High Pasture Cave complex

1

Footsteps in the dark

Descending the steep flight of uneven stone steps, the light of day turns to twilight as you crouch below the modified rock arch of the cave entrance. You enter a different place. The outside is gone, replaced by an at first obscure, shadowy otherworld. Your senses start to engage, enhanced by the enshrouding darkness. The space is at once humid and cool, with an overriding smell of dampness and decay. The sounds of the outside world have faded but here, in the cave, all is not silent. Sounds are exaggerated; drips from the cave roof echo on the floor, your breathing audible, and, somewhere in the distance, strange sounds emanate from the underground stream. With eyes adjusting to the enveloping darkness, you are drawn onwards through the narrow passage, calcite encrustations reflecting the limited light from the cave walls, the sound of flowing water increasing with every step.

From our first steps into High Pasture Cave, back in 2003, it was clear that this complex site would challenge our current understanding of cave use and function, as well as our wider understanding of Iron Age cultural and religious beliefs. The liminal location of High Pasture at the very edge of the settlement zone, its peculiarly restricted access, and its unique cave morphology are likely to have been important factors in its choice as a particularly special place in the Skye landscape. This unique location became a focus for what appear to have been specific and special activities and a venue for spectacular and extensive ceremonies – feasting, the use of fire, and the symbolic deposition of a wide range of materials including human remains. These actions may have been tied into wider cultural events, marking significant points in the prehistoric calendar, transcending individual lifetimes, traditions, and genealogies.

Throughout its long use history, the High Pasture Cave complex provides glimpses of continuity interspersed with periods of hiatus, suggesting that some of its activities may have marked constants in a changing social landscape. As such, the site may be seen as a prism through which wider social relationships and the organisation and use of land and resources may have been explored. The location of the cave may have granted it a neutrality which facilitated inter-community gathering and all that implies: the enactment of status, identity, and relationships, whether personal or communal, local, or regional.

A recent resurgence of interest in cave research has seen greater consideration of the place of these enigmatic sites in the worldviews of later prehistoric communities. Traditionally, cave sites have been seen as primarily domestic: temporary homes and shelter for hunter-gatherers, farmers, and pastoralists, even though some sites have produced evidence for their use as workshops, storage, hideaways, and repositories for human remains. But many caves, especially during prehistory, show evidence of specific activities involving the preparation and display of human remains and the structured deposition of material culture (Dowd 2015). The recurrent use of caves as the arenas for such clearly performative acts can tell us much about their role in the cosmology of later prehistoric communities.

The High Pasture Cave complex remained a focus for Iron Age communities in Skye for at least 800 years, with its use as a sacred site extending into the depths of prehistory. What events prompted the abandonment of the rites undertaken here are even more obscure than their motivation. After its final closure, the site vanished from the historical record until its discovery by speleologists in 1972.

1.1 Background

The High Pasture Cave system – or *Uamh an Ard Achadh*, was discovered in 1972 by John Sanders and a party

from University College London Speleological Society (UCLSS). Further exploration and a detailed survey of the cave system was made by the Moldywarps Speleological Group in August 1973 (Ryder 1974) and revealed the second longest underground cave system in Skye, with a surveyed length of over 320 m.

From the first archaeological discoveries of 2003, and throughout seven subsequent years of excavations, High Pasture Cave became an iconic site in Scottish prehistory, even featuring in a 'Celtic'-inspired historical novel (Paisley 2009). From the outset, High Pasture's dramatic setting and rich assemblages inspired wild interpretations regarding site function – the mysterious cave, the notable absence of domestic dwellings, the plethora of artefacts and unusually butchered bone, the presence of human remains. Seemingly defying chronological or typological classification, it was clear that only an ambitious post-excavation programme would do this site justice.

Project directors Steven Birch and Martin Wildgoose were determined to create a community endeavour with a strong research base and the resulting fieldwork and post-excavation analysis represents the most thorough investigation of a cave and its environs in Scotland to date. The subterranean heart of the site complex is a dry, fossilised cave passage above an active streamway. Excavations initially focused on disturbed archaeological material in this aptly named 'Bone Passage', spanning the Early Bronze to Middle Iron Age. Subsequent seasons revealed deep, finely stratified layers of midden around a complex suite of features associated with access to the cave, including a series of stone-built walkways and stairwells. An external 'precinct' area showed that High Pasture was modified throughout its history, with enclosure walls constructed around cave and stairwell entrances, and a central activity area dominated by a suite of superimposed hearths.

Beyond the confines of the 'precinct', significant quantities of fire-cracked stone were deposited through the Iron Age, initially resembling the remains of a substantial burnt mound. However, with no central water tank or convenient water supply, this did not seem a typical burnt mound construction. Underlying these deposits, evidence for Early Bronze Age activity included a concentration of ard marks, pits, stake-holes, and a recumbent standing stone, with associated lithics and Beaker ceramics. Although there was evidence for intermittent Bronze to Middle Iron Age activity, no evidence for domestic settlement was identified either above ground or within the cave.

The Iron Age deposits in particular produced an unusually substantial and diverse artefact assemblage, while the underlying limestone geology contributed to enhanced preservation of organic remains: extensive zooarchaeological and botanical assemblages, along with human remains. The site hub of Bone Passage and adjacent precinct, defined by natural topography and a series of enclosing walls, was the focus for deposition, with the great majority of artefacts and ecofacts recovered from here: as discrete caches, within midden spreads, and with items such as quern stones re-used in structural settings across the site. The precinct also saw the primary butchery and preparation of animals and the processing of other foodstuffs such as barley, the grains of which were possibly dried and burnt over the many slab-built hearths.

These rich assemblages testify to the repeated use of a special place in the prehistoric landscape of Skye, and one highly significant for our understanding of life, death, and belief in Iron Age Scotland and beyond. This volume tells the story of the High Pasture complex, and what we think we can tell of its relationship with its wider landscape, the meaning of the activities which took place there, and what this tells us about life beyond the practical for the inhabitants of the Scottish Atlantic Iron Age.

1.2 Location and topography

Uamh an Ard Achadh (*Cave of the High Field*), or, more commonly, High Pasture Cave, is situated on Scotland's western seaboard, on the Isle of Skye (Figs 1.1, 1.2), 1.3 km southeast of the small crofting township of Torrin in the Parish of Strath (NGR NG 5943 1971). Overshadowed by the Black and Red Cuillin mountains and with dramatic views over Strath Suardal, the cave entrance is located on a terrace 60 m above Ordnance Datum, in a shallow valley on the northern flanks of Beinn an Dubhaich (*The Hill of Darkness*) (235 m) (Fig. 1.3). The site lies at an important geological junction between granite and limestone, a key factor in local soil fertility and vegetation. Strath Suardal, running from Broadford in the northeast to Camas Malag in the southwest, forms an important access to the sea routes of the Inner Sound and Loch Scavaig and beyond to the Small Isles and the adjacent Scottish Mainland.

The freshwater Loch Cill Chriosd to the northeast of High Pasture Cave is fed by small streams from the north and west and is drained by a large outflow stream into Broadford Bay. Near the loch, the floor of Strath Suardal comprises damp meadow and fen at the west but, closer to Broadford where the influence of the limestone is reduced, blanket bog is extensive. Well-drained limestone areas support a wide range of habitats for ground-cover plants, while Coille Gaireallach is an extensive area of woodland to the south of Loch Cill Chriosd. This is dominated by hazel and birch, with extensive stands of hazel located on the south-facing hillsides above Kilbride.

The soils deriving from this complex geology produce distinct variations in vegetation cover. Fertile limestone soils support grazing, cultivation, and thus much of the local settlement, while poorly drained, acidic granite soils promote the growth of peat and heath-loving plants. Compared to the past, Strath Suardal is now sparsely populated, although there has been a recent increase in the construction of new houses around Torrin, Kilbride, and Broadford, the latter forming the second largest centre of population in Skye.

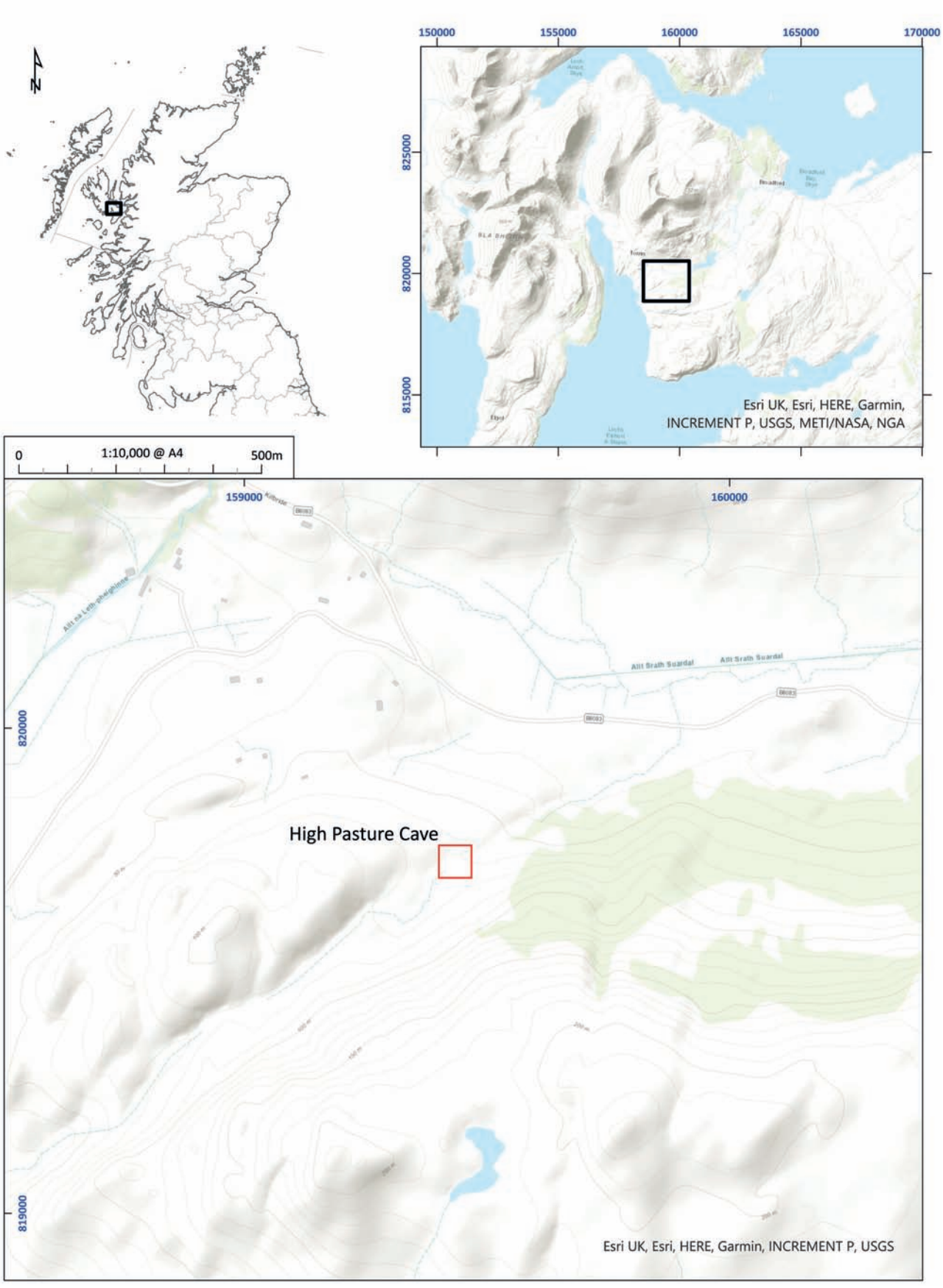


Figure 1.1. Location map

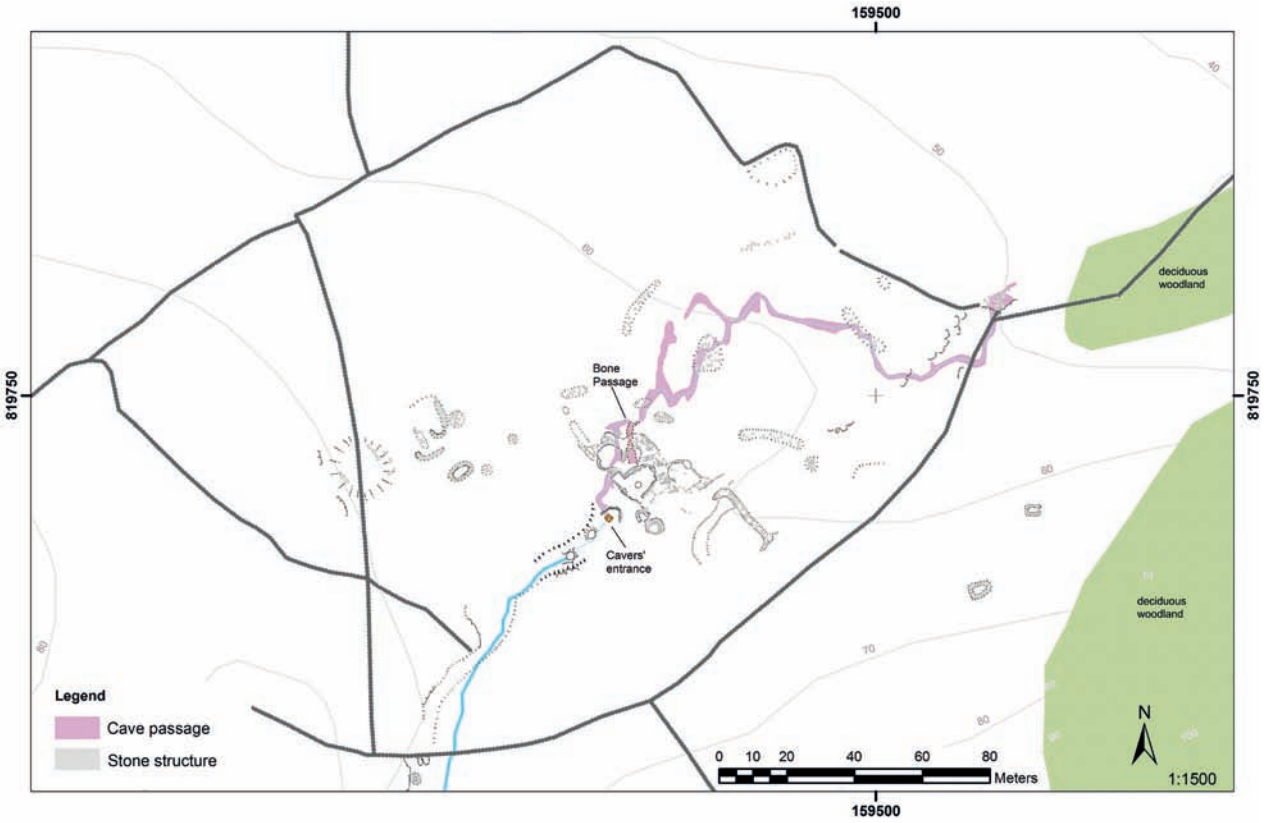


Figure 1.2. The location of High Pasture Cave & surface features

1.3 Discovery and excavation

High Pasture Cave comprises a linear, active streamway of modest proportions, with short sections of dry, high-level fossil passage (Figs 1.4, 1.5). It was in one of the high-level passages, around 40 m downstream from the entrance, that cavers first noticed bones embedded in the calcite floor deposits. The passage ran for 12 m to a boulder blockage. A visit to the site by members of the Grampian Speleological Group in 1973 (Dowswell and Ponter 1973) provided a basic description:

> A short climb from the streamway led into a low passage one metre high and two metres wide which was blocked by rubble after 8 m. This passage contained a large number of various bones, some of which had obviously been there a long time as they had been calcited over.

High Pasture Cave, with its relatively 'spacious' passages and calcite formations subsequently became one of the most popular systems to explore in Skye. Project director Steven Birch first visited the cave system in 1994. His diary entry reads:

> I entered the short high-level passage, which was blocked at the far end by a quite solid boulder choke. The passage floor was partially covered in calcite, especially to the sides of the passage and at the north end. The passage varied in width between approximately 1.1 m and 2.5 m, while the height also varied between 1.8 m at the north end (where the access ramp from the mainstream passage enters) to a minimum of 1.2 m at the south end, adjacent to the boulder blockage. A shallow trodden groove has developed in the floor deposits through access by cavers and in some places the calcite floor has been broken. Numerous bone fragments can be seen covered in calcite, suggesting that the material could be very old, potentially relating to Late Glacial fauna.

From here on, this section of the cave would be called *Bone Passage*, a name that endures in reports on the site and in this publication.

This visit to the cave revealed the potential importance of the archaeological deposits in Bone Passage and identified the significant disturbance that had taken place after the previous excursion, with cavers attempting to dig through the blocked southern end of the passage, removing sediments and boulders, and exposing a significant quantity of well-preserved animal bone, charcoal fragments, and fire-cracked stone. Subsequent visits were clearly causing additional erosion and damage, including recent breaks to some of the bones littering the cave floor.

Investigations found that the cavers responsible for excavating in the passage had recovered several fragments of well-preserved bone and antler. Assuming the material derived from Late Glacial or early Holocene reindeer and



Figure 1.3. Photographs showing the location of High Pasture Cave. A. Image showing the change in vegetation due to underlying geology & the stream flowing towards the cave; B. view southwest over the site (bottom of image) to Kilbride; C. looking west over the caver's entrance to the Black Cuillin mountains; D. view northeast over the site to Loch Cill Chriosd & Strath Suardal



Figure 1.4. Left: The active mainstream passage in High Pasture Cave, downstream of Bone Passage; Right: a grotto located in a dry fossilised passage downstream of the duck

wild boar, samples were submitted to the University of Manchester for identification: the antler was from red deer, while the mandible fragments were domesticated pig. Fortunately, time constraints and the sheer amount of material involved limited the group's efforts, which may have caused significant damage to the complex archaeological deposits within Bone Passage.

With a clear threat to archaeological deposits confirmed, the project directors conducted a detailed survey of Bone Passage and the adjacent streamway in 2003, and a gridded collection of all disturbed archaeological material. A significant assemblage of bone, shell, charcoal, and fire-cracked stone was augmented by artefacts including worked red deer antler, worked bone, ceramics,

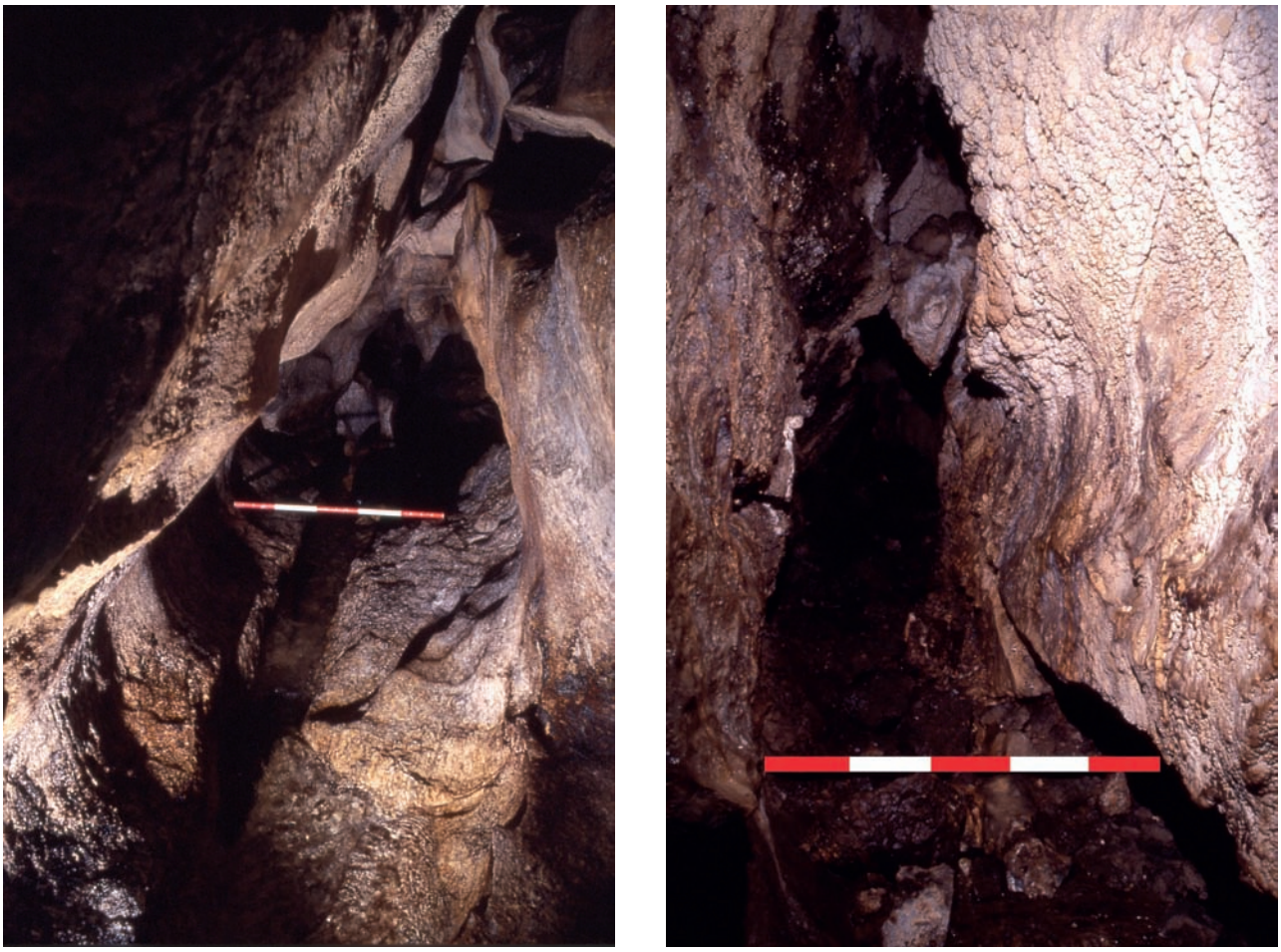


Figure 1.5. Left: The active mainstream passage, viewed from the ramp access to Bone Passage, looking downstream; right: looking up the ramp access to Bone Passage

stone tools, and a socketed iron adze. This, and ceramics of potential Iron Age date, suggested that the material related to later prehistoric use of the cave.

With assistance from Noel Fojut and Patrick Ashmore of Historic Scotland, and Fraser Hunter of National Museums Scotland, archaeological investigations started at High Pasture in 2003, initially as a survey and rescue project to remove at-risk material. In 2004, investigations in Bone Passage were augmented in parallel with a survey of features and earthworks identified at the surface above the cave (Birch *et al.* 2004). This approach, guided by solid research criteria, paid dividends in informing site interpretation and recommendations regarding its future management.

A small trial trench spanning the width of Bone Passage (Fig. 1.6, left) was located to further evaluate the extent, preservation, and chronology of the archaeological deposits and a detailed survey of local surface features was completed (Birch and Wildgoose 2005). The trial trench identified a complex sequence of deposits over 0.8 m deep, including two paved floor horizons interspersed with complex layers of midden. Augmented by a 100% wet-sieving strategy, the trial excavations produced large assemblages of burnt grain and charcoal, well-preserved animal bone, and a significant number of artefacts, including metalworking residues. These indicated that conditions for preservation within the cave were excellent, in marked contrast to that seen in material from contemporary surface sites on Skye's dominantly acidic soils. A preliminary analysis of the artefact assemblage by National Museums Scotland suggested that, although not chronologically diagnostic within the Iron Age, the socketed iron adze, ceramics, and use of knives rather than saws to work antler, supported a 1st millennium BC date (*ibid*., 43). Despite the unusual deposit location, the assemblages were initially interpreted as domestic, and so further excavation offered the potential to recover evidence for a later prehistoric site in Skye with enhanced preservation of organic materials.

Results from the 2004 surface survey indicated the potential for contemporary structures and deposits. Earthworks and degraded stone walls above the cave entrance included a U-shaped enclosure and what appeared to be the stone footings of a circular building. However, the presence of possible post-medieval shielings and associated field walls indicated that these features could



Figure 1.6. Left: Bone Passage. Looking south through the narrows to Steven Birch standing in Trench 1; right: view south to the cave entrance & base of the stairwell access, with natural sunlight illuminating a complete inverted saddle quern

not be accurately dated without excavation. Before this, geophysical survey was undertaken, primarily in order to investigate the possibility of a former blocked entrance leading directly into the south end of Bone Passage. With north end access through a long stream passage at the mercy of fluctuating water levels, might the south end of the cave conceal an easier entranceway used by Bone Passage's prehistoric visitors?

A magnetometry survey of 1800 m^2 and a resistivity/ground penetrating radar (GPR) survey of 225 m^2 was conducted by David Elks and Alex Pimlow of Stratascan Ltd (Carpenter 2004). Results were limited by the presence of intruding igneous dykes in the limestone bedrock, although several anomalies were identified including potential areas of ferrous material deriving from metalworking. Resistivity data also proved enigmatic, revealing a number of rectilinear responses which differed from the circular features and earthworks identified at the surface. However, GPR revealed a number of strong and complex responses within the U-shaped enclosure identified at the surface. The northern and most intense anomaly aligned with the south end of Bone Passage, making this the most likely position for a blocked former cave entrance.

In 2005 these anomalies were evaluated, along with excavations at the south end of Bone Passage adjacent to the potential blocked entrance. Removal of the turf revealed archaeological deposits immediately below including fire-cracked stone and a wide range of prehistoric artefacts in what would become the main trench, extended as excavations progressed to reveal an increasing depth of archaeological deposits: a succession of large, slab-built hearths and associated deposits extending to a depth of at least 3 m. Such a depth of well-stratified prehistoric material was highly unusual, the discovery more comparable to the deep archaeological deposits encountered on urban settlements.

The end of 2005 revealed one final, important discovery. Within the trench investigating the U-shaped surface enclosure, an oval stone-built feature was revealed below a chaotic jumble of stone and sediment, some 1.5 m below ground surface. Removal of the overlying stone revealed human and animal remains, some showing signs of fragmentation for burial as selected groups of material (Birch and Wildgoose 2006). These deposits overlay a boulder-filled and blocked stairwell including a series of narrow, stone steps descending steeply towards the south end of Bone Passage. Meanwhile, excavations within Bone Passage had continued to produce a staggering amount of archaeological material and, adjacent to the base of the blocked entrance, one of the steps from the same stairwell identified at the surface. The complete excavation of the stairwell linking cave to surface would have to wait until 2006 but speculation on the nature of this unique site and its potential function were, from this point on, an intensely enjoyable topic of debate throughout the excavations.

Faced with a growing material assemblage, a detailed programme of post-excavation analysis running alongside and informing future project strategy was vital. We were fortunate from the outset in attracting the assistance of a dedicated core of post-excavation specialists, whose numbers grew considerably throughout the life of the project.

By the end of 2006, the total excavated area was less than 120 m² and although deposits in this area extended to over 4 m deep, the number and density of artefacts recovered was astounding. A major factor in this was the excellent conditions for preservation, especially for bone and antler. However, preservation notwithstanding, comparison with contemporary major settlement sites and other Scottish cave excavations suggested that High Pasture was producing an unusually high density of artefacts. What the site would lack in built features throughout the

excavations, including a paucity of evidence for domestic settlement, would continue to be balanced by the sheer quantity of artefacts and ecofacts recovered.

Throughout the seven years of excavation at the High Pasture complex, the major focus of investigation would be Bone Passage, the natural (southern) cave entrance and associated stairwells (Fig. 1.6, right), and the precinct area outside the cave (Birch and Wildgoose 2007; 2008; 2009; 2015). This was augmented by extension of the surface trenches and excavation of a series of trial trenches and test pits to evaluate geophysical anomalies identified from the survey of 2004, and a more extensive magnetometry and resistivity survey in 2006 (Hodgson and Moore 2006). Surface excavation identified the limits of the precinct, defined by a series of enclosure walls centred on a natural amphitheatre to the south of the cave and stairwell entrances (Fig. 1.7). The enclosed area contained the main access to Bone Passage including the remains of three phases of stairwell structure and 15 hearths and their associated features and deposits. At least three phases of paved walkway were also identified within this enclosed space which directed access to Bone Passage and the caves beyond.



Figure 1.7. Looking northeast showing the entrance to Bone Passage & stairwell F2.35 in 2010 showing the depth of deposits removed over 7 years of excavations (scale = 2 m)

By completion of excavations in 2010, approximately 750 m² of deposits 0.8–5.2 m deep had been evaluated, all hand excavated. The length of Bone Passage was excavated to bedrock, generating in excess of 14 m³ of deposits, 100% wet sieved. A significant proportion of deposits from the deeper precinct area was also 100% wet-sieved, with a comparable programme of targeted bulk sampling for laboratory processing. This methodology produced an unusually complete data set, on a scale not undertaken on a Scottish cave excavation before. This would allow a remarkably cohesive picture of depositional activity on site, specific activity areas, and a detailed chronological framework.

The High Pasture Cave Project comprised a core of experienced archaeologists, university students, and a dedicated team of volunteers (Fig. 1.8), who happily faced



Figure 1.8. Left: Student volunteers taking a well-earned break with Site Director Martin Wildgoose; right: site volunteer with sherd of Beaker pottery

sometimes arduous conditions to assist with fieldwork. The project received substantial financial support from Historic Environment Scotland and other agencies and undertook a gruelling schedule, with the initial 2004 Bone Passage evaluation extended to 6–8 months per year on site from 2005 to the end of fieldwork in 2010. The result of such an exhaustive and detailed strategy is the scope of this publication.

1.4 The archaeological landscape of High Pasture and Strath Suardal

Although sparsely populated today, Strath Suardal contains extensive evidence for prehistoric and historic period settlement, with survey and excavation identifying a significant number of sites and monuments, including evidence for upland transhumance activities. Survey in the parish of Strath has focused on the Strathaird, Torrin, and Sconser Estates, owned and managed by the John Muir Trust. However, unlike other areas of Skye and the adjacent Scottish mainland, Strath did not receive the same level of attention from antiquarians, including no formal excavation of archaeological sites in the parish. The more visually impressive sites were mentioned by 19th–early 20th century ministers, including entries in the *New Statistical Account*.

Archaeological surveys carried out in Skye by RCAHMS (1928), renewed interest in Skye's built heritage and a number of important sites were recorded in Strath including standing stones, chambered cairns, mostly coastal complex Atlantic roundhouses, souterrains, and later ecclesiastical sites including churches and holy wells. The area around Broadford Bay contains a number of Neolithic chambered tombs, the most impressive of which is the Liveras cairn, also containing Early Bronze Age features.

Detailed landscape-scale survey of the archaeology of Strath only dates from the 1980s but has revealed a significant number of sites and monuments, some forming well-preserved archaeological landscapes, such as the Bronze and Iron Age hut circles and their contemporary field systems at Druim an Fhuarain and within the catchment basin of the Abhainn Cill Mharie (Wildgoose 2000b, 10–11). The historic period is well represented by townships, their associated infrastructure, and numerous shieling sites indicative of transhumance through the wider landscape. This practice, whereby livestock were removed from cultivated lands to higher or more remote pastures for the summer months, characterises the medieval and later economies of many parts of upland Scotland, including the Hebrides. These small buildings of varied morphology occur in isolation or in clusters, sometimes in considerable numbers, such as at Airidh na Creige near Torrin (Miket and Wildgoose in prep.). It is possible that such activity has its foundations embedded within prehistory.

Kilbride House, established *c.* 1825, and the former Kilbride Township, are located to the northwest of the High Pasture Cave complex, with the remains of the nearby St Bridget's Chapel most likely located on a low platform to the southeast of the standing stone of Clach na Annait (*Stone of the Mother Church*). In 1870, the tenant of Kilbride House dug up near the site a small hand bell, the handle surmounted by a cross, while a baptismal font was also found nearby. The bell, along with the place name Annait, strongly suggests that this chapel has an early foundation. Tobar na h-Annait, a Holy Well, is located on a spring to the south of the chapel site at Kilbride, covered by an old mill stone (Fig. 1.9). The use of the well is surrounded by early folklore and superstition, including bringing newlyweds to the well to ensure fertility (Lamont 1913). The immediate area surrounding Kilbride contains a wealth of prehistoric monuments including the standing stone mentioned above, a stone circle demolished in the 1950s, a burial cairn and an Early Bronze Age cist containing a funerary urn.

Northeast of Loch Cill Chriosd are the remains of the early 16th century church of Kilchrist, which most likely replaced the early Christian chapel at Kilbride. Before the construction of what is now the present ruin, legend claims that the 7th century St Maelrubha preached and held mass on the small knoll between the present churchyard and the loch, still known as Cnoc na-Aifhreann (*the hill of the mass*). The recent discovery of finely decorated mouldings suggests that the original church was a fine and imposing medieval structure. The church would have served the communities, cleared from the land during the latter half of the 19th century. Post-medieval Strath also witnessed extensive industrial activities including quarrying for lime, marble extraction (primarily for road stone), and magnetite prospection.

Understanding the function of this apparently isolated site drove a desire to set the High Pasture complex within



Figure 1.9. Clach na Annait standing stone & quern stone covering the Holy Well (inset), Kilbride



Figure 1.10. Aerial image showing location of High Pasture Cave, the cave resurgence, Site LS06 & post-medieval settlement at Kilbride (contains OS Data © Crown Copyright & Database Rights 2022)

its wider landscape setting. In 2007 a detailed desk-based assessment and walkover surveys of Strath Suardal began, aiming to identify and record all visible archaeological sites and associated enclosures and boundaries (Birch and Wildgoose 2007, 21–2). The survey, completed in 2009, revealed a wide range of prehistoric to historic sites and monuments (Birch and Wildgoose 2009, 22–6) but few within the immediate environs of High Pasture. Those that were, including shielings, field walls, and clearance cairns, appear to relate to post-medieval transhumance.

The survey revealed a well-populated area of Skye during the later prehistoric period, identifying hut-circles and associated field boundaries which may have been contemporary with the major phases of activity at High Pasture. Trial excavation was carried out during 2010 and 2011 on 31 individual structures identified as possible hut circles. These revealed a varied morphology and occupation deposits were often ephemeral, suggesting that occupation may have been temporary or seasonal and thus related to transhumance or animal husbandry. The structures generally produced small numbers of artefacts and environmental data, making interpretation difficult, but initial assessment suggested use from the Neolithic through to the later historic period. Material for radiocarbon dating was recovered from 16 sites, facilitating multiple dates for three sites indicating more complex and extended use. Results suggested use of these sites from the Bronze Age through to the Middle Iron Age, dates contemporary with the extended periods of activity at High Pasture, while six of the samples produced dates indicating later early medieval and medieval use. It is possible that structures were used as summer shielings during these later phases, although one of the sites did produce some limited evidence for small-scale metalworking (Birch and Wildgoose 2015).

One site in particular is worthy of further mention. LS06 is a well preserved, complex group of structures *c*. 250 m down slope and to the northeast of High Pasture Cave and *c*. 30 m above Ordnance Datum (Fig. 1.10). The stream which bounds the structures to west and north is the same that runs through the High Pasture Cave system and returns to the surface some 50 m to the southwest. The remains comprise a circular enclosure of 14 m diameter with a southeast facing entrance and a second, elongated enclosure attached to its east side. The circular structure contained the remains of a central slab hearth and associated pottery sherds which overlay an earlier pit hearth. Surviving walls of boulder stone with rubble-earth core measured up to 1.6 m wide. A test pit at the centre of the attached enclosure revealed a mass of burnt and fire-cracked stone overlying a collapsed sandstone slab tank constructed within a cut into the underlying natural clay. A single sherd of decorated pottery, half of a steatite (soapstone) tuyere, and a quantity of iron slag were recovered from the exposed burnt mound material associated with this feature.

More extensive excavation, comprising two opposing quadrants in 2011, demonstrated that LS06 had seen

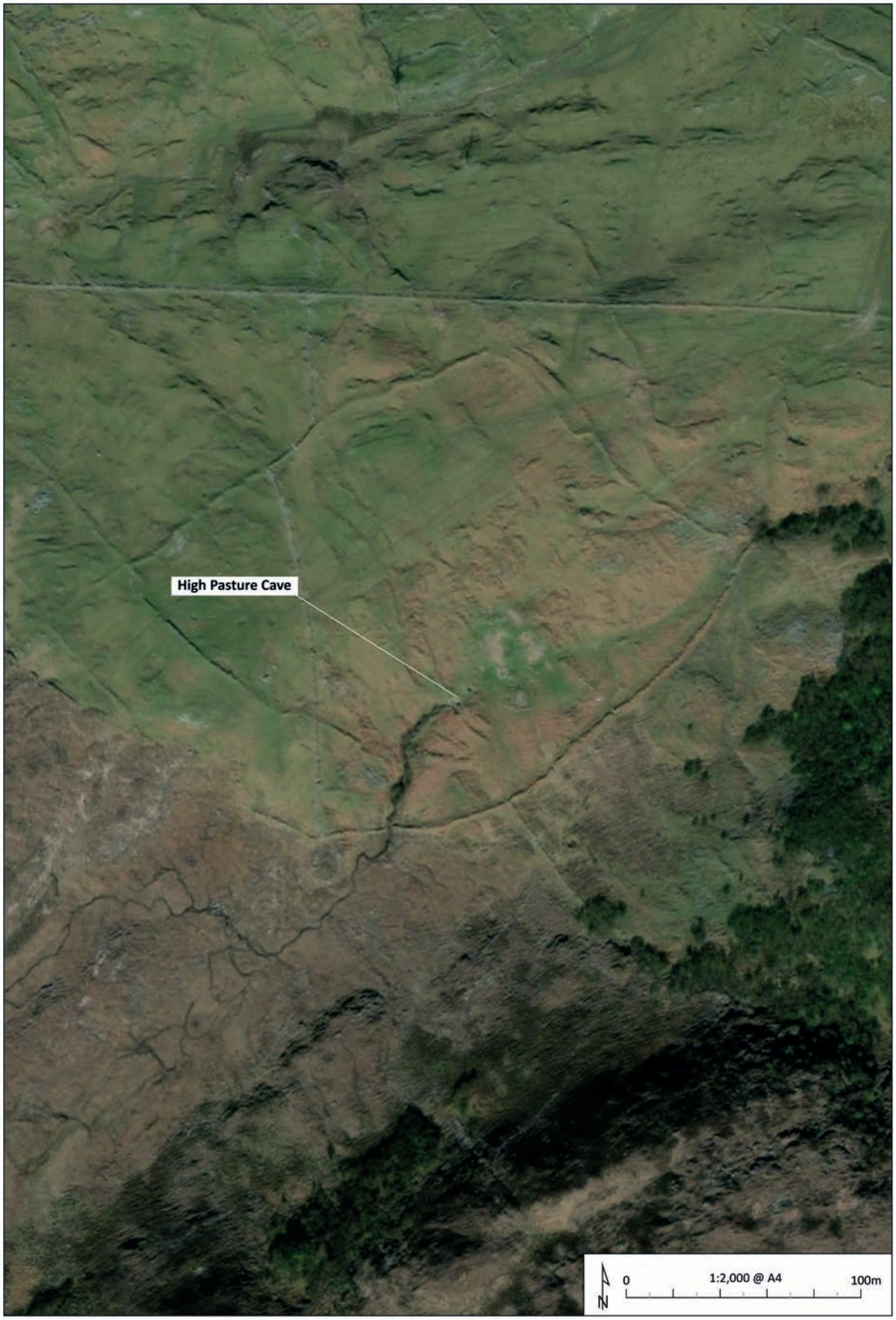


Figure 1.11. Aerial image showing location of High Pasture Cave within post-medieval field enclosure & transition in ground vegetation associated with underlying geology

extensive use during the Iron Age when the central pit hearth and an arc of posts within the northern quadrant were constructed. Later, perhaps during the Early to Middle Iron Age, the circular, stone walled enclosure was constructed sealing the earlier features, and a slab hearth superseded the pit hearth. A horizon containing small and abraded Iron Age pottery sherds then accumulated, the associated burnt mound was levelled, concealing the tank, and a rectangular enclosure constructed over the burnt mound spreads against the east side of the circular enclosure. Charcoal produced a Middle Iron Age date of 370–170 cal BC (SUERC-33772) for the central slab hearth. The location and date of this site and some similarity with the deposits found at High Pasture Cave suggests that the two may have been directly connected.

Alongside these investigations, a second cave was selected for trial trench excavation, located 0.7 km to the ENE of High Pasture Cave in the nearby Coille Gaireallach woodlands. Discovered in 1973 by the Grampian Speleological Group, subsequent explorations within the main chamber of Uamh an T-Sill (*Cave of the Seed,* but also named *Cave of the Skull*) discovered human remains within a vertical and constricted section of passage (Ryder 1995, 37–8). Most unfortunately, the whereabouts of the well-preserved human skull and other fragments of bone that were removed from the cave after discovery could not be traced. Trial trench excavation produced animal bone, including domesticated pig, and two stone cobble tools from a location close to the site where the human remains were recovered. A late medieval date of AD cal 1390–1425 (SUERC-33759) from ash deposits in the main cave chamber suggested an extended period of use, as did a recovered gun flint. Oral tradition indicates that this is one of the few caves in the area that was given a name in the past, with a local story suggesting that the site was used to hide grain and other produce during visits from the Tacksman to collect rents.

The results of these landscape investigations were surprising, especially with regards to hut circle chronology. Few of the dated structures appear contemporary with the main phases of activity at the High Pasture complex. It is apparent that we have to look beyond the boundaries of Strath Suardal to find the numbers we might expect to populate the site during some of the larger events evidenced there.

In 2011 excavation for the new Broadford Medical Centre on a gravel ridge above the northwest shore of Broadford Bay at NG 64133 23915 (Birch 2012; Birch in prep.) revealed a suite of important prehistoric archaeological features, including a stone-lined grave or cist of Early Bronze Age date, grain storage pits, a grain-drying kiln complex, and a souterrain. The excavation of the souterrain, kiln, storage pits, and a number of smaller negative cut features, produced Iron Age ceramics, stone tools, and a wealth of environmental data. In particular, the grain-drying kiln and storage pits produced significant amounts of hulled barley, much of which was clean and similar in quality to the burnt grain recovered at the High Pasture Cave complex. Some of the pottery recovered from the Broadford site is also similar in form and decoration to that from High Pasture (Birch 2019, 80–90). The grain-drying kiln complex and the souterrain produced Middle Iron Age dates, ranging between 375 cal BC and cal AD 25.

The High Pasture Cave complex is located within a wider landscape where evidence for at least some contemporary structures and activities have been identified. However, these discoveries only seem to emphasise that its catchment area is likely to have extended beyond Strath Suardal, the shores of Skye, and potentially to the adjacent Mainland and surrounding islands.

1.5 Going underground: a brief history of cave archaeology in Scotland

The extensive tradition of archaeological research in Scotland, as elsewhere in Britain, has generally focused on monuments, stratified occupation sites, and human-modified landscapes, with only the past two decades seeing an awareness of natural-place archaeology informing intellectual and curatorial approaches to the archaeological record (Tilley 1994; Bradley 2000). As with other elements of the natural landscape, the aesthetic and historic-ecological value of caves are well established and appreciated but their archaeological properties are more difficult to characterise. The archaeological significance of a cave site is only usually recognised when its deposits are disturbed by natural erosion, human intrusion, and, ultimately, the destructive process of archaeological investigation (Chamberlain 2012, 81). In particular, speleologists play a pivotal role in the discovery of archaeologically significant caves, exploring remote and inaccessible locations.

The history of cave archaeology in Scotland can be traced back to the late 19th century, when exploration of underground spaces and their deposits became part of broader geological, palaeontological, and antiquarian research agendas, including the great debate over the antiquity of mankind in the country. However, despite this long history, the complexity of depositional processes and often haphazard excavation histories, combined with logistical difficulties to traditional excavation methods, have limited cave study. In addition, early investigation of Scottish caves and rockshelters focused on coastal sites to the general exclusion of other locations, resulting in a distorted picture of past human activity. The Oban cave sites are the most obvious example of this bias, when a limited artefact assemblage recovered from Mesolithic shell middens gave birth to the erroneous idea of the ‘Obanian Culture’ (Bonsall 1996).

A significant number of Scotland’s recorded cave excavations were carried out by Victorian ‘antiquarians’, some

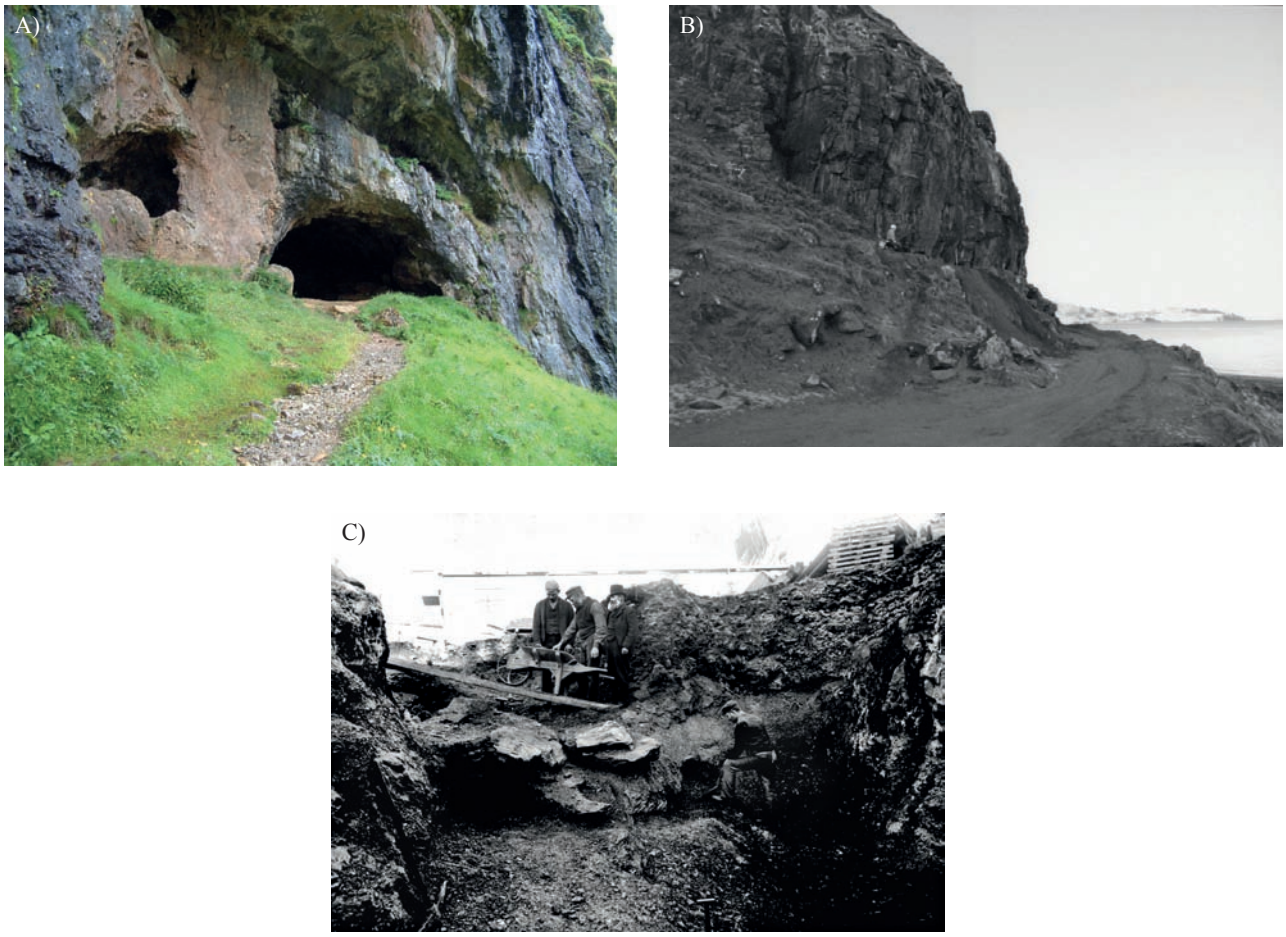


Figure 1.12. Bone Caves: A. Inchnadamph; B. An Corran rockshelter, Skye; C. excavations taking place at MacArthur's Cave, Oban (© courtesy of Historic Environment Scotland, cat no. SC 371 366; Society of Antiquaries of Scotland)

of whom left relatively detailed records and associated material archives. But while of their time, these endeavours were hugely destructive to deposits which would have been of the highest value to modern archaeological science techniques. These early investigations also included the first recorded forays into other man-made forms of underground space such as souterrains and formed a significant percentage of research excavation carried out in Scotland at the time. Several examples set a standard for the quality of the excavation and recording that was possible within caves at this time. In 1872, Corrie, Clarke, and Hunt produced the first of their reports on excavations at Borness Cave, a former sea cave on the coast of Kirkcudbrightshire (Corrie *et al*. 1872–74). Within the large main cave chamber, deep and well-stratified sediments produced animal bone and shellfish middens, burnt grain, human bone, and a wide range of artefacts – most of which had been manufactured in bone or antler but also including stone, bronze, iron, and glass objects, and ceramics including samian ware.

The results of the Borness excavations were matched by discoveries of a number of similar sites along the Argyll coast around Oban, including MacArthur's Cave (Fig. 1.12C), MacKay Cave, Distillery Cave, Gas Works Cave (Anderson 1895; Turner 1895), and Druimvargie Cave (Anderson 1898). Most of these sites are on a raised beach terrace above the present sea level, with some of their entrances hidden beneath natural talus slopes. Besides deep midden deposits containing stone and bone tools, a significant number of human bones were recovered. Turner suggested that tool typology and the few potsherds recovered indicated use during the Neolithic but more recent analysis of artefact and bone assemblages, along with radiocarbon dating of human remains, indicates the use of the caves from the Mesolithic through to the Iron Age (below).

The caves at Creag nan Uamh near Inchnadamph, Sutherland (Fig. 1.12A), initially attracted scientific attention during geological survey in 1885, after which John Horne and Benjamin Peach excavated in Bone Cave Number 3 (Peach and Horne 1917; Lawson 1981; Saville 2005). Material recovered from their excavations included Late Glacial fauna and a small number of artefacts and human remains. The discovery of supposedly modified reindeer

antlers along with hearths and other residues suggested human activity in the Upper Palaeolithic, attracted significant attention. However, further excavation in 1926–27 (Callander *et al.* 1927) produced only a preliminary report and archaeological attention to the Creag nan Uamh caves was only revived by Tim Lawson's (1981) re-evaluation of the site archive. Lawson's work added considerable stratigraphic detail and assessed previously unpublished material but, although the report highlighted the potential for Upper Palaeolithic activity, Lawson's doubts on this hypothesis (Lawson 1981, 19–20) were well-founded, with recent analysis of the artefacts and human remains showing no support for a human presence at Creag nan Uamh during the Upper Palaeolithic (Saville 2004, 208; 2005, 358–9). Radiocarbon dating of the human remains show them to be Neolithic (Saville 2005, 358), while the small artefact assemblage generally dates to the later prehistoric and medieval periods.

Many cave sites excavated during earlier periods were given the name *Bone Cave*, including examples on Colonsay (Grieve 1880) and at Duntroon in Argyllshire (Mapleton 1873). As at Creag nan Uamh, many of these early explorers were focused on geology and palaeontology, including finding evidence for extinct fauna. However, it was inevitable that, during their investigations, material would be identified and recovered relating to later periods. The work undertaken at these sites would result in the development of more structured cave excavation strategies, methodologies, and recording techniques.

A number of caves with Pictish and early Christian iconography were investigated during the later stages of the 19th century, especially around the Fife, Ayrshire, and Galloway coastlines and on the island of Bute. These sites included a number of caves at East Wemyss (MacLagan 1875; Patrick 1905; MacKie 1986; Ritchie and Stevenson 1993) which contained Pictish symbols and associated occupation deposits; St Medan's Cave and St Ninian's Cave in Wigtownshire (Maxwell 1885; 1887; Trotter and Maxwell 1886) and St Molio's Cave in Bute (Wilson 1882). Many other caves have been found in the southwest of Scotland with potential associations with the church. Some may have served as 'corpachs'; temporary resting places for the dead during their final journeys by boat for burial on offshore islands, including Oronsay and Iona (Mercer 1978). Some of these sites also incorporate graffiti carved into the cave walls including incised crosses and other inscriptions.

Early 20th century cave investigation became more measured and formalised, such as the excavations in Caird's Cave near Rosemarkie, Black Isle by Dr William Maclean and Colonel William Hall between 1907 and 1912 (Anderson-Whymark 2011). Unfortunately, these were never published and no primary records survive but an important assemblage of bone working debris and bone tools was recovered, including an exceptionally fine, likely 8–9th century AD amber inlaid pin. In 1909, James Cree (Cree 1909) excavated two small caves with the remains of Early Iron Age and later occupation at Dirleton, east of Edinburgh. The largest cave had a large drystone wall built across the main entrance, complete with doorway and bar-holes to secure the door. Two fireplaces or ovens were recessed into the inner wall face, with flues to remove smoke and fumes. A large, circular hearth was located in the centre of the main cave with ash and charcoal deposits surrounding it. Stone, bone, antler, glass, iron, and bronze objects, along with ceramics including samian ware, indicated activity at the site at least during the Roman Iron Age.

Evidence for Iron Age activity, including the remains of a small smelting or smithing hearth, was identified at Rudh' an Dunain Cave, near Glen Brittle, Skye by Lindsey Scott (Scott 1933–1934). Material recovered within this small rockshelter mainly comprised lithics and Beaker ceramics, initially indicating an Early Bronze Age date, but recent analysis of its lithics and microliths also suggests Late Mesolithic use (Ballin pers comm.*)*. Excavations at Keil Cave in Argyll in 1933–1935 (Ritchie 1966–1967) also uncovered evidence for smelting, along with midden material including animal bone and marine shells. Small finds included a bronze, penannular brooch, bone and antler objects including several fine comb fragments, an iron pin, two glass beads, and a spindle whorl.

One particularly notable excavation was undertaken at Sculptor's Cave, Covesea on the coast of Moray by Sylvia Benton (Benton 1931). This site, difficult to access via either cliff or coast, produced a wide range of objects dating from the Bronze Age to the Roman Iron Age including ceramics, worked bone and antler, metalwork, beads, and gold and bronze Ring money. But the cave also contained darker secrets. Numerous human bones were recovered, many young, and some displaying cut-marks on neck vertebrae suggesting decapitation. Hearths, associated deposits, and animal bones testified to ongoing activity, and a number of crude Pictish symbols were carved into the cave walls.

Coastal caves attracted most research attention at this time: more abundant within this dynamic zone, relatively easy to access, and with visible archaeological deposits. By contrast, inland sites tended to be fewer, and harder to identify. Major excavations at Torr's Cave, on the east shore of Kirkcudbright Bay in Galloway (Morris 1937) comprised a large, stone-built blockhouse complete with platform and steps into the interior, formed within the mouth of a former sea-cave. This showed several phases of modification between the Roman Iron Age and the 18th century AD, producing fine quality bone and antler objects, along with stone and glass.

After some hiatus, cave investigation in Scotland saw a resurgence in the last two decades of the 20th century which was paralleled elsewhere in Europe. Research and developer-led excavations included Kilmelfort Cave in Argyll (Coles 1983), undertaken after industrial tunnel



Figure 1.13. Left: approaching the Fiskavaig rockshelter, Skye; right: perforated human cranial fragment

blasting had removed most of the cave apart from its innermost recesses. The remnants of a flint and stone industry of Mesolithic character was identified with no associated datable materials. Recent lithics re-analysis (Ballin 2009) suggests that these represent Late Glacial Interstadial (12th millennium BP) occupation – the first substantive evidence for Late Upper Palaeolithic hunters in caves on the west coast of Scotland. Rescue excavations at the An Corran Rockshelter, near Staffin, Skye in 1993–1994 (Saville *et al*. 2012), also produced an Early Mesolithic lithic assemblage. Subsequent intermittent use of the site into the post-medieval period included Neolithic and Early Bronze Age funerary activity and a deep, environmentally rich midden sequence contained a well-preserved assemblage of bone, antler, and stone tools (Fig. 1.12B).

Under threat of erosion, deeply stratified midden sequences were excavated in several cave entrances off the narrow, rock-cut inlet of Geodha Smoo, near Durness, Sutherland (Pollard 2005). The famous Smoo Cave, along with Glassknapper's, Antler, and Wetweather Caves produced deposits mainly relating to Viking/Norse or post-Norse activity, especially the processing and consumption of marine and terrestrial foods. Possible evidence for metalsmithing (iron slag, boat nails) could suggest that boats were repaired in the sheltered inlet. Dates suggest activity between the 8th and 11th centuries AD, but with convincing evidence for pre-Norse activity, with probable Iron Age pottery from Glassknapper's Cave, and Late Neolithic pottery from floor deposits in Wetweather Cave.

Eroding midden deposits below a large rockshelter on the west coast of Skye, near the township of Fiskavaig, were investigated concurrently with the High Pasture excavations (Wildgoose and Birch in prep.). This remote and inaccessible location produced evidence for Middle Iron Age occupation associated with industrial activity, including non-ferrous metalworking and iron smithing. In addition, evidence for antler, bone-, stone-, and leatherworking and a unique assemblage of well-preserved animal bone, mainly adult cattle, was recovered. The cattle bone displayed unusual butchery, with the bones not processed for marrow – rare for Iron Age Atlantic Scotland. It is possible that the cattle represent a feasting event. Structural features included multiple hearth settings, some in contemporaneous use, and post- and stake-hole structural divisions within the rockshelter during the earliest phase of activity (50 cal BC–cal AD 140). After two major phases of activity, abandonment followed around cal AD 240 (Fig. 1.13, left).

While evidence for industrial activity at Fiskavaig may represent everyday replacement or repair of broken items, the preponderance of broken and unfinished items may also represent manufacturing debris from a small, multi-skilled industrial establishment. These include large numbers of perforated antler cylinders, an item also recovered in substantial numbers from other later prehistoric west coast sites such as Applecross Broch. It is possible that these represent a common day-to-day item, or a specific activity not recognised in the archaeological record. Notable artefacts from Fiskavaig include a



Figure 1.14. Early medieval inhumation at the Learnie 2B cave, Rosemarkie, Highland

polished marine-ivory ball – a possible composite fitting for a knife or sword handle that maybe indicative of wider marine contacts, a fragment of perforated human skull (one of four such objects recovered from Scotland; Fig. 1.13, right), and a single fragment of a clear glass vessel which may indicate contacts, perhaps indirectly, with the Roman world to the south.

This period also saw Scottish cave research begin to look outward to larger multi-disciplinary studies of natural and cultural landscapes, including the Scotland's First Settlers Project (Hardy and Wickham-Jones 2007) investigation into earliest settlement on Scotland's west coast; the work of Chris Tolan-Smith (2001) on the human use of caves in Mid-Argyll; and the Islay Caves Project (Hardy 2002; Hardy and Holderness 2003). Investigations at the old sea caves, fissure caves, boulder caves, and rockshelters identified by these projects have shown that these natural sites were used from the Mesolithic up to the present day and for a wide range of activities, such as Caird's Cave on the Black Isle (Anderson-Whymark 2011), now dated through Iron Age to medieval periods, and by artefact recovery to even later. Along this same stretch of coastline, the Rosemarkie Caves Project (Birch and Peteranna 2017; Birch *et al.* in prep.) indicates use of these caves in the Iron Age, early medieval and medieval periods, with later use by post-medieval travelling folk. Recent excavations in a group of three of the Rosemarkie caves shows evidence for early medieval metalworking, internal wooden structures, and the contemporary remains of a man, brutally killed (Fig. 1.14).

Most cave excavations now generally acknowledge the rarity of the surviving resource, with fieldwork driven by focused objectives, rigorously recorded, and linked with multidisciplinary scientific analysis. Re-examination of earlier excavation archives for modern dating and analysis is common, such as the Inchnadamph Bone Caves archive, Sutherland (Lawson 1981), originally thought to be Upper Palaeolithic in age (Saville 2005). Scientific analysis and dating have also investigated artefacts and human remains recovered from earlier excavations at the Oban Caves, Argyll (Bonsall and Tolan-Smith 1997), including more recently excavated material from Carding Mill Bay Cave (Connock *et al*. 1992), where human remains have been dated to the Early Bronze Age, while those from Mackay and MacArthur's Caves relate to Iron Age funerary activities.

We now understand that even well-known, supposedly 'dug-out' caves can retain overlooked pockets of undisturbed material, such as at the Sculptor's Cave, Covesea, Moray (Shepherd 2007; Armit *et al*. 2011; and Armit and Büster 2020), where artefacts and human remains were recovered more recently from both the cave and spoil heap associated with Benton's 1920s excavations. Parallel investigation in an adjacent, unexcavated cave produced similar material, including human remains (Büster and Armit 2016) – emphasising that radical advances can still be made even in well-known and previously investigated sites.

Recent investigations at Croig Cave, on the Mull coast (Mithen and Wicks 2012), have showcased the potential of smaller-scale, keyhole excavation. Here, a 1 m^2 trench exposed a 2 m deep midden sequence featuring cave floor surfaces dated to between *c.* 1700 BC and AD 1400. Midden analysis revealed processing of a diverse range of small fish and shellfish collection – notably long-term continuity of a low-risk inshore fishing strategy. Around 950 BC, a penannular copper bracelet and an amber bead were deposited in a small, shallow pit within one cave floor: a discrete ritual episode in a history of apparently mundane activity. Lead isotope analysis indicates an Irish origin for the copper ore, and iron slag at *c.* 400 BC, along with frequent wood charcoal, suggest smithing or smelting. High zinc levels at *c*. AD 1200 may represent intensive seaweed processing.

Archaeological research shows ongoing interest in the underground realm. Wilford's (2016) thesis on the use of British caves considers the *longue durée c.* 800 BC–AD 800 and thus explores how cave use may have been affected by periods of significant social change, developing a model for the role of caves across England, Wales, and Scotland, and the use of other natural places and underground spaces. This complements Marion Dowd's detailed synthesis of caves throughout Ireland (Dowd 2015). Wilford's distribution maps well reflect our current understanding of known caves and rockshelters and show sites dated to the 1st millennia based on artefact or direct radiocarbon. Recent and ongoing compilation of Scottish caves, rockshelters, and boulder caves by Birch (this volume) numbers at least 520 sites containing archaeological deposits, but it is likely that there are many more, including sites not Historic Environment Record (HER) recorded, or where archaeological deposits have so far not been identified. A total of 196 sites have at least

one radiocarbon determination which, in conjunction with artefact typologies, can provide a snapshot of cave and rockshelter use through time. Human remains are recorded at 113 sites although only a fraction of these have been directly dated.

With the exception of Wilford's work, a full synthesis of Scottish cave and rockshelter research has not been undertaken. While much therefor remains to be done, the fieldwork carried out at High Pasture Cave is a significant new addition to both cave research in Scotland and its wider European context. In particular, work at High Pasture demonstrated that the cave formed just one, albeit primarily important, element of a much larger prehistoric complex.

1.6 Caves as special contexts

Caves and underground spaces are one of the landscape's most enduring natural features. These mysterious cavities in the ground captivate us, their entrances draw us in, and whether their damp and dark interiors inspire fascination or fear, we recognise caves as otherworldly, transitional, and liminal (Moyes 2012). Caves offer a dark, mysterious entry into where natural and supernatural worlds mingle, so often expressed outwardly in a rich corpus of legend and folklore.

With use extending back into the last Ice Age and beyond, caves have not only been perennial sites for natural deposition, human occupation, burial, ritual, and artistic activities, but often individual foci for repeated use, adding to the richness of the archaeological record and providing often unique time capsules of cultural and scientific information. However, such diversity and longevity of activity, together with the particular taphonomies of subterranean environments, make interpretation challenging. Site formation processes and post-depositional influences differ, with caves requiring specialised investigation and interpretation techniques. Likewise, there remains a wide range of misconceptions and misinterpretations regarding their use and function.

Research indicates that caves in the British Isles were initially used as temporary shelters, reflecting more mobile forms of social and economic organisation. Later periods evidence a wider range of use, including what we might more confidently attribute to 'ritual' purposes, such as the Neolithic cave burials which are only one of many reflections of the move toward more sedentary societies (Chamberlain 1999; Dowd 2007). Due to the often-disturbed character of cave deposits and data derived from historic, poorly recorded excavations, it is often difficult to identify discrete forms of activity beyond funerary practice, especially during the later periods of prehistory. Prehistoric artefacts and features from caves vary widely, indicating that caves were used for an expanding range of activities. However, it has long been assumed that caves functioned primarily as domestic spaces, a general interpretation that rarely came into question.

While settlements generally produce an array of data demonstrating year-round occupation (Halstead 1999, 77–8), the stratigraphic and micro-morphological records from caves generally indicate that activity was markedly episodic in nature, periodically punctuated by longer periods of hiatus (Vitelli 1999, 61–2; Karkanas 2002, 250–1). But alongside this, archaeological cave sequences also often present clear evidence for deep continuities in practice and deposition which may extend over longer periods than any single open-air site in their vicinity, suggesting that caves were often constants in an otherwise changing social landscape.

Recent research has focused on this potential role in interpretation of site function, with caves interpreted as not simply convenient cavities but ideologically charged spaces imbued with meaning (Moyes 2012); not just geographic features, but cultural constructs (Skeates 2012a; 2012b) – their use a nuanced and culturally meditated phenomenon. As such, caves not only inform us about ancient religion and ritual practice, but also shed light on the social, economic, and political structures of which they are a part (Moyes 2006). This is explored by Peter Tomkins in his analysis of Cretan Neolithic caves (Tomkins 2012), perceived as places of power that are integral to the development of complexity, territoriality, and group identity. Caves are highly charged symbols (Pannell and O'Connor 2012) essential to identity construction and maintenance by creating deep historical connections and ties with the landscape. Marion Dowd's work on the use of caves in Ireland (Dowd 2015) argues that the archaeological evidence gathered together so far reveals that the primary role of these enigmatic places during prehistory was as theatres of ritual; while Clottes (2012, 25) powerfully reminds us that the use of caves for ritual purposes is humanity's oldest and most enduring religious tradition.

Entry into a cave triggers sudden, dramatic changes in sensory experience: light, sound, smell, and a relative restriction in freedom of movement which forces the visitor to momentarily re-orientate, as senses strain and heighten to catch information in this new and potentially dangerous place. For the uninitiated, a cave is a place of unexpected streams, flooded passages, vertical drops, and areas of complete darkness where only artificial light can assist in navigation. It is easy to appreciate the conditions which make caves a natural focus for ritualised activity but there is more to consider. Most natural caves are found in karst landscapes, where porous limestone geology quickly absorbs surface water into cracks and fissures, creating a relatively arid but fertile environment. Surface streams are usually only present at cave sinks and resurgences, with most water only accessible within subterranean passages. Water, therefore, was likely an important factor in the use of caves by communities. The visual impression created by a surface stream entering the ground at a cave sink, or resurging from a dark void, would have imbued

these locations with a significance which would endure in social memory and folklore. Whitehouse (1992, 127–34) discusses the importance of water in caves to Neolithic cult activities in Italy, where finds were commonly recovered from contexts associated with water in its varied forms – flowing water, still water, waterfalls, and solid or 'frozen' water (calcite). The deposition of objects in watery contexts in caves has been practised by different peoples and cultures around the world, with deposition into water also commonplace, of course, above ground, especially during prehistory.

Not all caves are created equal. Underground cavities are endlessly morphologically complex, reflect local environmental characteristics, and vary in the amount of space and light they provide. In archaeology, the definition of caves has historically been so broad that it conveys little useful meaning when understanding function or context. Generally, caves describe spaces that can be entered by humans and that contain a dark zone; as opposed to rockshelters, which are open and possess light, or twilight areas. The distinction between caves and rockshelters and their quality of light is critical to archaeological interpretation. For example, the use of cave dark zones for habitation is rare, while historically it has been suggested that most 'caves' used for refuge were actually rockshelters (Chard 1975; Goldberg and Sherwood 2006). As such, the connection of dark zones with ritual, symbolic, or liminal space has recently come to the fore in cave research (Dowd 2015). Not only do real and imaginary beliefs about caves influence human interaction with them but, as Holley Moyes (2012, 7) has argued, 'cave dark zones awaken something much more fundamental in the human psyche … the physical properties of caves have particular implications for human psychological responses'.

Finally, it is important that we do not investigate caves in isolation. Along with other types of underground structures, like souterrains, caves should be seen as a part of a much wider cultural and symbolic landscape, and survey, excavation and consideration of their environs, and potential contemporaneous activity at the site surface, should be an essential part of cave study. Beyond this, the wider landscape setting tells more of the story: access, location in relation to contemporary settlement zoning, whether the cave entrance is hidden from view. Liminality can beget segregation and secrecy, locales for rites of passage – but also where caves located on social boundaries may have been preferred as arenas for aggregation – where people from different communities could come together.

1.7 Structure of the volume

The present volume is divided into six parts. Part I, Chapter 1 has introduced High Pasture, its landscape setting and the story of its discovery, and a brief history of cave archaeology in Scotland and within wider archaeological study. Chapter 2 places the cave in its geological and geomorphological context. In Chapter 3, the major constituent parts of the High Pasture complex – and the difficulty in visualising them – are discussed, introducing the framework by which the archaeology is described throughout the volume. Chapter 4 introduces the archaeological sequence and phasing, survival, truncation and taphonomy, the excavation and recording specifics of the project.

Part II (Chapters 5–9) discusses the excavation results and presents the High Pasture Cave chronological sequence: from its earliest use during the Early Bronze Age, through the Iron Age, to its final abandonment in the early centuries AD.

In Part III, Chapter 10 provides a detailed examination of site chronology and presents the substantial number of AMS dates obtained for the project and their subsequent modelling. Chapter 11 discusses the human remains recovered at the site, including isotopic and DNA analysis, within their wider Atlantic Iron Age context.

Parts IV and V present analysis and discussion of the exceptional artefact (Part IV, Chapter 12) and environmental (Part V, Chapter 13) assemblages recovered from High Pasture, comprising individual specialist reports, synthetic discussion of the material in terms of site activity, economy, and wider cultural and landscape context.

Finally, Part VI (Chapter 14) discusses High Pasture in the context of the Scottish Atlantic Iron Age and from a wider British and European viewpoint: what can the fascinating extended biography of this unique site tell us about how caves were viewed, used, and curated in the Iron Age? That this discussion will only scratch the surface of what there is to say about High Pasture Cave is a given, and one we are more than pleased to acknowledge. We are even more pleased to have the honour to be the first to tell its story, and we hope you enjoy it.

2

The cave in the landscape: geology, geomorphology, and sedimentology

Tim Lawson, Ivan Young, Fiona McGibbon, Steven Birch, and Jo McKenzie

2.1 Introduction

High Pasture Cave is situated in an area of great geological diversity. It sits, like most of Skye's limestone caves, within a curving 8 km outcrop of Cambrian Durness limestone, running south from Broadford then west to Loch Slapin (Ryder 1974; 1995) (Fig. 2.1). Caves have been recorded in the Coille Gaireallach woodlands of Strath Suardal, the Allt nan Leac valley to the southeast, and around the southwest flanks of Beinn an Dubhaich. More are found within a parallel arc of limestone to the east: the Broadford Beds of the Lower Lias. Limestones lower in the Durness series outcrop around Ord on the Sleat peninsula, on the lower flanks of the granite Red Cuillins, but only a few short caves are recorded here.

The Strath Suardal caves are generally short but display interesting morphological features. This is especially visible in Coille Gaireallach and Allt nan Leac, where cave plan and passage form are influenced both by granite/limestone contact and frequently occurring dolerite dykes. Magnetite is also present along the granite/limestone contact around Beinn an Dubhaich, with magnetometry studies into granite-carbonate contact suggesting the presence of magnetite-bearing skarns at no great depth below the present level of erosion (Ryder 1995, 3).

The first forays into Skye's limestone caves took place in 1947, with geological survey around Beinn an Dubhaich by the Northern Pennine Club, followed by the University of London Caving Club and the Irish Speleological Association's low-grade surveys of Beinn an Dubhaich Cave in the 1960s (*ibid.*, 4). Activity by a number of speleological groups intensified between 1968 and 1974; and it was during one such trip in 1972 that John Sanders and a party from UCLSS discovered the High Pasture Cave system – or *Uamh an Ard Achadh*, the second longest cave in Skye. A detailed survey of the cave system was made by the Moldywarps Speleological Group in August 1973 (Ryder 1974), and it is this survey which is used throughout this publication (Fig. 2.4, below).

2.2 Approaching the cave

The Durness limestone of High Pasture Cave is specifically a dolostone of the Ben Suardal Member of the Strath Suardal Formation of the Durness Group. The area is also characterised by abundant Palaeogene (Tertiary) dolerite dykes, seen crosscutting the limestone in the cave itself, forming wall-like projections that subdivide the space into well-defined sections. Dolerite dykes also form cave passage walls when the cave direction turns to parallel their orientation. Immediately around High Pasture are large intrusions of granitic basement rocks (the Red Cuillin or Eastern Red Hills Centre) and, not far away, the gabbroic Black Cuillin forms an impressive craggy backdrop. The proximity of these high temperature igneous intrusions has modified the limestone, locally recrystallising it to marble. To the west are poorly exposed, well-bedded sequences of Jurassic fine-grained sedimentary rocks, sandstones, siltstones, and mudstones/flagstones, overlain by the Palaeogene lava pile (Fig. 2.1). To the south and the east are exposures of Torridonian sedimentary rocks: sandstones, arkose, and conglomerates. Further south are the metamorphic rocks of the Sleat Peninsula with Lewisian gneiss overlain by Moine metasediments, mainly quartz-rich psammitic schists (Bell and Harris 1986).

The low-lying Strath Suardal valley is dominated by granite and granophyre mountains of the Eastern Red Hills Complex (*ibid.*, 84–93) including the Beinn na Caillich Group (732 m) to the north; while Beinn an Dubhaich (235 m) is a Tertiary granite intrusion splitting the western

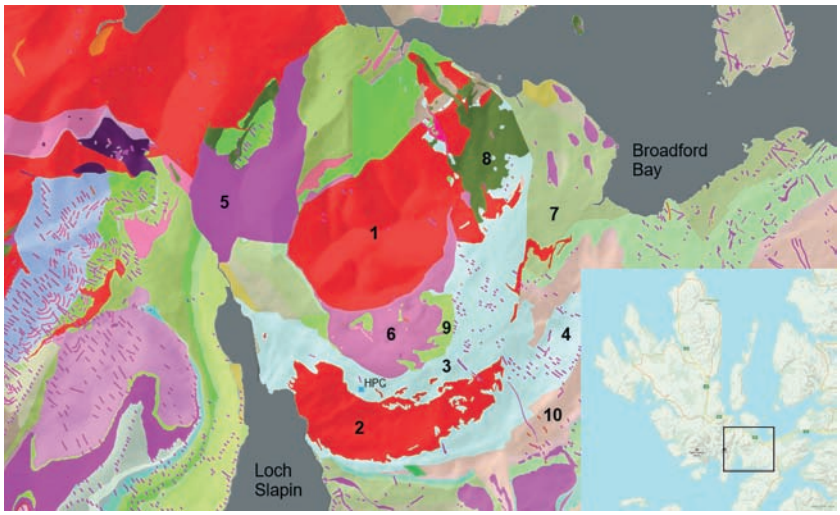


Figure 2.1. Map showing the varied geology of the Central Cuillin Complex & Strath Suardal with location of High Pasture Cave highlighted (extract from BGS GeoIndex DiGMapGB-50 Bedrock Geology 1:50 000 (© BGS 2024). Key: 1. Ben A Caillich Granite (Skye Eastern Red Hills), granophyric; 2. Beinn An Dubhaich Granite (Skye Eastern Red Hills Centre), granophyric; 3. Kilchrist Member Dolostone; 4. Ben Suardal Member Dolostone; 5. Beinn Na Cro Granite (Skye Eastern red Hills Centre), porphyritic; 6. Kilchrist Pyroclastic Rocks (Skye Eastern Red Hills Centre), pyroclastic-breccia & trace rhyolite & rhyolitic tuff; 7. Broadford Beds Formation, dominated by carbonate rocks, calcareous mudstones, & mature sandstones; 8. Broadford Gabbro (Skye Eastern Red Hills Centre); 9. Kilchrist Hybrids (Skye Eastern Red Hills Centre), igneous rock; 10. Aplecross Formation, sandstone; HPC. High Pasture Cave complex

end of the Durness Limestone (Ryder 1995, 3). The granite slopes are generally steep, while the limestone southern escarpment of the Strath is more gently angled, rising to the summit of Beinn Suardal (380 m). These limestone deposits are shot through with igneous dykes, the reason for the generally relatively short length of the many caves in the area. Closer to High Pasture, Durness Limestone shows intrusions of granite, syenite, granophyre, and allied types with overlying boulder clay and morainic drift (British Geological Survey (BGS) 1977; 1979). The boulder clay, termed karstic clay in this volume, derives from the weathering of limestone: a distinctive light yellow to orange, gritty sediment.

The geological map (Fig. 2.1) greatly simplifies the lithological complexity which gives the High Pasture rockscape such a varied appearance. For example, 'granite intrusions' are further divided into five different types, as well as complex heterogeneous marginal facies (BGS 2005). Textural variations within groupings and differential weathering results in greater diversity still.

The topographic diversity of High Pasture – a mountainous area, in a coastal setting, featuring a surface stream – is also a facilitator for rich geological resources, from solid, *in situ* exposure, to glacial and other drift deposits, reworked material as coastal shingle and riverbed pebbles, and materials in the cave itself. The site is only a kilometre from the shore of Loch Slapin, featuring an impressive shingle beach of waterworn cobbles and pebbles: a high energy storm beach deposit where nature has already put various lithologies to the test, leaving only the most durable rock types (McGibbon, this volume, Section 12.3.2). Around the cave itself, the terrain is littered with loose blocks shed by nearby granite exposures and rounded boulders and slabs most likely glacially transported to the locale. These mildly abraded, angular granite blocks are used for field walls in the vicinity today and are also the most common material utilised in the stone-built structures identified at High Pasture.

2.3 A journey through High Pasture Cave

High Pasture Cave sits to the west of Coille Gaireallach woodlands: a small limestone outcrop marked by a neat, incised stream flowing in a shallow valley between ridge and sloping ground which rises steeply up the northwest facing flanks of Beinn an Dubhaich. At NG 5142 1970 the stream sinks into gravel, and it is this water source which flows through the cave. Around 25 m from the mainstream sink is the present cave entrance, a locus for small shake holes long used as dumps for the modern rubbish found within the cave.

A climb down through a 2 m boulder ruckle, flanked by slumped glacial till, accesses the cave entrance which is now covered by a wooden trapdoor. On the upstream side, water flows through impassable beddings and along the cave passage. Working downstream, the roof is aligned along a bedding plane for some 10 m before bending right and reaching the first of many igneous dykes that cut across the passage. Like most, the first dyke is fine-grained, dark-coloured, and friable, of varying thickness,



Figure 2.2. Left: cruciform cross-section (section c on Fig. 2.3), showing initial phreatic formation & subsequent vadose incision; right: image showing where passage cuts through an igneous dyke, offset by faulting, looking upstream

and does not seem to have inhibited the development of the cave which punctures through it. The passageway has a rounded, cruciform profile, showing the effect of phreatic solution beneath the water table at a point of intersection between a vertical fault plane and a horizontal bedding plane and the subsequent development of a vadose channel below – forming the classic 'keyhole' cross-section. The roof and walls of the stream passage here are decorated with speleothems (Fig. 2.2, left).

The start of a pronounced pool with a rock shelf to the right is indicative of focused vadose incision on the left-side of the passage. A particularly wide section is covered with clastic deposits (Locality A, see Fig. 2.8), indicating a weakness in the cave wall at this point – perhaps a tight, choked equivalent of Bone Passage, which it parallels. Beyond the pool, another igneous dyke is dramatically offset to either side of the passage due to faulting (Fig. 2.2, right). The passageway then bends sharply right, and 8 m beyond this is a short passage on the right. This is Bone Passage, the heart of the High Pasture site, and an additional, higher sink point within the cave in times of high-water discharge.

Beyond this junction, the left of the passage shows an oxbow where vadose incision has moved to the right, and a phreatic 'teardrop' cross-section, again with a small amount of vadose incision in the floor (Fig. 2.4A). Another junction sees the stream flow sharply right, and the older passage continuing its previous line. A deep pool marks another igneous dyke, until the passage is blocked by a calcite and boulder choke.

Back at the streamway, the passage widens as the ceiling height falls dramatically to a short 'crawl and a duck' section of passage with low airspace (Fig. 2.3). Usually with around 0.2 m of airspace above the water-level, in high-water conditions this section of passage fills to the roof. Beyond this, the active streamway occupies passages more noticeably vadose in character, although elements hint at their phreatic origin. Cave cross-sections are more angular as the roof follows a horizontal or inclined surface, representing bedding or thrust planes. 30 m of dykes and interconnected pools leads to another choked, higher-level passage on the left as the ceiling height rises dramatically. This passage descends to the active streamway along the line of a rift, its floor covered in clastic deposits and its wall and ceiling decorated with speleothems. This is probably the same choked side passage as earlier, separated by a major roof collapse, now calcited over (Fig. 2.4B).

Ten metres beyond this junction, the stream plunges over a 3 m high waterfall (Fig. 2.4C) where another large igneous dyke crosses the entire passage - roof, walls, and floor – indicating that, once more, the stream has punctured through the intrusion rather than changing course to flow along or around it. Downstream from the waterfall, the cave passage (the Lower Streamway, Fig. 2.3) is characterised by intermittent high-level phreatic tubes and oxbows, now located at some height above the actively incising stream (Fig. 2.5D). Where the passage has been widened by lateral stream erosion, roof breakdown has modified the original passage cross-sections, and igneous intrusions form several sections of passage wall (Fig. 2.3),

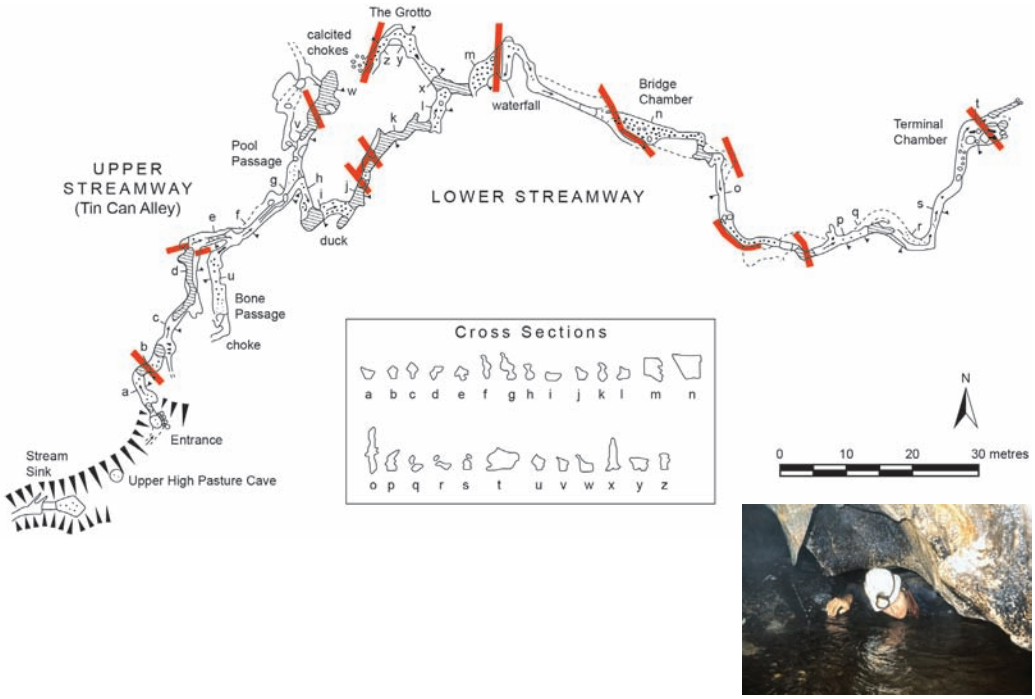


Figure 2.3. Plan & cross-sections of Uamh an Ard Achadh, taken from the MSG survey (BCRA Grade 5c) BCRA Grade 5 (is a survey grade) a magnetic survey with horizontal and vertical angles measured to +/- 1 degree; distances observed and recorded to the nearest cm and station positions identified to less than 10 cm by A. Riles & P.F. Ryder (1973). Igneous intrusions (dykes) are shown in red; inset: caver negotiating the 'duck' in low water conditions

guiding the orientation of its development. In other localities, the cave passage has once more cut through the intrusions.

Eventually, some 200 m from the entrance, Terminal Chamber is reached. This sizeable space (4 × 3 m), floored in breakdown blocks covered with clastic deposits, contrasts with the narrowness of the streamway and contains 2 m deep sediment sections along with debris and silt indicating that the chamber floods to the roof in high water. The stream drains through a small sump and a choked rift a few metres below the boulder collapse at the head of a shallow valley (NG 59541 19767), blocking what clearly was once the main resurgence for cave water (Fig. 2.5).

2.4 Shaping a cave I: geo-chronology

A feature of the High Pasture system is the number of igneous dykes that crop out in various orientations in the cave walls, ceiling, and floor (Fig. 2.3). While sometimes the cave passage runs along the dyke, which then forms one of the passage walls, the dykes often transect the passage. How was the cave able to form along its present orientation, essentially having punctured through igneous rock? Close examination of several dykes shows that they are often relatively thin and readily break up into small, angular fragments easily removable by hand. Although likely impenetrable barriers in the initial stages of cave formation, localised zones of weakness might have been exploited chemically under raised hydraulic pressures until water was able to penetrate. Subsequent faster water flow, as the local water table was drawn down by glacial erosion, and isostatic uplift and fluvial incision in Glen Suardal would have seen further dyke breakdown at these points of failure. This hypothesis is hard to test, but throughout the High Pasture system, igneous intrusions appear to have often offered a path of lesser resistance to erosion (other than by carbonation/solution) than the local dolostone. In certain locations, the presence of a dyke has had significant influence on cave morphology. The waterfall separating Upper from Lower Streamway cascades over one such intrusion, where a particularly erosion-resistant dyke has acted as a barrier to stream incision upstream.

A survey of passage cross-sections along the cave's length clearly indicates that much of the cave was formed phreatically (*i.e.*, by solution, below the local water table). This is particularly noticeable in the Upper Streamway, upstream of the duck. Downstream of the waterfall, the cave exhibits stronger vadose development, the stream actively incising the bedrock due to abrasion and hydraulic action. Here, phreatic features are left hanging above the present passage floor, showing initial cave development below the local water table before its lowering by (presumably) glacial erosion and subsequent post-glacial re-adjustment.

Ryder (1974) suggests three developmental phases at High Pasture: a possibly 'Pre-Glacial' phase represented by the dry side passages and high-level oxbows; a possible



Figure 2.4. Passage showing 'teardrop' cross-section (at section g on Fig. 2.3): A. the pillar by the caver is a remnant between two parallel phreatic tubes, subsequently breached to form the present passage; B. gravel infill over breakdown choking the end of the downstream high-level side passage, with speleothems; C. waterfall over igneous intrusion, from below; D. high-level phreatic oxbow in the Lower Streamway

'Pre-Glacial' or 'Inter-Glacial' during which the active streamway was created; and some 'Post-Glacial' cave passage development. However, it seems more likely that some contemporaneous development of cave passages took place, at more than one level, by solution along planes of weakness at various levels beneath a single water table. Between cross-sections 'n' and 'o' (Fig. 2.3) there are two distinct cave passage levels, a lower formed or forming when water was moving through the upper. The almost continuous presence of an upper series of passages as high-level canyons or abandoned oxbows high on the passage walls along the Lower Streamway is strong evidence for a single, formerly active streamway flowing along this path in vadose conditions. It could be that for much of its life the cave resurged at the valley head, close to the Terminal Chamber, and this set the local water table level. A subsequent period of down-cutting created the present active passages of the Lower Streamway, but perhaps not solely to glacial and post-glacial erosion outside: Ryder's survey shows that the waterfall head is approximately at the height of the upper passages downstream from it. This resistant dyke has thus prevented waters cutting a new base level upstream and the development of a lower passage level in the Upper Streamway.

High Pasture Cave's entrance lies at *c*. 60 m OD, and the former resurgence at *c.* 50 m OD. This shallow incline in the local topography is mirrored within the cave. To test how close the cave passages come to the surface, GPS and barometer survey created a spread of surface altitude points through the path of the main cave passage. This is superimposed onto the cave elevation (Fig. 2.7). The roof of the cave passages come remarkably close to the ground surface at a number of points, especially near the calcite chokes separating the two high-level passages in the Upper Streamway (only 5 m). However, there is no sign of a former stream sink, which would have some bearing on the chronology of the Upper Streamway and Lower Streamway passages. This, and their relationship to the complex, multiple glaciation events of this area during the Pleistocene, could only be determined by U/Th-series dating of speleothems from the cave.

2.5 Shaping a cave II: sedimentary facies

Caves are natural repositories for deposits of all kinds and analysis of sedimentary sequences can inform on the local palaeo-environment at the time of deposition, as well as on cave system development. High Pasture contains



Figure 2.5. At the head of the dry valley, a few metres above Terminal Chamber

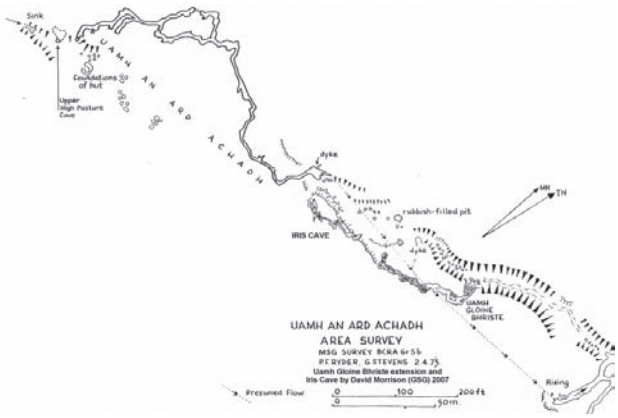


Figure 2.6. Karstic drainage in the Uamh an Ard Achadh area (after Ryder 1995, 31)

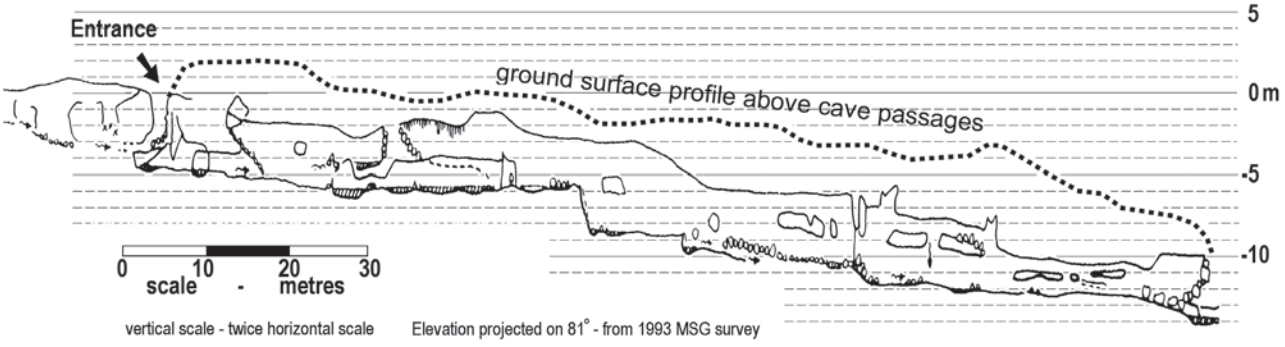


Figure 2.7. Longitudinal section along High Pasture Cave showing the measured surface topography

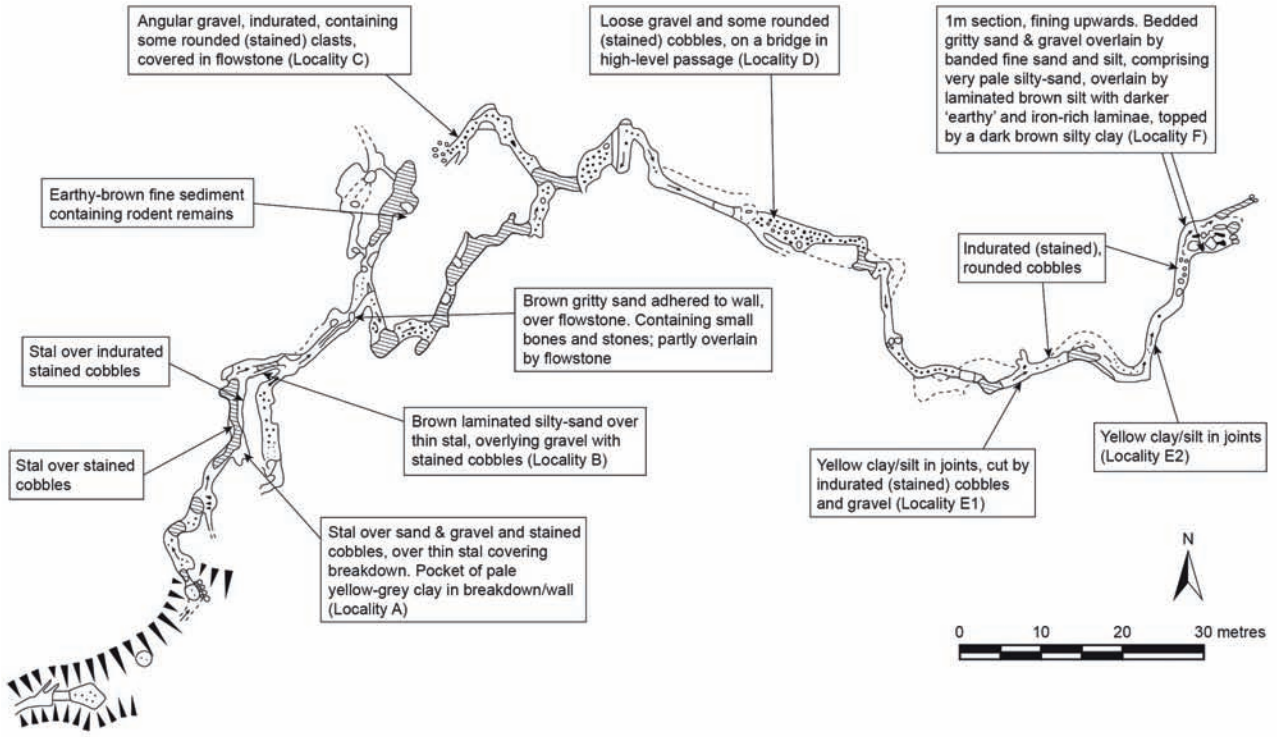


Figure 2.8. Summary of main clastic deposits in the cave & the key described sites

clastic sediments and speleothems at various locations and survey identification of significant clastic deposits and the characterisation of these into sedimentary facies allowed a schematic sedimentary sequence for High Pasture Cave to be proposed. Six localities with good representative sections of the sedimentary sequence were sampled, as well as surface sediments near the cave entrance and glacial deposits between the boulders within the entrance climb. Textural and lithological analysis of coarser deposits was undertaken, with the latter giving the most useful characterisation of variability and potential provenance of cave material. Fine deposits were analysed for organic content (loss on ignition) and carbonate content.

Figure 2.8 is a summary of the main exposures of sedimentary deposits in the cave. The full sedimentary analysis is summarised here. Facies 1 is a pale brown silt seen in isolated, sheltered crevices and pockets in the cave wall. This is truncated by Facies 2, a mixture of cobbles and gravel, perhaps the coarser fraction of a more extensive deposit whose finer fraction has been winnowed away by flowing water, its dark staining likely representing an oxide of magnesium or manganese derived from humic-rich, peaty groundwater, not uncommon in Scottish caves. Facies 3 is a mottled red-brown gritty sand and gravel, and Facies 4 a laminated dark grey to brown silt, invariably found at the top of sediment sequences in sheltered parts of the cave (*e.g.* Terminal Chamber). This appears to have been washed into the cave by groundwater via fissures in the local rock, then deposited in low energy conditions in ponded water. Facies 5 comprises angular or sub-angular blocks of dolostone – a breakdown deposit derived from spalling or collapse of the cave roof or wall.

Locality A: On a shelf on the right wall of the main cave, the oldest sediment is a pocket of pale silt indicating deposition in ponded water or a flooded cave passage. Doubtless truncated by fluvial erosion, this is only found within this and other wall pockets about a metre above the cave floor. Cutting across these fine deposits is a lag layer of angular boulders and cobbles with frequent calcareous concretions, overlain by a very thin layer of flowstone. Above this is a mixed red-brown coarse sand and gravel, again overlain by flowstone. The gravels are in turn sealed by a layer of 'earthy' brown silty sand containing small fragments of charcoal in its lower portion.

Locality B: On a similar shelf on the right-hand wall, immediately upstream of the junction with Bone Passage, a lower gravel unit contains dark-stained cobbles with frequent water-worn edges, indurated with calcite, and topped by a thin flowstone layer. Above this is a brown silty sand of variable thickness.

Locality C: A ledge in the high-level choked passage beyond the duck contains indurated angular gravel



Figure 2.9. A. Indurated gravel & breakdown choking the back of The Grotto, Locality C; B. locality D in upper level passage; C. close view of sediments at Locality D; D. joint infill at Locality E2

with large breakdown blocks (Fig. 2.9A). These are a mix of erratic lithologies and material from local dykes and are covered in places with more recent speleothem deposition, with *c*. 20% of clasts being calcareous concretions. This is the only locality without dolostone clasts – only chert.

Locality D: In a passage within the upper level of the lower streamway in Bridge Chamber, this deposit consists of loose igneous gravel with some rounded cobbles indicating fluvial transportation (Fig. 2.9B and C). Although there is an igneous intrusion on the south side of the passage, the position of this deposit high above present stream levels may represent deposition in vadose water flow in an earlier stage of the cave's development. Dark staining of igneous material supports the view that the dark-stained clasts reflect greater age and longer transportation paths prior to deposition.

Locality E1 and E2: Wall joints contain yellow silt or clay, truncated by stained and indurated cobbles and gravel which may reflect an earlier phase of deposition (Fig. 2.9D), related to the silt base of the sequence at Locality A.

Locality F: The Terminal Chamber sediment is the thickest in the cave: a laminated sequence of silt and silty clay overlying fluvial fine gravel with a sand matrix, deposited on bedrock. The lower gravel is finer than those seen elsewhere in the cave. It is likely that the finer gravel has eroded into and incorporated clasts from the older lag gravels deposited in the cave at this point, with layers draped progressively over existing surfaces, reflecting successive flooding events in the chamber and subsequent deposition of sediments in suspension. Distinct iron oxide-rich laminae suggest surface drying between phases of deposition, rather than sediment flowing into a permanently ponded cave passage.

The underlying gravels show good stratification and likely represent vadose water flow through the cave, prior to the collapse of the surface at what was then the resurgence, at the head of the dry valley. Two samples from the gravel are similar in composition, and directly comparable to basal till from near the cave entrance. The contact between gravel and overlying silt is sharp, indicating a change in sedimentation via flowing water to ponded. Samples from this unit showed a high organic component, and darker laminae become more prevalent to the top of the sequence, probably reflecting increased input of material derived from soil development on the surface.

2.6 Remaking High Pasture Cave: the sedimentary sequence

Figure 2.10 shows the postulated lithostratigraphy of High Pasture Cave, based mostly on a combination of Localities A and B, which lie *c*. 10 m apart. As the sediment exposures are fragmentary and intermittent, there could theoretically be more than one discrete deposit of each of these key layers. However, no such replication was observed.

The oldest, very sparse deposits are the pale silts found in wall pockets and joints. We can only speculate that these fragmentary deposits once formed a continuous layer through the cave system – they may reflect deposition below the water table during early stage phreatic cave development but are more likely to represent deposition in flooded passages beneath an ice sheet, derived from subglacial abrasion, washed in via fissures and joints by meltwater.

These units are truncated by a fluvial gravel/cobble unit, indicating active water flow. This change in fluvial conditions would indicate cave draining as water tables lowered and passages opened up. This may reflect Late Glacial and Post-Glacial conditions, with surface collapses due to unloading upon deglaciation perhaps contributing to vadose conditions within the cave. The gravel is

1	Pockets of pale olive-brown to brownish-yellow silt	Facies 1
2	Breakdown boulders and cobbles	Facies 5
3	Lag gravel of stained, rounded clasts	Facies 2
4	Brown to red-brown gritty sand and gravel containing inclusions from the lag gravel below	Facies 3
5	Brown silt with paler laminations containing occasional flecks of charcoal	Facies 4
6	Earthy-brown silt, often laminated	Facies 4
7	Speleothem deposits	

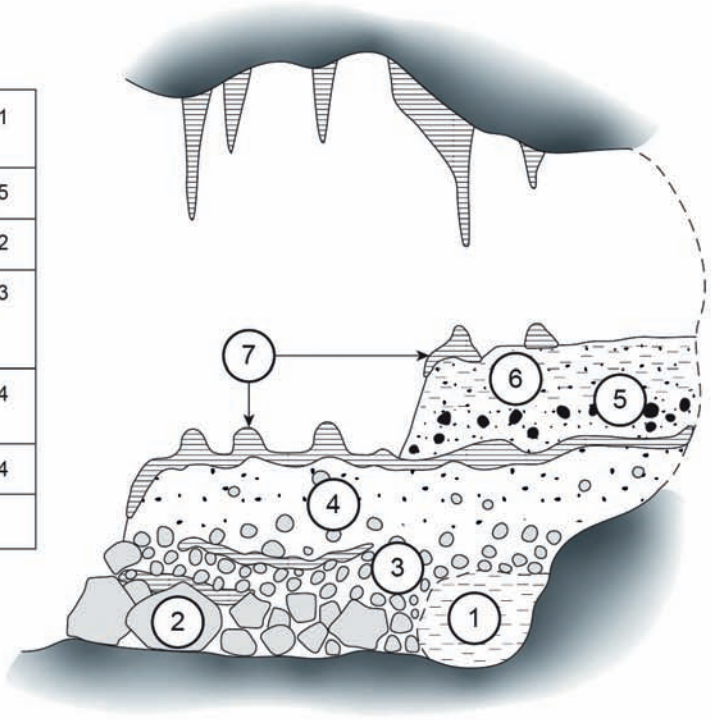


Figure 2.10. Schematic lithostratigraphy for High Pasture Cave

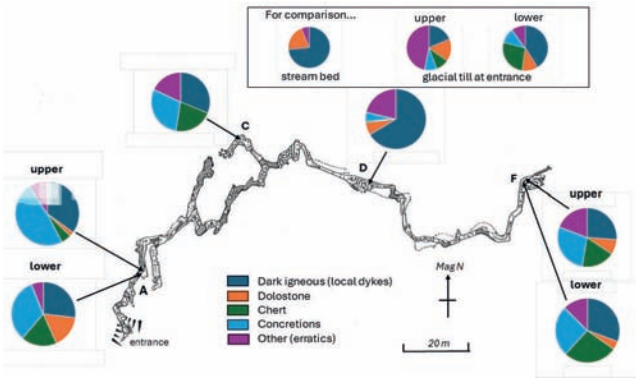


Figure 2.11. Lithological analysis of gravel clasts in gravel samples from within & from the immediate vicinity of the cave

likely a lag deposit, with finer particles winnowed away by flowing water, and dark staining indicating extended immersion in peat-rich water. Calcite indurations, now found preserved on small shelves and benches beside and above the active streamway, indicate quieter phases punctuating episodes of water flow as deposits built up.

Facies 3 deposits indicate water flow in vadose conditions. Gravels deposited on either side of the present channel, and subsequently truncated by more recent streamflow, show good sorting of individual strata, and suggest deposition at a time when sediment supply from the surface was greater than at present – perhaps during the Late Glacial/early Post-Glacial, before ground surfaces became heavily vegetated, or perhaps during one or more periods of harsher climate during the Holocene. Study of clast lithology of >20 mm fraction at selected sites is shown in Figure 2.11. Individual samples show variation in proportions of lithologies present, but there is no clear pattern. Most samples are dominated by locally derived clasts. Erratic lithologies (mainly red sandstone and granite clasts) are present in all samples and can only have been derived from surface glacial deposits.

Subsequent sediments (facies 3 and 4) are most likely to have been deposited since the last glaciation. However, without dating speleothems identified beneath these layers, absolute chronology is speculative. Some Facies 2 gravels may also be Late Glacial. Facies 4 deposits indicate a significant period of quiescence, when water periodically ponded, possibly flooding the Lower Streamway to its roof. Pulses of fine-grained sediment washed in via joints and fissures make a laminated sequence draped across the pre-existing surface, with significant organic content indicating surface vegetation, and rudimentary soil development. Many laminae show signs of iron oxidation, implying drying out of the sediment surface between ponding events. This multiphase depositional history – ponding water during the last ice sheet, de-glacial streamflow, and periodic flooding and streamflow during the Holocene – culminates in the arrival of human groups via an entrance accessing Bone Passage. They appear to have tried to divert floodwaters away from this entrance with the construction of a number of stone walls. Some of the interstitial fine-grained deposits excavated from Bone Passage are similar in colour and texture to the upper Facies 4 deposits, which themselves contained flecks of burnt vegetation probably reflecting nearby surface human activity.

3

The cave in the site: passage, precinct, stairwells, and periphery

3.1 Introduction

Although at the heart of the site, and the core of the excavation, the High Pasture complex is about far more than just the cave. Four main areas, forming discrete zones in both a physical and contextual sense, make up the site – the cave passage, the natural hollow forming an 'amphitheatre' of intensive activity just outside it (referred to as the 'precinct'), the stairwells, and the wider periphery of surface archaeology. This chapter introduces these very different areas and the way in which both the excavation (and this subsequent publication) was shaped by the challenge of interpreting this uniquely three-dimensional site.

Interpreting the relationship between the deposits recovered from (especially) the cave and the precinct, and thus building the story of the site, was complex. In particular, the specifics of formation processes and subsequent taphonomic impacts within the cave environment versus within the much deeper, yet surface-located precinct sequences, was challenging. As the excavation progressed, the importance of a fifth 'zone' – the cave entrance itself and the point of contact between precinct and cave – became apparent. Which came first: the creation of the steep, twisting staircase as an essential means of retaining access to the cave as the rich deposits of ash and stone built up within the precinct or the perception of High Pasture as a place of increasing monumentality, with both precinct deposits and the staircase through them elements of an increasingly curated space?

3.2 Visualising the High Pasture complex

Visualising the complex of surface and subterranean elements which make up the High Pasture site was challenging – and presenting its excavation for publication was even more so. This is perhaps compounded by the necessary excavation methodology. Working outwards from the primary discoveries within Bone Passage, initially guided largely by geophysical survey, the High Pasture excavation comprised a mosaic of several trenches and a necessarily 'stepped' approach to removing the archaeological deposits of precinct and surface periphery in an inaccessible location with no option for mechanical assistance. Opportunities for area and phase photographs was limited and larger boulders had to remain within the trenches. In particular, as excavation within the limited space of the precinct hollow reached their greatest depth, extracted stone – a staggering amount – had to be stacked within adjacent areas, again making it difficult to achieve clear photographic records of the excavation by phase.

A detailed series of schematic digitised plans and overlays by phase or sub-phase stands in for these gaps in the photographic record, assembled using the excavation drawings alongside the photo record: essentially, a reconstruction sequence. These schematic plans, along with the detailed reconstruction drawings which complement them, present a general picture of the surviving archaeology, especially relating to the built structures. In conjunction with this, distribution plans relating to artefacts and disarticulated human remains illustrate the evidence for structured deposition seen in both cave and precinct. Most important of all are the reproductions of the complex sections, especially those recorded through the precinct. These are simplified to phase in the section illustrations (the 'stratigraphic blocks' introduced in Chapter 4 provide a more detailed overview including sub-phase) via a colour system which ties into the simplified matrices showing the related chronology devised for cave, precinct, and surface (see Fig. 4.4). All individual cut features are included in this volume except the numerous natural scoops initially thought to be shallow truncated pits.

The complexity of this relatively small site is simplified via a 3D illustration showing its core configuration – here using the example of Phase 4 (Fig. 3.1). A person, shown standing within Bone Passage, provides a relative scale. The following sections take a tour through the morphology of these different site areas.

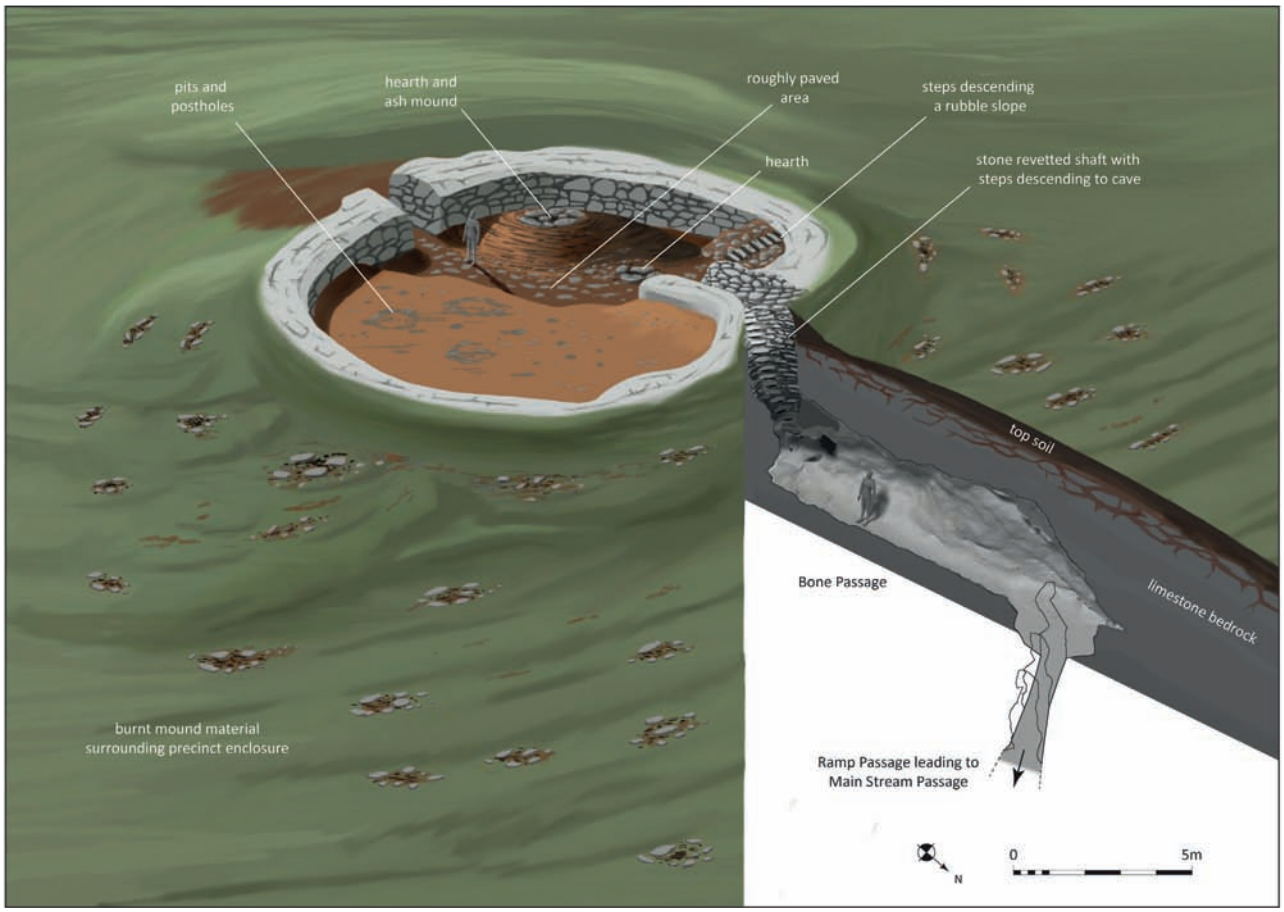


Figure 3.1. Schematic view of the High Pasture Cave complex during Phase 4c, showing the relatively small footprint of the site in plan, & a cut-away of the stairwell & Bone Passage

3.3 The four site areas

3.3.1 The cave

The natural cave is at the heart of the High Pasture complex and includes *c*. 320 m of underground passages (Fig. 2.3), most of which comprise a linear, active streamway, described in the previous chapter. A short section of low, wet passage, *c.* 50 m downstream of the caver's entrance, which fills to the roof during periods of heavy rain (Fig. 2.3), appears to have formed a natural barrier to activities beyond during prehistory, with all identified archaeological deposits upstream of this feature. Material associated with the use of the active cave passages includes a deposit of cattle bone, representing a single animal, placed on a ledge over 2 m above the stream level. The partial remains of a second individual were placed within a boulder choke at the end of a usually dry section of fossil passage, its floor *c*. 1.2 m above the stream level. These locations, accessed through Bone Passage or via the caver's entrance, are completely dark and would have required artificial lighting. The focus of activity underground was a section of fossil passage heading southwest off the main streamway, 40 m downstream of the caver's entrance and *c*. 1.6 m above the active stream level. This was named Bone Passage (Fig. 2.3; Fig. 3.5, below).

3.3.2 Bone Passage

This was initially accessed by a step-up of *c.* 0.8 m from the active streamway. A short, narrow section of passage (the 'Ramp'), *c.* 0.6–0.7 m wide and up to 2.4 m high (see Fig. 1.5, right) ascends to a junction. A boulder wedged in the passage at this point forms a constriction where it is necessary to crouch down and squeeze sideways to enter the larger passage beyond (Fig. 3.3 inset). Aligned NNW–SSE, the main section of Bone Passage is 9.2 m long and displays a wide range of cross-sectional profiles over its short length (Fig. 3.2).

From the original entrance at the SSE end – an irregular aperture 2.5 m wide by 1.8 m high (Fig. 3.7, below) – the first section of Bone Passage is the largest: a chamber 3.5 m long by a maximum of 2.4 m wide and up to 2.3 m high. The chamber reduces in width markedly towards its centre – 'the narrows' – where an igneous dyke in the east wall creates a pinch 0.7 m wide and 2.4 m high (Figs 3.3, 3.5). Beyond this section, the passage widens into a second chamber 2.7 m long by 1.5 m wide and

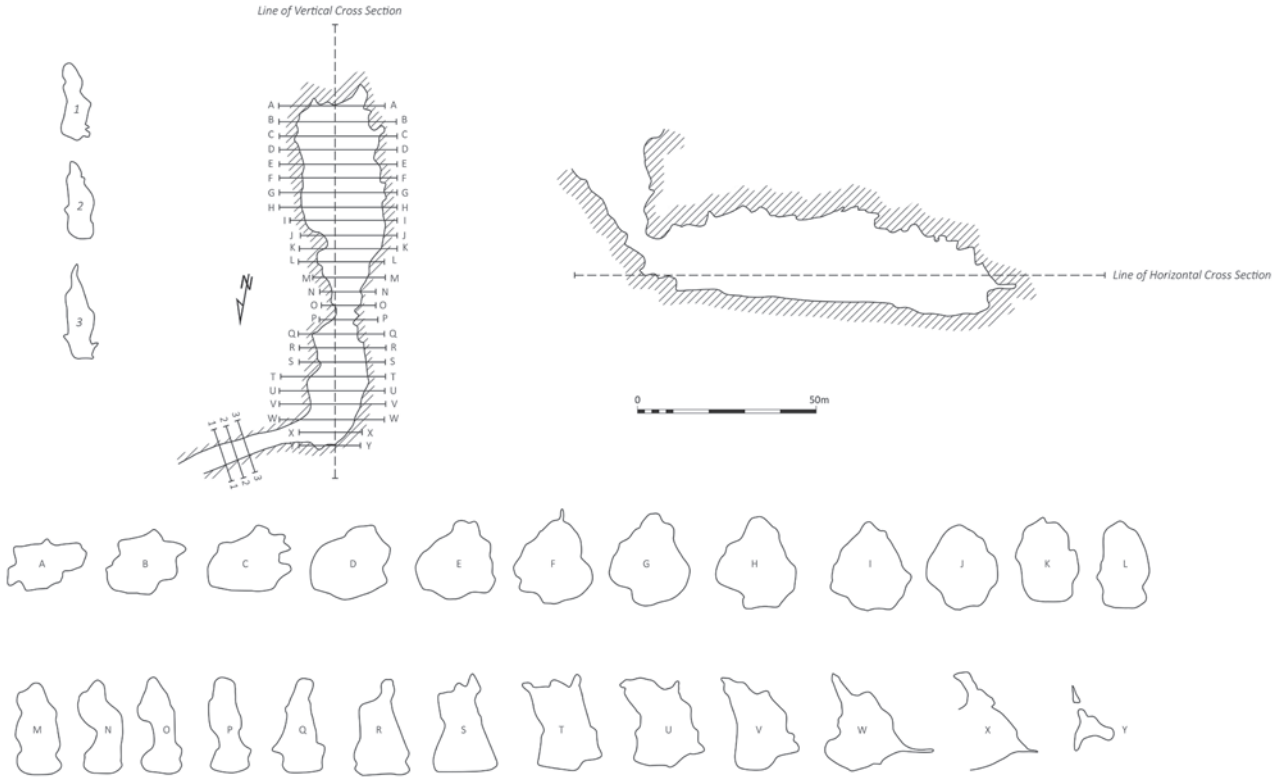


Figure 3.2. Bone Passage profile & cross-sections resulting from laser scanning data

up to 2.7 m high. Numerous solution cavities formed in the roof create an irregular profile. The Ramp leads off the end of the chamber to the right, while boulders and calcite block off what would have been a continuation of the passage to the NNW. Most of this blockage must have formed or been created during prehistory, the boulders possibly even placed at this junction to close off this continuation and guide access down the Ramp to the active streamway beyond.

Prior to the construction of the access stairwells (see Section 3.3.3), diffuse natural light would have penetrated to the junction of the Bone Passage and the Ramp. However, subtle differences would have been experienced during a traverse of the passage. The southern chamber received the maximum illumination: observation both early and late in the year, with the sun at its lowest horizon, showed natural light still penetrating the area immediately inside the cave entrance. Beyond the 'narrows', light penetration significantly reduced, although some reflection from the white calcite coverings on the cave walls was noticeable. Light levels available in the north chamber were much less and light is blocked considerably by a person moving through the passage. Traversing the Ramp and beyond, into the active stream passage would have required artificial light. Modification of the cave entrance, especially construction of the stairwell, reduced natural light penetration to a minimum, and this would have been even less were the access further closed off via wooden doors, animal skins, or other organic coverings.

Small areas of the walls forming Bone Passage include exposed limestone bedrock, but most of these surfaces are liberally coated with calcite deposits, creating a white to pale yellow textured surface (Fig. 3.5). Calcite formations also include areas of stalactite flows and curtains, their constant drips forming small stalagmite bosses and areas of calcite flow, especially in the northern chamber. When first discovered in 1972 (see Section 1.3) the calcite floor deposits appear to have been more extensive, but increased caving footfall since then has destroyed some of the more delicate features and formations. This was most pronounced in the southern chamber, where thin calcite flows had formed over the archaeological deposits in the cave at different horizons, possibly during phases of abandonment. In the north chamber, calcite flows had formed floors up to 30 mm thick, creating a hard, impervious barrier which required hammers and chisels to remove prior to excavation of the archaeological deposits below. This part of Bone Passage had witnessed no disturbance since the closure of the stairwell and cave during the Iron Age.

Laser scanning of Bone Passage (Figs 3.3, 3.4) to the junction with the streamway, recorded a total in-cave area of 26.6 m³ and, prior to the start of excavations in 2004, over half of this comprised archaeological deposits. These reached a maximum depth of 1.4 m at the SSE entrance end, where a wedge of material had formed from the

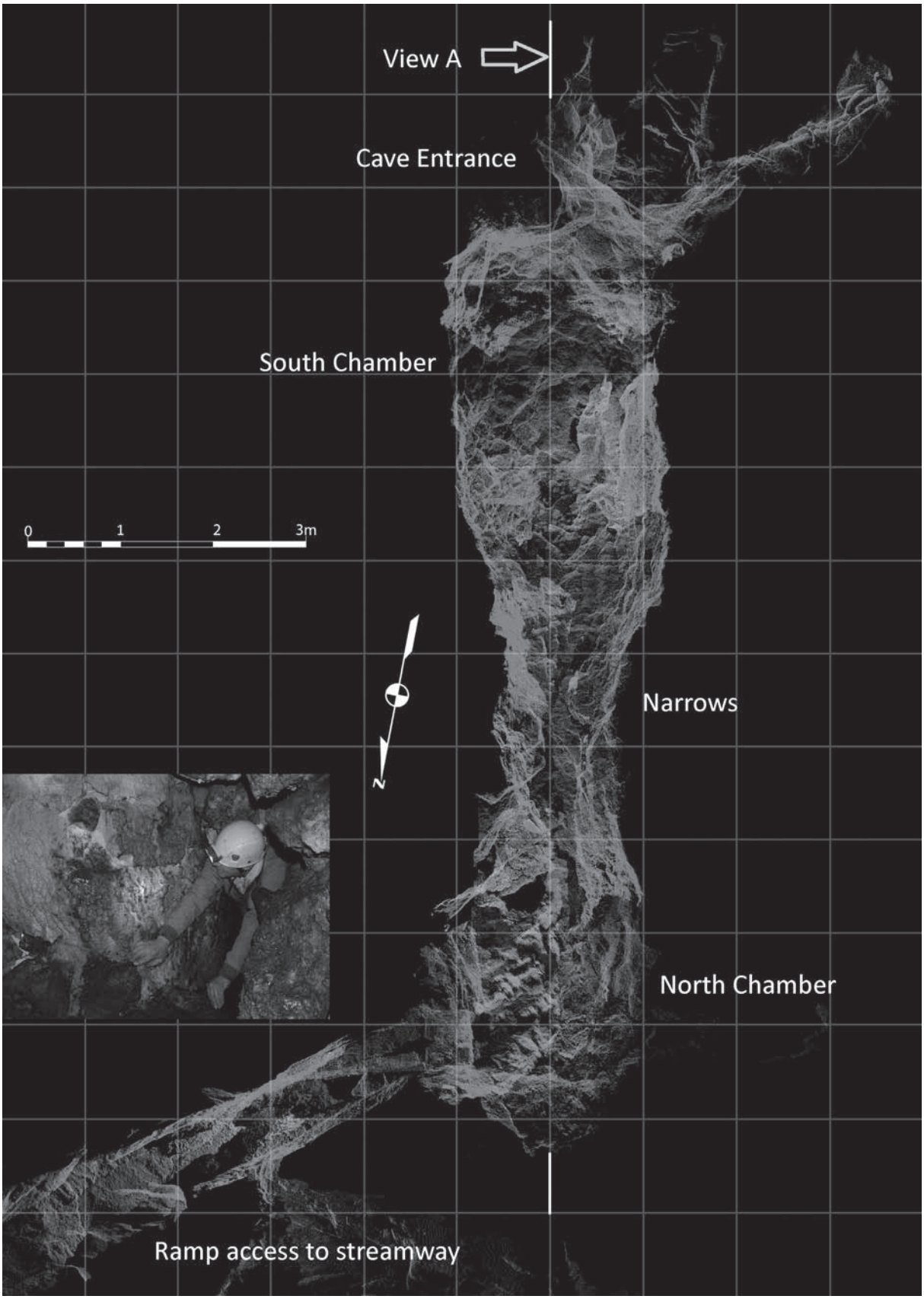


Figure 3.3. Laser scan showing plan view of Bone Passage & main features referred to in text. Inset showing Martin Wildgoose negotiating the narrow exit from the Ramp into the north chamber. View A–A shown in Fig. 3.4

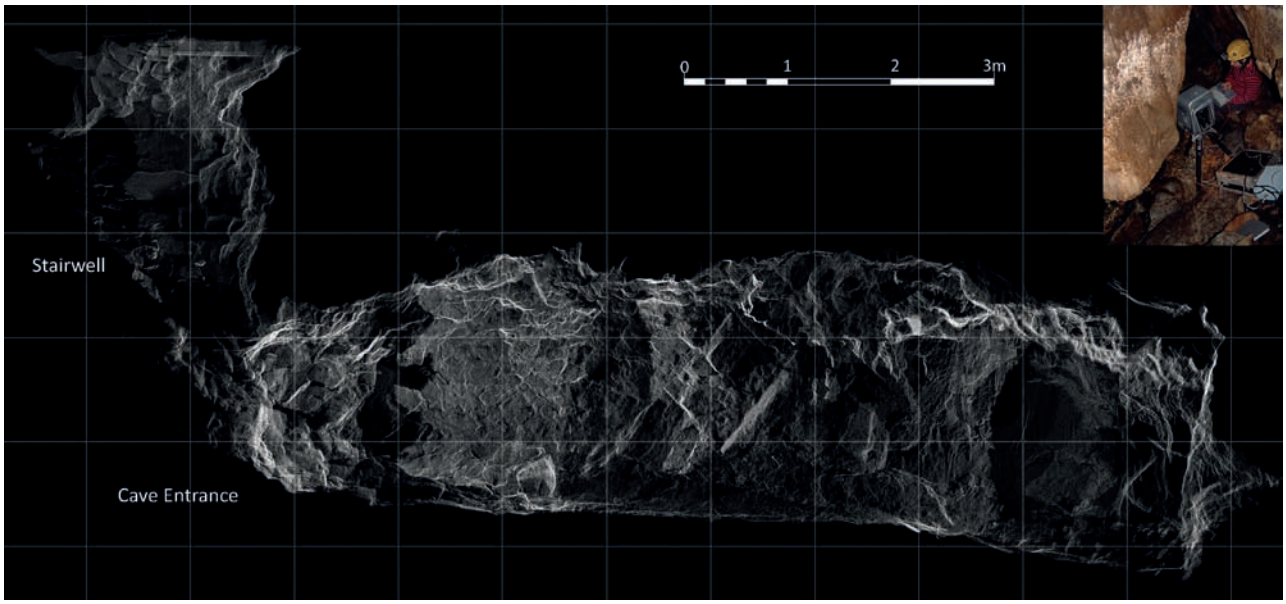


Figure 3.4. Laser scan (view A–A) showing profile of Bone Passage including stairwell F2.23 access. Inset image showing laser scanning taking place at the junction of the Ramp & mainstream passage by AOC Archaeology Group



Figure 3.5. View south through the narrows of Bone Passage to the base of the stairwell access showing calcite deposits on the cave walls

backfilling of the stairwell. These deposits thinned further into the cave, with around 0.8 m depth of material in the narrowest section. In the northern chamber, the bedrock floor had been eroded through water action to form a deep pothole where water-lain silts and gravels, and the overlying archaeological deposits, formed a sequence over 1.5 m deep. The earliest evidence for the use of the cave, during the Bronze Age, was recovered from this location. Deposits within the Ramp exit were shallow and eroded through footfall.

3.3.3 The cave entrance and stairwells

The cave entrance (Fig. 3.7) marked the liminal area demarcating Bone Passage and access to the passages beyond, and the natural amphitheatre, and later precinct enclosure. This transitional area between light and dark, was a focus for structured deposition from the Early Iron Age.

With the modification of the natural cave entrance and construction of a succession of stairwells between Phases 2 and 5, this particular area continued to form an important interface between the cave and precinct. The stairwell structures, which displayed enhanced monumentality through time, controlled access to the natural cave and underground stream. The structures probably housed a wooden door or screen, resulting in little natural light penetrating Bone Passage.

The design and morphology of the stairwells and their incremental modifications in height suggests a necessity to maintain access to the cave as the associated accumulations in midden and fuel residues in the precinct threatened to over-run the structures. One important aspect of the stairwells, which is reflected in the succession of hearths and their associated residues located in the precinct, is that the sequence of stairwells was also retained *in situ*, curated rather than being dismantled. With each modification,

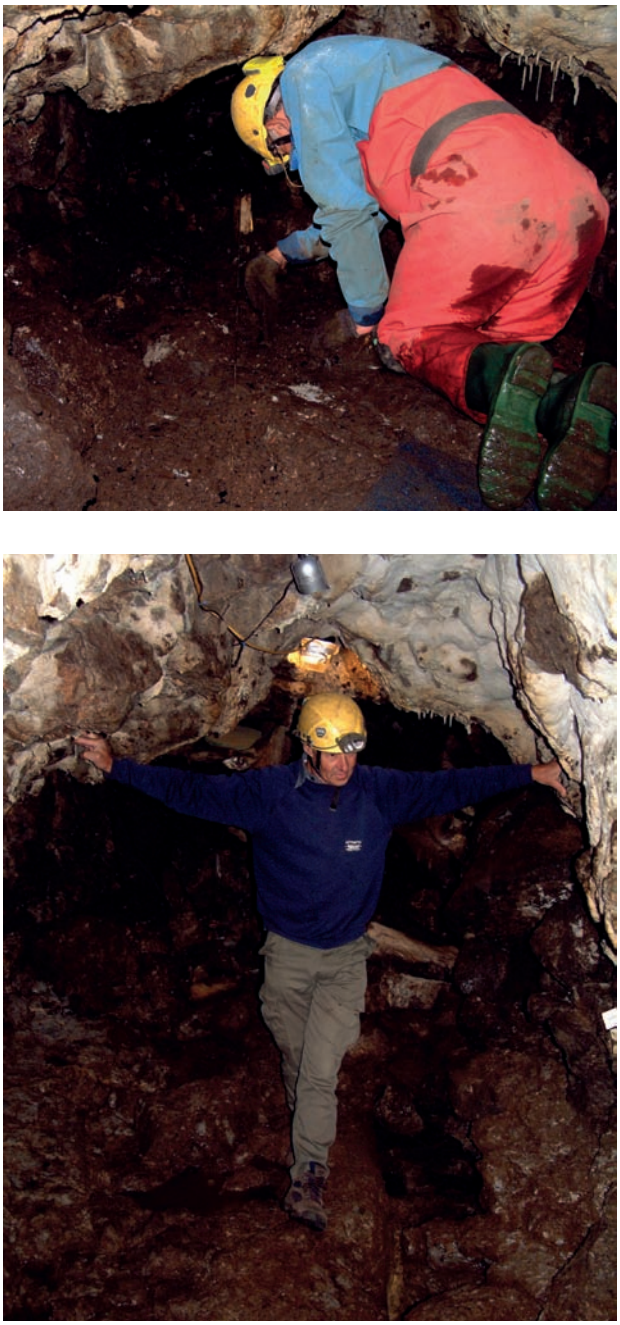


Figure 3.6. Top: the south chamber during excavations in 2006; bottom: the same location after removal of the last archaeological deposits in 2010

rebuild and elaboration, access to Bone Passage became more restricted, especially at the base of the stairwells, making the transportation of materials into the cave an increasingly difficult task.

A number of stone tools including saddle querns were incorporated into the fabric of these structures, while each successive modification and rebuild included evidence for structured deposition. These comprised a wide range of artefacts, along with specific animal bone groups (including elements from juvenile animals), that were placed under paved landings for the stairwells or within their wall cores. During Phase 6, the stairwell was backfilled preventing any further access into the natural cave and, after an intervening time period, became the focus of deposition for a combination of human and animal remains, signifying the final site closure.

Through time, the composite nature of the stairwells, along with voids within their stone structures, became a focus of subsidence and slumping of associated deposits within the northwest sector of the precinct. It is evident that these instabilities developed during the final phases of activity at High Pasture but continued after abandonment.

3.3.4 The precinct

Most major cave sinks are surrounded by a natural hollow or doline, where water running off less permeable bedrock contacts softer, more soluble limestone and penetrates the ground. They are usually distinctively 'teardrop' shaped, with a narrow stream entrance point widening into a hollow with the cave entrance at its deepest point, usually set in a cliff face. Stream volume, local geology, geomorphology, and soils all determine the size and shape of these natural amphitheatres, with that of High Pasture measuring 12.5 m N–S by 6.5 m wide, with a maximum depth of 4.5 m at its north end, where the cave entrance enters Bone Passage.

The cave entrance (Figs 1.7, 3.7) is surrounded by vertical to slightly overhanging friable limestone bedrock. To the east side, short bedrock steps punctuate a steep slope of the local karstic boulder clay, which gradually turns to the southeast to form a steep, short limestone face. At the base are two narrow openings in the bedrock, which would have accommodated water run-off during heavy rainfalls. The western arc of the hollow is slightly higher than the east, with a smoother slope formed of shattered limestone bedrock and boulder clay. The southern entrance to this natural amphitheatre has a shallow, dished profile, through which the stream originally flowed to enter the cave.

The floor of the hollow is comprised of rough limestone and granite boulders interspersed with gravel, all derived from the former streambed, its slope steepening as it nears the cave entrance where the stream would, once, have tumbled over larger limestone blocks. Over the time the cave system formed, the stream eventually created a new access route, abandoning the major point of entry discussed above. This action would be repeated through time, resulting in the amphitheatre only taking water as an overflow sink in extremely wet conditions.

Although threatened by flooding during periods of heavy freshwater run-off, the amphitheatre created a natural focus for activities from the Early Iron Age to the site's closure some 800 years later, and a 'precinct'



Figure 3.7. The modified cave entrance to Bone Passage, with threshold slabs constructed on the right side. This image was taken after the stairwell structures had been removed

to the cave itself. Structures inside the precinct hollow included a series of walkways, walls, the stairwell sequence maintaining access to the cave, and deep accumulations of associated residues containing a sequence of hearths. These structures and deposits eventually filled the hollow, creating an unusually deep, well-stratified sequence. The whole was defined and demarcated by a sequence of enclosure walls.

3.3.5 Areas outside the precinct boundary

The immediate area surrounding the precinct comprises gently undulating ground with limestone bedrock exposures and some well-defined igneous dykes breaking the surface. The topsoil, typically for this karst landscape is thin, averaging 0.15–0.25 m, with some deeper pockets of soil in isolated hollows. This rough landscape precludes invasive agricultural activity, with most ground given over to sheep and cattle grazing. Indeed, the only real evidence for agriculture at the site was the small area of ard marks identified during excavation to the northeast of the precinct, dating to the Early Bronze Age. Post-medieval activity includes several small stone and turf-built shielings and their associated enclosures, relating to transhumance activity. Two of these structures were evaluated during the excavation.

The survival of archaeological features in these surrounding areas is primarily due to the site formation processes that took place during the Iron Age, *i.e.* the deposition of extensive deposits of burnt and fire-cracked stone, unburnt clasts of granite and limestone, and associated sediments. These burnt spreads form a horseshoe-shaped earthwork surrounding the precinct, outwith its enclosing walls, and cover some 45 m northwest–southeast by 30 m southwest–northeast, with the most extensive deposits located northeast, east, and southeast of the cave entrance. Their depth varied significantly, but generally ranged between 0.3 m and 0.8 m, with some deeper accumulations in natural hollows. These deposits were initially generated in the hearths located in the precinct and form a major component of the site structure, in many ways comparable to the burnt mounds of mainly Bronze Age date seen throughout the Scottish Highlands and elsewhere.

4

Stratigraphy and phasing

4.1 Introduction

This chapter provides an overview of the site stratigraphy and phasing, alongside discussion of the High Pasture excavation and recording method, and the taphonomic and archaeological challenges which drove its development. Seven years of fieldwork and the growth of the High Pasture project from a rescue endeavour into an extensive, research-driven investigation into the site and its environs meant repeated modification of excavation and analytical strategies. At the heart of this was the development of the stratigraphic block system which provided the chronological framework around which the story of the High Pasture Cave complex is woven – a story of intermittent use over two millennia, at the heart of which is a more or less continuous sequence of activity commencing at the Late Bronze Age/Early Iron Age transition to span some 800 years.

The full stratigraphic report containing a complete context record is contained in the site archive. This chapter provides a summary report on stratigraphy and phasing which provides the basis for the chronological analysis presented in Chapter 10: the Bayesian modelling of the radiocarbon dates which underpins the High Pasture chronological framework discussed herein.

4.2 Excavation and recording

4.2.1 Excavation methods

High Pasture started as a rescue excavation, its aim to record and recover archaeological material in Bone Passage disturbed by the activities of speleologists. One season, and the incredible discoveries within the cave, plus the continued threat from visiting cavers, saw this evolve into a major research project.

Working within the dark and restricted space of Bone Passage presented methodological challenges, as did the peculiarities of the deposits and sediments within it. Alongside the installation of lights and CCTV cameras, alternative digging tools were employed. The cave deposits were a unique mix of damp, sticky sediments, packed with stone but also with the most delicate artefacts and ecofacts. Iron trowel blades proved too coarse and a clean working surface impossible to create, and eventually it was found that plastic and wooden spatulas of various sizes proved to be the most economic and safe tool for use. A 1 m grid square was laid out within Bone Passage to control the difficult removal of the cave deposits by context and to enable distribution plots to be created. Individual small finds, where identified and removed by hand, were given a grid location by context.

During the 2004–5 seasons, excavated material was transported through 35 m of narrow, wet stream passage to the cavers' entrance along the High Pasture streamway, using rubber kibbles (Fig. 4.1), where a manual hoist lifted them to the surface. This time-consuming process was improved significantly after the stairwell access to Bone Passage was cleared in 2006, after which material could be hoisted directly through the stairwell structure to a working platform mounted above. At the surface, using water extracted from the small stream that sinks into the cave, wet sieving quickly established the high density of small finds and palaeo-botanical material coming from the cave (Fig. 4.2). A 100% wet-sieving strategy was adopted for all deposits removed from Bone Passage and by the end of in-cave excavation in 2009 all material within – at least 14 metric tons of sediment – had been removed to reveal the limestone bedrock floor. Control bulk samples of the deposits excavated within the cave were retained for processing under laboratory conditions.

Prior to commencing surface excavation in 2005, a site grid established the core site area: at its centre, the precinct, including access to Bone Passage, and beyond the precinct boundary, spreads of fire-cracked stone and post-medieval structures including shielings and field walls. Magnetometry, resistance meter survey and GPR



Figure 4.1. Moving a kibble full of sediment & stone from Bone Passage along the main streamway





Figure 4.2. The wet-sieving station located adjacent to the stream sink for the cave

was followed in 2006 by a revised survey covering 0.56 hectares, using earth resistance gradiometer, and a series of GPR transects. Both surveys defined the extent of the visible surface features, with gradiometer data indicating considerable inputs of either burnt or magnetic stone amongst the wider stone spreads. The surveys also produced strong positive linear anomalies, interpreted as old stream courses and sub-surface igneous dykes. The GPR survey located two strong and complex anomalies with well-defined edges within the northwest sector of the precinct. The energy of the returns increased with depth, suggesting that material became less compact with an increasing amount of air voids. These anomalies were confirmed through excavation to be the location of the backfilled stairwell accessing Bone Passage.

Excavation in the precinct saw bulk samples taken from all key contexts and fills of features. Processing included 100% on-site wet-sieving of all key contexts and all stairwell-related contexts. Individual small finds were 3D recorded via the site grid, enabling distribution plots by phase, with those recovered by wet sieving assigned to context only.

The High Pasture excavation ran from 2004 to 2010 using a volunteer workforce drawn from local communities, university students, and individuals from the UK, Europe, South Africa, Canada, Australia, and the USA. After the initial one month 2004 investigation, seasons ranged between six and eight months, totalling just over 44 months of excavation over the seven years. The project directors, aided by George Kozikowski and Steph Glover, worked many additional hours on post-excavation processing during the winter months.

Three individual trenches were established in Bone Passage (trenches 1, 6, and 17; Fig. 4.4), while trenches 2, 3, 5, 11, 15, and 21 covered the precinct (Fig. 4.3). Areas beyond the precinct enclosure were covered by trenches 4, 5, 7–14, 16, 18–20, along with a number of test pits (Fig. 4.3). As excavation progressed, individual trenches could be extended and amalgamated, and new trenches opened to explore specific questions. With little initial awareness of the 3D complexity of the site and the deep stratigraphic sequences which would ultimately be uncovered, the lack of opportunity to start excavation with a single, large open area caused complication during post-excavation, such as difficulty in matching corresponding deposits across site.

In addition to being the most intensive study of a cave site in Scotland, the High Pasture project has examined in detail the cave environs outwith the cave itself and its immediate entrance deposits, the omission of which is a common flaw in cave excavations. This has produced evidence for wider contemporary activity over time.

4.2.2 Context and feature recording

High Pasture generally used a single context recording system. All contexts were given a unique number, prefixed with 'C'. In addition, individual 'compound' features such as hearths, areas of paving, walls, etc., were given a *feature* number, prefixed 'F', as well as cut features

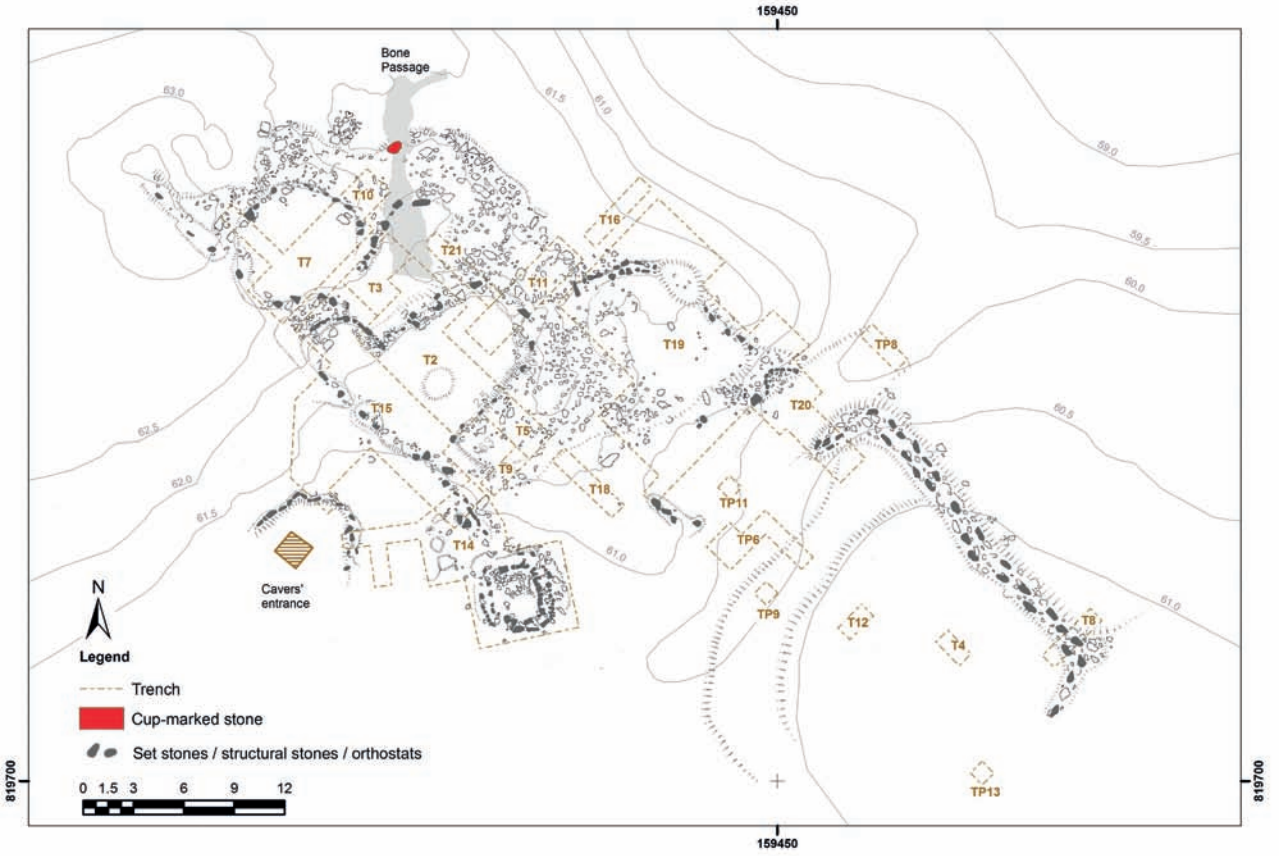


Figure 4.3. Pre-excavation plan of the High Pasture Cave complex showing the locations of the surface trenches. The plan also shows the location of cup-marked boulder SF0001, which had been deposited in a stone spread at the surface

(*e.g.* post-hole, pit): here, the pit cut would prefix F and its fill prefix C.

Numbers were designed to include the trench number. For example, a context in Trench 15 might be labelled C15.10 (context 10 in Trench 15), and a feature in the same trench labelled F15.10 (feature 10 in Trench 15). A downside to this system was the repetition of individual numbers, so the retention of the 'C' or 'F' prefix proved essential. However, very few issues arose with this system.

Initial post-excavation assessment quickly demonstrated that a means of simplifying the 3D stratigraphic complexity of the site was needed and the Stratigraphic Block system was devised (Section 4.3). Essentially a simplified matrix featuring contexts 'blocked' together in sub-phases of different resolutions, this allowed easier concordance between different site areas as well as a very useful first stage in the assessment of radiocarbon dates.

4.2.3 Finds and sample recording

Artefacts were numbered by trench plus unique number, prefixed with site code and year. During post-excavation the original prefix was replaced by 'SF', *e.g.* SF1.250 (Trench 1, Find 250). Ceramics, whilst also having SF numbers, were in many cases subsequently assigned a 'V' prefix, denoting individual vessel, where identified. A number of artefact illustrations retain the HPC prefix. The site archive retains complete records of the finds numbers and original site codes. Bulk and all other palaeo-botanical samples were prefixed by 'S', followed by trench number and unique identification number, *e.g.* S1.25 (Trench 1, Sample 25).

4.3 Stratigraphic blocks

4.3.1 Introduction

The 'Stratigraphic Block' process of grouping contexts and features together provided a framework for simplified analysis, allowing relationships between blocks (and thus site loci, areas, and zones of activity) to be easily viewed in relation to major site phases. Most importantly, the Block system facilitated tracing associated contexts across site, linking disparate areas of activity. The Site Matrix (Fig. 4.5 and Table 4.1) provides a useful core summary, using the Blocks, of the High Pasture stratigraphy.

These detachable stratigraphic elements were defined during post-excavation. Their numbers are arbitrary, and all original numbering is retained to preserve concordance with the site archive. Harris Matrices for individual

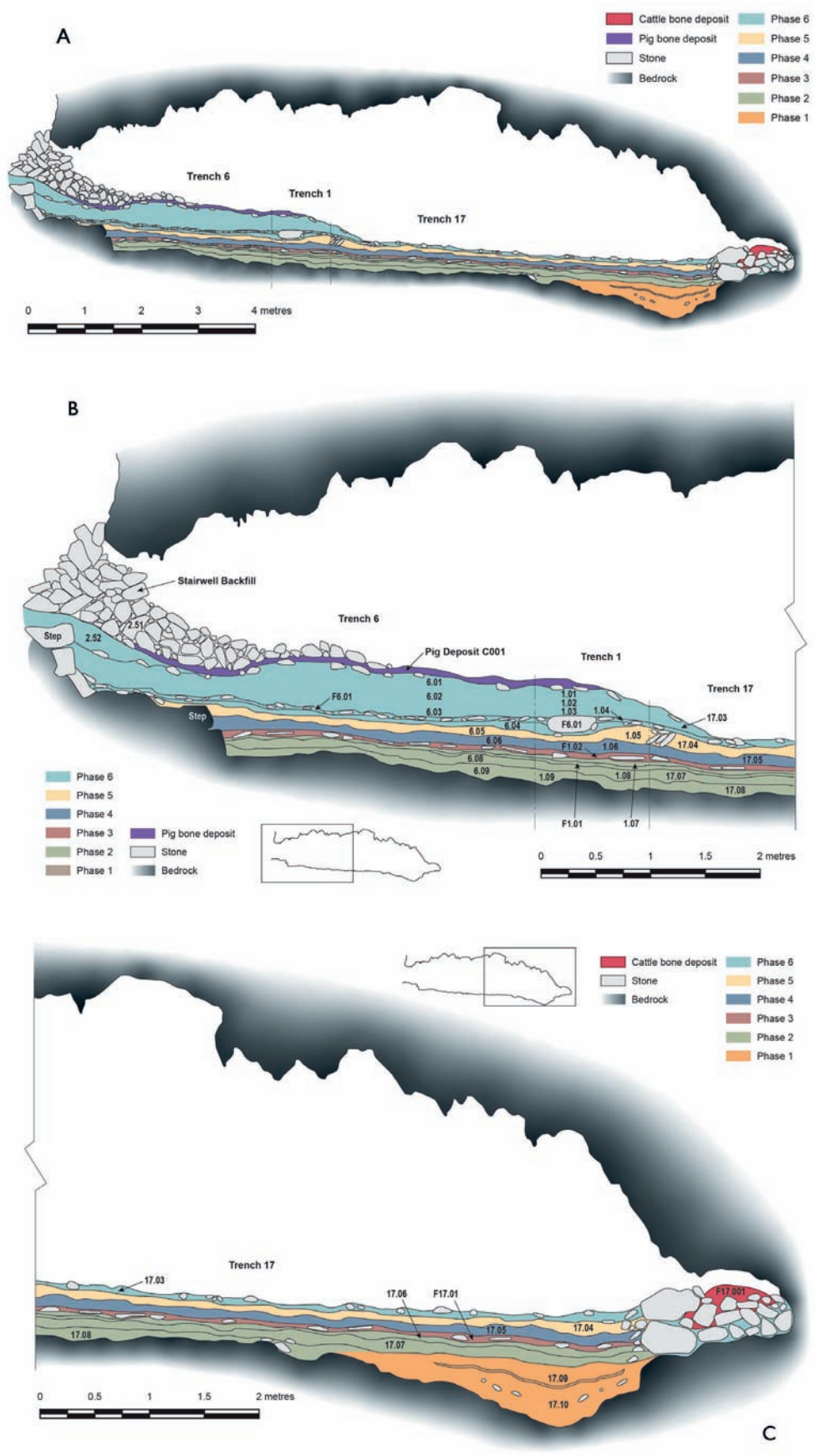


Figure 4.4. (A–C) Schematic longitudinal sections through Bone Passage showing trench locations, primary contexts, & floor horizons

blocks – too large to reproduce in-volume – are available in the site archive.

4.3.2 Using the stratigraphic blocks system

The Site Matrix (Fig. 4.5) presents High Pasture's four major stratigraphic 'strands' of groups (vertical columns). These are: the surface trenches (*i.e.* areas outside the precinct); the precinct; the surface-subterranean interface zone of the cave entrance/stairwells; and the cave, which generally comprises Bone Passage. Blocks located to each side of the precinct column represent enclosure walls (Blocks 14–17) and paved walkways (Blocks 12 and 13).

Individual blocks can represent a built feature and associated deposits, such as a hearth setting (*e.g.* Block 7a comprising hearth F15.35 and associated features and deposits), or deposits relating to a specific episode identified during excavation (*e.g.* Block 27a's floor deposits in Bone Passage). Some blocks, *e.g.* Block 32, may include a range of features such as post-holes, pits, and associated fills. Table 4.1 describes individual Block components.

The blocks allow further refinement of High Pasture's eight chronological phases by the introduction of sub-block/phases, where these could be established. For example, Block 7a (a precinct hearth and associated features and deposits) and Block 26 (a paved floor in Bone Passage) are contemporary. Contexts within these two blocks possibly directly link; or they may have direct association through analysis of the materials recovered from them, or through radiocarbon dating of samples from each context.

Where stratigraphic links between blocks are lacking, or uncertain, this system allows certain blocks to 'slide' up and down the vertical axis of the site matrix. For example, the small hearth and its associated contexts represented by Block 37 may relate to Phase 2a or 2b or may have been active in both sub-phases; while the construction of stairwell F2.23 [Block 21] within the precinct spans Phases 4a–5b and reflects various modifications to the structure, including increasing height with construction of several new steps and landings.

4.4 Missing strands of evidence: taphonomic processes

The loss or modification of deposits through taphonomic process is a basic reality of archaeology and in caves, these processes can account for complex stratigraphy and co-mingling of material. High Pasture Cave, although well 'protected' thanks to its alkaline sediments, deep stratigraphy, enclosed cave, and lack of later surface disturbance, has suffered a range of taphonomic-related damage, truncation, and loss.

4.4.1 The cave

Limestone caves and fissures are valuable and significant preservers of archaeological and palaeo-environmental remains. Providing stable micro-climates, localised parent sources of sedimentation, and protection from erosion, caves of all types may provide levels of preservation not seen at more exposed archaeological sites. Unfortunately, cave deposits are often difficult to interpret, with re-use of these enclosed spaces through time resulting in turbated, disturbed stratigraphies (Chamberlain 1999).

Formed by water and erosion over thousands of years, High Pasture Cave and its deposits were subject to modification, truncation, and redeposition. During fieldwork we witnessed the dynamic effect of rainwater run-off and flash-flooding. The active cave sink southwest of the cave entrance would fail to accommodate the increased water flow and the stream would cascade down an overflow channel formed from a former streambed. This channel currently runs northeast, immediately southeast of the precinct itself.

Before the build-up of the huge Iron Age deposits at High Pasture, such flash-flooding events would have resulted in this overflow water from the sink entering the precinct, the stream then flowing through the original cave entrance and Bone Passage before entering the main streamway. This would have eroded any archaeological deposits building up within the precinct outside the cave, or forming within Bone Passage, and would also have deposited its own new sediments in these two site areas. Animal bone located in alcoves in Bone Passage, mixed with sediments containing charcoal, fragments of Early Bronze Age pottery, and gravel deposits (Phase 1b), are most likely the result of such events, which must have occurred on a regular basis – possibly several times a year based on observations made during fieldwork.

These flooding and erosion events are most likely responsible for the limited evidence for human activity within the precinct and the cave prior to the Early Iron Age (Phase 2). Earlier phases of activity, represented by Early Bronze Age ceramics, lithics, and a range of features including the recumbent standing stone, pits, stake-holes, and ard marks (Phase 1a), did survive at the surface surrounding the hollow around the cave entrance. We can only speculate on the human interactions with the cave during these earlier periods of use.

The effect of flooding on the core site areas would have been reduced considerably from the Early Iron Age onwards, as protective measures were either put in place or naturally developed: the construction of a series of stone and turf walls across the entrance to the precinct (north of the active cave sink), the modification of the main cave entrance, and the gradual formation of archaeological deposits through time. Attempts to divert the flow of water away from the precinct indicates that people visiting the site had experienced such events in the past and were in their own way attempting to manage the natural hydrology.

Rainwater run-off also percolates through the roof of the limestone cave, especially in Bone Passage which lies



Figure 4.5. High Pasture Cave Complex Site Matrix showing stratigraphic blocks (SB) by phase & sub-phase where applicable (see Table 4.1 for descriptions of the individual blocks)

Table 4.1. Descriptions of stratigraphic block units including block number & phase/sub-phase

Block	*Phase*	*Summary description*
1	–	Natural limestone bedrock and karsticclay
30	1a	Early Bronze Age activity at surface
23	1a	Natural silting in cave
24	1b	Bronze Age activity in cave
2	2a	Silting within natural hollow
18	2a	Internal features and deposits within cave entrance
25a	2a	Midden deposits in cave
3	2a	Construction of walkway F15.37, associated features, and deposits
37	2a	Hearth F15.33, associated features, and deposits in natural hollow
4	2a	Internal deposits within walkway F15.37
5	2a	Hearth F15.36,associated features, and deposits
31	2	Grey silt deposit pre-dating Early Iron Age activity in surface trenches
25b	2a	Floor F1.01 and associated deposits in cave
25c	2b	Midden deposits in cave
6	2b	Closing deposits within walkway F15.37
7a	3a	Hearth F15.35
12	3a	Walkway F15.26a and associated deposits
26	3a	Floor F1.02, F6.02 and F17.01 in cave
32	3	Early Iron Age activity pre-dating formation of burnt spreads at surface
19	3a	Stairwell F2.35, associated features, and deposits
7b	3b	Hearth F15.30
27a	3b	F6.02 floor deposits in cave
20	3c	Stairwell F2.32, associated features, and deposits
7c	3c	Hearth F2.10
13	3d	Walkway F15.26b and associated deposits
7d	3d	Hearth F15.27
7e	3e	Hearth F2.15 and Pit Hearth F15.28
8a	4a	Hearth F2.27
21a	4a	Landing F2.40 (Stairwell F2.23)
21b	4a	Landing F2.41 (Stairwell F2.23)
14	4a	Enclosure wall F15.22 and associated deposits
33	4	Deposition of burnt spreads, associated features, and deposits at surface
8b	4b	Hearth F2.26
21c	4b	Landing F2.42 (Stairwell F2.23)
8c	4c	Hearth F15.20
21d	4c	Landing F2.25 (Stairwell F2.23)
15	4c	Enclosure wall F15.14 and associated deposits
27b	4c	Midden deposits in cave
9a	5a	Clay/silt levelling deposit and Hearth F2.05
21e	5a	Landing F2.43 (Stairwell F2.23)
9b	5a	Hearth F2.13
34	5	Deposition of burnt spreads, associated features, and deposits at surface
9c	5b	Hearth F2.07
21f	5b	Landing F2.44 (Stairwell F2.23)
16	5b	Enclosure wall F15.09 and associated deposits
27c	5c	Midden deposits in cave

(Continued)

Table 4.1. Descriptions of stratigraphic block units including block number & phase/sub-phase (continued)

Block	*Phase*	*Summary description*
10	6a	Hearth F5.03, cellular structures, walls, and associated deposits within precinct
17	6a	Enclosure wall F15.03 and associated deposits
28	6a	Floor F6.01 in cave
29a	6a	F6.01 floor deposits in cave
35	6a	Hearth F5.03, cellular structures, walls, and associated deposits outside precinct
29b	6a	Special cattle deposits and associated contexts in cave
29c	6b	Special pig deposits and midden within cave (closing deposits)
10	6b	Closing deposits within precinct
35	6b	Closing deposits in surface trenches outside precinct
22a	6b	Backfill deposits in stairwell F2.23
22b	7	Human and animal remains in stairwell F2.23 (closing deposits)
11	7	Final activity, backfilling deposits, and site landscaping at final closure
36	8	Post-medieval activity in surface trenches

relatively close to the present ground surface. Localised drips formed small areas of ponding on the passage floor during heavy periods of rain during excavation: a window into past processes of winnowing and down-movement of fine sediments through the stratigraphic sequence. This created difficulties for stratigraphic interpretation and the long-term effects of rainwater percolation through the Bone Passage deposits may also have displaced small artefacts and palaeo-botanical remains, although this must have been minimal when compared to the impact from human disturbance.

Reworking of the deposits within Bone Passage was extensive, both in prehistory and by modern cavers. In particular, radiocarbon dates obtained on materials from the southern chamber of Bone Passage (at the base of the cave/stairwell entrance and extending *c*. 4 m to the north), indicate a high level of residual and redeposited material in upper contexts. The location surrounding the cave entrance was also subject to continual physical modification, especially during construction and remodelling of built structures associated with maintaining access to the cave. In addition, this same area saw large-scale deposition prior to, and during, the final closure of the stairwell access during Phase 6. The material used for this closing event probably derived from the deep deposits that had accumulated outside the stairwell entrance in Phase 5 or was mined from the extensive burnt spreads beyond the precinct boundary. Micro-morphological analysis of these deposits identified a prominent area of truncation outside the stairwell entrance, within the precinct, while artefacts and ecofacts recovered from both locations display marked similarities and levels of preservation.

Reworking is less evident further inside Bone Passage. Although the morphology of the passage, especially its narrow profile, concentrated the impact of foot traffic, resulting in trampling, erosion, and the redistribution of archaeological deposits, radiocarbon dates obtained from materials sampled in these more secure areas display a more uniform and coherent sequence. Calcite formation sealing the archaeological deposits here was in excess of 20 mm thick, creating a natural barrier to further erosion and disturbance, and must have started forming during the final stages of site use.

The second major taphonomic process affecting in-cave deposits was modern caver activity. Although only discovered and re-opened in 1972, High Pasture became the most popular caving trip in Skye. The relatively easy access created erosion issues in the cave, especially in Bone Passage, until the major disturbance of these deposits in 1997, when a group of speleologists attempted to extend the known limits of the cave into a perceived boulder choke at the south end. Their activities removed thin and fragile deposits of calcite flowstone, disturbing and partially truncating the underlying stratigraphic sequence; fortunately, the lower sequence of deposits relating to Phases 2 and 3 were not penetrated, as evidenced by the integrity of the stratigraphy and the resulting radiocarbon dates. The irony is that these actions are what alerted archaeologists to the potential of the Bone Passage deposits but, if pursued to conclusion, the cavers would have truncated the surviving sequence within the entire cave entrance, including three phases of stairwell.

The cave taphonomy features episodes of accumulation and input as well as loss. The most obvious of these are human-derived, including accumulation of floor deposits via trampling as well as more major depositional events. It is also important to consider use of the cave by wild animals and the input of sediments from surface run-off and smaller-scale accumulations through natural fissures in the cave roof, including stone chips and larger limestone clasts from the roof and walls of the cave through frost shatter and water erosion. All these inputs will have had a bearing on in-cave processes and our resulting interpretations.



Figure 4.6. Three images showing the level of subsidence within the precinct. A. paving & hearth slabs tilting at around 30° into the subsiding deposits; B. Martin Wildgoose excavating deposits adjacent to hearth F2.07, the slabs of which are tilting at around 50°; C. the inside & back faces of enclosure wall F15.14 (indicated by lines), the inside face tilting to the right at around 50°

4.4.2 The precinct

The main entrance into High Pasture Cave and its highly modified surround forms the major focus of activity at the site. As discussed above, flood erosion would have been relatively common during the early history of the site and evidence for erosion of the steep sides of the precinct and resulting silting in its base was uncovered during excavation. The most dramatic expression of this was the detachment of a large limestone block from above the cave entrance during the early stages of Phase 2, which necessitated modifications to the access arrangements to the cave including the re-alignment of main walkway F15.37. Evidence for human modification of the limestone bedrock was also seen approaching the cave entrance, most likely a result of quarrying stone for use in the lower walkway and its surfaces during Phase 2.

Generally, the built structures and associated deposits of the precinct survived remarkably well, having been buried relatively quickly by accumulating material during High Pasture's use. Truncation of deposits and features took place during construction and remodelling of the stairwells, in particular Phase 3 stairwell F2.35, which was partially dismantled during the construction of new stairwell F2.32. Phase 4 stairwell F2.23 was built within the confines of the earlier stairwell, severing stratigraphic links between deposits forming inside and outside the cave.

Micro-morphological analysis of the deep precinct deposit sequence indicated a gradual accumulation of material and associated use of the hearths, interspersed with larger, redeposited dumps. Phase 3 saw the development of a distinctive mound within the southwest sector of the precinct, the result of repeated hearth use and fuel residue build-up. Throughout most of High Pasture's long history, it is apparent that this sequence of hearths and deposits continued to accumulate and survived any major disturbance. It is possible that these distinctive heaps of refuse and buried structures were curated, representing special deposits marking past events, testimony to the deeper historical use of the site. The sides of the mound formed quite steep slopes which would have been prone to destabilisation and collapse, especially during periods of heavy rain, while the extreme perimeter of the feature would have been subject to trampling during successive periods of use. Some mixing of deposits around the ash mound during formation would be inevitable before this, in turn, would be buried below later accumulations. Some of the precinct deposits were truncated during Phase 5, the material used as backfill into Bone Passage prior to final closure of the cave and stairwell in Phase 6. Otherwise, archaeological deposits in the precinct provided a deep, well stratified sequence representing Iron Age use, between approximately *800–745 cal BC* and *cal AD 70–135*.

Analysis of the precinct deposits is described in detail elsewhere but one of the most significant findings is the very high levels of phosphate recorded, partly because

its presence almost certainly enabled enhanced preservation of organic materials such as animal bone, bone and antler artefacts, and other organics, while also providing evidence for activity areas outside the cave entrance associated with butchery and animal carcass processing.

Of similar importance to site formation processes in the precinct is the effect of subsidence on its stratigraphy. Accumulated deposits in the natural hollow of the precinct exceeded 4 m in depth and contained structural stone and void-filled areas within collapsed boulders: evidence of catastrophic subsidence occurring during the use of the site, especially during Phases 5 and 6 and (to a lesser extent) after site abandonment (Fig. 4.6). In the northwest sector of the precinct adjacent to the stairwell, the archaeological deposits had slumped creating a depression up to 1.2 m deep, 'stretching' some contexts and fragmenting others in the process, while hearths, areas of paving, and stone-built walls followed the steeply tilted stratigraphic sequence. From Phase 5 onwards, attempts had been made to infill the subsided areas within the precinct using redeposited sediments, creating a more level area on which to construct new features and activity areas.

4.4.3 Areas beyond the precinct boundary

Deposits and features relating to activities at the surface around the precinct and cave entrance saw less drastic taphonomic alteration. There appears to have been some truncation and erosion of material relating to early use of the site, especially prior to the Early Bronze Age activity of Phase 1a, with the record limited to isolated small finds including lithics of Mesolithic and Neolithic date. Phase 1a material itself displayed varied survival across the site. Where sealed by the compact and relatively deep burnt spread deposits formed during the Iron Age, its survival was excellent. This included a thin soil horizon containing Beaker ceramics and lithics, which overlay well-preserved ard marks (F19.14) and other negative cut features. Elsewhere, flooding, erosion, and later modification had partially truncated or removed evidence of earlier use.

Surface evidence for Iron Age activity generally comprised large accumulations of burnt stone, which overlay Early Iron Age deposits and features (Phases 2 and 3). This material, redeposited from the precinct, formed a compact, protective lens over earlier deposits. But compared to Bone Passage and the precinct, organic survival in the burnt spreads was relatively poor. A lack of organic material, save small fragments of heavily calcined bone, is likely partly due to more acidic conditions in the burnt spreads but perhaps more attributable to the pattern of deposition of material during the Iron Age.

The surface deposits and features suffered no major truncation from later activities, such as the post-medieval construction of shielings and a series of stone and turf walls, or especially, by ploughing. The location of High Pasture, dominated by rock outcrops and undulating ground, was unsuited to ploughing or cultivation and has generally been used for rough grazing.

Both stratigraphic and micro-morphological data also highlight a final major factor in the survival of the High Pasture archaeological record: episodic use, periodically punctuated by periods of hiatus. At major settlement sites of the same period, domestic maintenance often prevented the accumulation and survival of deposits, along with more usual processes of removal of earlier settlement configurations. Despite these hiatus points, the High Pasture sequence presents clear evidence for deep continuities in practice and deposition, often stretching across periods of hiatus and suggesting that the significance of this site was not simply constructed on the basis of immediate physical involvement. Memory, maintained through oral tradition and ancestral geographies (Tilley 1994, 7–75; Edmonds 1999, 15–31), reinforced by an ongoing landscape presence, is likely to have ensured that the site remained a candidate for renewed activity when required, the deep deposit sequences perhaps providing a familiar template.

4.5 Phasing and chronology

Traditional post-excavation stratigraphic analysis of the High Pasture sequence formed a basis for the most crucial element in the construction of a final site chronology, the Bayesian analysis of the radiocarbon dates. Bayesian modelling was only applied to Iron Age activity and made possible by the large number of radiocarbon dates and the presence of long 'stratigraphic chain' sequences from the deep, complex deposits in both precinct and cave. Bayesian modelling was fundamental in establishing an accurate chronology for the site, as most results fall on the Hallstatt Plateau of the radiocarbon calibration curve. The process also enabled outlying dates to be identified that were at variance with the Bayesian model, and detail of the Bayesian analysis is presented in Chapter 10.

The phasing presented below presents an interpretive overlay of activity at High Pasture (Fig. 4.5; Table 4.1). Individual stratigraphic blocks mostly fall entirely within a single phase, with some exceptions (see Section 4.3.2). The stratigraphic sequence was only refined into subphases in the precinct, Bone Passage, and the area connecting these two zones, the cave entrance, and stairwells. Due to tenuous stratigraphic links between the precinct and areas beyond its boundary, stratigraphic blocks for these outlying areas general relate to a complete phase (Fig. 4.5).

AMS dates presented in Chapter 10 suggest that activity at the site during the Iron Age (Phases 2–6) was fairly continuous, with likely short periods of hiatus at the interface between Phases 2 and 3, Phases 3 and 4, and Phases 4 and 5. Excavation confirmed that no permanent domestic dwellings or occupation existed, either in the cave or at the surface. It therefore appears that visits to the site must have been relatively frequent

throughout the main Iron Age phases, with insufficient time between individual activities to allow the formation of significant wind-blown or water-borne deposits, or soil development. Given this manifest continuity, the phasing should be seen as a tool for analysis, rather than implying major cultural changes or breaks in site use: a heuristic means of organising the data into a general event sequence.

The raw, calibrated radiocarbon dates used throughout this publication are cited at 95.4% probability, while Bayesian modelled dates, including the summary below, are depicted in italics. They reflect chronological brackets for each period, phase, or stratigraphic block, at 95.4% probability. For the Phase 1 activity, Bayesian modelling was not carried out, and so Phase 1 is bracketed using the AMS dates available, also at 95.4% probability.

Phase 1 (start: 2140–1920/finish: 1730–1510 BC and 1320–1110 cal BC)

Activity during the Early Bronze Age was generally confined to the surface, to the northeast of the cave entrance, and comprised a recumbent standing stone and socket, and a complex series of ard marks, pits, and stake-holes (Block 30). Artefacts associated with this included lithics and Beaker sherds. Isolated sherds of similar type were also recovered from basal deposits in Bone Passage. During the Bronze Age, a larger group of ceramics were deposited at the north end of Bone Passage, forming a structured deposit (Block 24). Variations between ceramics deposited at the surface and in the cave may relate simply to their deposition at the site during different time periods, as suggested by the radiocarbon dates. However, if deposition of the ceramics at both surface and underground were contemporary, they indicate the selective choice of different types of pottery styles for these differing contexts (see Section 12.2).

Phase 2 (start: 800–745/finish: 730–640 cal BC)

The earliest phase of Iron Age activity includes the construction of the first formal access to the cave, including a partially paved walkway (Block 3), retaining walls, and steps down into Bone Passage (Block 18). This phase also included the construction of two hearths within the precinct (Blocks 5 and 37), adjacent to the walkway access, and several stake-holes that probably formed a screen or partition. Material generated from use of these hearths, featuring fuel residues and fire-cracked stone, was deposited in Bone Passage along with a range of artefacts and ecofacts (Block 25). A trampled floor surface provided access through Bone Passage. The end of Phase 2 and transition to Phase 3 is marked by the backfilling and closure of the walkway access to the cave (Block 6), and structured deposits marking this closure were also placed within the cave entrance (Block 18) and within Bone Passage (Block 25c).

Phase 3 (start: 730–640/finish: 650–570 cal BC)

During Phase 3, activities at High Pasture included modification to the access arrangements into the cave: the construction of two consecutive stairwell structures (Blocks 19 and 20), two consecutive walkways (Blocks 12 and 13), and a paved walkway running through Bone Passage (Block 26). In the precinct, five slab-built hearths were constructed (Blocks 7a–7d), with four of these structures superimposed, and the fifth pit-hearth (Block 7e) located to the south. Other precinct features included the first evidence of wall foundations associated with enclosure of the precinct space, relating to possible attempts at diverting water run-off away from the precinct and cave entrance. Material deposited in the precinct displayed evidence for a wider range of activities, and an increase in the use of fire. Significant numbers of artefacts were recovered from the deposits within Block 7, including several caches of cobble tools. By the end of Phase 3, the build-up of superimposed hearths and their associated residues formed a distinct, curated mound of material in the precinct's southwest sector.

In Bone Passage, deposits above the paved floor (Block 26) contained several important caches of objects, along with various other finds (Block 27a). Stratigraphic links could be traced between these deposits, through the stairwell access, and into the north sector of the precinct.

A series of postholes, pits and low wall foundations located outside the precinct boundary (Block 32) appear to relate to the division of space at the surface surrounding the precinct. Access to the precinct from the northeast included an avenue formed by two rows of wooden posts. Artefact recovery and depositional activity beyond the precinct boundary was insignificant compared to other areas of the site.

Phase 4 (start: 630–515/finish: 540–435 cal BC)

At the transition from Phase 3–4, continuing activity was marked by several distinct changes to the site infrastructure. In the precinct, this included construction of a new stairwell (Block 21a), areas of paving, and the first evidence for enclosure of the precinct (Block 14). The focus of new hearth settings within the precinct changed. A series of two hearths were constructed adjacent to the stairwell access to the cave (Blocks 8a and 8b), while in Phase 4c a third and much larger hearth setting was built to the southwest (Block 8c). During Phase 4c, two hearth settings were used at the same time and produced evidence for intense use, including a number of individual burning episodes leaving detailed deposit sequences. Phase 4c also witnessed the construction of a massive enclosure wall (Block 15) defining the precinct area, with access from the SSE. The stairwell access to the cave was also modified on two occasions, with the construction of three new landings and the raising of the stairwell side walls (Blocks 21b–21d). Huge amounts of material were

deposited within the precinct at this time containing large quantities of artefacts and ecofacts, including caches of material and evidence for structured deposition.

During Phases 4a and 4b, it appears that the paved walkway (Block 26) and overlying floor deposits (Block 27a) in Bone Passage continued to be used for access through the cave. But during Phase 4c, a significant amount of fuel-residue rich material was introduced into the passage. Containing many ecofacts and artefacts, this most likely formed a closing deposit (Block 27b).

Areas beyond the precinct enclosure wall appear to show the zoned use of space, although it is difficult to define this with any certainty, and the first deposition of fuel residues and fire-cracked stone during Phase 4 (Block 33), their material deriving from activity taking place in the precinct. The numbers of artefacts deposited in these areas also increases during this phase, especially during Phase 4c, with a mixed group of objects possibly forming a structured group.

Phase 5 (start: 520–415/finish: 315–225 cal BC)

By the end of Phase 4, subsidence within the precinct must have created some serious issues with regards to accessing the stairwell and cave. At the beginning of Phase 5, possibly after a short hiatus in activity, a deposit of clay or ash of varying thickness was spread over the areas where subsidence had been most intense, creating a relatively level surface (Block 9a). This levelling episode also sealed the curated mound of fuel residues and embedded hearth structures of Phase 3. Successive areas of paving were laid down, and two new slab-built hearths constructed (Blocks 9a and 9b) in Phase 5a. By this stage, the deeper areas of the natural hollow forming the precinct were filled with deposits, and thus it became possible to utilise more easily the natural platform in the eastern sector of the enclosure.

The build-up of material in the west arc of the enclosure also threatened to over-run the top of enclosure wall F15.14 (Block 15). In response, the enclosure wall in this area of the precinct was modified (Block 16), which retained enclosure of the space around the stairwell and access to the cave. A third, large slab-built hearth was added in Phase 5b (Block 9c), located in a central position in the precinct, with a fire-pit also in use to its southwest in Phase 5b, complete with a series of angled post-holes forming a tripod over the feature.

Modifications to stairwell F2.23 also continued, probably in response to the increasing accumulations of midden and other residues in the precinct, with restructuring and heightening of the side walls and the inclusion of two new, successive landings. This included modifications enabling access to the stairwell and precinct from the west. Access to Bone Passage was maintained by modifications to the stairwell, where material continued to accumulate – including a significant input in Phase 5b (Block 27c), most likely mined from deposits in the precinct and areas beyond its boundary.

With the exception of a few minor features – post-holes, pits, and a small, paved area – activity outwith the enclosure wall comprised deposition of large quantities of fire-cracked stone (Block 34), containing increasing amounts of ceramics and metalworking residues; activity which ceases at the end of Phase 5.

Phase 6 (start: 295–215 cal BC/finish: cal AD 50–130)

Phase 6 included the last evidence for significant activity at High Pasture, especially in the precinct and Bone Passage. The precinct was reduced in size at this time, defined by a new section of enclosure wall (Block 17) which controlled access to the stairwell and cave. The area surrounding the precinct enclosure was modified to include two small cellular structures of unknown function to the southwest, the construction of a new hearth on top of the old enclosure wall to the east, and modifications to the precinct access from the west (Block 10). During this phase, the stairwell had a corbelled roof, although it is possible that this was built during Phase 5c (Block 9c). A series of four steps provided access to the stairwell landing from the southeast. Material from its hearth was deposited during Phase 6 within the precinct, but this was restricted to an area to the southwest of the enclosure wall. These deposits accumulated between the cellular structures in the precinct and eventually started to encroach over their walls.

A new paved floor surface was inserted in Bone Passage at the start of Phase 6 (Block 28), sealing earlier deposits. Material accumulated through successive depositional events (Block 29a), focused on the southern end of the passage. Structured animal bone deposits comprising the remains of three cows (Block 29b) were placed in the cave at this time, two within Bone Passage, and the partial remains of one animal placed on a ledge above the active stream. Deposition of material into the north cave chamber ceases at this time and calcite deposits start to form over the surface of earlier materials.

The closure of the cave took place by the end of Phase 6 and evidence for this event can be traced across all three major site areas. A significant midden dump containing a large quantity of artefacts was deposited at the south end of Bone Passage (Block 29c), over which was placed a large assemblage of semi-articulated pig bone representing at least 23 individual animals. This has been interpreted as a feasting deposit, placed in the cave prior to its closure. A structured artefact deposit was also placed at the base of the stairwell before its closure with boulders and midden (Block 22a). At the surface, midden deposits were spread across the surface of the precinct (Block 10), including a wide range of artefacts, while access to the head of the stairwell from the west (F2.29) was also blocked (context 2.61). Within the area surrounding the precinct,

structured deposits included metalworking residues, a glass bead, and a roman coin (Block 35 – although the bead and coin were most likely placed on the surface of the burnt spreads during Phase 7). Rotary quern fragments also formed part of these structured closing deposits across the surface trenches, both within and outside the precinct enclosure.

Phase 7 (finish: cal AD 70–135)

It is possible that this last phase of activity at High Pasture took place immediately after the Phase 6 stairwell backfilling (Block 22a). However, it is more likely that the deposition of a combination of human and animal remains as closing deposits into the top of backfilled stairwell F2.23 (Block 22b) took place at some stage following this closure – possibly up to 100 years later based on Bayesian modelling (Chapter 10). In the interim period, between the stairwell closure and the internment of these burials, it is possible that activities on a small scale continued to take place within the precinct enclosure, although we have no firm dating or stratigraphic evidence to support this.

Following the placement of the Phase 7 human and animal remains, the immediate area surrounding the access to this structure within the precinct was landscaped, covered with extensive deposits of redeposited midden and boulders. The midden included significant amounts of fire-cracked stone and it is possible that this was gathered from outside the precinct (Block 34), or from within (Blocks 9 and 10). The boulders, including granite and limestone clasts, were most likely gathered from High Pasture's immediate environs, or may have been robbed from structures within the complex. Boulder deposition concentrated on covering the burials within the stairwell, the head of the stairwell structure, and the access to the stairwell from the west. This sequence of events signalled the end of activity at the site, before some limited evidence for transhumance resumed in the post-medieval period, some 1600 years afterwards.

Phase 8 (Post-medieval activity)

Phase 8 represents post-medieval agricultural activities across the site, probably starting during the 18th century AD and which continues to the present day. Although a number of structures were identified as belonging to this period (shielings, enclosures, and field walls), these had little impact on the underlying Iron Age material. A major feature linked to agricultural practice at this time affecting the caves of Strath Suardal, including High Pasture, was the backfilling of many cave entrances with waste materials and domestic rubbish. This was carried out primarily to protect livestock from falling into cave entrances, especially those with vertical morphology such as the cavers entrance at High Pasture. Prior to the start of organised refuse collection in the recent past, cave entrances and vertical shafts in the limestone bedrock also provided convenient cavities in which to dispose of domestic waste and agricultural machinery.

Part II

The High Pasture Cave complex through time

5

High Pasture Cave before the Iron Age

Steven Birch

5.1 Introduction

Excavations at High Pasture recovered a limited amount of evidence for pre-Iron Age activity, mostly from the surface trenches surrounding the cave entrance. This comprised a small assemblage of flaked stone tools of probable Mesolithic and Neolithic date and a more coherent suite of features and associated artefacts dating to the Early Bronze Age. During the Middle Bronze Age, a cache of ceramics and isolated small finds were deposited in Bone Passage, seemingly as a structured deposit. All of this suggests that the cave and its immediate environs had become a recognised landmark and perhaps a focus of activity within Skye's prehistoric landscape, hundreds of years before intensive activity commenced in the Early Iron Age. However, as is the case for the Iron Age, there is no evidence that the cave or its immediate surround formed a domestic settlement. It could have been used for temporary overnight shelter by foragers, or farmers tending their livestock, but the overall impression from this dataset is that, even from this early period, High Pasture was not a focus for everyday activities but a place to be visited.

5.2 Early visitors

Hidden from view to the casual visitor, tucked within its natural amphitheatre on the high ground overlooking Strath Suardal, the entrance to High Pasture Cave would have been known rather than seen – a geographic feature surely embedded into the collective memory of the people of this part of Skye. Repeated visits, oral tradition, the deposition of material culture – all would have provided a focus for mobile forms of social and economic organisation. Natural features in particular would have formed the mental map to navigate through the land in which economic resources were embedded, with caves and rock shelters an essential group within this construct – locales for refuge, temporary habitation, and convenient shelter close to important resources. The limited space available within the passages of High Pasture Cave, along with other morphological constraints, would have ruled it out for extended periods of occupation but Bone Passage would have been suitable for temporary shelter during hunting and gathering trips into the Strath Suardal woodlands.

Excavation failed to identify any *in situ* archaeological deposits relating to activity during the Mesolithic or Neolithic periods, either above ground or in the cave. The few lithic artefacts of these periods are residual, mixed with the later Bronze and Iron Age deposits, and can only indicate that the site was visited occasionally. Lithic raw materials were obtained from a variety of mostly local Hebridean sources, such as the Staffin area at the northern tip of Skye (baked mudstone), and from the island of Rhum (bloodstone); although longer-range contacts are indicated by several lithics of Yorkshire flint and a roughout for a polished stone axehead recovered from an Iron Age context at the site (ditch F13.01, C13.02), manufactured from Cumbrian Tuff extracted from the Great Langdale area. A polished stone axe head from Langdale was found buried with Iron Age pottery at a new housing site at Middlebeck in Nottinghamshire in 2023. The axe bore marks likely to show its re-use as a whetstone, suggesting it had been valued for generations (Watson pers comm.).

Diagnostic artefacts of Mesolithic and Neolithic typology recovered from High Pasture include a single microlith (SF5.012), a leaf-shaped arrowhead (SF19.009), the tip of a bifacial point (SF20.04), a scale-flaked knife (SF2.409), and the polished stone axe (SFTP13.01).

5.3 Phase 1a: the Early Bronze Age

5.3.1 General

A complex suite of surface features to the northeast of the cave entrance provided evidence for more intense activity during the Early Bronze Age (Figs 5.3, 5.4, below). These comprised a recumbent standing stone and associated socket hole, the displaced and partially robbed remains of a boulder kerb and stone fill surrounding the stone setting, plough ard marks, and a group of pits and stake-holes.

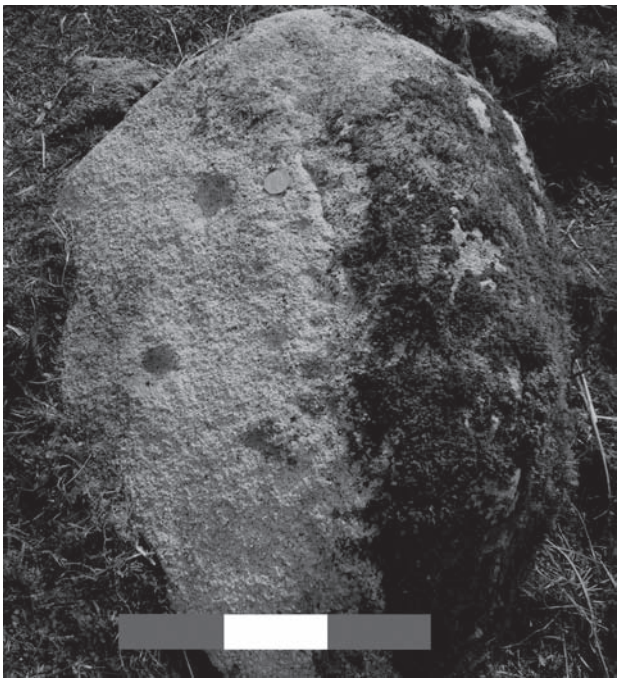


Figure 5.1. Cup marked boulder SF0001 deposited in stone spread, looking southwest (scale: 30 cm)

Associated deposits produced a small number of artefacts including Beaker ceramics and lithics, while a cup-marked boulder (Fig. 5.1) potentially relating to this period was located to the NNW of the cave entrance. Within the natural amphitheatre outside the cave entrance – the precinct-to-be – a sequence of deposits seems to relate to natural weathering and silting and contained only limited amounts of environmental material. No archaeological deposits associated with this phase were recovered from the cave, although two abraded sherds of decorated pottery (SF6.545 and SF6.546) found in a deep slot in the limestone floor of Bone Passage may be contemporary. However, they may have been washed into the cave or formed a part of the larger cache of ceramics deposited in Bone Passage in Phase 1b (see Section 5.4).

5.3.2 Recumbent standing stone and associated features – Phase 1a [Block 30]

The earliest feature (Fig. 5.2) is small granite standing stone F19.29 and associated kerb setting C19.41. The stone, a triangular-shaped granite erratic, heavily weathered and with rounded edges, 1.6 m long by 1.2 m wide at the base, and up to 0.38 m in depth was found in a recumbent position, overlying a thin former ground surface soil (C19.28). Its socket (F19.30), aligned northeast–southwest and filled with granite stone clasts, was to the northwest, cut through the natural karstic clay (Figs 5.2, 5.6, bottom, and 5.7). Allowing for the socket depth, the stone would have stood at a maximum height of *c.* 1.20–1.30 m above the contemporary ground surface. C19.28 had formed around the setting and over the karstic clay, punctuated by



Figure 5.2. Recumbent stone F19.29 & stone fill C19.44 in socket hole F19.30, looking southwest (larger scale: 2 m, short scale: 0.5 m)

small limestone bedrock outcrops, and a number of natural shallow scoops were recorded to the northeast of the stone setting, also filled with the overlying soil. The stone socket was surrounded on the east and northeast by a displaced alignment of granite boulders (C19.41), most likely a kerb, approximately 2.5 m across (Figs 5.3 and 5.5). Within the kerb and packed around the recumbent stone was a deposit of small granite clasts and soil (C19.42), from which four ceramic sherds with comb-impressed chevron decoration (SF19.156, SF19.157, and SF19.158), representing four vessels, were recovered.

Further away, to the northwest of the cave entrance, a granite boulder erratic with two simple cup marks had been re-used in an Iron Age context, located in the top of a boulder spread – possibly collapsed material from the wall enclosing the precinct (see Section 6.4). The two cups measure 50–60 mm in diameter and up to 10 mm deep (Fig. 5.1).

5.3.3 The ard marks: Phase 1a [Block 30]

A complex pattern of V-shaped ard marks (F19.14 & TPF11.02), filled and covered by C19.28, extended north to east around the stone setting, cutting into the natural clay (Fig. 5.5) and respecting the setting and kerb. They show regular and sometimes intermittent northeast–southwest and southeast–northwest alignments, as a result of the plough bouncing off outcropping limestone bedrock, and their overall pattern indicates intensive, repeated passes with the ard. These cover an area only *c*. 10 × 9.2 m and run out to the northwest against a low bedrock outcrop (Fig. 5.5).

The thin ploughsoil fill (C19.28) contained charcoal, a small assemblage of flaked stone artefacts, and ceramic sherds, including three simple flint and quartz flakes (SF19.142, SF19.150, SF19.151). Other lithics relating to this period were recovered from Iron Age contexts, including a thumbnail scraper (SF15.440), two short end-scrapers (SF6.233 and SF20.030), and three small Yorkshire flint flakes (SF2.550 and SF 19.133). Ceramics comprised 17 sherds representing six vessels including two Beakers, one of which may have been an All-Over-Cord type, the second decorated with incised lines and impressed cord.

5.3.4 Pits and stake-holes: Phase 1a [Block 30]

To the northeast and east of the stone setting, cutting through the ard marks, were several pits, scoops, and small

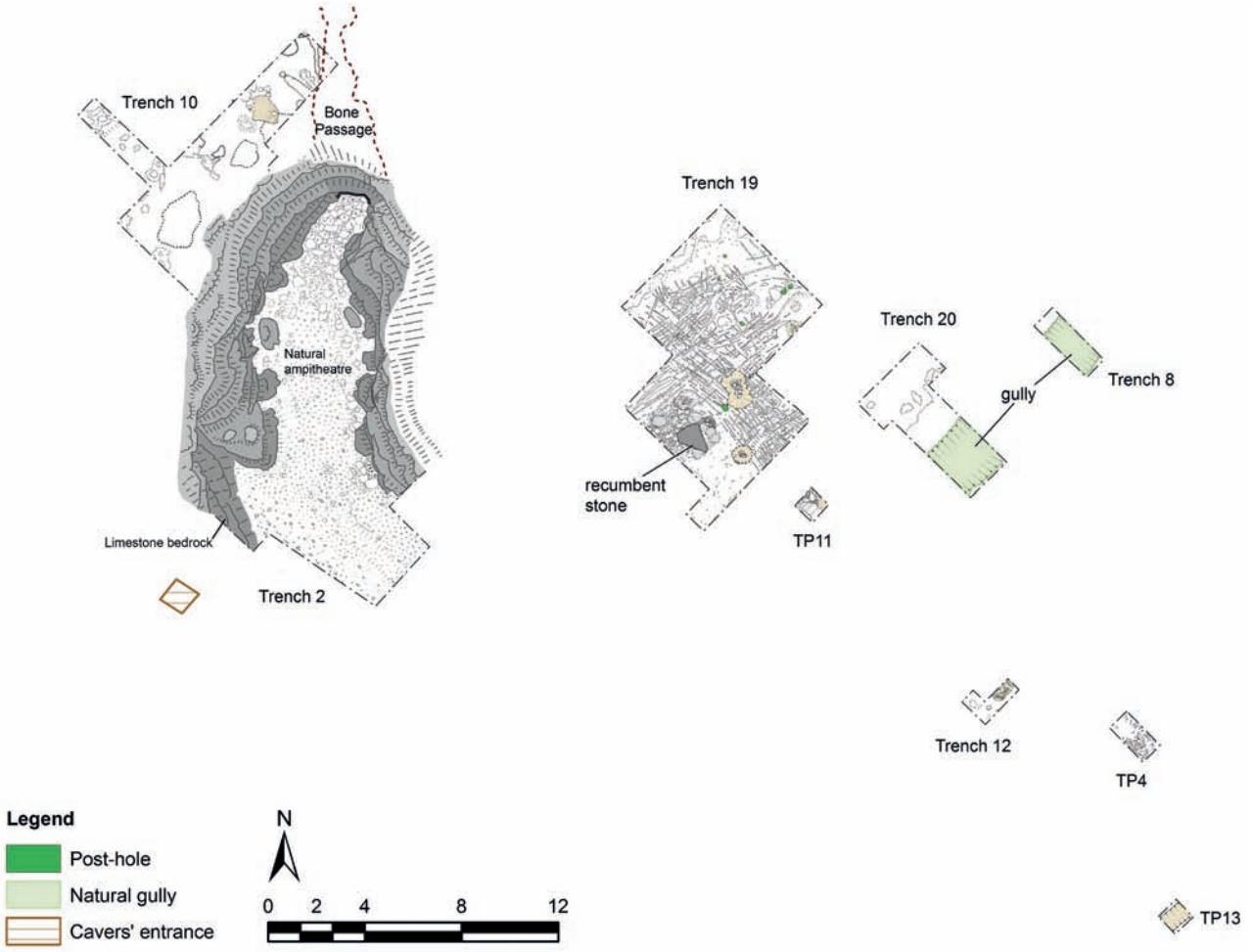


Figure 5.3. Plan of Phase 1 features within excavated trenches

post-/stake-holes. The latter measured 0.1–0.25 m diameter; larger pits and scoops 0.52–0.80 m, and stone-filled pit F19.10 1.50 × 1.05 m. F19.16 contained two decorated potsherds, one possibly from a Beaker. Stake-holes and pits formed no cohesive pattern but possibly represent a temporary building or shelter, or screens – potentially the first timber structures erected at the site (Figs 5.4, 5.5).

In three trial trenches on a level platform to the southeast were further isolated pits and stake-holes. In the platform centre, a spread of medium-sized granite stones, up to 0.9 m wide and cut into natural (F4.01), ran north–south. Some stones were set on edge, possibly indicating a degraded wall or drain. At the southeast platform edge, a geophysical anomaly proved to be a V-shaped ditch or a pit (F13.01). No contemporary finds were recovered from these features, although a Neolithic polished Cumbrian Tuff axe roughout (SFTP13.01) was found within the very top fill of F13.01: deposited during Iron Age Phase 6b.

A small pit (F10.01), associated spoil heap, and several shallow scoops, were identified on flat ground to the west of the cave entrance (Figs 5.8, 5.9). The pit contained several small charcoal fragments, traces of cereals, one hazelnut shell fragment and a worked quartz flake.

5.3.5 The 'amphitheatre' hollow: Phase 1a [Block 2]

Phase 1a deposits within the natural amphitheatre outside the cave entrance were limited to gritty silts containing occasional fragments of burnt bone and charcoal, along with indeterminate cereal grains. These are likely the product of natural erosion and silting, or intrusive material from overlying Phase 2a (Iron Age) activity but may represent some very early activity in this zone, especially C2.35 and C2.36. Small fragments of burnt bone and charcoal recovered from Phase 1b [Block 24] deposits in Bone Passage (see Section 5.4.1) are possibly contemporary with this material.

5.3.6 Use of the cave

No archaeological deposits were recovered from the cave passages during this phase. Two abraded, decorated pot sherds (SF6.545 and SF6.546) from a deep slot in the passage floor may be contemporary but may also have been washed into the cave or formed a part of the larger cache of ceramics deposited in Bone Passage in Phase 1b (see Section 5.4). Taphonomic processes in Bone Passage at this time would

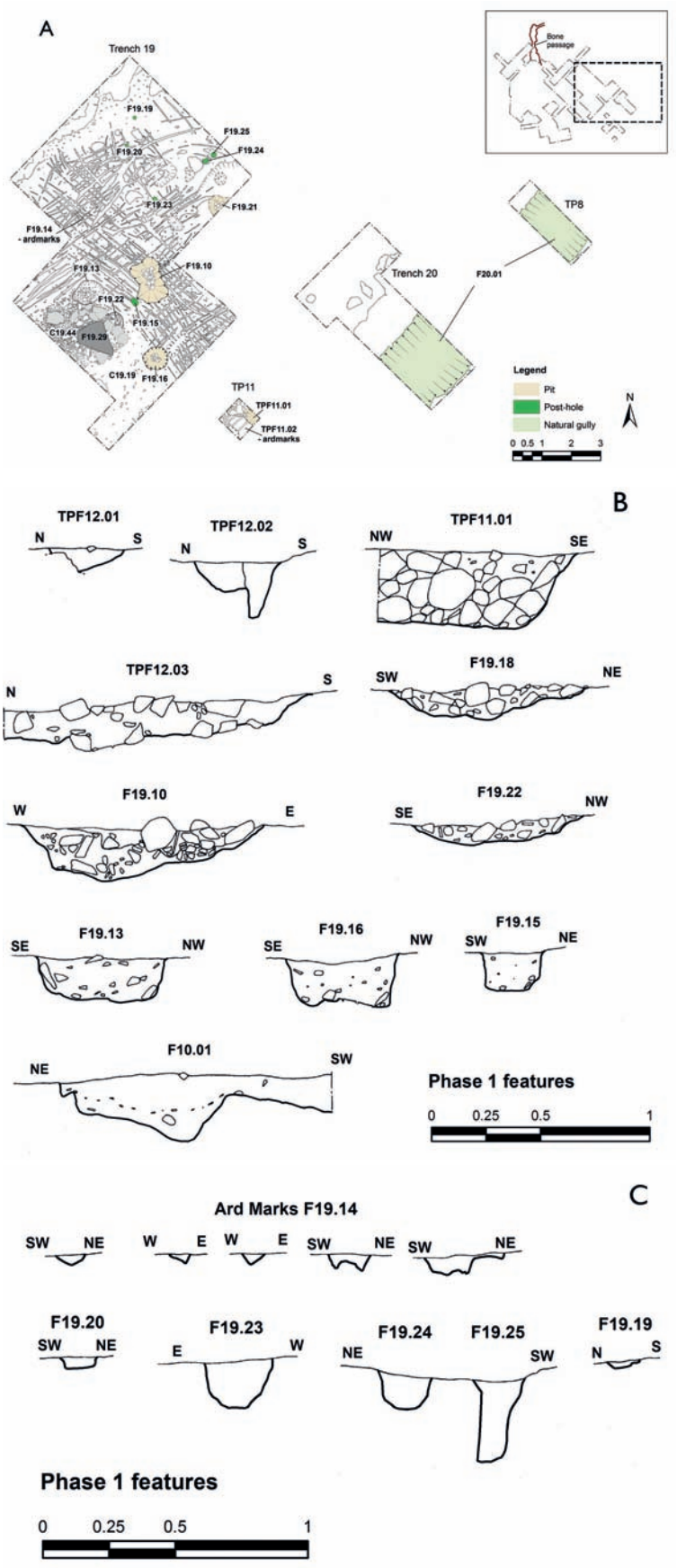


Figure 5.4. Phase 1 features focused on Trenches 19 & 20, & TP8 & TP11

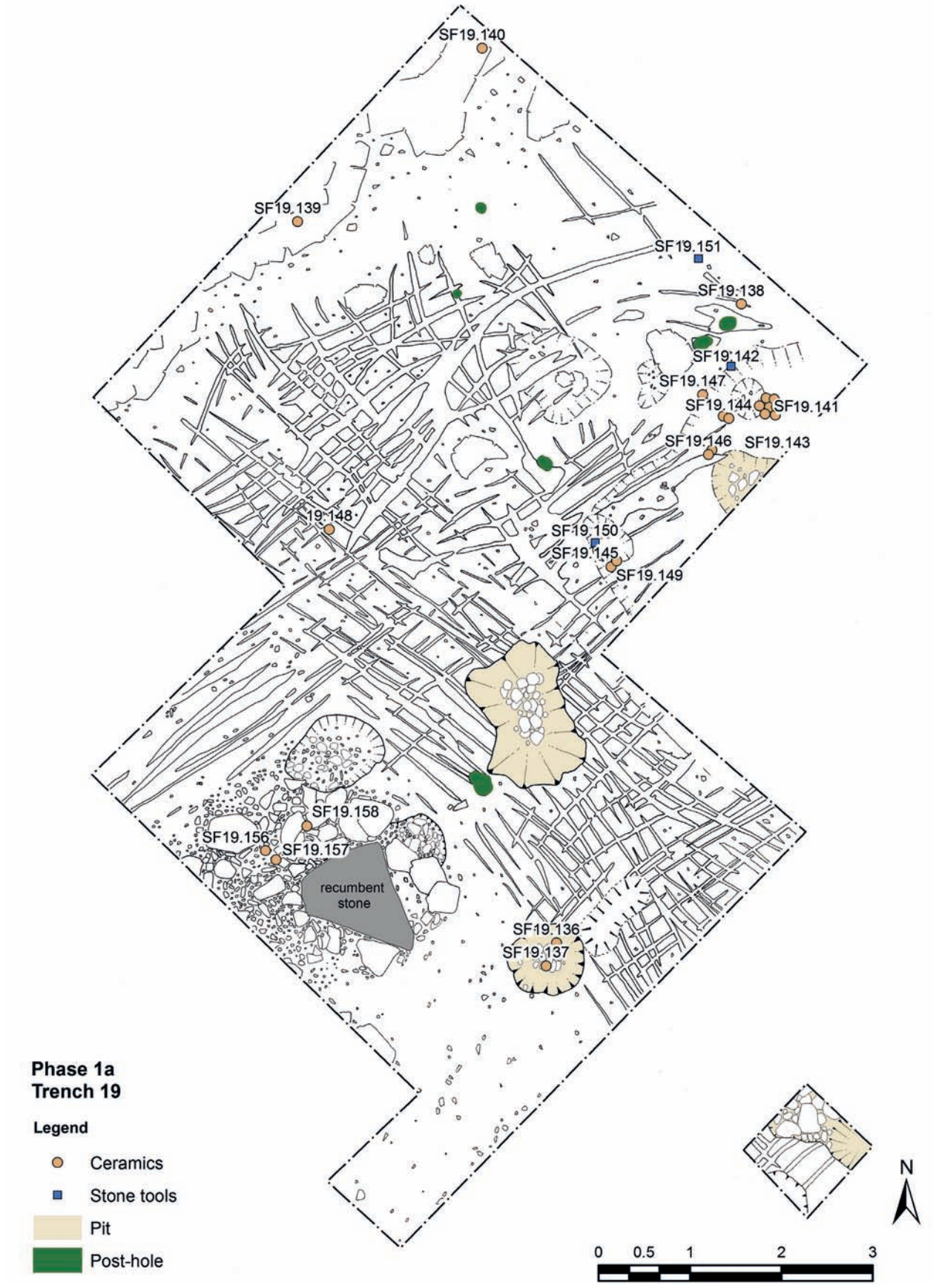


Figure 5.5. Plan of Trench 19 & TP11 showing features & finds distribution





Figure 5.6. Top: south facing section through stone filled pit F19.10; bottom: looking northeast over recumbent stone F19.29 with stone filled socket



Figure 5.7. Top: northeast facing section through stone filled socket F19.30 for recumbent stone F19.29; bottom: northeast facing drawn section showing associated contexts

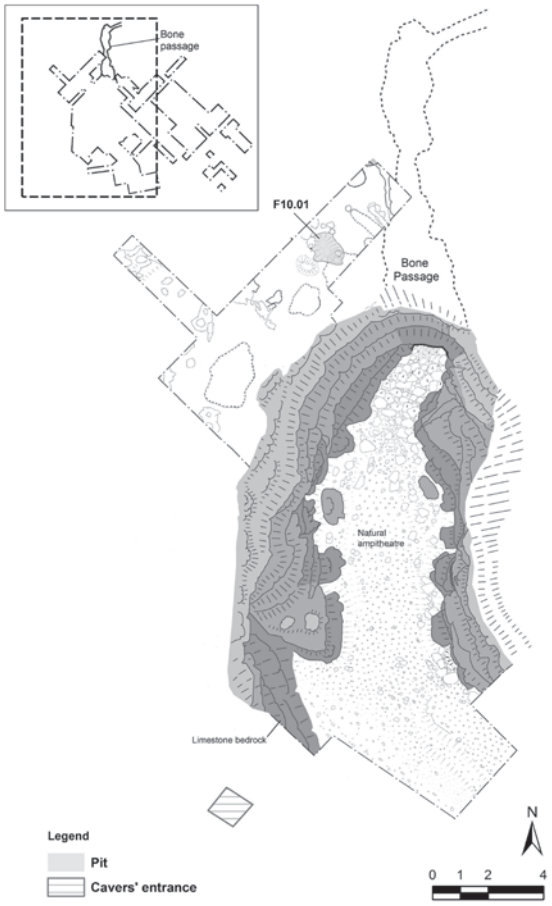


Figure 5.8. Plan showing natural amphitheatre, entrance to Bone Passage & location of pit F10.01

have included re-activation of this section of the cave as an overflow sink for water run-off during periods of heavy rain and may be the cause of this lack of archaeological material.

5.3.7 Chronology

Single AMS dates on samples from Phase 1a include hazel charcoal from ploughsoil horizon C19.28 overlying the ard marks (2140–920 cal BC, SUERC-28062); hazel charcoal from socket hole backfill C19.44 (1880–690 cal BC, SUERC-33767); and hazel charcoal from pit F10.01 (C10.05) to the west of the cave entrance (1730–1510 cal BC, SUERC-12296).

5.4 Phase 1b: Bronze Age activity in the cave

5.4.1 Ceramic deposition in Bone Passage: Phase 1b [Block 24]

Evidence for Bronze Age activity in the cave is confined to the deposition of a cache of 71 potsherds from C17.10 and C17.09, in the darkest recess at the north end of Bone Passage (SFs 17.011–17.014; 17.018; 17.020–17.032; 17.082–17.097; 17.104; 17.171). These represent four plain and six decorated vessels featuring a variety of impressed and incised techniques and were recovered

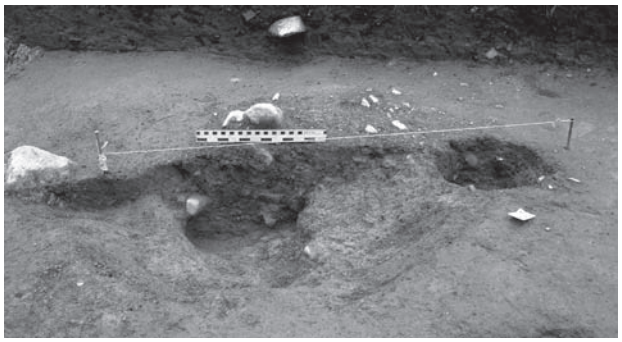


Figure 5.9. East-southeast facing section through pit F10.01

from an area 1.2 × 1.0 m, at a point where the cave passage accesses the active streamway via the Ramp (Fig. 5.10). The cache was embedded within gritty, water-washed silts containing black, water-worn cobbles packed with coarse limestone and granite clasts and featuring burnt and unburnt animal bone and charcoal. Incised decoration is also seen on the other two sherds from Bone Passage which may relate to this deposition (Section 5.3.6, above). Three simple lithic flakes also date to Phase 1b, one (SF17.103) deposited with the ceramic cache, the other two (SF17.022) from the Bone Passage 'narrows' (C17.09) along with a polished bone point fragment (SF1.337). An unworked long bone splinter (SF17.018) was also recovered from the north chamber.

5.4.2 Chronology

Hazel charcoal associated with the ceramic cache produced a Bronze Age date (1320–1110 cal BC, SUERC-23633). The limited number of radiocarbon dates from Phases 1a–1b precluded them from being included in the Bayesian model. However, these date ranges agree with the diagnostic ceramic sherds and lithics to indicate periodic use and deposition during the Bronze Age.

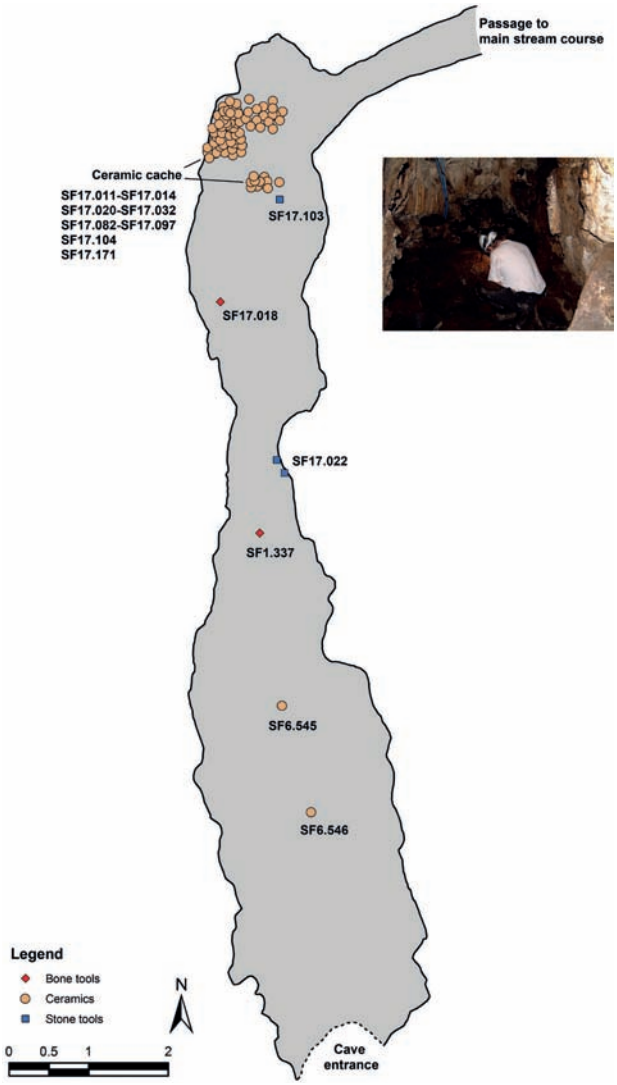


Figure 5.10. Distribution plot of Phase 1b [Block 24] finds in Bone Passage including cache of ceramics in the north chamber, & excavating the ceramic cache (inset)

5.5 Survival of Phase 1 features and deposits

Phase 1a Early Bronze Age material was confined to a relatively small area to the northeast and west of the cave entrance and within the amphitheatre hollow, with those outside the hollow well sealed below redeposited Iron Age material including deep layers of fire-cracked stone, granite boulders, and associated ashy residues. We can be fairly certain that these traces of early activity at High Pasture were not truncated by later events. However, the limited assemblage of charcoal, bone, and cereal recovered within the hollow of the later precinct would have been impacted on by one of two factors. Potential re-activation of the old cave entrance by freshwater run-off after heavy periods of rain would have had a devastating impact on any features or deposits in this vulnerable area, as experienced during excavation. Later Iron Age activity could also have impacted Phase 1 material within the precinct, in particular, modifications within the natural amphitheatre to improve access to the cave during Phase 2.

Within the cave, water movement would have had the same impact. The ceramic cache and other isolated small finds recovered from Bone Passage appear to have been protected by a lens of material which formed in the Bronze Age, comprising water-washed stones, coarse silts, and larger clasts (C17.09), relatively shallow at the south end of the passage but increasing in depth to the north and filling a deep hollow in the bedrock floor. However, additional deposits and finds may have been lost to taphonomic processes before C17.09 was deposited.

6

Transformation to sacred place: the Early Iron Age

Steven Birch

6.1 Introduction

The Late Bronze Age–Early Iron Age transition saw a flourish of activity at High Pasture. Periodic intensive use was punctuated by intervening periods of hiatus of varying duration. Activity was concentrated within Bone Passage and the natural hollow outside, which developed during this period into a 'precinct' featuring hearths, walkways, and three successive stone-built stairwells to access the cave. These features were embedded within deep and well-stratified archaeological deposits in the precinct, most seemingly generated by the use of the hearths. Moves to physically define this clearly important space culminated in the complete enclosure of the precinct within a wall by Phase 4.

In the cave, two floor horizons punctuated midden deposits containing plentiful artefacts and environmental material. Artefact caches, evidence for structured deposits, and disarticulated human remains were incorporated into structural elements as well as the middens.

There is limited evidence for activity beyond the precinct during Phase 2, but through Phases 3 and 4 the area to the east/northeast of the precinct shows ephemeral structures and spreads of redeposited ash and fire-cracked stone, with limited (especially compared to the cave and precinct) artefacts and ecofacts.

Chronology (Bayesian modelled radiocarbon dates)

The modelled dates for Phase 2 are discussed in Chapter 10 and presented in Appendix Table 1

6.2 Phase 2: modifications to the natural cave and amphitheatre

6.2.1 General

Before Phase 2, the area surrounding the cave entrance was a rocky natural amphitheatre: craggy limestone overhangs to the west, north, and northeast interspersed with slopes of karstic clay and eroding bedrock facing the steep 4.5 m limestone cliff with the cave entrance at its base. A floor of water-washed gravels and silts [Block 2] and limestone and granite boulders dipped gently to create an uneven surface leading into Bone Passage. Small cavities within these walls would flow with water during heavy rain and run-off activity and during such episodes the amphitheatre would have been transformed into a dynamic zone, the abundant flow of water disappearing underground at several locations. Such events may have helped mark out the external, as well as subterranean, morphology of High Pasture as a distinctive space in the landscape, a fitting arena for public, significant events.

Phase 2 saw the first modifications which transformed this external space: remodelling of the natural cave entrance, activity surfaces and hearths flanking a formal walkway leading through precinct to cave, and a paved access into Bone Passage. Few artefacts were present, most deposited within the entrance and Bone Passage. Phase 2 ends with the backfilling of the lower walkway and the deposition of midden, including large quantities of butchered animal bone, in Bone Passage. This was followed by a (likely quite short) break in activity.

6.2.2 Phase 2a: lower walkway to the cave [Blocks 3 & 4]

Lower walkway F15.37 first modifies the natural cave access, constructed on top of chaotic limestone and granite boulders (C2.73, [Block 1]) and gravels and silts (C2.35–C2.39 [Block 2]; C15.73 [Block 3]). A thin iron pan (C15.72) over the latter indicates waterlogging at the amphitheatre base, above which a pale silt (C15.71) provided a base for the side walls of the walkway and contained the perforated end of a bone needle roughout (SF15.399), an antler tine handle/fitting (SF15.400), and some animal bone, mainly cattle. Hazel charcoal dates to

810–740 cal BC (SUERC-33647) and 790–530 cal BC (SUERC-28059).

Low granite and limestone revetment walls formed the walkway sides, forming 2–3 courses 0.3–0.4 m high. Limestone quarried from the amphitheatre face (C15.68) was packed within a karstic clay matrix (C15.70; C15.76) behind these revetting walls each side of the walkway to form terraces. The walkway was up to 1.5 m wide and aligned roughly north–south, entering the southeast end of the precinct and gradually descending north to terminate at the cave entrance (see Fig. 6.6A, below). Walkway deposits included intermittent paving/silts C15.69 [Block 4], occasional fragments of fire-cracked stone, degraded animal bone, mainly cattle, and charcoal (Fig. 6.1).

Three small, truncated stake-holes (F2.38), set in the terrace to the west of the walkway and running parallel to it may have formed uprights for a screen or partition. This went out of use when the terraces were modified: levelled and dressed in crushed limestone fragments (C15.68; C15.75) to form distinctive white surfaces flanking each side of the walkway, creating level activity areas and guiding access towards the cave entrance (F15.34).

6.2.3 Phase 2a: precinct activity: the first hearths [Blocks 37 & 5]

Two hearth settings appear contemporary with the use of walkway F15.37. Small slab hearth F15.33 [Block 37] was the first to be built, to the west of the walkway. A small bowl-shaped pit (F15.31) to its southeast contained a black ash and charcoal layer (C15.66) superseded by orange peat ash (C15.67), both probably deriving from the hearth. Hearth F15.36 [Block 5] was constructed from well-fitted granite slabs on a pedestal of limestone blocks within the trough of walkway F15.37, where it narrowed and descended towards the cave entrance, the hearth top just above the level of surface F15.34 (Fig. 6.3). The construction of this hearth, within the walkway, would have created a major obstacle to accessing the cave, necessitating movement to either the west or east via the cobbled limestone terraces, at this point only 0.8–1.0 m wide between the hearth and the amphitheatre edge.

Deposits associated with the hearth (C2.33; C2.34) featured calcined animal bone (Fig. 6.5), mainly cattle, along with sheep/goat, pig, deer, and small mammal cranial/tooth fragments, traces of burnt cereals and hazelnut shell, bone perforated fitting SF2.136, and worked antler (SF2.137). Hazel charcoal from C2.34 dated to 750–400 cal BC (SUERC-12280).

6.2.4 Phase 2a: accessing the cave: modification of the natural entrance [Block 18]

The path of walkway F15.37 steepened and narrowed as it approached the cave entrance, the revetting walls merging into the limestone bedrock edges of the amphitheatre. At the west of the entrance, this bedrock was modified, large blocks were detached to create a relatively vertical face. The natural arch of the cave entrance was also altered, dressed to a relatively horizontal surface. A large limestone block (F6.03) was erected on the east side of the entrance, forming a threshold stone, with a long granite slab (F6.04), fixed on top of it via supporting pinning stones (Fig. 6.4, Fig. 6.6B). This was crudely chipped and flaked along its upper edge to respect the contours of the cave roof (Fig. 6.6C). A fragment of walling four courses high (F2.34a) combined with the threshold structure to form a rectangular 'doorway' construction, which also blocked off natural cavities and a small additional passage in the limestone wall, formalising the entrance point. A wooden door or screen could now have been fitted across the cave entrance. Inside the threshold (Fig. 6.1) fragmentary animal bone, a whetstone (SF2.548), and a large fragment of carbonised wood (SF2.551) were found (C2.72 [Block 18]).

At some stage during the use of the walkway, there was a natural collapse of the limestone cliff above and east of the cave entrance. A large boulder *c.* 1.8 × 1.0 m and up to 1.2 m deep, came to rest immediately outside and to the east of the cave access (Fig. 6.5; Fig. 6.6A–B). Too difficult to remove from the precinct, this was left *in situ*, possibly moved slightly to retain access to the cave, with other debris from the collapse stacked around the south and east of the boulder, and the walkway modified to include this new feature. The walkway was now narrower as it approached the cave and a new section of wall (F2.34b) was constructed between the boulder and the cliff to the east of the entrance.

Thin, rough granite paving and low steps (F2.39) provided access into the cave. The paving formed a 1.2 × 0.7 m surface, with slabs 0.05–0.1m thick. This earliest in-cave paving is contemporary with cobbled floor surface F1.01 in Bone Passage (see Section 6.2.5). Paving and steps were impregnated and covered with an organic-rich matrix (C2.71) full of charcoal, burnt cereal grains, degraded and mainly burnt animal bone, and fire-cracked stone, along with artefacts possibly forming a structured deposit at this liminal point (Table 6.1). This deposit remained in place into Phase 2b and the closure of walkway F15.37, and it is possible that this deposition may have been associated with this closure event (see Section 6.2.7).

6.2.5 Phase 2a: activity within the cave [Block 25a]

Phase 2 saw the deposition of a wide range of materials in Bone Passage. Phase 2a is defined by a significant group of poorly sorted 'dump' deposits (C6.09, C6.08, C1.09, C17.08a and C17.08b), all packed with over 80% stone: black water-worn cobbles, limestone, granite, and fire-cracked fragments (Fig. 6.7). All the dumps contained burnt hazelnut shell, and C6.09, C6.08 and C1.09 low

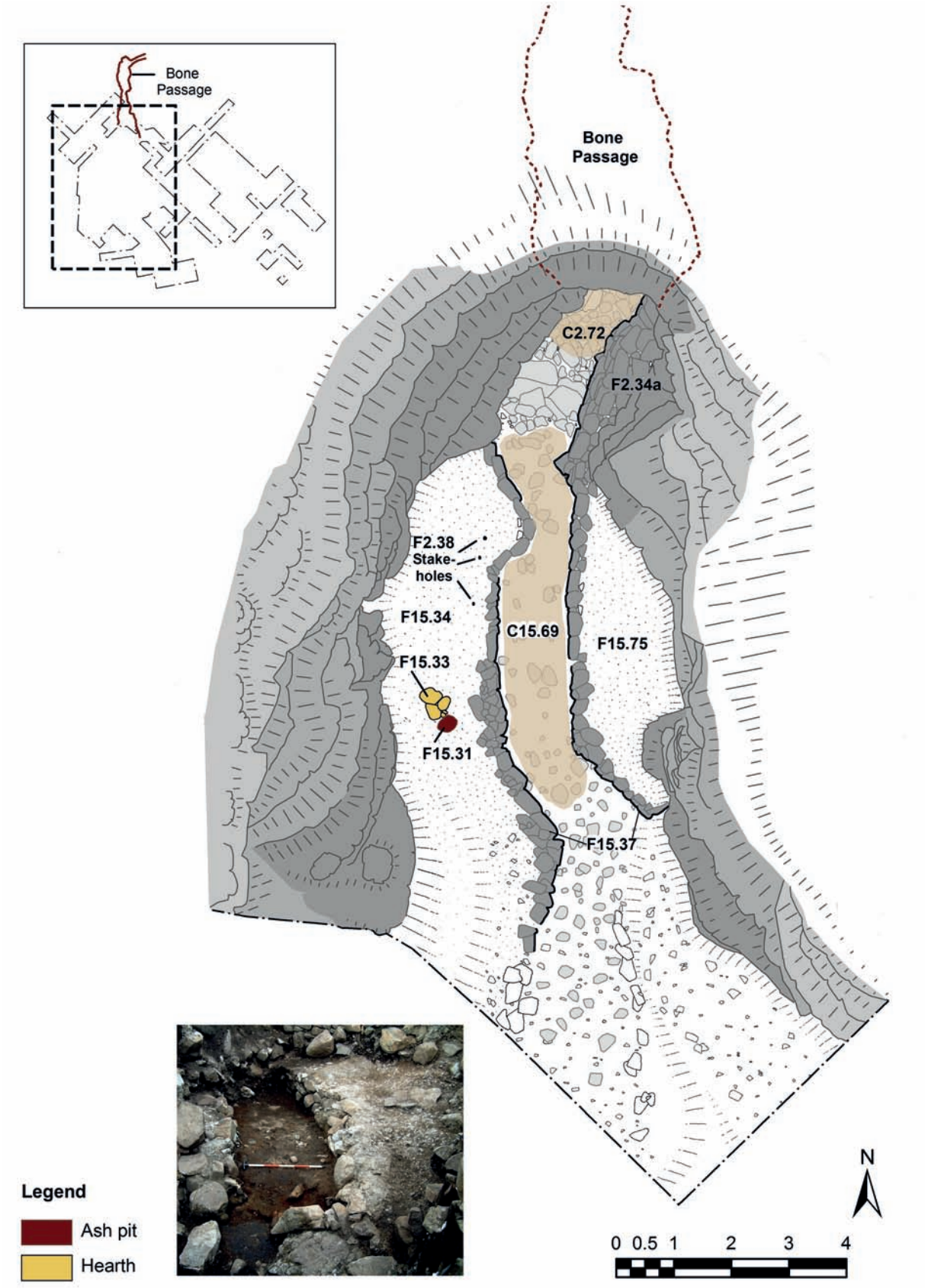


Figure 6.1. Phase 2a features & deposits within the natural amphitheatre outside the cave. Lower walkway F15.37 during excavation, looking south (inset)

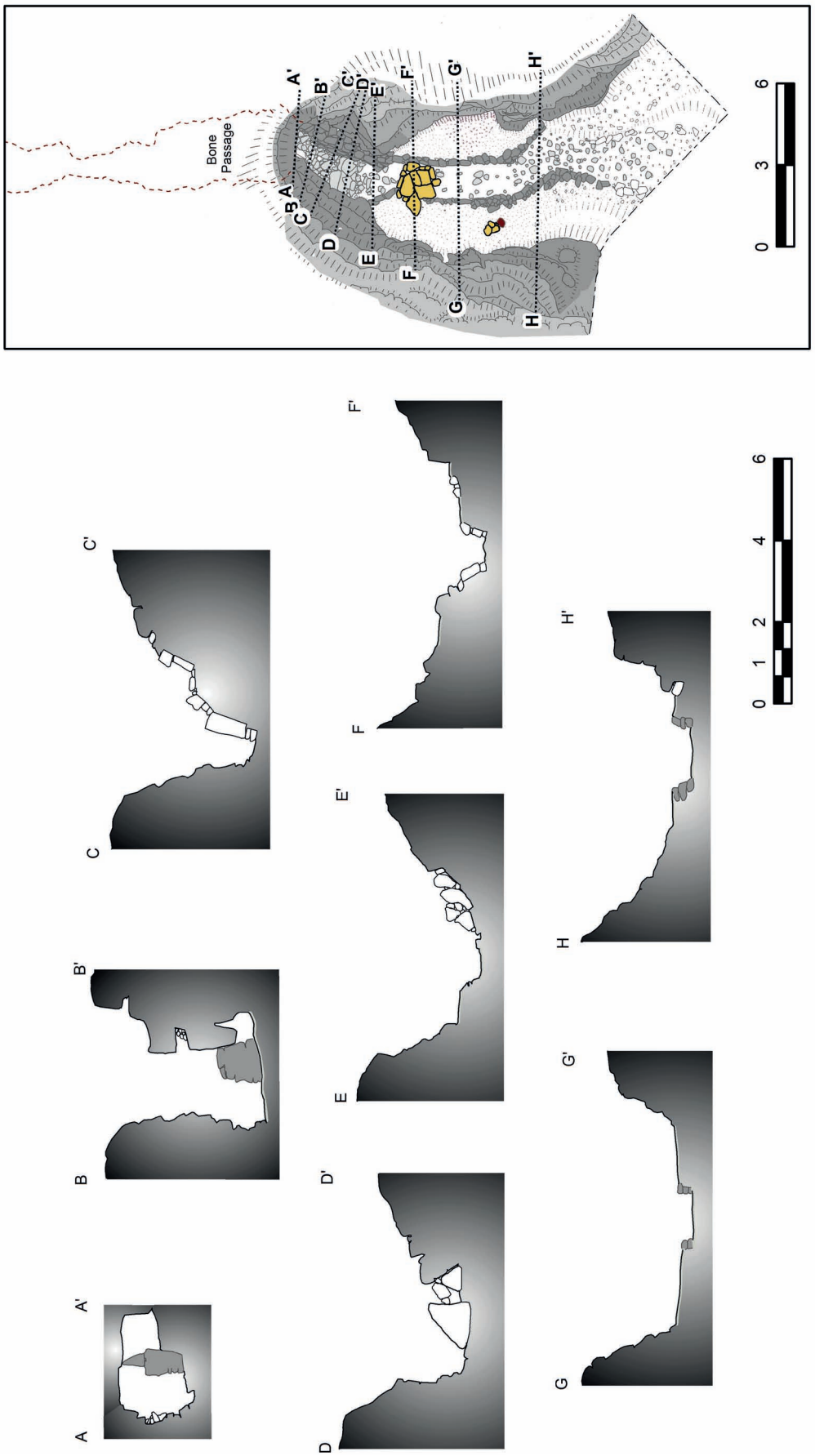


Figure 6.2. South facing profiles through the natural amphitheatre & entrance to Bone Passage at Phase 2 with hearth omitted in section F–F (see inset plan for profile locations)

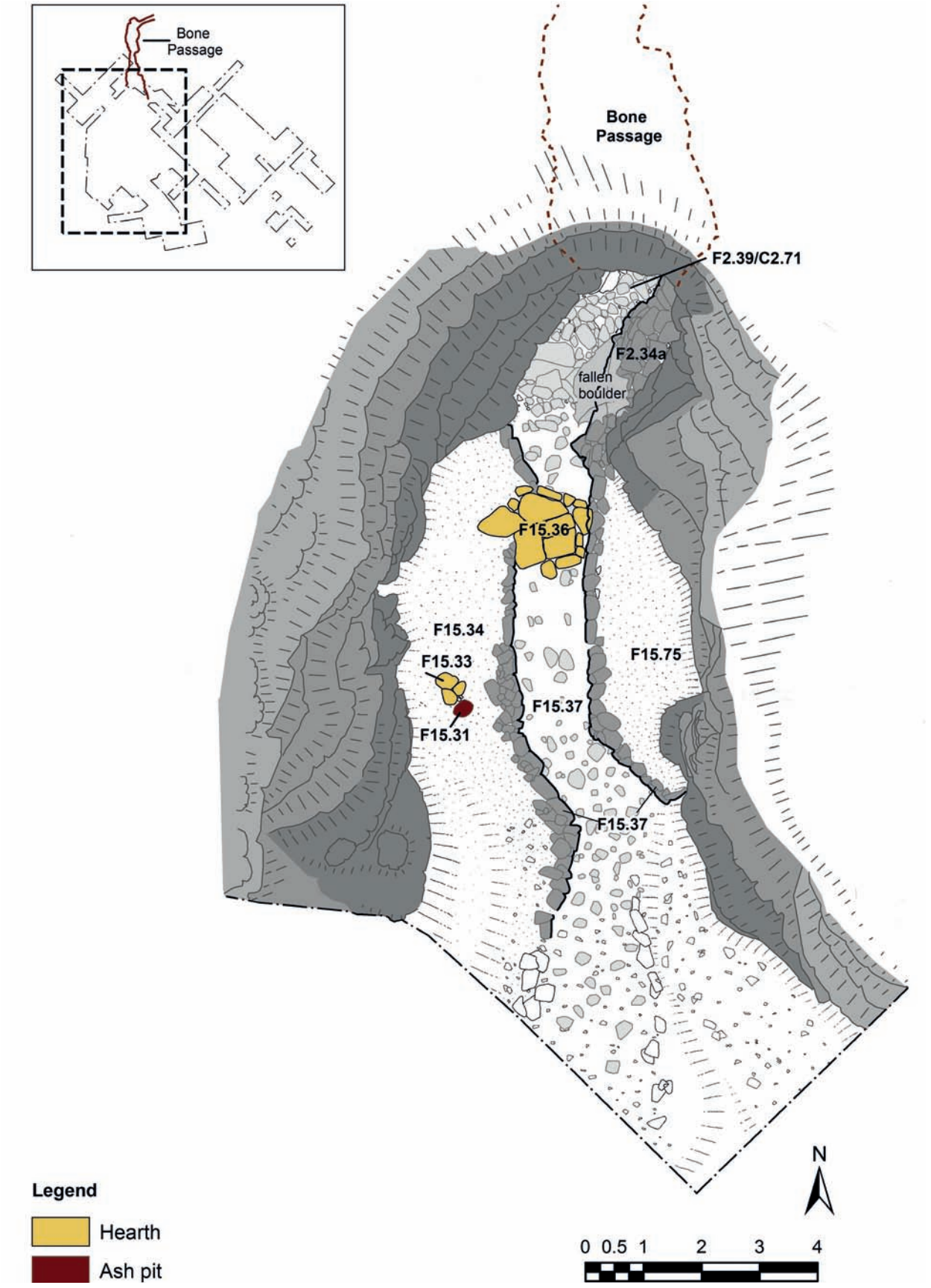


Figure 6.3. Phase 2a showing lower walkway F15.37, the two hearth settings, & associated features within the natural amphitheatre outside the cave

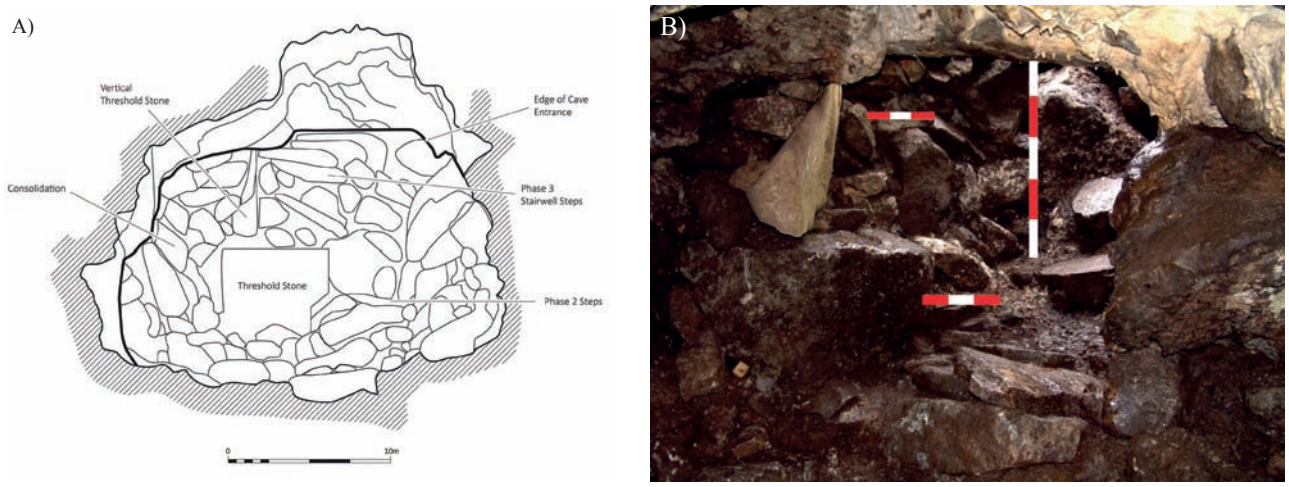


Figure 6.4. Elevation & photograph showing south end of Bone Passage, the modified cave roof & threshold stones F6.03 & F6.04 (vertical scale: 1 m)

Table 6.1 Artefacts recovered from Block 18 deposits within the cave entrance

SB	*C*	*SF*	*Description*
18	2.71	2.545	Quern rubber
		2.546	Cobble grinder/pounder
		2.547	Cobble grinder
		2.549	Steatite spindle whorl
		2.541	Worked pumice
		2.543	Polished bone/antler pin
		2.550	Lithic: Yorkshire flint flake
		2.554	Chunk of bog iron ore

quantities of burnt cereal grains – mainly barley, but with rare oat and wheat, mainly in the south chamber and central narrows. The dumps formed a compact surface of pebbles and silt, peppered with large rock fragments through to fine sand, and containing microscopic traces of fuel residues.

The dumps were also packed with animal bone, especially butchered material, and fragments of red deer antler, some showing evidence of working. Some of the earliest bone included heavily burnt and calcined material, indicative of high temperature burning. Identifiable fragments included cattle, sheep/goat, pig, red deer, and a dog's femur fragment (Fig. 6.8).

Artefact distribution within the Block 25a dumps may suggest structured deposition, with distinct groups of objects in the southern chamber (Fig. 6.7A). Although taphonomic processes, including disturbance by later activity, may have affected object placement, these concentrations merit further discussion. A first object group (Group 1) is seen roughly in the centre of the south chamber and a second (Group 2) just to its northeast (Table 6.2). Both were recovered from C6.09 and C6.08. Burnt grain from C6.08 produced an AMS date of 790–500 cal BC (SUERC-23625), and a human tooth (SF6.606) 777–539 cal BC (SUERC-66384). A third, mixed object group was deposited at the north end of the south chamber, adjacent to the passage narrowing, in C1.09 (Table 6.2; Fig. 6.7A).

The only small finds recovered from these dumps in the north chamber of Bone Passage are prepared antler strip SF17.059, bronze sheet offcut SF17.079, and fragmentary bronze cast object SF17.078. Hazel charcoal from C1.09 dates to 810–530 cal BC (SUERC-14935), and animal bone a date of 780–480 cal BC (SUERC-14938).

6.2.6 Phase 2b: deposition into the cave [Blocks 25b, 25c]

A compacted floor horizon (F1.01; C1.08) developed over the Block 25a dumps (Fig. 4.4A-C). Made up of fire-cracked pebbles and a patch of paving through the narrow section of Bone Passage, this horizon divides Phase 2a [Block 25a] and Phase 2b [Block 25b] (Fig. 6.7), extending past the narrows as C17.07 and C17.06b. The latter was a thin, pale red, clayey sediment, similar to precinct hearth deposit C2.34 (hearth F15.36), containing heavily calcined bone fragments, hazelnut shell, and rich in cereal grains. C17.06b survived as pockets between stone clasts, abutting the cave walls to each side and possibly representing the remnants of a thicker layer long eroded by the passage of feet through the cave before its burial by later deposits.

The Block 25b deposits contained well-preserved animal bone, mainly cattle, with more burnt bone recovered from the north chamber, with sheep/goat, pig, deer, dog, and horse represented. A large cattle bone deposit in C1.08, including semi-articulated vertebrae, recovered from behind a displaced slab of limestone against the east cave wall, may have formed a discrete, structured cache. C17.07 and C17.06b contained more red deer antler, much of which was worked. A large dog or wolf

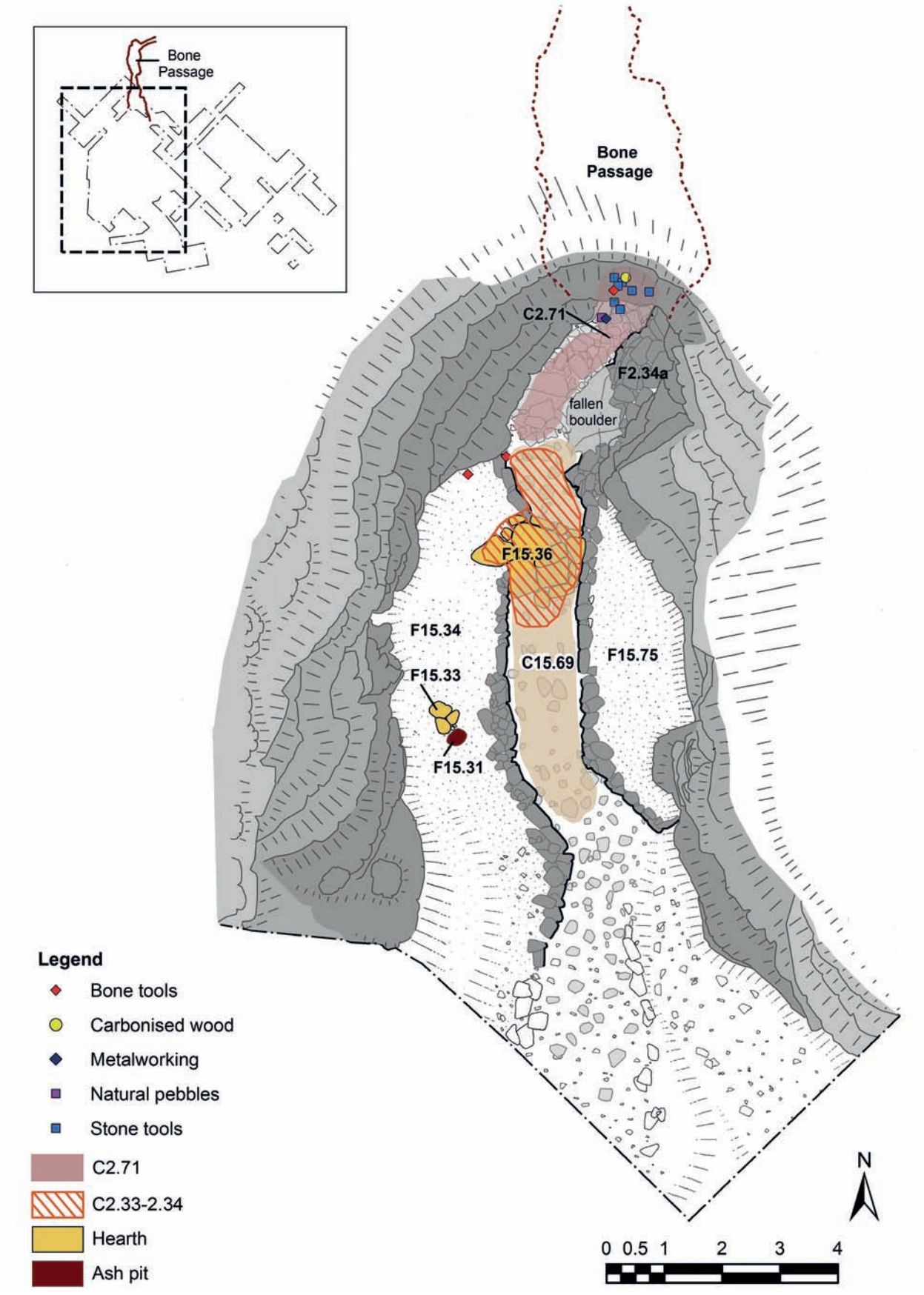


Figure 6.5. Phase 2a showing lower walkway F15.37, Block 5 deposits & finds distribution

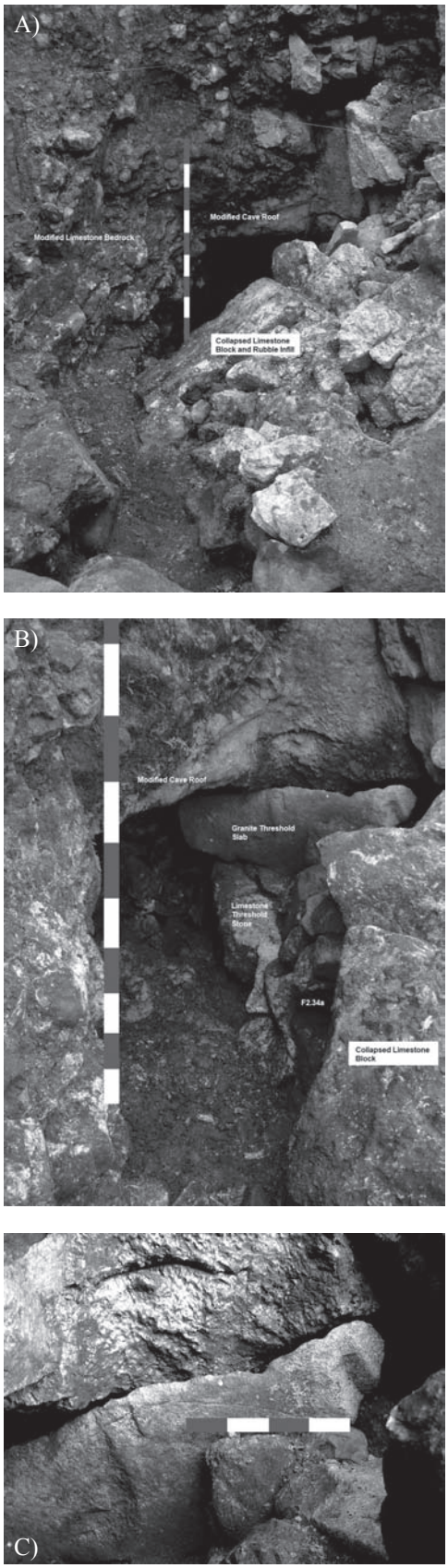


Figure 6.6. The north end of lower walkway F15.37: A. fallen limestone boulder & packing; B. modifications to the cave entrance; C. shows how granite threshold stone F6.04 has been shaped to fit & mirror the natural cave roof

calcaneum along with some other *Canis* elements was recovered from C17.07, and a medium-sized dog canine from C1.08. Fish bone, mainly herring, was a feature of C1.08, mostly deposited within a distinct area just to the south of the narrows.

Block 25b contained several mixed groups of objects which may represent structured deposits into the cave, with similarities to the Block 25a groups (Fig. 6.9). The first (Group 1) was placed just south of the narrows in C1.08, Group 2 was recovered from C17.07 and C17.0.6b, within the narrowest section of Bone Passage. An antler percussion tool/work surface (SF17.006) deposited against the west wall of the north chamber refits with SF17.063a (Group 2, Table 6.3). Another small group of objects (Group 3) was recovered from C17.07 and C17.06b immediately north of the narrows. Other artefacts spread through the Block 25b deposits are also shown in Table 6.3. Burnt hazelnut shell and cattle bone from C17.07 were dated to 556–406 cal BC (SUERC-66352) and 782–512 cal BC (SUERC-66354), burnt grain and burnt hazelnut shell from C17.06 to 670–410 cal BC (SUERC-28051 and SUERC-23632), and cattle bone from the same context to 770–481 cal BC (SUERC-66361).

A second Phase 2b deposition sequence is represented by C6.07 and C1.07 [Block 25c]. Three groups of objects roughly mirrored the deposition of material in Phase 2a. The first group were placed in the centre of the south chamber, and a second against the east wall just south of the narrows (C6.07). A third group was located just south of the narrows in C1.07 (Table 6.4). Animal bone from C6.07 dated to 781–514 cal BC (SUERC-50994). All were within stony redeposited midden containing substantial burnt/calcined bone including cattle, sheep/goat, pig and deer, and fragments of unburnt, butchered bone unidentifiable to species, marine shells, herring bones, some large charcoal fragments, and burnt hazelnut shell and grain. It is possible that this material, along with the groups of objects it contained, formed a structured closing deposit marking the end of a specific period of activity at High Pasture which also featured the backfilling of lower walkway F15.37.

6.2.7 Phase 2b: closure of the lower walkway [Block 6]

The end of Phase 2 in the precinct is marked by the backfilling and closure of lower walkway F15.37. This was filled to the top of its revetting walls and hearth F15.36's surface with a granite and limestone boulder-filled matrix (C15.59; C15.63) (Fig. 6.10) containing animal bone with little burning or working, and some charcoal. Spread through this material, at the south end of the walkway away from the cave, were several artefacts including saddle quern fragments, a complete saddle quern deposited working face down, and a quern rubber. A group of objects were cached at the southern limit of the walkway (Table 6.5). Hazel charcoal from C15.59 produced an AMS date of 600–400 cal BC (SUERC-28060).

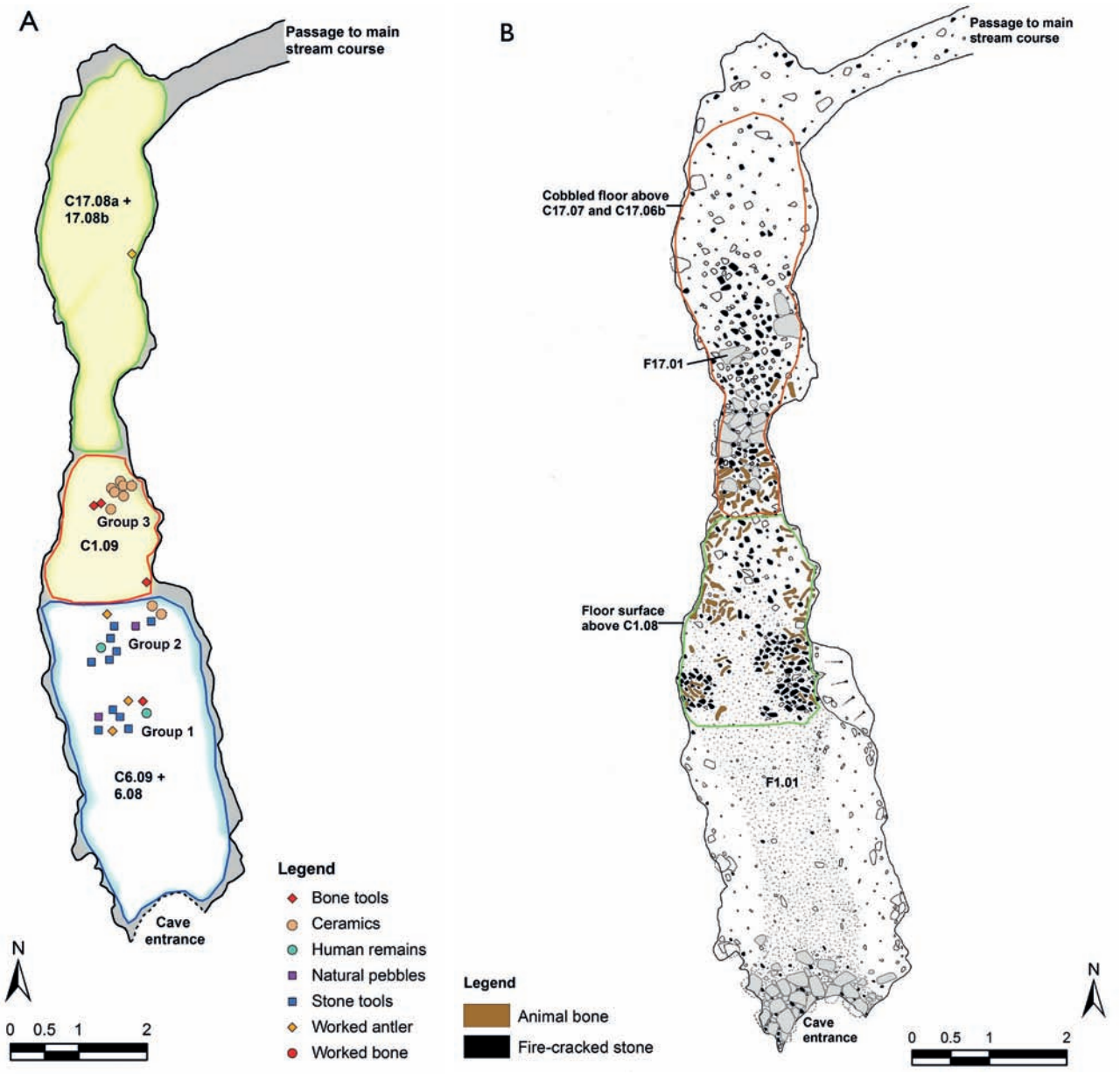


Figure 6.7. Plans of Bone Passage showing A. Phase 2a [Block 25a] contexts & finds distribution; B. deposits & features forming floor F1.01

6.2.8 Phase 2: activity beyond the precinct boundary [Block 31]

Little activity was identified beyond the precinct during Phase 2. Shallow, charcoal-flecked sediment C19.13 [Block 30] had formed, sealing all Bronze Age material except the recumbent standing stone and its setting. Above this, a thin iron pan deposit preceded redeposited stony silts C19.10, which contained small fragments of heavily burnt and calcined bone, degraded unburnt bone and teeth, including a red deer metapodial. Artefacts included broken pebble grinder/pounder fragment SF19.064 and two lithics (SF19.081, SF19.135). Hazel charcoal from C19.10 produced an AMS date of 800–520 cal BC (SUERC-23635). Thin lenses of material similar to C19.10 were seen to the northeast and east of the precinct. C11.10, C11.14 and C19.10 (Block 31) produced limited burnt cereal, with more recovered from nearby C18.04.

6.3 Phase 3: keeping the fires burning: precinct and cave

6.3.1 General

After the closure of walkway F15.37 and an apparent short hiatus, activities resumed at High Pasture. Site infrastructure was modified, with the use of fire becoming a particular focus for activity. A sequence of five slab-built





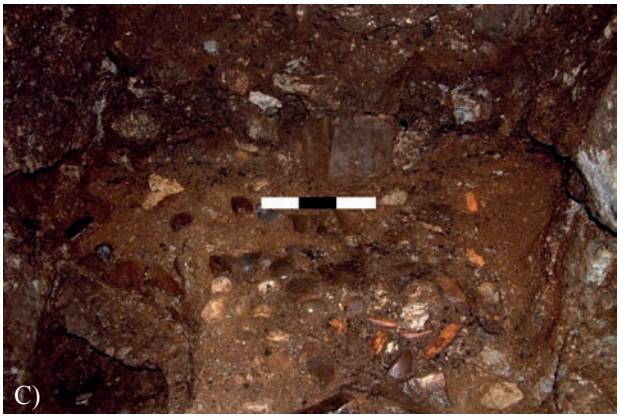


Figure 6.8. A–B. Phase 2a [Block 25a] deposits in Bone Passage including animal bone & red deer antler; C. floor F1.01 [Block 25b] in the south chamber of Bone Passage

Table 6.2 Artefacts recovered from Block 25a deposits within Bone Passage

SB	*C*	*SF*	*Description*
25a	6.09/6.08	6.486	Quern rubber
Group 1		6.487	Bone point roughout (broken)
		6.488a	Steatite spindle whorl
		6.531	Steatite spindle whorl (unfinished)
		6.504	Whetstone
Group 2	6.09/6.08	6.409	2 Pottery sherds from 2 vessels
		6.418	Steatite spindle whorl
		6.482	Sharpening stone
		6.483	Double ended antler tine handle/fitting
		6.484	Steatite spindle whorl (half)
		6.485a-b	2 Steatite spindle whorls
		6.550a	Bone needle (broken)
		6.550b	Antler point (broken)
		6.550c	Antler peg (broken)
		6.550d	Polished bone pin (broken)
		6.606	Human tooth (incisor: child 6–7 years)
		6.607	Baked mudstone microblade
		6.620	Human tooth (upper molar: adult 30 yrs +). Also identified as poss. pig tooth based on isotope analysis
		6.639	Flint flake
Group 3	1.09	1.240/ 1.330	7 Pottery sherds (from 1 vessel)
		1.331	Bone point (broken)
		1.335	Bone needle roughout
		1.004	Bronze rod frag. (poss. ring/ link)

hearths and a pit hearth were constructed in the precinct, and the multiple layers and dumps of fuel-residue rich material generated via their use were enough to necessitate the construction of two successive stone-built stairwell structures to maintain access to the cave. Within this material, significant quantities of artefacts were deposited, some in distinct caches and structured deposits where, despite some movement via taphonomic processes, patterns of distribution are clear.

A new paved walkway was also constructed through Bone Passage, maintaining access to the active streamway. Save for some shallow surface deposits, this new floor was kept relatively clean for a significant time, with the next significant in-cave deposits dating to Phase 4c.

Table 6.3 Artefacts recovered from Block 25b deposits within Bone Passage

SB	*C*	*SF*	*Description*
25b	1.08	1.254	Bone shaft point
Group 1		1.321	Bone shaft point
		1.326	Bone point/pin frag.
		1.327	Antler polished pin (broken)
Group 2	17.07/17.06b	17.014	Prepared antler strip
		17.060	Part worked antler beam & work surface
		17.062	Antler beam work surface
		17.063a	Antler junction offcut
		17.063b	Gathered antler
Group 3	17.07/17.06b	17.003, 17.004, 17.008, 17.009	4 Pottery sherds (from 1 vessel)
		17.015	Antler prepared strip
		17.058	Gathered antler frag.
25b	1.08	1.002	Flint chip
	17.07	17.005	Bone point (broken: similar in form to spear points)
		17.007	Bone needle/pin/point roughout (in 3 parts)
		17.075	3 Flint chips
	17.06b	17.105–8	Cobble edge grinder

For the first time since the Early Bronze Age, Phase 3 provides tantalising evidence for activity beyond the precinct boundary, with fragments of walls, pits, post-holes, and scoops in the surface trenches. These may relate to a processional way providing access to the site from the east, as well as possible divisions of space and activity areas overlooking the precinct.

Phase 2a's bedrock collapse proved to be the first stage of a challenging stratigraphic sequence inside the precinct. The intensive depositional and structural sequences created through Phases 3 and 4 produced a rich, yet fragile archive: construction and dismantling of stairwell features meant slumping and disturbance of the ever-increasing, increasingly complex midden sequence around them. All of this made it difficult to interpret the complex stratigraphy at this location.

Chronology (Bayesian modelled radiocarbon dates)

The modelled dates for Phase 3 are discussed in Chapter 10 and presented in Appendix Table 2

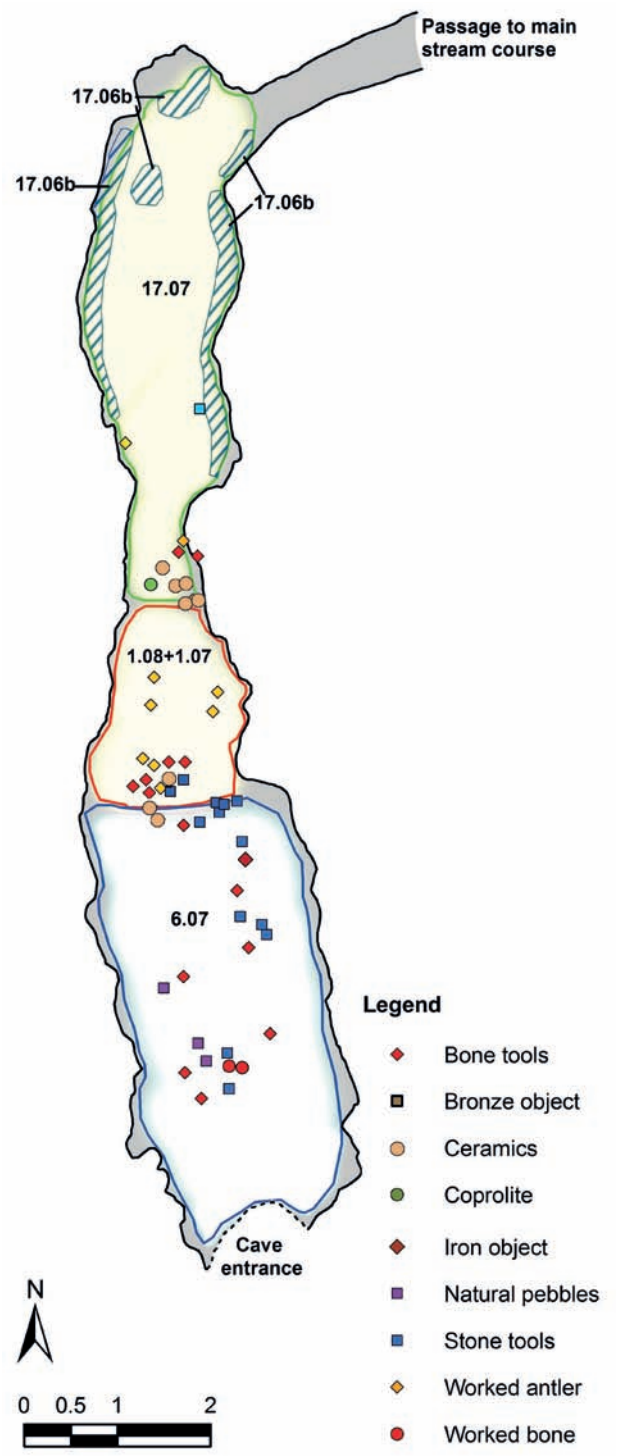


Figure 6.9. Plan of Bone Passage showing combined Phase 2b Block 25b & Block 25c contexts & finds distribution

6.3.2 Phase 3a–3b: hearths, walkway, and stairwell construction [Block 7a, 7b, 12 and 19]

The construction of a new walkway (F15.26a; [Block 12]) maintained access through the precinct, between new hearths F15.35 and F15.30, and onwards to the

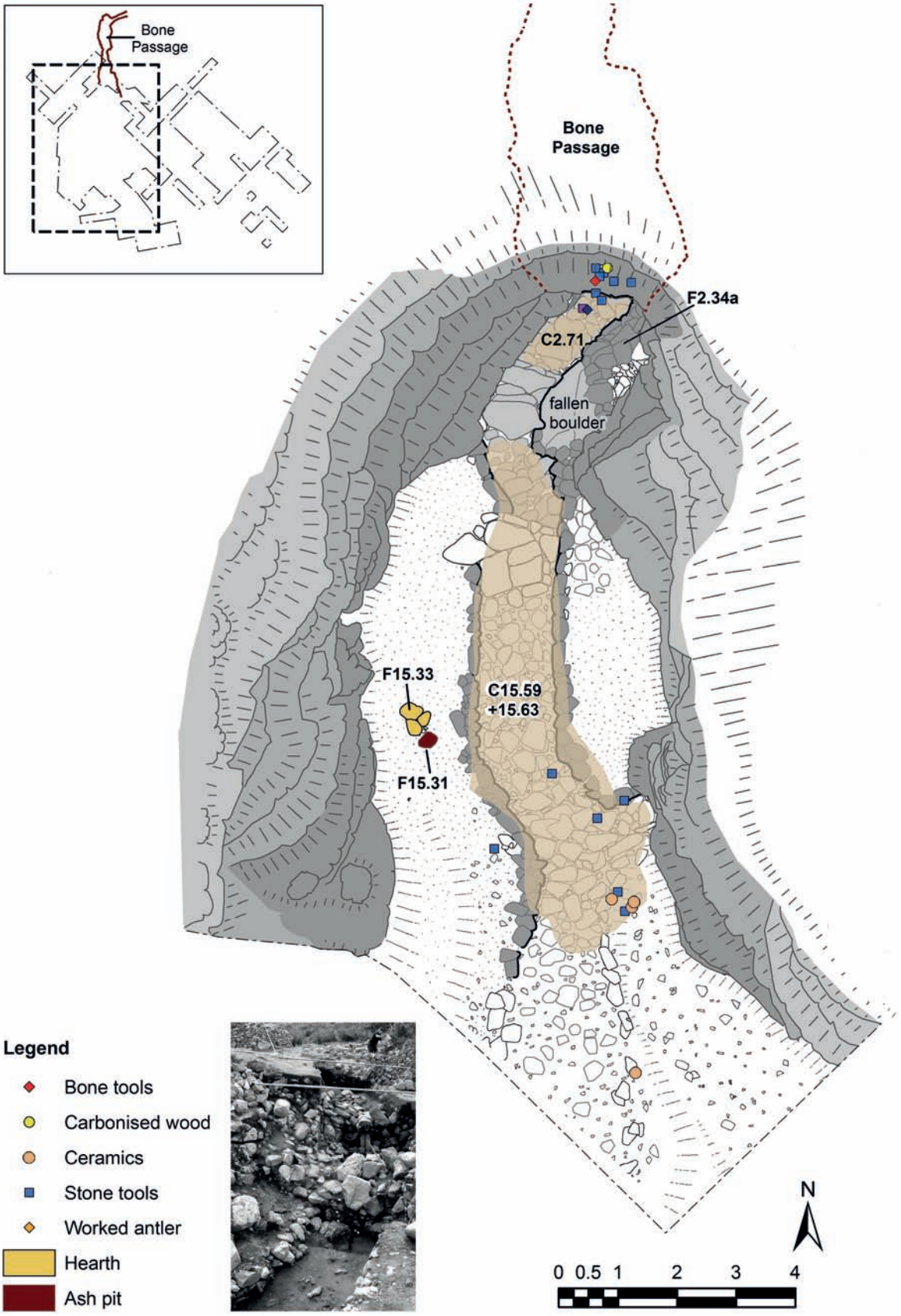


Figure 6.10. Plan showing the Phase 2b backfill deposits & associated finds distribution in lower walkway F15.37 [Block 6], & section through backfill deposits within south end of walkway (inset)

Table 6.4 Artefacts recovered from Block 25c deposits within Bone Passage

SB	*C*	*SF*	*Description*
25c	6.07	6.479	Polished bone needle
Group 1		6.480	Steatite spindle whorl
		6.481	Polished bone point (tip frag.)
		6.526	Poss. stone anvil/ working surface
Group 2	6.07	6.375	Unfinished steatite spindle whorl
		6.376	Bone point (broken)
		6.377	Iron pin shank
		6.378	Whetstone
		6.441	Bone point (broken & burnt)
		6.442	2 Flint flakes
Group 3	1.07	1.231	Flint chip
		1.294	Flint flake
		1.300/ 1.312	3 Pottery sherds (from 2 vessels)
		1.306	Antler anvil
		1.313	Bone point (broken)
		1.314a–b	Unworked antler frags
		1.314c	Antler blunt heavy point tip
		1.315	Poss. saddle quern

Table 6.5 Artefacts recovered from lower walkway F15.37 backfill deposits [Block 6]

SB	*C*	*SF*	*Description*
6	15.63	15.309	Saddle quern frag.
	15.59	15.303a	Saddle quern frag. (refits with F15.288 & F15.295)
		15.303, 15.305, 15.306	3 Pottery sherds (from 3 vessels)
		15.307	Quern rubber/grinder
		15.308	Pottery sherd
		15.312	Quern rubber
		15.313	Saddle quern frag.(refits with F15.435)
		15.176	Complete saddle quern

new stairwell to access the cave (F2.35) [Block 19]. F15.26a used some elements of the Phase 2 walkway and the surface of earlier hearth F15.36, with a boulder kerb (F15.32) created on the west side of the walkway adjacent to the hearths (Fig.6.11). New Phase 3 slab-built hearth F15.35 overlapped the revetting wall west of the walkway, just covering the west edge of earlier hearth F15.36 (Fig. 6.11). F15.35 and its associated ashy spreads (C2.32; C15.84) [Block 7a] produced rare burnt grain, some burnt hazelnut shell, and burnt and unburnt bone. A small artefact assemblage included prepared antler strip SF2.556a, antler tine offcut SF2.556b, antler tine roughout SF2.135, antler needle SF2.458, and antler point roughout SF15.394 (Fig. 6.12).

A second, slab-built hearth (F15.30) was constructed above and slightly south of F15.35. One slab comprising a saddle quern SF15.449, was set working face down. Ash deposits from F15.30 flowed over adjacent cobbled surface F15.34, running down the incline to the cave entrance, and may have influenced construction of single-skin revetment wall F2.17 [Block 12]. Up to 0.35 m high, this was constructed around the hearth's east and northeast sides, probably to both support the structure and stop ash spreading into the walkways and stairwell. These extensive ash spreads [Block 7b] included key contexts C15.64 and C15.65 and produced significant artefact and environmental assemblages – the latter comprising ubiquitous charcoal, but rich grain deposits only from C15.65, suggesting some variation in the character of burning events.

Differences in zooarchaeological profile were also seen, with C15.65 producing fewer bones, and C15.64's larger assemblage including, in particular, deer lower limb and loose teeth. Some heating and butchery indicating carcass division was seen. Hazel charcoal recovered from C15.64 dated to 670–410 cal BC (SUERC-33646).

The artefacts recovered from C15.64 formed two distinct groups (Fig. 6.13; Table 6.6), the first located between hearth F15.30 and the stairwell landing, merging with the deposits in this area (below). Over 20 artefacts included a cache of ten cobble tools and blanks and may indicate some larger structured deposit. The second group was concentrated to the southeast side of the hearth and included material from C15.65. Other objects recovered from C15.64 included trough/saddle quern SF15.408, deposited working face down on the WSW side of the stairwell landing.

Another contemporary deposit was identified in the landing area of stairwell F2.35, merging with C15.64 to the south and another landing deposit, C2.70, to the north. Context C2.26a was an extensive dump of gritty, pebbly sediment which, although producing few artefacts (Fig. 6.13; Table 6.6), contained large amounts of (generally unburnt) bone. This may highlight a focus on butchery activity distinct from hearth-related processing in this early part of Phase 3. Again, potentially specific events are suggested – the C2.26a bone skews the typical cattle-dominated species profile, with 27% pig. Juvenile cattle and juvenile and perinatal pig, roe and red deer molar teeth, and a red deer, corvid, and a possible dog vertebra were present. Some of this material may relate to structured deposits associated with the construction

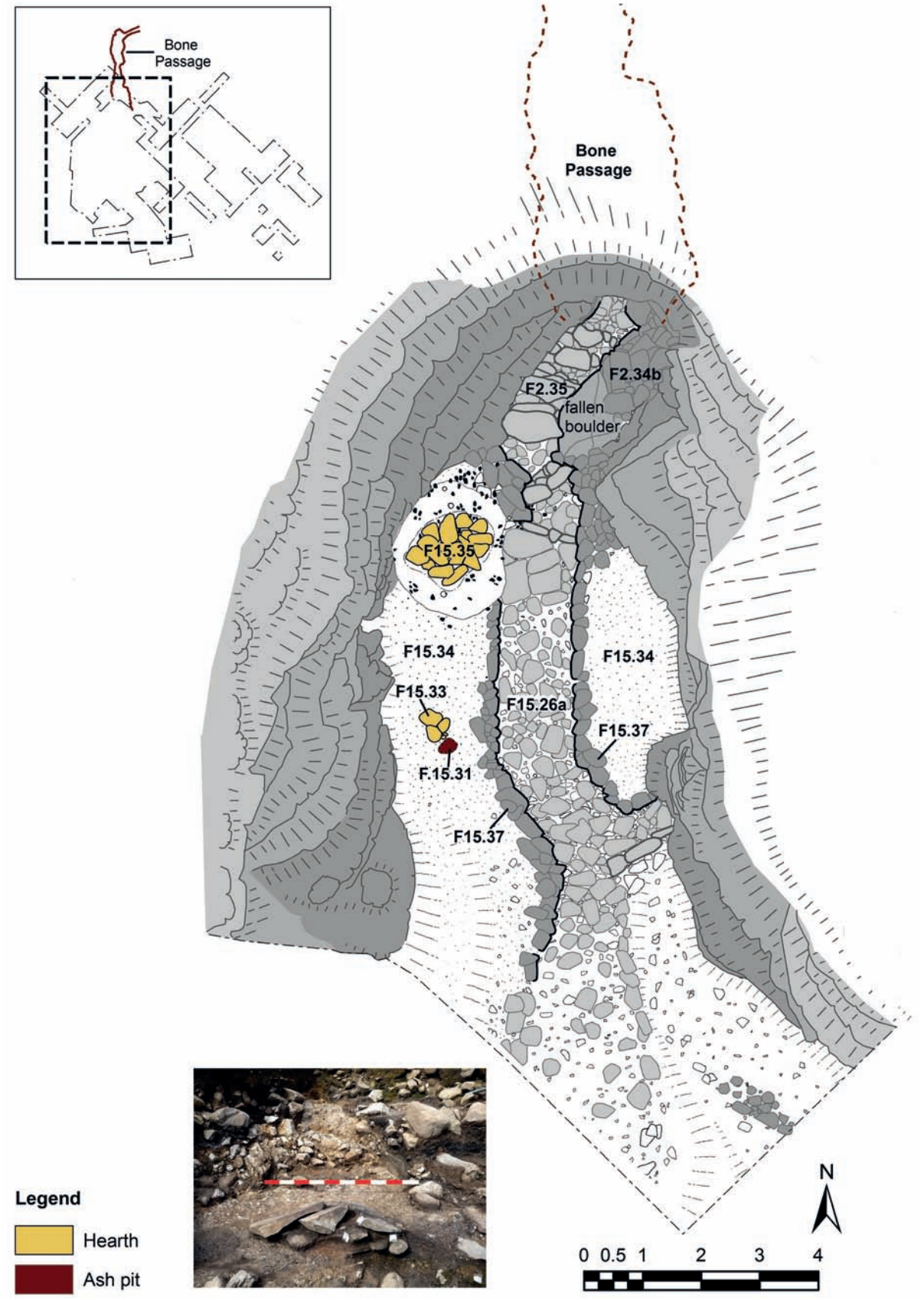


Figure 6.11. Plan showing Phase 3a features in the precinct including stairwell F2.35. Inset photograph showing east facing section through hearths F15.35 & F15.30, with inverted saddle quern fragment SF15.449 forming upper left slab

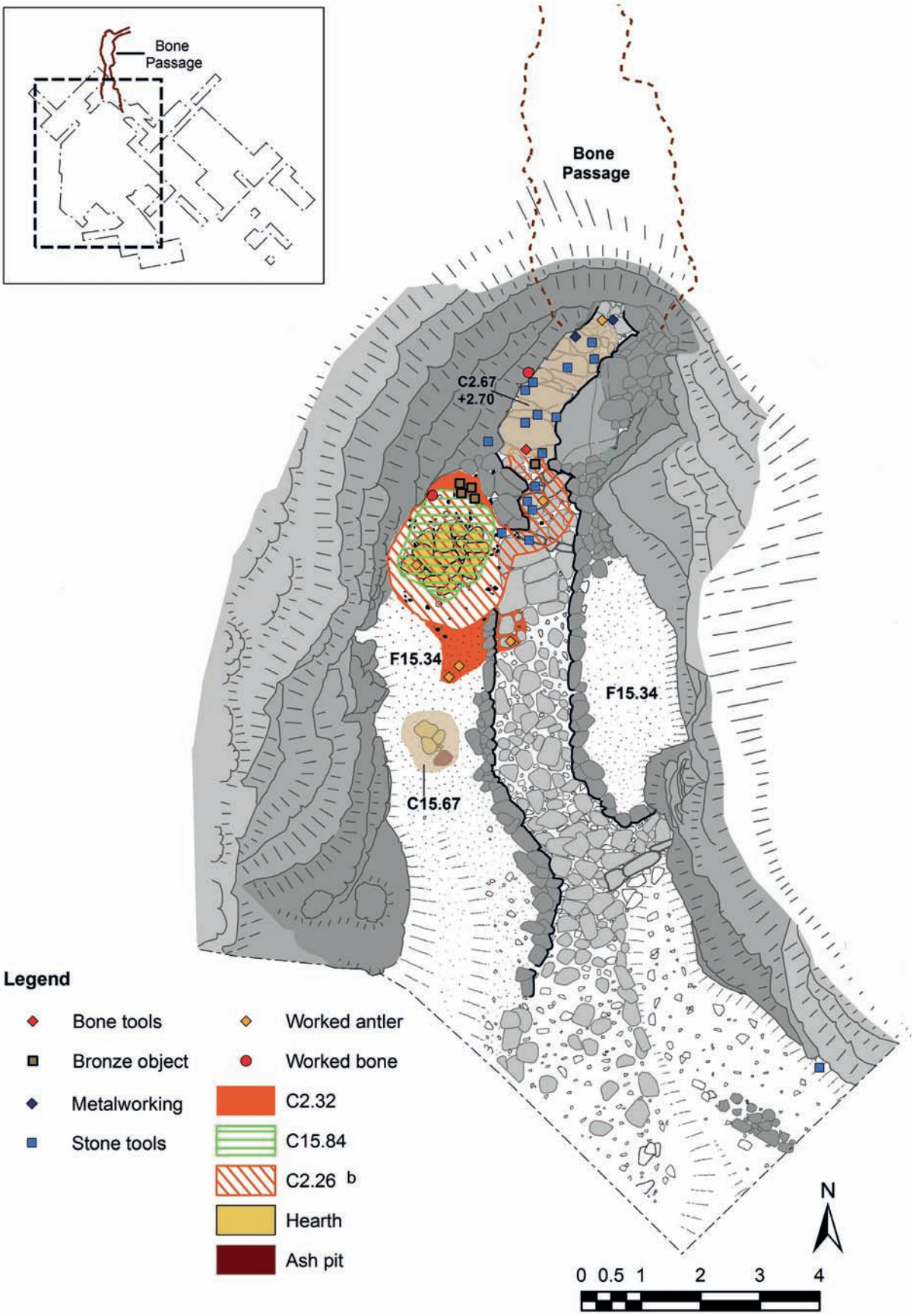


Figure 6.12. Plan showing main Phase 3a [Block 7a] deposits & finds distribution

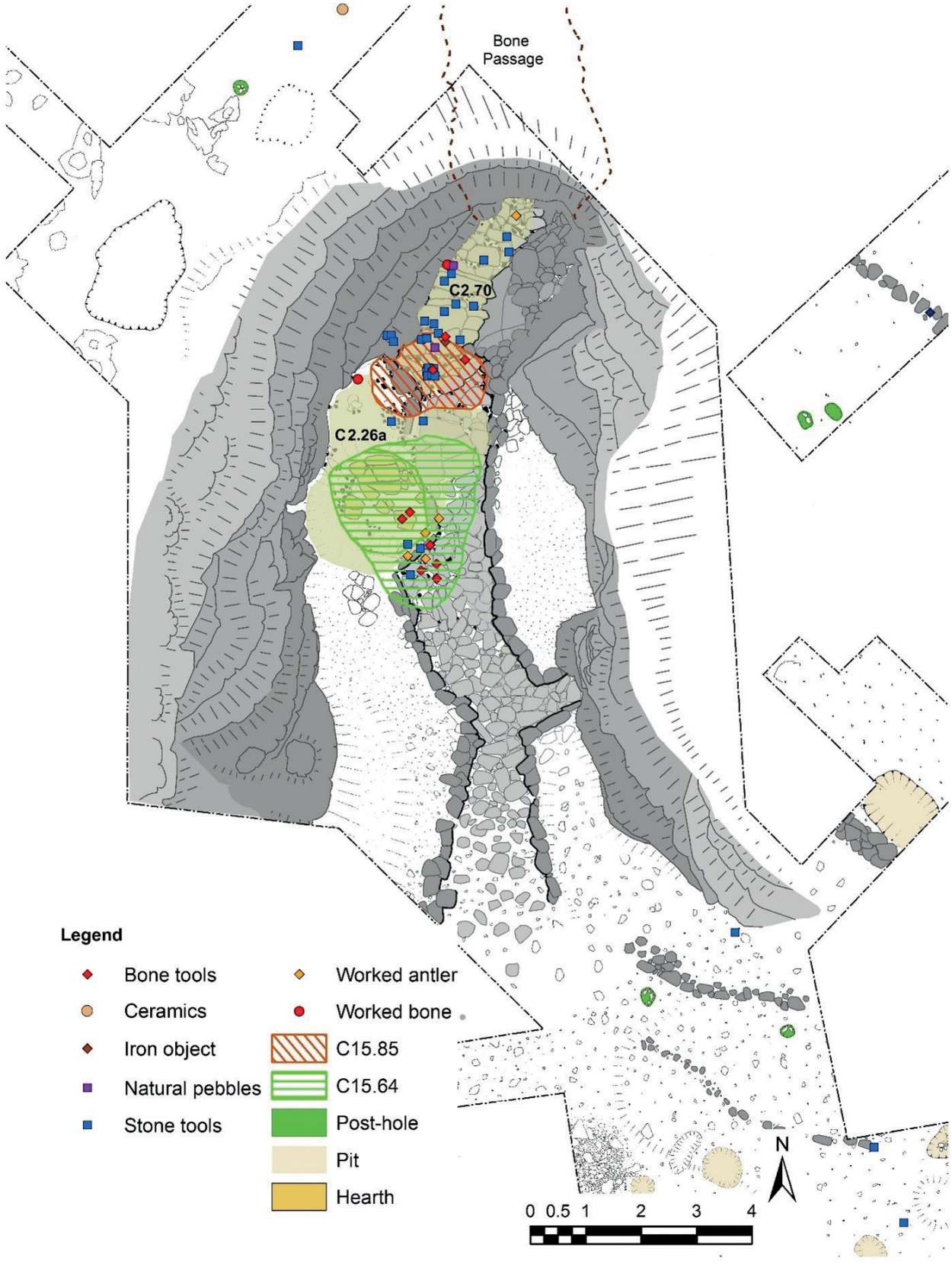


Figure 6.13. Plan showing main Phase 3b [Block 7b] deposits & finds distribution (see Fig. 6.27 for Block 7b features)

Table 6.6 Artefacts recovered from Phase 3b [Block 7b] deposits

SB	*C*	*SF*	*Description*
7b	15.64	15.409	Cobble grinder
Group 1		15.410	Cobble whetstone/grinder
		15.411	Bone splinter point
		15.412	Cobble grinder/pounder
		15.415	Steatite spindle whorl
		15.416	Polished bone pin
		15.417	Abraded steatite
		15.418	Quern rubber
		15.419–428	Cobble tool cache including 6 grinders, 1 grinder/pounder, 3 blanks
		15.434	Iron tankard handle
		15.435	Saddle quern frag. (refits with F15.313)
		15.436	Whetstone
		15.437	Cobble pounder/work surface
		15.439a	Quern rubber
		15.439b	Quern rubber/hammerstone
		15.442	Bone splinter point
Group 2	15.64	15.183	Steatite spindle whorl
		15.187	Polished bone needle
		15.188	Antler tine
		15.189	Antler tine spearhead
		15.190	Bone needle/point roughout
		15.192	Bone femur head whorl
		15.443	Bone hide rubber
		15.444	Bone hide rubber/scraper
		15.246	Antler prepared strip
	15.65	15.186	Polished haematite frag.
		15.247	Antler tine offcut
	2.26a	2.096	Saddle quern frag.
		2.097–98	2 Refitting quern rubber frags
		2.102	Bone blunt point
		2.451	Cobble grinder/poss. strike-a-light
		2.453	Cobble multifunctional tool
		2.454	Antler work surface
		2.456	Iron fitting

of the stairwell [Block 19], but most likely relates to its closure at the end of Phase 3b. Hazel charcoal from C2.26a produced an AMS date of 770–480 cal BC (SUERC-28058).

Earliest stairwell F2.35 comprised a partially robbed structure: rough limestone, granite, and sandstone steps,

Table 6.7 Artefacts recovered from the Phase 3a stairwell [Block 19] deposits

SB	*C*	*SF*	*Description*
19	2.70	2.532	Cobble grinder
		2.533	Cobble pounder
		2.534	Bone femur head whorl
		2.536	Worked pumice
		2.537	Lithic: thumbnail scraper
		2.539	Cobble grinder/hide rubber
		2.540	Stone palette
		2.552	Bog iron ore
		2.553	Antler junction offcut
		2.555	Bog iron ore
		2.557	Quern rubber

and stone artefacts used as structural elements including complete saddle quern SF2.544, used as a step, and a burnt quern rubber fragment SF2.538 (which refits with SF2.530) used to support a step in the lower part of the stairwell. The stone steps bridged the modified limestone face to the west of the cave entrance and the angled face of the large collapsed boulder of Phase 2a. Below this, the surviving steps leading to the cave entrance were displaced forward through settlement and slumping of underlying deposits: five F2.35 steps, and a further step into the cave, established in Phase 2. The east side of the stairwell utilised Phase 2a wall F2.34b (Fig. 6.14). Below and between the steps, a dark silt with charcoal and fire-cracked stone (C2.67) contained a group of temporal bones from a very young or juvenile pig, unfused vertebrae, cattle scapula fragments, and 11 phalanges from a very young dog. No artefacts were recovered but this very unusual group may represent a structured foundation deposit relating to the stairwell construction.

Within the confines of the stairwell (Fig. 6.13), a significant artefact group was placed within its midden infill (C2.70; [Block 19]), suggesting a structured group potentially linked with its closure: stone tools, antler and bone tools and bog iron ore (Table 6.7). Fire-cracked stone, charcoal fragments, burnt cereal grain, and bone (much of it burned) were also recovered. It appears likely that C2.70 is contemporary with C2.26a and C15.64 and together these rich deposits represent activity relating to hearth F15.30 and the use and then final closure of stairwell F2.35.

6.3.3 Phase 3c–3e: continuing activity in the precinct [Blocks 7c–7e, 20]

The third slab-built hearth in Phase 3 (F2.10 [Block 7c]) measured over a metre across and was constructed over the fuel residue 'dome' of C15.64 and C15.65 overlying hearth F15.30 (Fig. 6.15). Walkway F15.26a saw minor

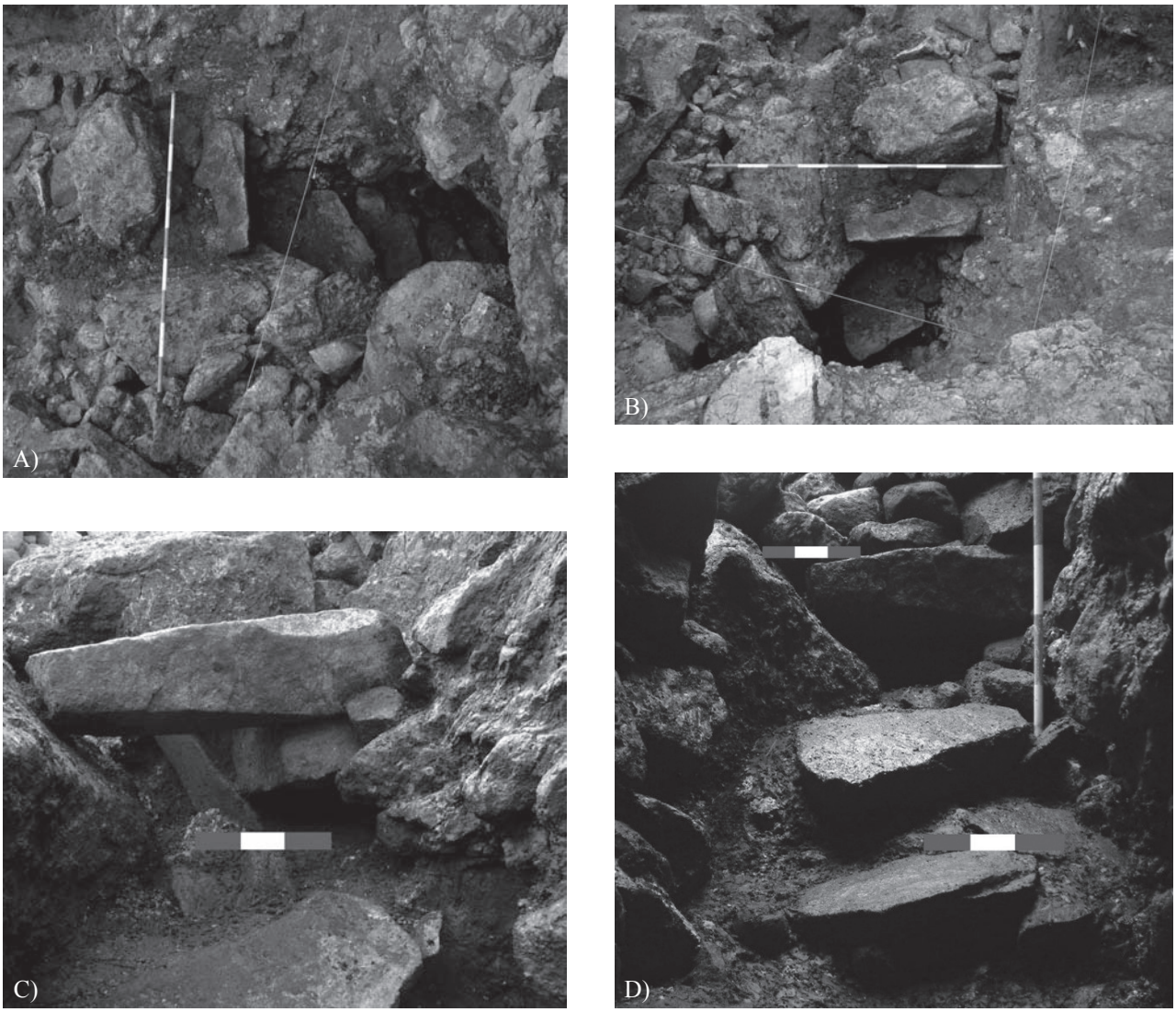


Figure 6.14. Phase 3a [Block 19] stairwell accessing Bone Passage: A. view of the stairwell from above, looking west-northwest; B. from above the cave entrance looking south; C. a step bridging between the fallen boulder (left) & natural limestone bedrock, looking south; D view of the displaced steps in the lower section of the stairwell from just inside the cave entrance

modifications, including additional paving which formed activity areas in the precinct. A short kerb of upright stones (modifying earlier kerb/walling F2.17) to the east of the hearth prevented burning residues from spilling into these working surfaces and the walkway. The retention of these 'waste' materials within the precinct was deliberate to the point of creating structural accommodation for them.

The Block 7c contexts associated with the use of hearth F2.10 (C2.22, C2.23, C2.24, C2.27, C2.28, and C15.60 (Fig. 6.16) comprised ash and fuel residues and fire-cracked and unburnt stone. This accumulated over the hearth, creating a dome of material which spilled onto the adjacent walkway. Some burnt barley and heavily fragmented bone and a small number of artefacts were recovered, including antler and bone tools and raw materials (Table 6.8).

A series of deliberate spreads were then laid over walkway F15.26a. Contexts C2.59, C15.62, C15.78, and C15.86 were a stony mix of redeposited organics and karstic clay, apparently laid to form surfaces accessing stairwell F2.32, especially the approach to landing F2.33 (below). These produced no grain and limited bone. Stony deposits also accumulated at the south end of the walkway (C15.46). Just two artefacts were recovered from these deposits: bone shaft point SF15.182 and cobble grinder SF15.181b.

Two deposits stand out in the Block 7c group. C2.27 and C2.28 both relate to the use of hearth F2.10, with C2.28 spilling down onto walkway F15.26a, where its associated animal bone was crushed through trampling – most of which was pig and dog, including fragments from at least one very young individual from both species. These two animals may have formed an associated bone

Table 6.8 Artefacts recovered from the Phase 3c [Block 7c] deposits

SB	*C*	*SF*	*Description*
7c	2.22	2.446	Antler tine offcut
		2.448	Antler pin/peg
		2.449	Worked bone
		2.450	Polished bone shaft point
		2.455	Baked clay/daub
	2.23	2.131	Cobble grinder/pounder
		2.133	Undiagnostic worked antler
		2.134	Antler tine roughout
		2.245	Bone needle
	2.24	2.185	Bone needle
	2.27	2.111	Polished bone point (broken)
		2.122	Antler tool/hook fitting
	15.60	15.245	Antler tine roughout
	15.62	15.181b	Cobble grinder
		15.182	Bone shaft point

group placed as a structured deposit, in a context for which no burnt bone or botanical material was recovered, but this is conjectural. C2.27 was particularly rich in both fire-cracked stone and heavily butchered bone and was the only context to contain burnt cereal grain.

Phase 3d commenced with the construction of hearth F15.27 [Block 7d], contemporary with walkway F15.26b/F15.42 and stairwell F2.32 (Fig. 6.17). Measuring 1.5 × 1.0 m, with a low kerb defining its east to northeast edge, F15.27 was built directly over hearth F2.10 and its associated ash spreads. The first deposit associated with this new hearth was C15.83, a gritty silt with a thin iron pan at its base abutting the west slope of the precinct and stairwell F2.32. Above this, C15.61 formed a stony dump southwest of the hearth. Both contexts contained more bone than the ashy residues above, including two boar tusks, horse, and deer teeth – and four human skull fragments from a young adult. Animal bone displayed evidence for butchery, fragmentation, and some burning: probably raked-out, redeposited hearth material (Fig. 6.18). The contexts associated with the later use of F15.27 included finely laminated, fairly sterile ashy spreads C2.19, C2.20, C2.21 and C2.57.

Most finds within these contexts are grouped together at the west of the hearth, within C15.38, and it is possible that the stone tools and human skull fragments in particular, along with some of the more unusual animal deposits, represent partially disturbed structured deposits. Artefacts from C15.61 and C15.83 separate into find groups from the southwest, west, north, and east sides of the hearth (Table 6.9). An AMS date on hazel charcoal from C15.83 gave 790–520 cal BC (SUERC-33766), and hazel charcoal from C15.61, 800–510 cal BC (SUERC-23640).

Around 3.2 m to the south of hearth F15.27, the boulder footings of wall F15.29 ran northwest–southeast, merging at the southeast with walkway F15.26b/F15.42. Running across the former water channel, the wall may have acted as a barrier during periods of heavy rain and run-off. However, it may also represent a first attempt to enclose the precinct on its south side – the later Phase 4a enclosure wall F15.22 mirrors this earlier feature – closing off the open end of the precinct. Wall F15.29 remained in use throughout the remainder of Phase 3 and it is possible that its stone foundations supported a turf-built upper structure. A second fragment of northwest–southeast wall (F15.21), 1.5 m to the southwest, blocked the channel leading to the cave entrance, some of its stones set vertically into the underlying clay. This may also have supported a turf superstructure.

The final stage of Phase 3 [Block 7e] saw construction of its last slab-built hearth (F2.15), again overlying earlier examples (Fig. 6.19). Contemporary with F2.15 was pit hearth F15.28 at the northeast side of wall F15.29 inside the precinct, and associated ash dump C15.58 (Fig. 6.21). Most Block 7e activity focuses on the use of the two hearth structures: C2.17, C2.18, C2.25, C15.51, C15.52 and C15.57 (Fig. 6.20), mostly comprising residue from F2.15, and C15.53, C15.54 and C15.55 filling the pit hearth (Fig. 6.21). Context C15.54 produced a few burnt cereal grains. Animal bone included red and roe deer from C2.17 and C2.18, a single dog femur and horse teeth from C2.18, and a horse tooth from C15.51. A deer antler tine fragment was also recovered from the pit hearth fill C15.54. Cattle and pig included very young and juvenile examples. C15.53, a fill within the pit hearth, produced a sizeable assemblage of bone including a deer phalange and metacarpal and a pig ulna fragment. Artefacts within these contexts clustered around (especially) the north and south of hearth F2.15, including cobble tool cache SF2.505, accompanied by bone and antler objects (Fig. 6.20; Table 6.10). Only baked mudstone flake SF15.144 was recovered from pit hearth F15.28.

The most significant Phase 3e deposits relate to the end of the sequence. C15.50 and C15.56, large, very stony dumps peppered with char, were rich in complete, unburnt bone, mainly cattle, with some red deer, sheep, and pig – the latter representing around 30% of the material from C15.56 – with C15.50 also producing horse and *Canis* teeth. C15.50 also contained burnt gathered antler fragments (SF15.248) and a fine bone point (SF15.142). A mixed assemblage, possibly representing some cached and structured material, was recovered from C15.56 (Table 6.11). Objects distributed more randomly through C15.56 included pin/needle/point roughout SF15.388, polished bone point SF15.393 and unworked bone splinter SF15.397. A saddle quern fragment (SF15.383) was built into hearth F2.15. Hazel charcoal from C15.50 produced a date of 780–480 cal BC (SUERC-23615). These contexts comprised the final precinct events in Phase 3 and



Figure 6.15. Plan showing Phase 3c [Block 7c] features within the natural amphitheatre including stairwell F2.32. Inset photograph showing interface between stairwell wall F2.32 & natural limestone bedrock housing the cave entrance, looking northwest

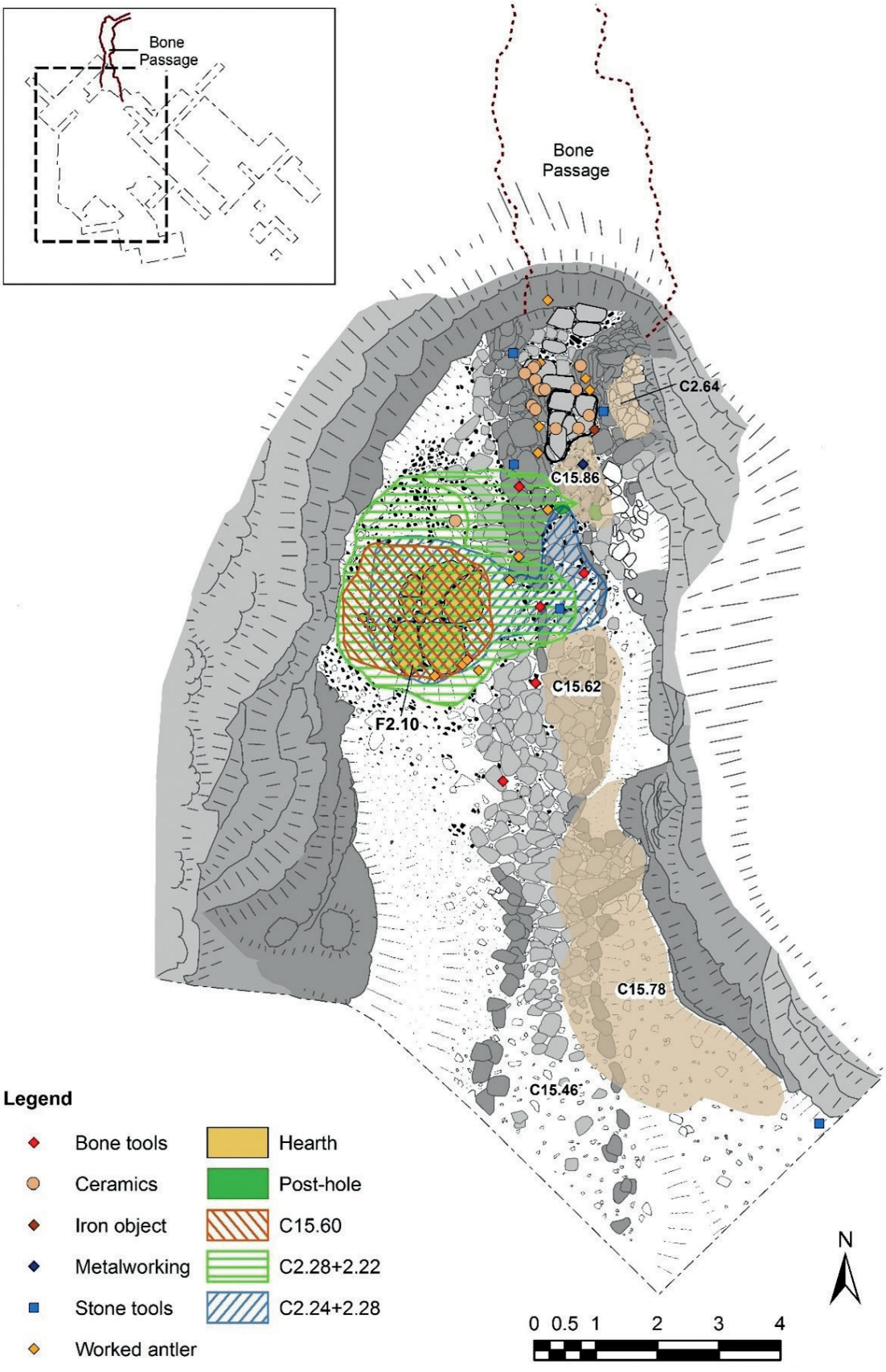


Figure 6.16. Plan showing main Phase 3c [Block 7c] deposits & finds distribution

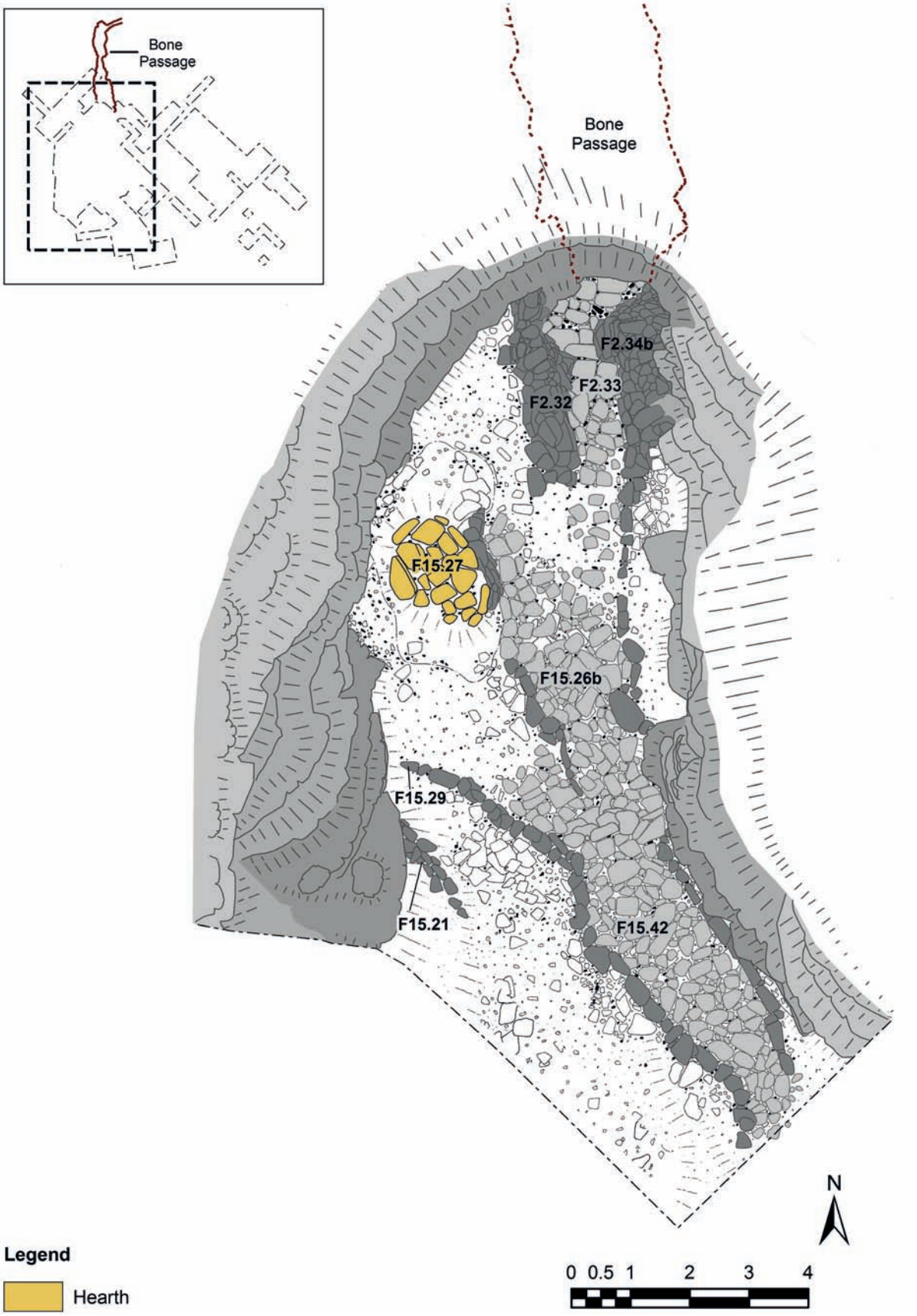


Figure 6.17. Plan showing Phase 3d [Block 7d] features within the natural amphitheatre including stairwell F2.32 & hearth F15.27

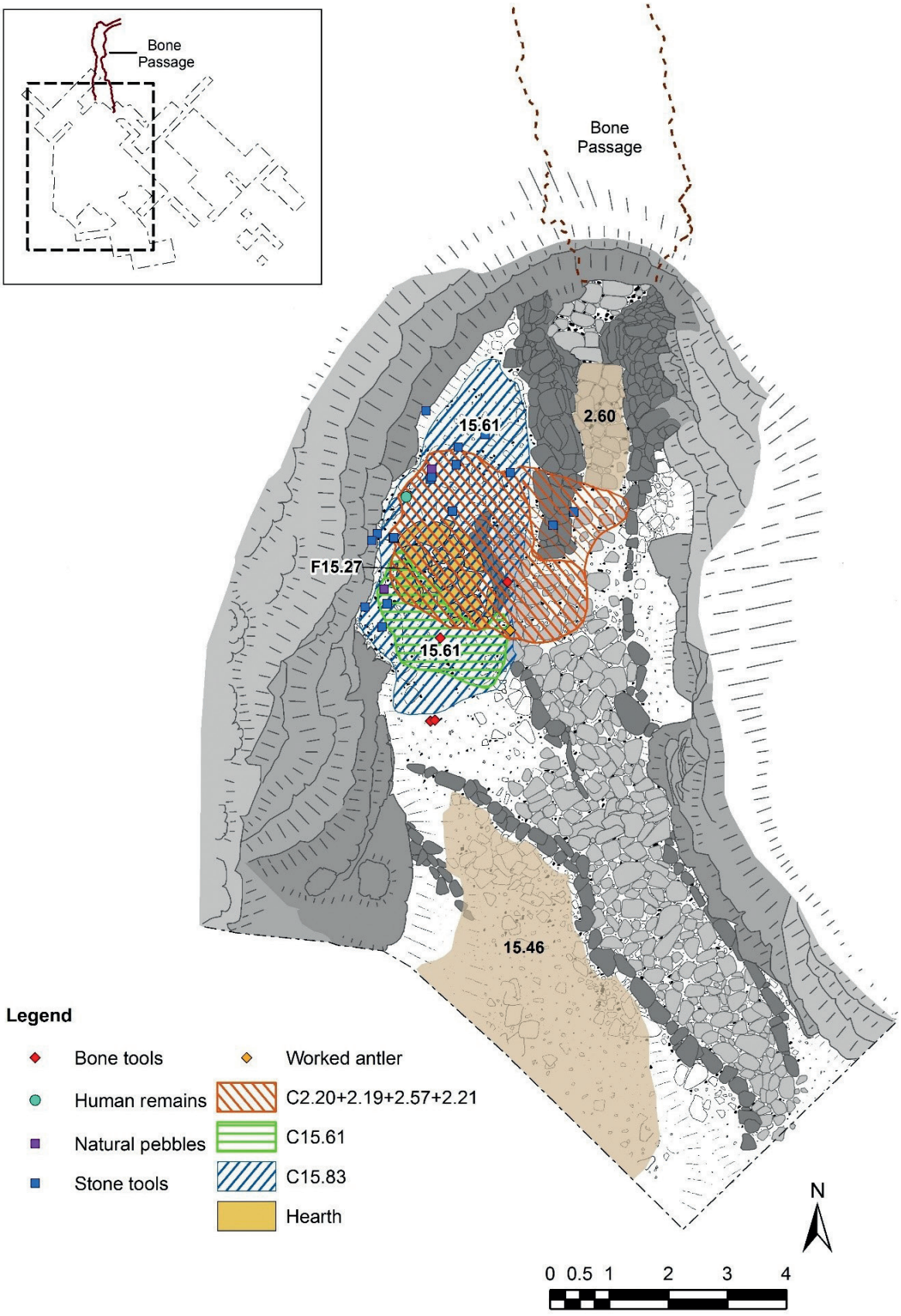


Figure 6.18. Plan showing main Phase 3d [Block 7d] deposits & finds distribution

Table 6.9 Artefacts recovered from the Phase 3d [Block 7d] deposits

SB	*C*	*SF*	*Description*
7d	15.83	15.360	Splayed-head bone/antler pin
Group 1		15.366	Cobble grinder/pounder
		15.367	Cobble grinder/pounder (burnt)
		15.370	Cobble grinder
	15.61	15.179	Bone point (broken)
		15.180	Bone point (broken)
Group 2	15.83	15.359	4 human cranial frags (young adult)
		15.363	D-sectioned unfinished cannel/ canneloid shale bracelet frag.
		15.364	D-sectioned unfinished cannel/ canneloid shale bracelet frag.
		15.369	Cobble grinder/pounder (burnt)
Group 3	15.83	15.362	Decorated shale bangle frag.
		15.365	Quern rubber
		15.401	Whetstone/sharpening stone
		15.403	Cobble pounder/hammer
		15.404	Cobble grinder
		15.405	Whetstone
		15.407	Cobble grinder/pounder
		15.413	Worked pumice
		15.414	Cobble pounder

Table 6.10 Artefacts recovered from the Phase 3e [Block 7e] deposits associated with the use of hearth F2.15

SB	*C*	*SF*	*Description*
7e	2.18	2.441	Stone palette
		2.442	Multifunctional tool
		2.505	Cobble tool cache including 2 grinder/pounders, 1 pounder, 1 multifunctional tool & 1 blank
		2.506a	Bone shaft point (with cobble tool cache SF2.505)
		2.506b	Bone point (with cobble tool cache SF2.505)
		2.507a	Antler tine offcut (with cobble tool cache SF2.505)
		2.507b	Unworked bone splinter (with cobble tool cache SF2.505)
		2.517	Cobble pounder
		2.518	Cobble pounder
		2.522	Steatite spindle whorl
		BNN15	Antler work surface
	2.17	2.226	Gathered antler frag.
	2.25	BNN13	Longbone splinter point
	15.51	15.250, 15.296	Bronze domed mount (refitting halves)
	15.52	15.143	Polished bone pin
		15.371	Bone needle
		15.372	Polished bone point
		15.373	Bone shaft point
		15.374	Cobble grinder/pounder
		15.375	Quern rubber
		15.376	Bone shaft point

Table 6.11 Artefacts recovered from the [Block 7e] deposits associated with the end of the Phase 3 hearth sequence

SB	*C*	*SF*	*Description*
7e	15.56	15.380	Cobble tool cache including grinder, multifunctional tool, pounder, palette/ hammerstone
Group 1		15.382a+b	2 Steatite spindle whorls
		15.387	Whetstone/pounder
		15.392	Cobble grinder/hide rubber
		15.406	D-sectioned steatite bangle frag.
Group 2		15.377	Bone needle (2 refitting frags)
		15.378	Double-ended bone splinter point
		15.379	Polished bone pin/needle tip
		15.381	Bone femur-head spindle whorl
		15.384	Polished bone needle (re-used as pin)
		15.385	Cobble grinder/pounder
		15.386	Perforated antler mount with 2 bone pegs
		15.396	Spatulate bone pin
		15.398	Antler point (tip only)

the intensive spread of material over hearth setting F2.15 and character of its animal bone assemblage, it is possible that Phase 3 ended with a major closure event after its extended period of activity. Sterile, artefact-free C2.16b, sealing the Phase 3e deposits, represented a period of abandonment of unknown duration, but sufficient to allow a thin ground surface to form. Small chunks of degraded limestone in this deposit may represent erosion of the exposed limestone bedrock at the west of the precinct.



Figure 6.19. Plan showing Phase 3e [Block 7e] features within the natural amphitheatre including stairwell F2.32 & hearth F2.15

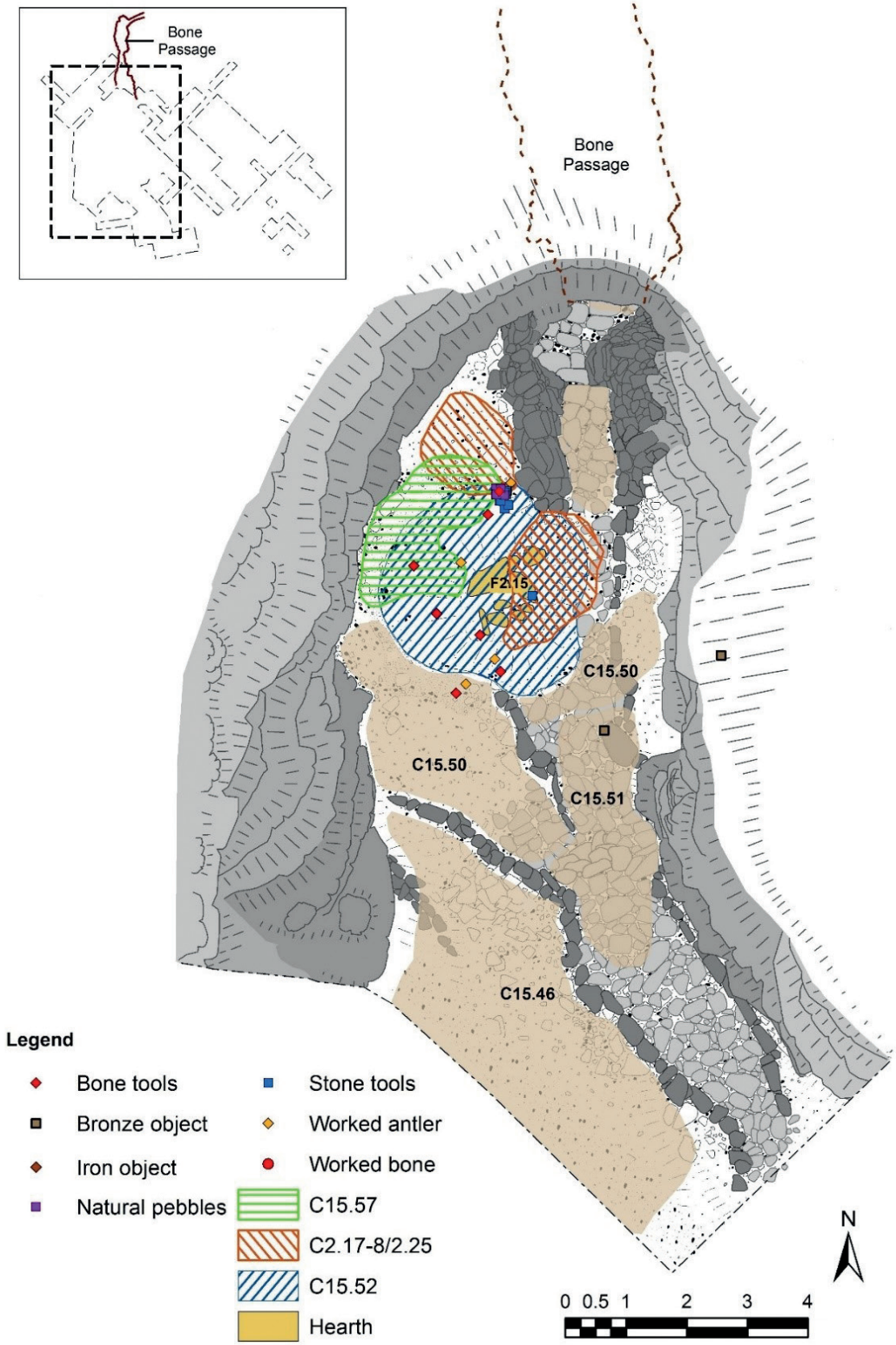


Figure 6.20. Plan showing main Phase 3e [Block 7e] deposits & finds distribution associated with use of hearth F2.15

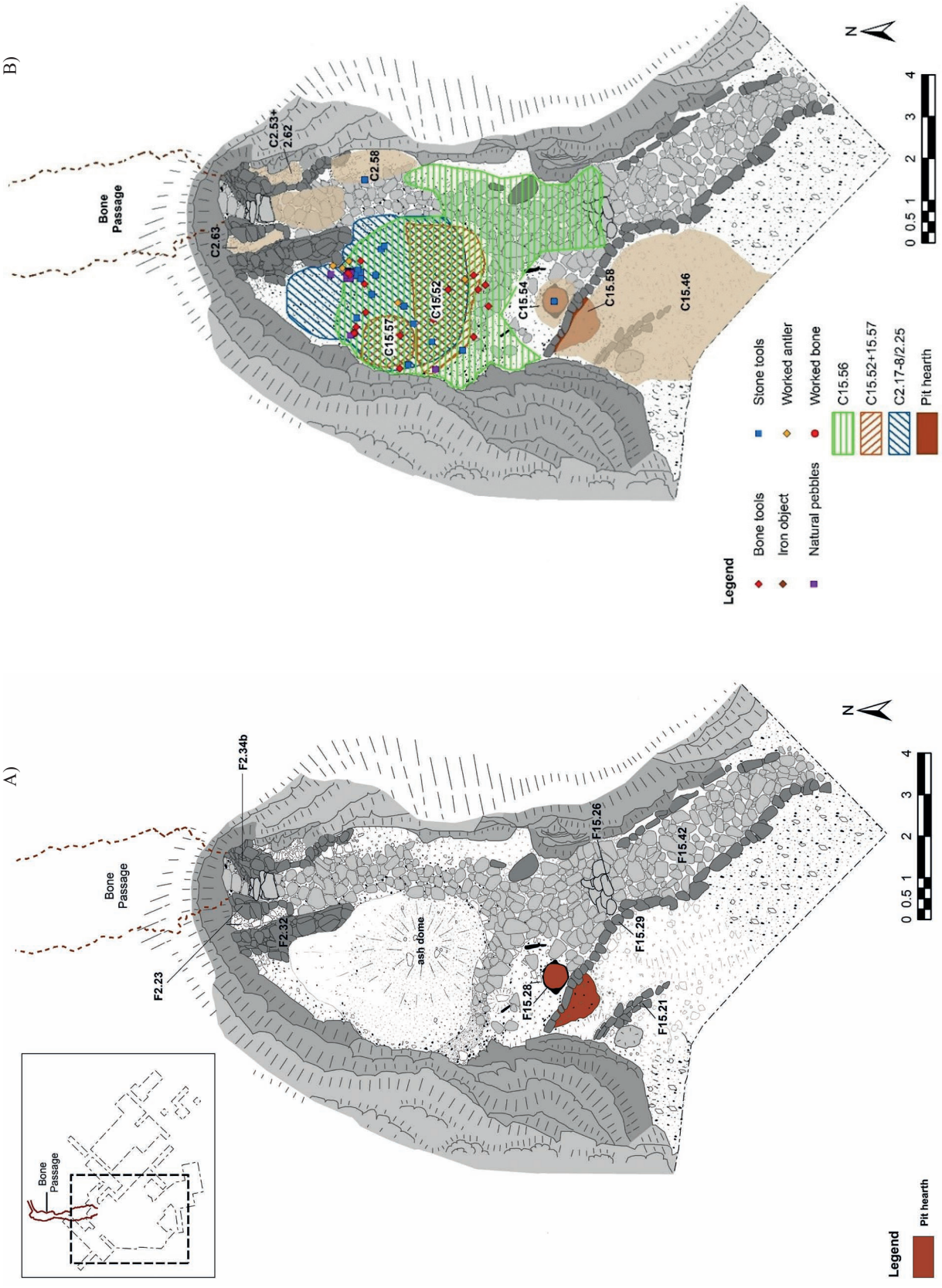


Figure 6.21. A. plan showing Phase 3e [Block 7e] features including pit hearth F15.28; B. main deposits associated with the end of the Phase 3 hearth sequence



Figure 6.22. Phase 3c [Block 20] stairwell from above, looking northeast

After the closure and backfilling of stairwell F2.35, a new stairwell (F2.32) was constructed to maintain access to the cave [Block 20]. One of F2.35's surviving steps was used as a lintel within the construction, and a drystone revetment wall constructed off it, with larger limestone blocks used in the foundation course of the structure. The wall survived to 1.4 m, with outside and inside faces of rough stonework with a rubble core, creating a double skin construction. The basal courses of the wall were cut into underlying midden deposits, and during its use, material built up against the outer face as deposits accumulated within the precinct. The wall abutted the limestone cliff at its north end and terminated in a vertical buttress at the south. Almost vertical at the north, where it was supported by the underlying granite lintel, the wall's central and southern sections leaned outwards due to underlying subsidence. The structure provided an effective barrier against the accumulating hearth deposits, maintaining access to the cave, and also blocked off earlier entrance routes, including Phase 2 walkway F15.37 and the subsequent paving leading to stairwell F2.35.

Revetment wall F2.34b, to the east of the cave entrance, was modified during construction of this new stairwell, granite blocks raising its height by up to three courses, its rubble packing containing bone and char (C2.64). A well-constructed paved landing (F2.33) for stairwell F2.32 utilised fire-cracked pebbles as packing between granite slabs and had sockets for two wooden posts (F2.36 and F2.37) to each side, one containing a packing stone (Fig. 6.15). These posts may have provided a frame for a door or screen across the entrance or have helped secure a roof in place above the stairwell: both would have limited the light entering the cave, while also potentially controlling access.

A thin occupation horizon (C2.60) formed over landing F2.33 during its use, containing iron awl SF2.482, charcoal, fire-cracked stone, and bone, much of which had been heavily eroded through trampling. The precinct

Table 6.12 Artefacts recovered from the Phase 3c stairwell Contexts [Block 20]

SB	*C*	*SF*	*Description*
20	2.65	2.495	Cobble grinder/hide rubber
		2.500	Perforated antler strip
		2.503	Antler junction offcut
		2.519	Possible antler pick
	2.66	2.501	Quern rubber
		2.509	Bog iron ore
		2.513a	Antler handle roughout
		2.513b	Burnt antler frags
		2.514	Haematite frag.
		BNN16	Antler beam (poss. tool)

walkway was also modified shortly after the construction of stairwell F2.32, with new areas of paving (F15.26b; [Block 13]) to the south/southeast (F15.42). This extension provided access to the precinct from the southeast over a series of displaced steps. Animal bone from C15.78, immediately below the F5.42 paving, dated to 670–410 cal BC (SUERC-28048).

Material deposited below landing F2.33 and within the packing of the west wall possibly relates to its construction (C2.65; C2.66). These dark, char-rich silts contained fire-cracked stone, a concentration of burnt cereal grain, and a well preserved, generally unburnt bone assemblage including bone from a foetal pig. An artefact group included a pottery cache and a small assemblage of stone and antler items (Table 6.12).

The Phase 3–4 transition saw further stairwell modification (Fig. 6.24). The lower section of F2.32 was narrowed with the insertion of a large granite slab, set almost vertically, on the west. A new section of wall (F2.23) was built above this, within the confines of the existing stairwell structure, with packing stones and sediments filling the void behind it (C2.63). East wall F2.34b was also raised by two courses and its alignment reconfigured to the contours of the natural limestone and clay slope, with packing material (C2.53/2.62) forming the core of the structure. These alterations allowed new steps to be inserted and created a narrower, more restricted access, and would form the basis for further structural developments in accessing the cave in Phase 4 (see Section 6.4.3).

6.3.4 Phase 3: access within the cave [Block 26]

Phase 3 commenced with the construction of a paved walkway (F6.02/F1.02/F17.01) through Bone Passage (Fig. 6.25; Fig. 4.4A-C). From its south end to the cave's narrow central zone, this comprised a single line of flat paving slabs running roughly central through the passage, flanked by small, rounded boulders defining the walkway edge at each side. Through the central narrows the paving was more uniform, but was more fragmented towards the



Figure 6.23. Phase 3c [Block 20] stairwell: A. west stairwell wall F2.32 & landing F2.33; B. view of the stairwell from above, looking southeast; C. approaching the stairwell from the south. The southern end of the stairwell wall had already been removed when these photographs were taken

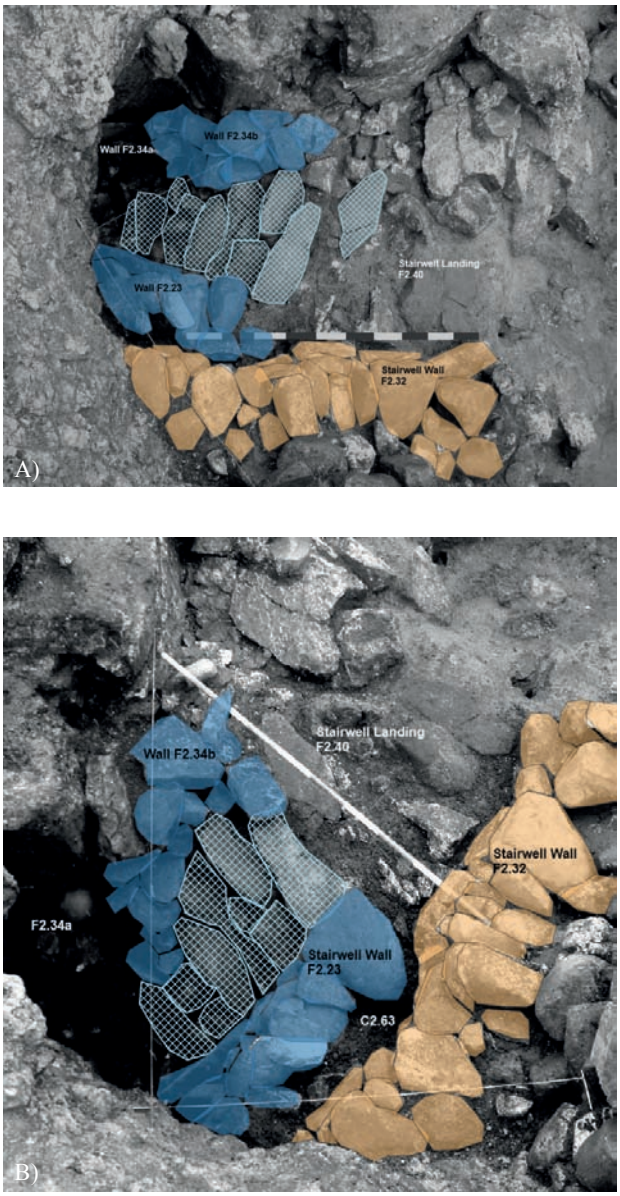


Figure 6.24. Modifications to stairwell F2.32 in Phase 3e with the construction of wall F2.23 (forming a new west wall) & new steps & landing: A. the vertical slab forming the base of wall (adjacent to left end of scale) can be seen, looking east; B. construction of the wall above the slab, looking southeast

cave rear, with isolated paving slabs interspersed with compacted fire-cracked stone and larger boulders, ending at the junction with the ramp exit to the streamway.

The walkway would have facilitated access through the dark cave, using the maximum height available in the passage. It appears that, with the exception of thin trampled surface deposits, this feature was kept relatively clear of accumulating material – an act which also prevented erosion of the earlier Phase 2 and contemporary Phase 3 material at each side of the walkway.

Table 6.13 Artefacts recovered from the Phase 3b Block 27a contexts in Bone Passage

SB	*C*	*SF*	*Description*
27a	6.06a	6.189a–g	Cache of 7 antler points/ roughouts
Group 1		6.191	Steatite spindle whorl
		6.268a–i	Cache of 7 antler points, spatula-ended tool & antler peg
Group 2	17.06a	17.001	Socketed iron axe
		17.002	Fine iron chain
		17.002a	Pottery sherd
		17.011	Antler tine tip offcut
		17.020	Flint flake
		17.043	Cobble grinder
		17.053	Cobble grinder/pounder
	17.06a	17.101–17.102	2 Pottery sherds

There is evidence for comparable management of walkways F15.26a and F15.26b/F15.42 in the precinct, in sharp contrast to the accumulation seen elsewhere within its space. There would be no further depositional events in Bone Passage until Phase 4c – perhaps due to a necessity to maintain access to the underground stream, which may have formed a continuing focus for ritual activity.

6.3.5 Phase 3: activity within the cave [Block 27a]

Thin, trampled lenses comprising midden and fuel residues interspersed with fine silty laminations [Block 27a] sealed the walkway paving in the cave (Fig. 6.25). Several important groups of objects recovered from these contexts (C6.06a and C17.06a) displayed evidence for structured deposition (Table 6.13). In the southern cave chamber, two groups of antler pins were placed in gaps between the paving stones forming the walkway, 0.7 m apart. Both groups comprised seven pins, with one group displaying circumferential wear patterns around their tips (SF6.268a–g), and the other group including unfinished pins or tools (Fig. 6.26). Antler spatula-ended tool SF6.268h and antler peg SF6.268i accompanied these caches, the only other object found in close proximity was steatite spindle whorl SF6.191 (Fig. 6.25).

The degraded remains of a fine iron chain (SF17.002) were deposited between paving slabs within the narrow central section (Fig. 6.26), over which had been placed a small, socketed iron axe (SF17.001). A third socketed iron tool – an adze (SF17.001/1), still containing part of its alder haft within the socket, recovered at the start of excavation from disturbed deposits overlying this area – possibly formed part of this cache, although no stratigraphic link exists. A worked antler tine tip offcut lay against the west wall of the passage and, immediately north, a small spread of objects included a cobble grinder/ pounder, a broken cobble grinder, a flint flake, and a potsherd. Two potsherds were recovered from the north end of Bone Passage, adjacent to the junction with the active streamway.

These objects, particularly the two groups of antler pins and the iron finds, may form structured deposits relating to the construction of the paved walkway, or shortly afterwards. Burnt barley from C6.06a produced an AMS date of 800–510 cal BC (SUERC-23624) and animal bone, 771–507 cal BC (SUERC-50990). Burnt barley and burnt hazelnut shell from C17.06a produced matching dates of 670–410 cal BC (SUERC-28051 and SUERC-23632).

6.3.6 Phase 3: activity beyond the precinct [Block 32]

Activity outwith the precinct was more defined in Phase 3, with scoops and pits, post and stake-holes, and the construction of several low, ephemeral walls (Fig. 6.27). Most features were located east and southeast of the precinct: pits/scoops F5.04, F9.03, F14.08, F14.09, F14.10 and F14.13, with fewer to the west F10.03, F10.04, F10.05 and F10.06. Some of these may be natural and their few finds residual. Fragmentary low walls to the east and southeast of the precinct seem to have demarcated activity areas. Some structures appeared more clearly related to access to the site and the potential control of people moving into, and through it: walls F19.04 and F19.08, F9.02, F11.04 and F11.07 – the latter three closely related to the first attempts to enclose the precinct. A series of degraded granite boulder walls to the southeast (F14.12; F14.17) likely relate to the first walkway (F15.26a) accessing the precinct.

Six post-holes ran from the hollow of an old streambed east of the precinct, curving clockwise to terminate at its southern end, where walls F14.12 and F14.17 led into Phase 3 walkway F15.26a (Fig. 6.27). All but one of these (F19.05, F19.28, F18.02, F14.11 and F14.07) appears to form the northern arc of a processual way, guiding people towards the precinct walkway and on to the cave entrance. The sixth (F20.02) may have formed a setting within an unexcavated opposing arc, although unlike the others, no packing stones or post pads were noted. Pit F14.10, also south of the post-holes, may also have formed a setting within an opposing arc. One posthole (F19.05) displayed evidence for a recut, and some features produced artefacts, all of which may be residual, mainly flint and pottery. Hazel charcoal from the primary fill of posthole F19.05 dated to 790–500 cal BC (SUERC-23620).

Scattered additional postholes include F19.07, just to the north of the post arc, F11.05 and F11.06 within

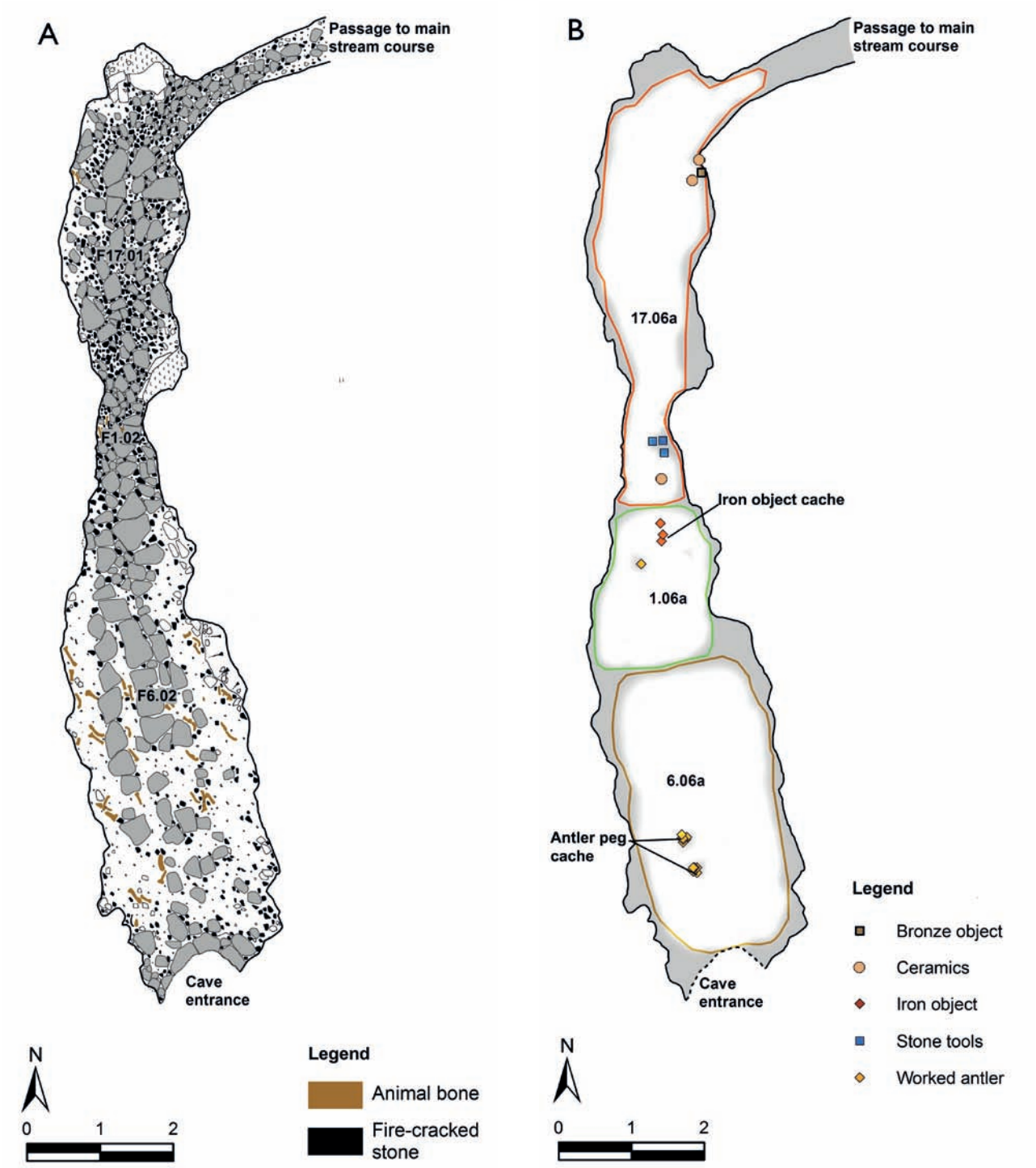


Figure 6.25. Plans of Bone Passage showing A. Phase 3a [Block 26] floor; B. Phase 3b [Block 27a] contexts & finds distribution

the precinct, and F7.01 to the northwest. Hazel charcoal from F7.01 produced an AMS date of 760–400 cal BC (SUERC-12290), and birch charcoal from F19.07 a date of 560–400 cal BC (SUERC-28061). Isolated artefacts included cobble grinder SF14.028, ceramic sherd SF.10.002 and quartz flake SF7.019, with environmental material limited to some burnt grain and bone.

6.4 Phase 4: restructuring and monumentalising: from cave to complex

6.4.1 General

Although there appears to be some continuity of activity between the end of Phase 3 and the start of Phase 4, the sharp increase in the scale of this, coupled with evidence for major restructuring of both precinct and cave entrance



Figure 6.26. Phase 3a [Block 26] floor in Bone Passage & overlying [Block 27a] deposits: A. view south in north chamber showing bone, antler, & charcoal; B. cache of antler points SF6.268a–i deposited in gap between paving F6.02; C. view north through the narrowing of the passage with cache of iron objects (SF17.001 & SF17.002) below left end of scale

and more intensive use of the precinct surrounds, marks Phase 4 as a key time for High Pasture. A series of walls defining and enclosing the precinct were constructed, incorporating a new and more elaborate stairwell, and the precinct hearths were restructured, suggesting that this area of the site had taken on a new significance. Most significantly, the enclosing wall created a more defined and accessible space, creating two levels upon which activities could take place. It is possible that this new phase of enclosure served to 'contain' the cave and its entrance, emphasising or controlling access to an important, potent place in the landscape, perhaps also representing a boundary between this world and the underworld.

The scale of Phase 4 activity, especially its larger depositional events, may also indicate High Pasture's increased significance: as a place where larger gatherings – ceremonies, performances – took place. Hearth-associated residues dwarfed their Phase 3 predecessors and the relatively static location of the Phase 2a–3e hearths changed, with two new slab-built settings constructed immediately outside the stairwell entrance to the cave: two hearths, in contemporary use, highlighting the significance of fire and its products to site function. These new locations meant that visitors would have been directed close to one of the hearths in order to access the stairwell and cave, echoing the position of early hearth F15.36 in Phase 2a (and a similar two-hearth configuration seen later, in Phase 5a). The placement of the hearths may have been used to create 'special effects' focused upon entering or emerging from the cave as well as the challenge of moving close to the flame and smoke: the latter would blur the view of the all-important cave entrance, creating an atmosphere of mystery and uncertainty at this liminal point. Another interpretation is that the hearths provided a means of cleansing, purification or change for individuals accessing or leaving the cave.

The large finds assemblage deposited during this phase, especially within the precinct and associated with the hearths, featured several important objects and a number of structured caches.

Chronology (Bayesian modelled radiocarbon dates)

The modelled dates for Phase 4 are discussed in Chapter 10 and presented in Appendix Table 3.

6.4.2 Phase 4a–4b: Activity in the precinct: hearths, walkways, and associated features [Block 8a, 8b, 13 and 14]

The first Phase 4 precinct hearth to be established, and the only one in use in Phase 4a, was F2.27, complete with upright, granite backing slab F2.28 [Block 8a]. Overlying and immediately surrounding it, bright pink ash lenses (C2.54; C2.55) (Fig. 6.28) contained charcoal, small fragments of calcined and unburnt bone, and rare burnt

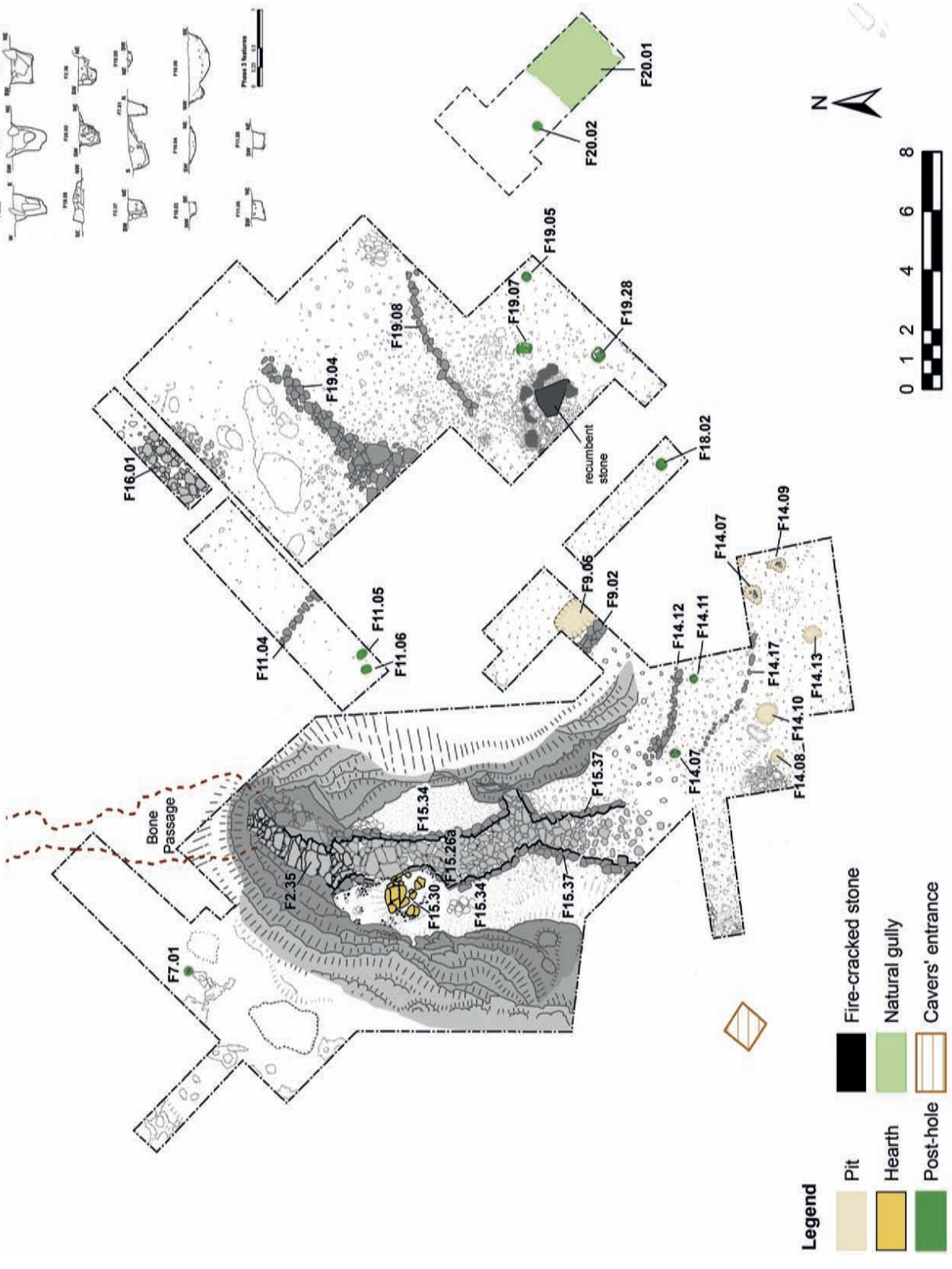


Figure 6.27. Plan showing Phase 3 [Block 32] features including postholes & pits possibly forming a processual way with sections through negative features (inset)

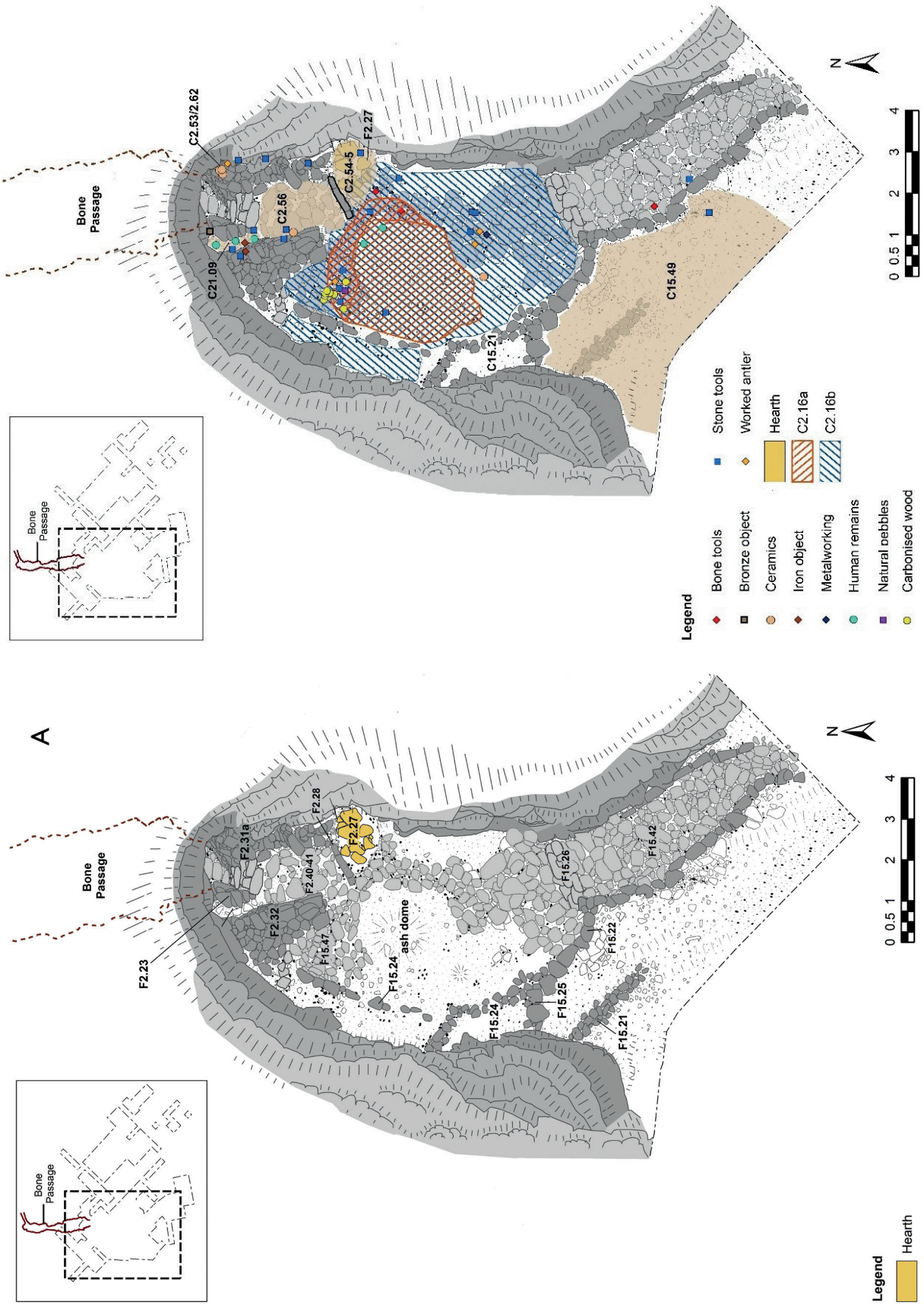


Figure 6.28. A. Plan showing Phase 4a [Block 8a] features including hearth F2.27 & stairwell F2.23; B. main deposits & finds distribution in the precinct

Table 6.14 Artefacts recovered from the Phase 4a Block 8a contexts in the Precinct

SB	C	SF	Description
8a	15.49	15.291	Saddle quern frag.
Group 1		15.292	Bone splinter point
		15.293	Quern rubber frag.
Group 2	2.16a	2.129	Cobble polisher/grinder
		2.499	Cobble grinder/hide rubber
Group 3		2.109	Bone pin roughout
		2.437	Steatite spindle whorl
		2.438	Cobble pounder (poss.)
		2.439	Whetstone
Group 4		2.093	Cobble grinder
		2.094	Multifunctional cobble tool
		2.095	Cobble grinder with pigment residues
		2.110	Natural stone with adhering iron slag (hearth stone)
		2.112	Antler handle roughout
		2.445	Ceramic sherd

Table 6.15 Artefacts recovered from the Phase 4b Block 8b contexts in the Precinct

SB	C	SF	Description
8b	15.48	2.525	Quern rubber
		15.139	Palette/sharpening stone
		15.140	D-sectioned cannel coal or shale bracelet frag.
		15.153	Gathered antler frags
		15.440	Flint thumbnail scraper
	15.42	15.132	Antler tine spearhead (socket only)
		15.145	Iron projecting ring-headed pin shank
		15.295	Saddle & frag. (refits with SF15.288 and SF15.303a)

grain. To the southwest, clayey, charcoal lensed C2.16a formed over the by now prominent, domed mound of earlier hearth settings and residues, and spilled over the paved walkway.

C2.16a was low in grain but rich in bone, and the heavily burnt and processed assemblage highlighted a different butchery and treatment profile to that seen previously. Condition was poor and species tended to be indeterminate, with a high proportion of highly fragmented material. The presence of such large quantities of burnt material may suggest that these contexts derive from the deposition of hearth waste post-burning, rather than the disposal of waste formed prior to cooking from nearby carcass processing.

The final deposit associated with F2.27 was stony C15.49, located at the southwest of the precinct adjacent to walkway F15.26b/F15.42. Its bone assemblage was similarly fragmentary and finds were few.

The Block 8a deposits produced several artefact groups, most deposited around the distinctive C2.16a ash dome (Table 6.14). Many objects were located at the interface between C2.16a and the Phase 3 abandonment deposits immediately below it: 2.16b [Block 7e]. Group 1 finds clustered around 2.5 m to the west of the stairwell and hearth, with Group 2 located 2.5 m to the west of the stairwell entrance and hearth F2.27. Group 3 were to the south/southwest of F2.27, and Group 4 from around walkway paving F15.26b where it narrowed approaching the hearth – including a hearth stone with iron slag adhering to it. Also from C2.16a were a residue-stained cobble grinder (SF2.487), polished bone point tip SF2.440, antler strip roughout SF2.130, gathered antler fragments SF2.225, and several disarticulated human bones (SF2.443) including a 1st proximal foot phalanx from a young adult, a 6–12-month right pubis, and an eroded foetal/neonate vertebra fragment. C2.55 produced only a struck quartz flake (SF2.432).

Block 8b (Phase 4b) saw new hearth F2.26 built directly over primary ash deposits C2.54/C2.55 covering F2.27 (Fig. 6.29). This hearth, contemporary with stairwell landing F2.42, featured a slightly larger setting, also using granite slab F2.28 as backing, forming a barrier between hearth and stairwell landing. Its ash and burnt stone-filled residues, containing moderate levels of burnt grain and burnt, unburnt and some processed bone, spread through the core of the precinct as C15.48, C15.41 and C15.42. Slab-lined pit F15.10, set between enclosure wall F15.22 and the west precinct edge, was filled with C15.20, which likely related to later Block 8c activity (se Section 6.4.4). Its location below the footprint of enclosure wall F15.14 may also indicate that its contents formed a foundation deposit (see Section 6.4.5): large lumps of charcoal, fire-cracked pebbles, and artefacts including flint flake SF15.061, baked mudstone flake SF15.079, fine iron oval ring SF15.078, and quern rubber SF15.114.

Fewer – but some interesting – artefacts were recovered from the precinct in Phase 4b (Table 6.15). These were well-distributed around the precinct periphery and mostly below the footprint of enclosure wall F15.14 (Section 6.4.5), perhaps suggesting some element of foundation deposition.

Walkway F15.26b [Block 13] provided access to stairwell F2.23 during Phase 4a (see Section 6.4.3). The walkway entered the precinct from the southeast, stepping down and narrowing as it flanked the ash dome, to a further paved area established west of the stairwell (F15.47), defined to the northwest by enclosure wall F15.22 and to the north by the Phase 3 stairwell wall F2.32. During Phase 4b, some additional crude slabs were placed to provide access to hearth F15.20.

Phase 4 saw several phases of construction resulting in the complete enclosure of the precinct (see Section 6.4.5) – a process begun in Phase 3 with wall F15.29 and (probably) low stone walls F19.02, F11.04, and F11.07 (see Section 6.3.3). Phase 4's clear boundary demarcated the precinct area through to the cessation of activities in Phase 7.

The first phase of this is seen in boulder alignment F15.22 (Phase 4a [Block 14]), running from the west side of walkway F15.26b and arcing northwest (F15.24), where short wall F15.25 runs west to meet the rocky precinct edge. F15.22 continued north and northeast, mirroring the natural rock profile, terminating just before the remains of the west wall of stairwell F2.32. F11.04, aligned northwest–southeast to the east of the stairwell may relate to this. However, here the natural sloping outcrop on the east side of the precinct may have formed a natural boundary to the space.

6.4.3 Phase 4: stairwells and associated landings [Block 21a, 21b, 21c and 21d]

Phase 4a saw construction of a new stairwell (F2.23, [Block 21a], Fig. 6.31) which was a focus for modification and elaboration throughout Phase 4, with wall courses added to the east (F2.34) and west (F2.23) walls, and four new successive paved landings (F2.40, F2.41, F2.42 and F2.25). New stone steps were inserted, forming a steep, continuous staircase with narrow heel-treads (Figs 6.34 and 6.35). The catalyst for this remodelling was most likely the continued generation of fuel residue and midden in the precinct. As in Phase 3, accumulating and curated deposits would have inhibited access to the stairwell and cave, and the raising of stairwell F2.23 in stages was most likely a periodic response to this issue. That the solution of removing the accumulating material from the precinct was not considered is significant. We can suggest that materials generated via activities in the precinct had some symbolic importance, necessitating their curation within precinct or cave – that these were not by-products of events undertaken, but an inherent part of the fabric and geography of the site. It is also possible that the elaborate stairwell that grew out of these changes may also have been a social construct, itself a product of the increasing significance of High Pasture.

An interesting feature of this phase was the construction of new granite boulder west stairwell wall (F2.23). This did not utilise Phase 3 stairwell wall F2.32 [Block 20], but neither was the earlier structure dismantled. The new wall was inserted within the limited space of the earlier stairwell, resulting in a significant narrowing of the structure. It is possible that this was carried out at the end of Phase 3 (see Section 6.3.2), but it was more likely a product of early Phase 4 change. Two reasons are suggested: first, the earlier stairwell wall had a distinctive 'batter', which would not have been conducive to modifying its height to any degree and its stonework was notably a poorer build. Secondly, the new stairwell may have been designed to feature a more restricted, and possibly darker access to the cave. The earlier wall (F2.32) continued in an important role through Phases 4a–4b as a retaining wall for the accumulating precinct deposits and this may also have influenced the build. The east wall of the stairwell (F2.34b) added courses to its Phase 3 predecessor, plus an extension to the south. The southern terminus of the east stairwell wall was abutted by granite hearth backing F2.28 (Fig. 6.29; Fig. 6.32). Measuring 1 m long by 0.6 m high, this guided access onto the stairwell landing from the WSW. Here, it also formed a heat shield from hearths F2.27 (Phase 4a) and F2.26 (Phase 4b) to the southeast, for those entering or leaving the stairwell, and would also have prevented, to some extent, light from the fire reaching the cave. F2.28 clearly showed the effects of heat, being cracked and partially fragmented.

By the final stages of Phase 4c (see Section 6.4.4), stairwell F2.23 was nearing maximum height. We cannot be sure if, as in Phase 3, the stairwell was roofed, although this seems likely. The earlier west wall was now completely incorporated into the new structure, which abutted wall F15.14 (see Section 6.4.5). The stairwell's east side utilised the natural bedrock, bridging the uneven, pocketed surface with a series of granite lintels (C2.31a). A vertical groove or chimney in the bedrock was filled with a single stack of granite blocks (F2.31b), built off one of the lintel-stones (Fig. 6.32, Fig. 6.33), which extended up the groove to a height where it most likely abutted the precinct wall (F21.01). The stairwell therefore became an integral element of the precinct enclosure.

A number of artefacts (Table 6.16) were incorporated into the west stairwell wall (F2.23) during its construction/modification at this time including burnt saddle quern fragment SF2.530, cobble grinder/hammerstone SF2.523, and saddle quern SF21.06. A steatite spindle whorl (SF15.389) may have formed a foundation deposit in the lower core of the stairwell wall (C21.10). Several objects were also deposited in the east wall F2.34b's packing (C2.53/C2.62) during modification, including four refitting saddle quern fragments (SF2.476, a fifth saddle quern fragment (SF2.435, pebble grinder SF2.473, worked rock crystal SF2.521, and single potsherd SF2.520 (Table 6.16).

Animal bone recovered from contexts associated with the construction and modification of stairwell F2.23 was generally heavily fragmented and not identifiable to species, though several deposits produced teeth and mandible fragments, phalanges, and a mature dog ulna. East stairwell wall fills C2.62/C2.53 produced a larger assemblage, including pig lower mandible elements and perinate fragments. C2.56, within stairwell F2.23, contained a small assemblage including a horse molar.

Hazel charcoal from C21.09/4 (lower packing of west wall F2.23) was AMS dated to 767–477 cal BC (SUERC-50985), while birch wood charcoal from C2.63 (lower east

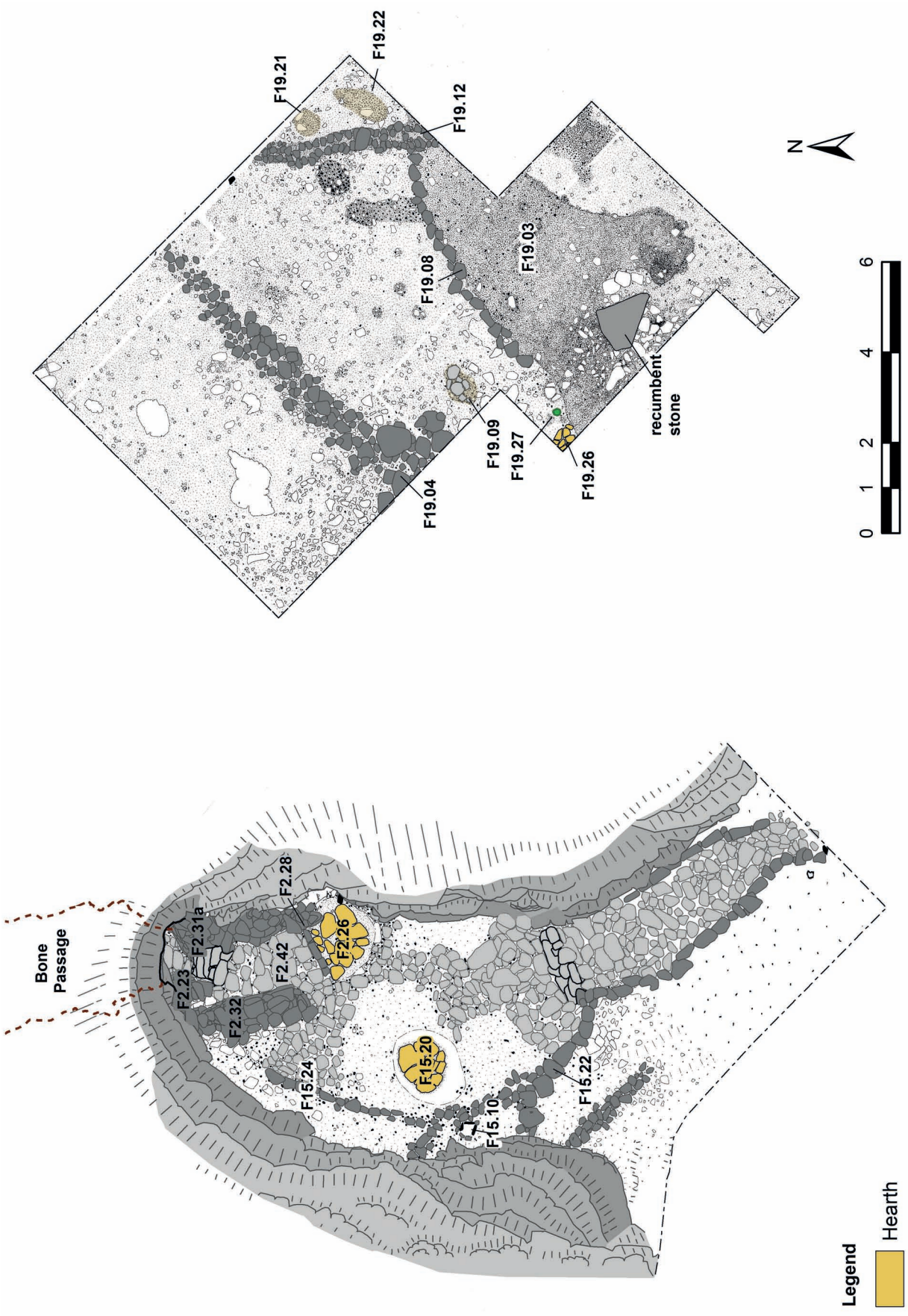


Figure 6.29. Plan showing Phase 4b [Block 8b] features within precinct & in Trench 19

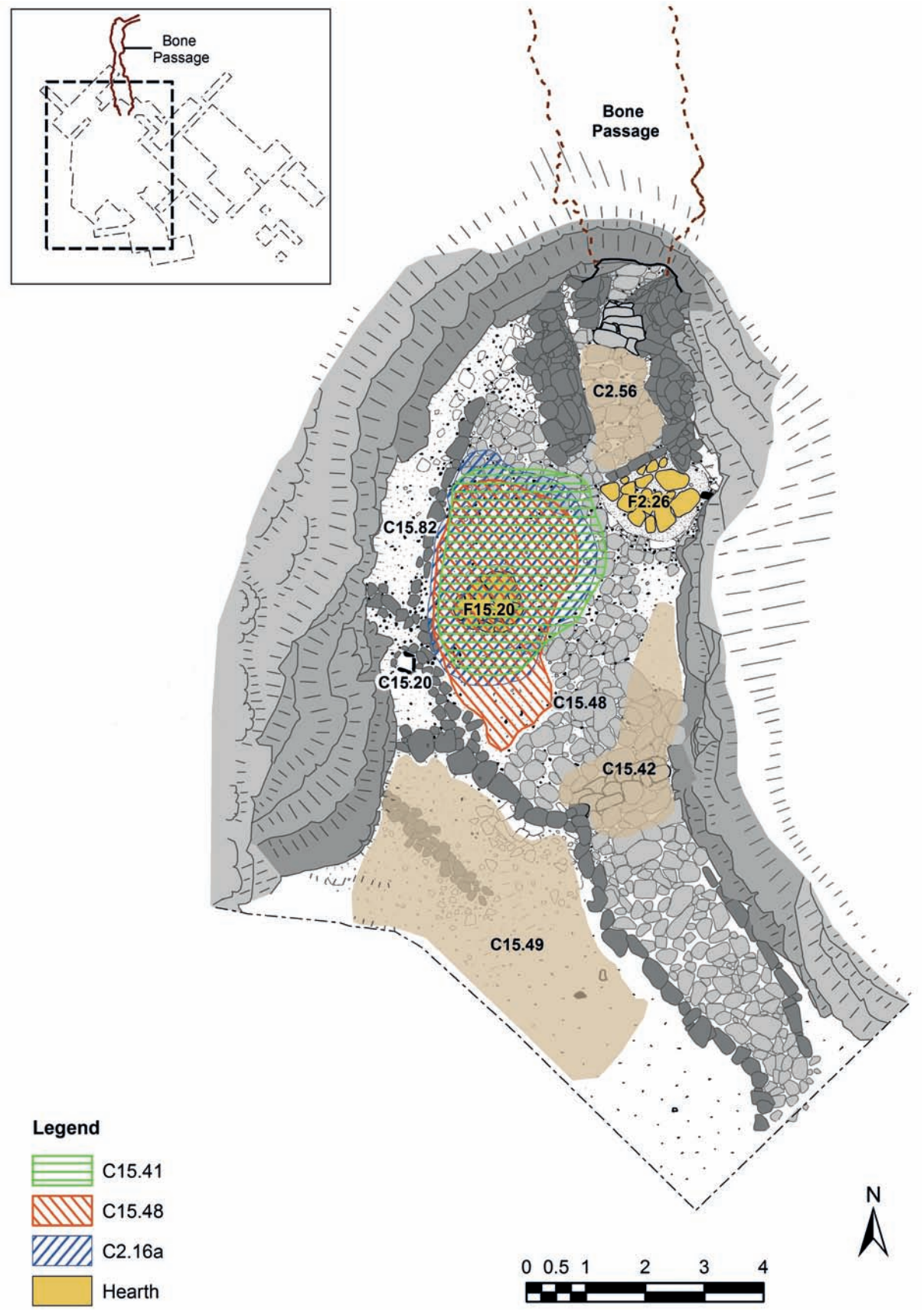


Figure 6.30. Plan showing main Phase 4b [Block 8b] deposits associated with use of hearths F2.26 & F15.20

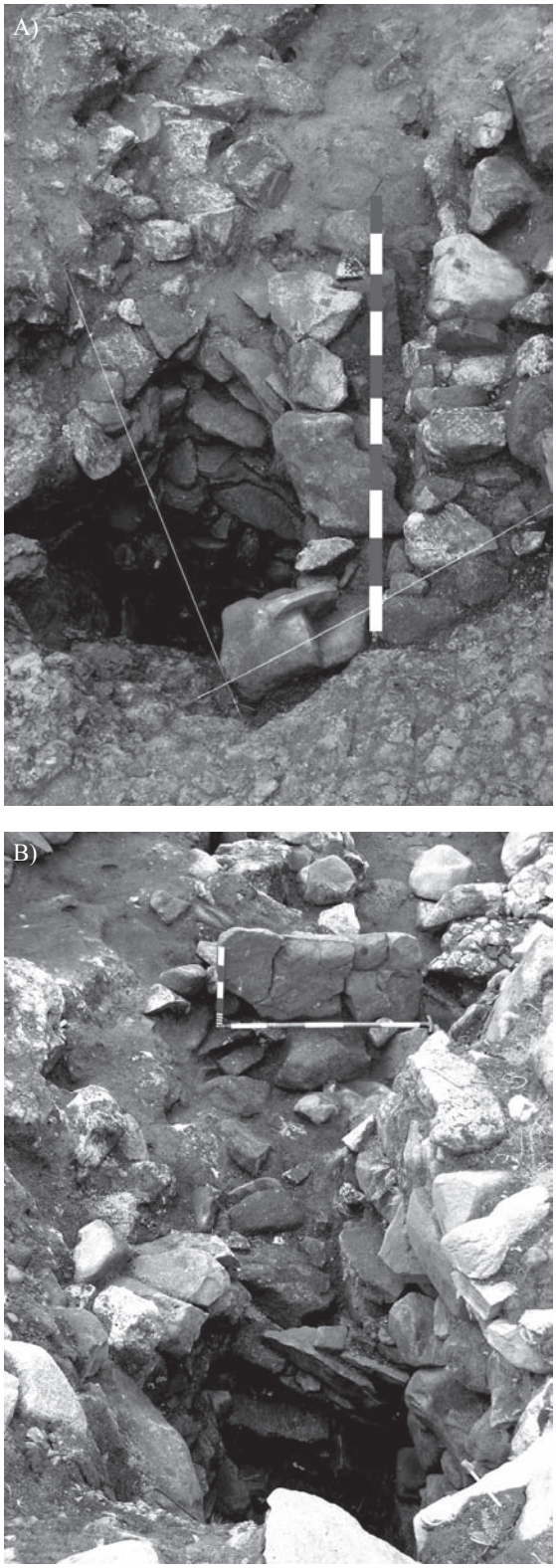


Figure 6.31. Phase 4 stairwell F2.23 [Block 21a]: A: the west stairwell wall F2.23 to the left of the scale & inside earlier stairwell wall F2.32. The east stairwell wall F2.23b can be seen to the left side of the narrow steps leading down into Bone Passage, looking southeast; B. view south-southeast showing the stairwell after raising the west wall to its full height, with the upright granite slab F2.28 at the far end of the landing leading into the stairwell

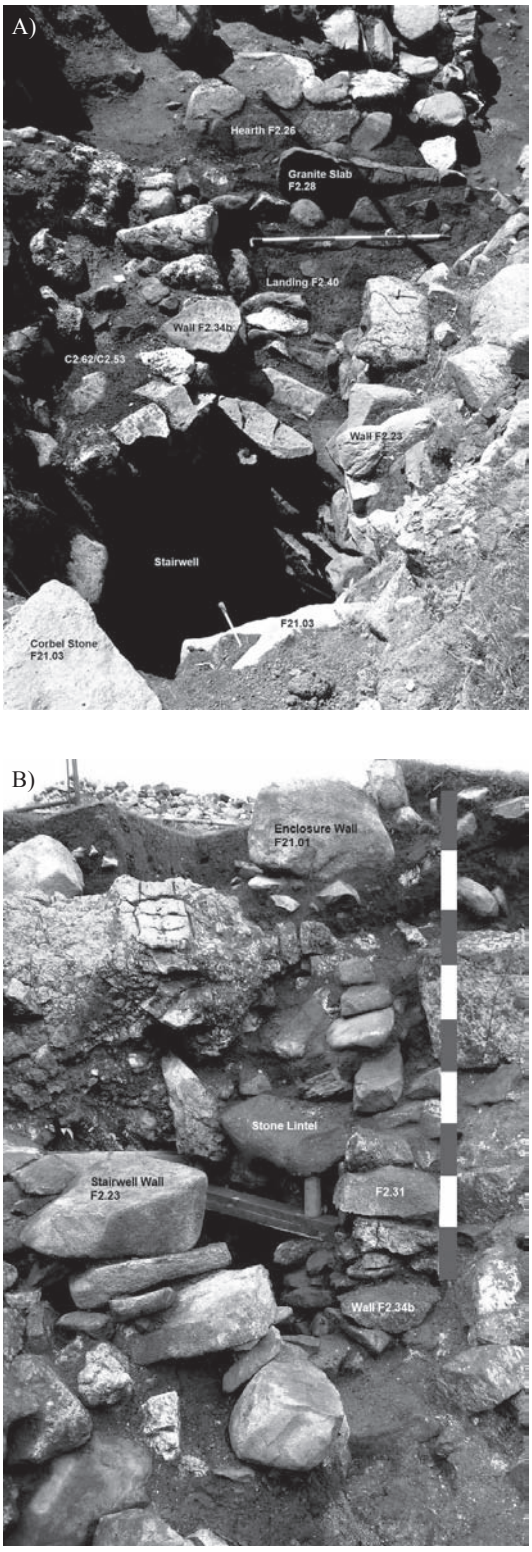


Figure 6.32. Phase 4 stairwell F2.23 [Block 21a]: A. looking south, showing the stairwell with the slabs of hearth F2.26 visible behind upright granite slab F2.28; B. taken during the dismantling of the stairwell walls, looking northeast shows the partially collapsed granite lintel F2.31a within the east wall (supported by timber during the excavations) & the stack of stone blocks F2.31b constructed in a chimney crevice in the limestone bedrock. The large boulder above is a foundation stone within enclosure wall F21.01

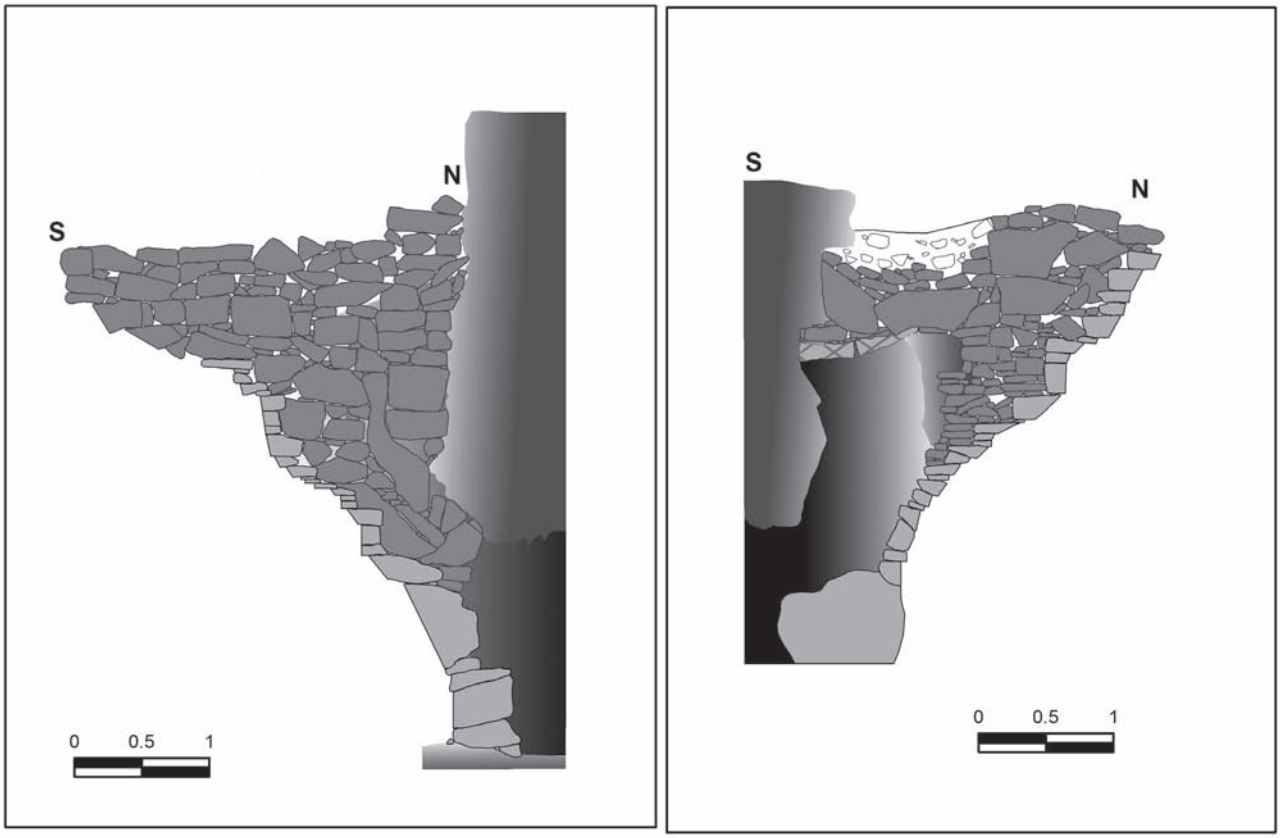


Figure 6.33. Elevations through the Phase 4 stairwell [Block 21a] showing west (F2.23) & east (F2.31a) walls. The lower sections of the east stairwell wall (F2.34) are not shown due to section location.

Table 6.16 Artefacts recovered from wall fills associated with the construction of stairwell F2.23 in Phase 4 [Blocks 21a & 21b]

SB	*C*	*SF*	*Description*
21a	2.62	2.473	Cobble grinder
		2.476	4 Refitting saddle quern frags
		2.520	Pottery sherd
		2.521	Worked rock crystal
	2.63	2.480-2.481	2 Pottery sherds
		BNN14	Antler beam segment (4 refitting frags)
	2.53	2.435	Saddle quern frag. (refits with SF2.413, SF415 & SF21.09)
21b	21.09/3	21.06	Saddle quern (built into west wall of stairwell)
	21.10	2.523	Cobble grinder/hammerstone (built into stairwell wall F2.32)
		2.530	Saddle quern frag. (burnt): built into stairwell wall (refits with F2.538)
		15.389	Steatite spindle whorl

wall packing) dated to 599–415 cal BC (SUERC-32908). Animal bone from east stairwell wall fill C2.53 produced a date of 591–406 cal BC (SUERC-50989).

6.4.4 Phase 4c: Intense use of fire and structured deposition in the precinct [Block 8c]

The major remodelling of the precinct in Phase 4c (Fig. 6.36), including the construction of enclosure wall F15.14 (see Section 6.4.5) signalled one of the most intense phases of activity at High Pasture, mostly focused on the use of hearths F15.20 and F2.26 [Block 8c]. Throughout Phase 4c, these generated huge amounts of fuel residue and wastes associated with in-precinct activity. Some of this material was removed elsewhere, including (significantly) to Bone Passage, and areas beyond the precinct boundary (see Sections 6.4.6, 6.4.7). Deposits associated with these hearths (Fig. 6.37) comprised interleaving lenses of dense black, charcoal-rich residues and vivid orange ash (probably derived from burnt peat), indicating several distinct events. Large deposits of fire-cracked stone (>80%) were interspersed throughout these deposits, most likely from cooking and heating activity. During this phase, increasing amounts of fire-cracked stone were transferred out of the precinct, the resulting deposits resembling a burnt mound surrounding the precinct on all sides bar the south (see Section 6.4.7).



Figure 6.34. Phase 4 stairwell with landing F2.25 [Block 21d] & hearth F2.26 above scale, looking southeast

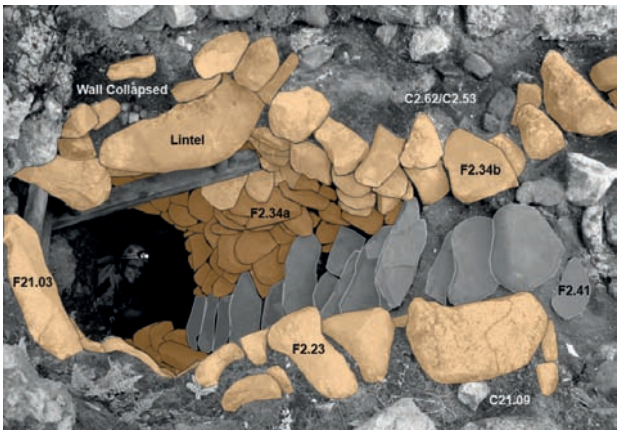


Figure 6.35. Phase 4 stairwell F2.23 [Block 21a] from above with in situ *corbel stones from roof structure at bottom left*

Block 8c deposits, relating to the use of hearths F15.20 and F2.26, contained moderate to high amounts of burnt grain and significant amounts of butchered animal bone (C15.43, C15.38, C15.20, C2.31, C2.30, C2.10, C2.15, C2.15c, C2.15b and C2.15a). Bone was heavily fragmented and processed, with fewer sheep/goat and pig, and more deer and horse than seen previously – the former represented mainly by loose teeth. Cattle bone in particular displayed extensive post-cranial working, and many bone fragments were burnt to heavily calcined. Cattle teeth, young pig elements, and a focus on appendicular elements indicative of meat joints featuring likely articulated material, all feature in these deposits. However, such intensive processing precluded much identification to species.

In total, the Block 8c contexts produced a notably large range of artefacts (Table 6.17). These were spread through the western half of the precinct, with some discrete caches and concentrations identified. However, post-depositional trampling and other taphonomic processes may have disturbed some deposits in this area. Object caches included a group of 17 cobble tools displaying varied use-wear, plus seven blanks (SF2.119a–w) deposited in ash to the north of hearth F15.20. A second cache at its southwest edge included two cobble pounders/hammers and a cobble pounder (SF15.134). A third possible cache included a cobble grinder and two cobble blanks (SF2.489). Three refitting quern rubber fragments (SF15.285) were deposited in the southeast arc of the precinct. A number of steatite spindle whorls were deposited around the hearth and a stone whorl just inside the precinct entrance. The wider spread of objects featured mainly stone tools, but also charred human skull fragments from a young adult (SF2.483).

A second major artefact group was recovered from context 2.15a: a re-deposited dump of ash and residues to the north of, and partially overlying, hearth F15.20 (Fig. 6.37). This most likely comprised rake-outs from hearth F2.26, and included quantities of charcoal, burnt barley, wheat, and hazelnut shell, and highly fragmented, butchered and burnt bone. Although C2.15a contained a wide range of artefacts (Table 6.17), its key feature was several fragments of carbonised worked wood within a large charcoal concentration. These included fragments of hazel withies, fragments from a turned wooden bowl, a split and bent roundwood fragment, fine tabular fragments of dressed alder (some refitting), and the bridge from a musical instrument (probably a lyre) manufactured from oak (Table 6.18; see Sections 12.10; 12.11). These objects were all carbonised to varying degrees and most likely relate to one low intensity burning event. Other carbonised wood fragments were recovered from associated contexts.

A number of AMS dates were obtained from Phase 4 precinct materials. Animal bone and hazel charcoal from C2.16a [Block 8a] produced dates of 591–404 cal BC (SUERC-50996) and 513–378 cal BC (SUERC-50974) respectively; hazel charcoal from C15.48 [Block 8b] produced a date of 770–480 cal BC (SUERC-23614); burnt barley grain and animal bone from C2.15c dated to 591–407 cal BC (SUERC-50968) and 696–540 cal BC (SUERC-50987); animal bone from C2.15b dated to 781–511 cal BC (SUERC-50998); hazel charcoal from C15.38 dated to 770–480 cal BC (SUERC-23619); and animal bone from C2.15a dated to 545–402 cal BC (SUERC-50995).

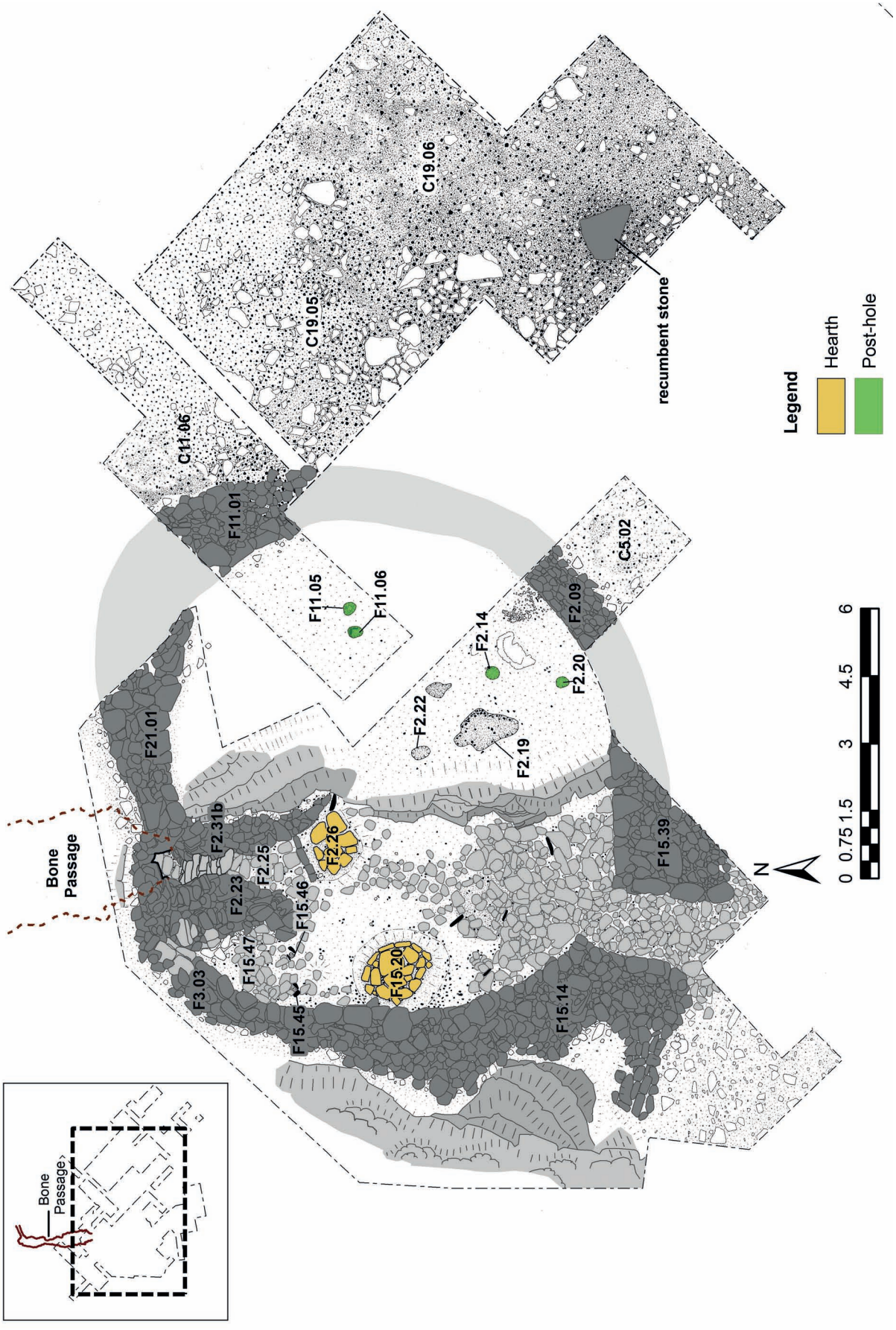


Figure 6.36. Plan showing Phase 4c [Block 8c] features within the precinct & burnt spread deposits in Trenches 5, 11, & 19

Table 6.17 Artefacts recovered from the Phase 4c [Block 8c] deposits associated with the use of hearths F2.26 & F15.20

SB	*C*	*SF*	*Description*
8c	2.15c	2.434	Flat-headed polished bone pin frag.
		2.436	Cobble grinder
		2.472	Sharpening stone
		2.474	Saddle quern frag.
		2.475	Cobble grinder
		2.477	Blue glass bead
		2.478	Ceramic mould
		2.479	Cobble hammer/pounder
		2.483	Charred human skull frags (young adult)
		2.485	2 Pumice fragments
		2.489	Cache comprising cobble grinder & 2 cobble blanks
		2.490	Cobble grinder/pounder
		2.491	Cobble burnisher
		2.494	Cobble pounder
		2.514	Prepared antler strip
		2.526	Quern rubber
		2.527b–m	Carbonised worked wood frags (inc. *Corylus avellana*, *Alnus glutinosa*, *Prunus avium* & *Sorbus* sp.)
		15.348	Lithic: Quartz irregular core
		15.350	D-sectioned cannel coal or shale bangle frag. (unfinished)
	2.31	2.124	Femur-head roughout (perforation just started)
		2.125	Cobble pounder
		2.126	Cobble multifunctional tool
		2.184	Finely polished bone pin/needle tip
		2.192	Polished bone pin
		2.193	Iron knife
	15.43	15.136	Iron awl
		15.137	Multifunctional cobble tool
		15.138	Stone spindle whorl
	2.15b	2.426	Fuel ash slag
		2.427	Pottery sherd
		2.428	Cobble grinder/hide rubber
		2.429	Bone femur-head roughout
		2.430	Pottery sherd
		2.431	Fuel ash slag
		2.471	Cobble grinder
		2.524	Bone femur-head spindle whorl (burnt)
		2.528	Copper alloy chain link
		15.346	Steatite spindle whorl
		15.347	Cobble grinder
		15.469	Steatite spindle whorl
		15.470	Steatite spindle whorl
	2.30	2.119a-w	Cobble tool cache. 17 cobble tools inc. 5 multifunctional tools, 4 pounders, 1 grinder/pounder, 1 polisher, 1 polisher/grinder, 3 hide rubbers, & 2 palettes: & 7 cobble blanks
		2.121	Granite anvil/mortar
	15.38	15.121	Fuel ash slag
		15.122	Cobble grinder/pounder (broken)
		15.123	Steatite spindle whorl
		15.124	Multifunctional cobble tool
		15.125	Cobble pounder/grinder
		15.126	2 Steatite spindle whorls
		15.127	Cobble grinder/hide rubber
		15.128	Cobble pounder
		15.134	Cobble tool cache (2 pounder/ hammers, 1 pounder)
		15.135	Worked pumice
		15.285	3 quern rubber frags (refits)
	2.15	2.118	Iron dagger
		2.251	Bronze sheet frag. with 2 poss. rivets & washers
	2.15a	2.417	Bone splinter (unworked)
		2.418	Cobble grinder
		2.419	Pottery sherd
		2.420	Cobble grinder
		2.421	Stone palette
		2.422	Edge grinder
		2.424	Cobble grinder/hide rubber
		2.433	Iron sheet frag.
		2.467	Cobble grinder
		2.468	Multifunctional cobble tool
		2.513	Gathered antler frag.
	2.10	2.077	Saddle quern frag.
		2.080	Worked stone
		2.083	Cobble pounder
		2.086	Saddle quern frag.
	2.09	2.075	Saddle quern

(Continued)

Table 6.17 (Continued)

6.4.5 Phase 4c: defining the precinct: construction of the enclosure wall [Block 15]

Phase 4c saw the construction of a massive stone-built wall defining the precinct [Block 15] comprising F2.09, F3.03, F11.01, F11.02, F15.14, F15.39 and F21.01 (Fig. 6.36). Its construction varied around its periphery: from free-standing double-faced wall with rubble and sediment core, to single-faced revetting wall with rubble backing, depending on its location and relationship to nearby features – such as the single-faced wall built against the steep, natural scarp outside the cave entrance, which survived up to four courses high with a rubble infill between the wall face and the natural slope. The enclosure wall survived best to the southwest, south, and northeast of the precinct, where a free-standing double-faced rubble-core wall of three to five courses was uncovered. The single-skinned southeast sector (F2.09) may have been modified during Phase 6a.

The wall was 1.2–1.4 m wide at its base and survived to a maximum of 0.95 m high, the absence of significant tumble inside the enclosure at its highest point indicating that it did not exceed this height. However, the solid foundation would have provided a good platform on which to raise the structure with wood and/or turf. If such additional constructions were not used to give the enclosure a level upper horizon, then its top would have varied significantly in height due to the underlying topography.

The wall construction was unusual compared with other Atlantic Iron Age structures and more recent examples of drystone field walls. The lower two courses comprised small granite slabs and sub-rounded glacial erratics, while the upper courses generally increased in size, including large, 'blocky', granite boulders. This building style would produce a less stable structure and, while the wall foundations generally survived well, the southwest, west, and northwest sections of the upper wall had slumped inwards, with total collapse only prevented by in-precinct deposits supporting the inner face. Two boulder buttresses (F15.18; F15.40) on the inside face were presumably built to prevent localised collapse, responding to wall failure due to subsidence in the precinct and earlier stairwells (Fig. 6.40; 6.41).

A single entrance *c*.1.5 m wide × 2.2 m long was identified in the SSW arc of the enclosure wall, with paving leading inside the precinct. This modification resulted in the abandonment of old paved access F15.26b, and the creation of new areas of paving. At the northern arc of the enclosure, the wall thinned markedly on contact with the bedrock and adjoining stairwell walls (F2.23 and F2.31). No wall survived immediately above the head of the stairwell, although this may have been destroyed along with the corbelled and lintelled roof of the structure in Phases 6b and 7.

The matrix of smaller stones and sediments within the enclosure wall included charcoal, animal bone, shellfish (periwinkles), and some artefacts. A single pig mandible of around 14 months in age came from C15.39, along with two sheep/goat tooth fragments and ten cattle bones, including a possible refitting left astragalus and calcaneus, and several phalanges; possibly indicating the disposal of a lower limb portion. A small burnt bone assemblage included two fragments of red deer antler. Objects recovered from the wall core are listed in Table 6.19.

The construction of enclosure wall F15.14 further defined available space within the precinct. Around 10 m in internal diameter, the precinct now comprised two activity areas: a lower western half focused on access through the enclosure entrance, leading to paving and access to stairwell and cave; and a slightly raised eastern platform *c*. 0.6 m above the west.

Features associated with Phase 4c activity included a number of small upright slabs, perhaps associated with post settings, although no potentially contemporary negative features were identified. In the northwest corner within paved area F15.47, two small post-holes with packing stones (F15.45 and F15.46) may have formed a lean-to or canopy-type structure utilising enclosure wall F15.14 and west stairwell wall F2.23.

6.4.6 Phase 4: deposition in the cave [Block 27b]

Interpretation of activity within Bone Passage during Phase 4 remains problematic, with the construction of stairwell F2.23 in Phase 4a destroying any stratigraphic link between cave and precinct. The remaining connection is only the respective artefact and environmental assemblages and these, along with accompanying AMS dates, provide a framework for tentative interpretation of Phase 4 events in the cave. While a major event sequence in Bone Passage can be defined, important boundaries separating stratigraphic blocks remain blurred, especially between Blocks 27a and 27b in Phases 3 and 4, and Blocks 27b and 27c in Phases 4 and 5. A model for the likely Phase 4 sequence in Bone Passage is outlined below.

During Phase 3 and for most of Phase 4, the paved walkway, and associated surfaces in Bone Passage [Block 26] were kept clear, with the exception of some finely laminated trample deposits [Block 27a – Phase 3b]. The precinct was the focus of depositional activity through Phases 3 and 4 and, while this may simply reflect the increasing scale of activity at the site and the accommodation of ever-larger gatherings, it may also reflect a desire to keep Bone Passage itself, and access through the cave, clear of additional material. It is not until the end of Phase 4 that this changes, with the deposition of midden in Bone Passage (C6.06, C1.06b, and C17.05 [Block 27b]; Fig. 4.4A-C).

These deposits (Fig. 6.42) show some variation across the cave, indicating some deliberate use of space and varied modes of deposition. Stony, gritty, char-rich silt C6.06 in the southern chamber contained significant

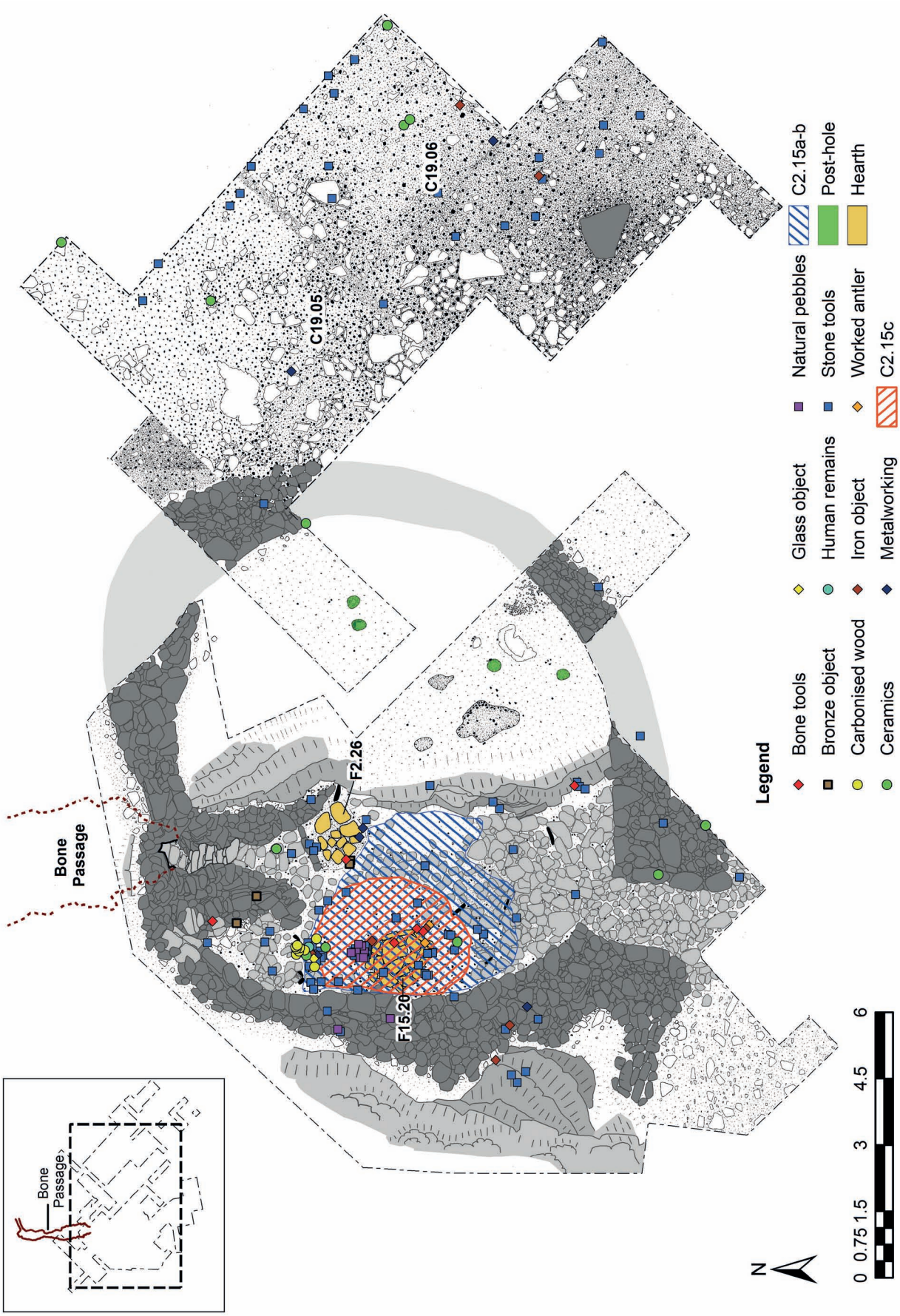


Figure 6.37. Plan showing main Phase 4c [Block 8c] deposits & finds distribution for Blocks 8b & 8c (see Fig. 6.38 for detail of precinct)

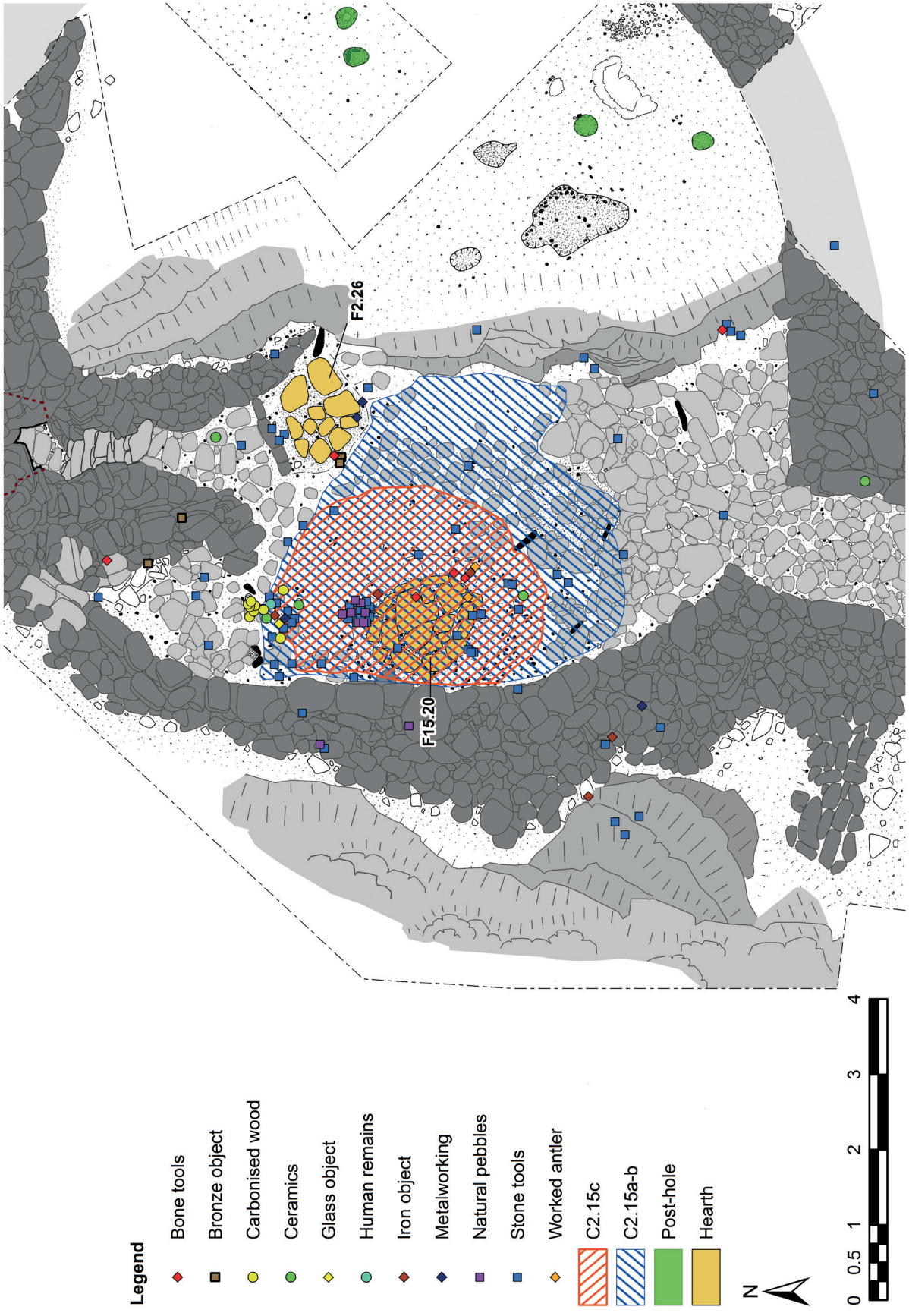


Figure 6.38. Plan showing Phase 4c [Block 8c] deposits & finds distribution within precinct enclosure



Figure 6.39. Hearth F15.20 after section excavation with enclosure wall F15.14 bottom left, looking northeast

Table 6.18 Carbonised wood artefacts recovered from the Phase 4c [Block 8c] deposits C2.15a in the precinct enclosure

SB	*C*	*SF*	*Description*
8c	2.15a	15.351	7 Hazel withy frags (burnt), *Corylus avellana*
		15.352a–g	7 Worked flat frags of alder (burnt), *Alnus glutinosa*
		15.353	2 Worked flat frags of alder (burnt), *Alnus glutinosa*
		15.3536a–p	12 Worked tabular dressed frags of alder (burnt), *Alnus glutinosa*
		15.354a–d	4 Worked flat frags of wood (burnt), 3 *Alnus glutinosa*, 1 *Sorbus* sp.
		15.355a-d	4 Worked flat frags of wood (burnt), 3 *Alnus glutinosa*, 1 *Sorbus* sp.
		15.356	Worked flat frag. of alder (burnt), *Alnus glutinosa*
		15.357	Spit & bent hazel roundwood frag. (burnt), *Corylus avellana*
		15.358	Bridge from musical instrument, poss. a lyre (burnt), *Quercus* sp.
		2.527	11 Worked refitting flat frags of hazel (burnt), *Corylus avellana*
		2.558	Burnt wooden peg of alder? *Alnus glutinosa*

amounts of burnt and unburnt bone and some grain. Less stony C1.06b, in the central narrows, was focused to the south side and contained animal and fish bone and fire-cracked stone. The north chamber was filled with C17.05, a compact cobble and fire-cracked stone layer containing charcoal, signs of burnt turf, animal and fish bone and moderate amounts of burnt barley. The amount of fire-cracked stone increased towards the north end of the passage, adjacent to the streamway access.

Table 6.19 Artefacts recovered from core of Phase 4c [Block 15] enclosure wall

SB	*C*	*SF*	*Description*
15	15.39	15.129	Flint flake with retouch
		15.130	Abraded haematite: pigment
		15.283–15.284	2 Ceramic sherds (from 2 vessels)
		15.287, 15.311	2 quern rubbers
		15.288	Saddle quern frags (refit with SF15.295 & SF15.303a)
		15.290	Gathered antler frag (burnt)
	11.07	11.002	Quern rubber

Quantities of semi-articulated bone, some heavily processed, were recovered from all deposits. Dog and deer were rare and domesticate bone heavily fragmented. Cranial and post-cranial elements for most species indicate nearby butchery. Burnt bone was almost wholly concentrated in C6.06, with over 1200 fragments recovered. Rodent bone was frequent, mirroring Phase 4 precinct deposits. Most bone was concentrated to the south and north chambers, and there is evidence for specific, zoned deposition. A significant unburnt pig bone deposit within the central narrows of the passage (C1.06b) included very juvenile and older individuals, including mandible and skull fragments and scapula from a perinate/neonate. C1.06b also contained a herring bone deposit, with a deposit of herring, saithe, cod, haddock, and mackerel recovered from context C17.05 in the north chamber. No fish bone was recovered from south chamber deposit C6.06. The Block 27b faunal assemblage is around 50% larger than equivalent precinct deposits – more so for burnt bone – suggesting that most bone generated in the precinct during this period was then redeposited in the cave. A scattering of marine shells was recovered from each deposit zone, with a marked increase in periwinkles in the north chamber, while burnt barley grain also appears to be deposited preferentially into the back of the cave in C17.05.

The artefacts deposited within Bone Passage during the Phase 3-4 transition also display some potential structuring (Table 6.20). From the base of the stairwell steps up to the central zone (C6.06), objects were spread evenly, suggesting in-midden deposition, but discrete groups, some broken, may mirror earlier deposition events. One unusual find was a fragment of pine resin, possibly relating to specific activity in the cave (SF6.605, see Section 13.12). Artefacts deposited to the cave rear (C17.05) included a discrete deposit of hammer scale (SF17.033) and a broken bone point (SF17.017) recovered from close to the west wall, while a antler prepared strip (SF17.174) was located at the ramp entrance. These materials may relate to the potential closing deposits

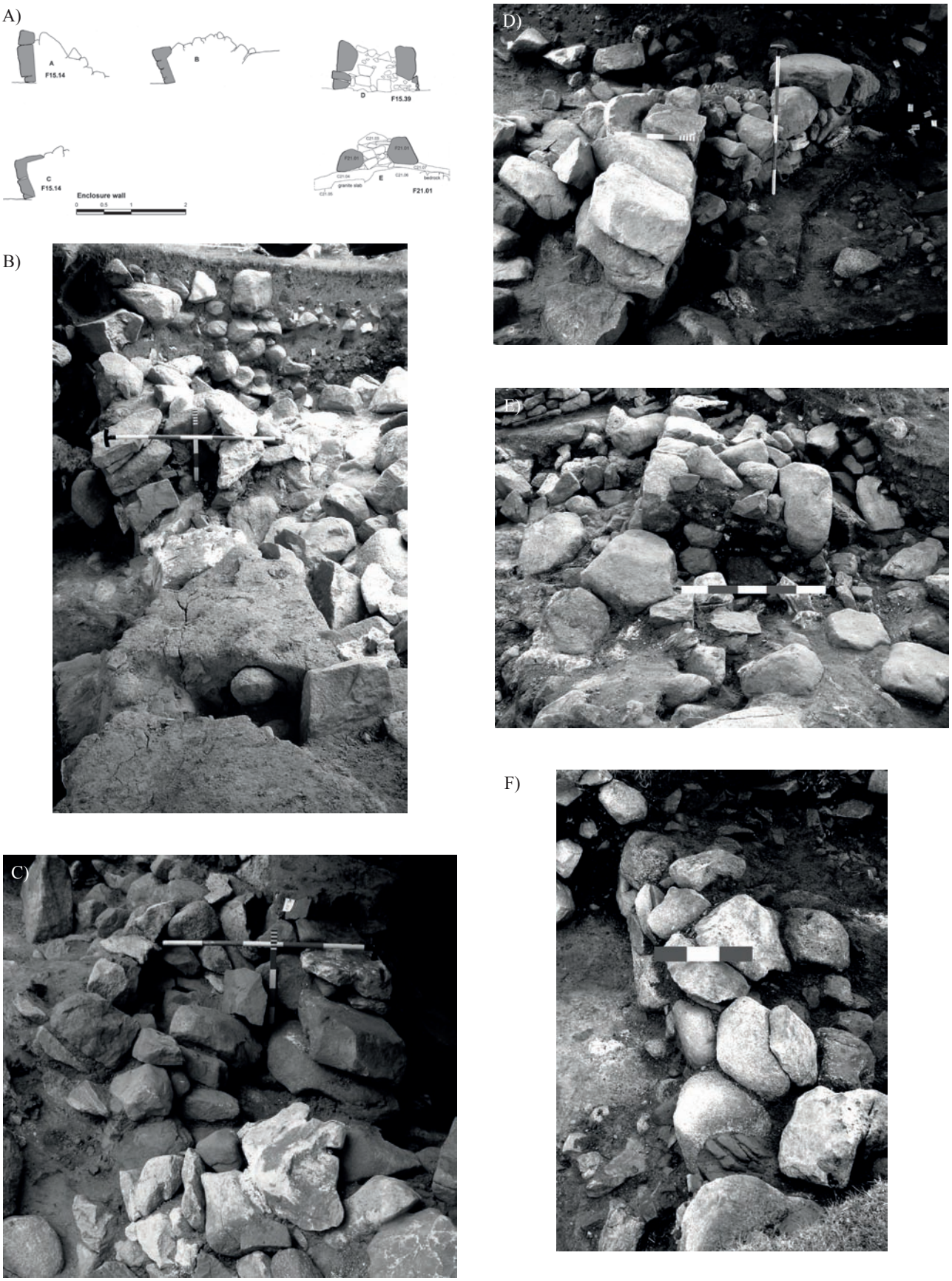


Figure 6.40. Sections through the Phase 4c [Block 15] enclosure wall and images showing wall profiles



Figure 6.41. Views of Phase 4c [Block 15] enclosure wall including F15.14 (A); & F15.39 (B & C) showing large boulders set on smaller courses of stone

Table 6.20 Artefacts recovered from the Phase 4c [Block 27b] deposits in Bone Passage

SB	*C*	*SF*	*Description*
27b	6.06	6.348	Gathered antler frags
Group 1		6.355	Cobble pounder
		6.357	Cobble pounder
		6.358	3 Refitting bone needle frags
		6.359	Bone point/pin/needle roughout
		6.366	Steatite flake (refits with 6.385)
		6.367a–b	2 Bone point tips
		6.368	Double-ended bone splinter point
		6.385	Steatite flake (refits with 6.366)
		6.457	4 Flint flakes
		6.614	Bone point frag.
Group 2	6.06	6.268	Highly polished bone needle
		6.338	Quartz side scraper
		6.339a	Bone shaft point frag.
		6.339b	Pin, needle, or fine point shaft frag.
		6.431	Antler peg frag.
Group 3	6.06	6.275a	Bone point tip
		6.275b	Bone pin head
		6.275c	Bone pin/needle tip
		6.284a	Broken bone point
		6.284b	Polished bone point tip
		6.284c	Unworked long bone splinter
		6.464	3 Flint flakes
Group 4	6.06	6.272	Perinate cranial bone frag.
		6.274	Multifunctional cobble tool
	1.06b	1.187	Cobble grinder/pounder
		1.228	Pumice frags
		1.229	Worked pumice
		1.230	Worked pumice
		1.287	Polished bone pin head
		1.289	Fragment of tuyère
27b	17.05	17.016	Antler tine offcut
Group 5		17.021	Flint flake
		17.023	Pottery sherd
		17.040	Saddle quern frag.
		17.044	Cobble hide rubber
		17.046	Cobble rubber
		17.051	Strike-a-light
		17.054	Hammerscale
		17.055	Red bead (unknown material)
		17.230	Flint chip
Group 6		17.035	Hammerscale deposit
		17.056	Slag sphere

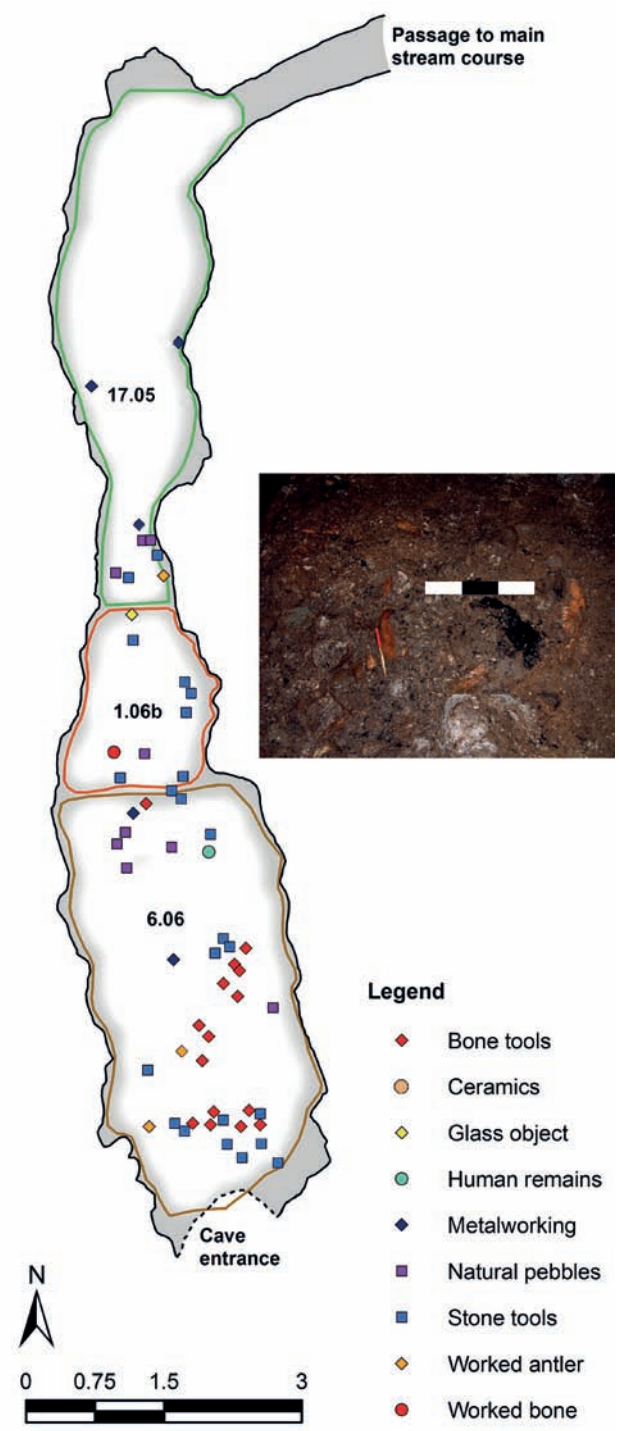


Figure 6.42. Plan of Bone Passage showing Phase 4c [Block 27b] contexts & finds distribution. Inset shows butchered animal bone & charcoal deposits in context C6.06

identified in Block 8c in the precinct and beyond the precinct boundary wall (6.4.7). Burnt barley grain from C6.06 and C1.06b produced AMS results of 560–400 cal BC (SUERC-28067) and 550–390 cal BC (SUERC-23639) respectively.

6.4.7 Phase 4: activities beyond the precinct [Block 33]

Phase 4 shows a marked increase in activity to the east and northeast of the precinct [Block 33]. Material generated in the precinct was deposited here, gradually covering earlier features. Partially robbed, double-faced granite wall F19.12 (Fig. 6.43), a small hearth of thin granite slabs (F19.26), and a small adjacent post-hole (F19.27) with pad-stone and packing were found. This was the only hearth identified beyond the precinct.

Fire-cracked stone, granite clasts and charcoal-rich residues were deposited between the remains of walls F19.04, F19.08 and F19.12. Thin charcoal-rich lens C19.09 contained burnt hazelnut shell, cereals, and over 500 fragments of heavily calcined bone. Dark, char-rich C19.11 contained a quern rubber, cobble tools, a D-sectioned canneloid shale bangle fragment. and an iron socketed gouge (Table 6.21) along with animal bone. To the east of wall F19.12, a small area of compact cobbles (C19.21, C19.22, and C19.23) probably formed an activity area, although diagnostic material was absent.

In the southeast corner of the site, a cut through an igneous dyke (F21.01) may indicate the construction of an entrance into the complex from the northeast during Phase 3 (see Section 6.3.6). Stone and char-rich associated Phase 4 deposit C20.04 contained an iron pin tip, a small bronze ring, and iron slag fragments. Metalworking residues were also recovered from a continuation of the infilled access route to the southwest, including a fragment of hearth/furnace lining (SFTP6.03) and a possible vitrified tuyère fragment SFTP6.04 (see Section 12.8).

Deposition in this area continued through the remainder of Phase 4: further spreads of generally compacted fire-cracked stone and unburnt granite stone clasts. The inclusion of the latter may relate to dismantled structures and features from earlier phases, but incorporation of similarly large quantities of unburnt stone into Bone Passage may suggest that these depositions had a symbolic element. Overall stone content within Block 33 varied between 80–90% and contained charcoal and bone, the latter normally heavily burnt/calcined. The majority of artefacts were recovered from C19.05, with fewer from C19.06 (Table 6.21). The latter included a burnt, fragmentary saddle quern (the second from this area), a cobble grinder/hammerstone and a decorated potsherd. C19.05 contained cobble tools (one burnt), a quern rubber fragment, a single potsherd, and a steatite spindle whorl. These may form a cache mirroring the earlier group of objects in C19.09, but poor stratigraphic links with the precinct make it difficult to interpret how these events and artefact groups may relate to precinct activity.

Hazel charcoal from Block 33 material produced the following AMS results: C903-3: 790–410 cal BC (SUERC-12289); C11.06: 670–410 cal BC (SUERC-23609); C19.09: 670–400 cal BC (SUERC-23621);

Table 6.21 Artefacts recovered from the Phase 4 [Block 33] deposits

SB	C	SF	Description
33	19.09	19.060	Iron rod frag.
		19.061	Quartz flake
		19.062	Crucible frag.
		19.063	D-sectioned shale bangle frag.
		19.056, 19.128	2 Cobble grinders (broken)
		19.127	Unclassified iron slag
		19.129	Burnt & fragmentary saddle quern
		19.130	Quartz flake
		19.131	Saddle quern
	19.11	19.110	Cobble pounder/hammer
		19.111	Pottery sherd
		19.113	Quern rubbers
		19.116	Whetstone (broken)
		19.126	Iron socketed gouge
		19.132	D-sectioned canneloid shale bangle frag.
		19.133	Flint flake
	20.04	20.01	Iron pin tip
		20.02, 20.03, 20.05, 20.06	Mixed iron metalworking residues inc dense slag, fuel ash slag, runned slag & unclassified slag
		20.04	Bronze ring
	19.06	19.059	Pottery sherd
		19.079	Burnt & fragmentary saddle quern
		19.125	Cobble grinder/ hammerstone
	19.05	19.046	Cobble grinder
		19.047	Cobble grinder frag. (burnt)
		19.048	Quern rubber (broken)
		19.049	Multifunctional cobble tool
		19.050, 19.054	2 Cobble grinder/pounders
		19.055	Burnisher
		19.051	Steatite spindle whorl
		19.053	Ceramic sherd
	19.14	19.078	2 Pottery sherds
	11.05	11.006	Pottery sherd



Figure 6.43. Trench 19 showing the Phase 4 [Block 33] contexts including wall fragment F19.12 & charcoal-rich lens C19.09

C21.05: 550–390 cal BC (SUERC-33773) and C19.11: 560–390 cal BC (SUERC-28066).

6.4.8 Temporary abandonment

AMS dates on material from the end of Phase 4 and the beginning of Phase 5 suggest a period of temporary abandonment, potentially supported by the deposition of midden and objects perhaps relating to an end Phase 4 closure. The deep precinct stratigraphy also displayed evidence for major subsidence, especially between the precinct centre and stairwell. Paving, hearths, and walls tilted at alarming angles, with deposits showing steeply angled profiles. The resulting uneven surfaces within the precinct were modified at the start of Phase 5, along with modifications to the precinct wall and stairwell, and provision of a new central location for the next sequence of hearths (Section 7.2).

7

Redefining space: the Middle Iron Age

Steven Birch

7.1 Introduction

Phase 5 saw activity resume at High Pasture after a likely short hiatus. In the precinct, measures were put in place to counteract the major subsidence that marked the end of Phase 4, as structures collapsed and the vast midden deposits now covering them slumped and settled (see Section 6.4.7). The precinct was once again remodelled, with new hearths, paving, and refashioned enclosure walls. The last series of modifications to the stairwell saw its walls raised, new steps and landings, and a corbelled and lintelled roof erected over its entrance. A new access into the precinct featured crude steps descending over the enclosure wall which would eventually be breached by the ever-increasing midden deposits, burying the remaining slope and the two-tier structure maintained through Phase 4. This created a level, roughly circular space, featuring post-holes which hint at a roof covering the structure, although it is perhaps more likely that they represent smaller shelters over specific activity areas. Beyond the precinct were extensive deposits of fire-cracked stone and isolated features, including a group of post-holes and scoops on the level platform northwest of the precinct, adjacent to the head of the stairwell. These probably supported a canopy or roofed structure associated with access.

Cave deposits relating to Phase 5 proved difficult to interpret (see Section 6.4.5). A group of midden dumps [Block 27c] can be assigned to Phase 5, but most of this material appears to form a closing deposit marking the end of Phase 5 activity. These deposits were similar in character to the underlying Block 27b (Phase 4c) material, but with more charcoal and burnt grain, and all pre-dated the construction of a partially paved floor (F6.01; C1.04) at the transition between Phases 5 and 6.

What may be clearer, however, is the intimate relationship of precinct to cave when looking at patterns of material deposition in both areas. During the Middle Iron Age there is a marked change in the treatment and deposition of midden material at the site. During Phase 3 and most of Phase 4, midden including animal bone was generally deposited within the preinct enclosure, with little in the cave. But during Phases 5–6, the cave became the focus for the deposition of these materials, mirroring activities during the Early Iron Age. The deposition of burnt grain showed no such strong zonation but increased in volume in both precinct and cave.

Chronology (Bayesian modelled radiocarbon dates)

The modelled dates for Phase 5 are discussed in Chapter 10 and presented in Appendix Table 4.

7.2 Phase 5: remodelling the precinct

7.2.1 Activity in the precinct

Four hearths, and several contemporary features, were constructed and used through Phase 5. However, before the construction of the earliest hearth (F2.05), a substantial deposit of uniformly fine, homogeneous compact yellow/buff silt (C2.06a, b and c and C15.34) was laid down within the west and southwest quadrants of the precinct (Fig. 7.1). This deposit abutted an area of paving (C2.07), the boundary between them defined by an alignment of small upright stones (F2.08). Some of the paving slabs had been affected by intense heat from adjacent hearth F2.05 (Fig. 7.2), which comprised fire-cracked granite slabs and smaller stones, surrounded by orange ash and charcoal-rich deposits C2.05d/C15.32.

This seems to have been a levelling deposit, filling the subsidence voids and hollows over the now deep stratigraphy underlying the Phase 4 surface. This was remarkably sterile, with only flint flake SF15.345 and pottery sherd SF15.118 recovered. Rare char streaks within the otherwise clean, pale, stone-free deposit only highlight that this material appears to have been laid with care and purpose, kept deliberately clean. Hazel

charcoal from C15.34 produced a date of 670–410 cal BC (SUERC-23613).

Hearth F2.05 [Block 9a] was placed to the SSE of the stairwell entrance (Fig. 7.2). Pit hearth F15.12 was located immediately to the south and contained a single upright granite slab and ash deposits containing unburnt bone and some grain (C15.31), and two potsherds from two vessels (SF15.101). Several upright slabs possibly formed post supports in this area, while three pits/post-holes cut into the levelling deposit: F15.15; F15.16, which had three small, angled stake-holes possibly representing a tripod, and F15.17 which contained a pad-stone, may have collectively represented an activity area or a covering shelter.

The second slab-built hearth (F2.13; [Block 9b]) was located to the WSW of F2.05. Close to the hearth setting was a single post-hole (F2.14) complete with packing stones. It is likely that both hearths were in use during Phase 5a (Fig. 7.2).

Ash deposits associated with hearths F2.05 and F2.13 included C2.05d, C15.32, C2.05c, C15.28, C2.05b, and C15.25, and were contained within the lower, west sector of the precinct. The deposits comprised a complex sequence of orange ash and charcoal-rich, organic lenses, seemingly carefully redistributed around the wider area (Fig. 7.2). Continuous, readily identifiable lenses of material covered this part of the precinct, creating distinctive alternating lenses of ash and char, orange and black, featuring fire-cracked stone, charcoal, and heavily fragmented bone, especially loose teeth, with deer, horse, and dog (one canine from a medium/large individual) present. C2.05d and C15.25 contained frequent burnt and calcined bone, mostly around hearth F2.05 and associated paved surfaces. C2.05d and C15.25 also contained rich botanical assemblages which are mirrored in contemporary cave deposits (see Section 7.2.4): C15.25 produced one of the largest deposits of burnt grain from the site. Thin-section analysis confirmed that the detail of the Phase 5a event sequence was even more complex, with numerous sub-contexts recorded which may represent individual burning events (Chapter 13.15).

At the start of Phase 5, the small natural NNW–SSE running 'step' which divided the precinct interior into two distinct activity areas was still extant. To its east, at a slightly higher elevation, a level platform of karstic clay deposits and bedrock contained several features: a semi-circular stone arc (F2.06), small pit F2.22, filled with char and ash rich deposit C2.43, and pit/scoop F2.19.

Numerous artefacts were recovered from the Phase 5a deposits, mainly stone tools of various forms, and almost all distributed through the lower, western half of the precinct. Some distribution is focused on central hearth F2.05; and potential structuring can be seen in the saddle quern fragment and quern rubber placed just outside the east stairwell wall; three refitting bone pin fragments and a gathered antler fragment at the northwest of F2.05, and a grinder/pounder and whetstone to the SSW. Notable finds include a bronze ring fragment, a steatite spindle whorl, an antler tine handle, a large piece of worked and charred wood, a piece of tool-marked carbonised worked wood, and several charred wooden bowl fragments (Table 7.1). A second potential levelling deposit of pale, clean silt/clay material (C2.05c) was then spread over this western half of the precinct at the end of Phase 5a. However, at only *c*. 10–30 mm in thickness, its utility as a new level surface would have been minimal, and it is possible that it may have represented a more symbolic sealing or closing of the Phase 5a deposits.

Hazel wood charcoal from C2.05d dated to 557–403 cal BC (SUERC-50975) and 513–380 cal BC (SUERC-50969) and burnt hazelnut shell from C15.32 to 390–200 cal BC (SUERC-23642). Birch wood charcoal and burnt barley grain from C2.05b and C15.25 gave dates of 400–200 cal BC (SUERC-12278) and 380–160 cal BC (SUERC-23612) respectively.

Precinct activity during Phase 5b [Block 9c] focused on large granite slab hearth F2.07 in the centre of the precinct, close to the base of the steps leading to the stairwell; and fire-pit hearth F15.11, in the southwest quadrant (Figs 7.3, 7.4). F15.11 had been cut vertically through earlier stratigraphy, and base-lined by granite slabs. A thin lens of orange ash (C15.29) covered these slabs, sealed by C15.27: a char-rich midden containing bone, grain and worked antler tine SF15.099. An ash dump to the north of F15.11 (C15.30) likely relates to its use. Major deposits associated with the use of F2.07 included C2.05a, C15.12, and C15.18: wood-ash rich hearth rake-outs concentrated to the west of the precinct. In the east, thin organic-rich, fire-cracked stone lenses (C2.08) had been laid down, or accumulated, over the natural clay (Fig. 7.4). Pine wood charcoal from C2.08 produced a date of 370–100 cal BC, and hazel charcoal from C15.18 a date of 260–50 cal BC (SUERC-23611). Other Phase 5b precinct features included eastern post-hole F2.20, and large pit F2.04, cut through the karstic clay into underlying limestone bedrock grykes (Fig. 7.5). F2.04 was filled with fire-cracked pebbles and pig bone deposit C2.73, with two large granite cobbles placed into its top – one roughly shaped into a spherical form, the second a beach-worn pebble quern rubber (SF2.081). A pig bone from C2.73 was dated to 410–200 cal BC (SUERC-14944).

More bone was recovered from Phase 5b deposits (Block 9c) than Phase 5a, but much of this material was extremely fragmentary, with most identifiable elements comprising teeth and maxillary fragments from the major species. This contrasts dramatically with the material deposited in Bone Passage during this phase (see Section 7.2.4). Moderate levels of burnt grain were recovered from Block 9c deposits.

A varied small finds assemblage was recovered from contexts relating to Block 9c, most deposited in the

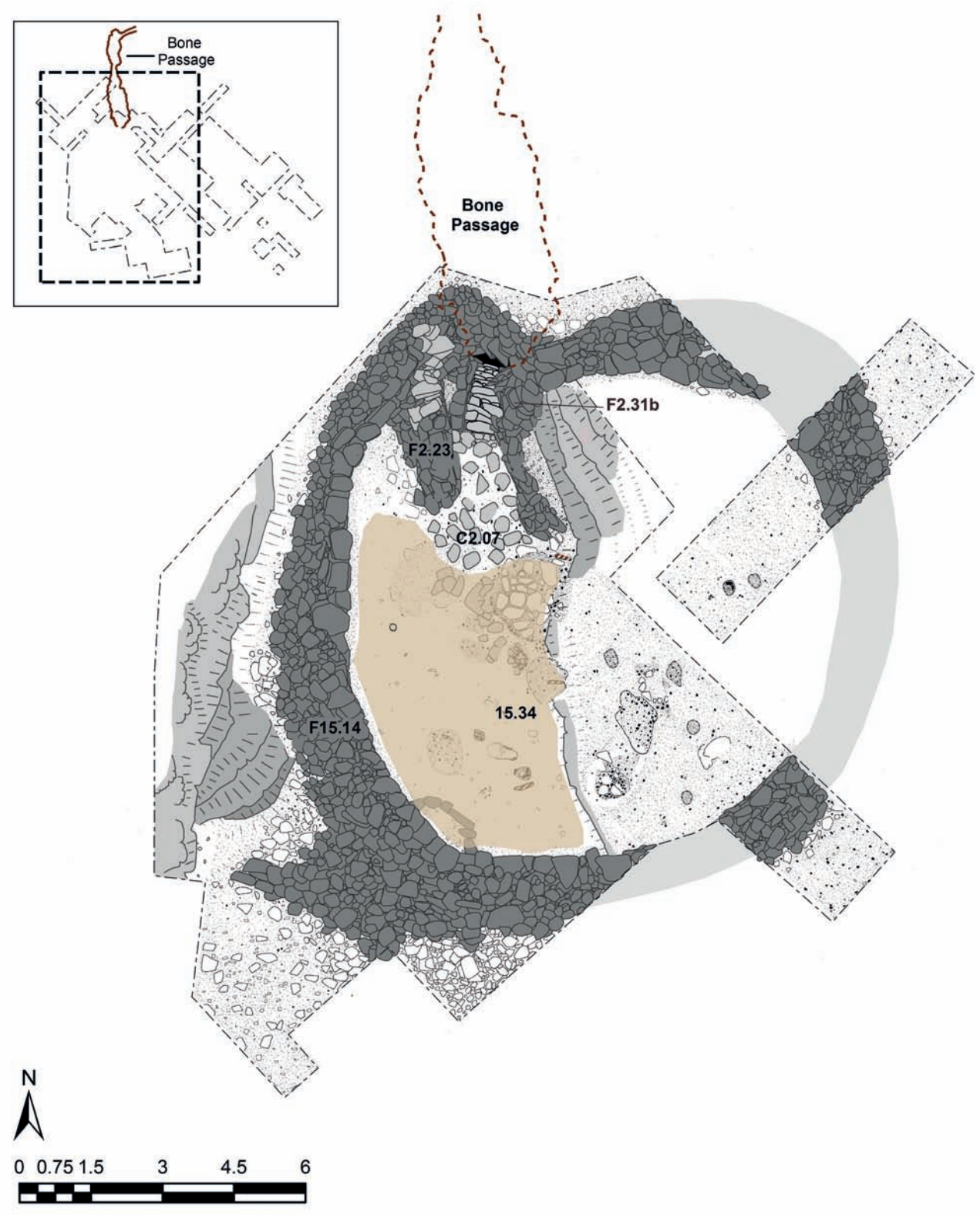


Figure 7.1. Phase 5a [Block 9a] showing extent of the clay-like deposit C2.06/C15.34 used to level the area within the precinct enclosure

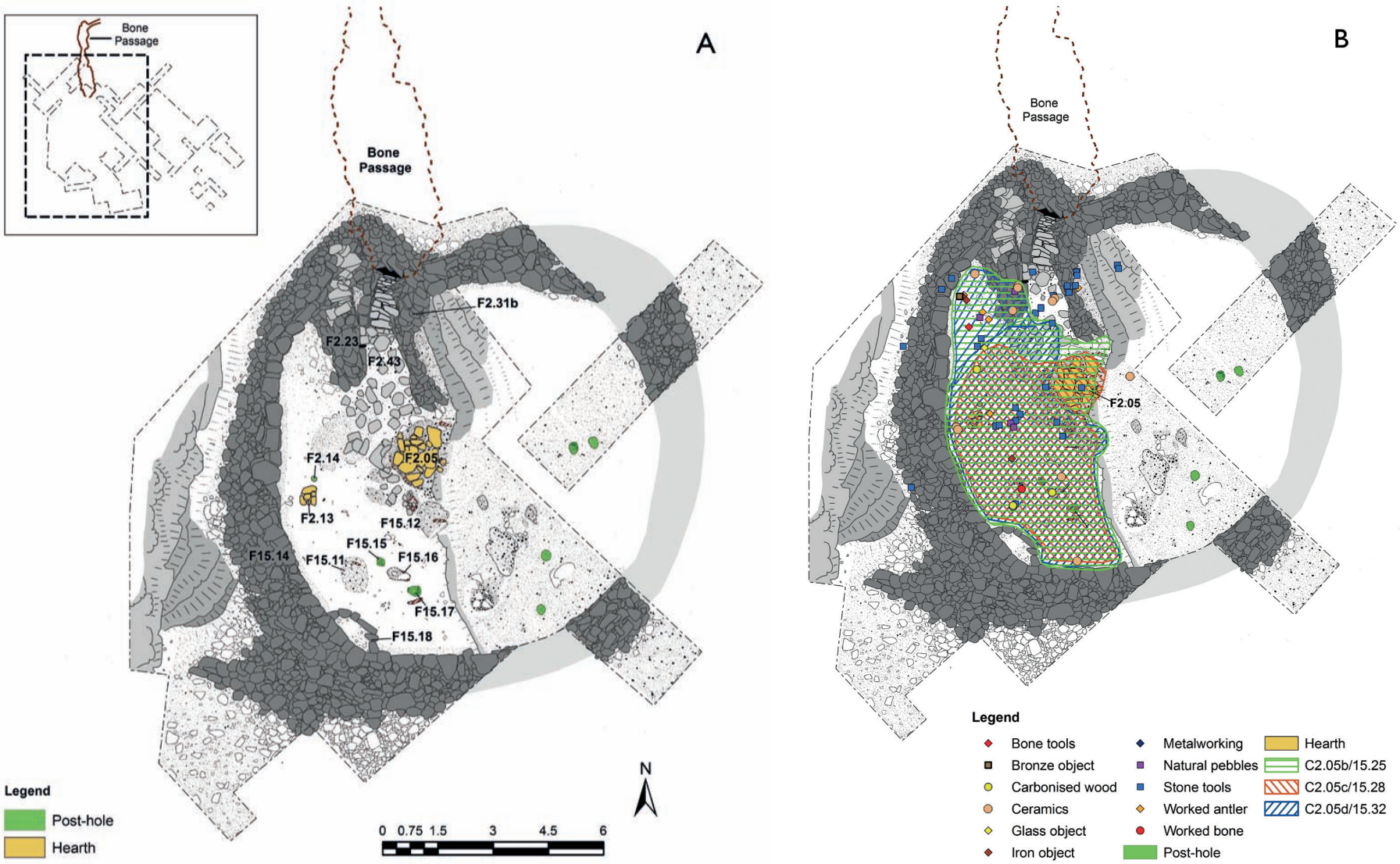


Figure 7.2. A. plan showing Phase 5a [Block 9a] features within precinct enclosure; B. main deposits & finds distribution

Table 7.1 Artefacts recovered from the Phase 5a [Blocks 9a & 9b] deposits in the precinct enclosure

SB	*C*	*SF*	*Description*
9a & 9b	2.05/d	2.058	Poss. antler tine offcut
		2.065	Cobble grinder
		2.067	Quern rubber
		2.072	Whetstone
		2.074	Cobble pounder/grinder
		2.244	Possible cobble polisher
		2.400	Pottery sherd
		2.404	Quartz flake
		2.405	Pottery sherd
		2.416a	Saddle quern frag.
		2.416b	Quern rubber
	15.14	15.050, 15.052, 15.053, 15.056	5 Pottery sherds
		15.051	3 Pottery sherds (refitting)
	15.31	15.101	2 Pottery sherds
	15.32	15.115	Cobble grinder
		15.341	Bronze penannular ring frag.
		15.342	4 Charred wooden bowl frags (*Sorbus* sp.)
	2.05/c	2.116	Cobble grinder/whetstone
		2.117	Cobble grinder/smoother
		2.246	Multifunctional tool
		2.413	Saddle quern frag. (refits with SF2.435, SF2.415 & SF21.09
	15.28	15.120	Worked pumice
		15.339	Iron crook-headed pin
		15.340	Cobble grinder/pounder (broken)
		15.343	Ceramic sherd
	15.25	2.264	Gathered antler frag. (burnt)
		15.080	Worked & charred wood
		15.081	Pottery sherd
		15.083	Green cylindrical glass bead
		15.085	Cobble hide rubber
		15.103	Fuel ash slag
		15.104	Carbonised worked wood with tool marks
		15.111	Cobble grinder/hide rubber + 2 unworked pebbles
		15.112	Bone needle roughout in 3 frags (refitting)
		15.336	Steatite spindle whorl
		15.338	Antler tine handle/fitting
	15.22	15.069	Unclassified slag



Figure 7.3. Looking southwest showing the two activity levels within the precinct, with the slabs of hearth F2.05 visible far right, & hearth F2.07 in the foreground

west sector of the precinct, just as in Phase 5a. Their distribution was fairly even through the ash and midden deposits filling this zone: potsherds, numerous cobble tools including hammers, grinders, pounders, smoothers, a hide rubber, a whetstone, and multifunctional tools (Table 7.2). Larger stone items included a saddle quern fragment and quern rubber, and the first rotary querns including two bun-type and one disc-type fragments. An iron pin shank, iron leaf-shaped spearhead, a possible iron punch, a small circular bronze stud, a bone spindle whorl, an antler tool and fragments, and metalworking residues including vitrified ceramic and slag make for a significant assemblage.

Some of the final Phase 5b hearth deposits included increased levels of fire-cracked stone, echoing the burnt spreads beyond the precinct enclosure (see Section 7.2.5). Interestingly, these were only found abutting the southwest side of enclosure wall F15.09, respecting the newly defined precinct (C15.12; C15.14; C15.19). Their makeup was similar to the Block 34 burnt spreads, containing charcoal and degraded fragments of animal bone and teeth, and producing a comparable small finds assemblage including potsherds, metalworking residues, pebble tools, and a rotary quern fragment (SF15.048). The deposition of material in this southwest sector indicates that, at this stage, access to the stairwell and cave was

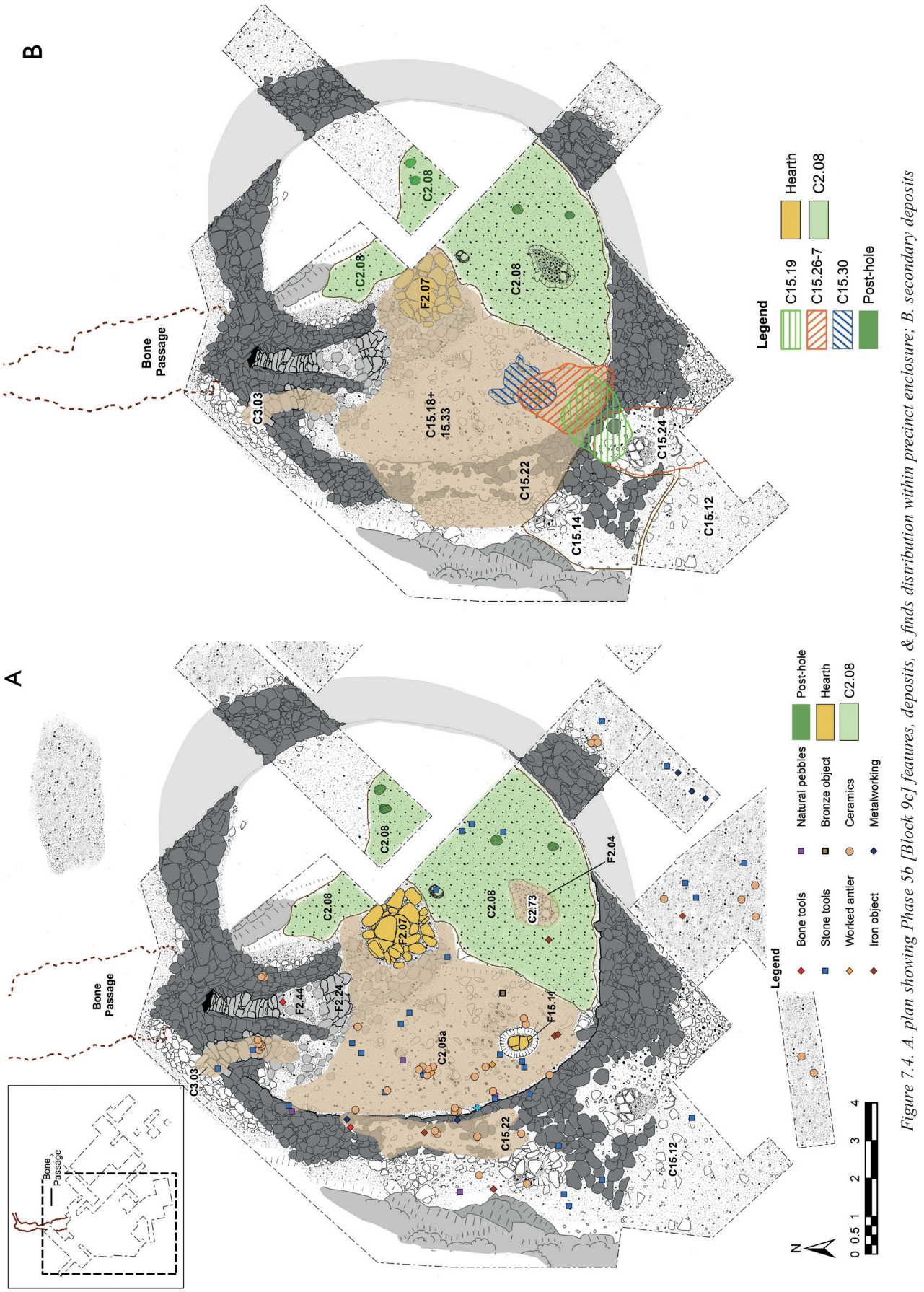


Figure 7.4. A. plan showing Phase 5b [Block 9c] features, deposits, & finds distribution within precinct enclosure; B. secondary deposits

Table 7.2 Artefacts recovered from the Phase 5b [Block 9c] deposits in the precinct enclosure

SB	C	SF	Description
9c	15.18	15.070	Rotary quern frag. (bun type)
		15.071, 15.075	2 Pottery sherds
		15.076	Iron leaf-shaped spearhead
		15.077, 15.087, 15.088	4 Pottery sherds
		15.090	Cobble grinder/poss. hide rubber
		15.092	Pottery sherd
		15.094	Quern rubber
		15.095	4 Pottery sherds
		15.096	Cobble pounder/hide rubber
		15.097	Pottery sherd
		15.281	Circular bronze stud
		15.282	Fine iron tool (poss. punch)
		15.330	Bone perforated disc
		15.331	Unclassified slag
		15.334	Cobble pounder?
	15.19	15.059	Saddle quern frag.
		15.063, 15.068, 15.072, 15.073	4 Pottery sherds
		15.086	17 Pottery sherds
	15.12	15.045	Pottery sherd
		15.046	Flint flake with retouch
		15.048	Rotary quern frag (bun type)
		15.057	2 Pottery sherds
		15.058	Vitrified ceramic & slag
		15.106	Cobble pounder/hammer
	15.12	15.107	Multifunctional cobble tool (broken)
		15.122	3 Pottery sherds
	2.08	2.187	Rotary quern frag.
		2.188–2.189	2 Multifunctional cobble tools
		2.191	Stone worked surface
	2.05	2.054	Cobble pounder
		2.055	Cobble grinder/polisher
		2.057, 2.064	2 Multifunctional cobble tools
		2.060	Perforated stone
		2.061	5 Pottery sherds
		2.062	Pottery sherd
		2.106	Cobble hammerstone/ pounder

(Continued)

Table 7.2 (Continued)

SB	C	SF	Description
		2.060	Perforated stone
		2.061	5 Pottery sherds
		2.062	Pottery sherd
		2.237	Cobble grinder
		2.108	Antler handle
	2.05/2	2.238	Bone roughout-ring-headed strip
		2.266	3 Pottery sherds
		15.047	Pottery sherd
	2.05/1	2.071	Sub-oval sectioned bar, tapers to tip
		2.114, 2.253	2 Pottery sherds
	15.24	15.108	Whetstone
	15.26	15.098	Pottery sherd
		15.100	Hide rubber
		15.105	Oval-shaped piece of iron
		15.127	Cobble grinder/hide rubber
	15.27	15.099	Antler tine roughout (pendant?)

through the western entrance. These dumps also overran old enclosure wall F15.14, inundating the modified section of precinct wall including F15.09. Hazel charcoal from C15.12 produced an AMS date of 370–100 cal BC (SUERC-23630).

7.2.2 Modification of the stairwell and precinct

Phase 5 [Block 21f] saw the final modification of the stairwell. The east and west walls were raised, a corbelled and lintelled roof constructed, and two paved landings inserted; the latter of these included four granite steps leading down to the paving surrounding hearth F2.07 in the precinct.

Well-laid courses of granite boulders and smaller stones on the west stairwell wall contrasted with the more irregular, opportunistic east wall, which utilised the irregular limestone bedrock, bridging the gaps with granite lintels, drystone walling (C2.31a), and building up the wall courses upon this. One very large lintel had slumped forward due to failure of its pinning stone, causing the collapse of the east stairwell wall-head. This prevented clear interpretation of the final part of the stairwell build sequence but, overall, the Phase 5 stairwell construction and the drystone walling technique are of a higher quality than that seen in earlier phases (Fig. 7.6).

A natural vertical crevice within the bedrock above the east wall lintel slab was filled with drystone walling (F2.31b), creating a column of stone around 1.5 m high which stopped just below a large granite boulder forming the inside face of enclosure wall F21.01 (F15.14). It is



Figure 7.5. A. Block 9c features in the upper level (east side) of the precinct enclosure including pit F2.04 looking south; B. pit F2.21 containing two upright granite stones, looking southeast; C. general view over the features looking southeast showing hearth F2.07 (partially excavated in foreground), pit F2.21 & pit F2.04, at right end of horizontal scale

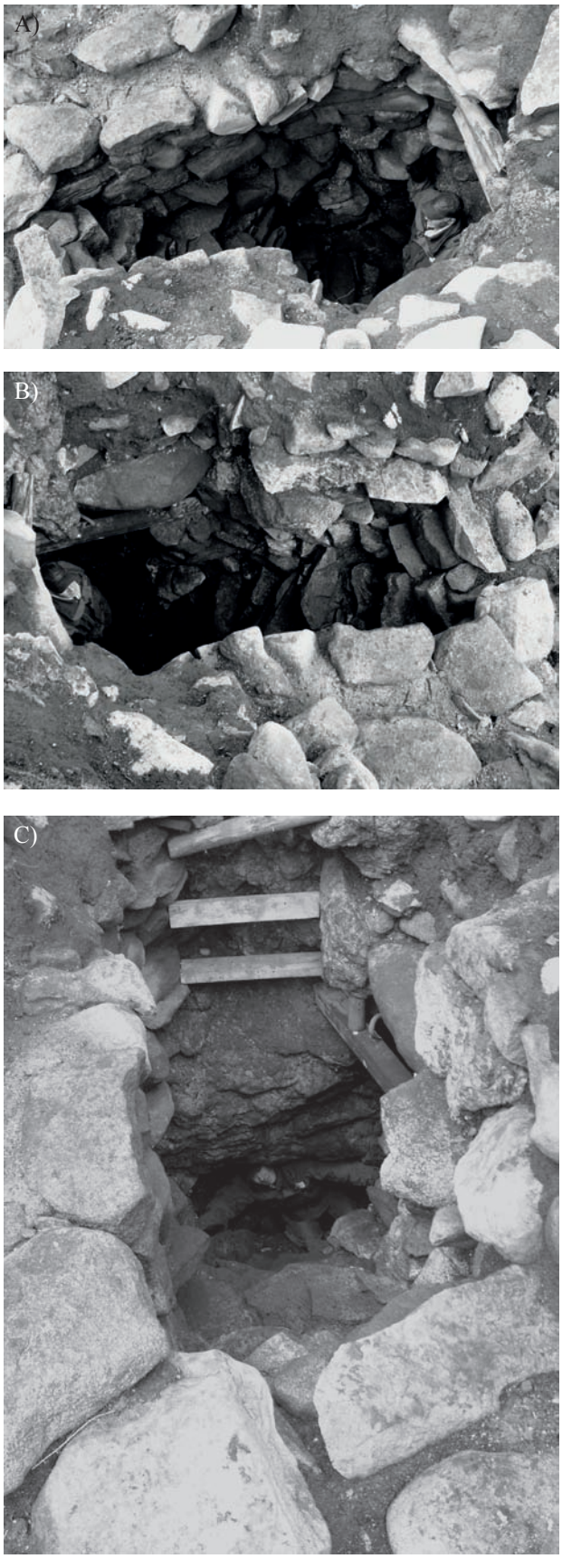


Figure 7.6. Phase 5 [Block 21f] stairwell: A. the west wall; B. the partially collapsed east wall with lintel F2.31a visible; C. looking north down the stairwell to the restricted access into the natural cave entrance below

Table 7.3 Artefacts recovered from the Phase 5a [Block 9a] deposits within the packing of the east stairwell wall

SB	C	SF	Description
9a	2.05/4	2.068	Multifunctional pebble tool
		2.073	Cobble grinder/pounder
		2.239	Whetstone
		2.402	Cobble grinder/hammerstone
		2.403, 2.243, 2.273	5 Pottery sherds
		2.414	Antler miscellaneous roughout
		2.415	Saddle quern frag. (refits with SF2.413, SF2.435 & SF21.09)

Table 7.4 Artefacts recovered from the Phase 5a [Block 9b] deposits within the precinct

SB	C	SF	Description
9b	15.25	15.337	Iron ring-headed pin
		15.344	Possible iron spearhead socket
	15.22	15.062	Unclassified slag
		15.064	Iron knife tang frag.
		15.074	Fuel ash slag
		15.082	Fine oval-sectioned cannel coal bangle frag.
	3.03	3.009	2 Pottery sherds (refitting)
		3.010	Haematite (pigment)
		3.011, 3.012, 3.013	8 Pottery sherds from 4 vessels
		3.014	Saddle quern (with calcite deposits)

possible that these two elements were originally connected but this relationship is lost to the Phase 7 destruction of the stairwell roof. A vertical granite slab and associated wall fragments at the top of the west stairwell wall most likely represent surviving elements of the stairwell/enclosure wall intersection. Two horizontal slabs projecting from its base were probably part of the corbelled roof (F21.01), as were some large lintel stones in the stairwell backfill [Block 22a]. Natural and constructed elements, linking stairwell to enclosure wall to form one continuous structure, characterises the monumental stairwell during this final phase of use.

As in earlier phases, continued midden deposition in the precinct enclosure necessitated ongoing re-organisation of the space. The stairwell modification itself probably arose from the need to maintain access to the cave as the deposit sequence increased – although another motive may have been to create a more elaborate entrance into the cave, possibly linked to control of access. The Phase 5 modifications would have resulted in a narrower and more restricted entrance, and more restricted light, into the cave. A door or screen would have enhanced this, while also protecting materials and objects placed inside the cave.

Artefacts recovered from these constructions may represent foundation deposits. A saddle quern fragment and an antler roughout strip were placed behind the east stairwell wall, at the wall-head, while a whetstone, five potsherds, a grinder/pounder, a grinder/hammer, and a multifunctional tool were placed at the top of the F2.23 landing (Table 7.3).

Major alterations were also made to the enclosure wall at this time. The entrance in its SSW quadrant was blocked by a boulder and sediment matrix which included a deposit of periwinkles. This abruptly ended the way in which the precinct and cave had been accessed, from the southeast, for at least 300 years, and a new route was established from the west. A single skin boulder wall (F2.29) was revetted into the precinct deposits, and a series of boulder steps laid over the top of enclosure wall F15.14 providing access to the head of the stairwell. Elements of F2.29 survived up to 0.8 m high, above which a slope gave way to a level platform. West stairwell wall F2.23 formed the east side of this access, which would remain in use until the site closure.

Phase 5b saw standing sections of original enclosure wall F15.14 increasingly inundated by the deepening precinct deposits, especially at the southwest, and sections of the wall started to slump inwards. Minor attempts at rectifying these issues included the placement of three large boulders (F15.40) and a semi-circular boulder arc (F15.18) as buttresses before more permanent modifications at the end of Phase 5 and into Phase 6. Granite boulder revetment F15.09 was constructed over the top of sediments covering earlier enclosure wall F15.14, along with an alignment of limestone blocks (F2.12) connecting with the precinct entrance passage (F2.29). This was the first visible attempt to retain the boundaries of the precinct enclosure as the midden deposits began to subsume the original enclosure.

Objects recovered from the surviving surface of F15.14 included an iron spearhead socket and an iron ring-headed pin, and from its rear stone packing, an iron knife tang fragment, a fine oval cannel coal bangle fragment, and iron slag (Table 7.4). Some potential foundation or closing deposit of significance associated with walls F15.14 and/or F15.09 is possible. From the entrance accessing the precinct through the enclosure wall, eight potsherds from four vessels, a small saddle quern, and a piece of haematite were recovered. The quern stone had a thin covering of calcite, indicating that it had lain in the cave for some time before its removal and deposition within the precinct entrance.

7.2.3 Changing modes of deposition: the cave

Understanding in-cave activity during the Phase 4–5 transition, and then through Phase 5 itself, proved challenging.



Figure 7.7. Martin Wildgoose descending the steeply descending steps of stairwell F2.23

Block 27c – the sole series of depositional events associated with this period – are most likely closing deposits, placed in Bone Passage at the end of the phase, and are very similar to the underlying deposits in Block 27b. But if deposition in the cave may have been limited during Phase 5, it seems to have been no less integral to events taking place at the site as a whole. The apparent interplay between cave and precinct is perhaps most vividly demonstrated during this phase than in any other, with the focus on animal bone deposition within the cave in place of the precinct.

Three contexts make up the Block 27 deposits – C6.05, C1.05, and C17.04 – moving from south to north through Bone Passage (Fig. 4.4A-C). These redeposited midden dumps are similar to those described in Block 27b but more mixed in composition and greater in volume. Stony, orange-brown clayey deposit C6.05 contained ash residues and frequent charcoal. C1.05, although abutting C6.05, was quite different, featuring some large, angled granite slabs in a dark organic sediment, the slabs forming a barrier breaking the continuity of the contexts between north and south cave chambers. At the north, C17.04 was very similar to C1.05, but more charcoal rich, filling gaps in a dense, compact layer of fire-cracked pebbles (Fig. 7.8).

Bone from Block 27c also resembled the Block 27b assemblage: concentrated in north and south chambers, with little bone in the narrow central zone. Burnt bone was concentrated very strongly at the south, adjacent to the entrance, with hardly any burnt material retrieved from elsewhere. The north chamber contained a concentration of unburnt bone identifiable to species, again suggestive of zoning within the deposits. Butchery featured heavy chop- and finer cut-marks centred on articulations, indicating consumption and disposal, with much bone heavily fragmented. C6.05 contained several dog bones, along with a large male pig canine indicating the presence of some hunted wild boar. An elevated

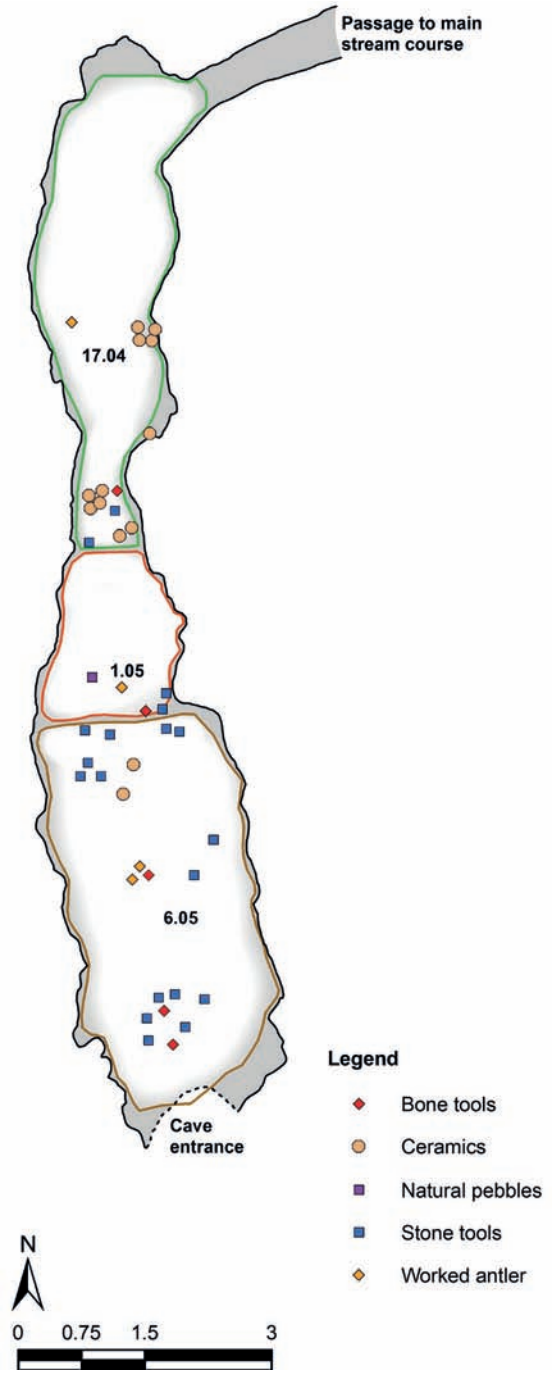


Figure 7.8 Plan of Bone Passage showing the Phase 5b [Block 27c] contexts & finds distribution. Inset image shows the discrete periwinkle shell midden deposited below a paving slab in context C1.05

deer presence mainly derived from C6.05, generally comprised of teeth.

Cattle dominated the assemblage. If domesticates only are considered, much more pig is present in Block 27c than the precinct [Block 9c] (36% viz *c*. 11%). There are also fewer cattle in the cave than the precinct and a comparable reduction in sheep/goat. These trends and the level of pig

Table 7.5 Artefacts recovered from the Phase 5b [Block 27c] deposits within Bone Passage

SB	*C*	*SF*	*Description*
27c	6.05	6.151	Cobble grinder/pounder
Group 1		6.191	Steatite spindle whorl
		6.212	Bone hide scraper/rubber
		6.213	Cobble grinder/polisher
		6.214	Worked steatite flake
		6.219	Bone point
		6.233	Flint short-end scraper
		6.240	Hammerstone
Group 2		6.188	Polished antler point
		6.192	Polished antler point (broken)
		6.254	Polished ivory bead/ fitting
		6.290	2 Flint chips
Group 3		6.253	Pumice line float
		6.261	Pumice
		6.262	Pumice
		6.263	Cobble pounder
	1.05	1.260	Saddle quern
		1.263	Worked pumice
		1.264	Perforated antler pendant
		1.125	Quern rubber (burnt)
		1.213	Flint chip
		1.226	Bone peg roughout
		1.293	Bloodstone flake
		1.295	2 Pottery sherds
	17.04	17.039	Possible stone tool
		17.041	Cobble grinder
	17.04	17.013	Prepared antler strip (burnt)
		17.017	Possible bone point (broken)
		17.024	3 Pottery sherds
		17.025	2 Pottery sherds
		17.027	Pottery sherd
		17.028	4 Pottery sherds
		17.030	Pottery sherd

within the Phase 5c cave material are comparable to the ratio seen within the Phase 4c cave deposits. A group of bones from a juvenile pig may represent the deposition of a relatively complete pig carcass.

Herring was the only fish in C1.05, while a mixture of herring, saithe, salmon, and mackerel were recovered from C17.04, and no fish bone from C6.05. Marine shells were limited to periwinkle and limpet in C1.05, with a mix of periwinkle, limpet, oyster, mussels, and dog whelk from C6.05 and C17.04. The frequency of periwinkle increased in the north chamber, especially in a foot-trench worn through C17.04, while a discrete periwinkle deposit identified below one of the large slabs in C1.05 suggests a structured deposit – possibly a Phase 5 closing deposit or a foundation deposit prior to construction of paved floor F6.01 at the start of Phase 6 (Fig. 7.8).

From Block 27c onwards, far higher levels of burnt grain, including particularly oat and, most of all, barley, are seen compared to earlier phases, along with an increase in hazelnut shell deposition. Grain deposition continued to increase into especially Phase 6b (although hazelnut deposition peaked here). Phase 5 burnt grain was concentrated within the north chamber.

Most of the Block 27 artefacts were grouped in the south chamber and up to the narrow central section (C6.05, C1.05), with a smattering of objects in the northern chamber: mostly potsherds (14 sherds from ten vessels, forming three distinct groups), a burnt antler prepared strip, and a bone point fragment. The C6.05 and C1.05 finds appear to respect the locations of earlier find concentrations and some of these may therefore have formed structured groups, but this is conjectural (Table 7.5). Perforated bone strip SF6.469 and a small fragment of pine resin (SF6.605) were found to the side of the bottom stairwell step.

7.2.4 Activity beyond the precinct

Phase 5 showed a marked increase in activity beyond the precinct. Quantities of fire-cracked stone, almost certainly generated by the precinct hearths, accumulated at the immediate surface, forming a horseshoe shaped mound with a southern open end. Dense, compacted pebble layers containing ash, char and calcined bone banked up against the enclosure wall, especially to the north and northwest (Fig. 7.10). Both excavation and dating evidence show that these dumps saw deliberate, phased distribution across site, and the clear increase in *unburnt* stone incorporated during Phase 5 suggests that they do not just represent the clearing out of activity by-products from the precinct but may also be intentional, monumentalising, or symbolic additions to the complex. Small finds recovered from the burnt spreads came mainly from the east, from the slightly earlier deposits, but these outlying areas only ever received small numbers of objects when compared to the precinct and cave.

Few features were identified in association with the burnt spreads. A group of post-holes and scoops on the platform northwest of the precinct relate to Phase 5. F7.02 and F7.03 contained burnt posts or stakes, and F7.09, packing stones and a burnt wooden post. The post-holes may have formed a small shelter relating to a discrete activity area or relate to a canopy or roofed structure covering access to the precinct from the northwest. This group had no overlying burnt spread deposits, suggesting that these had been removed and the area subsequently kept clear, most likely to maintain access to the precinct from the northwest. While a little burnt grain and hazelnut shell were recovered, there is a complete absence of

Table 7.6 Artefacts recovered from the Phase 5b [Block 34] deposits outside the precinct boundary

SB	C	SF	Description
34	5.07	5.017	3 Pottery sherds
		5.018	Whetstone
	9.03-1	9.007	Haematite (pigment)
		9.008	Dense slag
	9.03-2	9.009, 9.012	Unclassified slag
	14.04	14.004	Pottery sherd
	14.06	14.010	Lithic: indeterminate flake
	14.11	14.029–14.030	8 Pottery sherds
		14.033	Haematite (unworked)
		14.034	Vitrified ceramic
		14.035	Vitrified ceramic
		14.036	Multifunctional cobble tool (broken)
	14.13	14.012–14.014	7 Pottery sherds
		14.022–14.023	2 Pottery sherds
		14.024	Curved iron bar (poss. tool tine)
		14.025	Shale or Canneloid shale part-worked blank
		14.29	Stone palette (broken)
	14.15	14.027	Stone palette
		14.032	2 Pottery sherds
	18.03	18.004	Cobble pounder
		18.005–18.006	2 Pottery sherds
		18.007	Clay daub frag.
		18.007 a and b	2 Disc-type rotary quern frags (refits)
	19.02	19.012	2 Pottery sherds
		19.013–19.014	Unclassified slag
		19.015–19.016	Runned slag
		19.018–19.020	Unclassified slag
		19.019	Iron joiner's dog or cleat
		19.021	Cobble grinder/pounder
		19.023	Cobble pounder
		19.024	3 Pottery sherds
		19.025	Unclassified slag
		19.026	Haematite & iron-rich concretions
		19.027	Bog iron ore
		19.028–19.030	Unclassified slag
		19.031	Pottery sherds
		19.032	Bog iron ore
		19.058	Unclassified slag
		19.092	Pottery sherd
		19.093	Cobble pounder
		19.094	Pottery sherd
		19.095–19.096	Unclassified slag
		19.097–19.098	Runned slag
		19.099, 19.102	2 Pottery sherds
		19.100	Unclassified slag
		19.101	Runned slag
		19.103–19.104	Unclassified slag
		19.117–19.118	Unclassified slag
		19.122	Unclassified slag
		19.123	Runned slag
		19.124	Unclassified slag

bone from these features, again possibly suggesting an entrance location: a point of movement, rather than an activity locus.

Most of the Block 34 small finds were recovered from the east and southeast sectors (Trenches 19, 18, 14, 9, and 5). A distinctive concentration of finds dominated by metalworking residues was recovered from burnt spread deposit C19.02 (Figs 7.9, 7.10), to the east of the precinct: various slag types, vitrified ceramic, and bog iron ore, along with stone cobble tools, an iron joiner's dog or cleat, and a number of potsherds (Table 7.6). From Trench 19, 16 sherds represented 11 vessels, suggesting perhaps some deliberate sherd selection. Two important objects recovered from the surface of C18.03 comprised a cache of two unfinished but refitting upper rotary quern stone half fragments (SF18.007a–b). It is probable that the querns were deposited in Phase 6b (Block 35) prior to the deposition of covering burnt spreads C18.02. However, these objects still represent some of the earliest evidence for the deposition of rotary querns at the site (see Section 12.3.3) The groups of material deposited in this trench during Phase 5 were mirrored to some extent during the final deposition of material in this area in Phase 6, especially with regards to metalworking residues (see Section 8.2.3; 8.3.6).

The small but concentrated Phase 5 bone assemblage recovered beyond the precinct was dominated by cattle, with smaller amounts of sheep/goat, deer, and dog: but

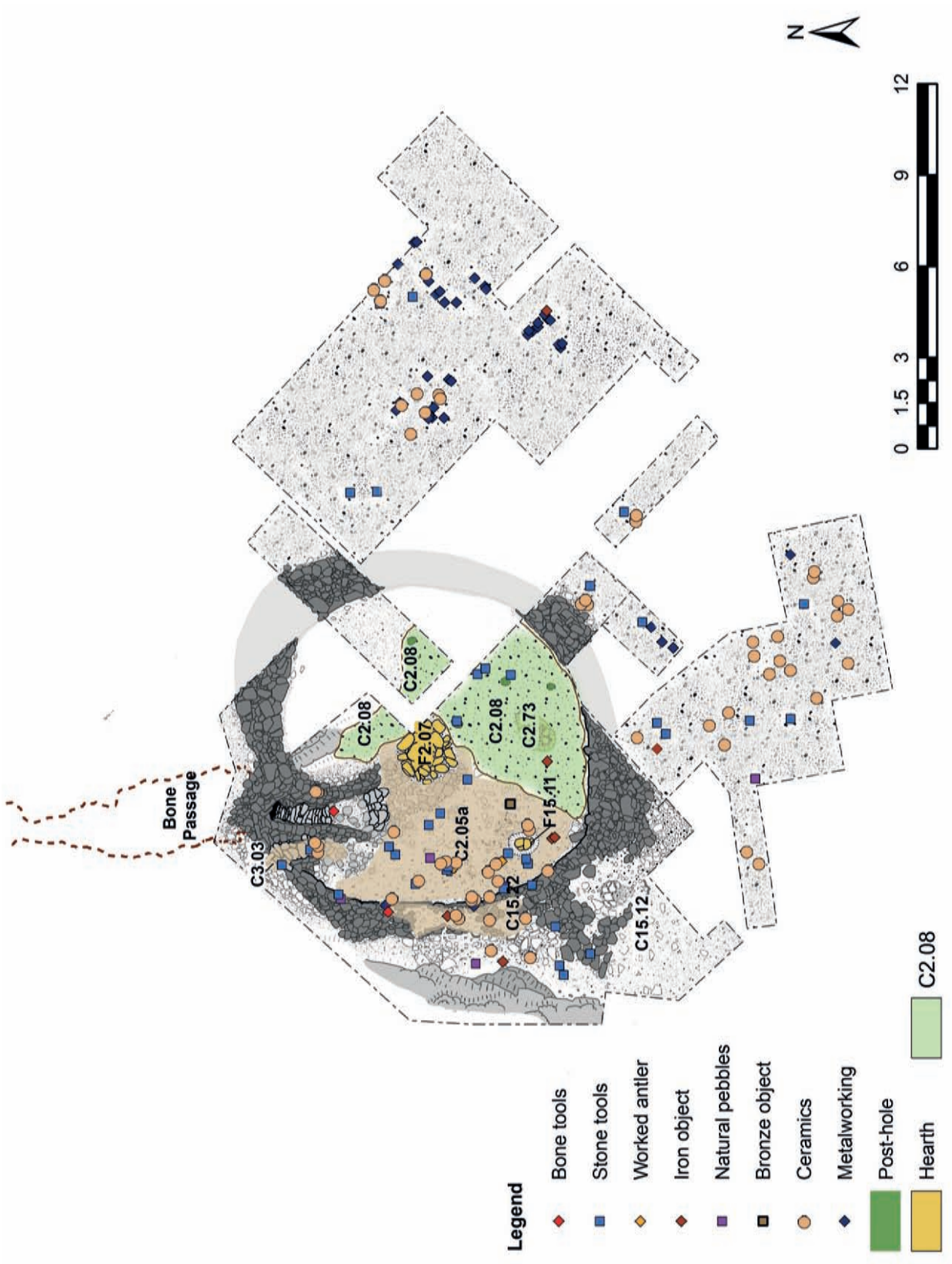


Figure 7.9. Plan showing finds distribution within the precinct & areas outside the precinct enclosure in Phase 5b [Blocks 9c & 34]



Figure 7.10. Top: showing surface of burnt spreads context C19.02 in Trench 19; bottom: post-holes & associated features on the platform to the northwest of the precinct, looking northeast. The baulk separating Trench 7 & Trenches 2 & 15 had not been removed at this time

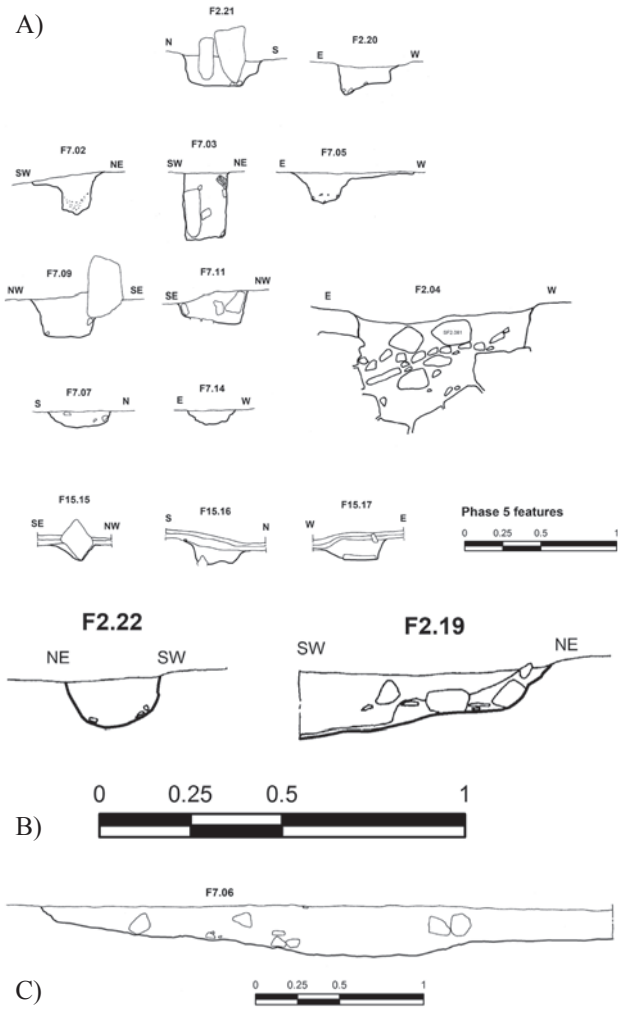


Figure 7.11. Sections through negative features relating to Phase 5 in Trenches 2, 7, & 5

most fragments were heavily burned and undiagnostic. Low unburnt bone totals through the surface contexts in this phase contrast with small spikes in burnt bone, especially in burnt spread deposits C19.02 and C14.13 and scoop fill C14.25. Small concentrations of burnt botanics are present in burnt spread deposits C18.03 and C9.03. Pockets of concentration such as these may be further indicators of deliberate, precise re-location of discrete deposits out of the precinct and into the surrounding burnt spreads.

Hazel wood charcoal from C19.02 and C14.37 provided AMS dates of 550–380 cal BC (SUERC-23641), 404–352 cal BC (SUERC-50979) and 410–340 cal BC (SUERC-23610); while samples of birch wood charcoal from C18.03, C9.03-2, C10.03, C14.11, and C9.03-1 produced results of 410–350 cal BC (SUERC-23634), 390–200 cal BC (SUERC-12288), 380–190 cal BC (SUERC-12292), 370–110 cal BC (SUERC-23629), and 370–110 cal BC (SUERC-12287). Burnt hazelnut shell from C5.06 produced a result of 390–180 cal BC (SUERC-23623).

8

Towards closure

Steven Birch

8.1 Introduction

Final Iron Age activity at High Pasture included modifications to the enclosure wall, restructuring of access at the west of the precinct, and the construction of small cellular structures and walls inside it. The latter, associated with the old stream sink, were possibly built to control water flow across the precinct or to modify access to the cave via a second entrance. And, for the first time during its Iron Age history, no hearth was constructed or used within the precinct proper, the only Phase 6 hearth being a structure set atop the earlier enclosure wall. Material generated by this hearth was not deposited beyond the precinct, as in Phase 5, but was redeposited within it, although outside the new enclosing wall (Fig. 8.1).

In the cave, Phase 6a saw the construction of a new floor in Bone Passage (F6.01) over earlier midden, followed by a complex series of floor deposits featuring unusual bone caches. Prior to the stairwell backfilling and closure of the cave in Phase 6b, large quantities of finds-rich midden were deposited in the southern chamber, most likely a closing deposit featuring material gathered from the surface. Finally, a large, domesticated pig assemblage was placed above these deposits. Following deposition of the pig assemblage and a number of associated artefacts at the base of the stairwell, it was backfilled with boulders and midden.

It is not clear what happened at the surface after this event but, at some time after the backfilling of the stairwell, a semi-articulated adult female skeleton was interred at the top of the structure along with the remains of two human perinates, one neonate, and the fragmentary remains of a neonatal pig and perinatal dog. This mixed group of people and animals marked High Pasture's final closure, the stairwell and precinct areas were landscaped with boulders and redeposited midden, and numerous finds deposited within the precinct, and overlying the abandoned burnt spreads beyond its boundaries.

Chronology (Bayesian modelled radiocarbon dates)

The modelled dates for Phase 6 are discussed in Chapter 10 and presented in Appendix Table 5.

8.2 Phase 6a: final precinct modifications; activity in the cave

8.2.1 General

The final events to take place at High Pasture were some of the most significant. Site modifications were more constrained but their associated assemblages indicate that the gatherings of people and the events undertaken took on a new significance, with large-scale deposition of a wide range of artefacts and organic materials. These and the final closing events of Phase 7 provide some of the most compelling evidence for ritual activity at the site.

8.2.2 The precinct boundary and the stairwell

By the end of Phase 5, midden accumulation had all but over-run precinct walls F15.14 and F15.09. Activity areas, however, were kept clear: in the lowest-lying part of the precinct a new double-faced boundary wall (F15.03; F15.38 – Block 17) was built, mirroring the alignment of earlier structures. Its northwest end connected to the western precinct entrance, where additional boulders formed crude walling (F15.44; F3.01) guiding access towards stairwell F2.23. A later wall fragment (F15.07) mirrored earlier wall F15.03, indicating that the precinct was continually maintained and clearly defined during Phase 6. To the southwest of the precinct, low revetment wall F15.02/F14.15 [Block 1] was constructed, enclosing the vertical overflow entrance into the cave. The base of a second wall (F15.08) mirrored revetment wall F15.02, and the combined structures may have helped divert flood water into the overflow entrance. The wall foundations

may have formed stable platforms onto which a turf or wood superstructure could have been erected.

Alternatively, these combined wall structures may have been established to define and monumentalise this complementary entrance into the cave. If this were the case, it would have important implications for the final stairwell closure of the stairwell and Phase 6 access into the cave (see Section 8.3.4). Because this entrance was cleared of rubble in 1972, there is no record of prehistoric activity. If this second entrance into the cave system was used in prehistory, it would have meant negotiating over 30 m of active stream passage, involving tight passages, crawl spaces, and artificial lighting.

8.2.3 Cellular structures and precinct activity (Block 10)

Phase 6a restructuring of the precinct also comprised the construction of two small cellular structures (and two outside the precinct: see Section 8.2.5). The foundations of *c.* 3 m^2 circular cell F15.05 (Fig. 8.2) abutted wall F15.09 on the NNE side and wall F15.08 to the southwest, built within the collapsed rubble of earlier enclosure walls. There was no visible entrance or internal features. Within the structure, ashy spreads C15.10 and C15.23 produced two degraded potsherds and a small lump of unworked haematite (SF15.125). A second, smaller cellular structure (F15.07b) was positioned to the north of F15.05, and a large granite boulder connected the two cells together (Fig. 8.1). A stone-lined channel 0.2–0.3 m wide linked the structure through enclosure wall F15.03 to the precinct interior. Internal deposits C15.15, C15.16, and C15.17 revealed that the structure had truncated earlier enclosure F15.14, buried at the time of its construction, and produced only a broken pair of bronze tweezers (SF15.082a). The function of the structure remains unknown and the stone-lined channel linking to the precinct intriguing.

Hearth F5.03 was built partially overlying the main enclosure wall F2.09 and directly overlying compacted fire-cracked stone deposits (C5.07; Fig. 8.1). Oval-shaped and measuring 0.8 × 0.6 m, it included a low granite kerb. Its residues were redeposited in the precinct and Bone Passage, and associated fire-cracked stone probably deposited to the southwest of the precinct wall [Block 10]. As in earlier periods, the material generated seems to have been segregated for disposal. The stony dumps outside the precinct wall contained only small quantities of generally calcined bone – but more artefacts compared to earlier burnt spreads. Those to the southwest of precinct boundary wall F15.03/F15.07 (C15.04, C15.05, C15.06, C15.07, C15.09, C15.11, and C15.13) formed compact, relatively shallow stone layers abutting the enclosure wall and cellular structures to the east; revetments F15.08 and F15.02 to the south; stairwell access F2.29/F3.01 to the north; and the natural slope to the west. Artefacts recovered from these deposits were spread fairly evenly across the area and mainly included ceramics, stone tools, and metalworking residues (Table 8.1). Objects of note included a quern rubber and an iron tracer or chisel. Birch wood charcoal from C15.06 produced an AMS date of 179–20 cal BC (SUERC-50978).

Deposition in the precinct is more complex during Phase 6a [Block 10]. Two distinct phases of activity took place: the deposition of residues relating to the use of hearth F5.03, and the redistribution of midden from the precinct into Bone Passage. Organic and charcoal-rich hearth residues C15.08 and C2.03b (Fig. 8.3) contained frequent fire-cracked stone and highly fragmented and frequently burnt and calcined animal bone, not at all comparable to the contemporary material recovered from Bone Passage. Samples selected for dating from C15.08 and C2.03b all produced AMS results too old for the stratigraphic sequence, indicating that removal and redistribution of midden was taking place within the precinct during these final phases (see Section 8.4.4). This may also have included the incorporation of fire-cracked stone and associated residues from outside the precinct boundaries.

Artefacts recovered from the precinct in Block 10 (Phase 6a) were distributed through its western sector and especially concentrated around the southwest enclosure wall – mirroring earlier depositional events (Fig. 8.3). Ceramics (49 sherds from 30 vessels) and stone tools dominated, and the depositional context appears similar to that of the precinct burnt spreads, with objects integrated into redeposited midden or representing residual material in the deposits. Finds from C15.08 and C2.03b (Table 8.2) included two disarticulated human bone fragments including a right foot phalanx and lower permanent incisor, both from an individual aged 10+ years (SF15.317/SF15.329). A small potsherd assemblage was also recovered from thin deposit C3.02 in the base of the stairwell access. The density and variety of the artefacts from these contexts in the precinct core stand out compared to those objects deposited outwith its boundaries (Table 8.1).

8.2.4 Deposition in the cave

At the end of Phase 5b or the start of Phase 6a, a crude paved floor (F6.01) was constructed in Bone Passage, comprising granite boulders and slabs, some large, interspersed with smaller clasts and fire-cracked stone [Block 28]. This horizon was most defined in the southern chamber (Trench 6) and the south part of central narrows (Trench 1; Fig. 4.4A-C). Further north, the surface became less distinct, formed by random boulders and stones with rubble packing. The paved slabs forming the floor incorporated the lower floor deposits of C1.04 while, through the north chamber, associated deposits included the lower horizon of context C17.03.

The complex sequence of deposits [Block 29a] above floor F6.01 varied in both composition and content. In

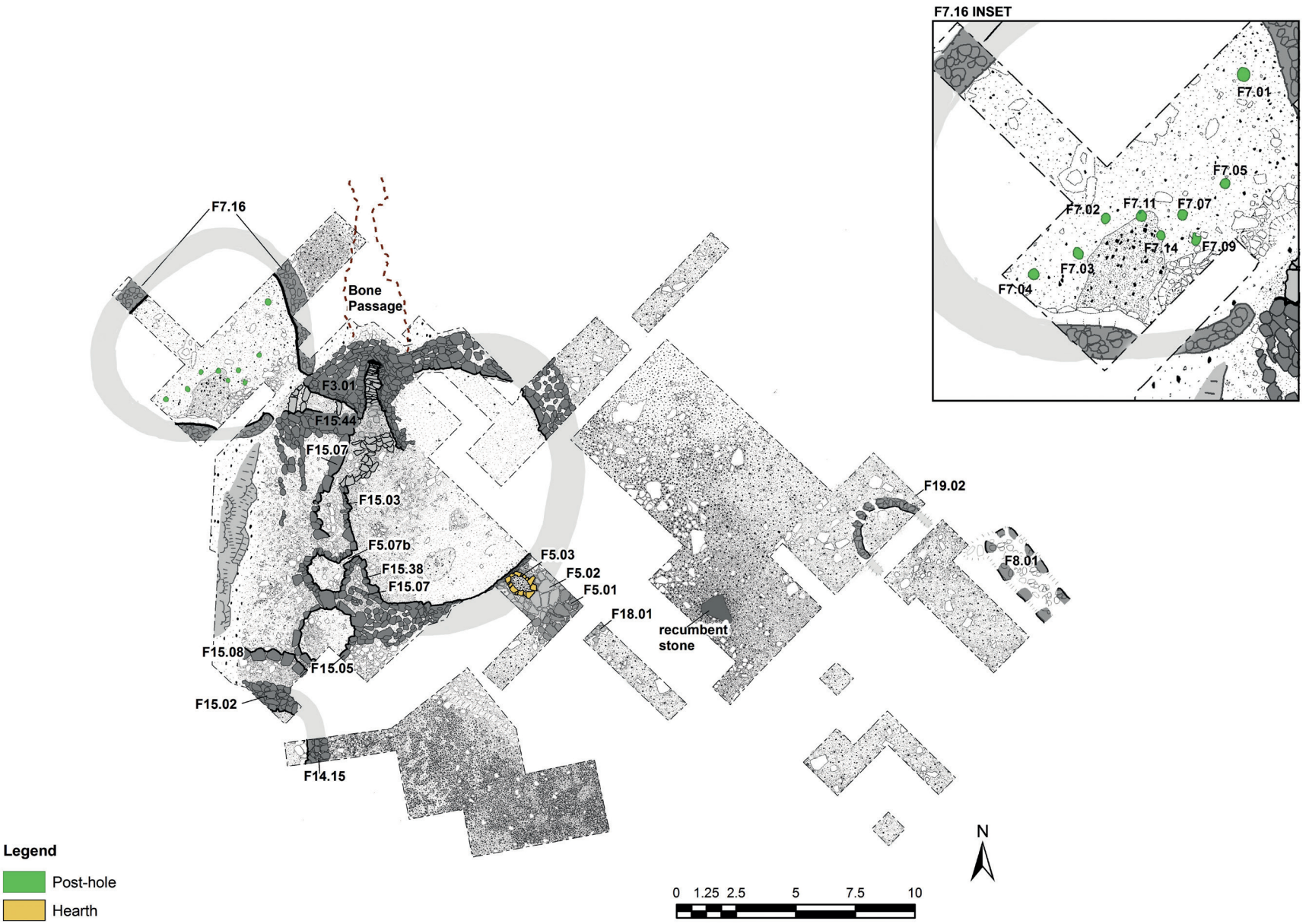


Figure 8.1. Plan showing the Phase 6 features at the High Pasture Cave Complex (inset shows feature numbers in cellular structure F7.16)



Figure 8.2. Looking northeast, showing cellular structure F15.05, just outside the precinct enclosure. Stairwell F2.23 at back left & boulder wall F15.08 in foreground

the southern chamber, dark, stony, char-rich deposit C6.04, contained carbonised grain and lenses of ash-rich silts and silty clay, most pronounced around the cave perimeter: probably due to trampling and localised water erosion. Immediately south of the cave centre, C1.04 showed a similarly stony, char-rich matrix which darkened to the north, increasing in fire-cracked stone and especially carbonised grain content to form C17.03, which spilled over into the ramp exit descending to the stream passage. The rich assemblage forming C17.03 comprised the last deposition event in this rear section of Bone Passage.

Birch charcoal and burnt barley, animal bone, and a human tooth from C17.03 produced AMS dates of 210–40 cal BC (SUERC-23631, 28056), 231–88 cal BC (SUERC-66360), and 208–87 cal BC (SUERC-66364). Burnt barley from C1.04 produced another date of 210–40 cal BC (SUERC-23622). Wood charcoal and animal bone from C6.04 produced wide-ranging results, all of which appeared too old for this phase, confirming some disturbance in the south chamber, and potential incorporation of older surface midden (see Section 8.4.4).

Animal bone from Block 29a was dominated by cattle, although with frequent pig (*c*. 39%): while ratios of cattle, sheep/goat, and deer were similar between Phase 6 cave deposits, overall pig content increased. A concentration of burnt bone was identified in north deposit C17.03, but only limited burnt bone from the south sector. Heavy butchery was noted for the C17.03 bone, including a number of pig and some cattle vertebrae cleaved along the spine. This is similar to that seen in the later, unusual deposits of Block 29b and C001 [Block 29c]. Increased fish bone and shellfish at the north end, adjacent to the ramp to the streamway, decreased significantly to the centre, and no fish was recovered from south deposit C6.04.

Table 8.1 Artefacts recovered from the Phase 6a [Block 10] deposits outside the precinct enclosure wall

SB	*C*	*SF*	*Description*
10	15.04	15.278	Pottery sherd
	15.05	15.261–15.262	2 Pottery sherds
		15.264–15.265	3 Pottery sherds
		15.267	Pottery sherd
		15.274	Vitrified ceramic
	15.06	15.322	Lithic: flint indeterminate piece/chunk
	15.07	15.007–15.008	2 Pottery sherds
		15.268	Pottery sherd
		15.297	Pottery sherd
		15.298	Cobble grinder
		15.299	Unclassified slag
		15. 300	Vitrified ceramic
		15.301	Iron tracer-fine chisel (engraving?)
		15.302	Vitrified ceramic
		15.304	Quern rubber frag.
	15.09	15.011	Multifunctional cobble tool
		15.118–15.119	Unclassified slag
		15.124	Slag/vitrified ceramic
		15.126	Pottery sherd
	15.11	15.016–15.018	17 Pottery sherds
		15.019	Cobble hide rubber/pounder (broken)
	15.13	15.042	Pottery sherd
		15.054	3 Pottery sherds

Artefacts deposited above the floor horizon in Block 29a were distributed across the length of Bone Passage, although several groupings were identified, some located similarly to earlier depositional events. A substantial group of objects was placed at the junction of Bone Passage and the ramp exit to the streamway (C17.03): ceramics (25 sherds from 16 vessels), metalworking residues, fragments of pins in iron, copper alloy, and bone, and a human tooth from an infant around 6 months old. Other artefacts scattered through C17.03 included antler working debris (Table 8.3).

Another object group (Table 8.3) recovered from the central cave section (C1.04) comprised frequent red deer

Table 8.2 Artefacts recovered from the Phase 6a [Block 10] deposits in the precinct enclosure

SB	*C*	*SF*	*Description*
10	15.08	15.014–15.015	3 Pottery sherds
		15.020	Saddle quern frag.
		15.021	Pottery sherd
		15.022–15.027	6 Pottery sherds
		15.028	Cobble hammerstone
		15.030–15.031	3 Pottery sherds
		15.032	Saddle quern frag.
		15.033–15.041	9 Pottery sherds
		15.037	Pottery sherd
		15.269	Pottery sherd
		15.270	Quartz crystal
		15.271	Cobble anvil/hide rubber
		15.273	Pottery sherd
		15.276	Saddle quern frag.
		15.277	Pottery sherd
		15.279–15.280	3 Pottery sherds
		15.314–15.315	16 Pottery sherds
		15.316	2 Bone comb frags
		15.317	Human r. foot phalanx (10+ yrs)
		15.323	Cobble grinder/pounder
		15.324	Cobble grinder
		15.325	Pumice frag.
		15.326	Runned slag
		15.327	Worked haematite
		15.328	Pottery sherd
		15.329	Human lower lateral permanent incisor (10+ years)
	2.03b	2.044	Multifunctional cobble tool
		2.045	Stone working surface
		2.046	Quern rubber
		2.047	Unclassified slag
		2.048	Pottery sherd
		2.051–2.052	3 Pottery sherds
		2.053	Cobble pounder/whetstone
	3.02	3.006	4 Pottery sherds
		3.008	2 Pottery sherds
		3.015–3.016	2 Pottery sherds
		3.024	Pottery sherd

antlerworking debris, cobble tools, metalworking residues, and ceramics (four sherds from two vessels). C6.04, in the southern chamber (Fig. 8.4) produced ceramics (eight sherds from seven vessels), lithics, bone tools, 2 red beads, an iron crook headed pin, an iron bradawl or punch-type tool, and a single cobble tool.

Contemporary with these deposits was a series of particularly unusual cattle bone assemblages (Block 29b). One of the final acts of deposition in the cave, these comprised the partial remains of three cows, with a possible forth cache deposited at the end of a short section of fossil passage running southeast of the main streamway, downstream from the ramp ascending to Bone Passage (Fig. 8.5). These remains were recovered from a void within boulders blocking the passage, adjacent to a standing pool of water.

Two caches within Bone Passage comprised heavily processed cattle bones located behind a boulder setting constructed against the east wall in the north chamber (F17.002) and from a boulder-filled alcove above floor level, again in the north chamber (F17.001). The third bone cache had been placed on a natural ledge (C001/5) above the active stream passage, downstream from the ramp access to Bone Passage (Figs 8.4, 8.6–8.8). This last assemblage was located approximately 2.8 m above the active stream, reached by a short climb up a dry, abandoned waterfall. The bones lay in a shallow sediment deposit that had accumulated on the ledge, although most of the assemblage was exposed to air. The material included the partial remains of an adult cow, although absence of major body parts including any cranial material or femora suggests either post-depositional disturbance, or the deposition of specific portions of the animal. A single AMS date of 370–90 cal BC (SUERC-14940) was obtained.

Alcove F17.001 (C17.12), featuring a voice connection with the nearby stream passage, contained the partial remains of a cow aged 15–16 months, cemented together by calcite drips from stalactites above the feature (Fig. 8.6). A full set of articulated left fore-limb carpals indicated that the lower left limb at least had been placed in the alcove as an articulated joint. Other bones in the calcite block were jumbled, demonstrating that the bone had been gathered together after processing. The second deposit, recovered from ground-level boulder setting F17.002, was also coated in a thick deposit of calcite. Most of these heavily butchered skeletal elements, again aged 15–16 months, were recovered including the skull which had been cut along the medial line with a knife (Fig. 8.6). It was possible to reconstruct the spine almost entirely, including refitting vertebral plates, and some of the heavily fragmented longbones could also be refitted. This material was gathered and deposited after meat was removed and the carcass broken down, a process also seen in the pig deposits from context C001 (see Section 8.3.3).

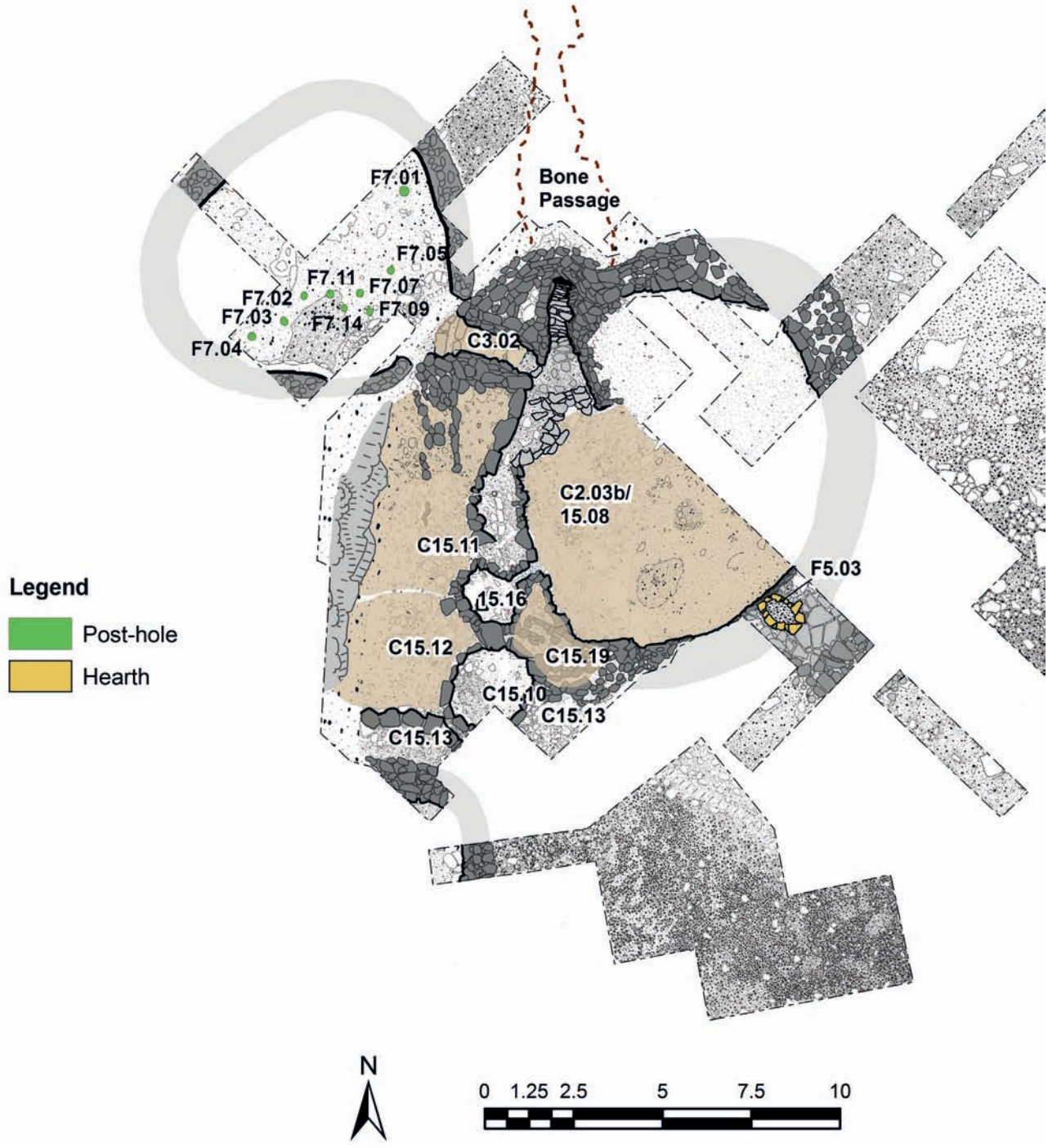


Figure 8.3. Plan showing Phase 6a [Block 10] features & deposits in the precinct

Bone from F17.002 produced an AMS date of 350–30 cal BC (SUERC-14939).

None of the cattle deposits could be sexed and there was no clear evidence for burning or dog or rodent gnawing. In contrast to the C001 pig, all three cattle were heavily fragmented, probably for marrow access, with butchery on over 60% of bones, including deep chop- and finer cut-marks, indicating dismemberment with a heavy tool before filleting to remove meat, typical of Iron Age cattle butchery. The extensive refitting possible indicated that some effort had been taken to gather, transport, and redeposit much of the bone waste from these animals to specific points within the cave.

8.2.5 Activity beyond the precinct boundary

Final activity outside the precinct during Phase 6a [Block 35] included the construction of a massive drystone wall (F8.01), a small stone-built cellular structure (F19.02;

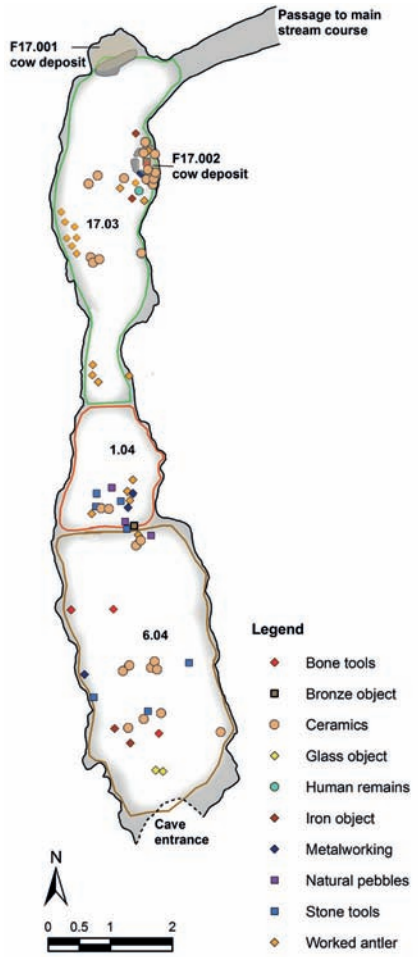


Figure 8.4. Plan of Bone Passage showing the Phase 6a [Block 29a] contexts, cow deposits & finds distribution

Fig. 8.9) and associated stone embankment, small areas of paving (F18.01; F19.11), and a circular boulder setting (F5.01) and associated paving (F5.02) adjacent to hearth F5.03 (Fig. 8.1).

The double orthostat foundation of wall F8.01 ran southeast from the precinct entrance and merged into sloping ground as it turned to the south. Built from large granite glacial erratics, this wall measured 1.8–2.2 m wide at its base and survived up to 0.4 m high, with tumble indicating that it once stood considerably higher, perhaps forming the base for an upper turf wall structure. The wall defined and contained a relatively flat area on its southwest side, forming a platform that dropped into the abandoned stream channel. This had been filled during earlier phases (Block 34) with fire-cracked stone, forming a walkway into the site from the northeast. Three trial trenches on the platform failed to find any evidence for associated structures, although Early Bronze Age activity was identified (see Section 5.3).

At the opposite side of the entrance and terminus of wall F8.01, a sloping bank of granite and limestone boulders ran in a southwest direction for around 5 m. Cellular structure F19.02 was built into this bank, its opening facing east onto the walkway. The cell was similar to the circular Phase 6a precinct structures (Block 10), and also of unknown function. Adjacent to hearth F5.03, a roughly circular structure comprising granite boulders and edge-set slabs (F5.01) sat on an area of flat paving (F5.02). Additional paving (F18.01) extended southeast from the structure and may have formed an activity area on this side of the precinct.

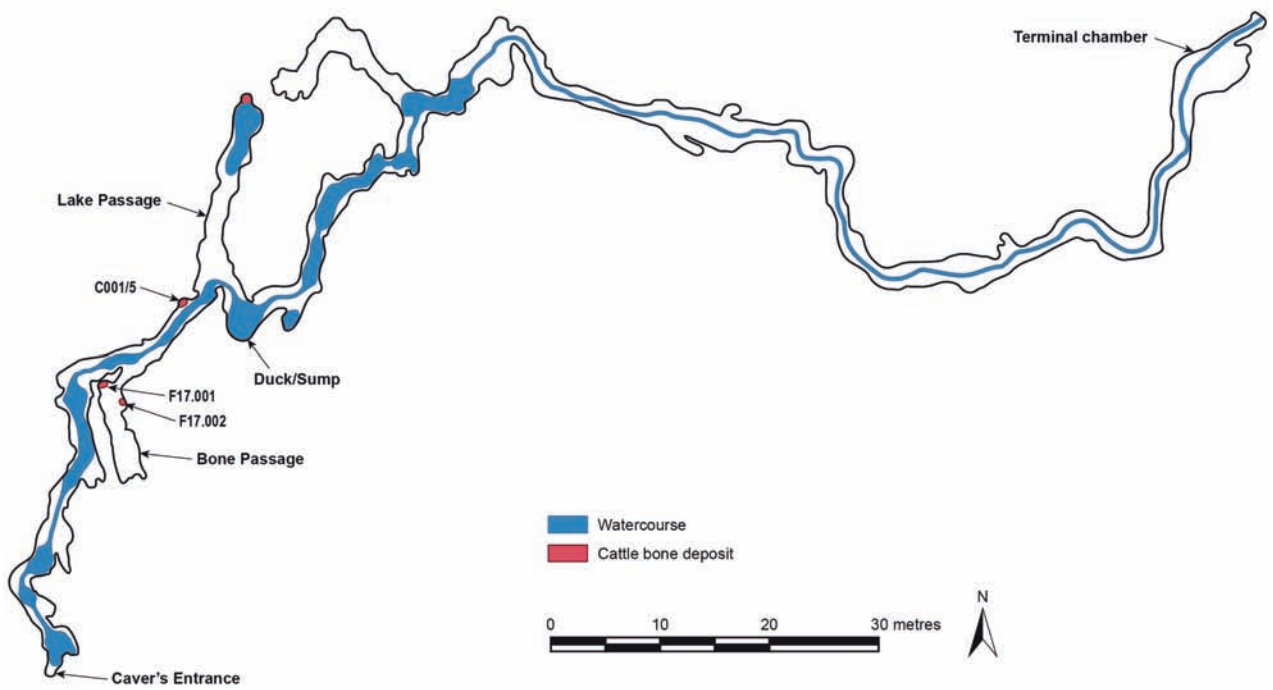


Figure 8.5. Plan showing the location of cattle bone deposits [Block 29b] in Bone Passage, and within the mainstream passage & Lake Passage

Table 8.3 Artefacts recovered from the Phase 6a [Block 29a] deposits in Bone Passage

SB	C	SF	Description
29a	17.03	17.015	6 Pottery sherds
Group 1		17.017	Iron pin shank
		17.018–17.019	2 Pottery sherds
		17.080	Infant/foetus lower r. 1st molar tooth, *c.* 6 mths
		17.098	Pottery sherd
		17.100	Unfinished bronze ring or projecting ring-headed pin
		17.149	Hammerscale
		17.172–17.173	2 Pottery sherds
		17.175	Iron pin shank
		17.229	Double-ended bone point
29a	17.03	1.253	Antler tine roughout
General		17.012	Partly polished antler point
		17.026	3 Pottery sherds
		17.029	Pottery sherd
		17.040a–b	2 Gathered antler frags
		17.040c	Prepared antler strip?
		17.044	Prepared antler beam segment
		17.046a	Prepared antler strip
		17.046b	Poss. prepared antler beam
		17.047a	Antler double-ended tool/ sockets
		17.047b	Antler basal offcut
		17.047c	Part-worked antler beam
		17.047d	Antler tine offcut
		17.061a	Part-prepared antler strip
		17.061b	Gathered antler frag.
		17.061c	Antler junction offcut
		17.061d	Undiagnostic worked antler
		17.099	Gathered antler (burnt)
	17.07	17.063a	Antler junction offcut
	17.06b	17.063b	Gathered antler frag.
29a	1.04	1.130	Cobble pounder
		1.134	Cobble pounder
		1.136	Cobble hide rubber
		1.177	Possible antler tine offcut
		1.221–1.222	2 Pottery sherds
		1.223	Unclassified slag
		1.224	2 Pottery sherds
		1.257	Cobble pounder/working surface
		1.258	Antler needle/point roughout
		1.259	Sheet bronze flanged boss/mount frag.
		1.261	Unclassified slag
		1.267	Prepared antler strip
		1.268	Antler roughout
29a	6.04	6.82–6.84	3 Pottery sherds
		6.85	Corticated flint flake
		6.87	Bone needle (broken through eye)
		6.89	Bone point (with spatulate head)
		6.91a	Cobble pounder/grinder
		6.91b	Iron crook-headed pin (2 refitting parts)
		6.92	Iron bradawl/punch-type tool
		6.183–6.184	5 Pottery sherds
		6.187	Bone point roughout (broken)
		6.221	2 Red beads (unknown material)
		6.222	Bloodstone flake
		6.226	Hammerscale

8.3 Phase 6b: stairwell closure

8.3.1 General

Activity in the cave during this period may all relate to preparation for the closure of the stairwell access to the cave. We can only speculate as to the reasons for closing what must have become a time-capsule of events and memory, of severing access to the spaces housing such important collections. This section describes the final activities leading up to and including the closure of the stairwell.

8.3.2 Deposition in the cave

The last in-cave event before the stairwell backfilling was the deposition of a large quantity of midden in the south chamber (Fig. 8.10; Fig. 4.4A-C). This formed a dome of material more than 0.45 m high at its centre that thinned towards the narrowest section of the passage and the cave walls [Block 29c]. These mixed deposits derived from surface, most likely precinct midden, although some may have come from the burnt spreads beyond its boundary: C1.01, C1.02, and C1.03, and C6.01, C6.02, and C6.03, along with 'special' pig deposit C001 (see Section 8.3.3). These stony deposits contained ash residues, abundant



Figure 8.6. A. location of cattle bone deposit F17.001; B. concretion of animal bone held together by calcite from F17.001; C. cattle bone deposit F17.002

charcoal, and high levels of carbonised grain. Fish bone and marine shells were also well distributed throughout, although a lack of these materials in surface contexts indicates that they date to the time of deposition. Animal bone varied in amount and quality of preservation and, while this may reflect the midden source, it was also apparent during excavation that mixing and breakage of bone had occurred, most likely due to modern caver disturbance (see Section 1.3). Cattle dominated the assemblage, although pig comprised *c*. 42% of the total Block 29c assemblage, including juveniles. Ratios of sheep/goat and red deer were similar to other Phase 6a cave deposits, suggesting that they may have derived from the same source. C6.03 contained rare refitting pig bone and a neonate dog ilium and ulna, from the base of the stairwell steps. As ratios of cattle to pig in contemporary precinct deposits are quite different (pig bone comprising only 13% of the precinct deposits), it seems that at least some of this material was directly deposited in the cave.

The Block 29c midden contained a rich artefact assemblage (Table 8.4). Did this form an integral part of the midden? Were these objects introduced at the time of deposition? Or does this assemblage reflect both forms of input? There was no conclusive evidence for structured caches or groups of objects within this large, amorphous deposit, but finds distribution indicates a major cluster of artefacts immediately south of the narrowest section of Bone Passage – an area targeted for depositional activity in previous phases. That this large dump was placed in the cave as one event is not in question – large, un-abraded potsherds, some of which refit, were recovered from the base and top of the sequence during excavation. But it is also obvious that the midden contained smaller abraded sherds that may relate to midden formed elsewhere on site, or from a completely different off-site source.

Broken down by individual deposits making up Block 29c, ceramics included 35 sherds from 32 vessels in C1.01; 2 sherds from 2 vessels in C1.02; 21 sherds from 15 vessels in C1.03; 25 sherds from 17 vessels in C6.01; 29 sherds from 21 vessels in C6.02, and 30 sherds from 14 vessels in C6.03. This sherd to vessel ratio is a relatively common occurrence within other ceramic assemblages from High Pasture (Table 12.1).

8.3.3 The 'special' pig deposit

A significant deposit of well-preserved domesticated pig bone (C001), including numerous semi-articulated and articulated groups, was recovered from the south chamber of Bone Passage immediately overlying the Block 29c midden deposits (Fig. 8.10; Fig. 4.4A-C). This final deposition event within the cave, most likely contemporary with the deposition of the midden beneath, has no parallel in earlier cave or precinct deposits. Full of refitting elements, this deposit featured butchery practices unique among the High Pasture assemblage: extensive cut and chop marks signalling disarticulation, dismemberment,



Figure 8.7. A. cattle bone recovered from feature F17.002; B. some of the refitted elements. Note the refitted longbone fragments displaying breakage fractures to extract marrow



Figure 8.8. Tim Lawson climbing up to the ledge above the mainstream passage where cow bone deposit 001/5 was recovered



Figure 8.9. Cellular structure F19.02 [Block 35] in Trench 19

and filleting and, most notably, splitting of carcasses, including heads and spines, down the saggital line, using iron knives. All parts of the appendicular skeleton were present, suggesting relatively complete butchered carcasses were deposited in the cave, not simply meat-rich joints. Large numbers of cranial elements suggests that primary butchery occurred nearby, as it is unlikely that these would have been transported far. The large quantity of well-preserved bone enabled the minimum number of individuals (MNI) to be calculated, considering fusion, bone completeness and size, and tooth-wear and eruption status. Up to 21 individuals were present in the assemblage, with a clear grouping of mandibles with an age at death of 7–9 months (MNI: 12), and nine other individuals of varying ages; one only a few months old. Pigs do not reach their full size and weight until 2–3 years of age, so this pattern indicates that these pigs were not utilised to their full nutritional value.

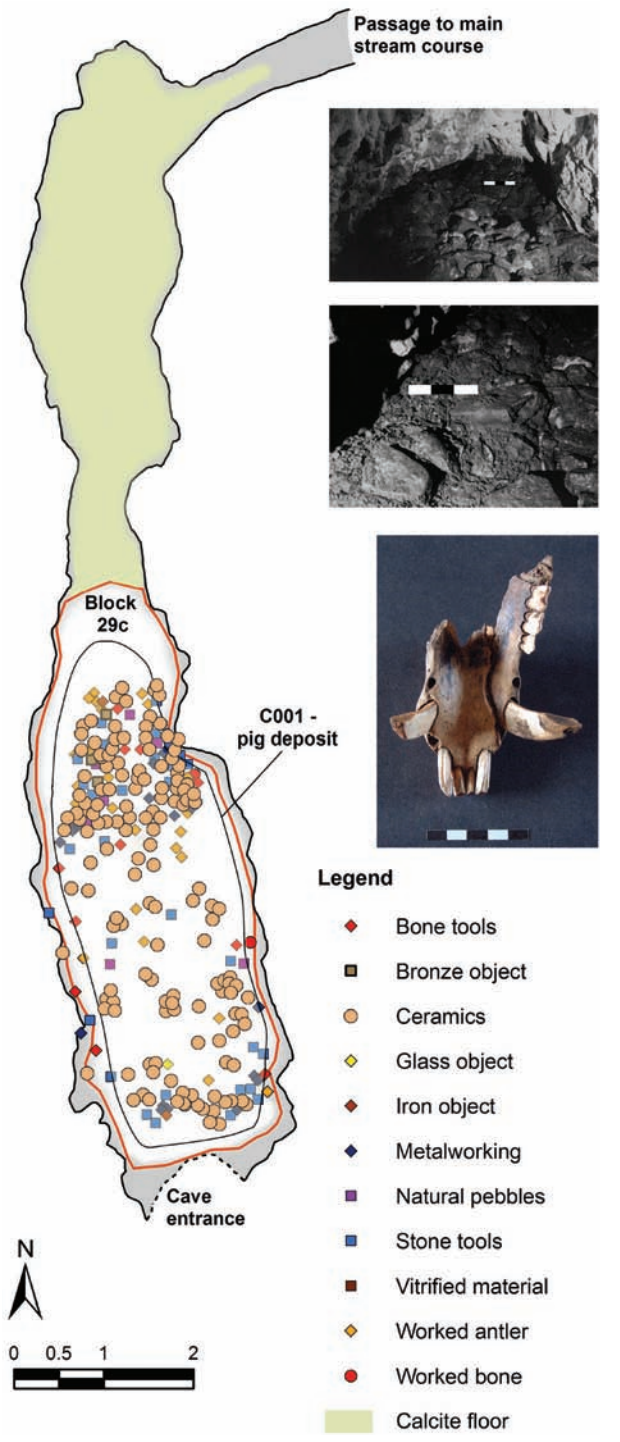


Figure 8.10. Plan of Bone Passage showing the Phase 6b [Block 29c] contexts, special pig deposit & finds distribution. Inset photographs show (top to bottom) the stone & midden in Bone Passage, looking south to the base of the backfilled stairwell; a closer view showing animal bone mixed through the Block 29c deposits; & a pig lower mandible from C001

Using an April farrowing date, it was possible to consider a specific slaughtering 'season' and this suggests that, on at least one occasion, pigs were killed in midwinter, with a peak of animals killed in their first

Table 8.4 Artefacts recovered from the Phase 6b [Block 29c] deposits in Bone Passage

SB	*C*	*SF*	*Description*
29c	6.03	6.21	Prepared antler beam segment
		6.23	Cobble pounder/ hammerstone
		6.24–6.28	10 Pottery sherds
		6.29	Antler tine offcut
		6.32–6.45	15 Pottery sherds
		6.46	Antler tine handle roughout (repaired)
		6.48	Antler handle/hook fitting
		6.49	5 Pottery sherds
		6.73	Gathered antler frag.
		6.76	Iron rivet/junction bar
		6.141a	Antler work surface
		6.141b	Roe deer antler (butchery marks)
		6.141c	Antler tine roughout
		6.141d	2 Worked antler frag.s
		6.143	Cobble pounder
		6.145	Cobble grinder
		6.146	Haematite/pigment
		6.149	Bone point (broken)
		6.150	Saddle quern
		6.179	Hammerscale
		6.180	2 Flint chips
		6.181	Antler/bone peg roughout
		1.064a	Bone peg roughout
		1.064b	Bone peg roughout
		1.064c	Possible bone peg roughout (broken)
29c	1.03	1.003	Flint flake with retouch
		1.101–1.104	4 Pottery sherds
		1.105	Perforated stone
		1.110–1.111	2 Pottery sherds
		1.143	Unclassified slag
		1.144–1.148	6 Pottery sherds
		1.150	Iron concretion
		1.153	Prepared antler beam segment
		1.159–1.167	9 Pottery sherds
		1.168a	Antler point
		1.168b	Antler peg
		1.169	Perforated antler plate
		1.170	Flint chip
		1.171	Bone peg frag.
29c	6.02	6.04–6.05	5 Pottery sherds
		6.07	Antler point
		6.09	Cobble grinder
		6.10	Antler handle/fitting

(Continued)

Table 8.4 (Continued)

SB	C	SF	Description
		6.11	Antler basal offcut
		6.12–6.14	5 Pottery sherds
		6.15	Whetstone/pounder
		6.16	6 x pottery sherds
		6.17a	Bone point frag.
		6.17b	Bone point frag.
		6.17c	Bone point frag.
		6.17d	Bone point frag.
		6.19a	Facetted bone point (broken)
		6.19b	Facetted bone point (broken)
		6.19c	Bone point (broken)
		6.20	Pottery sherd
		6.56	Hammerscale
		6.57	Bone point roughout (broken & partially burnt)
		6.58	Crucible spout frag.
		6.59	Possible ore
		6.60–6.67	11 Pottery sherds
		6.129	Gathered antler frag.
		6.132–6.133	6 Pottery sherds
		6.134	Bog iron ore
		6.171	Flint flake
		BNN11	3 Gathered antler fragments (burnt)
		BNN12	Antler beam spall with saw marks
29c	1.02	1.091	Runned slag
		1.092	Pottery sherd
		1.096	2 Flint chips
		1.097	Double-ended polished bone point
		1.106–1.108	3 Pottery sherds
		1.140	Cobble grinder/hide rubber
		1.251	Whetstone/grinder
		1.260a	Prepared antler strip
		1.260b	Antler tine tip offcut
		1.260c	Prepared antler strip
		1.260d	Gathered antler frag.
		1.260e	Gathered antler frag.
29c	6.01	6.01	Antler pin/peg roughout
		6.02	Perforated antler strip
		6.03	2 Pottery sherds
		6.08	2 Pottery sherds
		6.50–6.52	3 Pottery sherds
		6.53	Unclassified slag
		6.54	Unclassified slag
		6.55a	Facetted bone point (broken & partially burnt)
		6.55b	Bone fitting/peg (broken)
		6.55c	Facetted bone peg
		6.108	2 Pottery sherds
		6.109	Cobble grinder
		6.110	Cobble grinder
		6.112	Gathered antler frag.
		6.120	Flint flake
		6.121	Cobble pounder/grinder
		6.122–6.126	11 Pottery sherds
		6.136	Flint flake
		6.161	2 Flint chips
		6.162	Blue glass bead
		6.591	Agate pebble
		BNN10	Antler tine offcut
29c	1.01	1.016a	Part-worked antler beam
		1.016b	Prepared antler beam
		1.030–1.060	31 Pottery sherds
		1.061a	Antler tine roughout
		1.061b	Antler tine tip roughout
		1.063	Perforated antler strip/fitting with bone pegs
		1.064a	Bone peg roughout
		1.064b	Bone peg roughout
		1.066	Unclassified slag
		1.067	Decorated bronze sheet frag., curvilinear Repoussé decoration
		1.068	Unclassified slag
		1.070–1.071	Unclassified slag
		1.116	Quern rubber frag.
		1.118	Hearth stone/paving frag. (burnt)
		1.120	Hammerstone/work surface
		1.121	Cobble pounder/grinder (broken)
		1.124	Quern rubber
		1.131	Cobble hide rubber
		1.132	Cobble pounder/hide rubber
		1.252	Cobble pounder/palette
		1.254–1.258	5 Pottery sherds
		1.255a	Undiagnostic antler frag.
		1.255b	Antler prepared strip
		1.255c	Gathered antler frag.
		1.256a	Prepared antler strip
		1.256b	Gathered antler frag.
		1.262	Gathered antler frag.

(Continued)

winter, and a secondary group approximately 12 months older. This could indicate that the majority of the material was deposited in a one-off, midwinter event. Fusion data confirmed that the majority of pigs were under 1 year old, with two individuals of *c*. 3½ years, and also identified three further individuals not visible within the dental data, bringing the MNI to 24. While well-preserved articulating material is present, material from 24 entire pig carcasses was certainly not recovered. Only 2.7% of material from C001 was burnt, which may suggest that meat was removed from the bone prior to cooking, or other cooking methods such as boiling were used. An almost total lack of gnawing or weathering indicated swift deposition into the cave after processing.

A lack of marrow extraction from long bones suggests an abundance of available meat. One interpretation is that this deposit represents a one-off midwinter pig feast and/or was created by some symbolic deposition of specifically butchered young pig, along with cattle carcasses, in the cave. Pathology on some of the bones indicated that some of these young animals had healed fractures and diseases affecting mobility, suggesting that they were being cared for, probably within contemporary settlements. Isotope analysis also indicated a different diet to that of older pigs from the site, with the young animals fed protein-rich foods (see Section 11.4).

Three samples of pig bone from C001 produced AMS dates of 390–160 cal BC (SUERC-2435), 363–183 cal BC (SUERC-66358), and 211–87 cal BC (SUERC-66359).

8.3.4 Backfilling the stairwell [Block 22a]

Stairwell F2.23 was backfilled and closed immediately after the pig deposit comprising C001 was placed in Bone Passage. This may have started with the deposition of a group of objects on the two lower steps of the structure, over the top of C6.01 [Block 29a] which ran over the bottom steps: ceramics (55 sherds from 15 vessels); metalworking residues including hammer scale, and a variety of other objects (Table 8.5). All artefacts were recovered from C2.52, from which hazel charcoal produced an AMS date of 350–40 cal BC (SUERC-12281).

The stairwell was then backfilled by boulders, smaller stones, and midden, which ran into Bone Passage and formed a wedge of material over pig-rich deposit C001. Lintel slabs and other structural stone from the stairwell top – possibly the corbelled and lintelled roof structure (Fig. 8.11) were also used, filling the stairwell to *c*. 0.6 m below the surviving wall-heads, approximately 0.3 m below the top step and adjacent landing (Fig. 8.13). Although the Block 22a deposits appeared homogeneous, they were recorded in spits in order to control artefact recovery. From the base, these comprised C2.51, C2.50, C2.49, C2.48, C2.47, C2.46, C2.4,5 and C2.44. Hazel charcoal from C2.44 produced an AMS date of 360–30 cal BC (SUERC-14937); similar to that from basal stairwell deposit C2.52. Large voids encountered during excavation may be responsible for the few artefacts moving down-profile: the disarticulated human bone recovered from the lower backfill also appear to relate to the burials placed in the top. This was confirmed to some extent by the dating of a perinate cranial fragment from C2.49, which is contemporary with the main burials. However, a date on a foetal pig humerus from C2.47 produced a slightly earlier result, perhaps contemporary with the stairwell backfill (see Section 8.4.4).

Table 8.5 Artefacts recovered from the Phase 6b [Block 22a] backfill deposits in Stairwell F2.23

SB	*C*	*SF*	*Description*
22a	2.52	2.342	Antler handle roughout
		2.343–2.350	44 Pottery sherds
		2.351	Perforated antler strip
		2.352	Perforated antler strip
		2.353	Bone/blunt point (burnt)
		2.356	Decorated stone palette
		2.358	Blue glass bead (half)
		2.359	Facetted antler point (broken)
		2.360	Cobble grinder/smoother
		2.361–2.363	8 Pottery sherds
		2.364	Antler junction offcut
		2.368	Quern rubber
		2.381	Hammerscale
		2.382	Abraded pottery sherds
		2.383	Possible decorated antler handle/ fitting (burnt frag.)
		2.384	Copper alloy pin (4 frags)
	2.51	2.326–2.328	3 Pottery sherds
		2.331	Antler/skull frag. (unworked)
		2.334	Strike-a-light
	2.50	2.320	Human perinate/foetal cranial bone
		2.324	Pottery sherd
	2.49	2.297	Pottery sherd
		2.299	Bones from 2 human perinates
		2.317	Human perinate rib mid-shaft bone
	2.48	2.295	Quern rubber
		2.296	Quartz flake
		2.308	Hammerscale
		2.315	Bones from human foetus
	2.47	2.283	2 Pottery sherds
		2.286	Human perinate rib frags & carpal bone
		2.313	Bones of human perinate & foetus
	2.46	2.280	2 Pottery sherds



Figure 8.11. Excavation of the Block 22a backfill deposits in stairwell F2.23: A. looking south in Bone Passage to the base of the backfilled stairwell; B. looking down into the stairwell showing large stone lintel slabs; C. the lip of the natural cave roof emerging as the backfill deposits are removed

Material recovered from C2.45 and C2.44 [Block 22b] comprised the burial environment for the later Phase 7 animal and human interment. C2.45 produced human bone belonging to the Block 22b burials (see Section 8.4.2), while artefacts from C2.44 included potsherds (SF2.257–2.259 and SF2.265; comprising 15 sherds from two vessels), gathered antler fragment SF2.262, and burnt antler fragment SF2.263. These were probably incorporated into the backfill of the stairwell, rather than forming grave-goods. The human remains from this context are discussed in Section 8.4.2.

8.3.5 Activity in the precinct

Activity in the precinct at the time of the stairwell backfilling included the closure of the stairwell access from the west (F2.29, F15.44, and F3.01) [Block 10]. Earlier activity in this zone, particularly the close proximity of the access passage and the west wall of the stairwell, compromised interpretation of these deposits, with AMS results also highlighting potential intrusive and residual material.

Deposits used to backfill the lower section of access F2.29 included C2.61, a chaotic boulder and stone fill with an organic-rich matrix with charcoal, bone, and periwinkles. Small finds included potsherd SF2.463, bronze strip spiral ring SF2.462, and disarticulated human remains comprising vertebrae and pelvis fragments from an adult aged 21+ (SF2.464). The upper structure comprising access to the stairwell (F15.44/F3.01) was filled with C3.02, containing granite and limestone boulders, degraded bone and teeth, and charcoal. A thin, organic lens of material at the base of C3.02 most likely represents trample associated with the stairwell landing. Pottery comprising nine sherds from five vessels were the only finds recovered from this material. Hazel charcoal from C3.02 produced an AMS date of 360–50 cal BC (SUERC-12282).

At the time of these backfill events, it is possible that the fragmentary human remains, double link bronze chain SF21.10, iron socketed spearhead SF21.02, and natural stalactite SF21.11 were incorporated into the upper levels of deposit C21.09/4, in the stairwell wall core. Significantly, three AMS results on the human remains recovered from the same upper levels of C21.09/4 ranged between cal AD 49 and 229 (see Section 11.3).

8.3.6 Deposition beyond the precinct boundary

Activities beyond the precinct boundary in Phase 6a [Block 35], discussed in Section 8.2.5. were followed in Phase 6b by the deposition of a wide range of artefacts over the compacted surface of the burnt spreads. Some of these objects appear to have formed structured depositions relating to the backfilling and closure of the stairwell, and the final Phase 7 closure of the site (see Section 8.4 for additional comments relating to this material, including whether some of the objects from this stratigraphic block should fall within Block 11). The Block 35 artefacts were

Table 8.6 Artefacts recovered from the Phase 6b [Block 35] deposits outside the precinct enclosure

SB	C	SF	Description
35	19.02–1	19.022	Decorated blue & white glass bead (half)
		19.034–19.036	6 Pottery sherds
		19.037	Unclassified slag
		19.038	Flint bipolar core
		19.039	Cobble burnisher/polisher
		19.040	Unclassified slag
		19.042	Unclassified slag
		19.083	Roman bronze coin (As or dupondius, poss. 2nd century)
		19.119	Unclassified slag
		19.120	Cobble pounder/grinder (broken)
		19.121	Unclassified slag
	19.01	19.001	Whetstone
		19.002	Quartz crystal with wear
		19.003	Runned slag
		19.004	Unclassified slag
		19.006	Plano-convex hearth base
		19.007	Rotary quern frag. (bun type)
		19.009	Leaf-shaped point
		19.010	Cobble whetstone/pounder
		19.011	Plano-convex hearth base
		19.088	Whetstone (broken)
		19.089	Unclassified slag
		19.105–19.107	Unclassified slag
		19.108	Runned slag
		19.109	Unclassified slag
		19.114	Runned slag
		19.115	Rotary quern frag.
		19.153–19.154	3 Pottery sherds
	5.05	5.009–5.011	4 Pottery sherds
		5.012	Flint microlith/microblade
	5.04	5.019	2 Soapstone vessel frags (refit)
	5.01	5.001	2 Rotary quern frag. (refit)
		5.002	Perforated stone
		5.003	Pottery sherd
		5.006	Perforated stone (refits with SF5.007)
		5.007	Perforated stone (refits with SF5.006)
	13.02	13.01	Polished stone axe (Cumbrian Tuff)

recovered from around the periphery of the precinct, with particularly high concentrations to the northeast of the stairwell access. However, they should also be considered alongside similar types of material recovered from the burnt spreads deposited in the precinct (Block 10, see Section 8.2.3).

The Block 35 assemblage is similar to that from the precinct: numerous ceramic sherds and some coarse stone tools (Table 8.6). However, metalworking residues formed an important component of this assemblage, including various types of iron slag and two plano-convex hearth bases. The deposition of metalworking residues overlying the burnt spreads to the northeast of the precinct mirrors earlier episodes of activity, especially in Phase 5 [Block 34]. Other objects included lithics, which were most likely residual.

A final object possibly relating to site closure was recovered from C13.02, forming the upper backfill of ditch feature F13.01 in the southeast sector of the complex: just below the turf horizon was an Early Neolithic polished stone axe roughout, manufactured from Cumbrian Tuff (SF13.001; see Section 12.4). This clearly curated object may have been selected for deposition at this important moment in the history of the High Pasture complex.

8.4 Phase 7: closing deposits

8.4.1 General

The stairwell backfilling prevented access to the cave from the precinct. Although it has proved difficult to find direct evidence of activity in the precinct or its surrounds after this event, it is likely that High Pasture was still visited. It is possible that the sink (the cavers' entrance) remained open, allowing access to Bone Passage via the active streamway. Whether or not this was the case, the final act of closure at the High Pasture complex appears to have been decisive, with the interment of human and animal remains into the closed stairwell top, the deposition of a number of important objects, and the landscaping of the immediate surrounding area. Buried under a mound of stone and midden, the site then appears to have been abandoned until activity during the post-medieval period (Chapter 9).

8.4.2 Interment within the stairwell

At least 100 years after the stairwell backfilling (Section 8.3.4), a final act of closure was initiated at High Pasture (Fig. 8.13), with human and animal remains inserted into the top of the structure [Block 22b], overlying earlier backfill deposits [Block 22a]. This included the virtually complete skeleton of an adult woman aged 25–40 years, a perinatal skeleton within the last month of foetal development or the first two weeks of life, and a foetus of 12–26 weeks gestation (see Section 11.2). A second perinate individual was represented by the proximal half of a left tibia, which had possibly moved down from the

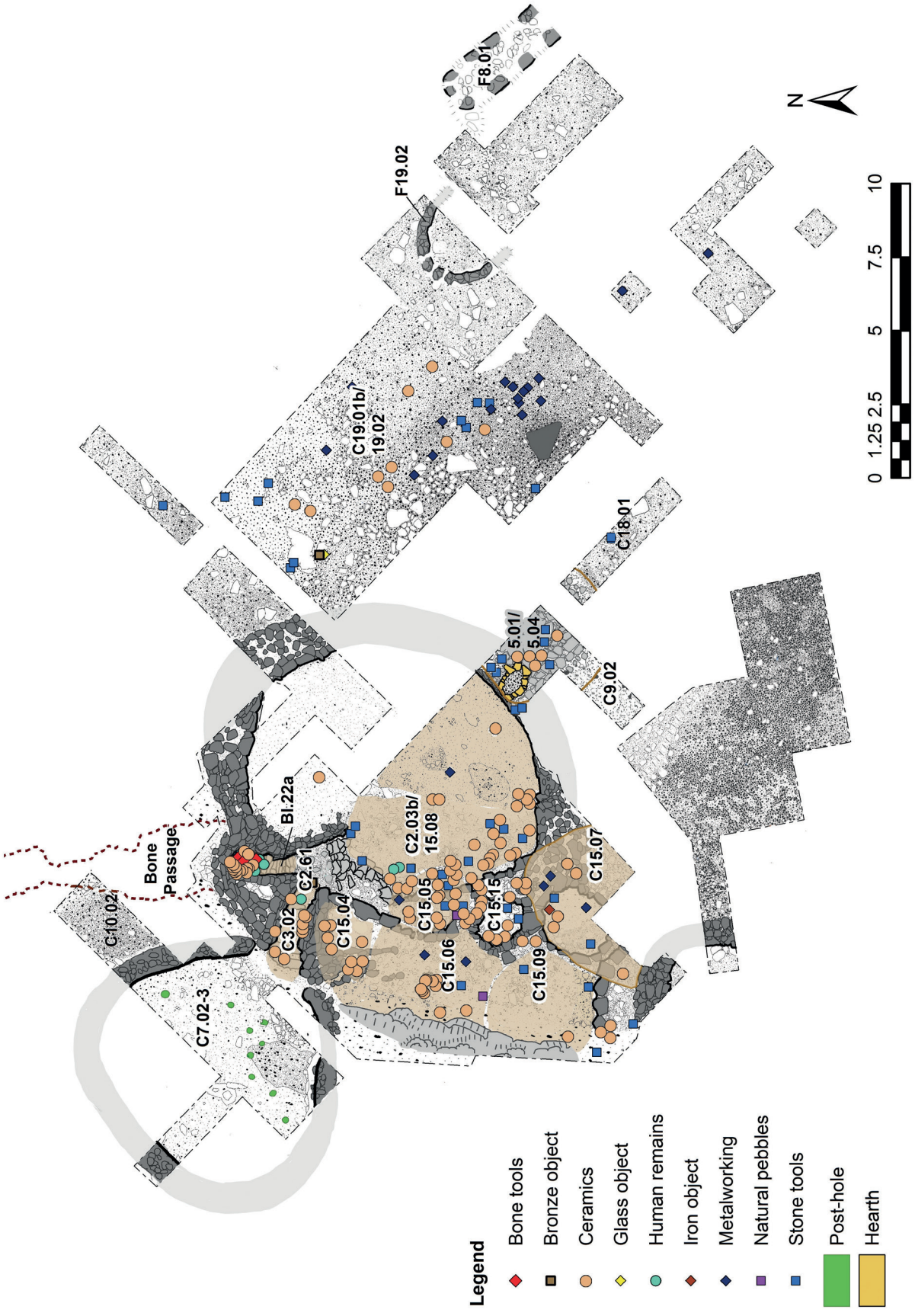


Figure 8.12. Plan showing Phase 6a & 6b [Blocks 10, 22a, & 35] deposits & finds distribution

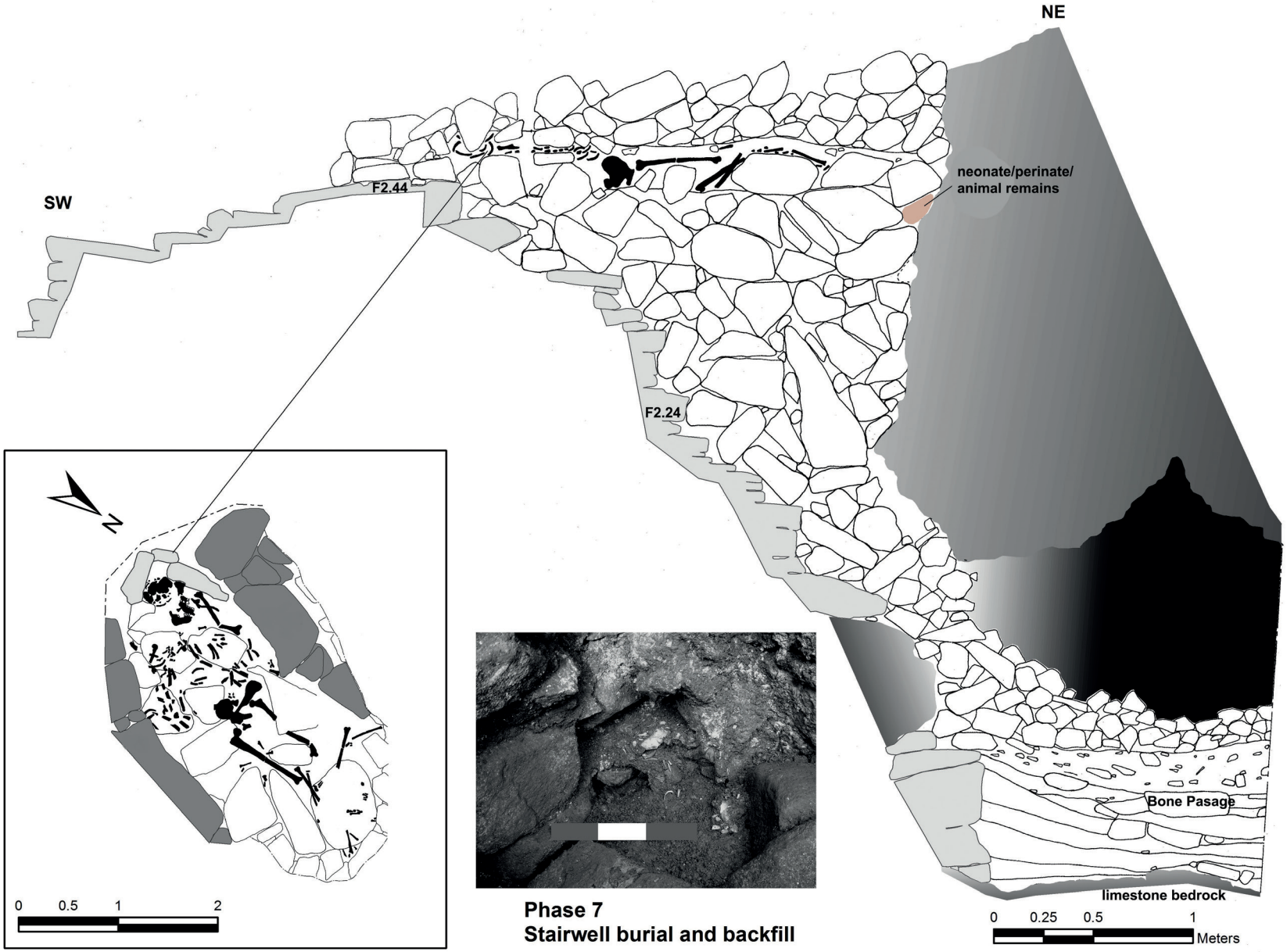


Figure 8.13. Plan showing the backfilled stairwell F2.23 [Block 22a] & location of the human & animal remains in Phase 7 [Block 22b]. Inset image showing combined elements of human perinate & foetus, & perinatal piglet

main burial environment. Animals placed alongside the human remains included most of the skeleton of a perinatal piglet and a number of elements, including head and limbs, of a very young dog.

At the time of interment, the visible elements of the relict stairwell would have resembled a stone-lined cist – roughly oval, with 1–2 courses of stone showing above upper backfill C2.44. The north end comprised the rock face above the cave entrance while the two top stairwell steps would have been visible at the south, with backfill stones and boulders protruding through thin midden C2.44.

Two small, fist-sized bundles of bones at the north end of this cist-like structure were first to be deposited, in a small natural cavity in the bedrock (Fig. 8.13), removing some of the earlier backfill deposits (C2.45 – Block 22a) to access the cavity and place the remains inside: disarticulated cranial fragments, vertebrae, and ribs from the human perinate and foetus and most of the elements from the perinatal piglet. The adult woman was then laid out in a supine position, cranium to the south, resting on the stairwell steps (Fig. 8.14). Three small granite stones were placed surrounding the top of the skull, acting as cushion-stones. Pollen analysis on sediments immediately below the burial produced significant willow pollen, suggesting that she was placed on a bed of willow branches, complete with catkins. This indicates that the burials took place between late February and the end of March.

Her feet almost touched the limestone bedrock at the north, resting on a large, flat granite boulder, which partially covered the two bundles of bone relating to the perinate and foetus. Several tiny bones had been interred between her knees and lower limbs: the arms and legs of the human perinate and foetus, along with the bones of the very young dog and isolated bones from the perinatal piglet: clearly, the specific segregations of these bone groups were a significant part of the burial ritual. Radiocarbon dating indicates that the woman, perinate, and foetus were roughly contemporary, while isotopic analysis also produced results suggesting a high probability that the woman was the mother of both perinate and foetus. More recent aDNA analysis has shown, however, that the perinate was not maternally related to the woman, whereas the foetus shared her mitotype and was therefore possibly her child (see Section 11.5).

Some of the bones from the extremities of the adult woman were missing, suggesting that excarnation may have preceded her burial. This may also have been the case with the perinate, foetus, piglet, and dog, as no cut-marks suggesting dismemberment were noted on any elements, only limited (likely rodent) gnawing. The curated remains of the woman, associated foetus, and unrelated perinate could have been available for interment after the woman had died – possibly in childbirth, or through a miscarriage. If a cover to protect from scavengers had been erected above the burial environment, it is possible that the excarnation process could have taken place *in situ*.

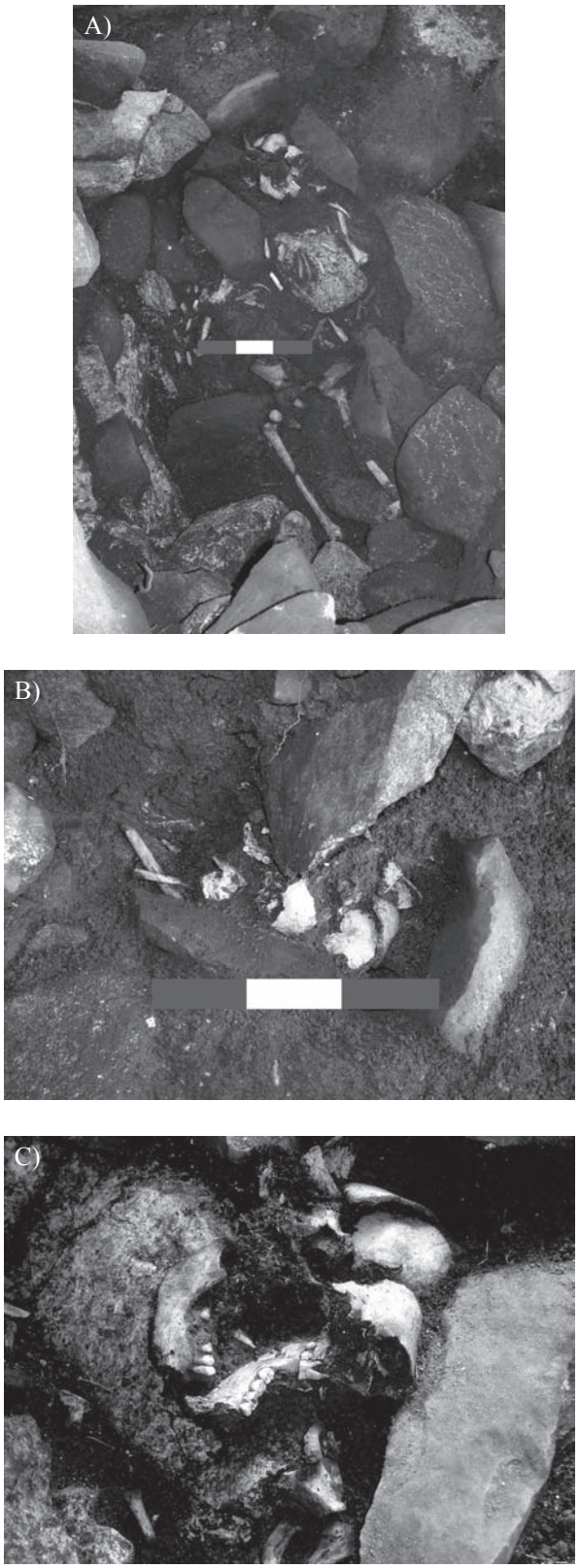


Figure 8.14. The adult female human remains overlying the backfill in stairwell F2.23 [Block 22b]: A. partially excavated skeletal remains looking south-southwest; B. fragmented cranium & embedded stone shown in plan; C. cranial elements after removal of the large stone

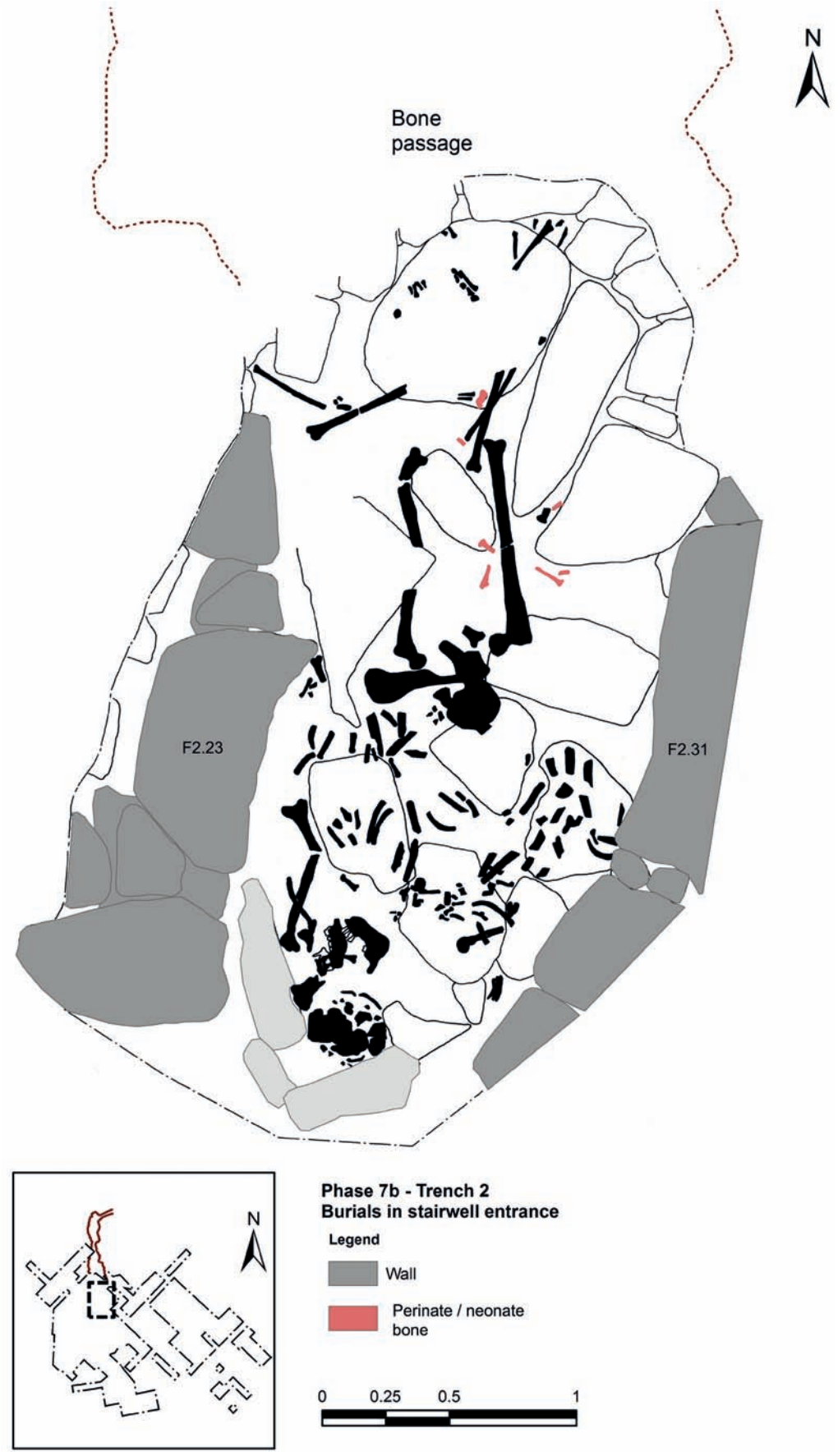


Figure 8.15. Plan showing the adult female inhumation in the backfilled stairwell & location of the long bones from the perinate & neonate/foetus, after removal of covering stone

Although care and attention had been given to the adult woman's interment, her skeletal remains displayed some severe post-depositional trauma. After placement into the stairwell top, stones had been deposited with some force onto her remains. A large boulder had crushed the chest area, reducing more fragile bones to splinters, while a large, pointed stone had been dropped onto the cranium. The force of this impact had displaced the lower mandible, caused significant damage around the nasal cavity, and fracturing of the cranial vault (Fig. 8.14). This could have been deliberate, or a result of the backfilling process (see Section 14.2.4; 14.2.8).

The other disarticulated fragments of human bone recovered from the stairwell backfill [Block 22a] and from the core of the west stairwell wall (C21.09/4) all appear to be contemporaneous, based on AMS dating. It appears most likely that these fragments derive from the main burials discussed above, perhaps disturbed by the rodent activity that was noted in the stairwell during excavation, in association with air-filled voids between some of the stones. However, for the human bone fragments recovered from the head of the stairwell wall, see Section 8.4.3 below.

The formal closure of entrance passage F2.29 accessing the stairwell (see Section 8.3.5) may also have formed part of this event. A disarticulated vertebra fragment from an individual aged 21 years+, recovered from C2.61 (SF2.464), produced a date contemporary with the stairwell burials. However, an adult pelvic iliac crest from the same context produced a much earlier result and must have derived from a different individual. This bone may represent a curated object included in the access passage backfill or may be residual. Human remains at High Pasture are further discussed in Section 11.2.

Two samples from the adult inhumation produced dates of 50 cal BC–AD cal 130 (SUERC-14945) and cal AD 20–230 (SUERC-14946). For modelled dates see Section 10.6, while other samples are discussed in Section 11.3.

8.4.3 Site landscaping and structured deposition of artefacts

Contemporary with the combined human and animal stairwell burials was the final landscaping of the surrounding area (Fig. 8.16), using redeposited midden, most likely harvested from the precinct and the burnt spreads, and a quantity of granite and limestone boulders. These formed a distinctive mound, up to 1.2 m deep, over the stairwell landing. Little of interest was recovered from the stone contexts of Block 11, but stony redeposited midden C2.03a produced a varied assemblage of objects relating to site closure. Compacted lenses of fire-cracked pebbles and stone clasts, charcoal, and ash-rich lenses containing burnt bone had been spread through the northern half of the precinct, to the south and east of the stairwell. Artefacts were distributed fairly evenly through this (Fig. 8.16), some possibly associated with the original formation of the midden. However, it is also evident that some material was incorporated at the time of redeposition.

Artefacts from C2.03a included ceramics, metalworking residues, and a wide range of other objects including stone tools (Table 8.7), rotary quern upper stone fragments, including a cache of three bun-type fragments stacked together, comprising one half and two quarter fragments (SF2.231, SF2.232, and SF2.233; Fig. 8.18), deposited to the side of the backfilled stairwell. Another bun-type quarter fragment (SF2.249) refitted with fragment SF2.232, recovered several metres to the southeast. These echo the Phase 6b [Block 35] material, which included refitting fragments SF5.001 (Fig. 8.17) and two unfinished and refitting half fragments, SF18.001 (Section 8.3.6).

A number of important artefacts were recovered from the upper fill (C21.09) of the west stairwell wall F2.23. Initially assigned to Phase 4a (SB8c) activity including modifications to the head of the stairwell, subsequent AMS dating of human bone from the context and alloy analysis of a fine double-link chain (SF21.10), suggests that these were deposited at the head and west of the stairwell during the closure of the site in Phase 7 (Block 22b). The alloy analysis showed that the chain was manufactured from leaded gunmetal, and while the zinc levels are low, they are sufficient to indicate it included re-used Roman metal. The other important artefact deposited in this fill was an unusually large and deliberately bent iron spearhead (SF21.02) with part of its wooden haft preserved in its spherule and, unusually, a copper alloy retaining pin. A small concretion next to the spearhead was later identified as its tip (SF21.03), detached after deposition but refitting the spearhead at an angle, indicating that it had been bent before deposition. The impressive appearance of this spearhead, along with its sheer weight in iron (328 g) would have made this a valuable object. The fact that this impressive item was intact but deliberately damaged when it was deposited strongly suggests it was an offering made at the time of the deposition of human and animal remains in the top of the backfilled stairwell.

Recovered from the same deposits, some of which had been placed within the wall core at the head of the west wall of stairwell F2.23, were three potsherds from three different vessels (SF21.05), a small natural stalactite from the cave (SF21.11), a small burnt saddle quern fragment (SF21.09), and several disarticulated fragments of human bone. These included an adult metatarsal and proximal foot phalanx, a first cuneiform bone, and a hand phalanx – all from a young adult aged *c*. 14+ years (SF2.461 and SF21.07); and a humerus from a perinate (SF21.08). Radiocarbon dating of the cuneiform bone and hand phalanx from the 14+ year old provided dates of cal AD 65–220 and cal AD 49–177 respectively (see Table 11.9).

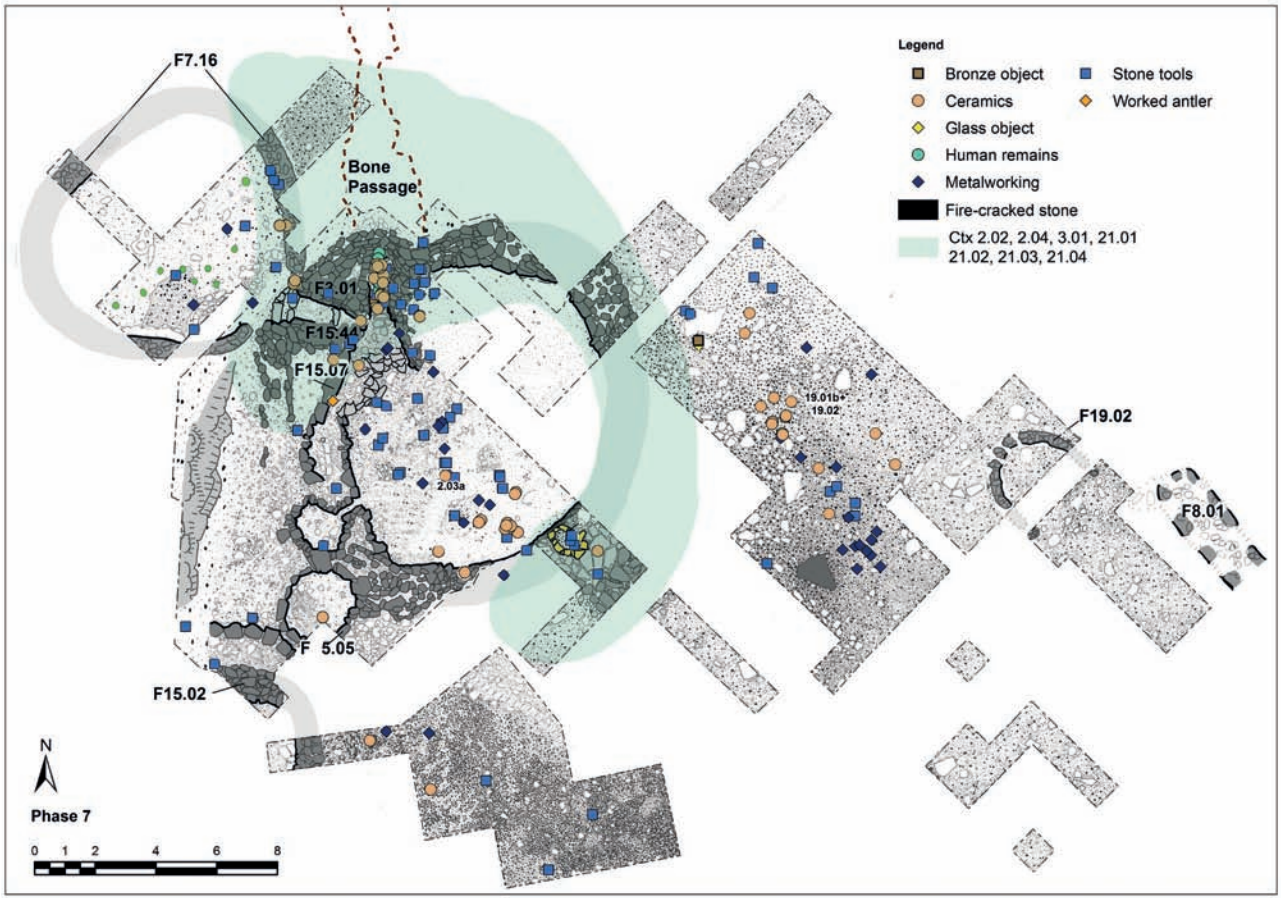


Figure 8.16. Plan showing the final landscaping of the core area of the High Pasture Cave complex, major deposits & finds distribution [Block 11]

A Roman as or dupondius, probably of 2nd century date (SF19.003) and recovered from the surface of the burnt spreads to the east of the stairwell, is most likely contemporary. Roman coins are rare in Skye and it is most unlikely this was a casual loss. It is much more likely to be a deliberate offering of a powerful, exotic item at a site of venerated memory. A single annular bead (SF19.022) of Guido class 14, decorated with white horizontal trails, was recovered alongside the coin, so these were most likely deposited together.

The Block 11 mixture of boulders, stones, and midden used to landscape the site, which formed a distinctive spread above the area focused on the stairwell, was also used to backfill the Phase 6a cellular structures (F15.05, F15.07b, F5.01, F19.02). This backfill was visible above the turf, with many artefacts from these deposits within the topsoil: abraded potsherds, lithics, metalworking residues, and stone tools. To the west of the backfilled stairwell, redeposited sediments C7.02 and C7.03 produced a mixed assemblage including potsherds, iron slag, and a cobble tool (SF7.002), plus lithic tools and debitage relating to different phases. Much of this material is probably residual.

The Phase 7 events not only signalled an end to prehistoric activity at High Pasture Cave, but also attempted to eradicate and conceal the visible elements relating to it: a clear indication that these 'closing' events were intended to be final. At least 1700 years would pass before High Pasture was used again, at the time of the Highland Clearances.

From the end of Phase 5 (*315–225 cal BC*), activity continues in Phase 6, starting between *295–215 cal BC*, and ends with the backfilling of stairwell F2.23 and access to the cave between cal *AD 50–130*. The final activities on site, including the deposition of human and animal remains in the top of the backfilled stairwell and landscaping of the site focused on the precinct, took place between cal *AD 70–135*. While it is possible that the final acts of closure at High Pasture took place immediately after the backfilling of the stairwell, the modelled dates indicate that this major event took place up to 100 years afterwards (see Section 10.6).

Table 8.7 Artefacts recovered from the Phase 7 [Block 11] deposits focused on the precinct

SB	*C*	*SF*	*Description*
11	2.03a	2.026	2 Pottery sherds
		2.027	Possible vitrified ceramic
		2.028	Unclassified slag
		2.029	Vitrified ceramic, poss. non-ferrous furnace lining
		2.030a	Flint short-end scraper
		2.030b	Quartz crystal with wear
		2.031	Pottery sherd
		2.035	D-shaped unfinished shale bangle frag.
		2.036	Possible hide rubber
		2.037	Quartz core
		2.038	Multifunctional cobble tool
		2.040	Pottery sherd
		2.041	Unclassified slag
		2.079	Possible gaming piece
		2.082	Cobble hammerstone/pounder
		2.085	Quern rubber
		2.227	Unclassified slag
		2.228	Pottery sherd
		2.229	Cobble pounder
		2.230	Plano-convex hearth base
		2.231	Bun-type rotary quern frag.
		2.232	Bun-type rotary quern frag. (refits with SF2.249)
		2.233	Disc or bun-type rotary quern frag. (half)
		2.234	Pottery sherd
		2.240	Cobble pounder/hammerstone
		2.241	Perforated stone
		2.247	Cobble pounder
		2.249	Bun-type rotary quern frag. (refits with SF2.232)
		2.369	Cobble grinder
		2.386	Pottery sherd
		2.389	Cobble pounder
		2.390	Plano-convex hearth base
		2.407	Saddle quern frag.
		2.408	Cobble grinder
		2.409	Flint scale-flaked knife
		2.410	Multifunctional cobble tool
		2.411–2.412	2 Pottery sherds
		2.465	Cobble grinder/hide rubber
		2.467	Cobble grinder/hide rubber
11	21.09	2.461	Human bone: adult metatarsal & proximal foot phalanx (*c.* 14 yrs+)
		21.08	Human bone: perinate humerus
		21.07	Human bone: cuneiform & hand phalanx, young adult 14 ys+
		21.05	3 Pottery sherds from 3 vessels
		21.09	Saddle quern frag. (burnt: refits with F2.413, F2.415 & F2.435)
		21.11	Natural stalactite from cave
		21.10	Bronze double-link chain
		21.02–21.03	Socketed iron spearhead & broken off tip
	2.04	2.070	Cobble pounder
		2.104	Possible worked stone
		2.105	Pottery sherd
	2.01	2.001	6 Pottery sherds
		2.004	Flint bifacial arrowhead
		2.005	Hammerstone
		2.007	Quartz flake
		2.009	Quartz flake
		2.011	Fuel ash slag
		2.012	Flint flake with use-wear
		2.013	Unclassified slag
		2.014	Flint chip
		2.016–2.018	Unclassified slag
		2.021	3 Flint chips
		2.022	Flint single platform core
		2.023	Perforated stone
		2.024	Fire-flint
	3.01	3.002	Possible copper ore
		3.003	Whetstone/smoother grinder
		3.004	10 Pottery sherds
	7.02	7.002	Cobble grinder/pounder
		7.006	Unclassified slag
		7.007–7.008	2 Flint flakes
		7.009	Pottery sherd
		7.010	Flint flake with retouch
	7.03	7.013	Haematite (unworked)
		7.014	Stone working surface
		7.017	Pottery sherd
	9.02	9.004	5 Pottery sherds
	21.04	21.01	Pumice

(Continued)

Table 8.7 (Continued)



Figure 8.17. Upper rotary quern fragment SF5.001 deposited in cellular structure F5.01 [Block 35]

Table 8.8 Artefacts recovered from the [Block 36] deposits outside the precinct enclosure

SB	*C*	*SF*	*Description*
36	TPC4.02	4.01	Runned slag
	TPC5.02	5.01	2 Pottery sherds
	TPC6.03	6.01	8 Pottery sherds
		6.02	Unclassified slag
	TPC7.02	7.01	2 Pottery sherds
	14.01	14.17	Flint flake
		14.30	Dense slag
		14.31	Pottery sherd
		14.33	Flint flake
		14.034	Fire-flint
	14.12	14.017	Flint irregular core
		14.018	Dense slag
	15.01	15.001	Flint chip
		15.003	Flint bladelet
		15.005	Saddle quern frag.
		15.123	Flint microblade
		15.251–15.252	2 Pottery sherds
		15.259	Pottery sherd
	16.01	16.001	Flint bipolar core

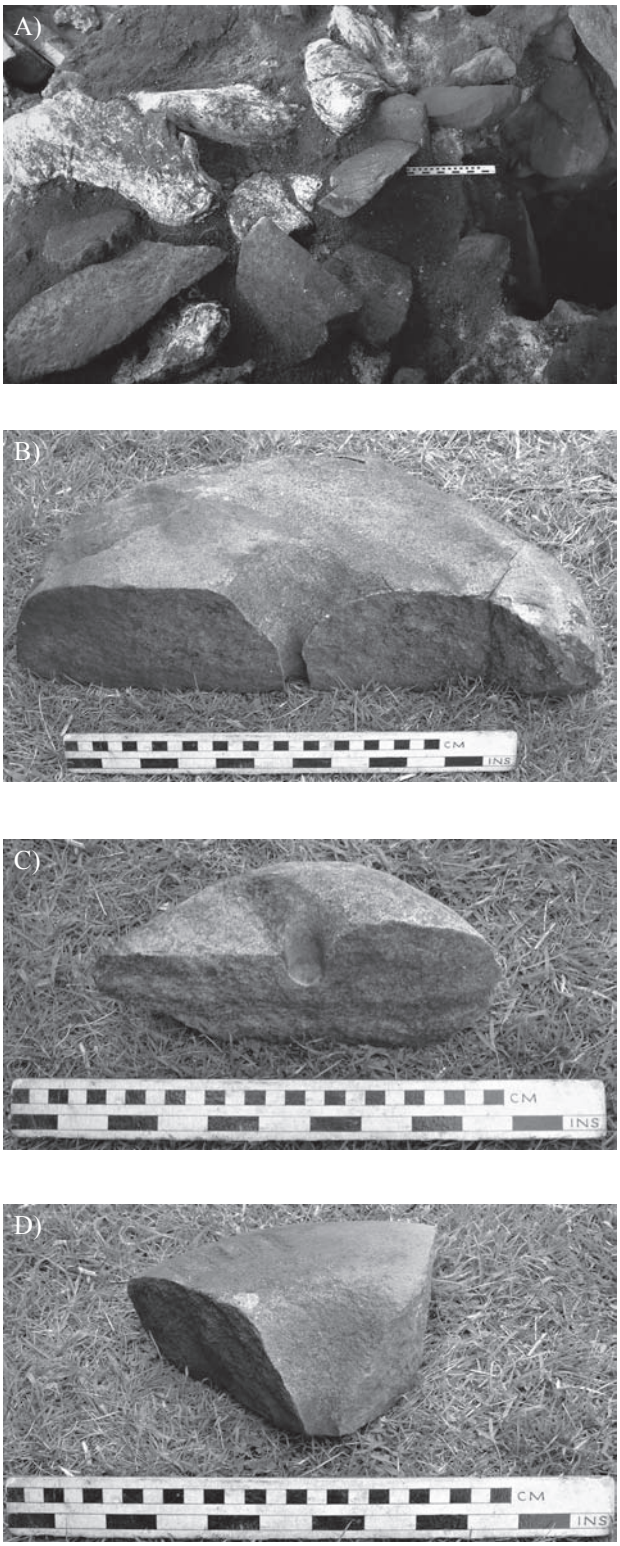


Figure 8.18. Rotary quern fragment SF2.233 in backfill deposits [Block 11] adjacent to stairwell F2.23 entrance. The stone formed a part of a cache of three upper rotary quern fragments, also including SF2.231 & SF2.232 (shown below)

9

Post-medieval activity

Steven Birch

9.1 Introduction

After the closing events of the early 1st millennium AD, High Pasture and its environs saw little in the way of activity for at least 1500 years. It is likely that the people of surrounding settlements drove their cattle up to the fertile grazing of these high pastures for many generations but, if they did, they left little sign of it. However, the decayed stone structures and earthworks remaining at the core of the site provided a framework for some later settlement. From the mid-18th century, a group of small cellular structures and interconnecting walls were established, forming a shieling settlement providing a seasonal base for people of the nearby Kilbride township to tend livestock, make dairy produce, and undertake small-scale craft activities through the summer months. The Highland Clearances brought these activities to an abrupt end by the middle of the 19th century.

High Pasture and its landscape then came within the tenanted farm of Kilbride and remain so to this day. The natural cave entrances, especially vertical openings such as existed at High Pasture, were potentially dangerous to livestock and such features were thus deliberately filled with domestic and agricultural rubbish. This still occurs today, with household and agricultural machinery, bicycles, and fencing debris forming the modern-day equivalent of querns, ceramics, and spindle whorls.

9.2 Phase 8: post-medieval transhumance

Transhumance, the seasonal and temporary occupation of upland areas, is a practice with likely roots in prehistory. The movement of livestock from cultivated lands to higher or more remote pastures for the summer characterises the medieval and later economies of much of upland Scotland and the islands. The transhumance economy was a vital component of settlement and social organisation within these landscapes (Cheape 1997), and it has even been suggested (Campbell 2009, 239) that the traditional relationship between the township and shieling grounds could be inverted and that a township may simply reflect the social organisation of a particular shieling group. Significant numbers of shielings have been recorded in the Parish of Strath, especially around Torrin and Kilbride townships (Wildgoose 1991; 1993). At Airidh na Creice, to the northwest of Torrin, excavations by Wildgoose and Miket in 1994 of two shielings revealed medieval and Iron Age features underlying post-medieval structures (Wildgoose pers. comm.).

The group of shielings and associated ancillary structures identified at High Pasture were built overlying the core area of the complex (Figs 9.1, 9.2), mostly enclosed by a substantial turf and stone dyke. Where possible, these structures utilised existing walls and earthworks, robbing the stone from Iron Age features. A U-shaped enclosure incorporated degraded elements of the precinct enclosure wall (F15.43) with a semi-circular stone-built cell (F2.11) built into its northwest side. A boulder wall running northwest–southeast (F15.01) closed off the 'U', terminating at the north wall of shieling structure F14.05. Shieling F14.03 abutted the southeast corner of structure F14.05. The circular Iron Age structure F7.16 was also re-used during this phase, while an oval depression within boulders to the east may have formed another shieling. F14.03 and F14.05 were excavated to investigate their stratigraphic relationship with earlier activity and to secure material for dating.

Structure F14.05 appears to be the older of the two excavated shielings, built directly overlying thin soil C14.23 covering the Iron Age burnt spreads. Roughly circular in plan, this measured 4 m diameter over walls up to 0.9 m wide, with a SW entrance (Figs 9.1, 9.2). The usable internal space was only 1.3 m across, and the walls had been robbed, possibly for adjacent structure F14.03. No internal features, artefacts or dating material was recovered.

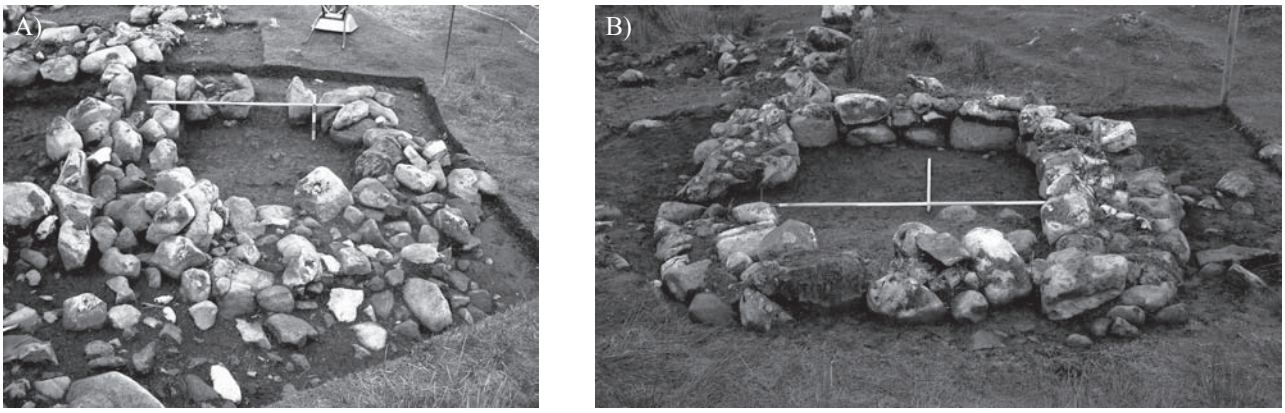


Figure 9.1. Shieling structures: A. F14.05 &: B. F14.03, after preliminary excavations

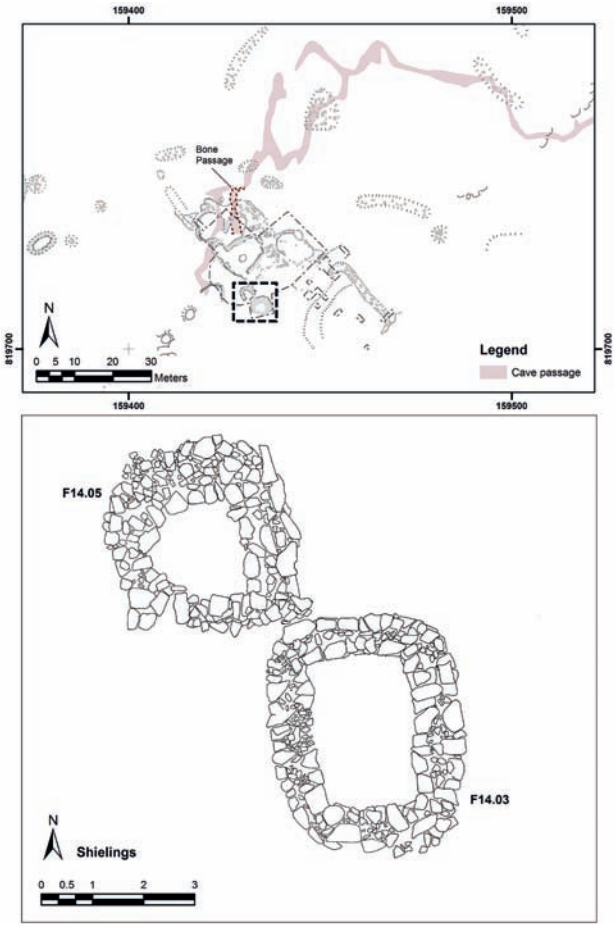


Figure 9.2. Plan of shieling structures F14.05 & F14.03

The slightly larger, rectilinear F14.03, adjacent to shieling F14.05, was aligned north–south and measured 4.5 × 3.8 m over walls up to 0.8 m wide (Figs 9.1–9.3). The walls were double skinned with a rubble and sediment core, and a blocked entrance 0.6 m wide was located in the west wall. F14.03 was built over slope-wash deposits C14.03/14.09 which, in turn, overlay burnt spreads. The interior had a rough paved floor (F14.06) and the only artefacts recovered were two refitting clay pipe fragments (SF14.001), one stamped *Christie - Glasgow*. The interior was infilled with boulders (C14.10) and dark brown sediment.

Additional post-medieval features were located *c.* 50 m to the WNW of the excavated structures. These included a rectilinear building 7 m (southwest–northeast) × 4 m, comprising a double-faced wall with soil core 0.8–1.2 m wide; and a more degraded structure of similar dimensions aligned northwest–southeast within a small turf and stone banked enclosure. Several clearance cairns were nearby. Two further shielings of similar morphology were located on gently sloping ground *c*. 110 m to the east, outside the High Pasture enclosure dyke. The shieling structures identified and evaluated at High Pastures most likely relate to the settlement of Kilbride, located within the valley floor a short distance to the north and northwest.

During 1836 and 1837 the Parish of Strath, along with the rest of the Scottish west coast, saw massive crop failure, particularly the blight affecting the potato, the staple food of the crofter. Famine and severe hardship followed, with the Rev. John MacKinnon of Kilbride, the local Minister, stating that adults and children roamed the shores 'like other animals' gathering shellfish 'glad for any supporting bite' (Lamont 1913, 136). The resulting clearances of the Parish of Strath, especially the destruction of the settlements of Boreraig and Suisnish in 1852–53 were 'exceptional', now a notorious example within Skye and western seaboard Clearance history (Devine 1988, 173). While staying with Rev. MacKinnon at Kilbride House, geologist Archibald Geikie was conducting fieldwork near Camas Malag and witnessed the clearances of these townships, and his recollection is worth quoting here:

> A strange wailing sound reached my ears … I could see a long and motley procession winding along the road that led north from Suisnish … There were old men and women, too feeble to walk, who were placed in carts; the younger members of the community on foot were carrying their bundles of clothes … while the children,

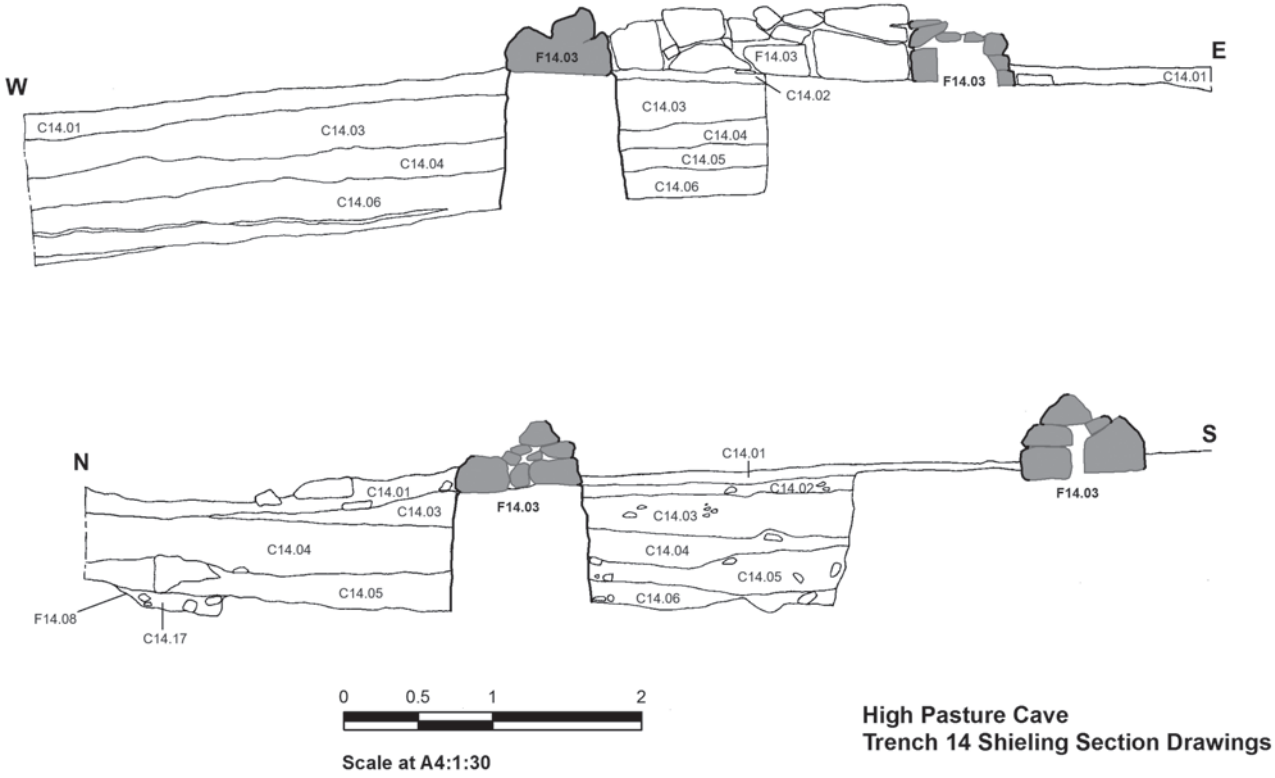
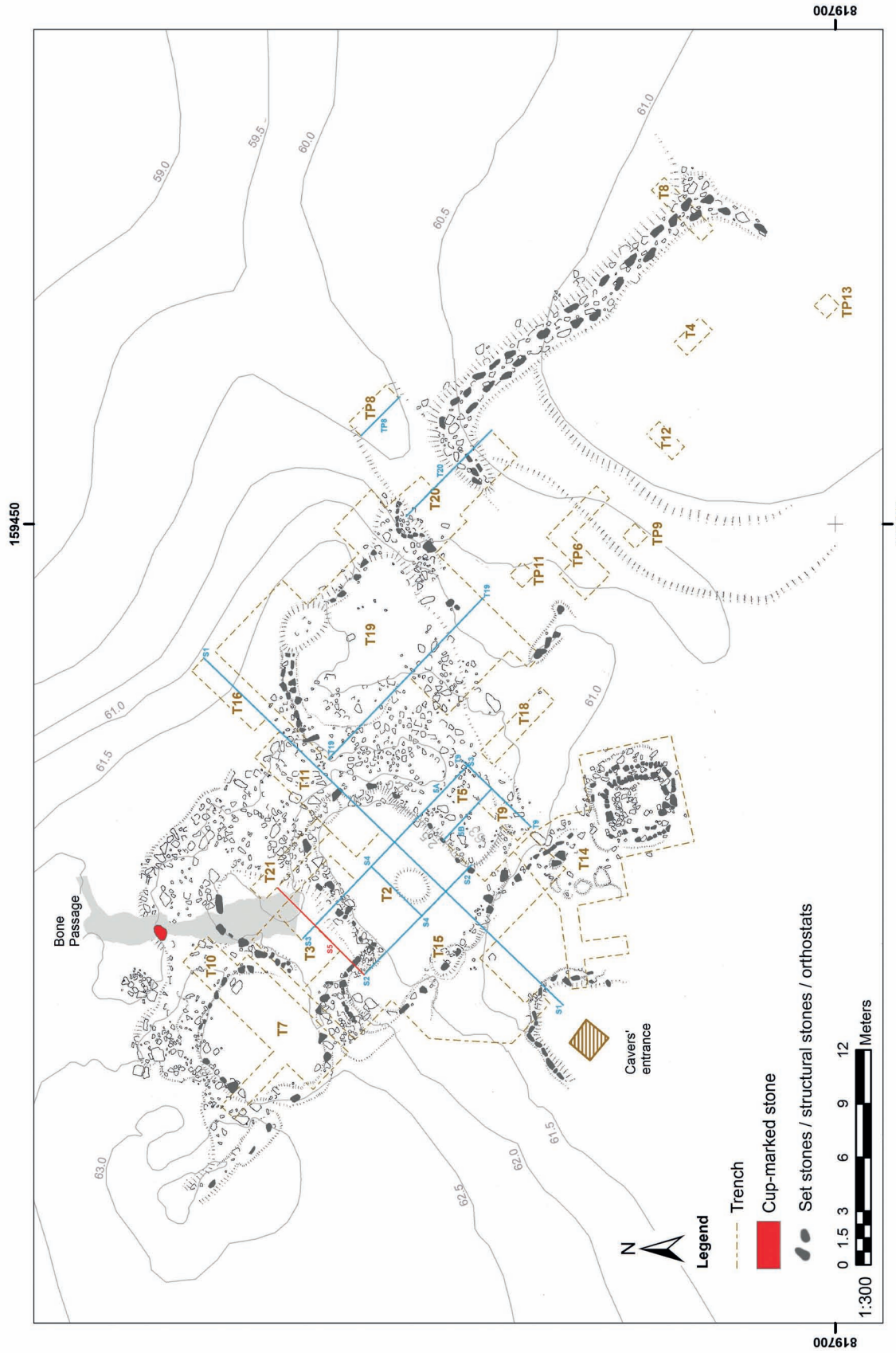


Figure 9.3. Sections through shieling structure F14.03 in Trench 14

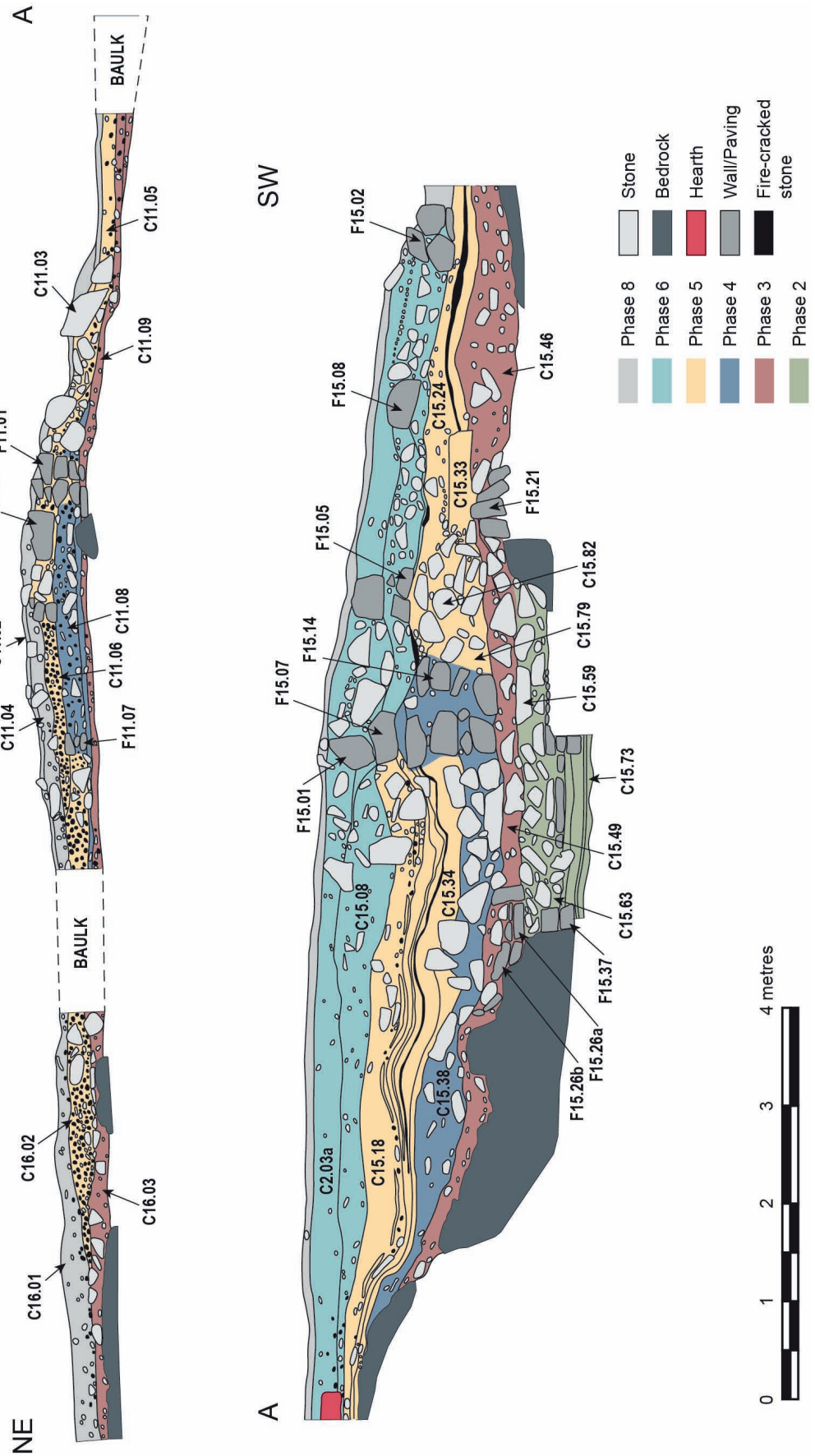
> with looks of alarm, walked alongside … A cry of grief went up to heaven, the long plaintive wail, like a funeral coronach, was resumed … the sound re-echoed through the wide valley of Strath in one prolonged note of desolation. (Lamont 1983)

9.3 Twentieth century activity

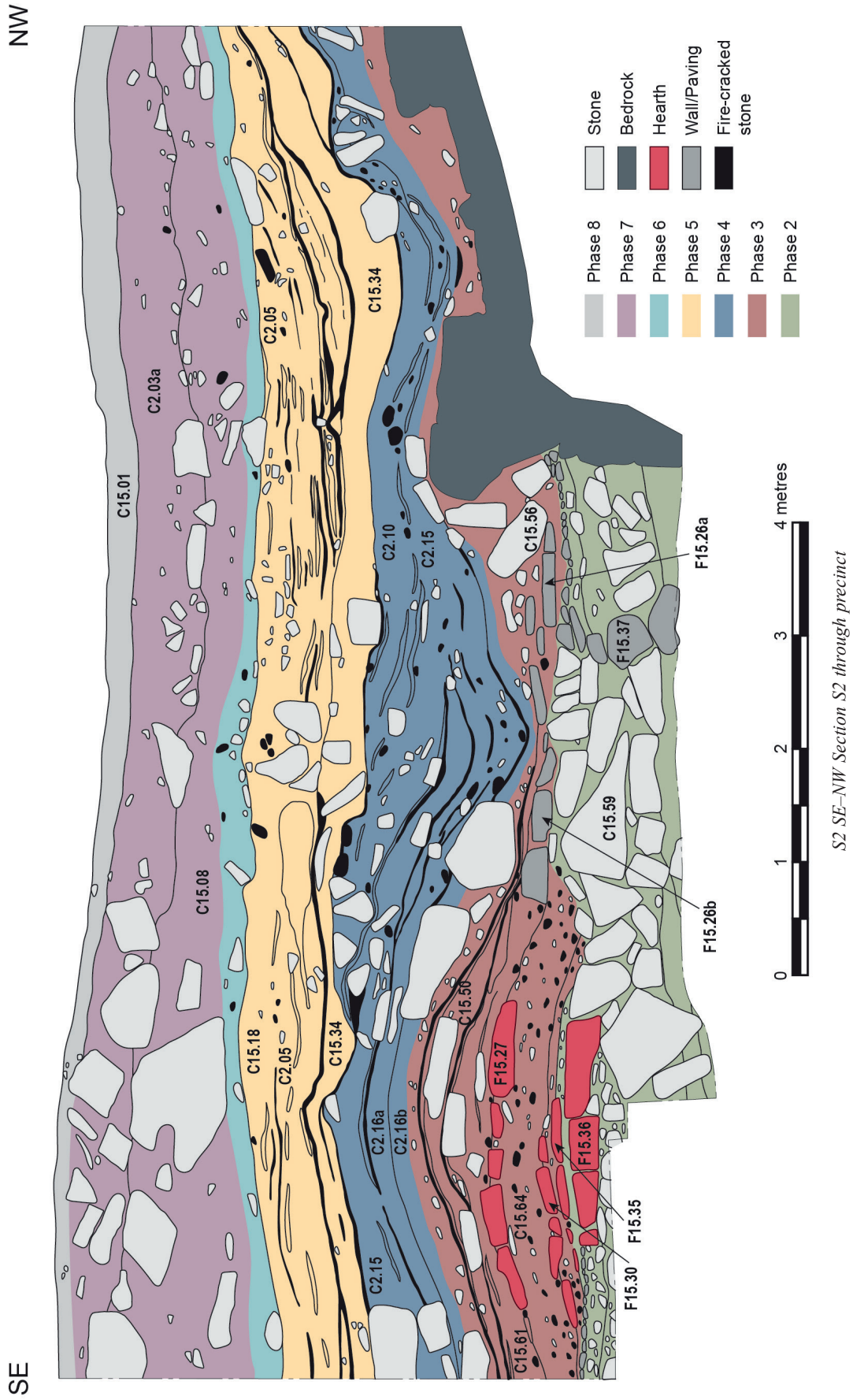
Landscape management for livestock grazing continues to the present day at High Pasture: largely the construction, modification, and repair of field dykes. This has had little impact on the archaeology, with the exception of some limited stone robbing for dykes, and the blocking of cave entrances to safeguard livestock. The dumping of boulders, domestic and agricultural rubbish within the cavers' entrance, while having a detrimental effect on the underground stream passages, had no impact on the archaeological deposits in Bone Passage, where disturbance only started after the cave entrance was opened in 1972 (see Section 1.3).



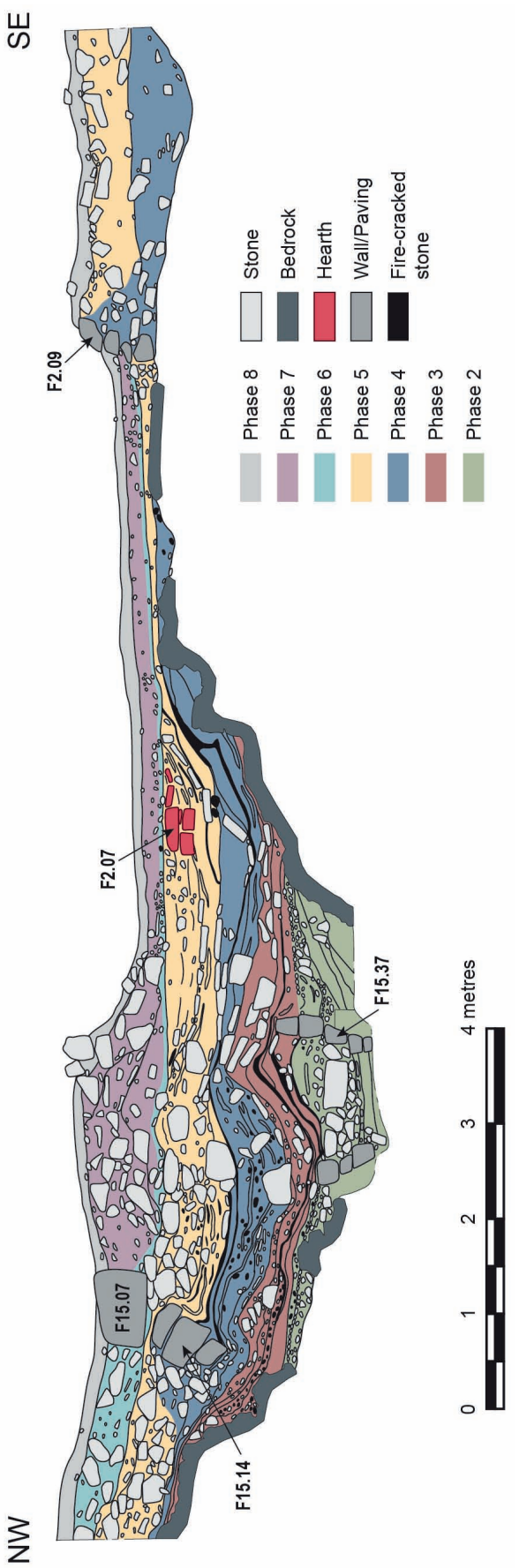
P1 Site plan showing location of drawn sections (sections T19, T20, TP8 and TP10 in site archive)



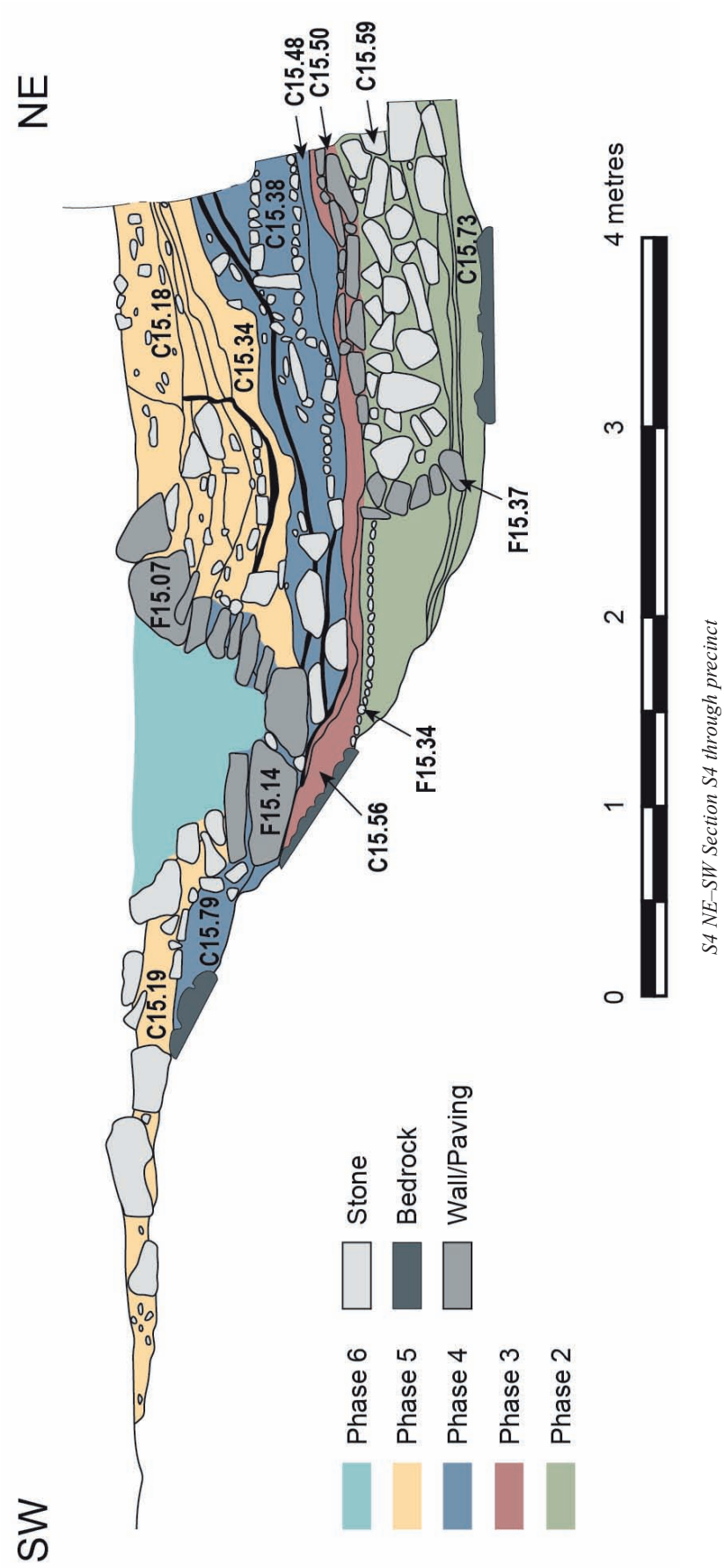
S1 NE–SW Section S1 through complex



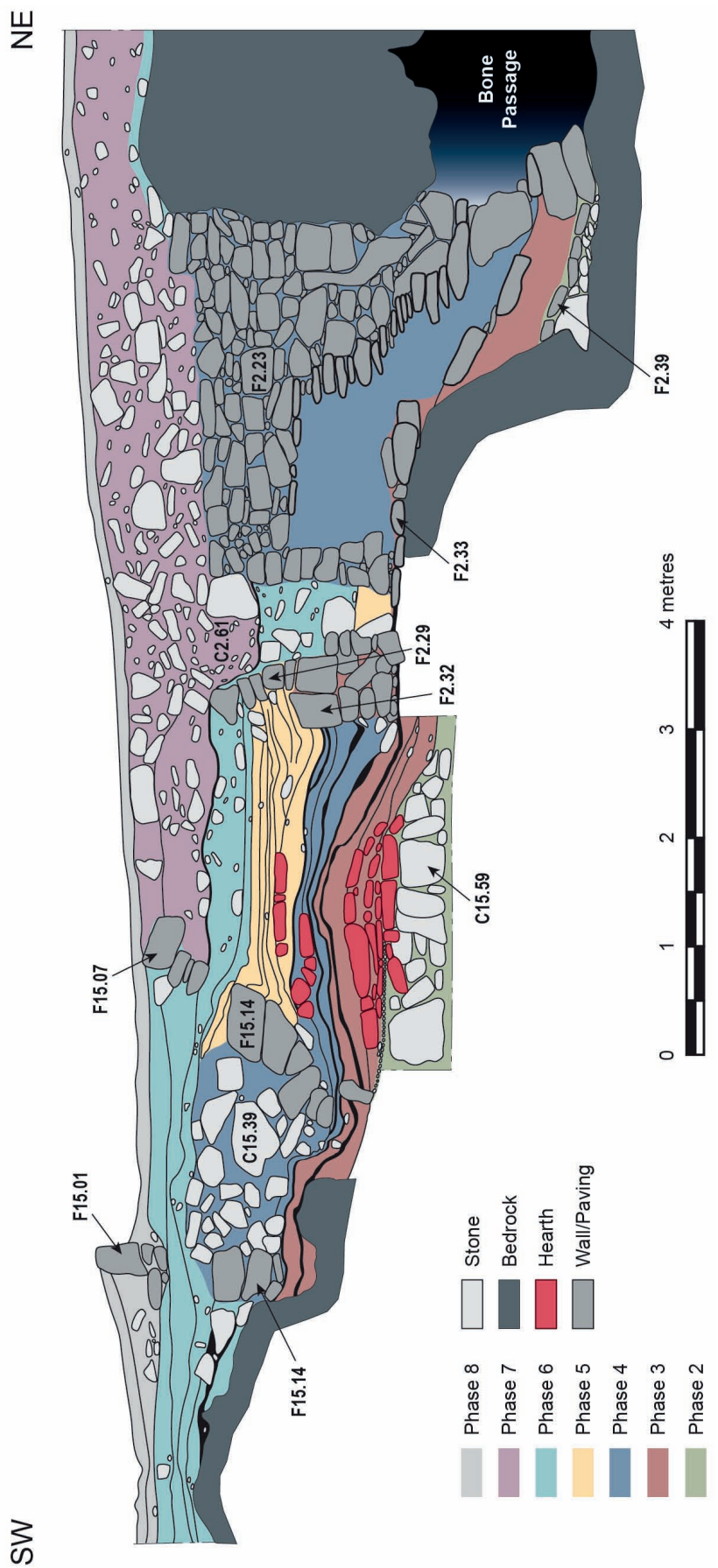
S2 SE–NW Section S2 through precinct



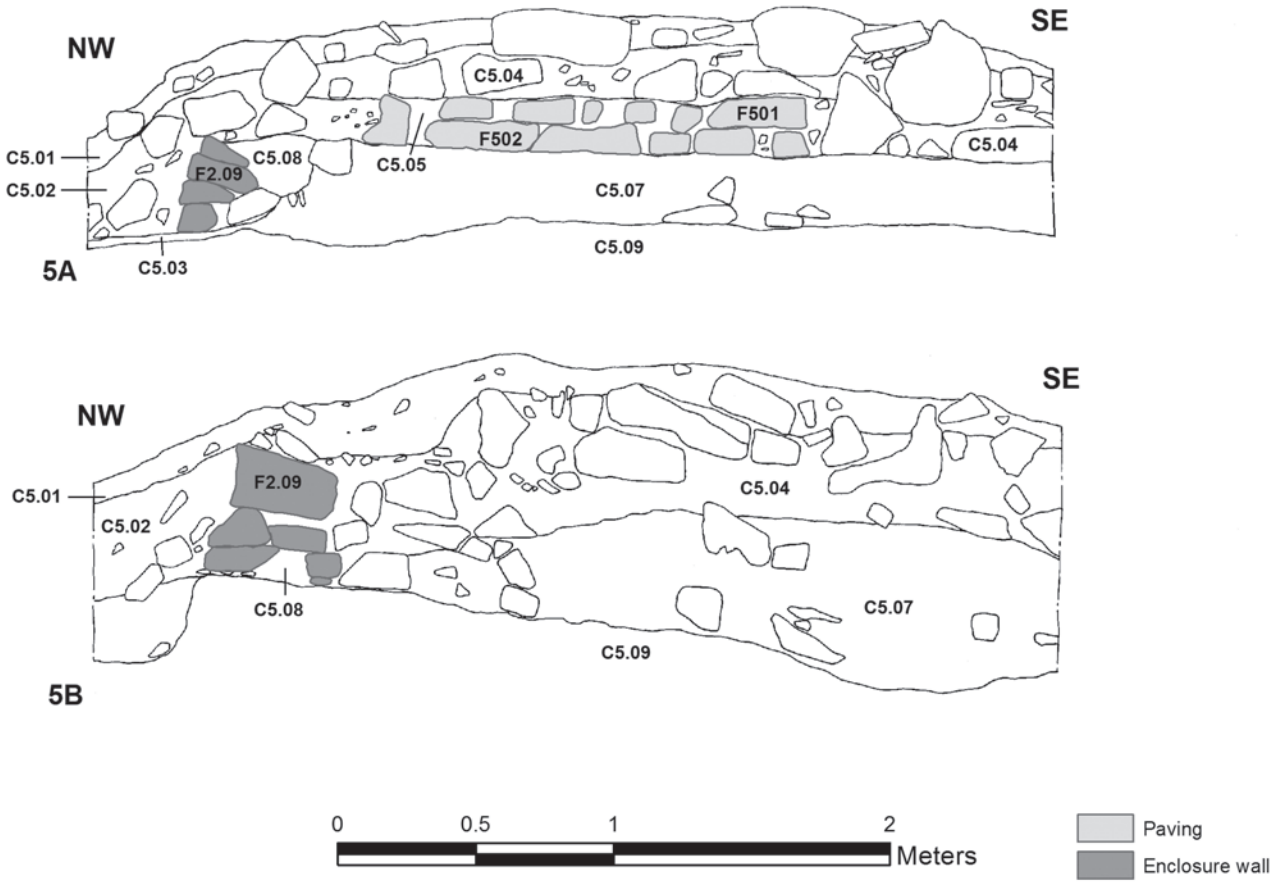
S3 SE–NW Section S3 through precinct



S4 NE–SW Section S4 through precinct

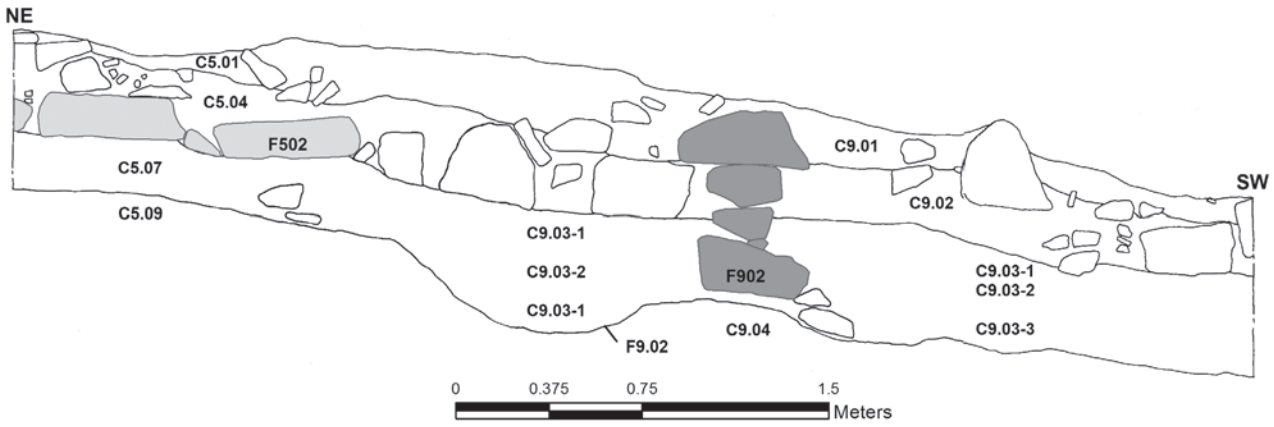


S5 NE–SW Schematic section S5 through precinct

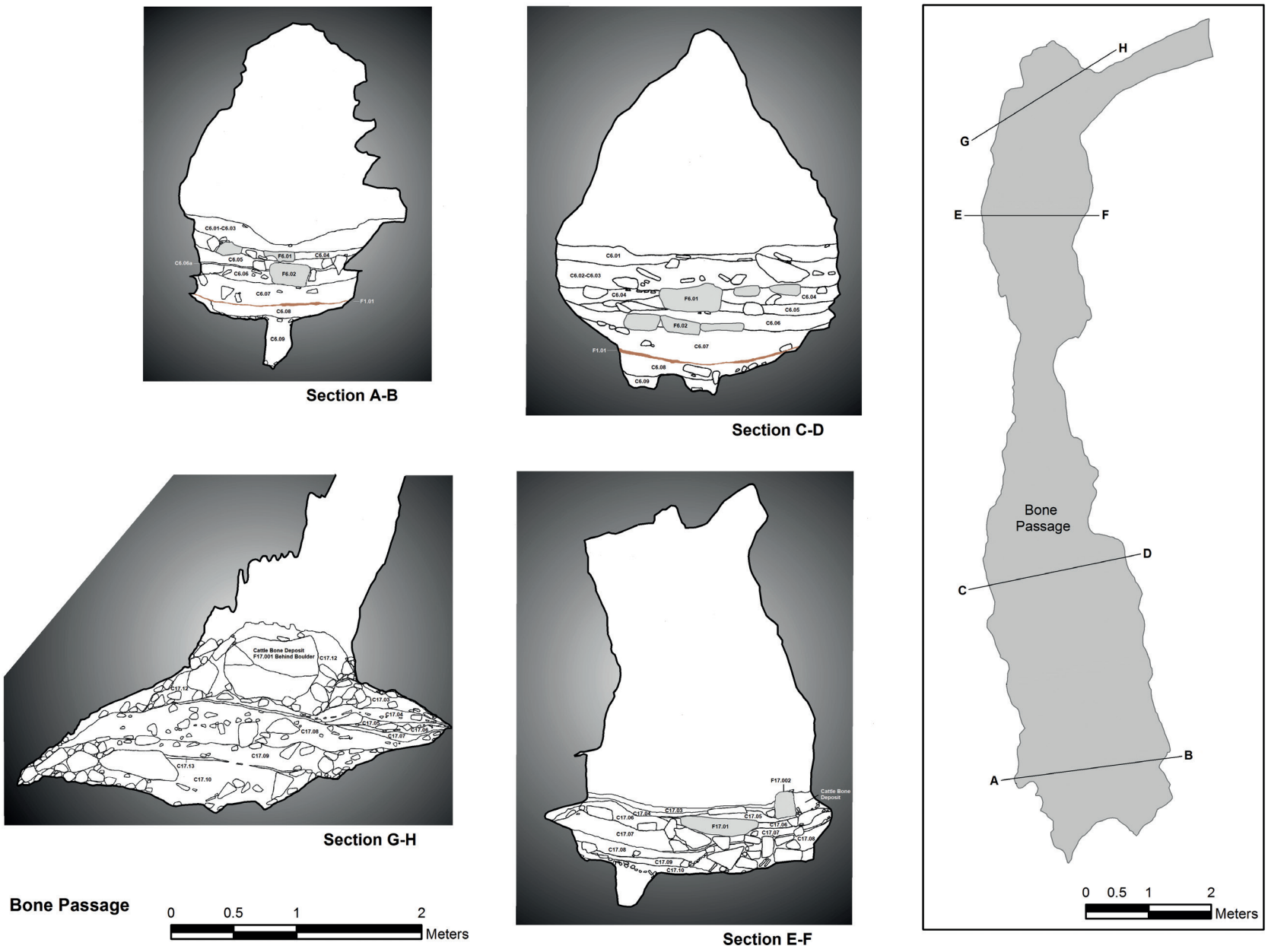


S5A SW facing section through Trench 5

S5B NE facing section through Trench 5



T9 NW facing section through Trench 9



BP1 Sections through Bone Passage: NNE facing A–B; NNE facing C–D; S facing E–F; & SE facing G–H

Part III

Chronologies of deposition: time and people

10

Chronology: radiocarbon dating and Bayesian analysis

Derek Hamilton, Steven Birch, and Jo McKenzie

10.1 Introduction

High Pasture Cave's extended radiocarbon dating programme saw most samples selected without the benefit of Bayesian methodology. Despite this, the sheer number of dated samples and the finely resolved High Pasture stratigraphic sequence has enabled a robust and detailed chronological framework to be created. A meticulous sampling regime, focused on the identification of secure contexts and recovery of datable material considered coincident with their formation, has generally held good through a post-excavation process which has revealed a much more detailed and nuanced interpretation of activity at High Pasture.

The High Pasture 'Stratigraphic Block' system, developed as a way to simplify and facilitate stratigraphic interpretation of this very complex site (see Section 4.3; Fig. 4.5), also proved invaluable to the dating programme. In dating terms, the blocks identify the smallest unit where complete sample security is assured. A block may therefore comprise a whole series of contexts (*e.g.* where evidence for reworking precludes further separation) or denote a single demonstrably discrete event (*e.g.,* the 'a', 'b', 'c' context sub-groups representing individual hearths). The block system has also facilitated contexts extending across wider site areas to be linked and, with them, disparate site locations. However, such useful simplifications can also prove problematic – inevitably obscuring some stratigraphic nuance and, for the dating programme, the finer interpretative detail needed to troubleshoot apparent 'misfit' dates. Therefore, the utility of the block system did not remove the need to consider the individual context of each sample and its fit within the chronology of its stratigraphic block.

10.2 Sample selection

In total 120 samples were selected for radiocarbon dating (Table 10.1). These derived from human bone and teeth (17), mammal bone and teeth (26), carbonised grain (13), carbonised hazelnut shell (5), and wood charcoal (59). Results were fed back into the project from excavation stage onwards, informing both the field and post-excavation strategy. Dated samples covered all major phases of activity, although most relate to the extended Iron Age sequence.

From the start, sample selection was problematic. High Pasture's complex depositional patterning – the repeated removal of material generated around the precinct hearths for redeposition both outside the precinct enclosure and within the cave – meant that attempting to date sequences from these latter areas was uniquely difficult and yet essential if a full chronology of site activity were to be achieved, perhaps especially within the cave.

Bracketing dates were therefore first obtained for the main site areas, with care taken to avoid contexts containing potentially residual material. These sequences confirmed that little disturbance or reworking had taken place in the precinct, except for some material exported to other areas of the complex. However, some of the deposits sampled within the cave (Bone Passage) had clearly been subject to complex taphonomic processes, and additional sampling therefore undertook to clarify how extensive this disturbance had been. Surprisingly, the trenches beyond the precinct enclosure, including the extensive redeposited spreads of fire-cracked stone, provided a remarkably good chronological sequence.

Table 10.1 Radiocarbon dates from High Pasture Cave complex: dates omitted from the Bayesian analysis shaded

Lab ID	*C*	*SB*	*Context description*	*Material*	*Species*	*Element*	*$\delta^{13}C$ (‰)*	*$\delta^{15}N$ (‰)*	*C:N*	*$\delta^{34}S$ (‰)*	*Radiocarbon age (BP)*	*Calibrated date (95% confidence)*
SUERC-2435	C1.01	29c	Redeposited midden material in the cave	Bone	*Sus scrofa*	Lower mandible	-20.4				2195±40	390–160 cal BC
SUERC-12276	C6.04	29a	As above	Wood charcoal	*Corylus avellana*	n/a	-29.1				2405±35	750–390 cal BC
SUERC-12277	C6.08	25a	As above	Wood charcoal	*Corylus avellana*	n/a	-26.5				2195±35	380–170 cal BC
SUERC-12278	C2.05	9a–9c	Redeposited midden & ash in precinct	Wood charcoal	*Betula* sp.	n/a	-25.6				2265±35	400–200 cal BC
SUERC-12279	C2.08	9c	Occupation deposit	Wood charcoal	*Pinus sylvestris*	n/a	-24.4				2165±35	370–100 cal BC
SUERC-12280	C2.34	5	Deposits resulting from use of hearth F2.18/F15.36.	Wood charcoal	*Corylus avellana*	n/a	-27.4				2425±35	750–400 cal BC
SUERC-12281	C2.52	22a	Deposits in base of stairwell prior to backfilling event	Wood charcoal	*Corylus avellana*	n/a	-27.8				2115±35	350–40 cal BC
SUERC-12282	C3.02	10	Trampled deposits in access to stairwell from W	Wood charcoal	*Corylus avellana*	n/a	-28.4				2155±35	360–50 cal BC
SUERC-12286	C3.03	9c	Midden deposits within access to stairwell from W	Wood charcoal	*Betula* sp.	n/a	-26.8				2165±35	370–100 cal BC
SUERC-12287	C9.03-1	34	Redeposited burnt spreads	Wood charcoal	*Betula* sp.	n/a	-25.1				2175±35	370–110 cal BC

(Continued)

Table 10.1 (Continued)

SUERC-12288	C9.03-2	34	Redeposited burnt spreads	Wood charcoal	*Betula* sp.	n/a	-25.8			2235±35	390–200 cal BC
SUERC-12289	C9.03-3	33	Redeposited burnt spreads	Wood charcoal	*Corylus avellana*	n/a	-27.0			2495±35	790–410 cal BC
SUERC-12290	C7.05	32	Fill of post-hole F7.01	Wood charcoal	*Corylus avellana*	n/a	-26.7			2450±35	760–400 cal BC
SUERC-12291	C7.08	35	Fill of post-hole F7.03	Wood charcoal	*Corylus avellana*	n/a	-26.5			2105±35	350–40 cal BC
SUERC-12292	C10.03	34	Redeposited burnt spreads	Wood charcoal	*Betula* sp.	n/a	-28.3			2210±35	380–190 cal BC
SUERC-12296	C10.05	30	Primary fill of pit F10.01	Wood charcoal	*Corylus avellana*	n/a	-25.5			3330±35	1730–1510 cal BC
SUERC-14934	C1.01	29c	Redeposited midden material in cave	Wood charcoal	*Corylus avellana*	n/a	-25.1			2310±40	510–200 cal BC
SUERC-14935	C1.09	25a	As above	Wood charcoal	*Corylus avellana*	n/a	-26.4			2550±40	810–530 cal BC
SUERC-14936	C2.03	10	Redeposited midden material in precinct	Wood charcoal	*Corylus avellana*	n/a	-26.4			2280±40	410–200 cal BC
SUERC-14937	C2.44	22b	Upper backfill of stairwell	Wood charcoal	*Betula* sp.	n/a	-27.5			2115±40	360–30 cal BC
SUERC-14938	C1.09	25a	Redeposited midden material in cave	Bone	*Bos sp.*	Rib	-22.2	5.3	3.5	2490±40	780–480 cal BC
SUERC-14939	C1.13	29b	Upper fill of boulder setting in cave	Bone	*Bos sp.*	Rib	-22.1	5.6	3.6	2110±40	350–30 cal BC
SUERC-14940	C1.01	29c	Redeposited midden material in cave	Bone	*Bos sp.*	Rib	-21.9	4.0	3.5	2160±40	370–90 cal BC

(Continued)

Table 10.1 Radiocarbon dates from High Pasture Cave complex: dates omitted from the Bayesian analysis shaded (Continued)

SUERC-14944	C2.03	10	Redeposited midden material in precinct	Bone	*Sus scrofa*	Rib	-22.4	4.1	4.1	2275±40	410–200 cal BC
SUERC-14945	C2.44	22b	Adult burial in stairwell	Bone	*Homo sapiens*	R.femur	-21.2	10.2	3.6	1965±40	50 cal BC–cal AD 130
SUERC-14946	C2.44	22b	Adult burial in stairwell	Bone	*Homo sapiens*	L. humerus	-21.3	10.0	3.7	1890±40	cal AD 20–230
SUERC-23609	C11.06	33	Redeposited burnt spreads.	Wood charcoal	*Corylus avellana*	n/a	-27.3			2460±35	670–410 cal BC
SUERC-23610	C14.37	34	Redeposited layer, charcoal & peat ash	Wood charcoal	*Corylus avellana*	n/a	-25.9			2280±35	410–340 cal BC
SUERC-23611	C15.18	9c	Redeposited ash & hearth residues	Wood charcoal	*Corylus avellana*	n/a	-23.5			2145±35	260–50 cal BC
SUERC-23612	C15.25	9b	As above	Carbonised cereal	*Hordeum* sp.	n/a	-23.6			2185±35	380–160 cal BC
SUERC-23613	C15.34	9a	As above	Wood charcoal	*Corylus avellana*	n/a	-27.7			2465±35	670–410 cal BC
SUERC-23614	C15.48	8b	As above	Wood charcoal	*Corylus avellana*	n/a	-26.2			2475±35	770–480 cal BC
SUERC-23615	C15.50	7e	As above	Wood charcoal	*Corylus avellana*	n/a	-27.1			2490±35	780–480 cal BC
SUERC-23619	C15.38	8c	As above	Wood charcoal	*Corylus avellana*	n/a	-26.9			2480±35	770–480 cal BC
SUERC-23620	C19.12	32	Secondary fill of post-hole F19.05	Wood charcoal	*Corylus avellana*	n/a	-26.1			2495±35	790–500 cal BC
SUERC-23621	C19.09	33	Redeposited ash & burnt spreads	Wood charcoal	*Corylus avellana*	n/a	-27.1			2450±35	670–400 cal BC
SUERC-23622	C1.04	29a	Redeposited midden material in cave	Carbonised cereal	*Hordeum* sp.	n/a	-22.7			2130±35	210–40 cal BC

(Continued)

Table 10.1 (Continued)

SUERC-23623	C5.06	34	Burnt spread deposits underlying hearth	Carbonised nutshell	*Corylus avellana*	n/a	-24.8	2205±35	390–180 cal BC
SUERC-23624	C6.06	27b	Redeposited midden material in cave	Carbonised cereal	*Hordeum* sp.	n/a	-21.7	2505±35	800–510 cal BC
SUERC-23625	C6.08	25a	As above	Carbonised cereal	*Hordeum* sp.	n/a	-23.4	2495±35	790–500 cal BC
SUERC-23629	C14.11	34	Burnt spread deposits	Wood charcoal	*Betula* sp.	n/a	-25.0	2170±35	370–110 cal BC
SUERC-23630	C15.12	9c	Redeposited ash & hearth residues	Wood charcoal	*Corylus avellana*	n/a	-27.4	2165±35	370–100 cal BC
SUERC-23631	C17.03	29a	Redeposited midden material in cave	Wood charcoal	*Betula* sp.	n/a	-26.0	2110±35	210–40 cal BC
SUERC-23632	C17.06	27a	As above	Carbonised nutshell	*Corylus avellana*	n/a	-27.5	2455±35	670–410 cal BC
SUERC-23633	C17.09	24	As above	Wood charcoal	*Corylus avellana*	n/a	-26.9	2985±35	1320–1110 cal BC
SUERC-23634	C18.03	34	Burnt spread deposits	Wood charcoal	*Betula* sp.	n/a	-24.8	2300±35	410–350 cal BC
SUERC-23635	C19.10	31	Redeposited fuel residues	Wood charcoal	*Corylus avellana*	n/a	-27.9	2520±35	800–520 cal BC
SUERC-23639	C1.06	27a	Redeposited midden material in cave	Carbonised cereal	*Hordeum* sp.	n/a	-25.2	2395±35	550–390 cal BC
SUERC-23640	C15.61	7d	Deposits resulting from use of hearth F15.27	Wood charcoal	*Corylus avellana*	n/a	-26.9	2505±35	800–510 cal BC
SUERC-23641	C19.02	34	Burnt spread deposits	Wood charcoal	*Corylus avellana*	n/a	-25.3	2380±35	550–380 cal BC

(Continued)

Table 10.1 Radiocarbon dates from High Pasture Cave complex: dates omitted from the Bayesian analysis shaded (Continued)

SUERC-23642	C15.32	9a	Redeposited ash & hearth residues	Carbonised nutshell	*Corylus avellana*	n/a	-25.0	2230±35	390–200 cal BC
SUERC-28048	C15.78	7c	Deposit below walkway F15.42	Bone	Indet. terrestrial mammal	Femur frag.	-22.2	2460±35	670–410 cal BC
SUERC-28049	C8.04	34	Burnt spread deposits	Wood charcoal	*Corylus avellana*	n/a	-28.1	2245±35	330–200 cal BC
SUERC-28050	C6.05	27c	Redeposited midden material in cave	Carbonised cereal	*Hordeum* sp.	n/a	-24.2	2150±35	260–50 cal BC
SUERC-28051	C17.06	27a	As above	Carbonised cereal	*Hordeum* sp.	n/a	-23.6	2460±30	670–410 cal BC
SUERC-28052	C2.15	8c	Deposits resulting from use of hearth F15.20	Carbonised cereal	*Hordeum* sp.	n/a	-23.8	2145±35	260–50 cal BC
SUERC-28056	C17.03	29a	Redeposited midden material in cave	Carbonised cereal	*Hordeum* sp.	n/a	-23.4	2130±35	210–40 cal BC
SUERC-28057	C2.05	9a-9c	Redeposited midden & ash in precinct	Carbonised nutshell	*Corylus avellana*	n/a	-25.2	2335±35	520–350 cal BC
SUERC-28058	C2.26	7b	Deposits resulting from use of hearths in precinct	Wood charcoal	*Corylus avellana*	n/a	-26.7	2475±35	770–480 cal BC
SUERC-28059	C15.71	3	Silting within base of walkway F15.37	Wood charcoal	*Corylus avellana*	n/a	-27.0	2515±30	790–530 cal BC
SUERC-28060	C15.59	6	Backfill deposits in walkway F15.37	Wood charcoal	*Corylus avellana*	n/a	-26.2	2430±35	600–400 cal BC

(Continued)

Table 10.1 (Continued)

SUERC-28061	C19.24	32	Primary fill of post-hole F19.07	Wood charcoal	*Betula sp.*	n/a	-25.8	2420±30	560–400 cal BC
SUERC-28062	C19.28	30	Buried ground surface	Wood charcoal	*Corylus avellana*	n/a	-27.2	3655±35	2140–1920 cal BC
SUERC-28066	C19.11	33	Burnt spread deposits	Wood charcoal	*Corylus avellana*	n/a	-26.7	2400±35	560–390 cal BC
SUERC-28067	C6.06	27b	Redeposited midden material in cave	Carbonised cereal	*Hordeum* sp.	n/a	-23.4	2420±30	560–400 cal BC
SUERC-33646	C15.64	7b	Redeposited ash & hearth residues	Wood charcoal	*Corylus avellana*	n/a	-27.3	2460±30	670–410 cal BC
SUERC-33647	C15.71	3	Silting within base of walkway F15.37	Wood charcoal	*Corylus avellana*	n/a	-26.4	2555±30	810–740 cal BC
SUERC-33766	C15.83	7d	Deposits resulting from use of hearth F15.27	Wood charcoal	*Corylus avellana*	n/a	-27.0	2505±25	790–520 cal BC
SUERC-33767	C19.44	30	Upper fill of stone socket F19.30	Wood charcoal	*Corylus avellana*	n/a	-26.1	3455±25	1880–1690 cal BC
SUERC-33773	C21.05	15	Ground surface below enclosure wall F21.01	Wood charcoal	*Corylus avellana*	n/a	-28.7	2405±30	550–390 cal BC
SUERC-50967	C2.15A	8c	Deposits resulting from use of hearth F15.20	Carbonised cereal	*Hordeum* sp.	n/a	-22.4	2095±30	188–47 cal BC
SUERC-50968	C2.15C	8c	As above	Carbonised cereal	*Hordeum vulgare*	n/a	-23.9	2437±27	591–407 cal BC

(Continued)

Table 10.1 Radiocarbon dates from High Pasture Cave complex: dates omitted from the Bayesian analysis shaded (Continued)

SUERC-50969	C2.05 Spit 4	9a	Redeposited midden & ash in precinct	Wood charcoal	*Corylus avellana*	n/a	-25.2	2353±29	513–380 cal BC
SUERC-50970	C2.15B	8c	Deposits resulting from use of hearth F15.20	Carbonised nutshell	*Corylus avellana*	n/a	-25.8	2225±29	330–204 cal BC
SUERC-50974	C2.22	7c	Deposits resulting from use of hearth F2.10	Wood charcoal	*Corylus avellana*	n/a	-27.5	2351±29	513–378 cal BC
SUERC-50975	C2.05 Spit 4	9a	Redeposited midden & ash in precinct	Wood charcoal	*Corylus avellana*	n/a	-27.7	2423±29	557–403 cal BC
SUERC-50976	C2.53	21a	Backfill material behind E wall of stairwell F2.23	Wood charcoal	*Corylus avellana*	n/a	-27.9	2250±29	318–207 cal BC
SUERC-50977	C2.63	21a	Fill of W wall of stairwell F2.23	Wood charcoal	*Betula* sp.	n/a	-25.5	2457±29	599–415 cal BC
SUERC-50978	C15.06	10	Burnt spread deposits	Wood charcoal	*Betula* sp.	n/a	-26.2	2074±29	179–20 cal BC
SUERC-50979	C19.02	34	Burnt spread deposits	Wood charcoal	*Corylus avellana*	n/a	-26.7	2282±29	404–352 cal BC
SUERC-50980	C20.04B	33	Burnt spread deposits	Wood charcoal	*Betula* sp.	n/a	-25.7	809±29	cal AD 1170–1270
SUERC-50984	C21.09/1	21b	Upper fill in W stairwell wall F2.23	Wood charcoal	*Corylus avellana*	n/a	-26.2	2104±29	198–49 cal BC
SUERC-50985	C21.09/4	21b	Lower fill in W stairwell wall	Wood charcoal	*Corylus avellana*	n/a	-25.9	2468±27	767–477 cal BC
SUERC-50986	C7.10	35	Fill of post-hole F7.09	Wood charcoal	*Corylus avellana*	n/a	-25.9	2133±27	210–86 cal BC

(Continued)

Table 10.1 (Continued)

SUERC-50987	C2.15C	8c	Deposits resulting from use of hearth F15.20	Bone	*Bos taurus*	Femur frag.	-21.6	3.8	3.2	2507±30	696–540 cal BC
SUERC-50988	C6.01	29c	Redeposited midden material in cave	Bone	*Sus scrofa*	Mandible	-22.8	5.2	3.3	2230±30	328–204 cal BC
SUERC-50989	C2.53	21a	Backfill material behind E wall of stairwell F2.23	Bone	Indeterminate terrestrial mammal	Rib	-22.8	4.9	3.2	2434±30	591–406 cal BC
SUERC-50990	C6.06	27b	Redeposited midden material in cave	Bone	*Bos taurus*	Metacarpal	-23.0	5.1	3.3	2479±26	771–507 cal BC
SUERC-50994	C6.07	25c	As above	Bone	*Bos taurus*	Refitting metapodia	-22.3	4.9	3.3	2492±30	781–514 cal BC
SUERC-50995	C2.15A	8c	Deposits resulting from use of hearth F15.20	Bone	Indeterminate terrestrial mammal	Rib	-23.1	5.1	3.2	2408±28	545–402 cal BC
SUERC-50996	C2.22	7c	Deposits resulting from use of hearth F2.10	Bone	*Bos taurus*	Rib	-22.0	5.4	3.3	2433±30	591–406 cal BC
SUERC-50997	C6.04	29a	Redeposited midden material in cave	Bone	*Bos taurus*	Right scapula	-22.5	6.4	3.3	2452±30	597–412 cal BC
SUERC-50998	C2.15B	8c	Deposits resulting from use of hearth F15.20	Bone	*Bos taurus*	Juvenile metatarsal	-22.5	5.7	3.3	2490±30	781–511 cal BC
SUERC-50999	C2.63	21a	Fill of W wall of stairwell F2.23	Bone	*Sus scrofa*	Mandible frag.	-21.4	8.6	3.2	2073±26	176–37 cal BC

(Continued)

Table 10.1 Radiocarbon dates from High Pasture Cave complex: dates omitted from the Bayesian analysis shaded (Continued)

SUERC-66351	C17.05	27b	Redeposited midden material in cave	Carbonised cereal	*Hordeum vulgare*	n/a	-23.4				2108±26	197–53 cal BC
SUERC-66352	C17.07	25b	As above	Carbonised nutshell	*Corylus avellana*	n/a	-25.5				2430±25	556–406 cal BC
SUERC-66353	C17.05	27b	As above	Bone	*Sus scrofa*	Femur frag.	-21.7	8.1	3.4	19.3	2721±30	920–811 cal BC
SUERC-66354	C17.07	25b	As above	Bone	*Bos sp.*	Rib	-22.5	4.8	3.3	19.9	2491±30	782–512 cal BC
SUERC-66358	C001	29c	Closing deposit in cave	Bone	*Sus scrofa*	Femur	-21.8	7.2	3.3	19.5	2195±30	363–183 cal BC
SUERC-66359	C001	29c	As above	Bone	*Sus scrofa*	Vertebra	-21.7	7.6	3.4	19.1	2138±29	211–87 cal BC
SUERC-66360	C17.03	29a	Redeposited midden material in cave	Bone	*Bos sp.*	Metacarpal	-21.8	4.0	3.4	18.3	2143±29	231–88 cal BC
SUERC-66361	C17.06	27a	As above	Bone	*Bos sp.*	Femur frag.	-22.7	5.3	3.5	19.9	2473±27	770–481 cal BC
SUERC-66362	C15.08a	10	Redeposited ash & hearth residues	Bone	*Homo sapiens*	Child r. foot phalanx	-19.3	12.3	3.3		2217±30	375–202 cal BC
SUERC-66363	C15.08a	10	As above	Tooth	*Homo sapiens*	Child lower permanent incisor	-19.8	12.0	3.2	19.6	2233±29	327–204 cal BC
SUERC-66364	C17.03	29a	Redeposited midden material in cave	Tooth	*Homo sapiens*	Lower r. 1st molar	-20.7	10.1	3.2	20.8	2130±26	208–87 cal BC
SUERC-66368	C21.09/4	21b	Fill in W stairwell wall F2.23	Bone	*Homo sapiens*	Adult 1st cuneiform	-21.6	10.3	3.4	19.0	1882±29	cal AD 65–220
SUERC-66369	C21.09/4	21b	Fill in W stairwell wall F2.23	Bone	*Homo sapiens*	Adult hand phalanx	-21.2	10.4	3.3	18.4	1902±29	cal AD 49–177

(Continued)

Table 10.1 (Continued)

SUERC-66370	C21.09/4	21b	Fill in W stairwell wall F2.23	Bone	*Homo sapiens*	Perinate proximal 3rd r. humerus	-22.0	10.8	3.5		1857±27	cal AD 84–229
SUERC-66371	C2.44	22b	Human remains in backfilled stairwell	Bone	*Homo sapiens*	Neonate r. femur frag.	-21.6	10.8	3.3		1884±29	cal AD 63–219
SUERC-66372	C2.44	22b	As above	Bone	*Homo sapiens*	Perinate r. femur	-21.7	10.6	3.5	18.8	1867±29	cal AD 76–228
SUERC-66373	C2.47	22a	Backfill of stairwell F2.23	Bone	*Sus scrofa*	Foetal humerus	-19.1	11.0	3.3		2056±26	166 cal BC–cal AD 4
SUERC-66374	C2.49	22a	As above	Bone	*Homo sapiens*	Perinate mandible frag.	-21.8	10.6	3.3	21.5	1923±29	cal AD 6–134
SUERC-66378	C2.16	8a	Deposits resulting from use of hearths in precinct	Bone	*Homo sapiens*	Adult 1st proximal foot phalanx	-19.5	11.8	3.2	20.4	2203±29	366–196 cal BC
SUERC-66379	C2.61	10	Fill of access route to stairwell from W	Bone	*Homo sapiens*	Adult vertebra frag.	-21.3	10.2	3.3	19.6	1885±29	cal AD 61–218
SUERC-66380	C2.61	10	As above	Bone	*Sus scrofa*	Foetal pig humerus	-19.2	11.1	3.3		1994±29	50 cal BC–cal AD 70
SUERC-66381	C2.61	10	As above	Bone	*Homo sapiens*	Adult pelvis iliac crest	-22.3	7.0	3.2	19.4	2160±27	236–111 cal BC
SUERC-66382	C6.08	25a	Redeposited midden material in cave	Tooth	*Homo sapiens*	Adult upper l. 3rd molar	-21.9	5.9	3.2	20.1	2503±29	785–540 cal BC
SUERC-66383	C6.06	27b	As above	Bone	*Homo sapiens*	Perinate cranial occiput	-21.7	10.4	3.4	20.0	2048±27	120 cal BC–cal AD 19
SUERC-66384	C6.08	25a	As above	Tooth	*Homo sapiens*	Child upper r incisor	-20.9	11.2	3.2		2499±27	777–539 cal BC

Despite careful sample selection, a number of results seemed at variance with the overall sequence. While many of these could be attributed to the factors discussed above, some poor sample choices, and occasional poorer labelling is regretfully acknowledged to account for a few 'rogue' dates. The Bayesian process identified other problematic results which did not fit the overall sequence, and these samples (Table 10.1) were omitted from the analysis, the probable reasons for their errors and removal discussed in Section 10.5.4. The following discusses the sample selection process.

10.2.1 Precinct

Sixty-one samples were submitted for dating from the precinct area, targeting deposits associated with key features (hearths, walkways, and stairwells), alongside specific deposits rich in artefacts and ecofacts such as the large midden dumps interpreted as potential closing events. Most samples produced an excellent sequence of results which were included within the overall Bayesian model (see Section 10.5).

10.2.2 Bone Passage

Thirty-five samples were selected from Bone Passage and one from a cattle bone deposit placed on a ledge above the active streamway. It was obvious from the start of excavations in the cave that the archaeological sequence had not only been disturbed by cavers accessing Bone Passage (especially within the southern chamber), but also represented a complex series of redeposition events with only tenuous stratigraphic links to their source within the precinct, thanks to truncation by the stairwell construction. The potential for erroneous dates from this fragile sequence was high and so a detailed dating programme was undertaken. This was defined, and undoubtedly both supported and complicated by, the three individual trenches established in the cave through successive field seasons. Dated sequences through Trenches 6, 1, and 17 ensured cross-trench linkage through the complex, stone and void filled Bone Passage deposits.

10.2.3 Burnt spreads and earlier deposits

Twenty-three radiocarbon dates from the burnt spreads and their underlying deposits represented Bronze and Iron Age activity outside the precinct: ashy matrices of material redeposited from their origin within the precinct hearths.

10.3 Results and calibration

In total, 120 samples selected for radiocarbon measurements were submitted to the Scottish Universities Environmental Research Centre (SUERC) for pre-treatment and measurement by accelerator mass spectrometry (AMS).

All samples were processed following methods outlined in Dunbar *et al*. (2016) and were graphitised and measured following Naysmith *et al*. (2010). While the majority of bone and teeth samples were processed following the modified Longin method, the bone, and teeth samples with SUERC numbers 66353–66384 also underwent an ultrafiltration step on the purified bone collagen. SUERC maintains rigorous internal quality assurance procedures and participation in international inter-comparisons (Scott 2003) indicates no laboratory offsets; thus validating the measurement precision quoted for the radiocarbon ages.

Conventional radiocarbon ages (Stuiver and Polach 1977) are presented in Table 10.1, where they are quoted in accordance with the Trondheim convention (Stuiver and Kra 1986). Calibrated date ranges were calculated using the calibration curves of Reimer *et al*. (2013) and OxCal v4.2 (Bronk Ramsey 1995; 1998; 2001; 2009). Date ranges have been calculated using the maximum intercept method (Stuiver and Reimer 1986) and quoted with the endpoints rounded outward to ten years. Ranges quoted in *italics* are posterior density estimates derived from mathematical modelling of archaeological problems, rounded outward to five years. Ranges in plain type were calculated according to the maximum intercept method (Stuiver and Reimer 1986). All other ranges (*i.e.,* those in *italics*) were derived from the probability method (Stuiver and Reimer 1993).

10.4 Methodological approach

A Bayesian approach was applied to the interpretation of the High Pasture Cave chronology (Buck *et al*. 1996). Although simple calibrated dates are accurate estimates of the age of samples, this is not, usually, what archaeologists really wish to know. It is the dates of the archaeological events represented by those samples that are of interest. At High Pasture, the dating and duration of various phases, along with the start and end of the use of the site in general, are of most interest. The chronology of this activity can be estimated not only by absolute dating derived from radiocarbon measurements but also via the stratigraphic relationships between samples and the relative dating information provided by archaeological phasing.

Methodology is now available allowing explicit combination of these different types of information to produce realistic estimates of dates of archaeological interest. It should be emphasised that the posterior density estimates produced by this modelling are not absolute. They are interpretative estimates, which can and will change as further data become available and/or the existing data are modelled from different perspectives. The technique used is a form of Markov Chain Monte Carlo sampling, applied using the program OxCal v4.2 (http://c14.arch.ox.ac.uk/). Details of the algorithms employed are available in Bronk Ramsey (1995; 1998; 2001; 2009) or from the online manual.

10.5 Samples and the model

The Bayesian model was made up of trench stratigraphic sequences, unified in post-excavation into a phased site sequence. Of the total 120 radiocarbon dates (Table 10.1), 92 results were incorporated into the Bayesian model, described below. Dates omitted from the modelling included four Bronze Age results (SUERC-12296, 23633, 33767, 28062) and one mislabelled sample (SUERC-50980) (see Section 10.5.4). Summary models for each phase are presented in the Appendix.

10.5.1 Bone Passage (cave)

This was excavated in three adjoining trenches (6, 1, and 17), linked via key horizons in the horizontal stratigraphy: paved and cobbled floors F6.02, F1.02, and F17.01 [Block 26]; and floors F1.01 and F6.01. In other phases, context relationships were established via colour, stone content, presence of animal bone and other ecofacts, and artefact types/ceramics where possible. Excavation and post-excavation analysis revealed complex patterns of deposition: 'zoned' deposition of ecofacts and artefacts in specific passage loci, and differential deposition through time. The final Block 29 activity and the stairwell backfilling (Block 22a), saw the southern, stairwell-end chamber (Trench 6) receive more depth of material, including stone infill. Modelling Bone Passage dates used these three linked strands of vertical stratigraphy to create a single chronological framework with refined date estimates for some of the phase transitions.

The northern, cave rear chamber (Trench 17), shows the lowest dated cave stratigraphic block (24) from a single result (SUERC-23633) on a hazel charcoal fragments (C17.09). The result (2985±35 BP) dates to the 2nd millennium cal BC, considerably earlier than the activity of interest. This has been excluded from the modelling. This is followed by Block 25b, consisting of Floor F1.01 and associated deposits, with two results, from C17.07, on charred hazelnut shell (SUERC-66352) and cattle bone (SUERC-66354). Floor F6.02 [Block 26] ran through much of Bone Passage and defines the transition between Phases 2 and 3 (transition: Phase 2/3). Next dated is Block 27a (deposits lying within and just above Floor F6.02 featuring floor trample containing caches of objects). This produced three results (SUERC-23632, -28051, and -66361) from C17.06 on hazelnut shell, charred barley grain, and cattle bone. Block 27a is followed by 27b, a series of midden deposits, with two results (SUERC-66353 and -66351) from C17.05 on charred barley grain and a fragment of pig bone. These are wildly different, separated by over half a millennium. The pig bone (SUERC-66353) is a few hundred years older than material dated in underlying Blocks 25b and 27a and is thus excluded as residual. Block 29a, another floor (F6.01) above 27b, produced four results (SUERC-23631, -28056, -66360, and -66364; C17.03) on birch charcoal, charred barley grain, cattle bone, and a human tooth. This sequence is capped by a sample of cattle rib from C1.13 in Block 29b, part of a deposit placed in a boulder setting against the cave's east wall. It and C17.03 were capped by calcite deposits but may have been inserted into the setting before C17.03 was laid down.

The central Trench 1 sequence starts with two results (SUERC-14935 and -14938) on hazel charcoal and pig bone from C1.09 in Block 25a, midden deposits beneath Floor F1.01 (Block 25b). As in Trench 17, Block 25 is overlain by floor F6.02 [Block 26], marking the transition between Phase 2 and 3. Above this there is a result (SUERC-23639) on charred barley grain in C1.06 from Block 27b, formed of a series of midden deposits on floor F6.02 (Block 26). This is followed by a result (SUERC-23622) on charred barley grain from C1.04 in Block 29a, deposits associated with floor F6.01.

The front-cave Trench 6 sequence begins at Block 25a, midden deposits beneath floor F1.01 [Block 25b]. Four results (SUERC-12277, -23625, -66382, and -66384) come from C6.08, on hazel charcoal, charred barley grain, and two human teeth (SUERC-66382 is now identified as pig via isotope analysis). The result from hazel charcoal (SUERC-12277) is a few hundred years too recent for this portion of the sequence and is excluded as intrusive. C6.07, midden deposits overlying floor F1.01 [Block 25c] was dated (SUERC-50994) via cattle bone. Above Block 25c was floor F6.02 [Block 26], the transition between Phases 2 and 3. Above this there are three results (SUERC-23624, -50990, and -66383) from trampled floor deposits above the paved floor with caches of small finds (C6.06 of Block 27a), associated with floor F6.02, from a single charred barley grain, cattle bone, and a human cranial bone. The human bone (SUERC-66383) was recovered from a slab leaning against the cave east wall along with a cattle bone deposit and is approximately half a millennium too recent. This is excluded as intrusive. A single charred barley grain (SUERC-28067) from midden rich in semi-articulated unburnt and heavily processed unburnt bone, over floor F6.02 (C6.06, Block 27b). Above this is result SUERC-28050, on charred barley grain from C6.05 in Block 27c, also midden. The barley grain (SUERC-28050) appears too recent given other dates in the sequence and has been excluded. C6.04, Block 29a, deposits associated with floor F6.01, produced two results (SUERC-12276 and -50997) from hazel charcoal and cattle bone.

Trench 6 and 1 sequences are capped by Block 29c: pig-rich deposits and midden material. Five results (SUERC-2435, -14934, -14940, -66358, and -66359) from C1.01 are on pig mandible, hazel charcoal, cattle rib, and two pig bones from different articulated animals. The hazel charcoal (SUERC-14934) is earlier than expected in this context and has been excluded as residual. From C6.01 there is another sample of articulated pig bone.

10.5.2 Precinct

The precinct contains the bulk of the radiocarbon dates and covers nearly the entire stratigraphic sequence. This begins with Block 4, deposits associated with walkway F15.37, with two results (SUERC-28059 and -33647) from walkway overlay deposit C15.71, on two hazel charcoal fragments. Block 5 has a result (SUERC-12280) on hazel charcoal, from ash deposits associated with the slabs of hearth F2.18/F15.36 (C2.34). From Block 6, a result (SUERC-28060) on hazel charcoal from C15.59 represents a backfill/closing deposit in the walkway, containing complete saddle querns, broken saddle fragments, and rubbers.

It was possible to trace floor F6.02 (Block 26) up the stairwell, between undated Blocks 18 and 19, into the surface stratigraphy. This indicates that the Phase 2/3 transition should be occurring between Blocks 6 and 7. Dates from Block 7 represent a sequence of overlying hearth and hearth-related deposits. Hazel charcoal was dated (SUERC-28058) in Block 7a, C2.26b of hearth F15.35, and also (SUERC-33646) in Block 7b (C15.64) from residues from hearth F15.30, though it is possible that the latter relates to walkway backfilling/closure (see C15.59 above). From Block 7c, hearth F2.10, is a result (SUERC-28048) on indeterminate animal bone (C15.78) related to hearth activity cut by paved walkway F15.42, or possibly its underlying backfilling/closure. There are two results (SUERC-23640 and -33766) from C15.61 and C15.83, redeposited residues of hearth F15.27, in Block 7d, on hazel charcoal. From the top of Block 7e deposits, is SUERC-23615 from C15.50, a char layer associated with the use of hearth F2.15 and F15.28 (hazel charcoal, human bone).

Above Block 7, the sequence diverges, continuing in the precinct with Block 8, while following a path into the top of the Stairwell with Block 21. Like Block 7, Block 8 is composed of multiple overlapping hearth and hearth-related deposits, with associated radiocarbon dates. The sequence begins (Block 8a) with hearth-related scatter C2.16, and three results (SUERC-50974, -50996, and -66378) from hazel charcoal, pig bone, and human bone. The hazel charcoal (SUERC-50974) and human bone (SUERC-66378) appear too recent for the overlying sequence and are excluded as intrusive. In Block 8b, SUERC-23614 (hazel charcoal) represents an accumulation of ash and charcoal underlying hearth F15.20 (C15.48). Block 8c, denoting deposits related to hearth F15.20, is perhaps one of the most complex on site, marked by organic, charcoal-rich deposits which would almost certainly lend themselves to bioturbation and displacement of recent material further down the sediment column and, of eight results from four discrete contexts here, three are excluded as too recent for the dated stratigraphy. SUERC-50968 and -50987, on charred barley grain and a cattle bone from C2.15C, date a lower layer of accumulation from the use of hearth F15.20. Three results (SUERC-28052, -50970, and -50998) on charred barley grain, burnt hazelnut shell, and cattle bone, come from C2.15B, a middle layer of the same. The barley grain (SUERC-28052) appears too recent for both other radiocarbon dates and the stratigraphy and has been excluded. A further two results (SUERC-50967 and -50995) from upper hearth F15.20, layer C2.15A, date charred barley grain and indeterminate mammal bone. The barley grain (SUERC-50967) is more recent than other dates in the sequence and has been excluded. The final Block 8c result (SUERC-23619) is hazel charcoal from C15.38, a large deposit of charcoal and animal bone that accumulated next to hearth F15.20.

Many of the excluded dates associated with the Block 8c hearth material have calibrated ranges much more similar to those of Block 9, further suggesting activity-related disturbance to the upper layers of Block 8c. Block 9a features a levelling event, above which are deposits associated with hearth F2.05. C2.05 (midden containing elements of the hearth structure) is dated by SUERC-28057, -50969, and -50975, all on hazel charcoal. SUERC-23613 comes from C15.34, the levelling layer/deposit spread across the precinct area at the start of Phase 5, with the C2.05 and C15.32 contexts sitting above this. SUERC-23642 comes from hearth-related C15.32. A result (SUERC-23612) from charred barley grain from C15.25 in Block 9b, represents material associated with hearth F2.13. Block 9c, hearth F2.07 produced six results: SUERC-12278 (birch charcoal from hearth-related midden material C2.05), SUERC-12279 (pine charcoal from hearth-related occupation deposit C2.08), SUERC-14944 (pig bone from pit F2.04 to the east of the stairwell access), SUERC-12286 (birch charcoal from accumulation deposit C3.03, in the stairwell landing approach), and finally SUERC-23611 and -23630, from hazel charcoal in hearth-related material C15.18 and C15.12.

The precinct sequence is capped by eight dates from Block 10 features and associated deposits, three on human bone from C2.61 (SUERC-66379–81), the fill of the former access route to the stairwell leading into the cave. C3.02, a charcoal lens at the head of the stairwell approach, produced SUERC-12282 from hazel charcoal. SUERC-14936 dates birch charcoal from C2.03, a major charcoal and bone deposit which included older midden material taken from the precinct, or burnt spreads, to landscape the backfilled stairwell. Burnt material spread C15.06 produced SUERC-50978 from birch charcoal from context 15.06. Finally, human bone and tooth from C15.08a, within a stony ash matrix, produced SUERC-66362 and -66363.

Block 21 comprised the stairwell landing deposits, which should be approximately contemporary with Blocks 8–10 in the precinct. Four results come from Block 21a, a landing in F2.23: SUERC-50976 and -50989 from C2.53, packing within east stairwell wall F2.23 (hazel charcoal and indeterminate mammal bone). The mammal bone (SUERC-50989) is older than expected in this sequence and is excluded as residual. From C2.63,

an *in situ* accumulation in the west stairwell wall core, SUERC-50977 and -50999 date birch charcoal and pig bone. The pig bone (SUERC-50999) appears intrusive and has been excluded. There are five results (SUERC-50984, -50985, and -66368–70) from C21.09, a fill in the west wall of stairwell F2.23, Block 21b (landing F2.41): two from hazel charcoal and three from human bone. Three (SUERC-66368–70) appear intrusive and have been excluded from the model.

A series of deposits mark the ultimate closing of the cave, with the interface between Blocks 21 and 22 marking the closure of stairwell F2.23. This event can be traced to just after Block 10 in the precinct. Block 22a produced three dates: SUERC-12281 (hazel charcoal from organic-rich deposit C2.52), and SUERC-66373 and -66374 (pig and human bone from C2.47 and C2.49). SUERC-66374 appears too recent in this sequence has been excluded. C2.44, Block 22b represents the closing burials in the top of backfilled stairwell F2.23, for which five dates were obtained: SUERC-66371 and -66372 from human bone, SUERC-14937 from hazel charcoal, and SUERC-14945 and -14946 from human bone from the final inhumation into the stairwell. These two results have been combined prior to calibration (T'=1.8; ν=1; T'(5%)=3.8; Ward and Wilson 1978) to form mean inhumation 2.44 (1928±29 BP).

10.5.3 Burnt spreads and earlier deposits

Outside the precinct, surface activity in the form of burnt spreads and Bronze Age elements is broken down into seven primary blocks, and a further four relating to contexts at the interface between these areas and the precinct enclosure. 25 radiocarbon dates come from seven of these 11 blocks.

The sequence starts with three dates from Block 30, a series of Early Bronze Age deposits. SUERC-12296 dates hazel charcoal from C10.05, and SUERC-28062 and -33767 hazel charcoal from C19.28 and C19.44. All three date to the first half of the 2nd millennium cal BC, and so are excluded as representative of much earlier activity not under consideration in this model. In Block 31, SUERC-23635 dates hazel charcoal from burnt spread base layer C19.10. Subsequent Block 32 produced three results: SUERC-12290 from hazel charcoal in the fill (C7.05) of post-hole F7.01. SUERC-23620 dates hazel charcoal from the secondary fill (C19.12) of post-hole F19.05. Finally, birch charcoal from the fill (C19.24) of post-hole F19.07 produced SUERC-28061. This result agrees with the other two results from this block but is slightly too recent when compared to dates from overlying material. It has been excluded as either a slight statistical outlier or intrusive charcoal in the post-hole.

Blocks 33 and 34 represent burnt spread activity, from which 15 samples were submitted, almost all hazel charcoal. Block 33 produced five results (SUERC-12289, -23609, -23621, -28049, and -28066) on hazel charcoal from C9.03, C11.06, C19.09, C8.04, and C19.11, with a sixth result (SUERC-50980) from C20.04B on birch charcoal. These contexts all relate to burning activity on site. However, birch charcoal sample SUERC-50980 is intrusive, dating to the 12th–13th centuries cal AD, and is excluded from the model. SUERC-28049 also appears too recent and is excluded as intrusive, perhaps deriving from overlying deposits. A charcoal sample from C8.04 was taken from a test pit, so could not be linked to the burnt spread stratigraphy but may fall within Block 34.

Block 34 produced two results (SUERC-12287 and -12288) from burnt spread deposit C9.03, on birch charcoal. SUERC-12292 dates birch charcoal from a deposit of fire-cracked stone (C10.03). Hazel charcoal from C14.37, a charcoal-rich, stone-free layer, produced SUERC-23610. A hazelnut shell from C5.06, a deposit beneath hearth F5.03, produced SUERC-23623. C18.03, a layer of charcoal and fire-cracked stone, produced SUERC-23634 from birch charcoal. SUERC-23641 and -50979 date hazel charcoal from C19.02, a chaotic spread of granite and limestone boulders and compacted fire-cracked pebbles. Finally, SUERC-23629 dates birch charcoal from fire-cracked stone and hearth residue deposit C14.11.

There are two dates from Block 35. SUERC-50986 dates hazel charcoal from the fill (C7.10) of stake- or post-hole F7.09, while SUERC-12291 dates hazel charcoal from the fill (C7.08) of post-hole F7.03.

Sitting between burnt spreads and precinct is a sequence of blocks associated with the precinct enclosure walls. From Block 15, hazel charcoal from beneath enclosure wall F21.01 produced SUERC-33773.

10.5.4 Radiocarbon dates removed from the Bayesian model

Twenty-two radiocarbon dating results were excluded from the Bayesian modelling (Table 10.1). These included one result from a mislabelled sample (SUERC-50980), and four Bronze Age dates (SUERC-12296, -23633, -33767, -28062) excluded as they fall outside the Iron Age focus of the model. The omission of the 17 Iron Age dates is discussed below.

Bone Passage

Results from five samples appeared at variance with the general modelled sequence and were removed from the Bayesian analysis. These are:

SUERC-66353: this pig bone from C17.05 produced one of the oldest cave dates at 2721±30 BP. This apparent age could suggest a curated bone, included within the redeposited midden. A ceramic sherd of Bronze Age typology was also recovered from this context, which also suggests curation or redeposition of earlier material into the cave.

SUERC-66383: human perinate cranial bone from C6.06 produced a date too recent for the overall cave sequence. The bone fragments was recovered along with cow bones from behind a slab leaning against the east wall of the cave. It is possible that

the void behind the slab was accessed at a later stage in the site's history for specific depositional activity.

SUERC-28050: burnt grain from C6.05 [Block 27c] gives a date too late for the sequence. The material may have percolated down through voids within the stony fills in Bone Passage.

SUERC-50997: overlying context C6.04 produced a date on cattle bone which appears too old for the sequence. Overall, dated results from C6.04 suggests deposit mixing in the south cave chamber, possibly from the introduction of older surface midden deposits, or modern disturbance by cavers.

SUERC-14934: wood charcoal recovered from [Block 29c] deposits produced a date too old for the sequence. It is probable that midden forming this deposit comprised mixed deposits from the precinct.

Precinct

Results from four samples were at variance with the modelled precinct sequence and were removed from the Bayesian analysis. These are:

SUERC-66378, -28052, -50967: human bone (a foot phalanx from a *c.* 14-year-old individual) and samples of burnt grain were recovered from a complex sequence of ash lenses associated with the use of the precinct hearths. These appear too recent when compared to the dated sequence. The samples were recovered adjacent to stairwell F2.23, where subsidence had created voids between larger stones. It is likely that these samples had filtered down from contexts above and are thus intrusive. Bioturbation and mixing due to the intense activity focused on the precinct through Phase 4 may also be a factor.

SUERC-66381: pig bone recovered from C2.61, a backfill deposit within the access passage (F2.29) to stairwell F2.23, appears too old in relation to other dated samples from this context. The bone may relate to the floor deposits in the passage (Phase 5) and not the Phase 6 backfilling event, or comprise a curated bone introduced into the backfill.

Stairwells

Results from six stairwell samples appear to be at variance with the modelled sequence and were removed from the Bayesian analysis. These relate to the construction of Stairwell F2.23 during Phase 4a and its subsequent modifications and closure during Phase 6. The wall-heads and corbelling from the structure were collapsed into the stairwell during the closure event, with additional disturbance during the insertion of human and animal remains in Phase 7. Samples were dated from the packing and fills of the stairwell walls and landings. These are:

SUERC- 50999, -66368, -66369, -66370: charcoal recovered from the lower west stairwell wall core (SUERC-50985 and 50977) produced dates of 2468±27 BP and 2457±29 BP respectively and probably relate to the material packed into the wall core during construction. Pig bone (SUERC-50999) and three human bone fragments (SUERC-66368–70) recovered from higher in the same wall core fill all produced dates too recent for the sequence. During excavation, rodent activity was apparent within the wall core, along with large voids between the wall core boulders. These dates echo, and probably thus relate to, the human and animal remains placed at the top of the backfilled stairwell in Phase 7.

SUERC-50989: animal bone from the east stairwell wall core appears too old for the dated sequence here, and most likely represents intrusive packing material originating from deposits generated within the precinct, or is a curated bone placed in the wall.

SUERC-66374: this fragment of human bone from the Phase 6 backfill deposits of stairwell F2.23 [Block 22a] most likely relates to the Phase 7 stairwell burials [Block 22b] which has moved down through the void-filled, boulder backfill deposits.

Burnt spreads and areas outside the precinct

Results from 2 samples from these surface areas were at variance with the modelled sequence and were removed from the Bayesian analysis. These are:

SUERC-28061: charcoal recovered from the fill (C19.24) of post-hole F19.07 is too recent when compared to dates from overlying material. It was excluded as either a slight statistical outlier or an intrusive fragment of charcoal in the posthole.

SUERC-28049: this charcoal was recovered from burnt spreads (C8.04) within a trial trench with no stratigraphic links to the adjacent trenches, so was removed from the modelling.

10.6 Results

The model has good agreement between the radiocarbon dates and the stratigraphic sequence (Amodel=65). It demonstrates the overall longevity of the Iron Age activity associated with the High Pasture Cave complex. The activity began in *820–755 cal BC* (*95% probability*; *start: High Pasture Cave*), and probably in *800–770 cal BC* (*68% probability*). The activity occurred over a span of perhaps *845–945 years* (*95% probability*; *Iron Age activity: High Pasture Cave*), and probably *865–915 years* (*68% probability*). The activity ended in *cal AD 75–145* (*95% probability*; Fig. 10.4; *end: High Pasture Cave*), and probably in *cal AD 85–125* (*68% probability*) (see Figs 10.1–10.4).

Within Bone Passage the transition between Phase 2 and 3 was identified. This transition was also interpreted in the precinct between Blocks 6 and 7a, and the burnt

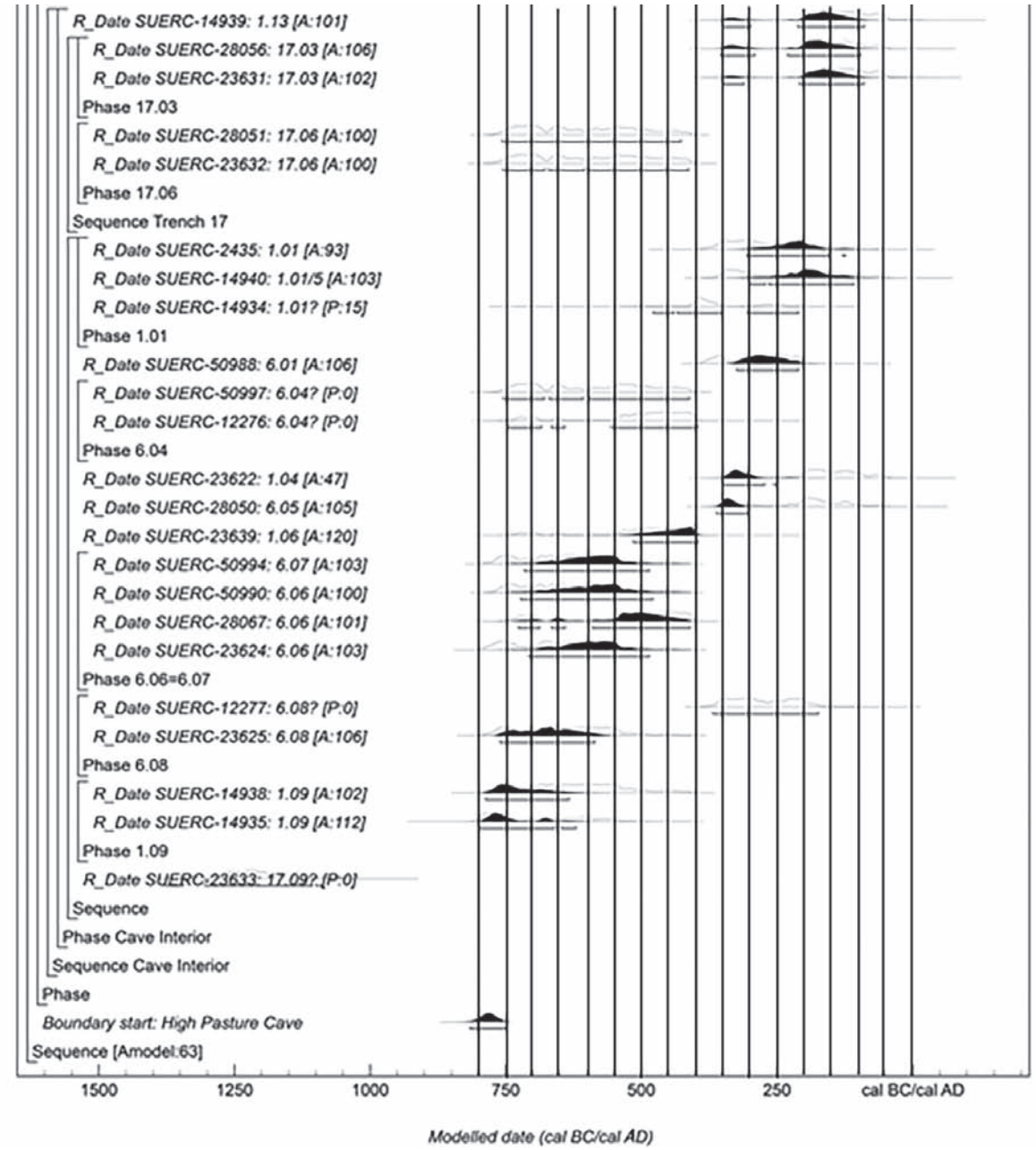


Figure 10.1. Probability distributions of dates (cal BC/cal AD) for Bone Passage

spreads between Blocks 31 and 32. The model estimated that the date of the transition was in *730–640 cal BC* (*95% probability*; *transition: Phase 2/3*), and probably in *715–660 cal BC* (*68% probability*). The stairway into the cave was closed off much later, in *310–75 cal BC* (*95% probability*: *Stairway Closure*), and probably in *185–100 cal BC* (*68% probability*). The inhumation in C2.44, placed into the closed off stairway, died in *cal AD 5–120* (*95% probability*: *inhumation 2.44*), and probably in *cal AD 25–90* (*68% probability*). The hiatus between the stairway closure and the inhumation is *120–380 years* (*95% probability*), and probably *155–265 years* (*68% probability*). This hiatus is calculated by subtracting the posterior probability for *inhumation 2.44* from that for *Stairway Closure*.

The longevity and complexity of activity at High Pasture Cave allowed for periods of activity to be examined in slightly more detail. For each Block, it was possible to calculate the earliest and latest probability for the associated activity, using the 'First' and 'Last' parameters in OxCal. These not only provide dating for the activity, but also a basis for comparing the date of activity between disconnected, or tenuously connected, site areas (*e.g.*, the interior and exterior of the cave). Table 10.2 provides the *95%* and *68% probability* ranges for each of the estimated date ranges.

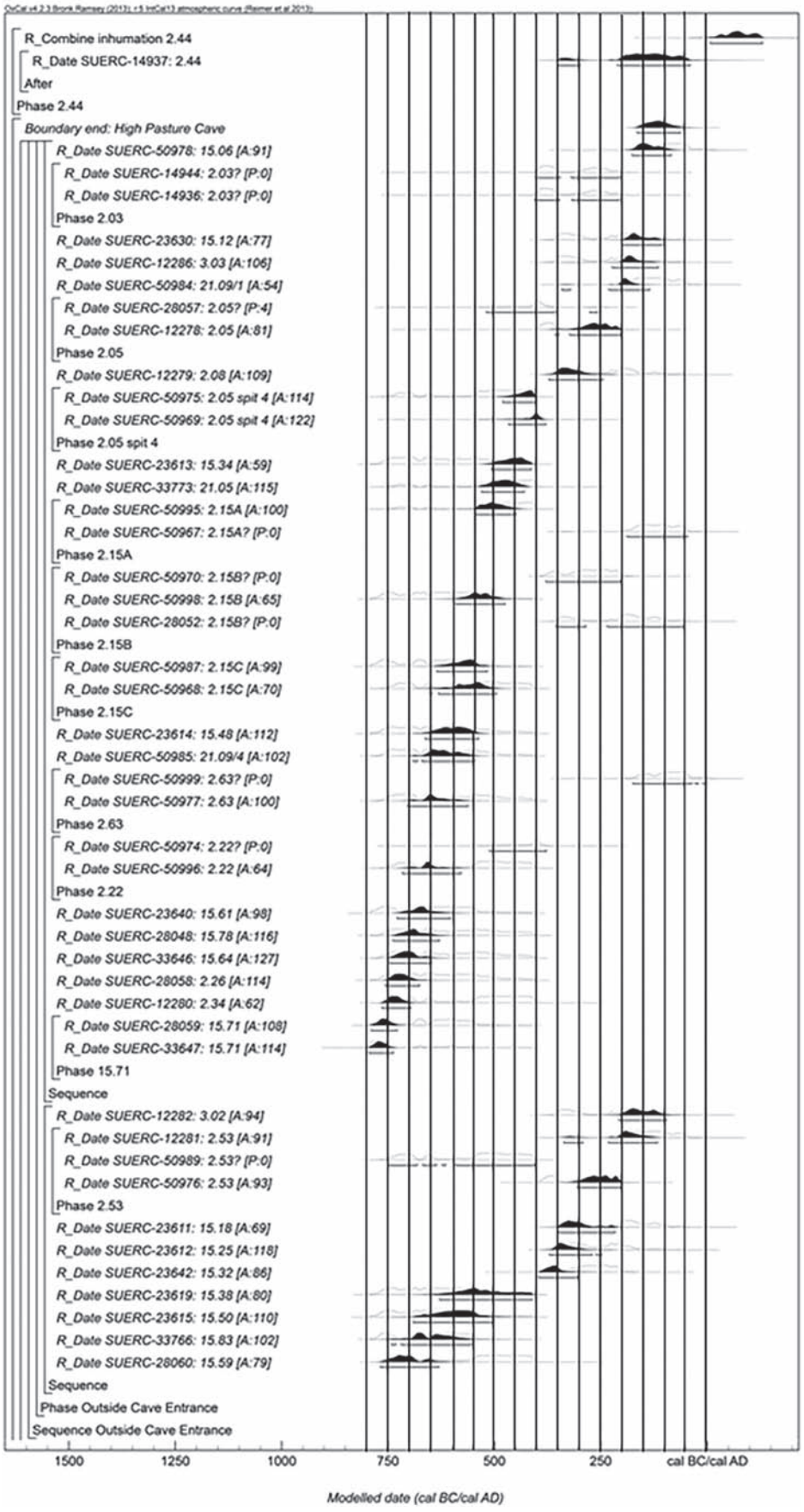


Figure 10.2. Probability distributions of dates (cal BC/cal AD) for precinct enclosure

Table 10.2 Modelled date (cal BC/AD) for archaeological phases & stratigraphic blocks at the High Pasture Cave complex

Ph	*Event*	*95% probability*	*68% probability*
2	*first: Block 4*	*800–745 cal BC*	*790–760 cal BC*
2	*first: Block 25a*	*800–740 cal BC*	*785–755 cal BC*
2	*last: Block 4*	*790–720 cal BC*	*775–740 cal BC*
2	*last: Block 25a*	*760–660 cal BC*	*750–705 cal BC (54%)*
2	*first: Block 25b*	*780–690 cal BC*	*765–720 cal BC*
2	*last: Block 25b*	*750–660 cal BC*	*735–690 cal BC*
3	*first: Block 32*	*715–575 cal BC*	*700–625 cal BC*
3	*first: Block 27a*	*715–585 cal BC*	*695–625 cal BC*
3	*first: Block 7d*	*695–585 cal BC*	*650–600 cal BC (62%)*
3	*last: Block 32*	*695–535 cal BC*	*665–575 cal BC*
3	*last: Block 7d*	*650–570 cal BC (80%)*	*640–590 cal BC (66%)*
3	*last: Block 27a*	*585–405 cal BC*	*550–480 cal BC (44%)*
4	*first: Block 33*	*670–505 cal BC*	*625–535 cal BC*
4	*first: Block 8*	*630–515 cal BC*	*590–540 cal BC*
4	*first: Block 21a*	*630–475 cal BC (91%)*	*590–510 cal BC*
4	*last: Block 21a*	*590–420 cal BC*	*550–465 cal BC*
4	*last: Block 8*	*540–435 cal BC*	*520–460 cal BC*
4	*first: Block 21b*	*550–405 cal BC*	*500–410 cal BC*
4	*last: Block 33*	*530–405 cal BC*	*495–415 cal BC*
5	*first: Block 9a*	*520–415 cal BC*	*490–430 cal BC*
5	*first: Block 34*	*490–390 cal BC*	*440–395 cal BC*
5	*last: Block 9a*	*395–340 cal BC*	*380–350 cal BC*
5	*first: Block 9c*	*370–305 cal BC*	*355–320 cal BC*
5	*last: Block 9c*	*315–225 cal BC*	*290–245 cal BC*
*6**	*first: Block 29a*	*560–410 cal BC*	*530–440 cal BC*
6	*first: Block 29c*	*350–240 cal BC*	*340–285 cal BC*
6	*first: Block 10*	*295–215 cal BC*	*275–230 cal BC*
6 (5)	*last: Block 34*	*280–150 cal BC*	*235–175 cal BC*
6	*last: Block 29c*	*215–50 cal BC*	*200–150 cal BC (41%)*
6	*first: Block 35*	*205–95 cal BC*	*200–145 cal BC (60%)*
6 (4)	*last: Block 21b*	*210–105 cal BC (72%)*	*200–145 cal BC (54%)*
6	*first: Block 22a*	*185–55 cal BC*	*155–85 cal BC*
6	*last: Block 35*	*180–40 cal BC*	*145–85 cal BC (50%)*
6	*last: Block 29a*	*155–40 cal BC*	*125–85 cal BC (38%*
6	*last: Block 22a*	*155–45 cal BC*	*115–50 cal BC*
6	*last: Block 10*	*cal AD 50–130*	*cal AD 70–105*
*7***	*first: Block 22b*	*130 cal BC–cal AD 5*	*95–40 cal BC*
7	*last: Block 22b*	*cal AD 70–135*	*cal AD 80–110*

Key: 6: old midden material deposited in Bone Passage makes start date too old; 7**: older material deposited with human & animal remains relates to backfilling event 6; (5): redeposited midden continued to accumulate in areas beyond enclosure wall; 6 (4): stairwell constructed in stages with last modification taking place in Phase 6*

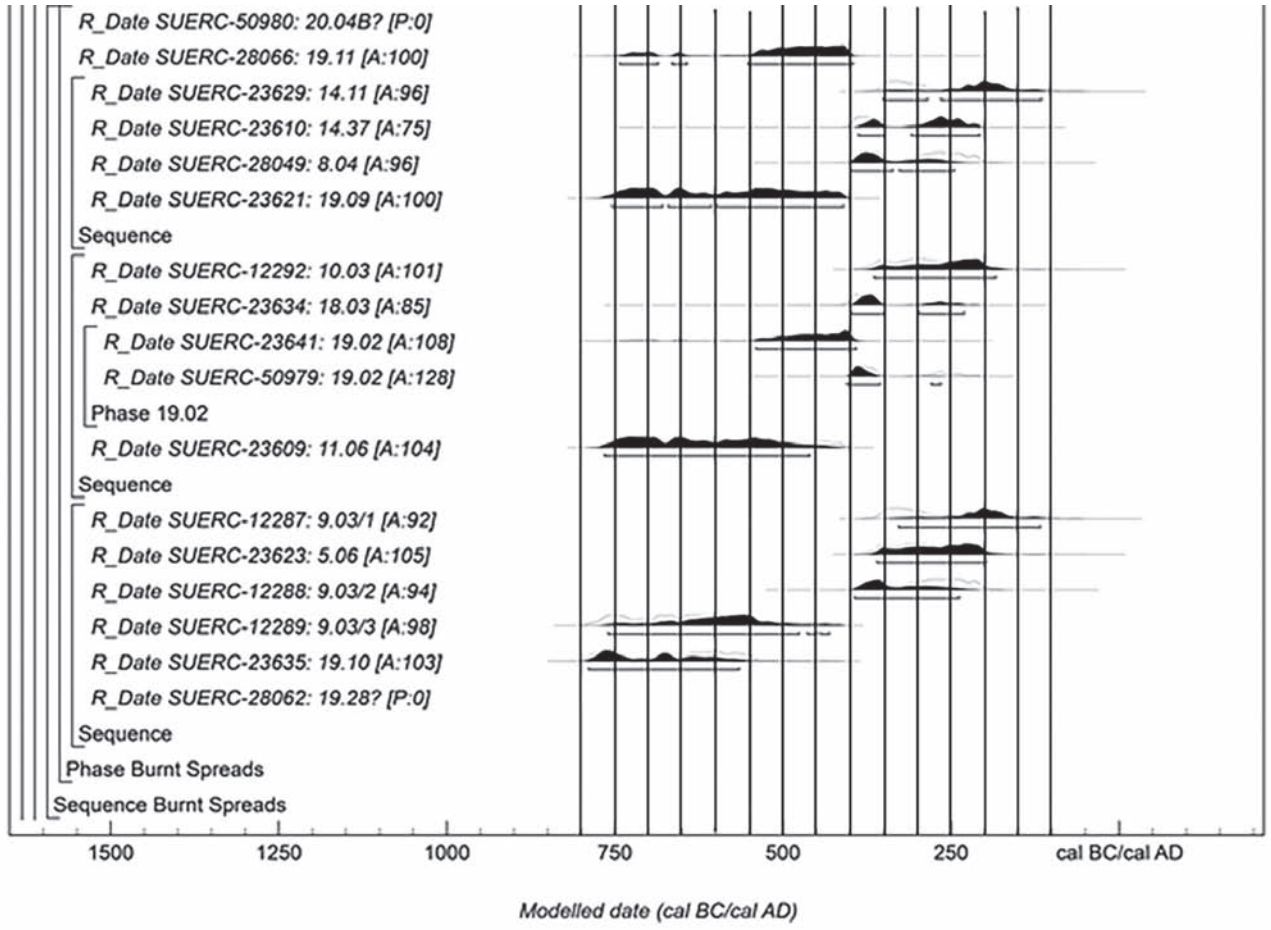


Figure 10.3. Probability distributions of dates (cal BC/cal AD) for areas outside precinct enclosure including burnt spread

10.6.1 Sensitivity analyses

A series of sensitivity analyses were constructed to explore how changes in the model structure affected the results. Many of these actually occurred prior to the development of the final model presented above. The initial modelling assumed many of the layers of burnt material remained *in situ* after initial deposition. The modelling questioned this assumption and further analysis (see Section 10.4) helped define the Blocks of activity in each trench. These blocks then made it possible to place associated dates into un-ordered groups, thereby severely reducing the stratigraphic constraints on the dating and producing a model that more accurately represents the taphonomic processes of the archaeological activity.

One element of the preferred model that relies on interpretation of the archaeology in multiple areas of the site is the transition from Phase 2 to 3. This transition is identified in three areas: Bone Passage, precinct, and burnt spreads. The preferred model places the date of the transition event equal in all three areas (five actual points in the model). It is possible for this form of cross-referencing to have a deleterious effect on the results, skewing them one way or the other. The sensitivity analysis removed this parameter in all five points in the model and evaluated the effect on the surrounding modelled radiocarbon dates.

The alternative model has good agreement between the dates and the model parameters (Amodel=69), which is not surprising. It is within the long stratigraphic chain of the precinct Blocks that the transition is most precisely defined and it is here that there is practically no difference between the surrounding dates in either model. In the burnt spreads area, the probability distribution for the transition helps to constrain slightly the start of the dates from the overlying Block 31 but has practically no effect on the underlying probabilities. Within Bone Passage, the addition of the transition has the greatest effect on the modelled radiocarbon dates from Block 25a and some of the overlying Blocks. The modelled date for the 'last: Block 25a' probability shifts from *760–660 cal BC* (*95% probability*) in the preferred model to *715–480 cal BC* (*95% probability*) in the sensitivity analysis. Although not as drastic in shift, considerable refinement can be observed in the probabilities associated with Blocks 25b and 32, as well as the calculated 'first' probability for Blocks 27a and 33. While such dramatic improvements

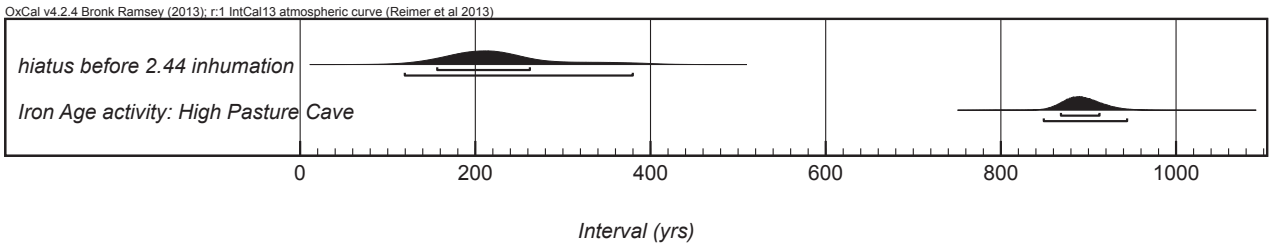


Figure 10.4. Probability distributions of dates (cal BC/cal AD) showing the duration of activity taking place at the High Pasture Cave complex up to Block 22a, but excluding the inhumations placed in the top of the backfilled stairwell in Block 22b

would normally be cause for alarm, it should be noted that the date for *transition: Phase 2/3* lies in the region of the Hallstatt plateau (*c.* 800–400 cal BC). The short sequences of dates in Bone Passage are not really enough to create a very precise chronology across this period; however, the long sequence of dated blocks in the precinct is able to resolve this dating with much increased precision. Formally linking the disparate strands of the model through the identified transition has allowed the precision gained in one area to have a positive effect in other areas. The one note of caution should be that the linking of a model in this way should only be done if there is strong evidence for synchronicity, either through the dating of the same event in multiple places on site, or through a strong belief in the synchronicity as interpreted from the archaeology (*e.g.,* as in this case). If the latter is the evidence, then it is important that it is clearly articulated in the site stratigraphy.

10.7 Discussion

The radiocarbon dating and chronological modelling for High Pasture have not been without difficulties. That many samples were selected prior to the implementation of a programme of applied Bayesian statistical analysis was the most prominent hurdle. Much of the earlier archaeological interpretations gave primacy to the observed stratigraphic relationships between samples from overlying layers, suggesting a high degree of security between the date of individual samples and the formation of the deposit from which they was recovered. This is not an altogether uncommon occurrence when modelling is brought into an already active dating programme. What this requires for rectification is that all parties take a few steps backward in the process and rigorously re-evaluate each context and its dated sample to determine which, based on taphonomic processes associated with the context, are most likely to be either residual or intrusive. Although often laborious, such a strategy ensures a clear future process for radiocarbon dating that ensures each subsequent date can be utilised in the final chronological model.

For High Pasture, this re-evaluation process was iterative, effectively working through the dataset in light of initial interpretations and submitting further samples in areas of the stratigraphy where new results might help clarify discrepancies. The dating results also required a re-evaluation of the physical processes that occurred on the site in the 1st millennium BC. Some material sequences likely accumulated *in situ* very quickly, while other layers are the product of mixing, likely *in situ* as well. However, one factor that seemed apparent during excavation, especially in the precinct, and was borne out by the radiocarbon sequence and subsequent Bayesian modelling, is that accumulating deposits were curated and subsequently buried by material generated through later activities at the site. The depositional and curatorial practices taking place within the precinct were also mirrored, to some extent, within the burnt spreads and in Bone Passage. In both locations, material generated through precinct activities were deposited and curated, although the limited space available in the cave did necessitate their manipulation and modification in order to maintain access to the underground stream.

The incorporation of Bayesian methodology in the development of a chronological framework for High Pasture Cave has tightened the dates for the sequence and produced valuable start and end dates for specific periods of activity. This refined framework is an extremely useful tool into which we can fit a wide range of artefact types, some of which are poorly dated and provenanced in Iron Age contexts. This has included dating the earliest deposition of rotary querns at the site, and the rare musical instrument bridge, representing the earliest such find in western Europe. Finally, the extensive dating of human remains, most of which comprise disarticulated fragments, has proved to be a useful exercise as it not only provides direct dating evidence for the burials, but in some instances was highly informative in our understanding of the taphonomic processes on the site.

11

Curating the dead

11.1 Introduction

The 2005 discovery of the adult inhumation and associated burials in the top of High Pasture's backfilled stairwell was an unexpected revelation. Funerary remains such as these are scarce across most of Iron Age Britain (Hume and Armit 2024, 6–8). During the following years of fieldwork, a number of disarticulated human bones and teeth relating to Early to Middle Iron Age activity were also recovered from both precinct and cave, following a tradition of deposition recognised elsewhere in Scotland and Europe. With the exception of the large assemblage of Roman Iron Age human remains recovered from Sculptor's Cave in Moray (Armit and Büster 2020), the combined skeletal remains from the High Pasture Cave complex constitute the highest number of individuals of Iron Age date recovered from a cave site in Scotland.

This chapter discusses the High Pasture human remains and the results of osteological, isotopic, and aDNA analyses, set in context with evidence for mortuary practices recorded at other Scottish and British cave and rockshelter sites and the wider context of depositional practice at contemporary settlement and other sites in Atlantic Scotland.

11.2 Human remains from High Pasture

Fiona Shapland, Laura Sinfield, and Kath McSweeney

Preliminary analyses of the human skeletal remains were conducted by Laura Sinfield and Kath McSweeney at the University of Edinburgh between 2007 and 2015. The results of their analysis have been synthesised by Fiona Shapland and are presented below.

11.2.1 Summary of the human remains found at the High Pasture Cave complex

The human remains from High Pasture Cave are amongst the most complex and intriguing British prehistoric assemblages of the period. At least seven, and probably many more, individuals are represented, from foetal to fully adult; from articulated burial to disarticulated deposits mixed with animal bones (Table 11.1). This report summarises a complex and difficult assemblage, presenting detailed and contextualised discussion of the High Pasture bones and teeth, the potential circumstances of the death and deposition of these individuals remains, and their wider Iron Age context.

Human remains from a minimum of seven individuals (MNI – Minimum Number of Individuals) were recovered from High Pasture Cave: two adults (A and B), one child (C), one infant (D), two perinates (E and F) and one foetus (G). The context of recovery and radiocarbon dates obtained from several other bones suggest the presence of at least three or four further individuals: one infant (I), two adults (J and L), and one older child (K). Of these, the majority of the individuals (B–D, F, I–K) were represented only by teeth or bone fragments, and three (A, an adult female, E, a perinate, and G, a foetus) were recovered as more complete individuals. Only one, individual A, was found as an articulated skeleton.

When an individual is identified, all bones, or teeth of that age/sex are considered to belong to that individual until a duplicate is found. At this point, a second individual is identified in the duplicated element, but no attempt is made to assign further isolated bones or teeth to one or the other, given that taphonomic commingling, as well as presumed excarnation with perimortem commingling, has taken place. The 'labelling' of individuals (Individual A, Individual B, *etc*.) thus indicates only the MNI represented and is not a definite statement of the possible numbers.

11.2.2 The skeletal remains

Individual A

Adult female skeleton; aged at 25–40 years (Fig. 11.1A).

Table 11.1 The High Pasture Cave complex human bone assemblage showing identified individuals & unassigned disarticulated material

SF	*Individual*	*Ph*	*C*	*Context description*	*Age*	*Sex*	*Bone element*
F2.270–71	A	7	2.44	Upper fill of stairwell F2.23	Adult (25–40 yrs)	F	Inhumation (see Tables 11.3 & 11.4)
F6.620	B	2a	6.08	Redeposited midden, south chamber, Bone Passage	Adult (25–35 yr)	–	Single tooth: malformed upper l. 3rd molar, tooth 28 or 26 (identified using isotope analysis as poss. pig tooth)
F6.606	C	2a	6.08	As above	Child (6–7 yrs)	–	Single tooth: upper r. incisor, tooth 51
F21.08	D	4a	21.09/4	Stairwell F2.23 wall fill, precinct	Perinate (*c.* 9 mths)	–	Proximal 1/3 immature r. humerus
F2.268	E	7	2.44/2.45	Upper fill of stairwell F2.23	Perinate (*c.* 9 mths)	–	Partial inhumation (see Tables 11.5–11.7)
F2.299	F	6b	2.49	Lower fill of stairwell F2.23	Perinate	–	Proximal half of a l. tibia
F2.267	G	7	2.44/2.45	Upper fill of stairwell F2.23	Foetus (*c.* 3–6 mths)	–	Partial inhumation (see Table 11.8)
F2.299	H	6b	2.49	Lower fill of stairwell F2.23	Perinate/neonate	–	Occipital bone
F17.080	I	6a	17.03	Redeposited midden, north chamber, Bone Passage	Infant (*c.* 6 mths)	–	Single tooth: deciduous lower molar
F2.464	J	6b	2.61	Backfill deposit in entrance leading to stairwell F2.23	Adult (20–25 yrs) Adult (25+ yrs)	– –	Unfused iliac crest of pelvis Vertebrae facet lumbar vertebrae body
F15.317 F15.329	K	6a	15.08	Ash & midden deposits in precinct enclosure	Child (10+ yrs) Child (10+ yrs)	–	R. foot phalanx (epiphysis fused) Lower permanent incisor
F2.443	K	4a	2.16	Ash deposits within precinct, adjacent to stairwell wall	Young adult (14+ yrs)	–	1st proximal foot phalanx (epiphysis fused)
F2.483	L	4c	2.15c	Accumulation of material resulting from use of hearths in precinct enclosure	Young Adult	–	Charred cranial fragments (15 frags)
F6.272	–	4c	6.06	Within midden between slab & cave wall, Bone Passage	Foetus/perinate	–	Occipital bone
F2.443	–	4a	2.16	Ash deposits within precinct, adjacent to stairwell wall	Foetus/perinate (c.6–12 months)	–	Eroded vertebrae fragment, r pubis
F2.463	–	4a	2.54	Ash deposits associated with use of hearth F2.27 in the precinct	Perinate/foetus	–	1 1st metatarsal
F21.07 F21.08	A?	4a	21.09/4	Stairwell F2.23 wall fill, precinct	Adult (14+ yrs) Perinate	– –	1st cuneiform bone and hand phalanx Humerus
F15.359	–	3d	15.83	Hearth rake-outs and redeposited midden in precinct	Adult	M?	2 cranial frags

(Continued)

Table 11.1 (Continued)

SF	*Individual*	*Ph*	*C*	*Context description*	*Age*	*Sex*	*Bone element*
F2.286	E	6b	2.47	Mid-fill of stairwell F2.23	Perinate	–	5 rib frags, 1 carpal bone, 3 vertebrae frags
F2.313	G	6b	2.47	As above	Foetus	–	9 vertebrae frags, l. 1st rib, r. 1st rib, 4 rib mid-shaft frags, 1 distal humerus, proximal 2/3 of r. femur, r. tibia in 2 pieces, 4 metatarsals, 1 distal long bone
F2.292 F2.315	G?	6b	2.48	Lower fill of stairwell F2.23	Foetus	–	3 cranial frags, partial neural arch of vertebrae, 2 r. ribs, 1 l. rib, 1 rib mid-shaft frag., proximal ¼ r. radius, proximal ¼ r. ulna, distal ¼ r. ulna
F2.299 F2.317	–	6b	2.49	As above	Perinate	–	R. orbit & zygoma, 13 cranial frags, 1 rib mid-shaft
F2.320	–	6b	2.50	As above	Perinate/foetus	–	1 cranial frag.

Preservation: Table 11.2 presents a summary of skeletal elements preserved. Bone condition is grade 3 (on a scale of 0–5) on the scale of bone degradation published by McKinley and Roberts (1993). The bones are robust to handle but there is considerable erosion, especially of trabecular bone (*i.e.,* the ends of long bones and the vertebral bodies and pelvic bones). The remains are badly fragmented in the head, chest, abdomen, right upper and lower arm, and left lower arm regions. The damage is consistent with the excavators' reports of large stones being found *in situ* in these areas of the skeleton. Very little of the damage is from excavation and is consistent with blunt force trauma from the stones at or around the time of deposition. There is no sign of vital reaction in the bone. Bone takes a day or two to develop a vital reaction to injury or disease and, therefore, an absence of this does not rule out the possibility of those injuries being the cause of death.

Age: of the pelvic ageing elements, neither the left auricular surface nor the left and right pubic symphyseal surfaces are present, so age was estimated only using the partially present auricular surface of the right ilium of the pelvis. This produced an age estimate of Phase 3 indicating 30–34 years (Lovejoy *et al*. 1985). The degree of cranial suture closure is a less reliable method than most and is normally used only where more reliable elements are not present. It produced an age estimate of about 35–37, with an error margin of ten years either side, *i.e*., late 20s to mid–late 40s (Bass 1987).

The teeth were assessed using two different methods, Brothwell's, and Miles', as laid out in Hillson (1996). Because of extensive dental disease in the right lower jaw, which would have affected the degree to which that side of the mouth was used for chewing, only the left upper (26, 27, 28) and left lower (36, 37, 38) molars were used. Brothwell's method produced an age estimate of 25–35 years and Miles' an estimate of 30–40 years.

Table 11.2 Bones present for individual A

Bone	*Unsided*	*Right*	*Left*
Cranium	*c.* 50% (r. temporal area n/p; facial <25% present)		
Clavicle		n/p	<75%
Scapula		<25%	<50%
Sternum	n/p		
Coccyx	n/p		
Vertebrae	13 body frags; 13 arch frags; partial C2		
Ribs	No intact ribs	Multiple frags	Multiple frags
Sacrum	<25%		
Ilium		>75%	<75%
Ischium		<75%	>75%
Pubis		<50%	>75%
Humerus		>75%	100%
Radius		>75%	<50%
Ulna		>75%	<25%
Femur		100%	<75%
Tibia		<75%	<75%
Fibula		>75%	<75%
Patella		>75%	>75%
Foot		<50%	<25%
Hand		<50%	<75%

n/p – not present in assemblage

The lower estimate resulting from these four age estimation methods is 25 years and the upper estimate is mid–late 40s. The oldest estimation is the upper limit of the cranial suture closure, but this is notoriously unreliable. The most reliable indicator is the auricular surface

Table 11.3 Dental chart for Individual A

18	17	16	15	14	13	–	–	21	–	23	24	25	26	27	28
48	47	46	45	44	43	–	41	31	32	33	34	35	36	37	38

– – not present in assemblage

(30–34) years, although this is based only on one element. The overall age estimate for this skeleton is therefore 25–40 years.

Sex: six elements in the pelvis and cranium were present and used for sex assessment. In the pelvis, the pre-auricular sulcus was present and both sciatic notches indicate a female. In the cranium, the nuchal crest and mastoid processes were inconclusive but the supra-orbital ridges and glabella of the mid-face indicate a female. The pelvis is the more reliable indicator of sex and the remains are most likely to be those of a female.

Stature: calculations based on the maximum length of the right femur and the left humerus (according to the formulae of Trotter and Gleser 1958) both resulted in stature estimates of 155–155.5 cm, or about 5 ft1 in.

Pathology: no major pathological processes, active or inactive, were observed in the skeleton. There is an area of roughened bone on the proximal shaft of the right mid-femur, *c*. 8 cm supero-inferiorly × 4 cm medio-laterally, on the anterior aspect: it is not clear whether this is a periosteal reaction (*i.e*., the bone's response to inflamed soft tissue) or if it is a taphonomic artefact (*i.e.,* caused by the burial conditions). In addition, lipping was found on the right temporo-mandibular joint at the coronoid process, indicating that the right side of the jaw produced some degree of discomfort or pain at the 'hinge' of the jaws.

Dental pathology: most teeth are still present, showing normal healthy development. Two molar teeth on the lower right have caries, one to a degree that has almost destroyed the tooth and has damaged the bone. This degree of infection is a potential cause of death, as a major dental infection of this type can result in sepsis spreading throughout the body (Hillson 1996).

Radiocarbon dating: two bones were taken for radiocarbon dating – the right femur and the left humerus. These produced an overall date range of 50 cal BC–cal AD 230 (SUERC-14945; SUERC-14946).

Individual B

Adult: represented only by one tooth, probably a malformed upper left third molar. Age at death may be tentatively estimated at 25–35 years based on the development and dental wear of the tooth. This tooth was found in one of a succession of redeposited midden deposits within Bone Passage in 2006 and was radiocarbon dated to 785–540 cal BC (SUERC-66382).

Individual C

Child: represented only by one upper right incisor, tooth 51. The degree of wear on the tooth and the fact that it shows none of the signs of preparation for its being shed to allow the adult replacement to erupt suggest that the individual was aged around 6–7 years at the time of death. This tooth was found in the same context as Individual B, redeposited midden within Bone Passage. It has been radiocarbon dated to 777–539 cal BC (SUERC-66384).

Individual D

Infant: represented by the proximal right humerus, age estimated at around 9 months. The humerus, which was found within the west wall of the stairwell but may have worked its way there from the neighbouring stairwell backfill, has been radiocarbon dated to cal AD 84–229 (SUERC-66370). The deciduous molar described as belonging to Individual I, below, was originally also assigned to this individual but the radiocarbon dates make it unlikely that these remains belong to the same individual.

Individual E

Perinatal skeleton: found in and around main burial excavated in 2005 (Individual A) in the upper fill of the Bone Passage stairway (Fig. 11.1B).

Preservation: the bones are fairly well-preserved, Grade 2 (McKinley and Roberts 1993). The long bones are in two or three parts, consistent with excavation in damp conditions and are well represented in the assemblage, there being present well-preserved elements of upper arm and forearm, leg, and lower leg on both left and right sides. No hand or foot bones were identified. The pelvis is represented for both left and right sides, and one (left) collarbone is present. Some cranial bone (see below) may have come from this individual, the foetal individual, or both. Table 11.4 presents a summary of skeletal elements preserved.

Age: the dental development of the two teeth, the lower right central incisor (81) and the lower right second incisor (82), still within the mandibular fragment, indicate an age of around 40 weeks in utero (Table 11.5). The skeletal measurements obtained (Table 11.6) provide an average

Table 11.4 Bones present for Individual E (n/p – not present in assemblage)

Bone	*Right*	*Left*
Mandible	>75% (distal 1/3 not present; lower r. 1st & 2nd incisors (81 & 82), unerupted)	
Clavicle		100%
Humerus	100%	
Humerus (reconstructed)		>75% (lateral epicondyle not present)
Radius	>75% (proximal articular surface not present)	
Ulna		100%
Ischium of the pelvis.	100%	
Ischium of the pelvis		>75% (superior 1/3 not present)
Femur	100%	
Femur		>75% (distal articular surface not present)
Tibia	100%	
Tibia		100%
Fibula		100%

(n/p – not present in assemblage)

Table 11.5 Age estimates from standard texts for individual E

Bone	*Age in utero*
Clavicle (left)	38–40 weeks
Humerus (right)	37–40 weeks
Humerus (left)	37–40 weeks
Ulna (left)	No data*
Radius (right)	No data
Ischium (right) – length	34–36 weeks
Ischium (right) – width	30 weeks
Femur (right)	38–40 weeks
Tibia (left)	38–40 weeks
Fibula (left)	40 weeks

(*No data – element is present but is too incomplete or damaged for assessment)

Table 11.6 Age estimates for individual E using Scheuer and Black 2000

Bones	*Age est. in utero (weeks)*	*Age range in utero (weeks)*
Humerus (right)	37.31±2.33	34.98–39.64
Humerus (left)	37.31±2.33	34.98–39.64
Femur (right)	38.33±2.08	36.25–40.41
Tibia (left)	38.82±2.12	36.70–40.94

age range of 37–40 weeks in utero, although it should be noted that this data is based on 20th century foetal individuals (Scheuer and Black 2000). Archaeological pregnancies, pre-dating modern medicine and nutritional levels, may have involved slower growth *in utero* and smaller birth sizes. It is therefore estimated that this individual died in the last month of foetal development or during the first two weeks of life. The possible causes of death must include stillbirth and death during birth as well as death in the first weeks of life.

Sex: it is not possible to ascertain sex in so young an individual.

Radiocarbon dating: two bones were taken for radiocarbon dating, the right femur and a mandible fragment. The mandible fragment failed to produce a result but the femur produced a date range of cal AD 76–228 (SUERC-66372).

Individual F

Perinate: this individual is represented only by the proximal half of a left tibia; found within the backfill of the stairwell in 2006. It is possible that this bone migrated down from the human remains/deposits in the backfill deposits above, as part of Individual G was also found in this context. Alternatively, this bone may have formed an offering in its own right within the initial closing of the stairwell.

Individual G

Foetus: around the second trimester (*c*. 3–6 months in utero). Found in and around main burial excavated in 2005 (Individual A), in the upper fill of the Bone Passage stairway (Fig. 11.1C).

Preservation: the bones are well-preserved: Grade 2–3. The bones are fragmented and incomplete but each fragment is robust enough to handle.

Age: five bones represent this individual (Table 11.7). Each is at the stage of development and general size which is considerably earlier and smaller than the stage and size it would be at birth but far enough developed to be identifiable as a particular bone. The fragments of left scapula, right radius, right clavicle, and right femur are too fragmented for any useful measurements to indicate age more closely but the right humerus has a maximum distal width of 5.5 mm which indicates an age of 16–18 weeks in utero (Scheuer and Black 2000). This is a single measurement of a single bone and is unfortunately not enough to rely upon. Overall, the age at death of this individual is estimated at between 3–6 months, or 12–26 weeks, of gestation.



Figure 11.1. Human bone relating to the articulated remains of: A. adult woman Individual A; B. partial remains of perinate E; C. fragments from foetus G. Recovered from the top of backfilled stairwell F2.23 (Phase 7, Block 22b)

Table 11.7 Bones present for individual G

Bone	*Right*	*Left*
Scapula (partial)		>25% (blade n/p)
Clavicle	100%	
Humerus (distal ¼ only)	>25% (proximal portion only)	
Radius (shaft only)	>75% (distal portion n/p)	
Femur (distal ½ only)	>50% (proximal portion n/p)	

(n/p – not present in assemblage)

Sex: it is not possible to ascertain the sex of so young an individual.

Radiocarbon dating: a sample from the right clavicle gave an age range of cal AD 63–219 (SUERC-66371).

*Individual H**

Represented by a perinatal/neonatal occipital bone found in context C2.49, slightly lower in the stairwell fill than Individuals A, E, and G. There is a linear groove in this fragment which has the initial appearance of a cut-mark, but on microscopic examination appears more likely to represent a gnaw-mark from rodent activity. The fragment has been radiocarbon dated to cal AD 6–134 (SUERC-66374) which would fit with the date of either Individual E or G. It is quite possible that this bone simply moved down the loose backfill of the stairwell over time and does not represent a separate individual.

*Individual I**

Represented by an infant deciduous lower molar (Fig. 11.4b, below), found in context C17.03, Bone Passage, 2007, and radiocarbon dated to 208–87 cal BC (SUERC-66364). Although this tooth could theoretically belong to the infant Individual D, above, there is no overlap in the radiocarbon dates and the remains were found some distance apart. It therefore seems likely that this tooth represents a separate individual.

*Individual J**

Represented by an unfused iliac crest of the pelvis, suggesting an age of 20–25 years at death. This bone was found in context C2.61, a closing deposit in the entrance passage leading to the landing of stairwell F2.23, and was radiocarbon dated to 236–111 cal BC (SUERC-66381). This date range makes it unlikely to belong to either adult Individuals A or B, and it most likely represents a separate individual. Interestingly, animal bone from this deposit has provided a later radiocarbon date 50 cal BC–cal AD 70, suggesting that the human bone may have been curated for some time before deposition.

*Individual K**

Represented by a right foot phalanx and lower permanent incisor (Fig. 11.4, below). The development of the tooth and epiphyseal stage of the phalanx suggest an age at death of over 10 years, but not fully adult. These remains were found in context C15.08, ash and midden deposits within the precinct, and have been radiocarbon dated to 375–202 cal BC for the phalanx (SUERC-66362) and 327–204 cal BC for the tooth (SUERC-66363). This date range does not fit with those provided by adult Individuals A or B and neither does the apparent age at death of this individual. It is theoretically possible that these remains belong to individual J, although they were found at some distance apart on the site. A proximal right foot phalanx recovered from ash deposits C2.16 was also radiocarbon dated to 366–196 cal BC (SUERC-66378). The bone was recovered from an area within the precinct where subsidence had taken place, and it is possible that it had moved down-profile between voids from overlying contexts. The date for the bone is too late for the context in which it was found.

* Individuals H–K are not represented within the MNI, as these remains could theoretically belong to other skeletons but the radiocarbon dates obtained and contexts from which they were recovered make it likely that at least I, J, and K represent separate individuals.

Unascribed human remains from the main burial in 2005

Approximately 30 further juvenile cranial fragments, which could theoretically be from any of the juvenile individuals, were recovered from the 2005 excavation within the top of backfilled stairwell F2.23. Given the context of their recovery, within a cavity in the limestone bedrock and 0.12–0.18 m below the primary burial of Adult woman A and combined remains of Individuals E and G, these fragments most likely belong to these two individuals. The cranial fragments and the bones of a foetal piglet (Fig. 11.3) were recovered in two small bundles within the cavity.

Unascribed human remains from the 2006 excavations

There are seven pieces of cranial vault bone from a very young individual or individuals, whose age(s) could range from foetal to infant. These fragments were recovered from the backfill deposits in stairwell F2.23.

A fragment (F6.272) of occipital bone, forming the very back of the head, with its size suggesting that it belongs to a foetal or perinatal individual (Fig. 11.2). New bone formation is visible on the inside of this occipital bone, in the centre. This resembles pale grey finely textured ‘foam’. It is the body’s response to damage but takes at least several days, and more likely a week or two, to react to an injury or infection. It is possible that this

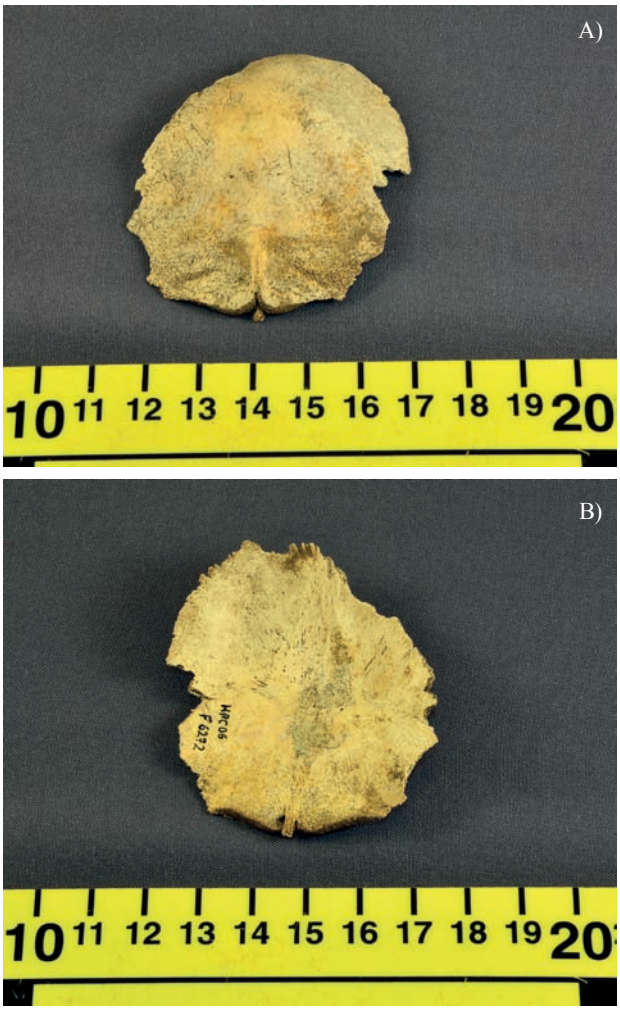


Figure 11.2. SF6.272 Occiput bone recovered with cattle bone behind stone slab leaning against east wall of Bone Passage: A. external & B. internal views



Figure 11.3. Bone assemblage relating to foetal pig recovered from the alcove in the limestone bedrock at the top of backfilled stairwell F2.23, along with skeletal elements from human individuals E & G



Figure 11.4. A–B: foot phalanx & right foot phalanx from individual K (1 & 5), hand phalanx from individual A (3), cuneiform from individual A (4), deciduous lower molar from infant, individual I (7 & 8), & lower permanent incisor from child, individual K (9). Bones 2 & 6 are animal. C–D: charred human cranial fragments recovered from hearth rake-outs C2.15c in the precinct, showing external & internal views

injury could have been caused in utero by a blow to the mother's abdomen; or it may have happened once the child was born. Running from side to side across this new bone formation is a hairline crack. This injury to a foetus or new-born could be sufficient to cause death. This bone was recovered from behind a slab lodged against the east wall of Bone Passage, along with a deposit of partially articulated, butchered cattle bones. It has been radiocarbon dated to 120 cal BC–cal AD 19 (SUERC-66383), which appears to be too 'young' for its depositional context. However, there were large voids behind the slab, which could have been accessed during later periods of activity at the site to make this apparently structured deposit. This bone has not been recorded as a separate individual as it could belong to one of Individuals E, F, or G.

The rest of the 2006 remains are a mixture of animal and human bones and teeth, including adult, juvenile, and foetal elements, most of which were recovered from the backfill of stairwell F2.23. No identifiable individuals could be recognised as articulated burials. In terms of age estimation, many of the bones could theoretically belong to the individuals identified above from the main burial excavated in 2005 (Individual A, E, and G), as there is almost no duplication.

Two adult cranial fragments (F15.359) had pitting of the external surface with expansion of the cranial wall indicating a healed porotic hyperostosis associated with skeletal stress in childhood. These cranial fragments were recovered from context C15.83, comprising hearth rake-outs within the precinct, dated to 790–520 cal BC. If the bones are contemporary with their context, this would preclude them from being assigned to Individual A and suggests the presence of a further adult or adults. Finally, several charred human skull fragments (F2.483) were recovered from context C2.15c, in the precinct, dated to 696–407 cal BC (Fig. 11.4C–D).

11.2.3 Discussion

There does not appear to have been a tradition of formal burial of the dead throughout the majority of the Iron Age in Atlantic Scotland and it has frequently been posited that an archaeologically 'invisible' form of disposal of the dead, such as exposure, must have been practised (Armit and Ginn 2007, 129). Consequently, human remains from this period are rarely recovered; on Skye, for example, just one other Iron Age site has produced human remains – Fiskavaig, a rock-shelter with evidence of Middle Iron Age occupation, from which a single perforated fragment

of adult human cranium was recovered in 2009 (Birch 2009). The human remains from High Pasture Cave are therefore particularly important.

The two earliest radiocarbon dates belong to the two teeth, one adult (Individual B) and one child (Individual C) found within the same context in Bone Passage in 2006. Apparently roughly contemporary, dating to the 8th–6th centuries BC and found within redeposited midden, these isolated finds are hard to interpret, and it should be considered that they may be accidental inclusions in the cave.

Also potentially early, and much more intriguing, are the cranial fragments (F15.359) found within the hearth rake-outs and the charred human skull fragments found in the precinct (Individual L). If these bones do indeed date to the 8th–5th centuries BC, this would suggest that they were deposited at the site while it was still in use. C15.83 and C2.15c both relate to an intense period of activity at the site featuring wide-scale deposition of midden, animal bone, and small finds in both precinct and cave. These may have formed foundation deposits at a time of major structural change at the site, including the construction of a new stairwell, precinct enclosure wall, and two new hearths. The deposition of cranial fragments within a site during its construction and occupation fits within the wider Scottish Iron Age tradition of careful curation and meaningful deposition of this particular part of the skeleton (Tucker 2010), part of what seems to have been a widespread Iron Age 'cult of the head' (Armit 2012).

Next chronologically come a few bones tentatively identified as Individuals I, J, and K, aged from infancy to young adulthood, and deposited again as isolated, disarticulated bones in various parts of the site between the 4th and 1st centuries BC. During this time, the pattern of feasting and deposition at High Pasture appears to have grown in scale and elaboration, and it seems that occasional deposition of human bones and teeth continued to occur on site as part of these activities.

The final individuals recovered from High Pasture Cave: the adult burial (Individual A) and the disarticulated remains of Individuals D–G (all foetal, perinatal, or infant), appear to be roughly contemporary, and date to the first few centuries AD. They were all deposited in the stairwell, apparently at some stage after it had been blocked up and sealed, and the long use of the cave and site had ceased. This seems to represent a very different, and purposeful, event (see Section 11.6.2).

The deposition of disarticulated human bone at High Pasture appears to fit within the wider tradition of the disarticulation, curation, and purposeful deposition of human bones on Iron Age sites throughout Atlantic Scotland (Tucker 2010). No cut marks were identified on any bones, adult or juvenile, making it unlikely that the bodies were cut up or dissected and it therefore appears likely that these bones were recovered from bodies that had been left to decompose naturally. A single gnaw mark on one bone suggests that such bodies were not always effectively protected from scavengers; perhaps the bodies were openly exposed. This type of funerary tradition would have provided the opportunity for disarticulated human remains to be recovered for curation, use, or deposition, and disarticulated human remains have indeed been recovered from a large number of Iron Age settlement sites (Tucker 2010).

Table 11.8 Estimated minimum number of individuals (MNI), with possible (MNI) based on radiocarbon dated context or dated human bone

Age group	*Element*	*MNI (confirmed)*	*MNI (possible)*
Foetus	Partial inhumation/ cranial frag./vertebra frag./r. pubis	1	3
Perinate	Partial inhumation/ proximal 1/3 r. humerus/proximal ½ l. tibia/vertebra frag. & r. pubis/1st metatarsal/r. orbit & zygoma/13 cranial frags/rib mid-shaft/ cranial frag.	2	4–5
Infant	Tooth: deciduous lower molar	1	1
Child	Tooth: upper r. incisor/r. foot phalanx/lower permanent incisor/1st proximal foot phalanx	1	2
Young adult	15 charred cranial frags	1	1
Adult	Inhumation/iliac crest of pelvis/lumbar vertebra facet/1st cuneiform bone/hand phalanx/2 cranial frags	2	3
Total		8	14–16

One unusual aspect of the human remains at High Pasture Cave, however, is their age profile (Table 11.8). Most of the individuals had either not lived at all independently of a womb or had barely lived a few weeks or months. This is particularly true of the remains deposited right at the end of the use of this site; one adult (A) and four foetal to infant individuals (D–G). Although pregnancy and birth in Iron Age Atlantic Scotland no doubt frequently ended in tragedy, this relative absence of older children and adults clearly cannot represent the natural death profile of a community, and it therefore seems an inescapable conclusion that the very young were specifically selected for deposition on this site. This is particularly noteworthy as the articulated skeletons recovered from other Iron Age sites are overwhelmingly adults (Tucker 2010).

One possibility has to be borne in mind: that the immature individuals may not be present through solely

accidental means. The occipital bone F6272 belongs to a perinate and exhibits new bone formation as a result of a blow to the back of the skull. It is possible that the injury was sustained in utero by an impact across the mother's abdomen or it may be that the skull was fractured by the new-born infant sustaining an impact to the back of the head. Bone at this age is very flexible, so as to allow deformation of the cranium during passage through the pelvic opening, and a fracture to the back of the skull may have required a degree of force. It may be worth considering all possibilities, accidental and deliberate. We do know that it was not immediately fatal – bone takes several days to respond visibly to a fracture, and it would appear this individual survived the impact by at least a week and perhaps a fortnight.

The deposition of individual articulated skeletons or 'burials' on sites in Iron Age Scotland is rare but has been recorded at over 20 sites (Tucker 2010), including examples such as the seated burial found within a roundhouse at Crosskirk (Fairhurst 1984), and the two adult skeletons buried within a workshop and a midden at Mine Howe. The majority of these 'burials' date to the last few centuries BC and first few centuries AD (Tucker 2010). The main adult burial (Individual A) at High Pasture Cave seems to fit within this tradition. This individual appears to have been deposited as an articulated skeleton at some time after the closure of the cave. Intriguingly, the disarticulated remains of an infant and a foetus (Individuals G and E) appear to have been collected and purposefully deposited with the adult skeleton. The potential relationship between this woman and the infants buried with her, and indeed with the roughly contemporary infants whose remains were recovered further down the stairwell (Individuals D and F), is intriguing and still partially unknown, but ancient DNA analysis indicates that while Individual G shares the mitotype of adult female Individual A and was therefore possibly her child, Individual E does not.

Why was this woman chosen for this extremely unusual form of treatment after death? Why were the bones of infants, seemingly including possibly a child who was hers but also others who were not, also curated, collected, and deposited in the cave with her? Like many of the human remains recovered from other Iron Age sites in Scotland, this assemblage seems to have been deposited as one of the final human acts at High Pasture and may perhaps best be viewed as a form of 'closing deposit' after the cave entrance was blocked off. The symbolic or, perhaps, in the view of the Iron Age people who deposited them, practical power of these remains must have been considered important in marking the end of the use of these sites, perhaps even sealing them off against the possibility of future use. The use of a whole body, rather than the more frequently deposited disarticulated bones, may have made a particularly strong statement, or carried unusual symbolic power. The unusual selection of the remains of foetuses and new-born infants for deposition with the woman, whether or not they were directly related, may have marked this site out as particularly special. It is impossible to be certain whether for the individuals involved this treatment, separating them in death from the rest of their society, was a sign of a higher or special status, or a form of punishment or abuse, as modern views on the respectful treatment of the dead cannot be transposed into prehistory.

Several authors have investigated the possibility that caves were the focus of ritual activity in prehistory and human remains often seem to have formed part of these activities. Far from representing sites of formal burial, caves appear to have been the locations of unusual and, on occasion, violent rituals utilising or harnessing the power of human remains. Particularly relevant in this context is the Sculptor's Cave in Covesea, Moray, from which large quantities of human bone, particularly juvenile remains, have been recovered. A number of juvenile cranial elements, including a defleshed cranium, were found at the cave entrance, where they may have been displayed, and relate to Late Bronze Age activity at the site. Evidence for formalised decapitation at Sculptor's Cave was identified however, with a number of Roman Iron Age individuals, represented overwhelmingly by adults (Armit and Büster 2020).

One other cave site in Scotland has produced Iron Age human remains: MacArthur Cave, Argyll. Unfortunately, records of this 19th century excavation are much less complete than those of a modern excavation but it appears the bones were recovered in a disarticulated state (Saville and Hallén 1994a). Several bones from this site present gnaw marks, suggesting that corpses or human body parts were laid uncovered in the cave to be defleshed by animals. Further human interaction with the remains is also suggested by one cranium which appears to have had a section deliberately removed from the side (Tucker 2010).

Several parallels can be drawn between High Pasture Cave, Sculptor's Cave, and MacArthur Cave, and indeed the nearby rock-shelter at Fiskavaig: the evidence for violent death, the deposition of predominantly juvenile remains, the disarticulation and excarnation of human remains, the curation and modification of human remains, particularly cranial fragments, and the harnessing of the symbolic power of the dead. These caves were not ordinary settlement sites nor were they simple burial sites. They seem to have been something else, something more – special places in the landscape where the relationship between the living and the dead, the world above ground and the world below ground, was being negotiated.

11.3 Chronology and phasing

Steven Birch

11.3.1 General

AMS radiocarbon determinations were obtained from a significant proportion of the human remains recovered from the High Pasture complex (Table 11.9); including four dates on the inhumations placed in the top of the

backfilled stairwell (Individuals A, E, and G); and 11 dates on disarticulated fragments recovered from the precinct and Bone Passage (Individuals B– D, H–K). Four of the dated disarticulated fragments recovered from the stairwell backfill and stairwell wall core deposits most likely relate to the inhumations at the top of the backfilled stairwell (three results for Individual A and one result for Individual G).

11.3.2 The inhumations placed in the top of the backfilled stairwell

The dating of the adult female (Individual A) deposited in the top of the backfilled stairwell in Phase 7 [Block 22b] was included in the Bayesian model (see Section 10.6). The individual died in *cal AD 5–120* (95% probability) and probably in *cal AD 25–90* (68% probability) and was placed in this location at what appears to be the final closure of the site, at some stage after the stairwell had been backfilled.

11.3.3 The disarticulated fragments

The disarticulated fragments recovered from the precinct and Bone Passage comprise human bone and teeth and provide a wide spread of dates (Table 11.9). The samples relate to at least seven individuals (nine including the four samples that most likely relate to Individuals A and G), and for some contexts their respective AMS determinations can be compared to other dated samples of animal bone, burnt grain, and wood charcoal. This has allowed direct comparisons to be made between the human bone and other materials within individual contexts and stratigraphic blocks, to investigate the potential curation of human remains prior to deposition. Individuals B, C, and I all appear contemporary with the midden in which they were deposited. However, the unfused iliac crest of the pelvis of Individual J (an adult of 20–25 years), produced a date older than the midden in which it was deposited. It is therefore possible that this bone had been curated for some time before its deposition, in midden used to backfill the access to the head of stairwell F2.23 in Phase 6b, or most likely in Phase 7.

The earliest deposition of human remains at High Pasture comprised the two teeth representing Individuals B and C, deposited in Bone Passage during Early Iron Age Phase 2a. The unburnt (F15.359) and charred cranial fragments (Individual L) recovered from hearth rake-out deposits in the precinct also relate to Early Iron Age activity, in Phase 4. Otherwise, the majority of the fragmentary human remains relate to Middle Iron Age activity, with a significant number dating to the final closure of the site in Phase 7. Some of these disarticulated fragments, like the inhumations placed in the top of the backfilled stairwell, were also accompanied by disarticulated animal remains of a very young age (see Section 8.4).

Table 11.10 shows the radiocarbon dated human bone and teeth from High Pasture, alongside other dated human remains from Iron Age contexts from caves and rockshelters in Britain and Ireland.

Table 11.9 List of dated human remains by individual from the High Pasture Cave complex

Individual	*Age*	*Representation*	*C*	*Depositional context*	*Radiocarbon date (95% probability):*
A – Adult female	25–40 yrs	Inhumation	2.44	Blocked stairwell	50 cal BC–cal AD 130
	25–40 yrs	Inhumation	2.44	Blocked stairwell	cal AD 20–230
	c. 14 yrs+	Cuneiform bone	21.09/4	Stairwell wall	cal AD 65–220
	c. 14 yrs+	Hand phalanx	21.09/4	Stairwell wall	cal AD 49–177
	c. 25 yrs+	Vertebrae frag.	2.61	Stairwell access	cal AD 61–218
B – Adult	25–35 yrs	Single tooth	6.08	Midden in cave	785–540 cal BC
C – Child	6–7 yrs	Single tooth	6.08	Midden in cave	777–539 cal BC
D – Infant	*c.* 9 mths	Proximal r. humerus	21.09/4	Stairwell wall fill	cal AD 84–229
E – Perinate	40 weeks	Partial inhumation	2.44	Blocked stairwell	cal AD 76–228
F – Perinate	–	L. tibia frag.	2.49	Blocked stairwell	
G – Foetus	3–6 mths	Partial inhumation	2.44	Blocked stairwell	cal AD 63–219
H – Perinate/neonate	–	Occipital bone	2.49	Blocked stairwell	cal AD 6–134
I – Infant	–	Single tooth	17.03	Midden in cave	208–87 cal BC
J – Adult	20–25 yrs	Pelvis iliac crest	2.61	Stairwell access	236–111 cal BC
K – Child	*c.* 10 yrs	R. foot phalanx	15.08	Midden in precinct	375–202 cal BC
	c. 10 yrs	Single tooth	15.08	Midden in precinct	327–204 cal BC
	c. 14 yrs+	Foot phalanx	2.16	Midden in precinct	366–196 cal BC
L – Foetus/perinate	–	Occipital bone	6.06	Behind slab in cave	120 cal BC–cal AD 19
M – Adult	–	Cranial frags	15.83	Midden in precinct	790–520 cal BC
		Charred cranial frags	2.15c	Midden in precinct	696–407 cal BC (dated contexts)

Table 11.10 Radiocarbon dates on Iron Age human remains from caves & rockshelters in the United Kingdom & Republic of Ireland (Scottish sites highlighted in dark shade & High Pasture Cave highlighted in light shade)

Site	*Country*	*Site type*	*Individual*	*Representation*	*Age BP*	*Calibrated date (95% probability)*	*Lab. code*
High Pasture Cave, Skye	Scotland	Cave	Adult	Single tooth	2503±29	785–540 cal BC	SUERC-66382
High Pasture Cave, Skye	Scotland	Cave	Child	Single tooth	2499±27	777–539 cal BC	SUERC-66384
Plateau Rift, Devon	England	Fissure cave	–	–	2480±65	–	OxA-4497
Carsington Pasture Cave, Derbys.	England	Cave	–	–	2435±55	–	OxA-9806
Skyrethorns, Yorkshire	England	Grike/fissure	Adult	Crania	2420±65	770–390 cal BC	OxA-6109
MacArthur Cave, Oban	Scotland	Cave	Adult	L. talus	2460±55	765–407 cal BC	OxA-4487
Antofts Windy Pit, Yorkshire	England	Fissure cave	–	–	2380±29	760–390 cal BC	OxA-13001
MacArthur Cave, Oban	Scotland	Cave	Adult	L. femur	2365±55	755–240 cal BC	OxA-4486
Langwith Cave, Derbys.	England	Cave	–	–	2330±60	–	OxA-2232
Priory Farm Cave, Pembrokeshire	Wales	Cave	–	–	2300±60	–	OxA-10648
MacArthur Cave, Oban	Scotland	Cave	Adult	R. patella	2295±60	499–183 cal BC	OxA-4488
North End Pot, Yorkshire	England	Fissure cave	Adult?	Crania	2260±55	–	HAR-8056
Wookey Hole, Mendip	England	Cave	–	–	2245±29	–	SUERC-50793
High Pasture Cave, Skye	Scotland	Cave	Child	R. foot phalanx	2217±30	375–202 cal BC	SUERC-66362
Plateau Rift, Devon	England	Fissure cave	–	–	2200±65	–	OxA-5818
MacArthur Cave, Oban	Scotland	Cave	Adult	R. humerus	2170±55	368–60 cal BC	OxA-4485
High Pasture Cave, Skye	Scotland	Cave	Young adult	Foot phalanx	2203±29	366–196 cal BC	SUERC-66378
High Pasture Cave, Skye	Scotland	Cave	Child	Single tooth	2233±29	327–204 cal BC	SUERC-66363
Tyning's Great Swallet, Mendip	England	Fissure cave	–	Lumbar vertebra	2254±29	320–200 cal BC	OxA-15350
High Pasture Cave, Skye	Scotland	Cave	Adult	Pelvis iliac crest	2160±27	236–111 cal BC	SUERC-66381
Mother Grundy's Parlour, Derbys.	England	Cave	–	–	2210±80	–	OxA-1832
Charterhouse Swallet, Mendip	England	Cave	–	–	2145±60	–	SRR-3450
High Pasture Cave, Skye	Scotland	Cave	Child	Single tooth	2130±26	208–87 cal BC	SUERC-66364
Coffey Cave, Co. Sligo	Eire	Cave	Adult	R. molar	2070±50	204 cal BC–cal AD 30	GrA-22112
St Cuthbert's Swallet, Mendip	England	Cave	–	–	2023±30	–	SUERC-50796

(Continued)

Table 11.10 (Continued)

Site	*Country*	*Site type*	*Individual*	*Representation*	*Age BP*	*Calibrated date (95% probability)*	*Lab. code*
Robin Hood's Cave, Derbys.	England	Cave	Adult	Mandible	2020±80	–	OxA-736
High Pasture Cave, Skye	Scotland	Cave	Foetus/ perinate	Occipital bone	1923±29	120 cal BC–cal AD 19	SUERC-66383
Distillery Cave, Oban	Scotland	Cave	Adult female	–	2023±29	108 cal BC–cal AD 55	SUERC-68705
Slip Gill Windy Pit, Yorkshire	England	Fissure cave	Young adult	Inhumation	1991±25	50 cal BC–cal AD 80	OxA-11800
High Pasture Cave, Skye	Scotland	Cave	Adult	Inhumation	1965±40	50 cal BC–cal AD 130	SUERC-14945
Slip Gill Windy Pit, Yorkshire	England	Fissure cave	Adult	Inhumation	1931±27	cal AD 4–130	OxA-14440
High Pasture Cave, Skye	Scotland	Cave	Perinate	Occipital bone	2048±27	cal AD 6–134	SUERC-66374
Fishmonger's Swallet, Alveston	England	Fissure cave	–	–	1990±80	–	Wk-8222
Dunald Mill Hole, Lancashire	England	Cave	–	–	1900±30	–	SUERC-56518
Fiskavaig Rockshelter, Fiskavaig	Scotland	Rockshelter	Adult	Perforated cranial frag.	1850±35	cal AD 70–240	SUERC-28068
Boat Cave, Co. Antrim	N. Ireland	Cave	Neonate/infant	Crania	1854±32	cal AD 81–236	UBA-6710
High Pasture Cave, Skye	Scotland	Cave	Infant	Proximal r. humerus	1857±27	cal AD 84–229	SUERC-66370
High Pasture Cave, Skye	Scotland	Cave	Perinate	Partial inhumation	1867±29	cal AD 76–228	SUERC-66372
High Pasture Cave, Skye	Scotland	Cave	Young adult	Cuneiform bone	1882±29	cal AD 6–220	SUERC-66368
High Pasture Cave, Skye	Scotland	Cave	Foetus	Partial inhumation	1884±29	cal AD 63–219	SUERC-66371
High Pasture Cave, Skye	Scotland	Cave	Adult	Vertebrae frag.	1885±29	cal AD 61–218	SUERC-66379
High Pasture Cave, Skye	Scotland	Cave	Young adult	Hand phalanx	1902±29	cal AD 49–177	SUERC-66369
High Pasture Cave, Skye	Scotland	Cave	Adult	Inhumation	1890±40	cal AD 20–230	SUERC-14946
Bone Hole, Somerset	England	Cave	–	–	1884±60	–	BRAMS-1259
Rawthey Cave, Cumbria	England	Fissure cave	Adult	Inhumation (crania)	1865±40	cal AD 60–240	OxA-7450
Bucklands Windy Pit, Yorkshire	England	Fissure cave	Adult	Inhumation	1864±24	cal AD 70–230	OxA-11798
Sculptor's Cave, Moray	Scotland	Cave	–	Axis vertebra	1835±35	cal AD 80–320	SUERC-16619
Bucklands Windy Pit, Yorkshire	England	Fissure cave	Adult	Inhumation	1829±24	cal AD 120–250	OxA-11799
Sculptor's Cave, Moray	Scotland	Cave	–	Axis vertebra	1795±35	cal AD 120–340	SUERC-16617

(Continued)

Table 11.10 Radiocarbon dates on Iron Age human remains from caves & rockshelters in the United Kingdom & Republic of Ireland (Scottish sites highlighted in dark shade & High Pasture Cave highlighted in light shade) (Continued)

Site	*Country*	*Site type*	*Individual*	*Representation*	*Age BP*	*Calibrated date (95% probability)*	*Lab. code*
Robin Hood's Cave, Derbyshire	England	Cave	Adult?	Mandible	1785±50	cal AD 120–390	OxA-1430
Sculptor's Cave, Moray	Scotland	Cave	Adult	R. tibia shaft frag.	1780±35	cal AD 130–350	SUERC-16621
Eel Point Cave, Caldey Island	Wales	Cave	–	–	1771±40	–	OxA-10968
Sculptor's Cave, Moray	Scotland	Cave	Juvenile	Thoracic vertebra	1770±35	cal AD 130–380	SUERC-16627
Wookey Hole, Mendip	England	Cave	–	–	1760±29	–	SUERC-50794
Dog Hole Cave, Cumbria	England	Fissure cave	–	–	1746±27	–	OxA-14173
Sculptor's Cave, Moray	Scotland	Cave	–	Axis vertebra	1740±35	cal AD 220–400	SUERC-16620
Sculptor's Cave, Moray	Scotland	Cave	–	Axis vertebra	1738±33	cal AD 230–400	UB-6930
Sculptor's Cave, Moray	Scotland	Cave	–	Axis vertebra	1735±35	cal AD 220–400	SUERC-16618
Dog Hole Cave, Cumbria	England	Fissure cave	–	–	1734±30	–	OxA-15994
Potter's Cave, Caldey Island	Wales	Cave	–	–	1725±40	–	OxA-7689
Uphill Quarry Caves 2, Somerset	England	Cave	–	–	1710±60	–	OxA-4022
Sculptor's Cave, Moray	Scotland	Cave	Male	L. temporal	1696±29	cal AD 250–420	SUERC-68712
Daylight Rock Cave, Caldey Island	Wales	Cave	–	–	1635±40	–	OxA-7685
Three Holes Cave, Devon	England	Cave	–	–	1540±80	–	OxA-3210

11.4 Isotopic analysis of the skeletal remains

Mandy Jay, Janet Montgomery, Jane Evans, and Julia Beaumont

11.4.1 Introduction

Isotopic analysis applies a number of different techniques to archaeological teeth and bones to obtain a chemical signature determined by the food and drink consumed during a person's lifetime. By matching the isotopic signature from the skeletal remains to that expected for different types of resource and the various environments from which those resources might have been obtained, it is possible to build up a picture of the diet and biosphere in which an individual lived, or from which they obtained their food, and also to consider whether they may have moved between different environments during their lives.

Some of these techniques were applied to both humans and animals from the site. Carbon, nitrogen, and sulphur analysis was undertaken on bone collagen. For the Iron Age adult woman (Individual A) from the stairwell, incremental dentine samples were also taken for carbon and nitrogen analysis and her tooth enamel was analysed for strontium, oxygen, and lead isotopes. This combination of techniques allows a multi-isotope approach to be taken to interpret relationships between diet and the local environment, the possible relationship between the infants from the stairwell and the adult, and the possibility that the woman might have originated outside of Skye.

The results from isotopic analysis are set out below. Each section provides some basic and relevant information about isotope ratio data for each of the chemical elements analysed and results relating to the relevant isotopic analysis. Further details relating to methodologies can be obtained from the references provided and the site archive.

Table 11.11 Bulk carbon & nitrogen isotope data for humans & animals from High Pasture Cave

Lab code[1]	*Species*	*Skeletal element*	*Sample & context details*	*$\delta^{13}C$ (‰)*	*$\delta^{15}N$ (‰)*	*C:N (atomic)*	*%C*	*%N*	*Collagen yield (%)*[2]
S-EVA 2294	Human E	L. clavicle	Perinate E, same individual as SUERC 66372	-21.5	10.7	3.2	41.9	15.3	2.2
SUERC 66372	Human E	R. femur	Perinate E, same individual as S-EVA 2294	-21.6	10.6	3.5	27.8	9.4	N/K
S-EVA 2295	Human A	L. clavicle	Adult female, poss. same individual as SUERC 66379, 66368 & 66369	-21.1	10.6	3.3	40.8	14.5	1.8
SUERC 66379	Human A?	Vertebra	Adult, *c.* 25 yrs+, poss. same individual as S-EVA 2295, SUERC 66368 & 66369	-21.3	10.2	3.3	36.3	12.8	N/K
SUERC 66368	Human A?	1st cuneiform	Adolescent, *c.* 14 yrs+, poss. same individual as S-EVA 2295, SUERC 66379 & 66369	-21.6	10.3	3.4	27.6	9.4	N/K
SUERC 66369	Human A?	Hand phalanx	Adolescent, *c.* 14 yrs, poss. same individual as S-EVA 2295, SUERC 66379 & 66368	-21.2	10.4	3.3	35.9	12.9	N/K
S-EVA 2296	Human G	R. clavicle	Foetus G. Same individual as SUERC 66371 & poss. same as SUERC 66374	-21.3	10.6	3.3	40.9	14.4	2.0
SUERC 66374	Human H	Cranial frag.	Perinate/neonate, poss. same individual as S-EVA 2296 & SUERC 66371 Radiocarbon date 1923±29 BP (AD 6–134, 95% probability)	-21.8	10.6	3.3	37.8	13.5	N/K
SUERC 66371	Human G	R. femur	Foetus G. Same individual as S-EVA 2296 & poss. same as SUERC 66374	-21.6	10.8	3.3	39.0	14.0	N/K
SUERC 66384	Human C	Upper r. incisor	Child, *c.* 6–7 yrs	-20.9	11.2	3.2	43.9	16.0	N/K
SUERC 66362	Human K	R. foot phalanx	Child, *c.* 10 yrs+, same individual as SUERC 66363 & poss same as 66378	-19.3	12.3	3.3	38.4	13.5	N/K
SUERC 66363	Human K	Lower permanent incisor	Child, *c.* 10 yrs+, same individual as SUERC 66362 & poss. same as 66378	-19.8	12.0	3.2	42.9	15.5	N/K
SUERC 66378	Human K?	1st foot phalanx	Adolescent, *c.* 14 yrs+ (Sample 2443), poss same individual as SUERC 66362 & 66363	-19.5	11.8	3.2	35.2	12.7	N/K
SUERC 66364	Human I	Lower r. unerupted deciduous 1st molar	Infant I, 9 mths±3 mths	-20.7	10.1	3.2	42.2	15.2	N/K
SUERC 66383	Human	Occipital	Frag. F6.272, foetus or perinate	-21.7	10.4	3.4	39.0	13.5	N/K
SUERC 66370	Human D	R. humerus	Infant D, *c.* 9 mths	-22.0	10.8	3.5	33.3	11.3	N/K
S-EVA 2297	Cattle	Calcaneus	Trench 3, Context C3.03	-21.3	4.6	3.2	43.4	16.0	3.4
S-EVA 2298	Cattle	Patella	Trench 2, Feature F223, Context C2.44. Skel.01. Bone 65	-21.7	4.3	3.4	42.5	14.6	4.2

(Continued)

Table 11.11 Bulk carbon & nitrogen isotope data for humans & animals from High Pasture Cave (Continued)

Lab code[1]	*Species*	*Skeletal element*	*Sample & context details*	*$\delta^{13}C$ (‰)*	*$\delta^{15}N$ (‰)*	*C:N (atomic)*	*%C*	*%N*	*Collagen yield (%)*[2]
S-EVA 2299	Cattle	Metapodial	Trench 2, Find F2269, Feature F223, Context C2.45	-21.6	4.2	3.3	41.9	15.0	3.0
S-EVA 2301	Cattle	Scapula	Context C001/5, Zone 5 of Bone Passage (cave) mainstream deposit. Cattle bone deposit directly dated: SUERC-14940	-21.5	3.6	3.2	42.3	15.4	3.3
S-EVA 2302	Cattle	Scapula	Zone 2 of Bone Passage (cave), Context C001	-21.8	5.6	3.3	41.2	14.6	2.1
S-EVA 2304	Cattle	Calcaneus	Trench 2, Find F2151, Context C2.16	-21.5	5.0	3.3	42.3	15.3	4.6
S-EVA 2305	Cattle	Femur	Trench 2, Find F2151, Context C2.16	-21.6	4.2	3.3	42.6	15.3	2.2
S-EVA 2306	Cattle	Scapula	Trench 2, Fine F2151, Context C2.16, F2151	-21.6	5.2	3.2	42.9	15.9	3.6
S-EVA 2307	Cattle	Metapodial	Trench 2, Find F2090, Context C2.10	-21.4	4.6	3.3	41.0	14.7	4.7
S-EVA 2308	Cattle	Phalanx	Trench 2, Find F2076, Context C2.10 Spit 1	-21.1	4.3	3.3	42.9	15.4	3.9
S-EVA 2309	Cattle	Ulna	Trench 2, Find F2143, Context C2.15. Contexts C2.15a, b & c directly dated on animal bone: SUERC-50995, 50998 & 50987	-21.6	4.2	3.1	42.6	15.9	1.4
SUERC 66360	Cattle	Bone	Context C17.03. Radiocarbon dated	-21.8	4.0	3.4	23.5	8.1	N/K
SUERC 66361	Cattle	Bone	Context C17.06. Radiocarbon dated	-22.7	5.3	3.5	27.1	9.1	N/K
SUERC 66354	Cattle	Bone	Context C17.07. Radiocarbon dated	-22.5	4.8	3.3	28.2	9.9	N/K
S-EVA 2313	Sheep	Mandible	Trench 2, Find F2141, Context C2.23. Adult animal	-21.4	5.0	3.2	42.7	15.7	5.6
S-EVA 2314	Sheep/ goat	Scapula	Trench 2, Find F2084, Feature F204, Context C2.03	-22.0	5.3	3.2	43.5	16.1	7.1
S-EVA 2315	Sheep/ goat	Scapula	Trench 2, Find F2183, Context C2.34	-21.8	5.0	3.3	43.6	15.6	5.4
S-EVA 2316	Sheep	Mandible	Zone 3 of Bone Passage, Context C001	-21.5	5.6	3.2	42.6	15.4	2.2
S-EVA 2317	Sheep/ goat	Femur	Trench 2, Find F2139, Context C2.32	-22.0	5.6	3.2	41.7	15.3	5.7
S-EVA 2318	Red deer	Humerus	Trench 2, Find F2145, Context C2.16	-21.3	3.7	3.3	42.8	15.4	4.8
S-EVA 2319	Red deer	Navicular cuboid	Trench 2, Find F2144, Context C2.16	-22.0	4.7	3.3	41.4	14.8	7.4
S-EVA 2320	Red deer	Metapodial	Trench 2, Find F2154, Context C2.31	-21.7	3.4	3.4	41.5	14.3	0.8
S-EVA 2303	Red deer	Scapula	Zone 3 of Bone Passage (cave), Context C001	-21.1	2.9	3.2	42.3	15.7	4.5
S-EVA 2321	Pig	Mandible	Trench 6, Context C6.01, Bone Passage, ‘special’ deposit. T33, T1. Animal over 2 yrs. Context directly dated: SUERC-50988	-21.4	7.2	3.1	42.1	15.8	3.9
S-EVA 2322	Pig	Maxilla	Trench 6, Context C6.01, Bone Passage, ‘special’ deposit. T41, T40, T39. Animal over 2 yrs. Context directly dated: SUERC-50988	-21.0	7.6	3.3	42.6	15.4	2.7

(Continued)

Table 11.11 (Continued)

Lab code[1]	*Species*	*Skeletal element*	*Sample & context details*	*$\delta^{13}C$ (‰)*	*$\delta^{15}N$ (‰)*	*C:N (atomic)*	*%C*	*%N*	*Collagen yield (%)*[2]
S-EVA 2323	Pig	Mandible	Trench 6, Context C6.01, Bone Passage, 'special' deposit. T7, T34. Animal over 2 yrs. Context directly dated: SUERC-50988	-20.6	8.3	3.2	42.8	15.7	5.0
S-EVA 2324	Pig	Maxilla	Trench 6, Context C6.01, Bone Passage, 'special' deposit. T.38. Animal over 2 yrs. Context directly dated: SUERC-50988	-21.4	7.7	3.1	42.6	15.9	2.8
S-EVA 2325	Pig	Mandible	Trench 6, Context C6.01, Bone Passage, 'special' deposit. T.8. Animal over 2 yrs. Context directly dated on animal bone: SUERC-50988	-22.0	6.6	3.2	43.2	16.1	3.8
S-EVA 2326	Pig	Mandible	Trench 6, Context C6.01, Bone Passage, 'special' deposit. T32, T3-4, T17–18. Animal over 1 yr. Context directly dated: SUERC-50988	-20.6	7.4	3.3	42.2	14.9	2.9
SUERC 66358	Pig	Bone	Context C001. 'Special' deposit. Radiocarbon dated	-21.8	7.2	3.3	36.7	13.0	N/K
SUERC 66359	Pig	Bone	Context C001. 'Special' deposit. Radiocarbon dated	-21.7	7.6	3.4	29.4	10.2	N/K
S-EVA 2300	Pig	Metapodial	Trench 3, Context C3.03	-22.3	5.3	3.2	42.7	15.5	6.6
S-EVA 2310	Pig	Mandible	Trench 2, Find F2138, Context C2.26. Animal over 1 yr.	-22.0	6.5	3.2	43.3	15.8	2.0
S-EVA 2311	Pig	Mandible	Trench 2, Find F2157, Context C2.27	-21.9	5.9	3.3	43.8	15.7	4.2
S-EVA 2312	Pig	Metapodial	Trench 2, Find F2142, Context C2.27. Poss. younger animal than surface deposit mandibles taken, but adult	-21.4	6.8	3.2	44.6	16.6	8.7
SUERC 66381	Pig(?)	Bone	Block 8c, Phase 4, Context C2.61. Originally identified as human 'pelvis iliac crest', but prob. misidentified & likely to be pig bone frag. Radiocarbon dated	-22.3	7.0	3.2	36.7	13.2	N/K
SUERC 66382	Pig(?)	Tooth	Block 25a, Phase 2, Context C6.08. Originally identified as human 'upper l. 3rd molar', but prob. misidentified & likely to be deciduous pig tooth. Radiocarbon dated	-21.9	5.9	3.2	39.5	14.3	N/K
SUERC 66353	Pig	Bone	Block 27b, Phase 4, Context C17.05. Radiocarbon dated	-21.7	8.1	3.4	32.2	11.1	N/K
SUERC 66373	Pig	Humerus	Block 22a, Phase 6, Context C2.47. Foetal/neonate/perinate pig. Radiocarbon dated	-19.1	11.0	3.3	40.2	14.2	N/K
SUERC 66380	Pig	Humerus	Block 8c, Phase 4, Context C2.61. Foetal/neonate/perinate pig. Radiocarbon dated	-19.2	11.1	3.3	40.6	14.3	N/K

[1] The S-EVA numbers are the laboratory codes from analysis at the Max Planck Institute for Evolutionary Anthropology in Leipzig & the SUERC numbers are the codes from the analyses undertaken at the Scottish Universities Environmental Research Centre in Glasgow.

[2] The collagen extraction process involves the use of ultrafilters, thereby reducing yields due to the discard of the more degraded molecules. This factor must be considered when yields are compared with other published data. Yield data are only available for extraction undertaken at the Max Planck Institute; data have not been supplied by SUERC & are marked as N/K (not known).

[3] All data presented are the mean of two replicates, run in separate batches.

11.4.2 Results

Carbon and nitrogen: bone samples

Details of the material sampled are included in Table 11.11, along with the results which are presented in Figures 11.5 and 11.6. The material analysed spans a radiocarbon range from around 2700 to 1850 BP. These calibrate to a period which probably starts around the 9th century BC and ends with human deposits, including the burial of the female adult Individual A associated with infants, around the 1st–2nd century AD. These human deposits are later in date than the majority of the animal bone, although one of the cattle samples came from the fill of the burial, at the top of the backfilled stairwell. Other human samples are dated throughout the sequence.

Carbon and nitrogen: incremental dentine samples

Incremental dentine analysis was undertaken on Adult Female A's maxillary right first, second, and third molars and on the tooth originally described as a retained deciduous canine but which was subsequently identified as a supernumerary permanent incisor as a result of the isotopic analysis and observations by one of the authors, an experienced dentist (JB). The results are depicted in Figures 11.7 and 11.8 and the data can be found in Beaumont and Montgomery (2015).

The charts show the nitrogen and carbon separately, plotted according to the formation point for each increment analysed. Overall, the data cover a period from around 6 months to 23 years of age. The time at which formation of a particular incremental sample occurs is identified according to the growth pattern of the particular tooth being analysed. It is important, therefore, to know which tooth it is, but supernumerary teeth can be difficult to identify. In this case, identification as a retained deciduous canine will give a different formation timing profile than if it is identified as a permanent supernumerary incisor. Figure 11.8 therefore shows two different profiles for this tooth, one for each possible identification.

The profile for a permanent supernumerary incisor fits almost exactly with the profile for the first molar, whereas that for a retained deciduous canine corresponds much less precisely. If the profile timing is correctly attributed (see Beaumont and Montgomery 2015), then each tooth should provide a similar plot for those periods of tooth growth which overlap. This is because the diet which is contributing to the formation of the tooth root is the same for all teeth forming at any one particular time. It would be expected, therefore, that the profiles for the first molar and the other tooth would match relatively well for any period of overlap, so an identification of this tooth as a supernumerary permanent tooth is indicated by these data.

Sulphur

The $\delta^{34}S$ data are provided in Table 11.12 and shown in Figure 11.9 plotted with $\delta^{15}N$ values. They are available for the majority of both the human and animal samples except for those where the samples were small, and the collagen yield was insufficient to undertake sulphur isotope ratio analysis.

Sulphur data for 30 of the animals, Adult Female A and associated Perinate E were obtained from the laboratories at the University of British Columbia in Vancouver under the supervision of Olaf Nehlich and Mike Richards. Data for six of the animals and 11 of the human samples (including duplication for Perinate E) were obtained from the laboratories at SUERC in

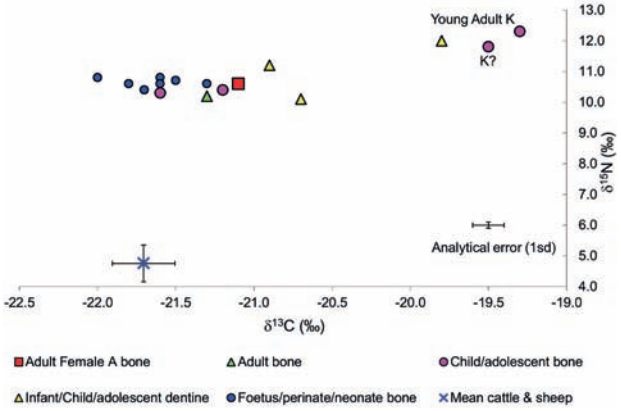


Figure 11.5. Carbon & nitrogen isotope ratios plotted for the human samples along with the mean for the domesticated herbivores. All human samples have been plotted separately; they have not been combined where a duplication of an individual is either definitely, or possibly present (see Table 11.11 for details)

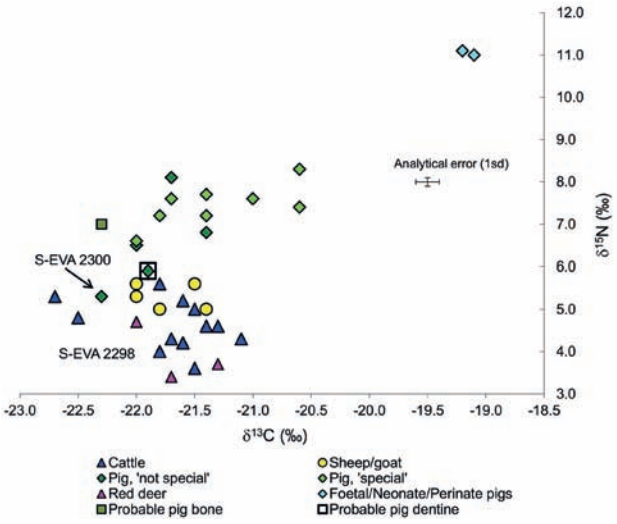


Figure 11.6. Carbon & nitrogen isotope ratios for the animals. The pigs are differentiated to show those from the 'special' Bone Passage deposit (Contexts C6.01/C001) separately. S-EVA 2300 is a pig from outside the Bone Passage, but which is closest in date to the 'special' group, being from a deposit within the former access to the Stairwell landing. S-EVA 2298 is the cattle sample from the fill context of the human burial of Adult Female A (Context C244)

Glasgow under the supervision of Kerry Sayle. There was a significant difference between the data obtained from the two laboratories, with those from SUERC being in the region of 5‰ higher for the animals and also for the duplicated sampling of Perinate E. This is likely to be a problem with analytical accuracy (rather than precision) and the SUERC data have been adjusted in Table 11.12 and Figure 11.9 by 4.7‰ (the difference between the values for duplicated Perinate E) to ensure comparability in the discussion. Data given in the text are all adjusted in this way.

The Vancouver laboratory used international standards in all sample runs and used vanadium pentoxide to aid the burn, while the Glasgow laboratory used internal standards previously calibrated to international standards and did not include vanadium pentoxide with the samples. Both laboratories ultrafiltered the collagen during processing, although the brand of ultrafilter was different. Since the difference appears to be systematic, it has been considered appropriate to adjust one set of data to make them comparable and the $\delta^{34}S$ values from Glasgow, as presented in this report, have been adjusted down by 4.7‰ (the amount of the difference between the one common individual). The decision to adjust the Glasgow data was based on the larger number of values obtained from Vancouver and also the fact that the latter runs included international standards alongside all samples. It is the adjusted data which are presented in the charts, tables, and text.

The analytical error for sulphur analysis (conservatively 1.0‰ [1 sd]) is much larger than that for carbon and nitrogen (0.1‰). Figure 11.9 shows that one of the animals (a red deer) has a noticeably lower value than the majority (11.6‰) the range starting at 12.7‰ if this animal is excluded. There is no significant trophic level effect for sulphur data, so that the differences between the diets of herbivorous and omnivorous animals (including humans) expected for carbon and nitrogen data are not important here, and that is reflected in the human values having a similar sulphur data range to the animals but higher $\delta^{15}N$ values. There are no significant differences in the sulphur data between the animals when grouped by species, or between the pigs when grouped separately between those from the Bone Passage deposit and the others. The sulphur isotope ratios are consistent across the animal species, suggesting, as would be expected, that they all reflect the 'baseline' value provided by the local geology and environment. This provides a comparative for the human values, which are very similar.

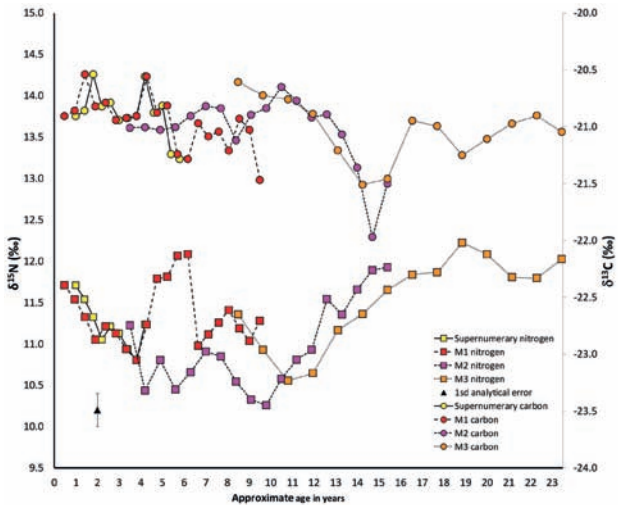


Figure 11.7. Carbon & nitrogen isotope ratios for dentine increments from the four analysed teeth from Adult Female A plotted against the approximate age at which each increment formed

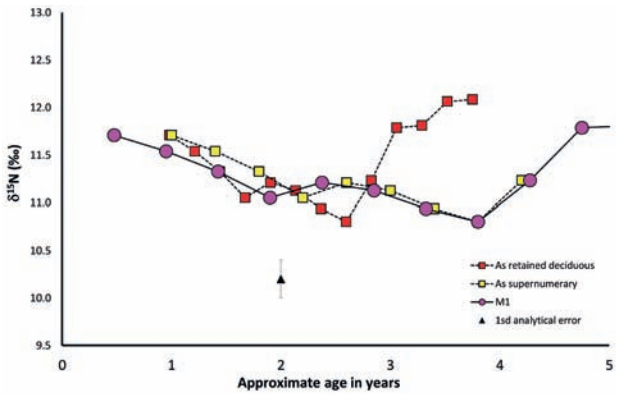


Figure 11.8. Nitrogen isotope ratios for dentine increments from Adult Female A for the first five years. The chart shows both the first molar & the tooth originally identified as a retained deciduous. The latter has been plotted both as if it were deciduous & also, as if it were a permanent supernumerary tooth, indicating that the overlapping period with the first molar is much closer when it is treated as a permanent tooth

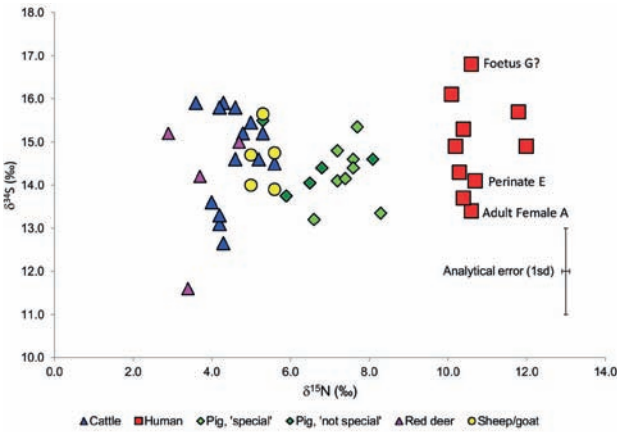


Figure 11.9. Sulphur & nitrogen isotope ratios plotted for human & animal samples. The $\delta^{34}S$ values from the samples analysed at the SUERC laboratories have been adjusted downwards by 4.7‰ for comparative purposes; see the Methods section of the text for details & Table 11.3 for the samples involved. All human samples have been plotted separately; they have not been combined where a duplication of an individual is either definitely, or possibly present (see Table 11.11 for details). The highest human $\delta^{34}S$ value is for a sample identified as possibly Foetus G, but this is thought to be unlikely given the isotope data (see text for details)

Table 11.12 Sulphur isotope data for humans & animals from High Pasture Cave

Lab code	*Species*	*Sample details*[2]	*$\delta^{34}S$ (‰)*[3]	*%S*	*C:S (atomic)*	*N:S (atomic)*
S-EVA 2294	Human	Perinate E, same individual as 66372. Data based on 1 replicate	14.1	0.25	440	138
SUERC-66372	Human	Perinate E, same individual as 2294	14.1	0.18	407	118
S-EVA 2295	Human	Adult female A. Data based on 1 replicate. Poss. same individual as 66379, 66368 & 66369.	13.4	0.19	565	172
SUERC-66379	Human	Adult female A? Poss. same individual as 2295, 66368 & 66369	14.9	0.16	616	186
SUERC-66368	Human	Adult female A? Poss. same individual as 2295, 66379 & 66369	14.3	0.16	469	137
SUERC-66369	Human	Adult female A? Poss. same individual as 2295, 66379 & 66368	13.7	0.19	496	152
SUERC-66363	Human	Young Adult K, same individual as 66362 but no sulphur data available for that one. Poss. same individual as 66378	14.9	0.19	606	188
SUERC-66378	Human	Young Adult A or K? Poss. same individual as 66362 & 66378, sulphur data only available for latter	15.7	0.16	575	179
SUERC-66364	Human	Infant I	16.1	0.20	554	172
SUERC-66383	Human	Perinate H	15.3	0.22	473	140
SUERC-66374	Human	Neonate G? Poss. same individual as 2296 & 66371, but no sulphur data available for those	16.8	0.17	579	177
S-EVA 2297	Cattle		15.8	0.25	457	144
S-EVA 2298	Cattle	Same context as Adult female A human burial	15.9	0.26	445	131
S-EVA 2299	Cattle	Immediately below Adult female A human burial	13.1	0.24	464	142
S-EVA 2301	Cattle		15.9	0.25	450	141
S-EVA 2302	Cattle		14.5	0.25	438	133
S-EVA 2304	Cattle		15.5	0.23	488	151
S-EVA 2305	Cattle		13.3	0.24	470	145
S-EVA 2306	Cattle		14.6	0.24	486	154
S-EVA 2307	Cattle		14.6	0.23	480	148
S-EVA 2308	Cattle		12.7	0.24	487	150
S-EVA 2309	Cattle	Data based on 1 replicate	15.8	0.25	453	145
SUERC-66360	Cattle		13.6	0.15	428	127
SUERC-66361	Cattle		15.2	0.13	559	161
SUERC-66354	Cattle		15.2	0.23	332	100
S-EVA 2313	Sheep		14.0	0.28	410	129
S-EVA 2314	Sheep/ goat		15.7	0.28	417	132
S-EVA 2315	Sheep/ goat		14.7	0.28	421	129
S-EVA 2316	Sheep	Data based on 1 replicate	13.9	0.29	387	120
S-EVA 2317	Sheep/ goat		14.8	0.28	398	125
S-EVA 2318	Red deer		14.2	0.23	490	151
S-EVA 2319	Red deer		15.0	0.23	481	147
S-EVA 2320	Red deer	Data based on 1 replicate	11.6	0.32	352	104

(Continued)

Table 11.12 (Continued)

Lab code	*Species*	*Sample details*[2]	*$\delta^{34}S$ (‰)*[3]	*%S*	*C:S (atomic)*	*N:S (atomic)*
S-EVA 2303	Red deer		15.2	0.24	467	149
S-EVA 2310	Pig		14.1	0.25	462	144
S-EVA 2311	Pig		13.8	0.30	390	120
S-EVA 2312	Pig		14.4	0.28	421	134
S-EVA 2321	Pig	Bone Passage deposit	14.1	0.25	453	146
S-EVA 2322	Pig	Bone Passage deposit. Data based on 1 replicate	14.6	0.23	486	151
S-EVA 2323	Pig	Bone Passage deposit	13.4	0.26	444	140
S-EVA 2324	Pig	Bone Passage deposit	15.4	0.25	448	143
S-EVA 2325	Pig	Bone Passage deposit. Data based on 1 replicate	13.2	0.25	454	145
S-EVA 2326	Pig	Bone Passage deposit	14.2	0.25	454	137
S-EVA 2300	Pig	Latest dating pig available outside of Bone Passage	15.5	0.28	412	128
SUERC-66353	Pig		14.6	0.27	318	94
SUERC-66358	Pig	Bone passage deposit	14.8	0.25	388	118
SUERC-66359	Pig	Bone passage deposit	14.4	0.23	336	100
SUERC-66381	Pig(?)	Originally misidentified as human, probably pig	14.7	0.20	492	151
SUERC-66382	Pig(?)	Originally misidentified as human, probably pig	15.4	0.22	478	148

[1] All S-EVA (University of British Columbia in Vancouver) data presented are the mean of two replicates, run in separate batches, except where collagen yield was insufficient for two analyses as indicated in the sample details column. SUERC data were run with 25% of samples duplicated.

[2] Comparisons between S-EVA & SUERC $\delta^{34}S$ values indicate that the data from Glasgow were significantly higher than those obtained from Vancouver. This was true for the groups of samples as a whole, for both humans & animals, & also for one sample for which analysis was undertaken at both laboratories. To allow direct comparison, the SUERC data were adjusted by 4.7‰ for presentation in this table.

Table 11.13 Tooth samples analysed from Adult Female A

Sample code	*Tooth*	*Crown mineralisation complete by approx..*	*Tooth preservation scores*			
			Root[1]	Attrition[2]	Enamel[3]	Dentine[3]
HPCS-100	Permanent supernumerary incisor[4]	5 years	5	2	3	23
HPCS-101	M^1R	4 years	5	4	3	3
HPCS-102	M^2R	8 years	5	3	3	3
HPCS-103	M^3R	16 years	5	2	3	3

[1] Scored using the table given in Montgomery (2002) adapted from Buikstra and Ubelaker (1994): 5 – roots complete, apices closed or closing.

[2] Scored using the table given in Montgomery (2002) adapted from Buikstra and Ubelaker (1994): 2 – slight, 3 – slight–moderate, 4 – moderate.

[3] Scored using the table in Montgomery (2002): 2 – preservation excellent, 3 – preservation good.

[4] Originally identified as a retained deciduous tooth, this has been re-attributed as a supernumerary incisor following isotopic analysis of the incremental dentine samples.

Strontium

Strontium analysis was undertaken on the tooth enamel from four of the maxillary teeth of Adult Female A (see Table 11.13). The enamel of these mineralises sequentially so taken together they span the period from before birth (*i.e.*, the diet of the mother) until the age of approximately 16, although the age at which a specific tooth mineralises in individuals varies considerably and the formation of the third molar (or wisdom tooth) particularly is highly variable (Hillson 1996; 2005). Analysis was also undertaken on the dentine from the third molar, to provide data which can be used to indicate any trend in diagenetic alteration towards the values present in the burial context.

The strontium results are shown in Table 11.14 and Figure 11.10. The differences in ratio and concentration between the four teeth are small, but there is a tendency for the concentration to rise as the ratio approaches 0.7092 (indicated by the dashed line) which is the value of marine shell-sand (machair), seawater, and rainwater in coastal regions.

Figure 11.10 also shows data obtained from human skeletons from machair burial sites on Lewis, Harris and South Uist, dating from the Neolithic to the Viking period. They separate into two groups, one of which, termed 'machair' dwellers, has high strontium concentrations and is dominated by strontium of marine origin (*i.e.,* 0.7092). The second, termed 'silicate' dwellers, has low-strontium concentrations and defines a linear array. It has been suggested elsewhere (Montgomery and Evans 2006; Montgomery *et al.* 2007) that the first group represents indigenous Outer Hebrideans whose dietary strontium is dominated by marine sources (*e.g.,* machair-grown crops, sea-splash, seaweed for food, fodder, and fertiliser) with only a small contribution from the gneiss and where there are thus few dietary strontium sources above 0.7092 and none below 0.7092. The second group are interpreted as immigrants to the islands from non-machair and possibly non-coastal regions; this conclusion is supported by the two burials from Arran and Mull also included in Figure 11.10.

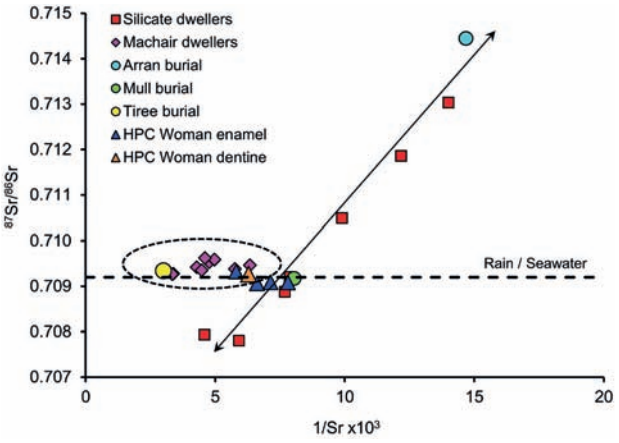


Figure 11.10. Strontium isotope ratios for High Pasture Cave & comparative sites plotted with strontium concentration data. The strontium concentrations are plotted as 1/Sr ppm, so high concentrations are on the left of the plot & low concentrations on the right. Enamel data for archaeological humans from the Outer Hebrides splits into two groups: indigenous Outer Hebridean machair dwellers (represented within the oval) & non-indigenous silicate dwellers (represented along the mixing line). Also shown are a burial from Arran, 1 from Mull, & 1 from Tiree. In addition to the enamel data, a dentine sample from the High Pasture Cave woman is shown, providing a value which may be indicative of the local burial environment. The dotted line indicates the modern value for seawater; 4 sd errors are within symbol. Comparative data sources: Montgomery 2002; Parker Pearson et al. *2005; Montgomery* et al. *2007; Armit* et al. *2015*

The results from the four High Pasture Cave teeth span the gap between the high strontium machair dwellers and the low-strontium silicate dwellers but three of the teeth have values below seawater which indicates some contribution from either basalt or limestones. There is, however, no systematic change in the four teeth from earliest to latest formed. Three of the four teeth have ratios below 0.7092, which is not consistent with Outer Hebridean origins. These three teeth represent the period from around 3–4 months up to around 16 years of age. The first molar, representing the period from approximately birth to 4 years of age (AlQahtani *et al.* 2010), is different and while it is consistent with Outer Hebridean origins it could equally indicate a greater dietary contribution from higher ratio strontium sources such as granite, of which the Red Cuillins are formed, at this stage of life. This could have arisen through a change in residence or an *in situ* change in diet but, given the comparability of the lead isotopes in all four teeth and that cohabiting siblings have been found to vary in their strontium isotope ratios by the same degree (Montgomery 2002, 148), it is within accepted individual variability.

Given the wide range (*i.e.,* 0.705–0.720) of biosphere $^{87}Sr/^{86}Sr$ values present on the Isle of Skye (Evans *et al.* 2009) and the absence of any other human or animal data, it is currently difficult to know what $^{87}Sr/^{86}Sr$ ratios people living and farming on Skye and in particular on the Durness limestone, one of the most fertile regions of the island, would exhibit. Marine carbonate rocks such as limestones and chalks tend to have $^{87}Sr/^{86}Sr$ ratios between ~0.7067 and ~0.7092 (McArthur *et al.* 2001) which reflects the changing $^{87}Sr/^{86}Sr$ ratio of the

Table 11.14 Strontium, lead, & oxygen isotope ratio data for Adult Female A

Sample	*Tissue*	*$^{206}Pb/^{204}Pb$[1]*	*$^{207}Pb/^{204}Pb$*	*$^{208}Pb/^{204}Pb$*	*$^{207}Pb/^{206}Pb$*	*$^{208}Pb/^{206}Pb$*	*Sr ppm*	*$^{87}Sr/^{86}Sr$[2]*	*$\delta^{18}O_p$‰[3]*
HPCS-100	Enamel	18.35	15.61	38.37	0.851	2.091	140	0.709085	
HPCS-101	Enamel	18.35	15.61	38.38	0.851	2.092	172	0.709317	17.7
HPCS-102	Enamel	18.36	15.63	38.43	0.851	2.093	128	0.709081	17.6
HPCS-103	Enamel	18.36	15.62	38.42	0.851	2.093	151	0.709061	17.5
HPCS-103	Dentine						159	0.709263	

[1] Data published in Montgomery *et al.* (2010). External reproducibility was estimated at: ±0.019% for $^{208}Pb/^{204}Pb$; ±0.014% for $^{207}Pb/^{204}Pb$; ±0.008% for $^{206}Pb/^{204}Pb$; ±0.007% for $^{207}Pb/^{206}Pb$; and ±0.013% for $^{208}Pb/^{206}Pb$ (1 sd, n – 9).

[2] Data published in Evans *et al.* (2009). External reproducibility was estimated at ±0.002% (1 sd).

[3] Data published in Evans *et al.* (2012). External reproducibility over a 7 month period was estimated at ±0.28‰ (1 sd, n – 80).

seawater over geological time. The $^{87}Sr/^{86}Sr$ of Ordovician and Cambrian marine carbonates (570–430 Ma) ranges from ~0.7078 to ~0.7092 (Dickin 2005, 59) but there is evidence to suggest that silicate impurities within the rocks and run-off from higher land composed of different rock types, can increase or lower the ratio of the overlying biosphere in components such as freshwater and plants (Montgomery *et al.* 2006; 2007; Evans *et al.* 2009).

The $^{87}Sr/^{86}Sr$ ratio of 0.70926 obtained from the dentine of the third molar provides an indication that the mobile strontium available at the limestone burial site was at least equal to or higher than this value. Plants growing on the Durness limestone, modern snails collected on it and an Iron Age snail from the cave produced a range of values from 0.7089 to 0.7094 (Evans *et al.* 2009) which span the values from the three teeth.

Oxygen

Oxygen isotope data from the enamel phosphate of the three permanent molars are presented alongside the strontium isotope ratios in Figure 11.11. The supernumerary tooth had insufficient enamel remaining for a reliable analysis. The mean enamel phosphate values decrease with the individual's age from 17.7‰ (first molar) to 17.5‰ (third molar). This pattern would be expected if a breastfeeding signature were present in the first molar and not the third molar. However, the magnitude of the difference (0.2‰) is low compared to other studies, which found a difference of 0.7‰ (Wright and Schwarcz 1998), and such a conclusion would imply a reduced breastfeeding signal in the second molar. The first maxillary molar crown commences mineralisation around birth, but crown mineralisation is not completed until around 4 years (Table 11.13) and at this age the diet may not be dominated by breast milk. Moreover, as already stated, the shift from first, to second, to third molar is small and is certainly within analytical uncertainty.

Figure 11.11 shows the ranges (to 1 sd) suggested by Evans *et al.* (2012) for eastern and western Britain, reflecting lower and higher rainfall regions respectively. Although the isotope ratios for adult female A plot in the eastern range, all of them are either in, or towards, the overlap region on the plot. Given that the range shown is only for 1 sd (68%), the overlap is much greater at 2 sd (95%) and this, together with analytical error considerations, mean that the data may well be consistent with an origin on Skye, although they would also be consistent with other regions of Britain. Recently, a Neolithic female from Tiree, another inner Hebridean island, was found to have the same value (*i.e.*, 17.7‰) as the female from High Pasture Cave (Armit *et al.* 2015). The comparative data in Figure 11.11 also show values obtained from South Uist in the Western Isles (Parker Pearson *et al.* 2004) and these also show values which plot towards the eastern range.

There are many sources of variation in how and when oxygen isotope ratios are changed (fractionated), both within the body and externally, that can produce variation among an indigenous population, and these are by no means well established or precisely understood. There are currently no baseline data for humans inhabiting the Isle of Skye in the Iron Age from which to assess the population variation and compare the results from High Pasture Cave. It is not known whether the woman at High Pasture Cave drank rainwater, surface water (*e.g.,* stream water), or groundwater (*e.g.*, well water), a combination of all three, or if this varied seasonally or over the years from choice or necessity. Oxygen isotope ratios of precipitation vary throughout the year and, in a region of high rainfall such as the west coast of Scotland, drinking rain or surface water may have an impact on the enamel values of an individual if the tooth analysed was mineralised predominantly from winter or summer rain over one or more years.

Lead

All four teeth from the woman produced very similar lead isotope ratios that were within analytical error and are thus superimposed in Figure 11.12. They indicate that she was exposed to a highly consistent lead source(s) from before birth to approximately 16 years of age. The lead data thus provide no evidence for a change in residence, status, or cultural exposure to lead pollution, for example in the use of lead items or pewter ware vessels (which may have been available in Britain during the latter part of her radiocarbon date range), during the first 16 years of her life.

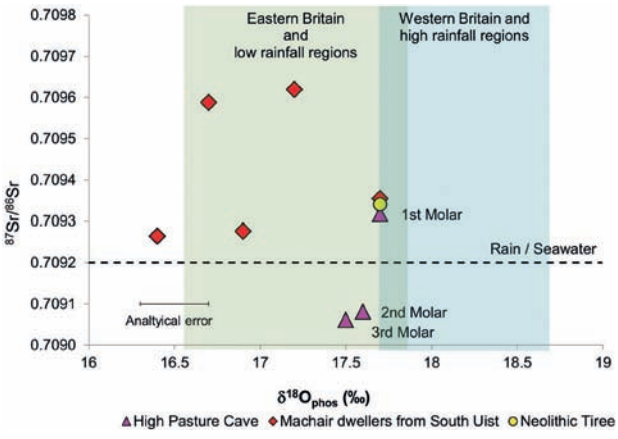


Figure 11.11. Oxygen & strontium isotope ratios for the three adult female molars from High Pasture Cave plotted with the data for machair dwellers from South Uist (Western Isles) & the Tiree burial (Inner Hebrides) shown in Fig. 11.6 (data from Parker Pearson et al. *2005; Armit* et al. *2015). The ranges shown for British lower & higher rainfall areas are based on Evans* et al. *2012 & given to 1 sd. The dotted line indicates the modern value for seawater; 4 sd errors for strontium data are within symbols*

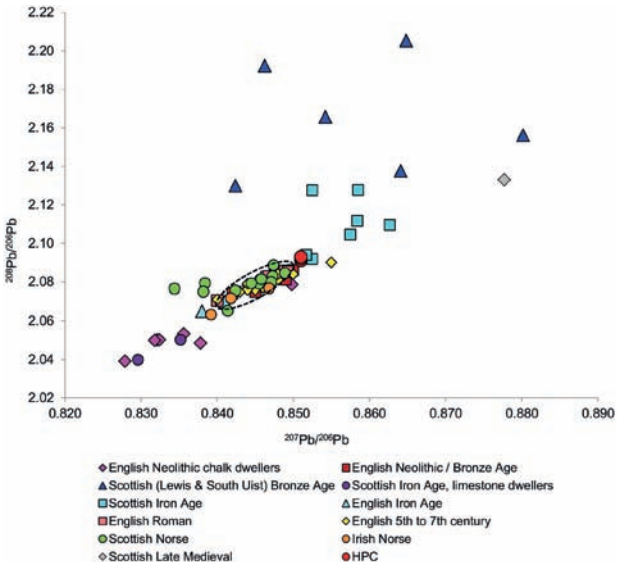


Figure 11.12. Plot of enamel lead isotope ratios for the four teeth from the woman at High Pasture Cave, with comparative data from other British archaeological humans. The majority of burials dating from the Roman period cluster tightly within the dashed oval & are consistent with lead ores from England, Wales, & Irish deposits from Meath, Kildare, & Wicklow. All individuals with high lead levels fall within this oval & this indicates anthropogenic rather than natural lead exposure. Scottish ore leads & the remaining Irish deposits fall in the top right of the plot, whereas burials excavated from marine carbonates fall in the bottom left. Data sources: Montgomery et al. *2000; 2005; 2010; Parker Pearson 2005*

As can be seen in Figure 11.12, the vast majority of humans dating from the Roman period onwards fall within the central oval which is consistent with lead ore from England, Wales, and some Irish sources, and these will reflect a largely anthropogenic lead contribution following the introduction of lead extraction and use of the ore for metal products (Montgomery *et al.* 2010). The lead isotope ratios for the Iron Age woman fall on the edge of this data range. These results could arise through natural exposure to lead via rocks and the diet on the Isle of Skye but, given the highly complex geology of Skye and the absence of data from other contemporary humans from the island, it is not possible to draw this conclusion at this stage. Alternatively, such ratios could derive from a combination of natural or anthropogenic Scottish lead sources and exposure to anthropogenic lead from English, Welsh, or Irish ores. Scottish ore leads plot in the top right of Figure 11.12, and the Iron Age and Bronze Age humans in this region of the plot were excavated from the Isle of Lewis, South Uist in the Outer Hebrides, and Orkney, whilst the late medieval individual was also excavated from Orkney. The two Iron Age Scottish data points which plot closest to High Pasture Cave are from Mine Howe on Orkney.

11.4.3 Discussion and interpretation

Female Adult A and associated infants, Perinate E and Foetus G

The $\delta^{13}C$ and $\delta^{15}N$ values for the adult female burial and two associated infants are similar for the three individuals when analytical precision and individual variation is taken into consideration. Figure 11.5, above, plots both of the infants twice, with values from both laboratories. There is also a value plotted for sample 66374, suggested as possibly from Foetus G. The $\delta^{13}C$ for this sample is -21.8‰ which is 0.2‰ more negative than any of the other four values for these infants. This, combined with the fact that the $\delta^{34}S$ is also much higher for this sample than for those obtained for the adult or Perinate E (or, indeed, the other samples, both human and animal, from the site) suggests that this is not from Foetus G.

The DNA evidence provided elsewhere in this chapter shows that Perinate E was not maternally related to Adult Female A and that Foetus G was possibly her child. Using current methods of interpretation, the similarity in $\delta^{13}C$ and $\delta^{15}N$ values is consistent with a hypothesis that the woman was the mother of Foetus G and that no breastfeeding had occurred. During pregnancy, the tissues of the infant will form from the constituents of the mother's diet. The signal from the mother's collagen has been built up over her lifetime and is not *necessarily* reflective of her diet during pregnancy, but if her consumption patterns were relatively stable throughout adult life then the values for her infant *in utero* might be expected to look very similar to her own, as they do here. The age suggested by the human remains report of second trimester for Foetus G is consistent with the isotope data.

Although there has been an expectation from the research that an infant's isotope signal will match that of the mother at birth, since tissues are expected to be forming from the mother's diet in both cases, there has been a recent improvement in the timing of the available empirical evidence due to the development of incremental dentine analyses (Beaumont *et al.* 2013; 2014; 2015). There is now evidence to suggest that the 'osteological paradox' (Wood *et al.* 1992; DeWitte and Stojanowski 2015) involved in looking at juveniles who have died early and may not be exhibiting the signals of a healthy individual, alongside changing diets in pregnant and lactating women, may mean that the relationships are not as clear-cut between the isotope ratio of a mother's bone collagen and that of her infant as has been assumed in the past.

In this case, the incremental dentine data available are from the adult woman, who died in her early 30s. These data can be tracked up to the age of around 23 years (Fig. 11.7, above). At that point, her $\delta^{15}N$ value was 12.0‰, as compared to the 10.6‰ obtained from her bone collagen as an averaged lifetime signal. It had also

been at this relatively higher level since around the age of 18 years, rising gradually over the previous six years, after the age of 12. So, it is true to say that in early adulthood this woman had a higher nitrogen isotope ratio than she did in later childhood and such fluctuations may well have continued into her early 30s. If that were the case, then the match between Foetus G and the woman shown in Figure 11.5 may well be misleading, particularly given that Perinate E, shown by the DNA evidence not to be related to the woman, also has similar values to her and to Individual G.

Not only would it be possible for the woman's diet at death to provide a different isotopic signal to that of her averaged lifetime diet, but Foetus G died before birth, and we do not know the reason for this. In cases of stress or starvation, for instance, infant bone collagen may not provide isotope ratios which are straightforwardly indicative of the mother's lifetime diet (Katzenberg and Lovell 1999; Mekota *et al.* 2006). If the mother was nutritionally very stressed or starving during the pregnancy, as is very possible (Fuller *et al.* 2005), then this would provide a very different isotopic 'snapshot' to that which we have from the bone collagen.

Overall, therefore, existing methods of comparing bone collagen data from infants and young children with that from their putative mothers may not be as robust as previously thought, and the complexities involved mean that it is far from clear that comparison between these data can be used to say anything about the relationship between these individuals. The best that can be said is that the data do not preclude a mother–child relationship for Female A and Foetus G.

The bone $\delta^{15}N$ value for the adult female is 5.8‰ higher than the average for the domesticated herbivores, while the $\delta^{13}C$ value is only 0.6‰ higher. It would normally be expected that the spacing for one trophic level in a food chain, between an omnivorous human consuming animal protein and the domesticated herbivores providing the animal protein at a site, would be 3–5‰ for nitrogen and around 1‰ for carbon. In this case, therefore, the nitrogen isotope ratio is particularly high and the carbon slightly low. There are three bone fragments, found separately from the majority of the skeleton, which were suggested to be possibly part of this individual. If the data from these are included in the comparison the averaged $\delta^{15}N$ and $\delta^{13}C$ values both reduce by 0.2‰, but this does not make any significant difference to the discussion.

This comparison is based on the averaged lifetime data from bone. If the incremental dentine data are taken into consideration, the averaged value for the last approximately five years of her life is 12.0‰. This is 7.2‰ above the mean for the domesticated herbivores, which is unlikely to be realistic as an indicator of one trophic level. It should be borne in mind, when making this comparison, that there may be a systematic difference between the values obtained from dentine and bone. There is some empirical evidence from the Beaker People Project, for instance, that the values for dentine may be slightly enriched in both ^{15}N and ^{13}C when compared to bone (Jay *et al.* 2012; Jay and Richards 2019), perhaps by around 0.2‰. Such a difference, however, would still mean that her young adulthood $\delta^{15}N$ value was 7.0‰ above that of the domesticated herbivores analysed from the site.

If the enrichment in ^{15}N were due to consumption of marine resources, then there would be a corresponding enrichment in ^{13}C which is not apparent, either in bone or dentine. There are a number of other possible explanations for the combination of values seen here; first, consumption of freshwater resources, such as fish or aquatic birds. However, no significant skeletal remains from freshwater sources were found at the site, and the local Skye environment was unlikely to have provided significant levels of these on a regular basis. Other possibilities involve the idea that the animals used as a baseline here are not suitable for the comparison, perhaps because of the time period involved, or mobility. The adult female is later in date than the majority of the animal samples analysed and it is possible that either the local environment changed over the period in question, or human management of the domesticated animals changed in some way. This seems unlikely. The cattle sample which dates to the same period as the human burial (S-EVA 2298) is not different to the rest of the group (see Fig. 11.6) and there is no trend across any of the animal data against time to indicate that the dating was critical.

Another situation in which these animals might not be an appropriate baseline for interpretation of the woman's diet might be where she did not spend the majority of her life consuming resources from the local vicinity, so that her collagen signal relates to a different environment. If she had moved into the area after collagen turnover had slowed significantly, then she may easily show a signal which does not compare easily with the animals at the site. The strontium, oxygen, and lead isotope analysis suggest that it is difficult to either support or negate this hypothesis with the currently available evidence but mobility is the most likely of the possible explanations presented.

If it was not domesticated herbivores which formed the majority of the animal protein in her diet, another possibility might be that she was consuming a significant level of pig protein. Those from Bone Passage show higher $\delta^{15}N$ values than are seen from the other animals at High Pasture. However, as with the suggestion for an aquatic dietary element, a significant contribution of these pigs should also have increased her $\delta^{13}C$ values and this has not happened. In fact, there is a significant spike towards a lower carbon isotope value in the incremental dentine data at around the age of 14 years, when the nitrogen isotope ratios are climbing. It is also the case that the 'special' pig deposit is earlier in date than the woman. Neither the

isotope data, nor a practical view of pig as the majority animal protein contributor, make this a likely explanation.

Finally, it must be noted that there is only one adult human analysed from High Pasture (assuming that the other bone fragments mentioned above may well be from the same individual) and that the trophic level spacings suggested are usually for group average comparisons. It is possible that this woman was at the extreme end of the range seen for a hypothetical human group and that she was consuming a very high level of animal protein. This is not a likely explanation, however, given the combined evidence of a particularly high lifetime $\delta^{15}N$ value for the bone and also the fluctuations in the dentine incremental nitrogen isotope ratios, which range from 10.2‰, at around the age of 10 years, to 12.2‰ at 19 years. Even for the lowest value seen in the dentine increments (10.2‰) the trophic level spacing is 5.4‰ above that for the averaged cattle and ovicaprid bone (n – 19). This is still higher than might be expected, even with a diet rich in animal protein (Hedges and Reynard 2007).

The sulphur isotope ratios from the bone collagen of the woman and Perinate E are consistent with those found in the herbivores at the site, although at the lower end of the range. Given the analytical error associated with this particular analysis, the data are consistent with a diet based on animal protein from herbivores from a similar environment to these. The overall range of values is similar to those found in this region of Scotland generally (Parker Pearson *et al.* 2021), but values such as these can be found across Scotland and, indeed, in other regions of Britain, although lower values might be expected for sites far away from the coast.

There was insufficient collagen available to obtain a $\delta^{34}S$ value from Foetus G. The cranial fragment suggested as possibly being from this infant is discussed above in the context of the carbon and nitrogen data and the divergence of values suggest that it is not Foetus G, but another neonate. The $\delta^{34}S$ value for this individual is the highest in the human range, putting them at the other extreme when compared to Adult Female A and Perinate E (see Fig. 11.9). The difference between the values for Adult Female A and this infant is 3.4‰ which is more than is likely explained by analytical error or individual variation, such that if this *were* identified as Foetus G, then a maternal relationship with Adult Female A would be called into question.

The isotope data from the tooth enamel are the first such data from the Isle of Skye, so there is currently no isotopic baseline for the indigenous population and no comparative data against which to compare the results. Data exist from the Outer Hebrides and to a lesser extent from the Inner Hebrides (Montgomery *et al.* 2003; 2007; Montgomery and Evans 2006; Armit *et al.* 2015) and biosphere variation has been investigated for the island (Evans *et al.* 2009), and so these data sources have been used to put the High Pasture results into a wider regional context.

The enamel samples from the four teeth analysed from the adult woman show only small variations in their lead, oxygen, and strontium compositions. This suggests that the source of her diet and place of residence did not change substantially from before birth up to approximately 15 years of age. The incremental dentine collagen data show changes starting to occur somewhere around the age range of 12–14 years of age, but the strontium and oxygen data for the third molar, which cover later childhood (approximately 8–15 years, with variation for individuals), are not different to those for the earlier forming second molar. Physiological factors, such as serious stress, or significant changes in dietary resource constituents independent of the source of those resources or the local environment, might explain why the dentine collagen is reflecting a change during the overlap period of 12–15 years, whilst the enamel is not, and variability in the formation timing for this particular individual's teeth may also be relevant.

Given the complexity of the geology of Skye it is possible, though unlikely (given that not all rock types produce land suitable for grazing and particularly agriculture), that the human population on Skye could have a strontium isotope range as wide as that of the population of the whole of the British Isles. However, the woman's oxygen isotope ratios are consistent with, if on the edge of, modern-day groundwater on the island and the strontium isotope ratios could arise through mixing between granite, basalt or limestone, and rainwater, or indeed, a combination of all of these four sources of strontium, and the amount of strontium in her enamel is consistent with a coastal or island origin (Montgomery 2010). The lead isotope ratios are on the edge of the known field of archaeological people exposed to anthropogenic sources of lead but could be consistent with limited exposure to Scottish lead sources of either anthropogenic or natural origin. There is, therefore, no substantial evidence from the tooth enamel to suggest that she lived away from the Isle of Skye during childhood. It is possible that her isotope signature is indicative of origins on this island, although it is also consistent with many other places in the British Isles and, indeed, further afield, given that there are only limited places where basalts or limestones are found in Scotland north of the Highland Boundary Fault.

Young Adult K

Two phalanges and an incisor dating to the 4th–3rd centuries BC are possibly all from Young Adult K and they all have $\delta^{13}C$ and $\delta^{15}N$ values higher than those seen in the rest of the human group (see Fig. 11.5). This suggests a high level of marine resource consumption for this individual. Such an interpretation is highly

unusual for British samples of this date. As a generality, consumption of marine resources is seen in the British Mesolithic but disappears in the Neolithic and does not re-appear until Roman or Viking period influences are present (Barrett *et al.* 1999; Richards *et al.* 2003a; Jay and Richards 2007). There are, however, indications both from isotope data and from other archaeological evidence that occasional consumption may have occurred in some circumstances, such as where environmental conditions were so marginal that the alternative would have been starvation (Richards *et al.* 2006; Russ *et al.* 2012; Montgomery *et al.* 2013).

Occasional consumption of marine resources will not necessarily be visible in the isotopic data if bulk samples are used, since the effect of small levels of protein from this source will be diluted by overall dietary composition. For example, data from Neolithic samples from Shetland did not reflect marine consumption in bulk bone samples but this was visible in small incremental dentine samples as an occasional dietary component (Montgomery *et al.* 2013). In the case of Young Adult K, the bulk samples are from both dentine and bone. Generally, the dentine will reflect childhood while the bone will reflect later life but, in this case, the individual was a child or adolescent and the difference in the periods reflected may not have been great. However, the fact that the isotopic data are similar for both suggests that the inclusion of marine resources was not occasional but prolonged.

An alternative to the interpretation might be that this individual moved into Skye from elsewhere and that the data, rather than reflecting different dietary constituents, reflect a different environmental baseline, *i.e.*, an environment where both $\delta^{13}C$ and $\delta^{15}N$ values are higher, which would likely mean a warmer environment than seen for most of Britain. This is not the most parsimonious explanation and the fact that the $\delta^{34}S$ value for this young person is similar to the other humans from this site counts against it.

Other humans

Figure 11.5 reflects four individuals who are not included in the discussion of Adult Female A and the associated Perinate E and Foetus G, or Young Adult K. These are Perinate D (1st–3rd century AD), Perinate H (2nd–1st century BC), Infant I (4th–1st century BC) and Child C (6–7 years old, 8th–6th century BC). All these individuals have $\delta^{15}N$ values similar to those for the other humans on the chart but reflect the extremes of the range for the $\delta^{13}C$ values.

If all the possible duplications of Adult Female A and the two associated infants are accepted, except for the Foetus G possibility suggested above as unlikely, then the range of $\delta^{13}C$ values for these three individuals is only 0.5‰ (-21.6 to -21.1‰). This is a tight range and supports the suggestion that the woman may be the mother of Foetus G. The overall range for all the humans, excluding Young Adult K, is 1.3‰ (-22.0 to -20.7‰). This range is defensible for humans from the same site and with similar diets, but where they range in age from neonates to adult, in date from 8th century BC to the 3rd century AD, and where the data have been obtained from two different laboratories, it is remarkable that the $\delta^{15}N$ values only have a range of 1.1‰ and that, if Child C and Infant I are excluded from the range (these are both dentine samples rather than bone), it is only 0.6‰.

Given that there are at least four perinate/neonates and one young infant thought to be represented and that none of them shows the elevated $\delta^{15}N$ values expected for breastfeeding babies, it is likely that all of them died before they had a chance to suckle for any length of time. Similarly, if they had died of starvation or stress-causing illness, or the mother had been nutritionally stressed during pregnancy, the expectation would also be for the $\delta^{15}N$ values to be elevated (Beaumont *et al.* 2013).

Whilst the four perinate/neonates might have died suddenly at or before birth, the infant, identified only from an unerupted deciduous first molar, is thought to have been 9±3 months old at death, so it is more difficult to explain the fact that this individual has the lowest of all the $\delta^{15}N$ values. It is possible that little or no breastfeeding took place for this individual and that nutrition was obtained from other sources. Such an interpretation has been seen elsewhere for infants of this date (4th–1st century BC; Jay *et al.* 2008), although it is important to be aware that current developments in the analysis of incremental dentine samples mean that research into isotopic signals compared between infants who died early and adults who survived suggest that the interpretation of breastfeeding and stress signals is unlikely to be as straightforward as had previously been thought (Beaumont *et al.* 2015; Beaumont and Montgomery 2016).

An alternative explanation for the lack of a breastfeeding signal may be that the comparison of the infant data with Adult Female A and Child C as the baseline for the 'local' maternal signature is not appropriate, so that the real mother(s) of these infants had significantly lower $\delta^{15}N$ values themselves and, when compared to that (unavailable) signal, breastfeeding is indicated. There are good reasons for that being possible; Adult Female A may have been an incomer, the radiocarbon dates from the human's range over a significant period of time, and there is a very limited number of individuals available for the comparisons. It is, however, the case that all the human samples have very similar $\delta^{15}N$ values across the board, from the infants young enough that they may not have survived long enough to breastfeed, through the infant old enough that it was likely, Child C who was around 6–7 years old and Adult Female A. The only individual not showing this similarity is Young Adult K who probably had marine resources included in their diet.

The pigs

The adult pigs show an apparent difference between those from the 'special' deposit in the Bone Passage ($n - 8$) and the others ($n - 7$), with both nitrogen and carbon isotope ratios higher for the former group, although group numbers are relatively small, and a bigger dataset might change the interpretation. It is possible that this difference relates to the timing of the deposits, with the higher values mainly associating with later dates. However, the Bone Passage material appears to have been disturbed and there may be a mixed age composition to the deposit, as indicated by the Bayesian analysis.

Figure 11.6, above, shows the individual pig values. The 'non-special' pig (S-EVA 2300), which dates to roughly the same time period as the dated 'special' group, has the most extreme isotopic values within its own group. This suggests that it is not the dating of the material which is leading to the differences seen.

If it is accepted that the difference between the groups exists, then the pigs deposited in Bone Passage appear to have consumed significantly higher levels of animal protein in their omnivorous diets than those from the other contexts. This might suggest some connection between the way in which the 'special' pigs were fed and managed and their ultimate deposition in Bone Passage. They might, for instance, have been kept for a particular feasting or ritual purpose and fed specific resources.

Included in the analysis are two infant pigs enriched in both ^{13}C and ^{15}N (see Fig. 11.6). They display the classic relationship between the adult pigs and suckling animals: they were old enough for their bone to reflect suckling behaviour but young enough not to have been weaned.

11.4.4 Conclusions

The strontium, oxygen, and lead isotope ratio data from Adult Female A's tooth enamel do not clearly indicate whether she was living on Skye during her childhood or not. The similarity of the values for the different teeth for each of the chemical elements tend to suggest, however, that wherever she was living for the majority of her childhood and early adolescence, she was probably not moving around during that period. The carbon and nitrogen collagen data suggest that she may have lived away from Skye, or on a different part of the island, at least during later adolescence and early adulthood. If she did move, then the collagen data overall are consistent with Scotland generally for both periods of her life, although the strontium data for childhood require some basalt or limestone contribution which narrows the range for childhood, since there is none in the Outer Hebrides or the Northern Isles and there is little limestone in the western highlands.

As a single individual, the collagen data for the woman are difficult to interpret in terms of her own diet but the high level of her $\delta^{15}N$ values when compared to herbivores from the site, both from the lifetime averaged bone collagen sample and the incremental dentine samples, suggest that she was not consuming a diet which was based on animal protein from herbivores with a dietary source similar to these. The majority of these particular herbivores probably date to a period several hundred years earlier than the woman but one of them (S-EVA 2298) came from the stairwell deposits and is probably of a similar date and does not show a different isotopic signature to that of the other herbivores. There are a number of possible explanations for the disparity between the woman's collagen signature and that of the herbivores but the most likely one is that these animals were from a different local environment to that of the animal protein consumed by the woman and that either the animals and the woman came from different parts of Skye, or that the woman spent some part of her life away from Skye, possibly during the period when her dentine nitrogen isotope ratios were climbing between the ages of around 12 years up until the dentine data finish their coverage at around 23 years. If this is the case, then the fact that her strontium, lead, and oxygen isotope ratios from the enamel samples were consistent up until the age of around 16 would suggest that whatever movement took place may have been in later adolescence, or else involved changes in the nitrogen environmental 'baseline' from which herbivores fed, but not in the geological bedrock from which plant resources for human consumption were obtained. That could include a variety of scenarios involving movement of the woman or transport of livestock and/or plant resources such as grain supplies. The sulphur isotope ratios from the bone collagen are consistent with Scotland generally.

She did not consume marine resources in amounts large enough to be isotopically visible. It is possible that she consumed freshwater aquatic resources, although this appears unlikely given the lack of such resources found at the site and the general environment prevailing on Skye. If she did live away from Skye for some period of her life, then this remains a possibility.

The results from the analysis of human bone and dentine collagen are not inconsistent with a hypothesis that the adult female was the mother of Foetus G. However, the complexity of the isotopic relationship between foetus and mother is such that this comparison is again inconclusive.

None of the other infants from the site shows elevated $\delta^{15}N$ values which may suggest that they died without significant levels of breastfeeding, even Infant I who was old enough that this would have been expected. It is, however, the case that the human 'baseline' for this comparison consists only of Adult Female A (who might be an incomer) and Child C, and that since the humans also range in date, the comparison is flawed.

It is likely that all three human samples showing a high level of marine resource consumption come from the

same individual (Young Adult K) who dates to the 4th–3rd centuries BC. This is a notably unusual diet for someone at this point in prehistory and the inclusion of both bone and dentine samples with the same signal suggests that this was a prolonged dietary inclusion over the lifetime of this individual.

The data for the pigs suggests that the group from Bone Passage were consuming more animal protein than those found elsewhere on the site. This may be due to the way in which they were fed and managed by the people at High Pasture, perhaps related in some way to their unusual deposition within the cave. They may have been fed in a particular way to prepare them for a specific function, such as ritual deposition or feasting, even if this occurred over a period of time and was not a single event.

Overall, the isotope data from this site are as enigmatic as the archaeological evidence. Further work to build a larger data set of isotope values for animals, humans, plants, and other environmental indicators for Skye, may help to refine the interpretation.

11.5 Ancient mitochondrial DNA analysis of human remains from High Pasture Cave

Katharina Dulias and Ceiridwen Edwards

11.5.1 Introduction

Human remains from adult female Individual A, aged 25–40 years were found together with two infants: one perinate (Individual E) that died during the last month of foetal development or during the first two weeks of life, and one foetus (Individual G) that died between 12 and 26 weeks of gestation (see Section 11.2.2). The woman appears to have been buried intact under large stones which has led to the suggestion that she may have been deliberately crushed to death (see Section 11.8). Unusual and specific burials for women, foetuses, and infants during the Iron Age were rather common (Finlay 2000; Armit and Ginn 2007) and the general assumption has been that the women died in childbirth and were thus buried together with their children. To determine if this was the case, the maternal genetic relationship of the adult female to both the foetus and the perinate was analysed.

11.5.2 Materials and methods

A petrous bone from the female adult (Individual A), and two infant bone fragments from perinate Individual E (ischium) and foetus Individual G (scapula), were sampled for genetic analysis. Sampling was carried out at the Ancient DNA Facility at the University of Huddersfield under dedicated clean-room conditions. DNA was extracted following the protocol by Yang *et al.* (1998) with modifications by MacHugh *et al.* (2000). Blank controls were included throughout the extractions, library preparation, and amplification reactions, to monitor for possible modern DNA contamination. Next-generation sequencing libraries were prepared from the DNA extracts using the method described in Meyer and Kircher (2010), with modifications outlined in Kircher *et al.* (2012), Gamba *et al.* (2014), and Martiniano *et al*. (2014). Each library was quantified on an Agilent 2100 Bioanalyzer prior to equimolar pooling and sending for high-throughput sequencing at either NBAF Liverpool, UK or Macrogen, South Korea.

The resulting sequence reads were trimmed using cutadapt (v.1.13; Martin 2011) and aligned to the human mitochondrial genome (rCRS, NC_012920; Andrews *et al.* 1999) using BWA aln (v.0.7.12-r1039; Li and Durbin 2009). Samtools v.1.3 was used to sort/filter reads and to remove PCR duplicates and DNA damage patterns were assessed using mapDamage 2.0 (Jónsson *et al.* 2013) and bamdamage (Malaspinas *et al.* 2014). Schmutzi (Renaud *et al*. 2015) was used to detect possible modern mitochondrial contamination and haplotypes were assigned using Haplogrep 2 (Weissensteiner *et al.* 2016). The consensus sequences of each mitochondrial genome were created using samtools mpileup and bcftools (v.1.3). Additionally, GATK (v.3.7) was used to call variants against the rCRS for the two infant samples, as their mtDNA genome coverage was very low. The genetic sex of the adult was determined using the tool published by Skoglund *et al*. (2013).

11.5.3 Results

DNA was successfully extracted and sequenced from all three samples. The mitochondrial haplotypes show that both the female (Individual A) and the foetus (Individual G) belong to haplogroup H7a1b, whereas the perinate (Individual E) was assigned to haplogroup J1c3. The endogenous DNA content of all three individuals was low, with 11.9%, 8.0%, and 7.6% for Individual A, Individual E, and Individual G, respectively. No exogenous contamination was observed in extraction or library blanks, supporting the authenticity of the results, and contamination estimates were low, ranging from 0.165% to 0.185% for Individual A, and 0–0.005% for Individuals E and G. In addition, there were no matches between the mitotypes from the three ancient samples and those of the researchers involved. The osteological determination that Individual A was female was supported by the genetic sex identification. No sex could be assigned for the two infants due to low genomic coverage.

11.5.4 Discussion

The results show that the perinate Individual E was not maternally related to adult female Individual A, whereas foetus Individual G shared her mitotype and, therefore, was possibly her child. Usually, the common understanding of these type of female/foetus burials is that the children are assumed to be related to the women and, so far, archaeological interpretations have suggested

either mother–child relationships or a midwife buried in the same place as foetuses and infants. In the case of the High Pasture individuals, the burial of a female with an unrelated child raises several questions. The most favoured explanation is that she was part of a sacrificial closing burial (see Section 11.6.2). The separation of infant burials from the rest of the population appears to have been widespread across the Iron Age and into the Romano-British period (Redfern and Dewitte 2011). Human remains of infants or foetuses were often placed into cave systems and the number and geographic spread of cave burials during this period in Scotland is relatively high – especially given that burials from this period are generally not abundant (Saville and Hallén 1994). The trauma evident on the adult female and the lack of any wider tradition of inhumation in the region has led to the suggestion that this burial was a deviant one, or even a sacrifice connected to the closure of the cave stairwell, rather than a ceremonial burial of a mother and her child (see Section 11.6.2).

This is the first time that complete ancient mitochondrial DNA sequences have been reported from foetal-aged bone fragments. Previous studies have used PCR-based methods to determine the genetic sex of neonates (Faerman *et al.* 1998; Waldron *et al.* 1999; Irish *et al.* 2008) but no mitochondrial genomes or genome-wide data have been published to date. Although whole mitochondrial genomes could be generated from the two infants it was not possible to perform genome-wide analysis to determine the molecular sex of either the perinate or the foetus due to their low genome coverage. Therefore, further analysis could yield more detailed relationships between the three burials at this cave site. Our preliminary data therefore show that a general assumption of mother–child relations within such burials can be misleading and that genetic analysis can aid the analysis and interpretation of such archaeological contexts.

11.6 Death in the Iron Age: the human remains in context

Steven Birch

11.6.1 Introduction

The disappearance of the definable burial rites of the Middle Bronze Age from the archaeological record suggests a fundamental change to the way the dead and their mortal remains were perceived and treated during the Iron Age. The earlier dominance of a monumental landscape of the dead and commemoration of ancestors is replaced by a landscape marked by concerns of the living, of agricultural and territorial divisions. The dead at this juncture assume a much less monumental profile. The deposition of crania and other disarticulated body parts and skeletal elements appears to have certain similarities with earlier Neolithic practices, these remains being utilised as a symbolic resource. The fragmentation of the corpse and dispersal and deposition of body parts or skeletal elements in settlements or special natural locations is suggestive of the mortal remains of the dead becoming a 'social currency' – a resource of the living, rather than used for ancestral commemorative purposes. Lucas (1996, 114) suggests the reason burial practices all but disappear from the archaeological record is due to the fact that 'the body is now one object among others used to signify social relationships and identities' and considers the 'shift or transformation from a descent-based to alliance-based society has been articulated through changes in the way dying is perceived' (Leach 2015, 294).

Here, we consider the significance of the various mortuary treatments displayed at High Pasture within the wider context of human remains recovered from caves and rockshelters in Scotland, Britain, and Ireland, and within contemporary settlements of the Scottish Atlantic Iron Age.

11.6.2 Death in the Iron Age: human remains in Scottish caves

Ian Armit

The human remains from High Pasture Cave date to a period for which funerary evidence in Scotland is otherwise scarce (Harding 2016; Armit 2017). Aside from the geographically circumscribed practice of inhumation under square barrows in the East Yorkshire Arras Culture (Halkon 2013), formal burial traditions across Iron Age Britain as a whole were generally scattered and short-lived. The small inhumation cemetery associated with Broxmouth hillfort, East Lothian, for example, seems to have been used for little more than a generation (Armit and McKenzie 2013), and represents an apparently sporadic, minority rite of inhumation in south-east Scotland (Armit *et al.* 2013). Evidence for cremation is equally elusive, though practised in some areas (*e.g.* Lelong and MacGregor 2007). Indeed, it is only at the end of the pre-Roman Iron Age that we see more widespread evidence for normative funerary rites (although it is obvious that these do not represent 'majority' rites), which even then are largely restricted to southern Britain (Harding 2016).

Funerary rites in Iron Age Britain did not, therefore, generally lead to the formation of cemeteries or the creation of identifiable burial monuments. Instead, it appears that a variety of complex rites were practised, involving both excarnation and mummification, which kept the dead closer to the world of the living (*e.g.* Booth and Madgwick 2016; Armit 2017). Excarnation is the removal of the flesh from a corpse, either through exposure to the elements and/or scavengers, or under controlled conditions in a protected environment (*e.g.* Carr and Knüsel 1997; Madgwick 2008); it can also encompass manual defleshing. Evidence for excarnation is rarely direct, coming principally from the frequent recovery of disarticulated human remains from non-funerary contexts such as settlement sites, where

they seem often to have been curated or even displayed (*e.g.* Armit and Ginn 2007; Tucker 2010).

Although the importance of excarnation has been understood for some time, the prevalence of mummification in later prehistoric Britain has only recently begun to be recognised (Booth *et al.* 2015). The practice was first identified at Cladh Hallan, South Uist, where long-curated mummies appear to have been buried beneath domestic house floors (Parker Pearson *et al*. 2004). An elderly man, sitting upright within a stone cist in a Late Iron Age building at Crosskirk, Caithness (Fairhurst 1984) seems also to have been mummified (Armit 2017), while Late Bronze Age juvenile remains from the Sculptor's Cave, Covesea, appear to represent the secondary deposition of mummy bundles (Armit and Büster 2020).

For all its familiarity to modern western eyes, burial of a complete human body was the exception rather than the rule in Iron Age Britain (Harding 2016). Excarnation focuses on the dissolution of the corpse, presumably as part of a rite of passage by which the soul is freed to pass to the next world. This process can be complex, however, and may involve the movement, retrieval, and curation of body parts and bones (Armit and Büster 2020). Mummification appears at first glance to represent the opposite ideal: preservation of the intact human body. Both excarnation and mummification, however, are visible processes that potentially retain the corpse, or its fragments, within the world of the living. In this context, one might see isolated Iron Age inhumations as representing a deviant or disrespectful rite (*cf.* Taylor 2002).

High Pasture

As might be expected from the broader Iron Age context, the human remains found within the High Pasture complex are not suggestive of a single, normative funerary rite. Instead, these bones appear to represent the material residues of various mortuary practices carried out over a period of around eight centuries, from the earliest traces of human remains in Bone Passage, to the latest-dated elements in the precinct.

It is useful to divide the assemblage from High Pasture Cave into two broad groups: the various disarticulated elements found throughout the sequence and scattered across several parts of the site and the adult female (Individual A) and associated series of infant, perinatal, and foetal remains (Individuals D–H) found in the stairwell and dating to the early centuries AD.

The first group comprises an enigmatic series of individual bones and teeth, scattered both chronologically and spatially. It includes mainly adults (Individuals B, J, and L), although an older child (Individual K) and a child (Individual C) are also represented. The fragmented and dispersed nature of the assemblage suggests that it reflects substantially more individuals than are indicated by the MNI.

These bones and teeth could have entered the cave in one of two principal ways. Either they were brought there for votive deposition as disarticulated fragments, perhaps retrieved from individuals undergoing excarnation in another location, or else they were derived from bodies curated within the cave and subsequently retrieved. The stray teeth (B and C), dating to the 8th–6th centuries BC, are suggestive perhaps of the latter, being potentially derived from crania or mandibles that were later removed. Broadly contemporary adult cranial fragments, including charred elements (L) from C2.15c, suggest that human remains were processed on site; perhaps the preservation of bodies by smoking. The pelvic fragment (J), dating to the 2nd century BC, certainly seems to have been curated, judging by the 1st century BC/AD dates of the associated animal remains.

Overall, these remains suggest the persistent use of the cave for mortuary activity over a prolonged period; with rites appearing to involve curation and possibly the deliberate preservation of bodies, although they are unlikely to have remained consistent over such a long time period. In line with the generally complex and multi-stage nature of Iron Age funerary practices, it appears that bodies were not curated indefinitely within the cave but perhaps transported elsewhere.

The second group of human remains forms an apparently unique assemblage comprising an adult female, some 25–40 years of age, associated directly with a perinatal individual and a foetus, and almost certainly also with a child of around 9 months and two further perinatal individuals deposited within the stairwell. The woman appears to have been buried intact, beneath stones, and may indeed have been deliberately crushed to death *in situ*. The AMS dates, depositional context, and age profile of the stairwell individuals suggest that they should be seen as a group, although their element representation varies from single elements (C and F) to what were probably complete skeletons (E and G). It is possible, given the fragility of the immature bones, that this is the result of taphonomic factors, although some may have been partial or token deposits. An obvious interpretation is that the woman was the mother of one or more of the children, which has been suggested by the results of aDNA analysis of the individuals (see Section 11.5). If this was the case, several of the children must have been curated prior to deposition (as potentially suggested by the gnaw mark on Individual H). The lack of any wider tradition of inhumation in the region, along with the trauma evident on the adult female skeleton, would in any case suggest that this should be regarded as a deviant burial rather than the normal interment of a mother and her children. Alternatively, these deposits might be better viewed as a sacrifice or votive offering, connected with the closure of the stairwell. The possibility that the woman was deliberately killed might support

this interpretation; it is not impossible that some of the children were similarly sacrificed, particularly given the evidence for trauma on an occipital fragment tentatively attributed to Individuals E, F, or G (although the AMS date might suggest that this derives from an earlier individual, unconnected with this deposit).

Parallels from caves in Scotland

Caves have been used for the deposition of human remains since at least the start of the Neolithic in Scotland (*e.g.*, Armit *et al.* 2016) through to the early medieval period (*e.g.*, Anderson-Whymark 2010; Birch and Peteranna 2017). Rather than signalling any continuity of mortuary practice across these millennia, however, this persistent link between caves and the dead doubtless reflects a more general human perception of caves as liminal places; natural conduits between the above-ground world of the living and the underworld of spirits, gods, or ancestors (*e.g.*, Dowd 2015; Armit and Büster 2020). In considering parallels for the deposition of human remains at High Pasture, it is important to consider those caves where mortuary activity can be dated from the end of the Bronze Age to the Roman Iron Age.

Perhaps the best-known cave to contain human remains of this period is the Sculptor's Cave, Covesea, in northeast Scotland, where two major episodes of funerary activity can be dated to the Late Bronze Age and Roman Iron Age respectively (Armit and Büster 2020). During the earlier period, it appears that the Sculptor's Cave was used for secondary deposition of predominantly juvenile bodies, along with small, personal items such as copper alloy pins and gold-covered hair-rings. The nearby Covesea Cave 2 seems also to have been used for mortuary rituals at this time (Büster and Armit 2016b). During the Roman Iron Age, deposition seems to have focused on adults, with complete bodies seemingly curated within the cave; this period also witnessed the beheading of at least six individuals inside the cave (Armit and Büster 2020). Intriguingly, there is no indication that human remains were deposited at the Sculptor's Cave between the end of the Late Bronze Age and the 3rd century AD: all the human remains from High Pasture therefore fall within a period when mortuary activity seems to be absent from the Sculptor's Cave. The much higher quantities of disarticulated human bone from the Sculptor's Cave (>1700), and the absence of any articulated individuals, further suggests that detailed comparison would be misguided.

There are, however, a few other caves where the deposition of human remains may be contemporary with that of High Pasture. Geographically, the closest parallel comes from Fiskavaig, Skye, where a perforated human cranial fragment was found, dated to cal AD 70–240 (Birch 2009; Shapland and Armit 2012); this is contemporary with the latest dated bones at High Pasture Cave, and clearly demonstrates the manipulation and modification of human remains (Table 11.15).

Further south, the Oban Caves have produced plentiful evidence for deposition of human remains of various periods, including the Iron Age, although understanding is hampered by the haphazard nature of antiquarian excavation. Radiocarbon dating of human bones from 19th century excavations at MacArthur Cave has identified at least four adults dating to the Early and Middle Iron Age (Saville and Hallén 1994). Gnaw marks suggest that at least some of these bones derive from excarnated bodies (Tucker 2010). Furthermore, one cranium appears to have been modified to remove a 'blank' for the production of a perforated cranial fragment, similar to that at Fiskavaig (Shapland and Armit 2012). A bone belonging to an adult female, thought to be from the nearby Distillery Cave, has also recently been dated to 108 cal BC–cal AD 55 (Armit *et al.* 2016).

Elsewhere in Scotland, evidence for the funerary use of caves in the Iron Age is sparse. Several coastal caves in East Lothian are recorded as yielding human remains in association variously with Iron Age pottery and Roman objects, though all were antiquarian excavations, and their chronology highly uncertain (*e.g.*, Sligo 1857; Richardson 1907; Cree 1909). This paucity of evidence is also reflected across much of England and Ireland, where evidence for the funerary use of caves during the pre-Roman Iron Age is very limited (*e.g.*, Dowd 2015; Lord and Howard 2013; see Section 11.6.3 below).

Parallels for the stairwell burials

While there are no close parallels for the woman and young children deposited in the stairwell at High Pasture, the context is reminiscent of a woman buried under a metalworking structure at Mine Howe in Orkney, dating to the 1st centuries BC/AD (Card and Downes 2003); one of three unusual inhumations on the site that might be interpreted as sacrificial or dedicatory burials. Unusual female burials, some exhibiting perimortem trauma, have also been identified at Broxmouth hillfort, dating to the Early/Middle Iron Age (Armit and McKenzie 2013). There may be some hints, therefore, of persistent victimisation or scapegoating focused on specific females during the Iron Age – perhaps as outcasts or witches. It is tempting to see the specific association of the High Pasture Cave woman with so many perinatal/foetal individuals as indicating her role as a midwife; an occupation traditionally associated with magic and the supernatural (*e.g.,* Kieckhefer 1989, 62–3; though see also Harley 1990). New-born or foetal individuals are often seen as liminal beings, not fully part of the human world (*e.g.*, Shalinsky and Glascock 1988). As such, this funerary tableau may have been regarded as a particularly appropriate marker for this passage into the underworld.

Table 11.15 List of Scottish cave & rockshelter sites that have produced human remains

Site name	*Period*	*Description*	*MNI*	*C^{14} dates*
An Corran, Staffin, Island of Skye	Neolithic/Early Bronze Age	2 adults, 3 juveniles	5+	Yes
Carding Mill Bay 1, Oban, Argyll & Bute	Neolithic	–	5+	Yes
Covesea Cave 2, Duffus, Moray	Early Bronze Age/Late Bronze Age/ Roman Iron Age	–		Yes
Reindeer Cave, Creag an Uamh, Assynt, Sutherland	Neolithic	1 adult, 3 juveniles	4+	Yes
Distillery Cave, Oban, Argyll & Bute	Neolithic/Iron Age	5 adults, 7 juveniles	12+	Yes
Glennan Cave, Kilmartin, Argyll & Bute	Early Bronze Age	Adult cremation with Food Vessel	1+	No
MacArthur Cave, Oban, Argyll & Bute	Neolithic/Early Iron Age	Adults	4+	Yes
Raschoille Cave, Oban, Argyll & Bute	Neolithic	–	20+	Yes
Sand 1 Rockshelter, Applecross, Highland	Early Bronze Age	1 adult, 1 juvenile	2+	Yes
Ulva Cave, Island of Ulva, Mull, Argyll & Bute	Neolithic	1 juvenile	1+	Yes
Borness Cave, Borgue, Dumfries & Galloway	Late Bronze Age	1 adult, 1 juvenile	2+	Yes
Sculptor's Cave, Duffus, Moray	Late Bronze Age/Roman Iron Age		33+	Yes
MacKay Cave, Oban, Argyll & Bute	Iron Age	1 adult, 1 juvenile	2+	Yes
High Pasture Cave, Strath, Island of Skye	Iron Age	Inc. 3 adults, 3 young adults, 1 child, 1 infant, 3 perinates, 1 foetus	8+ >14–16	Yes
Fiskavaig Rockshelter, Bracadale, Island of Skye	Iron Age	1 adult (perforated human cranial frag.)	1+	Yes
Culzean Castle Caves, Kirkoswald, South Ayrshire	Early medieval	1 adult, 1 juvenile	2+	Yes
Learnie 1B Cave, Rosemarkie, Highland	Early medieval	1 adult	1	Yes
Jonathan's Cave, East Wemyss, Fife	Medieval	1 adult	1	Yes
Alva Glen Cave, Alva, Clackmannan	Unknown	–	1	No
Ardrossan Rockshelter, Ardrossan, North Ayrshire	Unknown	–	1+	No
Benderloch Cave, Benderloch, Argyll & Bute	Unknown; poss. Early Bronze Age	2 adults, 1 juvenile with Food Vessel	3	No
Brae of Ganavan Cave, Oban, Argyll & Bute	Unknown	1 juvenile	1	No
Caipli Cave, Crail, Fife	Unknown	Burial reported to have been found outside cave	1	No
Cave of the Skulls, Kilmore & Kilbride, Argyll & Bute	Unknown	–	1+	No
Crinan Ferry Rockshelter, Knapdale, Argyll & Bute	Unknown: poss Early Bronze Age	Human bones found with Beaker pottery & remains of displaced cist	2+	No
Dunollie Castle Cave, Dunollie, Argyll & Bute	Unknown	–	5+	No
Duntroon Cave, Kilmartin, Argyll & Bute	Unknown	–	7+	No
En-Dah-Win Cave, Kilmore & Kilbride, Argyll & Bute	Unknown	–	1+	No

(Continued)

Table 11.15 List of Scottish cave & rockshelter sites that have produced human remains (Continued)

Site name	*Period*	*Description*	*MNI*	*C^{14} dates*
Gasworks Cave, Oban, Argyll & Bute	Unknown: poss Early Bronze Age based on associated artefacts	–	1+	No
Loch Borralie Cave, Durness, Sutherland	Unknown	–	1+	No
Loch Croispol Cave, Durness, Sutherland	Unknown	–	1+	No
MacAnall's Cave, Ailsa Craig, Ayrshire	Unknown	–	1+	No
Nether Warburton Cave, St Cyrus, Aberdeenshire	Unknown	–	1+	No
Red Cove, Killean & Kilchrenzie, Argyll & Bute	Unknown	–	1+	No
St Baldred's Cave, Whitekirk & Tyninghame, East Lothian	Unknown	Large number human remains inc. 2 children&	2+	No
St Columba's Cave, South Knapdale, Argyll & Bute	Unknown: poss later medieval (Tolan-Smith 2001)	Stone coffins and extended inhumations	14+	No
St Medan's Cave, Kirkmaiden, Dumfries & Galloway	Unknown	–	1+	No
St Ninian's Cave, Dumfries & Galloway	Unknown: poss. early medieval taking into consideration cave context	Male?	1+	No
Scurrival Cave, Eoligarry, Barra, Outer Hebrides	Unknown	–	1	No
The Yellow Man Rockshelter, North Berwick, East Lothian	Unknown: poss early medieval based on bone pin recovered with human remains	1 &	1+	No
Tigh Dugan, Soay, St Kilda	Unknown	–	1	No
Torr's Cave, Kirkcudbright, Dumfries & Galloway	Unknown	Human tibia with evidence of working	1	No
Uamh an t-Sill (Cave of the Seed), Strath, Island of Skye	Unknown	Human skull and other bones	1+	No
Uamh Fhraing (McDonald's Cave), Island of Eigg, Inner Hebrides	Later medieval	1 adult, 1 child	2+	Yes
White Cave, East Wemyss, Fife	Unknown	–	1+	No

11.6.3 Human remains from caves and rockshelters in Britain of Iron Age date

Steven Birch

With the exception of the human remains from High Pasture, Sculptor's Cave, MacArthur's Cave, and Fiskavaig Rockshelter, evidence for the funerary use of caves in the Iron Age in Scotland is sparse. A number of caves across Scotland, especially coastal caves, are recorded as yielding human remains in association with Iron Age materials, such as pottery, and Roman objects but their chronology is highly uncertain. AMS radiocarbon dating and osteological analysis hold the key to advancing such study of Iron Age burial practices in Scottish caves and rockshelters.

This paucity of evidence is also reflected across much of England and Ireland, where evidence for funerary use of caves during the pre-Roman Iron Age is very limited (*e.g.*, Branigan and Dearne 1992; Lord and Howard 2013; Dowd 2015). There is minimal evidence for burial rites or mortuary behaviour throughout most of the Iron Age record, with human remains only occurring with any frequency during the latest pre-Conquest phase in Britain (Leach 2015, 296). However, evidence from a series of radiocarbon dates on human bone recovered from cave sites throughout Britain suggests a resurgence in the practice of depositing human remains underground.

Two peaks of activity have so far been noted. One, between the Early to Middle Iron Age (*c.* 2500–*c.* 2200 BP; Chamberlain and Williams 2001), displays a continuation for the practice of body fragmentation and circulation. In England, deep fissure caves, rather than rockshelters

or multi-chamber caves, appear to be selected. Evidence from these sites in Yorkshire, such as that identified at the Antofts Windypits, Skyrethorns, North End Pot, and Slip Gill Pot (Leach 2015, 315), includes the use of violence and fire, and features a specific range of species including horse and dog. Other fissure caves used at this time include Charterhouse Warren Farm Swallet and Fishmonger's Hole, both in Somerset, the latter containing at least seven individuals, along with horse and cattle remains and a number of dogs. The human osteological profile was indicative of whole corpse deposition in the former, with evidence suggestive of disability and disease, while a femur from the site exhibited evidence of processing while still fresh, its fractures indicative of splitting the bone for marrow extraction. Dog remains from the Swallet included several large skulls (*ibid*., 297–8).

A second phase of use is identified during the Late Iron Age and Early Romano-British period, *c.* 2000 to 1900 BP (Chamberlain and Williams 2001; Leach 2015, 296): the Romans were known to utilise caves for many purposes including burial (Branigan and Dearne 1992; Branigan 1997). Research into Romano-British burial (Taylor 2008) identifies specific burial rites generally comprising cremation or inhumation along major roads, or on the periphery of settlements, in mounds or tombs. Cave burials at this period can therefore be considered deviant from common practice, and exceptional cases. Like Scotland, many sites in England and Wales have produced human remains, sometimes in association with objects (including ceramics) suggesting an Iron Age date.

One particular site with similarities to High Pasture is a vertical fissure at Bishop Middleham, near Durham. Completely excavated prior to development, the remains of a minimum of ten adults and one sub-adult, sherds of Late Bronze Age or Early/Middle Iron Age pottery, and other objects were recovered, suggesting an Iron Age date for the human remains. These came from the base of the fissure, considered to be the primary site of deposition, along with remains of cattle, sheep, goat, and dog or wolf. After deposition the fissure had been packed with rocks and midden, much of the rock not local to the area (Leach 2015, 299). Whimster (1981, 35–6) suggests that this site, along with a number of other vertical fissure caves with similar human bone assemblages along with specific animal groups including dog and horse, form a part of a widespread practice of specialised votive activities within cave environments perceived as sites of sacred significance.

Variation in modes of in-cave deposition of human remains has been identified during the Romano-British period in England and Wales (Leach 2015, 334), and although Branigan and Dearne (1992) do not differentiate modes of Roman cave burial (representing burial in the 'classic' sense), it appears that a range of different behaviours was occurring during this period. Leach (2015, 335) suggests that, from the Late Iron Age and continuing throughout the Roman period in the north and west of England, burial evidence suggests a re-emergence of concern for the integrity of the body, with less emphasis placed on the deposition of disarticulated fragments.

Generally, the deposition of human remains in caves across Britain becomes more visible during the Roman Iron Age, including the individuals displaying trauma including decapitation at Sculptor's Cave in Moray (Armit and Büster 2020) but also at Wookey Hole in Mendip and Ogof-yr-Esgryn in south Wales (Branigan and Dearne 1992; Wilford 2016). It appears that the cave environment became a focus for repeated mortuary deposition during this time, with burial on a scale to suggest small-scale cemeteries. However, the burial of these individuals in caves is still in marked contrast to more normative burial rites, so why was the underground realm chosen as a final resting place? Is it possible that they also comprised deviants, defined as unsuitable for burial in the more usual contexts?

Several authors have investigated the possibility that caves were the focus of ritual activity in prehistory, with human remains often seeming to form part of these activities: far from representing sites of formal burial, caves were locations for unusual and, on occasion, violent rituals utilising or harnessing the symbolic power of human remains. But do these death assemblages represent victims of sacrifice, execution, or conflict; or are they merely a regional variation of a normative burial rite? Green (2001, 24) highlights two key elements in the sacrificial act: the role of violence, sometimes incorporating a degree of 'overkill', and the necessity for 'separation'. For transference from the profane to the sacred realm, the sacrificed being or object must be physically or metaphorically removed from the human world. The liminal location of the cave mouth, or the base of a deep, vertical fissure, would appear to be ideal loci to engage with the realm of the underworld.

Several parallels can be drawn between High Pasture and some of the English examples discussed above: evidence for potentially violent death, deposition of predominantly juvenile remains, and disarticulation and excarnation. The inclusion of dogs, horse, and young animals also appears to be a theme linking these sites, with fire and burning also a recurrent theme (Green 2001, 67). Like the fissure caves, where fuel residues are often mixed with interred remains in backfill deposits, or are present around their entrances, High Pasture exhibits the widespread use of fire and the manipulation and curation of the resulting residues.

Who were the people deposited at these sites and why were they chosen for such treatment? Leach (2015, 311) suggests prime candidates may have included malefactors, foreign hostages, or social deviants, adolescents, and menopausal women: these individuals are at threshold life-stages and therefore symbolic of transformation. The adult woman interred at High Pasture may have been

a midwife or a witch. It would also appear from evidence from both caves and unusual depositional contexts on settlement sites that state of health, or presence of deformity or disabilities may have been qualifying criteria. Where isotope analysis has been conducted on these individuals including the woman from High Pasture, it appears they often had a different diet to the norm, such as high-protein or carbohydrate-rich foods, potentially indicating some individual status. Osteological analyses also note poor dental hygiene – also the case with the High Pasture Cave woman, who suffered caries in two molar teeth on the lower right jaw, one of which had almost destroyed the tooth and had damaged the bone. Infection and sepsis resulting from this could have caused death.

Elsewhere, it has been suggested (Barnatt and Edmonds 2002; Dowd 2015, 62–5; Leach 2015) that caves may have been used for the excarnation of human remains and the presence of disproportionate numbers of peripheral skeletal elements in some cave assemblages, along with the presence of calcite deposits on human bones found within Neolithic chambered tombs, would support this. Dowd (2015, 104–9) has highlighted a number of Irish caves where excarnation may have been carried out including Ballynamintra Cave, Co. Waterford. During excavations in 1879, 51 human bones were recovered, comprising primarily small skeletal fragments including teeth, metacarpals, and tarsal bones. It is suggested that the disarticulated fragments recovered from High Pasture were either brought to the site for votive deposition or perhaps retrieved from individuals undergoing excarnation in another location, or else derived from bodies curated within the cave and subsequently retrieved.

Overall, the types of caves used for deposition of human remains in the Iron Age, including High Pasture, were neither ordinary settlement sites nor simple burial sites. They seem to have been something else – something in between – special places in the landscape where, as observed above (see Section 11.2.3) social and spiritual negotiation took place, and the relationship between the living and the dead, the world above and below ground was bargained.

11.6.4 Human remains in the Atlantic Iron Age of Scotland

Steven Birch

The funerary traditions and depositional practices of the inhabitants of Iron Age Atlantic Scotland present a remarkably complex phenomenon. Previous studies have investigated elements of these traditions, such as human remains on settlements (Armit and Ginn 2007) and the appearance of inhumation in 1st millennium AD Orkney (Ashmore 2003). Tucker (2010) compiles the available evidence for the treatment of the dead during the Iron Age in Atlantic Scotland, providing a new map of funerary behaviour and enabling a fuller discussion of mortuary treatment in Atlantic Scotland. This study shows that a wide range of funerary traditions were practised over the long Iron Age and that these regularly involved deposition of animals and material objects in what might be termed structured deposits.

For the Early Iron Age, Atlantic Scottish evidence for funerary treatment is extremely sparse. The extreme rarity of human remains from this period, even in well-explored regions such as the Western and Northern Isles, must suggest that archaeologically invisible funerary rites such as cremation were in use (Tucker 2010, 295–6). With the exception of isolated cremation burials on Shetland, North Uist and Islay, remains from this period comprise a few fragmentary bones from midden deposits at Cnoc Stanger, Caithness, which may provide a hint to wider Early Iron Age practice (*ibid*., 297). On Orkney, two Atlantic roundhouse settlements at Howe (Ballin Smith 1994) and Bu (Hedges *et al.* 1987b) were used for the deposition of human remains during this period. The development of monumental Atlantic roundhouses during this time saw claims to land and power demonstrated by construction of ever larger and more complex dry-stone structures, providing a marked transition in depositional practices involving human and animal remains into domestic sites (Tucker 2010; Waddington 2014).

During the Middle Iron Age, at a time when Atlantic roundhouse architecture reached its most elaborate form, there is widespread evidence for the structured deposition of materials including human remains on domestic sites, especially across Caithness, Orkney, and the Western Isles. The structured deposition of materials within monumental structures, especially at the wheelhouse sites in the Western Isles – under floors, behind walls, and within abandoned structures – sometimes appear to mark liminal spaces such as entrances, or a particular period in the life of a building (*e.g.*, construction or abandonment). A number of such deposits include human remains, such as the perforated human skull fragment and other cranial elements from Cnip (Armit 2006, 226), or the wheelhouse of Sloc Sabhaidh in South Uist, where a human mandible was placed on top of a deposit of animal (Rennell and McHardy 2008, 15). A remarkable discovery at Hornish Point, South Uist (Barber *et al*. 1989) were four pits uncovered in the floor of a radially partitioned structure, each containing parts of a boy aged around 12 years. The boy had been dismembered after death, his remains accompanied by butchered bones of young cattle and sheep – the animals potentially relating to a feasting deposit contemporary with the burial (Armit 2006, 247). Evidence for peri-mortem sharp force trauma on the skeleton from Hornish Point raises the more sinister issue of human sacrifice (Tucker 2010). Moses has argued that 'foundation sacrifice' should always be considered as an alternative to the more neutral term 'foundation deposit' where juvenile remains are found in these contexts, as 'the act of killing the victim is necessary for the offering to have value' (Moses 2008, 45–9).

Partial human remains are found elsewhere in below-floor deposits in the Scottish Iron Age, such as in a drain at the Wag of Forse in Caithness (Curle 1948), in Howe broch on Orkney (Ballin Smith 1994), and at Dun Vulan in South Uist (Parker-Pearson and Sharples 1999, 137, 288–9). Adult teeth were recorded in the floor surfaces of external structures at two sites; Old Scatness in Shetland and Howe in Orkney, and although it is possible that these teeth were accidental losses, the discovery of individual teeth within caves and domestic contexts during the Iron Age suggest these may have formed token deposits (Armit 1996, 145–6; Dowd 2015, 164). These remains most likely comprised deposits associated with foundation rituals in which ancestors or even human sacrifices were deliberately incorporated within floor horizons, potentially adding power or protection to the spaces above them (Tucker 2010).

Entranceways, whether of Atlantic roundhouses or external structures, seem to have been one of the most commonly used areas for deposition of human remains, especially crania, and it has been suggested that the purpose of these deposits may have been for the ancestors to mark or guard the transition point from the ordered inside world to the wild outside (Parker Pearson 1999b, 51; Tucker 2010, 144). Belief systems revolving around the symbolic power of boundaries and ideas of liminality are supported by many ethnographic studies (Tucker 2010). The elaboration of many Atlantic roundhouse entrances suggests that this was an important area of the settlement infrastructure (Brück 2008, 259). Likewise, although in a non-domestic context, the combined human and animal burials placed in the top of the backfilled stairwell at High Pasture were placed in a liminal context.

A particularly intriguing set of materials possibly relating to closure was identified at The Cairns broch, Orkney. A human mandible had been placed in the upper fill of a whalebone vertebra vessel accompanied by two red deer antlers, and a saddle quern was placed against the vessel containing this deposit. The individual was at least 50 years of age and died between cal AD 120 and 240 (Carruthers pers comm.); contemporary with the main burials at High Pasture. Isotope analysis indicates a diet rich in marine fish, unusual for people of this period, even those living in a coastal landscape. The disarticulated bones of High Pasture's Individual K, aged around 10+ years, also provided isotopic evidence for a prolonged input of marine diet (see Section 11.3).

The inclusion of human remains within the fabric of structures was a long-lived tradition in Atlantic Scotland, extending from the Early to Late Iron Age. Often combined with midden containing animal bone and artefacts, these combined materials may appear to represent re-use of handy 'rubbish' for construction purposes, but the presence of human remains suggests that this material was chosen for its symbolic as well as practical qualities (Tucker 2010, 149). All the disarticulated human remains from High Pastures were found in midden contexts.

The majority of disarticulated human remains found on domestic sites in Iron Age Atlantic Scotland have been recovered from post-occupation deposits, sometimes including the rubble from collapsed walls. Disarticulated remains have been recovered from over half of the domestic sites discussed by Tucker (2010) and account for 93% of all remains found throughout Atlantic Scotland. This category encompasses human bone within the rubble fill of entrances or stairwells. On many monumental sites occupied during the Atlantic Iron Age, especially particularly long-lived settlements such as Howe and Dun Vulan, some areas appear to have fallen into disuse and decay while other areas continued to be occupied. It has been suggested that these depositional practices, with no apparent separation of the living from the dead, indicate a casual attitude to the dead, nearby empty structures forming convenient receptacles for human remains (Ballin Smith 1994, 262). Tucker (2010, 156–7) questions this: the composition of these deposits, most of which include only disarticulated, larger bones from the body, were likely recovered from beyond the settlement for this final depositional event.

The most obvious interpretation of deposits of disarticulated human remains in post-occupation layers is as abandonment or 'closing' deposits, marking off areas no longer to be occupied, or the final closure and decommissioning of a structure. The practice of depositing special items in houses at the time of abandonment or destruction has been recorded widely within many cultures, as a means of marking the end of the life cycle of the house (Webley 2007, 145). Generally, however, evidence to support a close chronological link between the placement of these kind of deposits and the point of abandonment or destruction of a structure is lacking for Atlantic Iron Age contexts. It is also obvious at some sites (including High Pasture, with its delay between the blocking of the stairwell and the burials above it) that deposition events sometimes took place a considerable time after collapse or abandonment: when deep-rooted memory associated with these places marked them out for continuation or resumption of some activity.

The partially collapsed Atlantic roundhouses would have remained very visible in the landscape, just as they are today, powerful symbols of past inhabitants. The use of such structures for offerings and rituals by later generations should not be unexpected, especially if Iron Age societies placed importance on places associated with the ancestors in the world of the living (Hingley 1996). It has also been suggested (Whitley 2002, 123) that disused monuments in later prehistory, as in recent history, may have been associated with supernatural creatures, gods, or spirits. If so, then some abandoned structures may have become shrines: locations for communication with the

ancestors, or simply sacred areas suitable for the disposal of certain members of society. There is evidence to suggest that earlier Bronze Age barrows and Neolithic tombs were often viewed and used in this way by the inhabitants of Iron Age Atlantic Scotland (Hingley 1992) and the use of more recent ruined structures may simply have been a continuation of this tradition (Tucker 2010, 157–8).

Excavation of souterrains at Bu and Rennibister, Orkney produced a large number of human remains, a type of depositional activity only recorded in the Northern Isles so far (Hedges *et al*. 1987, 124–5). Those at Rennibister comprised a considerable quantity of human crania, reportedly found placed in a carefully organised pattern (Marwick 1927). In many ways, the dark spaces found within souterrains can be compared with the partially subterranean stone structures which are often found within wheelhouses, roundhouses, and broch towers (including intra-mural galleries), and which seem to have been primarily used for storage (Miket 2002, 78–85). It has been suggested that souterrains may have had a concurrent ritual function, as unusual 'structured' deposits, including artefacts and animal remains, have been found in several Orcadian examples (Henderson 2007, 147).

Human remains have also been recovered from midden contexts at six sites in Iron Age Atlantic Scotland, including Old Scatness, Shetland, Bu, Orkney, Old Stirkoke, and Whitegate, Caithness, Cnip in the Western Isles, and Fiskavaig on Skye. The majority of these sites were in use for a substantial period of time after the midden deposits were placed, supporting the idea that these human-containing 'rubbish heaps' were maintained and curated during the life of the settlement as an important and ritually loaded resource. Tucker (2010, 154–5) suggests that deposition of human remains in middens should be considered a separate practice from remains placed in post-occupation or rubble deposits on Iron Age sites: once categorised as simply rubbish deposits, the potential cosmological significance of middens now a key part of archaeological discourse in not only Iron Age study. Human remains could have added to the regenerative power of midden, the association of human remains with regeneration and fertility being deeply embedded in many cultures (Bloch and Parry 1982, 7).

Two sets of remains placed into ash contexts during the occupation of structures at Howe, Orkney and Kettleburn, Caithness may reflect this tradition. At Howe, numerous bones from a single juvenile were placed into the ash 'dump' inside an outbuilding (Ballin Smith 1994, 261) and at Kettleburn four fragments of cranium were found in a 'heap of ashes' in the broch interior (Rhind 1853, 268). Neither set of human remains appears to have been burnt. Ash, like midden, forms good fertiliser, and may have been stored within these buildings for future use – which here would also involve the fragments of human bone added to them (Tucker 2010). Interesting deposits of human bone were recovered from ash related contexts within the precinct at High Pasture, including two adult cranial fragments and a group of 15 charred cranial fragments. The latter were deposited with a wide range of artefacts including wooden objects, burned in a slow, low-energy fire (see Section 6.4.4; Fig. 11.4).

Iron Age sites dedicated to non-domestic activities were unrecognised in Atlantic Scotland less than a couple of decades ago (Harding 2004, 297; Tucker 2010, 207), but with the excavation of sites such as Mine Howe and the Knowe of Skea in Orkney, Sculptor's Cave in Moray, and Fiskavaig and High Pasture Cave in Skye, this has changed. Human remains were found at all these sites and the use of entire bodies on all excluding Sculptor's Cave and Fiskavaig, contrasts with the general emphasis on disarticulated remains on domestic sites. Many of these sites also produced evidence for metalworking, the ritual connotations of which have been discussed by several authors including Bradley (2005, 150). The association between metalworking and human remains on these sites suggests complex belief structures involving technology, regeneration, life, and death.

Two adult skeletons recovered at Mine Howe appear to be roughly contemporary (1st centuries BC–AD) but represent very different rites: one involving careful placement with artefacts beneath the floor of a workshop and the other involving the violent killing and hasty deposition of an individual into a midden outside the same structure. Both incidents may have been timed to mark changes in the life cycle of the workshop, to add power or significance to these events within the wider ritual context of Mine Howe (Tucker 2010, 208–9). The discovery of the remains of over 150 people among an unusual group of buildings at the Knowe of Skea was a vital development in the study of Iron Age Atlantic Scottish funerary behaviour. The human remains from this site represent nearly a third of all those recovered in this area over the 1600 years of the long Iron Age. Most individuals (around 70%) are neonates or infants, with a smaller number of older juveniles and adults making up less than 25% of the group. Radiocarbon dates run from the last few centuries BC to the mid-1st millennium AD (Moore and Wilson 2005; 2007), although dates are all from the adult skeletons. The demographic profile suggests that this site cannot be viewed as a normal community cemetery, with the very young having been accorded differential funerary treatment.

The deposition of human remains on non-domestic sites such as Mine Howe, Knowe of Skea, and High Pasture Cave should not be unexpected. Human remains have been recovered at Iron Age shrines and sanctuaries on the continent, as well as on domestic sites with a partially ritualised character throughout Iron Age Britain. The fact that so few have yet been recognised makes it difficult to establish the full extent of the construction of specialised ritual sites in Atlantic Scotland and, in turn, of the use of human remains within these areas. The deposition of

human remains both disarticulated and articulated on settlements and ritual sites suggests a complex picture of domestic and public ritual involving human remains during this period.

Demographic differences can be seen between those deposited on domestic and ritual Iron Age Scottish sites, with the former usually reserved for adults, with a bias towards adult males (Tucker 2010, 158–60). The individuals deposited at Bu, Crosskirk, and the Udal were aged over 40, and well-built. Osteological analysis also suggested many of these individuals suffered from joint degeneration and poor dental health. Levels of tooth caries are particularly high (50%) among articulated individuals found on domestic sites and on sites where ritual activities can be inferred, compared to less than 10% of those (where this can be observed) among the disarticulated remains. This could suggest that the individuals chosen for whole body deposition were drawn from a group in the population with greater access to high-carbohydrate foodstuffs, usually regarded as a high-status trait (Tucker 2010, 212). The adult woman buried at High Pasture (Individual A) had very poor dental health, and isotopic analysis suggests she consumed a high-protein diet (see Section 11.4.3).

It seems likely that the use of human remains added a permanent symbolic importance to both domestic and non-domestic sites in Atlantic Iron Age Scotland, with the act of deposition itself important as a means of creating or adding to the significance of a particular place (Brück 1999a, 331). Although faunal remains were also frequently used in domestic rituals, human bones were obviously felt to fulfil an important role in these exchanges with the spiritual world. It is likely that the human remains selected for circulation and deposition in the Iron Age were regarded as powerful and contested objects, and their incorporation within settlement and non-settlement contexts was perhaps a mechanism employed to imbue agency in the architectures of these places. Death was therefore being conceptually controlled, and these practices may have also allowed some people to come to terms with the fear and drama of death (Hodder 1990, 40; Waddington 2014, 87–8). Jones (2007, 22) has suggested that 'the history of the kin group was read in the history of the house, and its very fabric remembered these changes and alterations'. Unfortunately, such driving forces within society remain all but invisible to the archaeologist but it seems fair, at least, to assume that these deposits were made to ensure the continued good fortune of the household.

The close relationship of Iron Age communities with their dead would not have been limited to living alongside dry skeletal remains but most likely involved the primary funerary treatment of cadavers: the handling and transport of partially decayed remains, circulation and use of dry bones within and outside the household, and complex final depositional rituals within settlements and other types of contemporary non-settlement sites. It is clear, however, that these locations were felt to be suitable only for certain members of the population. The placement of such individuals into occupied or abandoned settlements or non-settlement contexts separated the significant among the community from that community in death.

The concept of the body and perception of what it represents is not static. Differential treatment of the corpse may reflect variations in attitudes to this entity and to life and death but a direct correlation between specific ideas and mortuary behaviour is unlikely (Leach 2015, 343). In underground contexts including High Pasture Cave, and within contemporary settlement sites, regional variations in the treatment and manipulation of human remains have been identified, ranging from a concern for the corporal integrity and provision of grave goods, to deliberate fragmentation of the physical remains and dispersal across the landscape. It seems unlikely however, that there will be one unifying explanation with regard to human deposition, with past perceptions of these loci and their function, being fluid and multifaceted.

Non-normative occurrences of human bodies or body parts in the archaeological record have often been overlooked or played down, leaving them poorly represented in archaeological literature and thus, poorly understood: frequently normalised, described as burials – even though anomalous traits may suggests other behaviours and meaning. In the past, the bodies and body parts manipulated by the people using sites such as High Pasture had a social identity. It is therefore our duty to investigate these remains with the respect they deserve. A growing core of data in this area is beginning to allow these bones to speak once more, illuminating unique aspects of mortuary practice in Atlantic Iron Age Scotland and beyond.

Part IV

Biographies in life and death: material culture

12

Complex biographies in life and death: material culture

Gemma Cruickshanks

With contributions from Torben Ballin, Ann Crone, Mary Davis, Julia Gerken, Fraser Hunter, Graeme Lawson, Ann MacSween, Fiona McGibbon, Lynne McKeggie, Jo McKenzie, Dawn McLaren, Anthony Newton, John Purser, Alan Saville, and Valerie Steele

12.1 Introduction

High Pasture produced a rich and well-preserved artefact assemblage of over 1700 objects, showcasing the range of materials available in later prehistoric Scotland. Rarities such as the preserved wooden musical instrument bridge accompany decorated fragments of La Tène metalwork, an intricate spiral glass bead, a Roman coin, and some of Scotland's earliest iron and ironworking finds, all illustrating wealth and wider connections. Such finds are a minority compared to the vast corpus of the everyday though: cobble tools, bone points, pottery sherds, and craft debris form the majority of the assemblage.

The artefact assemblages and their chronology are vital to understanding both site function as well as the movement of objects during the Atlantic Iron Age in Scotland. Sections 12.2–12.11 discuss the objects and analyses in material specific reports, with a complete discussion in Section 12.12.

12.2 Pottery

Ann MacSween

12.2.1 Introduction

673 sherds representing an estimated 379 vessels were recovered from the High Pasture Cave excavations (Fig. 12.1; Table 12.1). They relate broadly to four phases of the site identifiable as Early Bronze Age Beaker (Phase 1A), mid to later Bronze Age (Phase 1B), Early Iron Age (Phases 3 and 4), and Middle Iron Age (Phases 5, 6 and 7).

12.2.2 Methodology

Sherds were grouped by context and vessel, and recorded using the vessel number plus finds number. Weight, length, breadth, and thickness were measured for each sherd and its position (body, rim, or base) recorded along with any surface finish and decoration. Fabric was described by eye using grade of clay (fine, fine sandy, sandy, coarse sandy) and the type and amount of temper (*e.g. c* 20% rock). 'Colour' across the sherd is also noted, along with presence of absence of sooting/residue on the interior and exterior, and abrasion (fresh, partly abraded, abraded).

Detailed examination at context level was vital. A spreadsheet catalogues each group of sherds (vessel) with diagnostic sherds described in a written catalogue (Site Archive), and a summary of pottery from each context included here (Section 12.2.3–12.2.9). Detailed summaries for each context are in the site archive.

Two additional specialist analyses complemented the main ceramic investigation. A group of 30 potsherds was selected for petrological analysis (Section 12.2.10). This aimed primarily to investigate provenance via assessment of the different temper types, evident from the first stage of visual analysis and, secondly, to further investigate the context of pottery deposition at this

very unusual site. Can temper analysis shed additional light on whether the High Pasture pottery represents localised activity, or a range of types, traditions, and, perhaps, geologies indicating a wider geographic origin for the assemblage? In addition, a number of ceramic sherds were analysed for absorbed residues and organics (Section 12.2.11).

The majority of sherds came from Phase 6 contexts. Compared to the patterns seen in other finds categories, and by the stratigraphy, the number of pottery sherds is less than would have been expected. This could indicate that Phase 6 is the period of most intensive use of the site or that there are middens relating to the other phases elsewhere. Alternatively, the activities being carried out around the cave before Phase 6 may not have involved the use of pottery vessels to the same extent. These questions are considered further in Chapter 14.

The four assemblages from High Pasture are distinct from each other in terms of fabric, surface finish, morphology, and decoration. The Beaker sherds are defined by their fine walls, impressed decoration, and coarse sandy fabrics; the mid-/late Bronze Age decorated pottery by the variety of decoration and the inclusion of steatite rock and clay in their fabric range; the Early Iron Age by its distinctive flat rims, the very high percentage of rock fragments in the fabric mix, and the shape of the vessels, many of which were straight-sided; and the Middle Iron Age assemblage by its everted rims, round-shouldered vessels, and the use of incised, applied, and impressed decoration.

The pottery from High Pasture was handmade using coil construction and presumably fired on a simple kiln or on the domestic hearth.

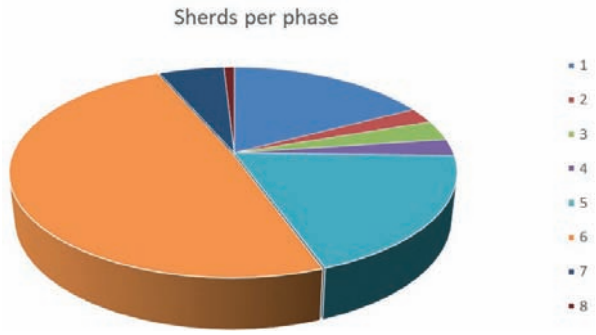


Figure 12.1. Pottery sherds per phase

Table 12.1 Pottery sherds & vessels by phase

Ph	*Sherds*	*Vessels*
1	117	37
2	16	8
3	21	13
4	17	15
5	128	128
6	330	203
7	38	21
8	6	6

12.2.3 Early Bronze Age: Beaker Pottery Phase 1a (start: 2140–1920 cal BC/finish: 1730–1510 cal BC)

Description

The earliest High Pasture pottery is from contexts in Trench 19, Phase 1a, which produced Early Bronze Age dates of 2140–1920 cal BC. Twenty-two sherds, many abraded or slightly abraded, were recovered (Table 12.2). The sherds are small, from early occupation near the cave (Fig. 12.2).

Seventeen sherds from six vessels are from the old ground surface (C19.28). Sherds from two vessels are from Beakers. Those from Beaker V325 are body sherds (8 mm thick) with a smoothed exterior, decorated with either incised lines or lines of impressed cord (the sherds were too abraded to tell). One sherd has a band of oblique incised decoration between two horizontal lines. The fabric is fine sandy clay with *c*. 20% small rock fragments. The second Beaker produced a sherd from the rim (plain lip) and neck of a vessel decorated with parallel lines of probable comb impressions (V329) and made from coarse sandy clay. Both surfaces are badly abraded. Also from C19.28 are five fragments from one vessel (V326) and single sherds from two further vessels (V327 and V328), all with 30–50% rock fragments. Sherds from the latter two vessels are thin walled (7 mm). The final sherd from C19.28 is from V340, a thin-walled vessel (6 mm thick) of coarse sandy clay. One small, slightly abraded body sherd (V324) with 30% rock was recovered from C19.29, the fill of a scoop within C19.28. The rest of the Phase 1a pottery is from C19.42, a matrix of packing stones and cobbles around recumbent stone F19.29, with elements of four vessels (V380, V381, V382, and V383), all

Table 12.2 Pottery recovered from Phase 1a

	C	*Sherds*	*Vessels*	*Rims*	*Decoration*	*Fabric*
19.28	Old Ground Surface	17	6	1 Beaker (V329)	1 comb & incised (V109)	2 untempered; 4 rock
19.29	Old Ground Surface	1	1	–	–	1 rock
19.42	Packing stones	4	4	–	1 impressed (V383)	4 rock

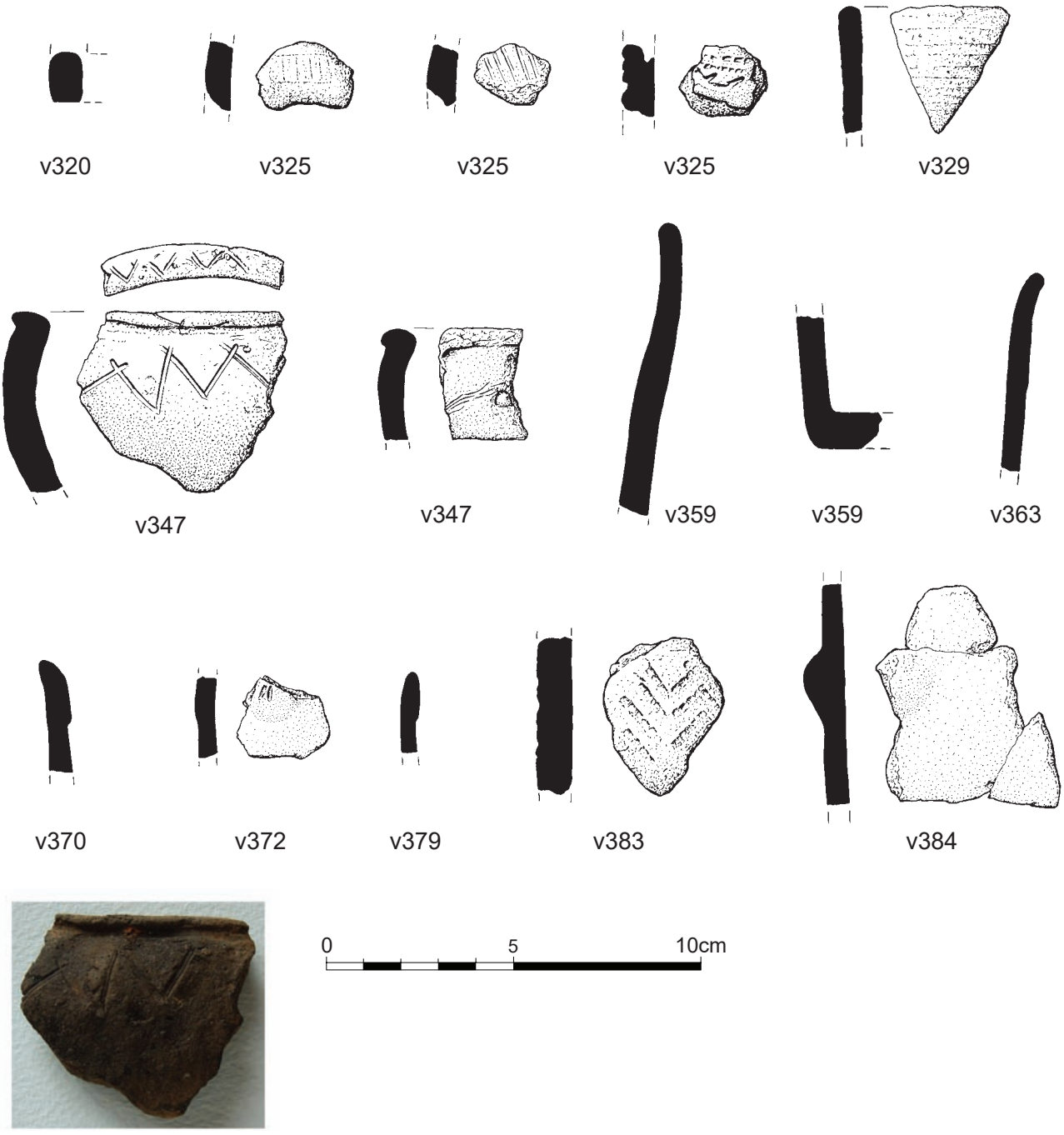


Figure 12.2. V320 lump of clay (Ph 5); V325 Beaker (Ph 1a); V329 Beaker (Ph 1a); V347 incised (Ph 4c); V359 (Ph 3b); V363 (Ph 3c); V370 (Ph 5b); V372 raised boss (Ph 6a); V379 (Ph 5a); V383 possible Beaker (Ph 1a); V384 raised boss (Ph 4a) - Inset V347

with *c.* 10% rock fragments, recovered. One sherd (V383) may be from a Beaker. It has abraded, comb-impressed herringbone decoration.

Beaker sherds were recovered from contexts identified as containing redeposited material in later phases. C17.06 in Phase 3a, redeposited midden in the cave, produced an out-turned Beaker rim (V282) with concave neck, decorated on the exterior with rows of comb-impressions. C19.06 (burnt spread deposits) in Phase 4 included a possible Beaker sherd (V267), very abraded, but decorated with possible comb impressions forming lines of horizontal parallel lines and a zone of vertical, closely spaced lines.

Discussion

The sherds are too small to allow detailed comment on the form of the Beakers, so the following discussion examines the wider context of Beaker dating and use in Skye. Bayesian modelling of dates obtained for The Beaker People project (Parker Pearson *et al*. 2019) concluded that the first dated use of Beakers in a funerary context in Britain is likely to have occurred in 2460–2330

cal BC (95% confidence) and the last dated use to have occurred by 1805–1650 cal BC (95% confidence). The use of Beakers in Britain therefore lasted for over 500 years from the 25th to the 18th century BC (Parker Pearson *et al*. 2019, 426). This agrees well with the results of the British Museum's radiocarbon dating programme published in the early 1990s, which gave a date for Beaker use in Britain of *c.* 2500–1700 BC (Kinnes *et al.* 1991), and with Needham's (2005) model for the introduction and spread of Beaker use.

Prior to Needham's publication the accepted view was that after Beakers were introduced into Britain, there was considerable overlap in the use of the various types (*e.g*. Boast 1995; Case 1995). Needham suggested that for the first three centuries or so of use, the vessels that evolved were the result of interaction between a western Maritime Bell Beaker tradition and an eastern Corded Ware tradition, producing a vessel form which was low-carinated with horizontal decoration either in impressed cord or comb-stamp (Needham 2005, 182–3). He suggested that it was after 2250 BC that the amount of diversification increases. Sheridan (2007, 99) suggested that the period of diversification began slightly earlier in Scotland, possibly around 2350 BC.

Parker Pearson *et al*. (2019, 426–7) used a Bayesian model which treated Beaker deposition in England and Scotland as a single phase of activity, which they conclude accords with evidence from early Beaker styles and grave styles, indicating a diasporic movement rather than an initial movement to one part of the country with subsequent expansion.

Phase 1 dates for High Pasture puts its Beakers into Needham's 'Fission Horizon', 2250–1950 cal BC. In this period Beakers were found across much of Britain and their diversification had increased prior to the appearance of bronze use during the 22nd century BC. Needham comments that during this time 'they reflect general society, rather than a specialised and readily identified minority' (Needham 2005, 209).

Beakers have been found at sites across Skye in both funerary and non-funerary contexts. Sheridan (2013, 62–3) notes that Scotland's earliest Beakers extend as far north as Skye where, at Broadford, a slab-lined grave with an early AOC Beaker and an S-shaped beaker was dated between the 25th and early 23rd centuries BC (Birch 2012).

The first Beaker found in Skye, or at least published, is that from Cnocan nan Gobhar cairn, Kilmarie, in Strath (Callander 1928), seemingly dug into the summit of a Neolithic cairn. It is decorated with two broad bands of zig-zag or chevron decoration with horizontal decoration between. In the year following publication of the Cnocan nan Gobhar Beaker, W Lindsay Scott published the excavation of a chambered cairn at Kraiknish, Loch Eynort, and the recovery of a complete Beaker with all-over, lozenge-based decoration, and fragments of a second Beaker with zones of herringbone decoration and horizontal lines (Scott 1929).

A Beaker was recovered from the chambered tomb at Rudh an Dunain, Glen Brittle (Scott 1931, 198, fig. 11). It has a straight, slightly expanded neck and is decorated with two bands of decoration (by incision and comb impressions) across the neck and body. The bands are defined by parallel lines of decoration above and below, with the bands themselves divided into a series of panels by sets of vertical lines. The sherds were found scattered in the northwest corner of the chamber with human remains in the same 'stratum' as the pottery.

The excavation of Rudh' an Dunain Cave near the chamber tomb uncovered four strata. At the lowest cave level, pottery fragments including Beaker were recovered along with knapping waste. The Beaker pottery includes sherds decorated by comb impressions divided into zones including horizontal nested V decoration (Scott 1934, 221, 222, fig. 5).

In 1978 sherds of Beaker pottery and six barbed and tanged arrowheads were recovered on a croft, 7 Elishader, from a mound protruding slightly above the peat. Local tradition stated that two Beakers and at least 12 arrowheads had previously come from the mound. Some of the sherds may be from an AOC Beaker. The others indicate decoration in zones. (Close-Brooks & Ritchie 1978, 99–101).

Beaker sherds were also recovered from a trench opened across a cairn, Cadha Riach, at Garrafad, Staffin, on the northeast coast of Skye, and were presented to the National Museum of Antiquities of Scotland in 1970 (Close-Brooks and Ritchie 1978, 100–1, and fig. 11, 20–22). One sherd has nested chevron decoration delineated in a zone. The decoration on the other two illustrated sherds is by incised lines – parallel and criss-crossing lines.

Fieldwork at Kiltaraglen, Portree, Skye, in 2006–7 uncovered two pits containing Beaker pottery. In total 114 Beaker sherds representing 39 vessels were recovered, 112 sherds from Pit 168 dating to 2550–2230 cal BC at 2 sigma: 3945±40 BP (GU-17926) and 3905±40 BP (GU-17927), and two sherds from Pit 134 dating to 2570–2200 cal BC at 2 sigma: 3945±30 BP (GU-17468) and 3845±30 BP (GU-17469). The highly fragmented nature of the assemblage meant that it was not possible to determine vessel profiles or the arrangement of motifs on the vessels, but hints of the more complex patterns were noted – overlapping lines, comb-impressed diagonals, chevrons, and zigzags, often with a border of parallel lines; and fingernail impressions with comb-impressed lines and lattice (Johnson 2013, 35–6).

Beakers have also been recovered from many islands adjacent to Skye. Most of these have also been from funerary sites although also from a number of domestic assemblages including that from Northton on Harris (Simpson *et al.* 2006), and smaller assemblages from

Sorisdale on Coll (Ritchie and Crawford 1978) and Rosinish on Benbecula (Shepherd 1976).

Across Scotland the relative abundance of vessels from funerary contexts has perhaps solidified the view of a domestic/funerary division, but it is likely that on domestic sites there was a mix of 'special pottery' including the finely decorated Beakers chosen to accompany burials and, alongside that, a wider variety of other pottery shapes to suit the needs of everyday life. An interesting question is whether the badging of assemblages as 'domestic Beaker' remains helpful, when our view of prehistoric communities is now more complex and holistic. This is brought into focus at High Pasture, where the cave as a source of wonder is likely to have been the draw for these earliest visitors.

12.2.4 Bronze Age decorated: Phase 1b (1320–1110 cal BC)

Description

Ninety-five sherds from 26 vessels were recovered from the water-washed gravels and silts in Bone Passage (Figs 12.3, 12.5). Two sherds from two vessels were found in natural potholes in the cave floor (C6.10). One sherd (V165) is decorated with incised decoration forming a multiple chevron with a lattice below and another (V164) has faint incised decoration. Both are low in rock fragments (up to 20%).

Ten body sherds from four vessels came from redeposited midden in the cave (C17.09) dated to 1320–1110 cal BC. One sherd (V283) is decorated with incised lines forming herringbone chevron style decoration. Sherds from two vessels have up to 30% rock fragments, one has no inclusions and the fourth up to 50% rock fragments. All vessels are made from fine sandy clay.

An assemblage from water-washed Bone Passage gravels and silts (C17.10) comprises 83 sherds from 20 vessels. Five vessels – V254, V255, V270, V291, and V292 – have rim sherds. V254 and V255 are plain rims; V291 is a rounded rim, rolled over and grooved under (the profile suggests a bowl); V292 is a flat rim from a vessel with an inverted profile; and V270 is more straight-sided in profile with an interior bevel. One vessel, V252, has a footed base. Seven vessels – V251, V270, V271, V272, V283, V286, and V287 – are decorated. Three vessels have impressed decoration: V271 has lines of impressed comb decoration, and V286 and V287 faint lines of impressed decoration. Three vessels have incised/grooved decoration: V283 has herringbone decoration; V270 has vertical and horizontal lines of incised decoration; and V251 has vertical lines of finger-tip grooving. V272 has lines of comb impressed decoration with stab and drag infill below. Five vessels were made from clay with no rock fragments – one sandy clay, three fine sandy clay. Two have organics and rock fragments and the rest have 10–50% rock fragments. V288, V289, V290, V291, and V292 have steatitic fragments and steatite-rich clays which were not present in Phase 1a contexts. The possible source of the steatite is discussed further in Section 12.2.10.

Pottery from C17.10 includes numbers of sherds from the same vessel and it is possible these represent parts of vessels fragmented by water running through the cave. Although the sherds are too small to allow vessel profiles to be identified, the three rim sherds indicate that open, straight-sided, and 'closed' vessels with an inverted profile are represented. A variety of decorative motifs were used – incised chevrons, lattice, horizontal and vertical lines; impressed comb decoration; and stab and drag decoration. Many sherds have fabrics with a fairly high rock fragment content.

Discussion

Scotland's ceramic sequence shows that the use of Beakers had ceased by around 2000 BC and the next *c*. 800 years were defined by the use of decorative urns and food vessels. By about 1200 BC the use of decorated ceramics was going out of fashion although cordoned urns with decoration restricted to the upper part of the vessel were still in use. There is considerable variation in decoration, within and between sites. The last few centuries of the 2nd millennium BC seem to have been defined by undecorated ceramics, often flat-rimmed (see Gibson 2002 for an overview).

Post-Beaker earlier Bronze Age decorated pottery from the Hebrides includes that from the first half of the 2nd

Table 12.3 Pottery recovered from Phase 1b

C		*Sherds*	*Vessels*	*Rims*	*Decoration*	*Fabric*
6.10	Pothole fills	2	2	–	1 incised (V165)	2 rock
17.09	Redeposited midden	10	4	–	1 incised (V283)	1 untempered; 3 rock (2 have steatite)
17.10	Gravel, bone pass	83	20	2 plain (V254, 255)	finger grooves (V251)	5 untempered
				1 rolled (V291)	incised (V283, V270)	12 rock
				1 flat (V292)	impressed (V271, V286, V287)	1 organics
				1 int. bev (V270)	grooved (V251) combined (V272)	2 organics & rock

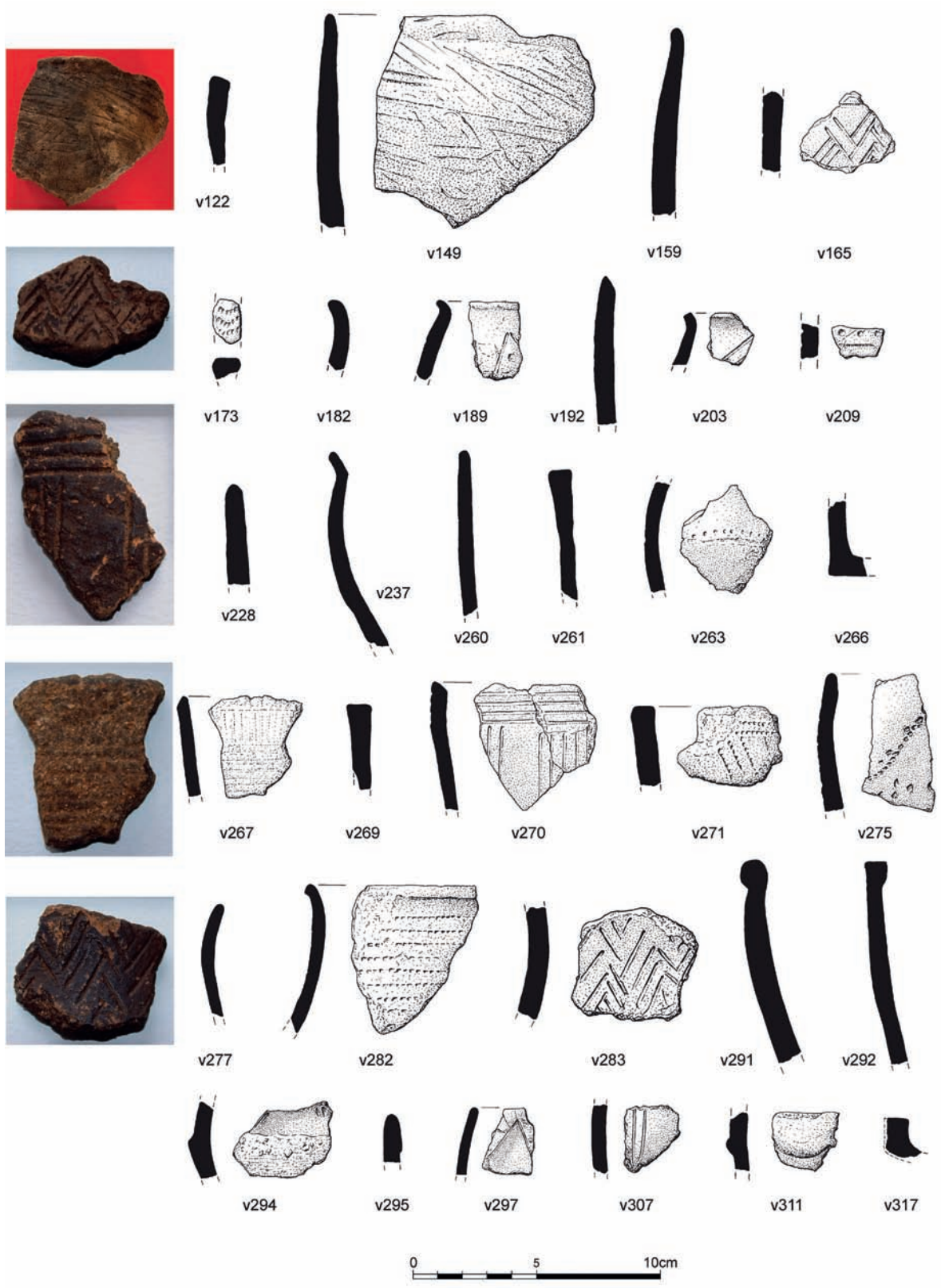


Figure 12.3. V122 (Ph 2A); V149 (Ph 6b); V159 (Ph 6a); V165 incised (Ph 1b); V173 comb impressed (Ph 3); V182 (Ph 5); V189 incised with impressed dot (Ph 6); V192 (Ph 6); V203 (Ph 6); V209 (Ph 6); V228 (Ph 6); V237 (Ph 5); V260 (Ph 4b); V261 (Ph 3a); V263 impressed dots (Ph 3a); V266 (Ph 5); V267 Beaker – redeposited (Ph 4); V269 (Ph 4); V270 incised (Ph 1b); V271 impressed comb (Ph 1b); V275 impressed dots (no context); V277 (Ph 6a); V282 Beaker (Ph 3a); V283 incised (Ph 1b); V291 rolled rim (Ph 1b); V292 flat rim (Ph 1b); V294 (Ph 8); V295 (Ph 8); V297 incised (Ph 6a); V307 incised (Ph 6b); V311 applied (Ph 4/5); V317 no context. Inset images from top to bottom: V149, V165, V270, V267, V283

millennium BC from Killellan Farm, Islay (Ritchie 2005) and Ardnave (Ritchie and Welfare 1983). In her report on Killellan, Cowie (2005, 70) noted the rarity of contemporary assemblages from the Hebrides, with much of the pottery of that period coming from funerary contexts. Most of the Killelan vessels are bipartite shouldered jars with internal bevelled decorated rims, categorised as 'domestic food vessel'. The presence of some open vessels and plain rims (*e.g*. Cowie 2005, vessels 81 and 80 respectively, 72, fig. 72) should, however, be noted as well as similarities with the decoration in the High Pasture assemblage (*e.g.* see Cowie 2005 – incised herringbone on vessel 28 (59, fig. 63); vertical incised panels on vessel 10 (53, fig. 60)). At the neighbouring site at Ardnave, domestic food vessels included decoration, such as stabbed decoration (*e.g.* Henshall 1983, 10, fig. 9).

While there was considerable variation in the pottery being produced in the west coast islands in the earlier Bronze Age, there was also commonality in decorative techniques over a fairly wide area. The variation in combinations of decorative elements and stylistic form is, however, striking. In conclusion, while the radiocarbon date for Phase 1b at High Pasture Cave indicates later Bronze Age activity, the pottery from these phases is more likely to date to the post-Beaker Bronze Age.

12.2.5 Early Iron Age: Phase 2 (start: 800–745 cal BC/finish: 730–640 cal BC)

Description

Eight sherds of undecorated pottery from three vessels were recovered from Phase 2a (Table 12.4), the dumped deposits and spreads in the cave. Seven sherds from two vessels (V1 and V122) were recovered from redeposited midden material from the cave (C1.09). Both vessels have flat rims and high rock fragment content (60–70%) and are wet smoothed on the exterior. The profile of rim sherd V122 indicates a vessel with straight sides, possibly bucket-shaped. The rims are from small to medium-sized vessels: V1 is 230 mm in diameter and V122, 160 mm.

One small sherd from one vessel, with 30–50% rock fragments, was recovered from C6.08, dumped animal bone and fuel residues in the cave. Seven sherds from four vessels, some with flat rims and straight sides, were recovered from Phase 2b (Table 12.4), the closing deposits in the lower walkway. Three sherds from three vessels were recovered from walkway closing deposits C15.59. All have low rock fragment content and one (V314) has organics. Four sherds from one vessel (V161) were recovered from C17.07, redeposited midden material in the cave. Flat-rimmed and of a similar profile to V122 (Phase 2a), this was slipped with 50–70% rock fragments, and is another small to medium sized vessel, measuring an estimated 190 mm in diameter. A further sherd of flat-rimmed pottery (V269) was recovered from a Phase 4 context: C19.14, the fill of F19.06 in the burnt spread deposits.

Discussion

The undecorated straight-sided, flat rimmed Early Iron Age pottery from High Pasture Cave is distinctive in terms of form, with flat rims and high rock fragments content (<70%) compared with the Phase 1a and Phase 1b assemblages. It also lacks decoration.

The Phase 2 assemblage has similarities with the pottery from the Enclosure and Roundhouse (2) at Kiltaraglen, Portree, and also with other later Bronze Age assemblages from the west coast, such as the Bronze Age settlement at Cil Donnain, South Uist, again characterised by undecorated pottery (Cill Donnain III) with plain and rounded rims, and both open and closed profiles (Cumberpatch 2014, 120, fig. 9.4). At Northton, Harris, later Bronze Age pottery was mainly plain pots in simple barrel shapes with rounded and flattened rims and very coarse fabric (Johnson 2006, 165, fig. 4.11).

Cill Donnain's Phase 2 pottery (Parker Pearson and Zvelebil, 2014), dating to the early 1st millennium BC, is entirely plain, the rims including one flat rim and the fabric coarse and gritty (Cumberpatch 2014, 117, 110, 121, fig. 19.5). Some of this was found in a relatively discrete horizon, in association with fired clay refractory material for bronze casting (Cumberpatch 2014, 120). Straight-sided, bucket-shaped vessels, some with slightly inverted rims, were also found in the Phase 0 levels at Dun Vulan, South Uist (Parker Pearson and Sharples 1999), dating to the 8th–5th centuries BC (Parker Pearson 1999a, 210). Parker Pearson has suggested that this pottery, which he refers to as 'Plain Style', was possibly used from as early as 1700/1500 BC (Parker Pearson *et al*. 2004, 53, 61).

Table 12.4 Pottery recovered from Phases 2a & 2b

C		*Sherds*	*Vessels*	*Rims*	*Decoration*	*Fabric*
Phase 2a						
1.09	midden in cave	7	2	2 flat (V1, V122)	–	2 rock
6.08	dumped material	1	1	–	–	1 rock
Phase 2b						
15.59	closing deposits	3	3	–	–	2 rock; 1 organics & rock
17.07	redep material	4	1	1 flat (V161)	–	1 rock

The publication of the excavations at Cladh Hallan, South Uist (Parker Pearson *et al.* 2021a) includes an excellent analysis of over 74,000 sherds from occupation-related contexts, changing our knowledge and understanding of the nature of ceramics in the Western Isles, especially in the later Bronze Age–Early Iron Age (Parker Pearson *et al*. 2021b). Within this period, the pottery changed little but this detailed, well-illustrated treatment gives a good impression of the fluctuation in favoured styles and sizes of vessels between 1150 and 600 BC.

The assemblage comprises plain wares of sandy clays with quartz and stone grit inclusions, probably made from locally available clay sources, although the similar geology across a wide area can only confirm that the ceramics were manufactured from clay derived from the Western Isles. Baked and raw clay was recovered during excavation, and potting carried out in all the main excavated roundhouses (Parker Pearson *et al*. 2021a, 491). The Cladh Hallan vessels are mainly bowls and squat jars, with some taller jars, and Parker Pearson notes that there was no distinction, from presence and absence of sooting, between cooking and eating. Decoration along rim tops was common (*c*. 15–20%).

Cladh Hallan provides comparators for the pottery from High Pasture Cave in Phases 2a and 2b; for V1 and V122 from Phase 2a, V261 from Phase 2b, and V269 from Phase 4. From the angle of their rims, all appear to have come from vessels with straight or slightly angled walls and find parallels in Cladh Hallan, for example, with pottery from the midden in Area C in Phase 9 (Parker Pearson *et al.* 2021b, 502, figs 15–28) and pottery from floor 1308 in House 401, Phase 10 (*ibid*., 505, *e.g.* Sq 2315). The Cladh Hallan report concurs with the observations above, from these smaller comparative assemblages, that there was a major change from the use of decoration to undecorated pottery around 1100 BC and that this form of pottery continued into the Iron Age until around 500 BC, when decorated pottery came into fashion again.

12.2.6 Early Iron Age: Phase 3 (start: 730–640 cal BC/finish: 650–570 cal BC)

Description

The pottery from Phase 3 (general) comprises two sherds from two vessels (Table 12.5). One sherd was found in C10.08, the fill of a shallow scoop. It is a flat rim (V173) with comb impressed decoration, possibly in a herringbone pattern, along the flat part of the rim. It has a high percentage of rock fragments (60%) and is probably Bronze Age in date, possibly from a food vessel. One sherd from one vessel came from C19.12, the secondary fill of a post-hole. Made from sandy clay, its firing indicates that it is from a vessel used in an industrial process.

Phase 3a

Three sherds from three vessels were recovered from C17.06 (Table 12.6), dumped material in the cave. One (V261) has a flat rim and is part of a vessel also in Phase 2b. Two vessels have rock fragments and the other, V282, is from a Beaker vessel with an out-turned rim, a long neck, and lines of comb-impressed decoration. Some of the pottery from this phase is attributable to the Earlier Bronze Age pottery of Phase 1a, including sherds which join, and may have been redeposited from an earlier phase of use.

Phase 3c

Sixteen sherds from ten vessels were recovered from contexts relating to Phase 3c (Table 12.7).Six sherds from five vessels came from fill between the stairwell walls and landing (C2.65). All had organics added and four also have rock fragments. One rim sherd is included (V359), a plain rim from a straight-sided vessel with a flat base. Ten sherds from five vessels came from C2.66, also a fill between the stairwell

Table 12.5 Pottery recovered from Phase 3

C		*Sherds*	*Vessels*	*Rims*	*Decoration*	*Fabric*
10.08	fill of scoop	1	1	1 flat (V173)	comb impressed (V173)	1 rock
19.12	posthole fill	1	1	1 crucible?	–	1 untempered

Table 12.6 Pottery recovered from Phase 3a

C		*Sherds*	*Vessels*	*Rims*	*Decoration*	*Fabric*
17.06	dumped deposits	3	3	1 flat (V261);	–	1 untempered
				1 Beaker (V282)	–	

Table 12.7 Pottery recovered from Phase 3c

C		*Sherds*	*Vessels*	*Rims*	*Decoration*	*Fabric*
1.09	fill: stair	6	5	1 plain (V359)	–	4 rock & organics; 1 organics
2.66	fill: stair	10	5	1 inverted (V363)	–	4 untempered

walls and landing. One vessel (V363) has a rim sherd included from a straight sided vessel with the rim inverted at the lip and surface combing on the exterior. Four of the vessels are made of untempered clay and the fifth has organic additions.

Two distinct groups of pottery are included in Phase 3c. All the pottery from C2.65 includes organics, contrasting with that from C2.66, most of which is made of untempered clays. This pottery is not immediately attributable to any recognisable pottery tradition – it is undecorated, probably from angle-sided or straight-sided vessels.

12.2.7 Early Iron Age: Phase 4 (start: 630–515 cal BC/finish: 540–435 Cal BC)

Phase 4 general

Four sherds from four vessels were recovered from four Phase 4 contexts (Table 12.8; Fig. 12.3) which appear to represent residual material. One body sherd of untempered clay was recovered from C11.05, and a Beaker sherd (V267) was recovered from C19.06 – it is abraded but it is possible to make out lines of impressed decoration; one body sherd with small amounts of rock fragments was recovered from C19.11. These contexts are all burnt spread deposits. A flat rim (V269) was recovered from C19.14, the fill of a feature in C19.06. These sherds are similar to pottery from the early phases – the Beaker pottery from Phase 1a and the flat rimmed pottery from Phase 2a, suggesting that these are redeposited from earlier phases of use, or are residual.

Phase 4a

Six sherds from six different vessels were recovered from Phase 4a (Table 12.9), a period when a significant amount of material was deposited across the site. One sherd of untempered coarse clay was recovered from C2.16, an accumulation of material from precinct hearths. One sherd with organic additions was recovered from the fill of the east wall of the stairwell (C2.62). Three sherds from three vessels were recovered from the fill in the west wall of the stairwell (C2.63). Two had low amounts of rock fragments and the third has organic additions. One sherd (V384) with *c*. 10% rock fragments and decorated with a raised boss was recovered from C21.09, the fill of the west stairwell wall.

Phase 4c

Five sherds from four vessels were recovered from five contexts in Phase 4c (Table 12.10). One untempered body sherd was recovered from hearth accumulation C2.10. Three sherds from two vessels were recovered from C2.15, residues from hearth F15.20. One vessel (V347) has a flat rim and is decorated on the exterior, and along the flat lip of the rim, with an incised zig-zag. The other (V345) has an incised line. Both have 10–20% rock fragments. One sherd, a plain rim from a straight-sided vessel (V260) made from untempered fine sandy clay, was recovered from C17.05, redeposited midden material in the cave.

Discussion

The pottery from Phases 4a and 4c comprises mainly sherds from different vessels, in a mix of fabrics, some

Table 12.8 Pottery recovered from Phase 4

C		*Sherds*	*Vessels*	*Rims*	*Decoration*	*Fabric*
11.05	burnt spread	1	1	–	–	1 rock
19.06	burnt spread	1	1	1 Beaker (V267)	impressed (V267)	1 rock
19.11	burnt spread	1	1	–	–	1 rock
19.14	fill of 19.06	1	1	1 flat (V269)	–	1 rock

Table 12.9 Pottery recovered from Phase 4a

C		*Sherds*	*Vessels*	*Rims*	*Decoration*	*Fabric*
2.16	hearth material	1	1	–	–	1 untempered
2.62	fill in stair	1	1	–	–	1 organics
2.63	fill in stair	3	3	–	–	2 rock; 1 organics
21.09	fill west of stair	1	1	–	1 applied (V384)	1 rock

Table 12.10 Pottery recovered from Phase 4c

C		*Sherds*	*Vessels*	*Rims*	*Decoration*	*Fabric*
2.10	hearth material	1	1	–	–	1 untempered
2.15	hearth material	3	2	1 flat (V347)	2 incised (V345, V347)	2 rock
17.05	redeposited midden	1	1	1 plain (V260)		1 untempered

Table 12.11 Pottery recovered from Phase 4/5

C		*Sherds*	*Vessels*	*Rims*	*Decoration*	*Fabric*
15.39	wall collapse	2	2	–	1 applied (V311)	2 rock

with small amounts of rock fragments and some with organics. The two examples of decoration, a raised boss and an incised zig-zag, are typical of assemblages from the Middle Iron Age from the west coast of Scotland, with comparable material recovered from Phase 5 contexts.

Phase 4/5

Two sherds from different vessels were recovered from C15.39, silting under the collapsed enclosure wall (Table 12.11). One (V311) has applied decoration, a wavy band. Both vessels have 10–30% rock fragments.

12.2.8 Middle Iron Age: Phase 5–7

The pottery relating to Middle Iron Age Phases 5–7 is here described according to phase but discussed together following the descriptions.

Phase 5 (start: 520–415 cal BC/finish: 315–225 cal BC)

Description

Fifty-seven sherds from 29 vessels were recovered from Phase 5 (general), from contexts that were not further subdivided to phase (Fig. 12.4). Eight sherds from seven vessels were recovered from Phase 5a and 67 sherds from 39 vessels from 5b.

The pottery from Phase 5, 5a, and 5b deposits are listed in Table 12.12. Most come from redeposited burnt spreads in the cave. Sometimes vessels are represented by single sherds, sometimes by groups, and there is a mix of fabrics – clay with no obvious additions, clay with organics, clay with rock fragments, and clay with rock fragments and organics. Everted rims are common (V63, V107, V182, V213, V237) but there are also examples of plain (V379) and flat (V233) rims. Some of the sherds are large enough to give an impression of the upper part of the vessel profile. V109, for example, is an everted rim, decorated with a line of finger impressions around the shoulder. Other decoration in the phase includes a possible wavy line (V343), traces of incised decoration (V238) and an applied band (V233).

Phase 6 (start: 295–215 cal BC/finish: cal AD 50–130)

One hundred and thirty sherds from 75 vessels were recovered from Phase 6a deposits, with 215 sherds from 125 vessels from 6b deposits (Table 12.13). The most common rim forms are plain rims (V35, V40, V76, V79, V93, V105, V124, V134, V149, V159, V192, V200, V228, V297, V349, and V370). A number of vessels (V35, V40 and V93) have short necks. Everted rims are also included (V97, V117, V125, V150, V189, V203) as well as examples of inverted (V7, V17, and V277); tapered (V81 and V82); flat (V80); and necked (V93 and V201) rims.

A number of decorated sherds were recovered: everted rim V189 is decorated with an incised chevron and an impressed dot; V117 is decorated with short vertical incisions below the point of inflection of the neck and, below that, a multiple-incised zig-zag; the lip of the rim of V40 is decorated with square-profile impressions around the outside of the rim; V149 has short incisions on the exterior forming texturing and V370 has an applied boss; V57 has impressed decoration, a raised circular boss with a finger impression in the centre; V297, a plain rim from a vessel with a slightly inverted profile, has possible incised chevron or infilled triangle-based decoration; V197, V201, V203, and V307 have incised lines and V209 has impressed dots and possible incised lines; V106 has a finger impression; V276 has a combed surface; V116 and V136 have dimples on the interior of the base; V48 has an incised applied band; V350 has fingernail impressions; V79 has an applied band decorated with vertical incisions, V81 is decorated with bird-bone impressions; V156 has possible decorative dimples in the interior of the base; and V102 is decorated with short vertical incisions around the exterior of the rim; and V316 has a possible line of impressed dots. A mix of fabrics is present, with no obvious preferences.

Phase 7 (finish cal AD 70–135)

Twenty-four sherds from 19 vessels were recovered from Block 11, Phase 7, and 14 sherds from 2 vessels from Block 22b, the last phase of activity at High Pasture Cave, which may have occurred up to 100 years after the cave closure (Table 12.14). One vessel (V110) has an inverted rim; one (V60) has a plain rim; the latter is decorated with possible incised decoration.

Discussion

The Phase 5–7 Middle Iron Age assemblage has decoration and vessel forms typical of that found on other sites of a similar age in Skye and the adjacent islands. Given the fragmented condition of much of the pottery from High Pasture, the relatively small number of diagnostic sherds, and the likelihood of at least some redeposition, the limits to what can be achieved from comparison with other assemblages in terms of adding to the west coast sequence are accepted. The main aim of the comparison with other assemblages is to identify the range of sites in Skye and neighbouring islands which have similar morphological and decorative characteristics.

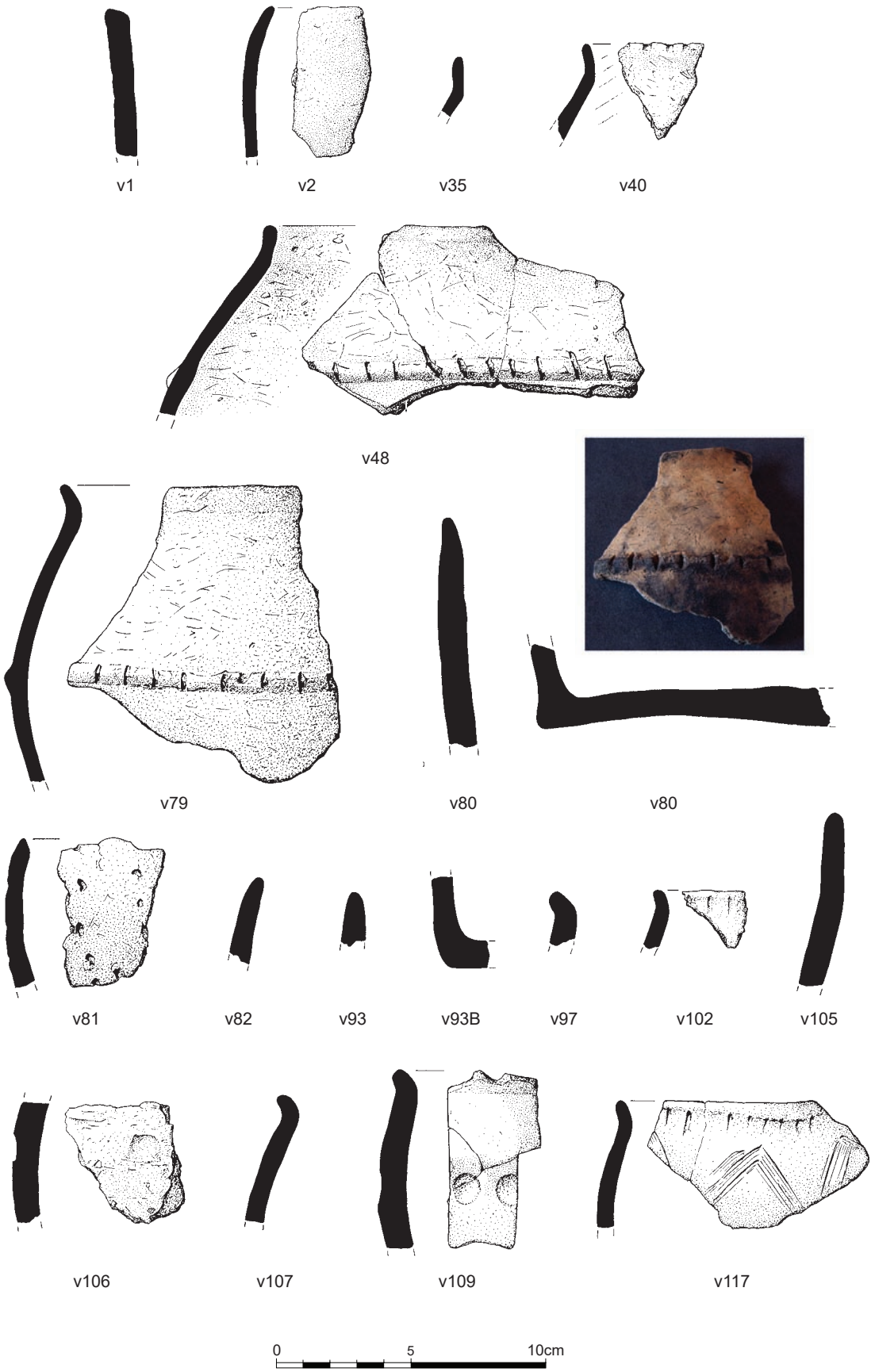


Figure 12.4. V1 (Ph2a); V2 (Ph 6b); V35 (Ph 6b); V40 (Ph 6b); V48 incised applied band (Ph 6b); V79 incised applied band (Ph 6b); V80 (Ph 6b); V81 bird bone impressions (Ph6b); V82 (Ph 6b); V93 (Ph 6b); V97 (Ph 6b); V102 (Ph 6b); V105 (Ph 6b); V106 finger impression (Ph 6a); Ph 107 (Ph 5b); Ph 109 finger impressions (Ph 5); V117 incised (Ph 6b) - inset image V79

Table 12.12 Pottery recovered from Phases 5, 5A & 5B

C		*Sherds*	*Vessels*	*Rims*	*Decoration*	*Fabric*
Phase 5						
2.05	Precinct	10	3	1 everted (V109)	1 finger imp (V109)	2 untempered; 1 rock & organics
5.07	Burnt spreads	3	3	–	–	2 untempered; 1 organics
14.04	Burnt spreads	1	1	1 everted (V174)	–	1 untempered
14.11	Burnt spreads	17	5	–	–	2 untempered; 2 rock & organics; 1 organics
14.13	Burnt spreads	10	7	1 everted (V182)	–	4 untempered; 1 rock ; 1 rock & organics; 1 rock & shell
14.15	Burnt spreads	2	2	–	–	1 untempered; 1 organic
18.03	Burnt spreads	2	2	–	–	1 untempered; 1 rock (10%
19.02	Burnt spreads	16	11	–	1 line of imp dots (V263)	2 untempered; 9 rock (10-30%)
Phase 5a						
2.05	Precinct	5	4	1 everted(V63)	1 applied wavy line(V343)	2 rock; 2 rock & organics
15.28	Precinct	1	1	1 plain (V329)	–	1 untempered
15.31	Precinct	2	2	–	–	organics
Phase 5b						
2.05	Precinct	2	2	1 everted	–	1 rock & organic; 1 organic
3.03	Precinct	5	4	1 everted(V107)	–	3 untempered; 1 organic
15.12	Precinct	7	6	1 everted(V213)	–	4 untempered; 1 organic
15.18	Precinct	12	8	1 flat (V233)	–	8 untempered
15.26	Precinct	1	1	–	–	1 rock & organic
15.27	Precinct	2	2	–	–	1 rock 10%; 1 organics
15.14	Precinct	8	8	–	–	4 untempered; 1 rock (10%); 3 organics
15.19	Precinct	29	9	1 everted(V237)	1 incised(V238)	3 untempered; 5 rock (10%); 1 organics
1.05	Bone Passage	1	1	–	1 applied wavy line	1 organics

On Skye an assemblage of Iron Age pottery was recovered from Dun Ardtreck, a small dry-stone fort on the west coast occupied from around the 2nd century BC to the 6th or 7th century AD (MacKie 2000). The Phase 2, primary occupation, is dated up to the end of the 1st century AD with the secondary occupation dating well into the 3rd with the possibility, from a find of E Ware, that the site continued in use to the 6th or 7th century. The pottery from Phase 2 is of a similar date to the Phase 7 pottery from High Pasture and although the number of vessels from Dun Ardtreck Phase 2 is small, the parallels between the two assemblages are obvious, particularly in the shape of the vessels, where round-shouldered vessels with short, everted rims and a profile narrowing to a flat base are a characteristic vessel type at both sites. The use of an applied cordon around the widest part of the vessel and of incised decoration on the upper part were noted at both sites (see MacKie 2000, 324, illus. 21).

In the north of Skye at Flodigarry in Staffin, excavations carried out in the late 1970s and early 1980s on what was interpreted as an unfinished broch produced an assemblage of just over 400 sherds (Martlew 1985). Most were undecorated but Martlew noted that the decorated sherds represented a range of motifs common in the Iron Age. Some features of the Flodigarry assemblage are similar to features noted at High Pasture including the rim forms: slightly everted, rolled, and short-necked (Martlew 1985, 43, fig. 9), and the decoration which included incised decoration around the upper part of the vessel (Martlew 1985, 40, fig 6 *e.g.* nos 87 and 53), combing (Martlew 1985, 40, fig. 6 *e.g.* 252), incised cordons (Martlew 1985, 42, fig. 8, no. 301), applied bosses (Martlew 1985, 42, fig. 8 no. 206), and impressed fingertip decoration (Martlew 1985, fig. 8, no. 14). The report notes that petrological analysis revealed dolerite and granite in thin section, the latter possibly from the south end of the island or from Rona (Martlew 1985, 39).

Table 12.13 Pottery recovered from Phases 6A & 6B

C		*Sherds*	*Vessels*	*Rims*	*Decoration*	*Fabric*
Phase 6a, Block 10						
2.03	Precinct	3	3	1 plain	–	1 untempered; 2 rock
3.02	Precinct	19	5	–	1 boss with impression	3 untempered; 1 rock & organics; 1 organics
15.04	Precinct	1	1	1 plain (V297)	1 incised chevrons	1 organics
15.05	Precinct	6	5	–	–	2 untempered; 2 rock (10–30%); 1 rock & organics
15.07	Precinct	4	3	1 everted (V189)	1 inc line, imp dot	3 rock (10–50%); 1 organics
15.08	Precinct	48	29	3 plain (V192, V200, V370)	4 incised lines	14 untempered
					1 raised boss (V372)	5 rock (10–30%)
				1 necked (V201)		11 organics
				1 everted (V203		
15.09	Precinct	1	1	–	–	1 organics
15.10	Precinct	1	1	–	–	1 rock & organics
15.11	Precinct	15	7	–	1 imp dots, incised (V209)	6 untempered; 1 organics
15.13	Precinct	3	2	–	–	1 untempered; 2 rock & organics
15.16	Precinct	1	1	plain (V228)	–	1 rock (10%)
15.05	Precinct	1	1	–	–	1 organics
Phase 6a, Block 29A						
6.04	Bone Passage	8	6	2 plain (V105, V159)	1 finger impressions (V106)	2 rock (10%);3 rock & organics; 1 organics
17.03	Bone Passage	16	7	1 inverted	1 combed	4 untempered; 3 rock (10–70%)
Phase 6a, Block 35						
5.05	Burnt Spreads	3	3	–	–	1 untempered; 2 organics
Phase 6a, Block 10						
2.61	Precinct	1	1	–	–	1 rock
Phase 6b, Block 22a						
2.46	Stairwell	2	1	1 everted	–	1 rock (30%)
2.47	Stairwell	2	1	–	–	1 rock & organics
2.49	Stairwell	1	1	1 everted	–	1 rock & organics
2.50	Stairwell	1	1	–	–	1 rock & organics
2.51	Stairwell	3	3	–	–	1 rock (10%); 1 rock & organics; 1 organics
2.52	Stairwell	54	15	1 everted(V117)	1 incised zig zag (V117)	2 untempered
					2 dimples (base)	10 rock
					(V116, V136)	1 rock & organic
						1 organic
Phase 6b, Block 29C						
1.01	Bone Passage	36	33	2 plain (V35, V40)	1 incised	3 untempered
				2 inverted (V7, V17)	1 applied band	19 rock (10–30%)
				(incised) (V48)	7 rock & organics	
				1 everted (V48)		3 organics

(Continued)

Table 12.13 Pottery recovered from Phases 6A & 6B (Continued)

C		*Sherds*	*Vessels*	*Rims*	*Decoration*	*Fabric*
1.02	Bone Passage	4	4	–	–	3 rock (10–30%);1 organics
1.03	Bone Passage	19	13	–	1 interior combing	2 untempered; 8 rock (10–30%); 3 organic
Phase 6b, Block 29C						
6.01	Bone Passage	24	16	2 plain (V149, V349)	1 incised (V149)	4 untempered
					1 fingernail imp (V350)	9 rock (10–30%)
				1 everted (V150)		3 organics
6.02	Bone Passage	29	22	1 plain (V79)	1 app band (inc) (V79)	9 untempered
				2 tapered(V81, V82)	1 bird bone imp (V81)	8 rock
					1 dimples (base) (V156)	4 organics
6.03	Bone Passage	33	14	1 flat (V80)	1 app band	5 untempered
				1 plain (V93)		5 10% rock
				2 everted (V97, V102)		2 rock & organics; 2 organics
Phase 6b, Block 35						
19.01	Burnt spreads	6	2	–	1 impressed dots (V316)	1 untempered; 1 rock (10–30%)



Figure 12.5. Bronze Age pottery sherds from the cache recovered from Bone Passage, including one sherd with calcite deposits

Table 12.14 Pottery recovered from Phase 7

C		*Sherds*	*Vessels*	*Rims*	*Decoration*	*Fabric*
Phase 7, Block 11						
2.01	Precinct	6	1	1 inverted (V110)	–	1 untempered
2.03a	Precinct	10	10	–	–	6 untempered; 3 rock (10-30%); 1 rock & organics
2.04	Precinct	1	1	–	–	1 untempered
7.02	Burnt spreads	1	1	–	–	1 untempered
7.03	Burnt spreads	1	1	–		1 untempered
9.02	Burnt spreads	5	5	–	1 poss incised (V169)	4 untempered; 1 rock (10%)
Phase 7, Block 22b						
2.44	Stairwell	14	2	1 plain (V60)	–	1 rock & organics; 1 organics

Two Skye broch sites excavated in the early 20th century by Countess Vincent Baillet de Latour, Dun an Iardhard near Dunvegan (MacLeod 1915) and Dun Beag near Struan (Callander 1921), also produced assemblages with features comparable to those from Dun Flodigarry and High Pasture. The assemblage from Dun an Iardhard has incised decoration on the upper part of the vessel, finger impressed decoration around the neck of the vessel, and applied dimpled bosses (MacLeod 1915, figs 13 and 14) and includes wavy cordons not included in the High Pasture assemblage. The assemblage from Dun Beag was re-examined (MacSween 2002, 147, fig. 44; 148, fig. 45) and found to be very similar to that from Dun an Iardhard, including finger impressions around the neck, incised decoration around the upper part of the vessel, and wavy cordons, as well as dimpled bosses.

Small-scale excavations at a further broch in the north-west of Skye, Dun Colbost, from 1989–1991 (MacSween and Reed 1989) produced a small assemblage of around 200 sherds from the area in front of the broch. Decoration included dimpled bosses, an incised chevron below an everted rim and a base decorated with fingertip impressions on the interior of the flat part of the base (MacSween in prep.).

In addition to brochs and duns, similar pottery has been recovered on Skye from souterrains. Recent excavations at Broadford (Birch 2012) produced a small pottery assemblage of 230 sherds representing 21 vessels. Five vessels were decorated – one had 'chain link' cordons, one had incised decoration, impressed dots, and applied bosses, two had applied bosses, and the final vessel had curved incised decoration infilled with stab and drag. At Tungadale Souterrain in Bracadale (central Skye) vessels with everted rims and also vessels with an inverted profile were recovered and decoration was with wavy cordons and applied bosses (Miket 2002, 99–101). The small assemblage at Carn nam Bodach souterrain near Portree had one vessel decorated with a wavy cordon (Miket 2002, 107).

From around AD 200 vessels with long flaring necks and wavy cordons as their common form of decoration are found on many sites in the West Coast islands, including Cnip, where their appearance is dated to AD 200–250 (Armit 2006), with their use continuing for several centuries with dates of the 5th–6th centuries for Eilean Olabhat, North Uist (Armit *et al.* 2009, 75). This pottery has been found elsewhere on Skye, for example, Broadford (Birch 2012) and its absence at High Pasture fits with the dating for the later phases of use of the site.

Outside Skye the High Pasture assemblage has parallels with a wide range of assemblages of similar date including those from the roundhouse at Cnip in Lewis (Phase 1a, 1st century BC/AD and Phase 1b-3, 1st– 3rd centuries AD); the wheelhouse at Sollas, North Uist (Phases B1 and B2; Campbell 1991, 139–41); the roundhouse at Dun Vulan, South Uist, Phases 1b–3 (Parker Pearson and Sharples 1999, 210–11; Parker Pearson 1999).

The Cnip assemblage has many of the same decorative elements as High Pasture including dimpled bosses; incised cordons (*e.g.* MacSween 2006, illus 3.16 c and g respectively), and incised multiple chevrons (*e.g.* MacSween 2006, illus. 3.12 f). In the Dun Vulan assemblage, applied cordons and incised motifs dominate, and cordons are usually around the shoulder of the vessel. Examples of applied dimpled bosses were also found (*e.g.* LaTrobe-Bateman 1999, 112, fig. 5.15, 3). At Sollas (Campbell 1991, 148–57) there are many decorative elements which are similar to the High Pasture assemblage, including the use of incised decoration above an applied cordon. Within individual assemblages, however, there is more variation in the details of the decoration. At Dun Vulan, for example, wavy or zig-zag cordons were most common with slashed cordons being much less common (LaTrobe-Bateman 1999, 216).

These comparisons give the overall impression that there is a common approach to pottery production over much of the Hebrides during the Iron Age. The next level of analysis would be to compare the use of individual motifs in certain areas and see whether regional styles can be defined. This is some way off. More well-dated sequences are needed but, crucially, a detailed analysis of pottery by context is needed, with an acceptance that the pottery from the structural phasing of the site may have derived from earlier use and discard on the site, and the redefinition of pottery sequences with that in mind.

12.2.9 Post-medieval activity: Phase 8

Description

Six sherds from six vessels were recovered from Phase 8, the post-medieval activity on the site, and represent residual material. One sherd from one vessel was recovered from C5.02, redeposited fire-cracked stone and ash deposits, sandy clay with less than 10% rock fragments. One sherd was recovered from C14.12, slope-wash overlying burnt spreads. It is made of untempered sandy clay. One sherd was recovered from C14.31, turf/topsoil. It has up to 10% rock fragments. Two sherds from two vessels were recovered from C15.01, turf/topsoil. One plain rim sherd is included (V295). One sherd (V294) is decorated with an applied cordon with incised lines above; another was recovered from C15.02, redeposited fire-cracked stone and ash deposits. The fabric is untempered coarse sandy clay.

Discussion

The ceramic sherds recovered from Phase 8 are all residual and of Middle Iron Age form and type.

12.2.10 Ceramic petrology

Jo McKenzie

Introduction

Ceramic petrology allows detailed characterisation of the components and internal structure of pottery at the microscopic level. The coarse matrix permits identification of temper and, where this comprises rock fragments, temper geology. The fine matrix informs on fabric type (texture, inclusions) construction (compaction, voids, evidence for construction techniques), and treatment and use (*e.g.* heating). The petrological study of the High Pasture assemblage particularly aimed to investigate provenance via assessment of the different temper types evident within the assemblage from the first stage of visual analysis. The location of High Pasture, at a junction of two very different and specific geologies (the outcropping Cambrian Durness Limestone and the granite of the nearby Central Red Cuillin volcanic complex), provides a rare opportunity to look in detail at whether, even with very distinctive local geology, choices in rock (and perhaps, as a result, even clay sources – though this level of detail is beyond the scope of this pilot study) can be determined.

The study of temper may inform on the nature of choices and construction techniques for the pottery in itself but it also allows further interpretation of the wider social context of pottery deposition at this very unusual site. Does the High Pasture pottery represent localised manufacture, or a range of types, traditions, and perhaps geologies indicating a wider geographic origin for the assemblage?

Thirty potsherds from a range of contexts and phases, and selecting material from cave, precinct, and surface, were sampled for thin section analysis (Tables 12.15 and 12.16). Although most pottery on site was recovered from Phase 6, the sherd selection, aiming at representing the range of temper types and fabrics noted in the initial pottery assessment, resulted in a bias towards material from Phases 1 and 6, with fewer sherds sampled from Phases 2–5. All major phases were, however, represented. Thirteen sherds came from the cave (Phases 1, 2, 6), ten from the precinct (Phases 4–6), four from the stairwell (Phases 3, 6, 7), and three from the surface trenches (Phases 3, 6, 7). Full analytical descriptions of each sherd are retained in the site archive. This small pilot study represented only a fraction of the sherds from the entire High Pasture assemblage and therefore did not aim to achieve a full typological assessment but concentrated on the objective outlined above.

Method

Samples were prepared by Patrick Quinn of University College London and analysed using a Brunel SP1500XP polarising microscope with reference to the procedures of Whitbread (1986; 1989). Additional mineralogical investigation was undertaken using the atlases of MacKenzie and Guilford (1980) and Adams *et al.* (1984). A range of magnifications (×10–×400) and light sources (plane polarised, crossed polars, and oblique incident) were used.

Analysis

Rock temper was ubiquitous throughout the sample set and, as inferred from the ceramic analysis, proved to be a hugely informative potential source of information on the sampled sherds and differences in their potential construction techniques, possible ceramic traditions, and potential provenance. Detailed analysis of temper showed that the sampled sherds can be split into three key groups – with the caveat, of course, that this is a relatively small sample set taken from a much larger (though still fairly small) assemblage. The main two groups comprise all but two samples and are divided into those which contain common volcanic rock fragments (*Group A*) (Fig. 12.6) and those which do not (*Group B*) (Fig. 12.7; Table 12.15). While this is a very distinctive separation, much of the overall character of the clay matrix is similar between both groups, both in terms of the fine mineral content, where this was possible to see, and the general clay matrix. Therefore, the division seen within the temper groups did not seem to extend (at least not in this limited sample set) to other elements of the ceramic structure. Unsurprisingly (with one exception, below) this study did not therefore allow identification of potential different clay sources or details of specific ceramic traditions or construction methods. The sample set displayed a range of matrix colours, oxidation patterns and intensities, void patterning suggestive of the inclusion (or not) of organics, and birefringence patterning (informing on potential clay types and construction methods). A larger sample set would be required to explore patterning of these properties (Table 12.16).

The third group (*Group C*) is entirely different. This contains two samples with a distinctively dark matrix and a coarse temper consisting almost entirely of what is commonly referred to within the archaeological literature at steatite but is identified more properly by McGibbon (below, 12.3.2) as talc schist (Fig. 12.8a–d). These very interesting outliers are discussed further below. A summary of the temper categorisations is provided below, and at Table 12.15.

Group A: These sherds are most frequently tempered with large, generally angular to subangular fragments of a distinctive dolerite-type rock made up mainly of long plagioclase laths with several other minor minerals present. Other common rock inclusions in these samples are basalt, granite, fine grained rocks containing phenocrysts which are likely to be rhyolite, large single quartz grains, and occasionally sandstone, siltstone, and other usually unidentifiable fine grained probable metamorphic rocks. Rare

Table 12.15 Pottery petrology: sherd location, phase & fabric type, & temper characterization

Sherd	*Ph*	*SB*	*C*	*Location*				*Temper: volcanic*				*Temper: granite-types*			*Talc*	*Fabric*
				Cave	Prec	St	Surf	A1	A2	A3	A4	B1	B2	B3	C	
V329	1a	30	19.28				■							■		4
V164	1b	24	6.10	■									■			3A
V283	1b	24	17.10	■									■			2B
V270	1b	24	17.10	■					■							2B
V272	1b	24	17.10	■									■			3B
V291	1b	24	17.10	■											■	2C
V290	1b	24	17.09	■											■	2C
V163	2a	25a	6.08	■				■								3C
V261	2a	25b	17.06b	■				■								3D
V1	2b	25c	1.07	■				■								2D
V122	2b	25c	1.07	■				■								2D
V173	3	32	10.08				■		■							3C
V359	3c	20	2.65			■			■							2G
V363	3c	20	2.66			■				■						2
V269	4	33	19.14				■		■							2B
V347	4c	8c	2.15		■							■				1B
V311	4-5	15	15.39		■				■							1B
V249	5a	9a	15.31		■				■							1F
V250	5a	9a	15.31		■						■					2F
V109	5b	9c	2.05a		■							■				1
V237	5b	9c	15.19		■					■						4
V108	6a	10	3.02		■							■				3
V299	6a	10	15.05		■							■				4
V76	6a	10	2.03b		■						■					3A
V228	6a	10	15.16		■				■							1A
V149	6b	29c	6.01	■									■			2F
V79	6b	29c	6.02	■					■							2F
V80	6b	29c	6.03	■					■							2G
V117	6b	22a	22a			■					■					4
V60	7	22b	2.44			■			■							2G

inclusions of carbonate rock fragments are also present (Fig. 12.6a–d). The Group A samples are subdivided into:

A-1: Over 20% coarse rock fragment temper, containing various rock types but dominated by igneous volcanic dolerite-type fragments in addition to frequent very fine-grained rhyolite-type inclusions (the latter seen nowhere else in the sample set) (Fig 12.6b, c).

A-2: Samples with 5–15% coarse temper (usually 10–15%), showing a range of geologies and listed in descending order from most dominated by dolerite-type temper to least dominated.

A-3: Samples with less than 2% coarse temper, dominated by dolerite inclusions. No temper >3 mm is present (Fig. 12.6d).

A-4: Samples with less than 2% coarse temper, not dominated by dolerite inclusions. No temper >3 mm is present.

Group B: While these sherds are defined chiefly by a lack of the dolerite/basalt inclusions, they are also typically tempered instead by granite-type rock fragments, often very large (>3 mm) and usually fairly angular. Granite is also present in the volcanic-tempered samples, but not the

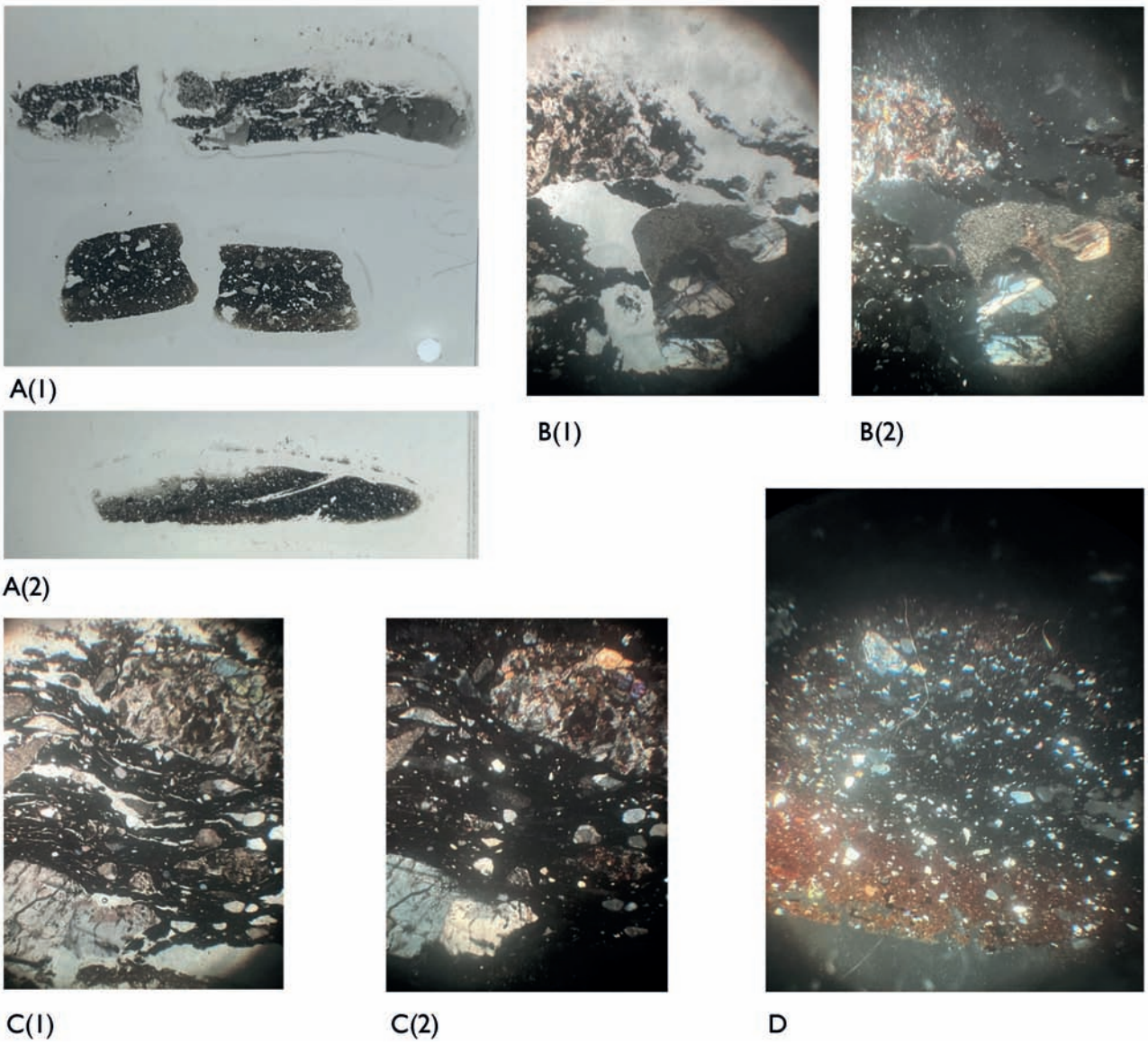


Figure 12.6. Temper variations in the petrology assemblage Group A. A(1–2): Macro-scale view of sherds A1 (V1), A2 (V60), & A3 (V363); B(1–2): large dolerite & rhyolite temper inclusions in V1 (PPL & XPL); C(1–2): similar temper patterning in A1 sherd V163 (PPL & XPL); D: temper distribution in A3 sherd V363 (XPL)

other way around. Inclusions of sandstone, quartz, and a variety of quartz compounds and metamorphics are also present, very similarly to Group A (Fig. 12.7a-d).

The Group B samples are divided into three subgroups:

B-1: Coarse rock fragment temper dominated by granite, and also featuring granophyre, an intrusive igneous rock with a distinctive appearance. It's possible that the presence or absence of this rock type could indicate the use of a particular source area (Fig 12.7b).

B-2: Coarse rock fragment temper featuring granite, but not granophyre, and having a notably pure clay matrix, with little fine mineral material. This could indicate either a particular clay source, or possibly a manufacturing procedure (Fig 12.7c).

B-3: One fragment with a coarse temper dominated by a distinctive fine-grained rock, possibly chert, and with an apparently more finely ground coarse temper fraction (Fig 12.7d).

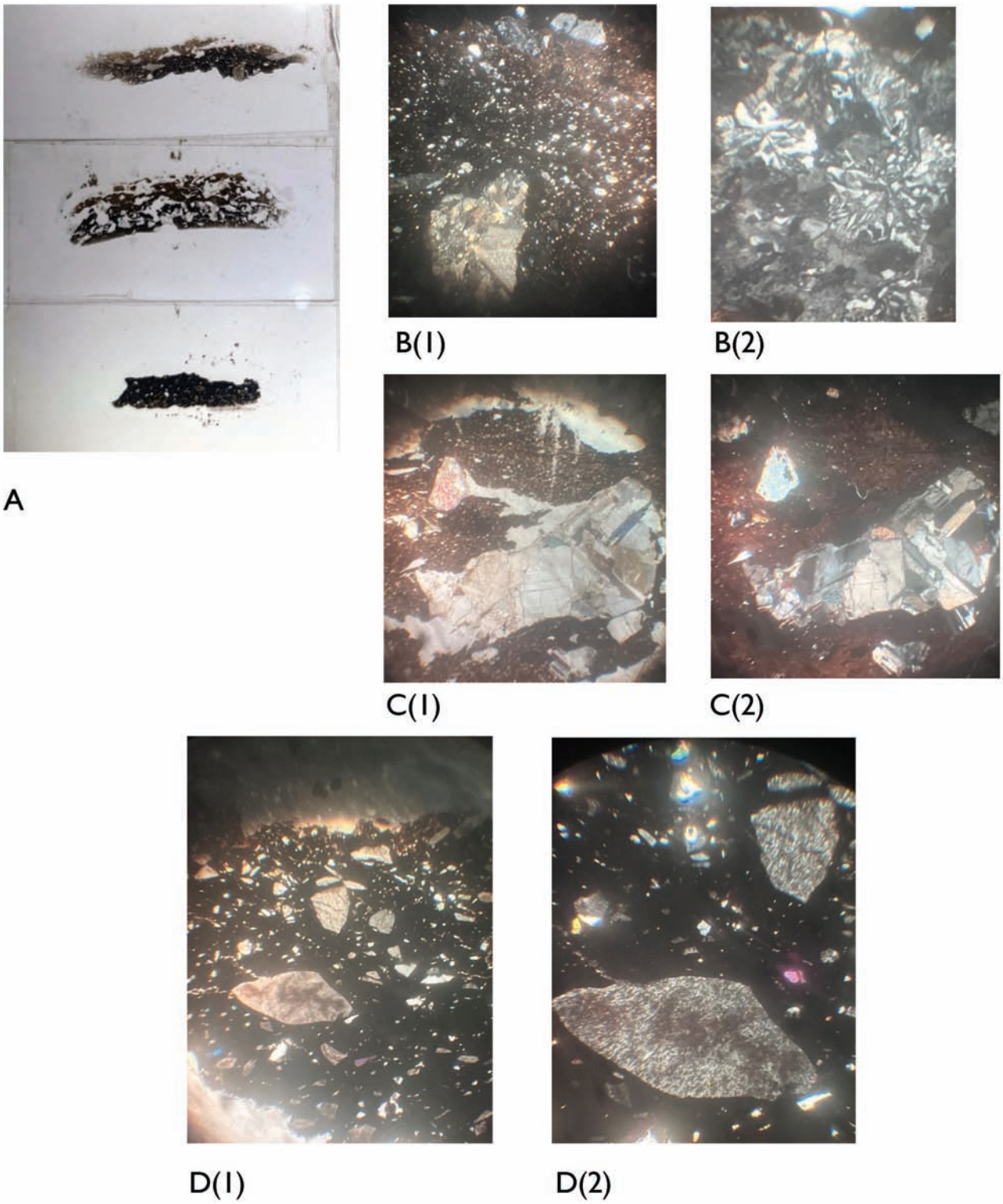


Figure 12.7. Temper variations in the petrology assemblage Group B. A: Macro-scale view of sherds (from top) from B1 (V108), B2 (V272), & B3 (V329); B(1–2): XPL view of the V108 matrix, showing large granophyric temper inclusion to base & close-up of granophyric structure; C(1–2): PPL & XPL views of the granite-tempered V272; D(1–2): PPL & PLX (close-up) view of chert tempered sherd V329

Table 12.16 Pottery petrology: sherd location, phase & fabric type, fine matrix characterisation

Sherd	*Ph*	*SB*	*Ct*	*Location*	*Temper*	*Fabric*	*Fine matrix*
V329	1a	30	19.28	SU	G	4	C: dark brown/dark brown. O: Y, one, mid-red brown (PPL), dark orange brown (XPL). Bir: N. V: thin channels, long voids
V164	1b	24	6.10	C	G	3A	C: dark brown/dark red brown. O: Y, one, light brown (PPL), light yellow brown (XPL). Bir: Y in ox margin, x-striation. V: small, round
V283	1b	24	17.10	C	G	2B	C: dark brown/dark red brown, patchy. O: Y, both, thin & light brown (PPL), v bright orange (XPL); thicker & duller light brown (PPL), mid-brown (XPL). Bir: Y in thinner ox margin, poro-striation. V: dense structure featuring small amorphous voids, but channels throughout
V270	1b	24	17.10	C	V	2B	C: light brown/mid-orange brown. Lumps of fine clay seen as rounded high Bir. patches. O: Y, one, partial, light brown (PPL), dark orange (XPL). Bir: Y, grano- & poro-striation. V: dense structure, large oval, small rounded
V272	1b	24	17.10	C	G	3B	C: mid-red brown/dark red brown, patchy. O: Y, one, red brown (PPL), bright red brown (XPL). Tripartite colour change across frag., light ox, mid-brown centre, dark edge. Bir: Y in ox margin, x-striation. V: dense structure featuring small amorphous voids, but channels throughout
V291	1b	24	17.10	C	T	2C	C: dark brown/dark red brown. O: Y, both, creates tripartite colouration. Thicker is mid-red brown (PPL), bright orange brown (XPL), thinner rich brown (PPL), v bright brown (XPL) Bir: N. V: dense str., channels horizontal lamination looks platy, round/elongate/ lenticular voids
V290	1b	24	17.09	C	T	2C	C: mid-red brown/mid-red brown. O: Y, one, light brown (PPL), bright orange brown (XPL). Bir: Y in ox margin. V: dense str., channels oriented to platy, lenticular str. Small round/elongate voids
V163	2a	25a	6.08	C	V	3C	C: v dark brown/dark red brown. O: N. Bir: N. V: denser structure than V2, V122. Denser areas show small amorphous voids
V261	2a	25b	17.06b	C	V	3D	C: v dark brown/dark red brown. O: Y, one, brown (PPL), bright dark red (XPL). Bir: Y, slight, in ox margin. V: open, channels, cracks, denser areas small amorphous voids, fibrous appearance
V1	2b	25c	1.07	C	V	2D	C: dark brown/dark red brown. O: N. Bir: N. Cell residue. V: open structure, channels, cracks, denser areas small amorphous voids, fibrous matrix
V122	2b	25c	1.07	C	V	2D	C: v dark brown/dark red brown. O: Y, one, brown (PPL), bright dark red (XPL). Bir: N. Cell residue assoc voids. few. V: open, channels, cracks, denser areas small amorphous voids, fibrous matrix
V173	3	32	10.08	SU	V	3C	C: dark blackish brown/dark blackish brown. O: N. Bir: N. V: dense structure, small round voids
V359	3c	20	2.65	ST	V	2G	C: rich brown/dark orange brown. Lumps of fine clay seen as rounded high Bir. patches. O: Y, both, thicker is light red brown (PPL), bright orange (XPL), thinner mid-dark brown (PPL), dark orange red (XPL). Bir: Y throughout, localised striation. V: small, round
V363	3c	20	2.66	ST	V	2	C: rich brown/dark red brown. O: Y, one, rich red brown (PPL), bright red (XPL). Bir: Y, slight, in non-ox margins. V: dense str., small, rounded, 1 large channel could be manufacture
V269	4	33	19.14	SU	V	2B	C: dark brown/dark red brown. O: Y, one, reddish brown (PPL), bright orange brown (XPL). Bir: Y in ox margin. V: large voids & cracks, amorphous/elongate, small voids round
V347	4c	8c	2.15	P	G	1B	C: dark brown/dark red brown. O: N. Bir: Y, slight, edges, could be manufacture. V: small, elongate, in dense str, but some slide manufacture issues

(Continued)

Table 12.16 (Continued)

Sherd	*Ph*	*SB*	*Ct*	*Location*	*Temper*	*Fabric*	*Fine matrix*
V311	4-5	15	15.39	P	V	1B	C: dark brown/dark red brown. O: Y, one, light brown (PPL), light yellow brown (XPL). Bir: Y in ox margin, x-striation. V: open structure, freq. large round & elongate, channels
V249	5a	9a	15.31	P	V	1F	C: dark brown/dark red brown. O: Y, one, sight, rich red brown (PPL), bright orange brown (XPL). Amorphous Fe? Bir: N. V: open structure, freq large round & elongate, channels
V250	5a	9a	15.31	P	V	2F	C: dark blackish brown/dark red brown. O: Y, one, light red brown (PPL), light red brown (XPL). Bir: Y in ox margin. V: small, round, open structure
V109	5b	9c	2.05a	P	G	1	C: mid-brown/dark brown. O: Y, both, creates tripartite colouration. Equal thickness, similar colour: bright red (PPL), dark red brown (XPL), external additional ox 'rim' duller brown (PPL), darker red brown (XPL) Bir: Y, slight, in ox rim, some x-striation. V: open str. Dense central zone, small round to elongate voids.
V237	5b	9c	15.19	P	V	4	C: dark red brown/dark red brown. O: N. Bir: N. V: round to elongate, join along cracks
V108	6a	10	3.02	P	G	3	C: mid-dark brown/dark red brown. O: Y, one, light brown freq dark patches (PPL), light orange (XPL). Bir: Y in ox margin, x-striation. V: small, round, some long elongate, dense str.
V299	6a	10	15.05		G	4	C: dark red brown/dark red brown. O: N. Bir: N. V: small, round to elongate, dense str
V76	6a	10	2.03b		V	3A	C: mid-brown/grey brown. O: Y, both, thick, dark red brown (PPL), rich bright red (XPL). Bir: N. V: dense str, freq. large round to elongate oval voids
V228	6a	10	15.16		V	1A	C: dark brown/dark black brown. O: Y, both, red brown (PPL), dark red brown (XPL). Bir: Y in ox margin, unevenly distributed. V: dense str, elongate, freq. larger cracks
V149	6b	29c	6.01		G	2F	C: dark red brown/dark red brown. O: Y, one, light brown (PPL), bright orange (XPL). Bir: Y in ox margin, x-striation, granostriation. V: dense, channels join, freq. small rounded/amorphous v
V79	6b	29c	6.02		V	2F	C: mid- to dark brown/dark brown. O: Y, one, dark brown (PPL), rich red brown (XPL). Bir: N. V: freq. large round/amorphous voids
V80	6b	29c	6.03		V	2G	C: dark brown/dark red brown. O: Y, one, light brown (PPL), dark orange brown (XPL). Bir: Y mainly in non-ox margin. V: round to long to elongate: burned organics
V117	6b	22a	22a		V	4	C: dark red brown/dark red/orange brown. O: N. Bir: Y, highly, entire matrix strongly speckled, no striation. V: notably uniformly rounded. Specific organic temper?
V60	7	22b	2.44		V	2G	C: dark red brown/dark red brown. O: Y, both, light red brown (PPL), dark orange brown (XPL). Bir: Y. V: small round, larger oval

C= Colour, PPL/XPL; O= oxidised margins; Bir= birefringence; V=voids

Discussion

How do these categories present through different phases and locations, and what can they tell us about the context of pottery distribution and deposition at High Pasture Cave? First, we can see that there is no clear change, development, or patterning in the use of different temper types over time. Granite tempers with granophyric textures may only appear from Phase 4, and finer volcanic tempers may increase in later phases. But overall, the picture is one of diversity. This perhaps suggests that the main groups, identified through temper choices, and therefore elements of production and/or construction strategies, are more likely to be locally-derived than not. The main temper choices (volcanics, granites) are available within Skye and locally to High Pasture. A certain temper choice appearing only within a certain phase of activity at the site would be more likely to suggest a specific incoming group, or a change in the source of material coming into the site, but this is not

observed. Similarly there is no division in temper typology between sherds found in specific areas of the site.

However, what we do see are quite distinctly drawn differences between the parameters of temper choice. With all temper materials recorded available locally, it is noticeable that we do not really see sherds with a mish-mash of tempers of both volcanic, igneous, chert *etc*. Specific choices appear to have been made. This may indicate two things. It may indicate that the High Pasture assemblage represents pots (or indeed, individual sherds) brought to the site by local people, but that these do represent a range of *different* groups, or traditions: diversity on a local scale. Alternatively, the deliberate geological choices clearly visible even in the few High Pasture sherds sampled may tell us more about pottery technology within this locality, technologies, and 'recipes' perhaps universal to the Skye-based groups who visited the site. If so, this may have the potential to provide detailed information – thanks to the highly variable local geology. Igneous rocks are clearly chosen over limestone which is far less stable when heated and may cause spalling, but this analysis appears to show at least some degree of *single* rock type choice over and above this, representing key temper signatures – *e.g.* dolerite, rhyolite, granite, chert.

It is also noticeable that much of this pottery is noticeably coarse-tempered. The typology of its rocky temper, in many of these sherds, would be as visible as any other element of decoration. It is therefore interesting to see such a varied temper sequence in the pottery brought to and deposited at High Pasture and raises the possibility that for the geologically literate potters and people of the Iron Age of Skye, these differently tempered pots may have provided a style or signature representative of a group or area, their tempers perhaps with specific significance.

Particularly interesting is the appearance of the two steatite-tempered sherds. At High Pasture, the spindle whorl assemblage is almost exclusively made of this material (below, 12.3.3.3). The nearest potential source of this material to High Pasture Cave is identified at Glenelg, although no clear confirmation of the use of this potential source in prehistory is confirmed, with far more extensive and well-utilised sources known much further afield, *e.g.* Shetland (Forster and Turner 2009) Most interestingly, the matrix of the two steatite-tempered sherds sampled from High Pasture Cave shows that these ceramics were not only tempered with steatite fragments, but also appear to show much finer steatite inclusions within the clay matrix itself, with both matrices are very similar (Fig. 12.8d). It appears most likely that these sherds were not just tempered with steatite, but possibly constructed with clay local to this source. Either way, these sherds, both of which were recovered from Phase 1b, inside the cave, are unlikely to have been made local to High Pasture.

12.2.11 Absorbed and organic residues from ceramic sherds

Valerie Steele

Introduction

Absorbed and visible organic residues from a suite of ceramic sherds from High Pasture Cave were analysed by gas chromatography-mass spectrometry (GC-MS). Residues were analysed from ten sherds, all of which had visible, semi-carbonised residues on the interior surfaces (Fig. 12.12). These were analysed separately, together with absorbed residues from the interior and exterior surfaces of each sherd.

Method

All sherds were examined before starting the sampling process to identify the extent and appearance of visible residues. In most cases, these consisted of dark, powdery deposits over all or part of the interior surface of each sherd. However, the visible residue of two sherds (V201 and V313) had a layered appearance: a paler surface over a dark, powdery deposit covering a large area of the interior surface of each, with further patches of dark material adhering over the top of this lower layer in small areas. It was not possible to sample these two layers separately as the upper layers were present in such small amounts. It is possible that the different layers represent two different stages in vessel use.

The visible residues were sampled by scraping off a small amount with a clean scalpel blade. To sample the absorbed residues, *c.* 0.5 g was drilled from each sherd surface using a modelling drill. The interior residues were generally taken from the same sherd area as the visible, to avoid destroying more visible residues across the sherd than necessary. For both absorbed and visible residues, organic residue was extracted using a mixture of dichloromethane: methanol. The samples were derivatised by silylation and a known amount of an internal standard added to allow quantification of the results prior to analysis by GC-MS. Full details of the method are recorded in the site archive.

Results and discussion

All the High Pasture sherds yielded at least one residue of archaeological significance and many were very well preserved. They can be divided into two groups: those which show evidence of milk fats and those which can only be categorised as fatty material.

All residues which yielded organic material had many features in common. These included the presence of a range of saturated fatty acids in the range C6:0–C30:0; low levels of unsaturated fatty acids (generally C16:1 and C18:1) and the presence of mono- and di-acylglycerols. Seven of the ten sherds also yielded ketones in at least

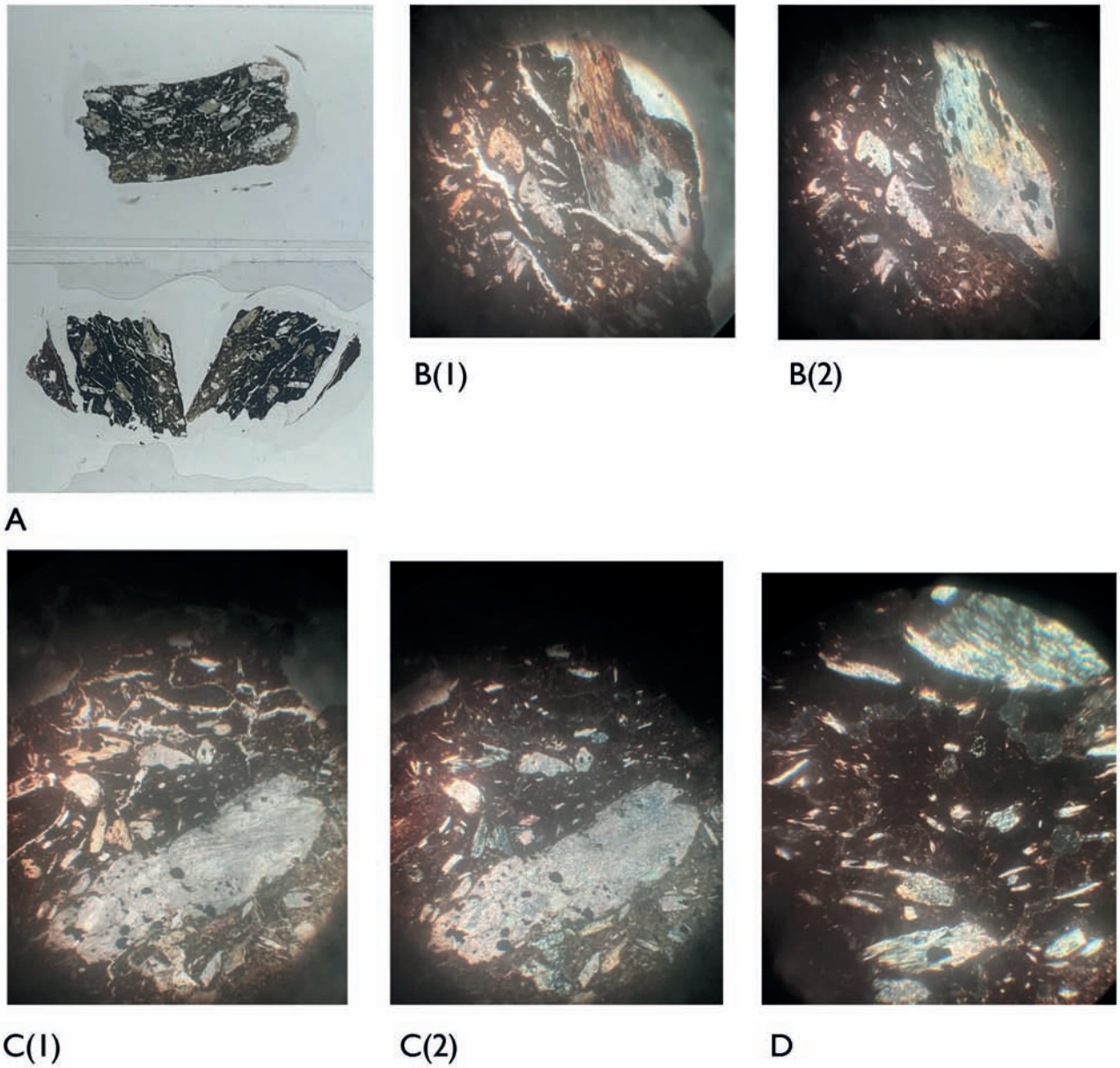


Figure 12.8. Temper variations in the petrology assemblage Group C. A: macro-scale view of steatite-tempered sherds V290 & V291; B(1–2): general matrix view showing dark spotted steatite temper in V290 (PPL & XPL); C(1–2): general matrix view showing dark spotted steatite temper in V291 (PPL & XPL;. D: close-up of V290 matrix, showing fine steatite inclusions in the clay

one residue, indicating that the fatty material had been heated to high temperatures.

All sherds were contaminated with phthalate plasticizers and other plastic additives and in some sherd exteriors (V190, V201, V292, V313, V342, V353, V360–1) these were the only organic materials present in significant abundances. This is unsurprising as vessel exteriors do not generally come into contact with the contents of the vessel unless boiling over or spillage occurs.

One of the visible residues, V122, did not yield any organic material of archaeological significance. This residue may have been almost completely carbonised during the use of the pot, or the organic material may have become strongly adsorbed onto the carbonised matrix of the residue. If the latter, the residue might yield more organic material if an alkaline saponification was used rather than a solvent extraction. In three sherds, the interior surfaces yielded low abundances of fatty acids (V284, V313, and V360–1). This is more difficult to explain, but it is possible that these surface residues formed very early in the life of these vessels and blocked the absorption of significant amounts of material into the ceramic. However, this is impossible to prove from the evidence available. In all three cases the visible residues

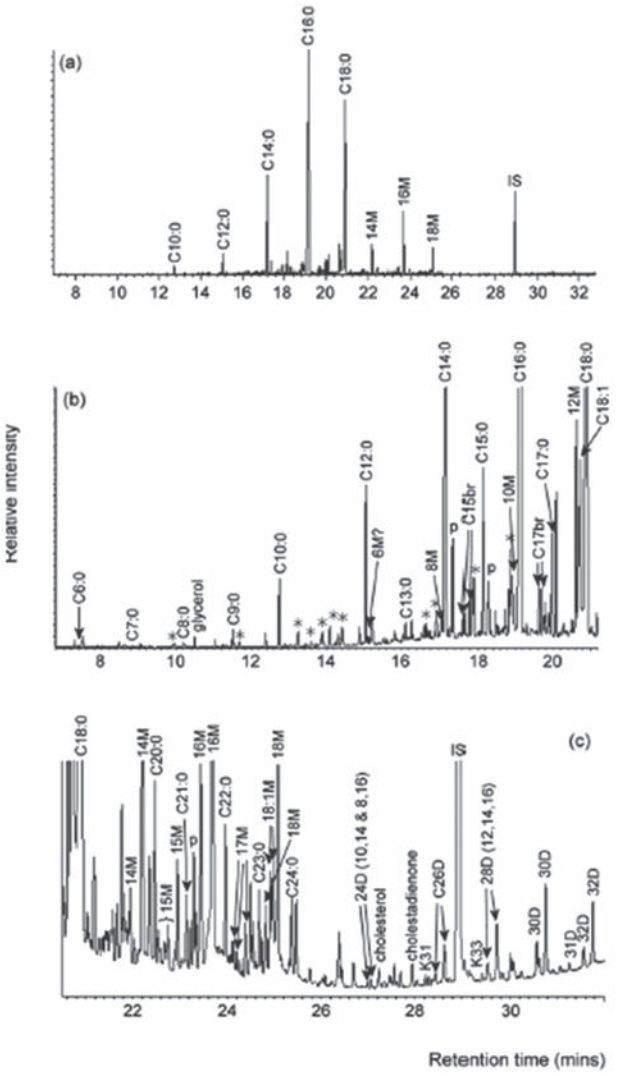


*Figure 12.9. (a): Total ion chromatogram of the exterior residue from sherd V284; (b–c): enlargements of the chromatogram between 7 & 21 minutes & 21 & 32 minutes retention time respectively. Key: Cx:y – fatty acid with x carbon atoms & y double bonds; Cxbr – branched, saturated fatty acid with x carbon atoms; Kx – ketone with x carbon atoms; xM – mono-acylglycerol with x carbonnumbered fatty acid; xD – di-acylglycerol with x fatty acid carbon atoms in total; p – phthalate plasticizer; IS – internal standard; * – modern contaminant*

yielded high abundances of fatty material and can safely be assumed to represent the contents of the vessels. In V284, the absorbed residue from the exterior is far more abundant than the interior absorbed residue, probably due to spillage or boiling over of the contents.

Samples yielding possible milk fats

In general, the specific marker compounds or biomarkers for milk fats are lost from archaeological residues by dissolution and degradation during burial. The distinguishing biomarkers for fresh milk are short chain fatty acids, present mostly in tri-acylglycerols (see above). However, these degrade more easily than the tri-acylglycerols which incorporate longer chain fatty acids and the resulting free fatty acids are volatile and highly soluble in water while the intermediate mono- and di-acylglycerols are also highly vulnerable to degradation (Dudd and Evershed 1998; Evershed 2008). This generally results in degraded fats which all appear very similar, regardless of origin (Fig. 12.9).

In some cases short chain fatty acids are present in archaeological residues, but it is sometimes difficult to distinguish these from milk fats and short chain fatty acids resulting from degradation of longer chain, unsaturated fatty acids (see above). In these residues, however, short chain fatty acids are still present in mono- and in some cases di-acylglycerols which cannot be mistaken for the degradation products of free, unsaturated fatty acids. In ten residues from six vessels (V190, V197, V201, V284, V342, and V353), short chain mono-acylglycerols down to C8:0 or C10:0, and in one case (V284e) possibly down to C6:0, are present, and di-acylglycerols incorporating fatty acids down to C8:0 and C10:0 are present in five residues from four vessels (V190, V284, V342, and V353). This level of preservation is rarely seen in archaeological material and indicates that these vessels were used for milk products. The presence of odd numbered fatty acids and their branched-chain isomers, in particular C15:0 and C17:0, indicates but does not uniquely identify, a ruminant animal origin for these milk fats (Evershed 1993; Gunstone *et al*. 1994; Gunstone 2004, 18–20). Analysis of the carbon isotopic signatures of individual fatty acids from these residues would confirm this identification.

In addition to the fatty acids, ketones in the range C29–C35 were also present in V190, V284, V342, and V353 indicating that the fatty materials had been heated to high temperatures. In sherds V190, V197, V201, V342, and V353, the visible residues yielded large abundances of fatty acids as did the interiors of the sherds, while the exterior surfaces contained either significantly less fatty material (V197) or nothing of archaeological significance. In some cases cholesterol and squalene are present but these are at such low abundances compared with the fatty acids that their presence is not significant in interpreting the residues. The cholesterol could also have come from the original animal fat and it is impossible to determine this from the biomolecular evidence.

In one sherd (V197) the interior absorbed residue yielded a series of long-chain, even carbon numbered, mono-unsaturated fatty acids (C20:1–C26:1; Fig. 12.10). These are not present in animal fats or in most plant oils. They are present in degraded aquatic fats which typically contain large quantities of mono- and poly-unsaturated, long-chain fatty acids when fresh (Padley *et al*. 1994, Gunstone 2004, 21–2). This residue also contains phytanic acid which is found in aquatic fats but is also present in milk and ruminant adipose fats. However, the rest of the accepted suite of biomarkers for aquatic fats, which includes alkyl-phenyl fatty acids, pristanic acid, trimethyl-tridecanoic acid, and dihydroxy fatty acids, were

not present, and the long-chain unsaturated fatty acids alone are not enough to identify the presence of aquatic material. Stable carbon and nitrogen isotopic analysis of the visible residue and/or compound specific stable carbon isotope analysis of the visible or interior absorbed residue(s) would provide more definitive identification of the residue from V197.

The interior residue from V353 also yielded low levels of long-chain, even carbon numbered alcohols in the range C20–C30, together with a range of odd carbon numbered alkanes in the range C25–C33 (Fig. 12.11). This may be indicative of the presence of plant material in this residue as these compounds are present in plant waxes (Eglinton and Hamilton 1967; Bianchi 1995). However, they can also be present in soils (Heron *et al.,* 1991; Otto and Simpson 2007; Rogge *et al*. 2007) and burnt organic material (Simoneit 2002; Rogge *et al.* 2007). All sherds except V342 yielded traces of these compounds in their exterior residues and, without analysing some soil samples, it is not possible to determine whether the compounds in the interior of V353 come from plant material in the residue or from the soil at the burial site.

Samples yielding generic fatty material

The remaining sherds (V122, V292, V313, and V360–1) all yielded fatty acids characteristic of animal fats as described above, with the presence of odd carbon-numbered, branched chain fatty acids indicating that these may be ruminant animal fats. All these also yielded ketones from at least one residue, showing that the fats had been heated. The interior absorbed residue from sherd V313 also contained traces of poly-aromatic hydrocarbons (PAHs), such as naphthacene, chrysene, tri-phenylene, and benzopyrene, which can be found in smoke, tars, and burnt organic matter but may also be present in soils, dust, air, and groundwater (Simoneit 2002; Olsson 2006; Rogge *et al*. 2007; Micić *et al*. 2011). However, as these compounds were present in the absorbed residue sampled from beneath the visible residue, it is probable that these were part of the original residue and formed during cooking. In some cases cholesterol and squalene are present but these are at such low abundances compared with the fatty acids that their presence is not significant in interpreting the residues.

As with the samples containing milk fats, all these sherds had at least one residue yielding traces of long-chain, even-numbered alcohols (C22–C30) and alkanes in the range C25–C33 with the odd-carbon-numbered dominating. The presence of a trace of the plant sterol β-sitosterol in the interior residue from V313 is also indicative of the presence of plant material in that particular residue. However, these compounds may be present in plant material, soils or burnt organic material and it is not appropriate to base any significant conclusions on this evidence.

As with the Fiskavaig samples, all samples were contaminated with phthalates and other plastic additives and

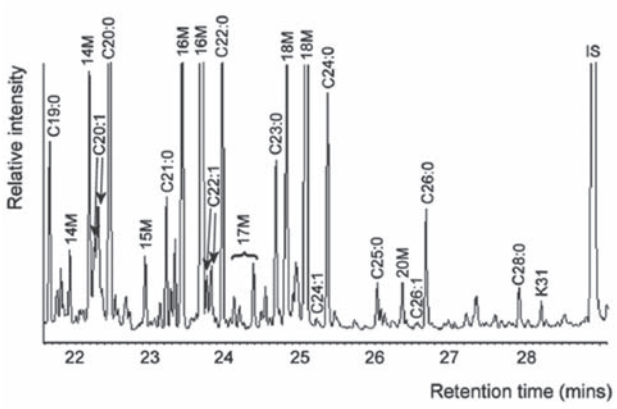


Figure 12.10. The interior residue from V197 between 22 & 30 minutes retention time. Key: Cx:y – fatty acid with x carbon atoms & y double bonds; Kx – ketone with x carbon atoms; xM – mono-acylglycerol with x carbon-numbered fatty acid; p – phthalate plasticizer; IS – internal standard

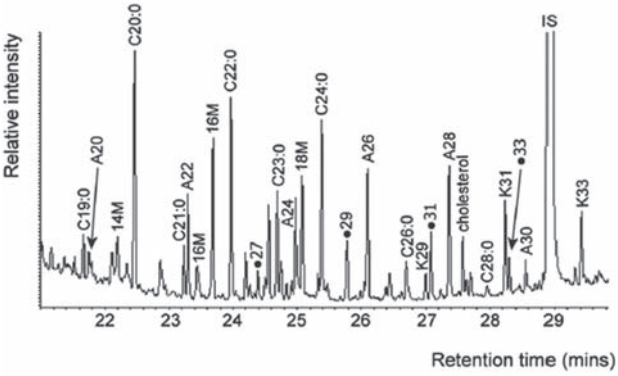


Figure 12.11. Chromatogram of the interior residue from sherd V353 between 21 & 30 minutes retention time. Key: Cx:y – fatty acid with x carbon atoms & y double bonds; Ax – long chain alcohol with x carbon atoms; ●x – n-alkane with x carbon atoms; Kx – ketone with x carbon atoms; xM – mono-acylglycerol with x carbonnumbered fatty acid; IS – internal standard

with some compounds which may come from plastics or personal care products, some of which also occur in nature. All the results have been summarised in the site archive (table 1).

Discussion

Organic residues of archaeological significance were extracted from all the sherds from the High Pasture Cave complex. The sherds analysed can be divided into two groups. The first (V190, V197, V201, V284, V342, and V353) yielded a degraded fatty material which is probably ruminant animal fat and also has features indicating that this was, at least in part, milk fat. One sherd, V197, yielded one residue containing significant abundances of long-chain, mono-unsaturated fatty acids which might indicate the presence of a marine fat. However, as none of the other biomarker compounds for aquatic fats are



Figure 12.12. Ceramics recovered from High Pasture with encrusting residues

present, no definite conclusions can be drawn from this evidence. The second group (V122, V292, V313, and V360–1) yielded a degraded fatty material which has some features of ruminant animal fats. All the sherds yielded at least one residue containing ketones which form when fatty material is heated in ceramic vessels. These results indicate that six of the vessels were probably used for processing milk products, although their additional use for meat products cannot be ruled out and isotopic analysis would be needed to confirm the presence of milk. The other four vessels were used for cooking meat, probably in a stew or broth. Although the residues from these vessels showed some features indicating that a ruminant animal fat was present, stable isotope analysis would be necessary to give a definitive identification.

Two sherds (V353 and V313) showed some evidence that suggests the presence of plant material in the residues. However, this is very hard to distinguish from similar compounds in the soil and is not sufficient to say whether plants were cooked in these vessels or not.

All samples were contaminated with plasticizers which have permeated into the sherds during storage in plastic bags. Most also yielded traces of compounds which could be evidence of plant material but may also have come from the soil at the burial sites and cannot be reliably interpreted as being part of the archaeological residues. In some cases cholesterol and squalene were present and may come from post-excavation handling of the sherds but they were present at such low abundances compared with the fatty acids that their presence was not significant in interpreting the residues. The cholesterol could also have come from the original animal fat, and it is impossible to determine this from the biomolecular evidence.

Suggestions for further work

To confirm the presence of ruminant milk fats in sherds V190, V197, V201, V284, V342, and V353, and the possible presence of a marine fat in V197, the residues could be sent for compound specific carbon stable isotope analysis by gas chromatography-combustion-isotope ratio mass spectrometry (GC-C-IRMS). It would also be possible to carry out bulk carbon and nitrogen isotopic analysis of all the visible residues. This could potentially identify any marine content of these residues, in particular the residue from V197.

12.2.12 General conclusions

Ann MacSween and Jo McKenzie

Although the pottery assemblage from High Pasture Cave is relatively small and fragmented, the detailed work on understanding the activities and depositional events taking place have allowed the pottery to be related to activity on the site but has also allowed four phases of ceramics to be defined. Of particular interest is the Bronze Age decorated assemblage and the Early Iron Age assemblage as little pottery from these periods has been recovered from Skye, and the High Pasture pottery provides some reference points for that part of the prehistoric ceramic sequence for the island. In addition, petrological analysis of especially the range of tempers used in the High Pasture pottery, and the accompanying lipid analysis, has allowed us to consider a range of questions in relation to the collection and use of raw materials for pottery production on the site.

12.3 Stone artefacts

Gemma Cruickshanks and Fraser Hunter with contributions by Fiona McGibbon, Dawn McLaren, Lynne McKeggie, and Anthony Newton

12.3.1 Introduction

A large assemblage of 425 coarse stone artefacts was recovered from High Pasture Cave. The assemblage is dominated by cobble tools with a range of wear patterns (60%) and fragments of rotary and saddle querns (21%), but also includes finely made palettes, decorated spindle whorls, and other personal items such as a finely polished steatite bangle (summarised in Table 12.17). This large

assemblage stores valuable information which aids our understanding of some of the activities taking place at the site. Although the assemblage is predominantly prosaic and everyday, with an abundance of basic food-processing and craft tools, caches of cobble tools and spindle whorls along with deliberately broken-up querns reveal traditions of deliberate destruction and ritual deposition throughout the site's use which make this assemblage an important resource from which to understand these practices. This also poses questions as to whether the objects were used at the site or were brought for deposition; attempts are made to tackle this issue.

A full catalogue of artefacts can be found in the archive, with summaries presented here. The following report will summarise each artefact category before returning to broader themes such as craft evidence and deliberate deposition in the discussion.

12.3.2 Geological investigation of stone finds

Fiona McGibbon

Introduction

Hundreds of artefacts and natural materials excavated from High Pasture were examined to describe and name their lithology. Full descriptions to justify classification can be found in the site archive. Most inspections were carried out with a ×10 hand lens, supplemented in final seasons by use of a binocular microscope and reflected light. Most large items such as saddle querns were only examined by hand lens.

Geological setting

As discussed in Chapter 2, High Pasture Cave is situated in an area of almost unrivalled geological diversity (Fig. 2.1) and dramatic scenery. The site itself is on and within Durness limestone (specifically a dolostone of the Ben Suardal Member of the Strath Suardal Formation of the Durness Group) in an area with abundant Palaeogene (Tertiary) dolerite dykes. Numerous dolerite dykes are encountered crosscutting the limestone in the cave itself, forming wall-like projections that subdivide it naturally into sections, somewhat like a chambered cairn. Dolerite dykes also form the cave edging wall when the cave direction turns to parallel their orientation. In the immediate vicinity of the site are large intrusions of granitic rocks (the Red Cuillin or Eastern Red Hills Centre) and not far away are the gabbroic Black Cuillin which form an impressive craggy backdrop. The proximity of these high-temperature igneous intrusions has modified the limestone, locally recrystallising it to marble (quarried at Torrin). Immediately across Loch Slapin to the west are poorly exposed, well-bedded sequences of Jurassic fine-grained sedimentary rocks, sandstones, siltstones, and mudstones/flagstones, overlain by the Palaeogene lava pile. To the south and east are exposures of Torridonian age sedimentary rocks which vary from sandstones to arkosic sandstones and conglomerates. Further south are the metamorphic rocks of the Sleat Peninsula with Lewisian gneiss overlain by Moine metasediments, mainly psammitic schists (*i.e.* quartz rich).

Table 12.17 Summary of worked stone assemblage.

Group	*Type*	*Quantity*		*Total*
Food preparation	Rotary quern	13		92
	Saddle quern	42		
	Quern rubber	37		
Cobble tool	Hammer	3	(28)	256
	Pounder	33	(83)	
	Grinder	53	(88)	
	Hide-rubber	13	(37)	
	Burnisher	3	–	
	Strike-a-light	2	(2)	
	Whetstone	16	(17)	
	Sharpener	2	(6)	
	Palette	9	(2)	
	Work surface	3	(14)	
	Combination tools	119		
Spindle whorls		25		25
Amulets/gaming		4		4
Personal ornament	Bead/pendant	2		12
	Bangle	10		
Ground materials	Pigments	8		9
	Steatite	1		
Pumice		18		18
Vessel		1		1
Perforated stones		3		3
Roughouts?		3		3
Misc. unidentified		2		2
Total		425		

Quantities for cobble tools are shown as both single-use tools & as incidence of wear-type on combination tools (bracketed). Rotary querns are number of fragments, not of querns (10)

The greatly simplified geological map (Fig. 2.1) hides the lithological complexities of the actual rocks which gives them such varied appearance. For example, areas marked as granite intrusions, when investigated at greater map resolution of 1:25000 (BGS 2005) are further divided into five different granite types as well as complex heterogeneous marginal facies called the Kilchrist Hybrids and the Kilchrist Breccias (see Fig. 2.1). The latter represent a coarse mixture of clasts of a range of local rock types formed when the granites were intruded. An investigation of the rocks themselves would reveal greater diversity still, with textural variations within groupings and differing amounts of weathering superimposed. There are also numerous potential sources of a given lithology (*e.g.* sandstone or granite) but careful examination can

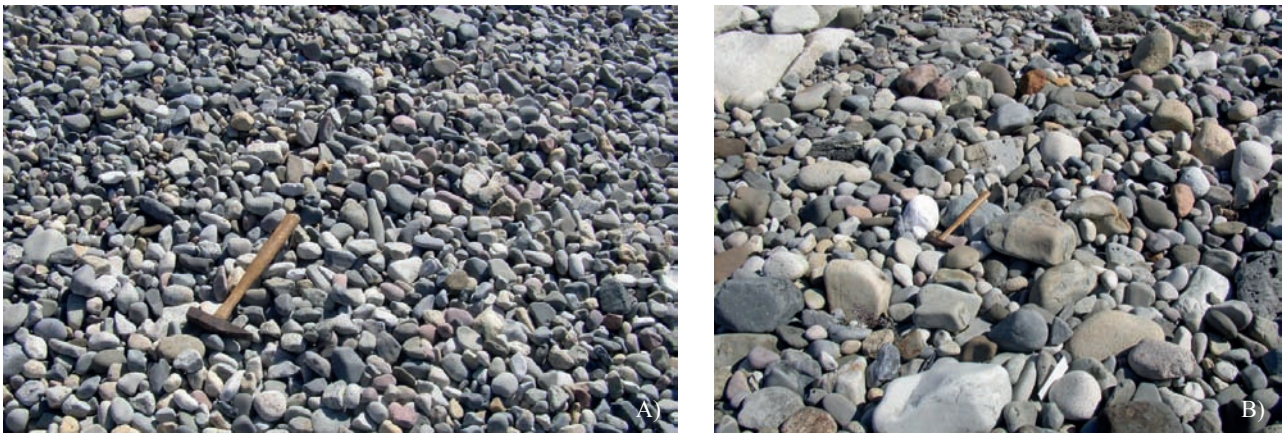


Figure 12.13. General views of shingle at Camas Malag with geological hammer (37 cm) for scale

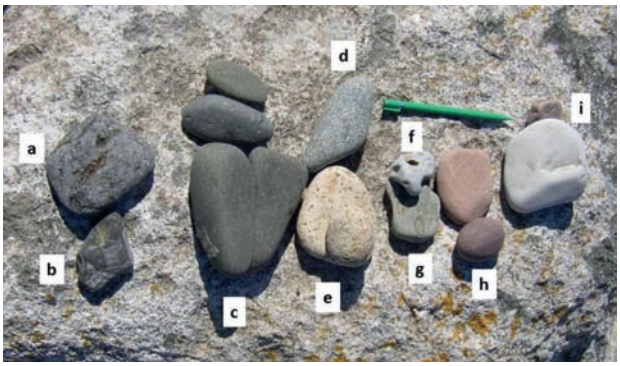


Figure 12.14. Collection of cobbles from shingle beach at Camas Malag showing variety of shape & lithology: a= porphyritic basalt, b= siltstone (flagstone), c= dolerite (second from top is vesicular), d= gabbro, e=granite, f= limestone with modern marine borings, g= limestone with evidence of contact metamorphism, h= Torridonian arkosic sandstones, i= quartzite (green pencil for scale is 14 cm)

distinguish different types. This explains the great range of lithological terms used in the full descriptions, greatly simplified in this summary report.

The site is also topographically diverse, a cave in a mountainous area in a coastal setting where a surface stream sinks near the limestone-granite contact. This provides easy access to rich geological resources, from solid, *in situ* exposure, to glacial and other drift deposits on land, reworked material as coastal shingle and river-bed pebbles, and materials in the cave itself, which has a stream running through it. Brief exploration of the local environment led to two key observations. First, the site is situated only a kilometre from the shore of Loch Slapin, where there is an impressive shingle beach of waterworn cobbles and pebbles at Camas Malag representing a high-energy storm beach deposit. Here, nature has already put various lithologies to the test, leaving hard durable rock types, wave energy having long since eroded away softer materials (Figs 12.13 and 12.14). The cobbles naturally occurring at the beach included dolerite, arkose, granite, gabbro, basalt, quartzite, psammite, limestone, and siltstone (Fig. 12.14). Higher up the beach, raised-beach deposits are encountered, now grass covered, showing an even greater expanse of these cobbles potentially available in the past. The link between High Pasture and this coastal site is evident in the finds of marine bioturbated pebbles – *i.e.* those with perforations made by boring gastropods in the modern coastal environment – in the cave itself. This demonstrates that shore cobbles were transported into the cave and hints at the source of the abundant cobble tools found there. The second key observation is that the terrain around the site itself is littered with loose blocks, shed by nearby granite exposures, as well as rounded boulders and slabs of material that have most likely been glacially transported in. These mildly abraded, angular granite blocks are used for field walls in the vicinity today and are also the most common material utilised in the excavated stone-built passage leading to the cave entrance.

Altogether the location offers a rich source of raw materials of varying lithology, size, and shape. However, although local sources of most rock types observed are available and are likely to be those used, most lithologies also exist elsewhere, *i.e.* they are not unique to the area, and it should not be ruled out that some items of common rock types could be imported.

Summary of stone finds examined

Artefacts are rock samples out of their geological context and as such some are challenging to identify lithologically. Conventionally geologists inspect whole outcrops of rock, looking at the relationship between rock types at this greater scale before provisionally naming lithologies, only to confirm these classifications by thin-section inspection. In geological terms, an artefact represents a small rock sample in isolation, hand lens examination of which is not always conclusive. Quartz-rich granular rock types are particularly challenging and are also common as

Table 12.18 Summary of lithology of classified artefacts

	Granite	*Arkose*	*Sandstone (Jurassic)*	*Quartzite*	*Gabbro*	*Limestone*	*Garnet mica schist*	*Dolerite*	*Others*
Saddle quern	16	7	4	1	2	–	–	–	–
Rotary quern	2	4	2	2	2	–	1	–	–
Quern rubber	26	3	–	–	3	–	–	1	1 (psch)
Pounder (sole use)	9	5	3	3	–	1	–	7	–
Grinder (sole use)	11	11	6	9	–	1	–	12	–
Hammerstone MFT	4	6	5	2	–	–	–	7	1 (psch) 1 (pyx)
Pounder MFT	21	17	17	6	–	4	–	28	1 (psch)
Grinder MFT	25	32	22	18	–	3	–	29	–
Hide rubber	4	17	5	2	–	–	–	7	2 (gst)
Burnisher	–	2	1	–	–	–	–	–	–
Strike a light	–	1	1	1	–	–	–	2	–
Whetstone	1	9	8	3	–	–	–	3	–
Palette (sole use)	3	3	4	–	–	–	1	–	–
Palette/working surface	3	7	5	1	–	–	1	5	–

Additional rock types in 'others' column are psch = psammitic schist, gst = greenstone & pyx = pyroxenite. Artefacts of single use type have been distinguished from multi-function tools (MFT) that also mention that particular use

cobble tools. For example, it can be hard to distinguish pure sandstones (arenites) from their metamorphic equivalents, quartzites, by hand lens inspection alone. White, medium- or fine-grained micaceous sandstone was quite common in the artefact assemblage and where there is a lack of metamorphic texture or suturing in the specimen it has been assumed that this lithology is Jurassic sandstone, potentially available *in situ* across Loch Slapin in coastal exposure and possibly as eroded fragments there too. The *in situ* Jurassic sequence is divided into ten different units, each containing various lithologies ranging from mudstone and siltstone to sandstone, described as being either grey or white (BGS 2005). Jurassic sandstone cobbles were, however, not common at the local shingle beach. Torridonian sandstones (all named arkose for simplicity) are easier to distinguish, being peach or brown coloured and arkosic (*i.e.* containing abraded potassium feldspar grains, and sometimes lithic fragments too). These two major sandstone types have been carefully distinguished in the assemblage. Torridonian sandstone is also locally available (both *in situ* and as cobbles on the local beach) and is far superior in terms of its physical properties; it is silica cemented, much harder and less likely to shed grains when in use, and cobbles of this rock type are smooth and polished.

Table 12.18 demonstrates that a range of rock types have been utilised at the site. It also shows a preference for particular rock types for specific uses which is summarised in the discussion. Overall, the artefact assemblage is dominated by granite, arkose, Jurassic sandstone, and dolerite, all abundant in the local environment.

Querns and rubbers – larger objects

Fifty-two per cent of saddle querns and 74% of saddle quern rubbers are granite (Table 12.18). This suggests, first, that the large granite blocks available locally at the surface have been utilised for these and also that it is common to use a similar lithology with matching physical properties for the rubbing stone. This seems sensible, as choosing a strongly contrasting rubber lithology would lead to unwanted erosion of either rubber or quern, leading to mineral matter in the grinding product. The large size of these saddle querns also argues against their transport from further afield. This may be why some poorly chosen granite blocks, showing extensive abrasion, were utilised. Some saddle querns were notably friable due to their coarse grain size and seemed a poor choice given the range and abundance of granitic blocks available. The simplified classification of granite covers a range of felsic igneous rock compositions and a range of grain sizes, details of which are given in the archive. Arkose saddle querns are notable in that this lithology does not occur in large blocks at the site, although it does outcrop nearby. It is likely that arkose boulders were sought out and brought in, or even quarried from outcrop, as this material is physically superior, finer grained, and silica-cemented, and therefore far more robust.

Rotary querns, although fewer, show a contrasting distribution of lithology (Table 12.18), with a preference for arkose over granite and a greater proportion of Jurassic sandstone too. Both arkose and sandstone come from bedded rock types and so are more slab-like and planar, even when eroded into drift boulders. These rock types

therefore naturally occur in flat, slab-like shapes more suited to shaping into discs; this suggests intentional choice for this feature as well as the superior grinding properties (greater surface roughness, less tendency to shed grains) of these lithologies. Torridonian arkose was not noted amongst the surface blocks at the site itself and this material was probably intentionally sought, either from drift in nearby areas or potentially quarried from exposures of this material to the south and east, as mentioned above. Blocks quarried from weathered outcrops would however be hard to distinguish from short transport drift slabs. Similar comments can be made for Jurassic sandstone, not present in the blocky drift deposits around the site itself and likely to have been sought out and brought in, again potentially from slabs quarried from outcrops.

One rotary quern is garnet mica schist is not likely to be local. Although Moine schist outcrops on the Sleat Peninsula, it differs in that it is quartz-rich psammite. Garnet mica schist is more pelitic (quartz-poor, mica-, and garnet-rich) and is more typical of Dalradian metamorphic rocks which do not outcrop on Skye. It is also a favoured choice for rotary querns in the large tract of Scotland that is Dalradian. As such it seems likely that this rotary quern was brought to the site and is not local.

Cobble tools

The range of rock types utilised for cobble tools is greater than that used for querns (Table 12.18), suggesting different selection criteria and/or source area. The range of lithologies chosen reflects that available on the local shingle beach with a few exceptions. Notable is the dominance of dolerite in the cobble tool assemblage. Dolerite is more abundant in the range of artefacts than in the local environment and so too is arkose, suggesting intentional selection of these materials. Natural cobbles of different rock types display different characteristic shapes. Dolerite cobbles tend to be less equidimensional and more elongate, due to jointing in their original outcrops and a lack of layering. It is possible therefore that this shape (with high length to width ratio) was preferable, but it is also possible that the greater strength of this lithology was an added benefit. Additionally, the pebble lithology most common in the cave itself is dolerite, eroded *in situ* from the cross-cutting dykes there. It is unlikely that pebbles would be transported into the cave naturally, so the abundance of dolerite cobble tools perhaps implies use of pebbles found in the cave itself. This might have some bearing on artefact cache SF2.119, dominated by dolerite cobbles. It should also be noted that most fire-cracked stones seen in the wider assemblage of material examined were dolerite. In this assemblage of rock types, dolerite formed originally at highest temperature; that and its finer crystal size make it the most thermally resistant, again suggesting intentional choice.

Arkose is also common in the cobble tool assemblage. Arkose cobbles tend to be flatter and oval in outline and very strong because grains are well bonded due to the silica cement. Dolerite and arkose therefore seem to have been selected for strength and shape. A common lithology in the cobble tool assemblage, not available in the local outcropping geology, is quartzite. This lithology is likely to occur in glacial drift and its reworked deposits due to its exceptional hardness and persistence in the sedimentary environment.

Arkose cobbles appear to be greatly favoured for use as hide rubbers. This is most likely due to the flat sides and disc-like shape of the natural cobbles of this material, which ultimately reflects the bedding in the original source. As noted, this lithology is silica cemented giving it a high surface smoothness despite its granular sedimentary nature. The silica cement is as hard as the grains in this rock and erosion leads to smoother surfaces rather than grain plucking, which would be characteristics of other clastic sedimentary lithologies. It is significant that two hide rubbers found amongst the stone tool cache (SF2119r and u) are of greenstone, a fine-grained, chlorite-rich metamorphic rock type. This lithology is unique in the artefact assemblage and is not likely to be locally available. It is common in the Dalradian rocks of Argyllshire. Its softness rules out glacial transport and indeed perceived local glacial transport direction is not favourable, and it is therefore suggested that these two greenstone hide-rubbers were imported too.

The most common lithologies chosen for whetstones were arkose and sandstone of likely Jurassic origin (Table 12.18). Both lithologies form eroded cobbles that have planar sides, given that they represent fragments of planar, bedded deposits, so shape was probably a major influence on choice. However, cobbles of Jurassic sandstone were not noted on a brief examination of the shingle beach and it is suggested that their relative abundance in the whetstone assemblage indicates another source of this material, perhaps nearer its outcrops across Loch Slapin. Given the highly shaped nature of these artefacts and the lack of original natural erosion surfaces, it cannot be ruled out that they were manufactured from raw material quarried from those outcrops. Similar points can be made for palettes and working surfaces where shape was an influence in material chosen. One palette is fashioned from garnet mica schist not available locally and like the garnet mica schist rotary quern, it is also likely to have been imported.

Limestone, although locally abundant, is not a common choice for tool use owing to its softness. Several worn cobbles of limestone were examined, however, some with extensive wear facets. It is suggested that these were being used as a raw material rather than as tools, the wear on them representing grinding to produce powdered limestone. This could have been a chalky white pigment,

an additive to ceramic or even a flux for metalworking. The adhering black ashy material on one worn limestone cobble (SF2.093) supports such potential uses.

Use of other specialist rock types: haematite, steatite, basaltic pumice, shale/cannel coal etc.

Objects noted as haematite are hard to describe lithologically, most having a featureless cryptocrystalline matrix. One was a water-worn pebble, but most are heavily ground-down irregular lumps, offering few clues as to their original source. Phenocrysts (*i.e.* primary igneous crystals) of feldspar and occasionally amphibole are noted in some. Textures like drusy vugs and geode-like infills suggest a secondary origin of the matrix. The brick red colour of the matrix suggests deep weathering of an iron-rich original rock. The best suggestion is that these samples may represent deeply weathered lava flow surfaces, or baked palaeosols between lava flows, a common feature of the Palaeogene lava piles across the region. Lava flows cap the hills across Loch Slapin, potentially offering a local source of such a resource, but only field investigation could confirm this. The soft, delicate nature of this material makes it unlikely to survive transport by nature meaning that it is unlikely as a clast on the local shingle beach. It is thus likely that this material was intentionally collected from outcrop. A ground-in deposit of waxy haematite was noted on a palette (SF2.540) demonstrating active use of this material.

Spindle whorls from the site are almost exclusively talc schist (the term steatite is not used geologically and in fact covers a range of potential rock types, from metamorphic talc schists to altered volcanic rocks). All except one of the items referred to as steatite in the catalogue are, geologically speaking, talc schists and although they vary a bit petrographically they are remarkably similar. A source of talc-bearing rock is recorded in Glenelg, although the geological setting suggests it is likely to be far less extensive than the well-known Shetland sources. Further research is required to establish the source of this material. One spindle whorl was of actinolite schist (SF2.203), a different rock type and one not occurring locally. This has some similarities to talc schist but is a notable sage green colour and more coarsely crystalline, the whorl more crudely fashioned as a result.

Water-worn basaltic pumice clasts are known to occur on west coast Scottish beaches and are still found today, although rarely. Their rounded shape testifies to their abrasion during natural transport by ocean currents. These are obviously prized finds as they are well used, offering a far more abrasive material than any in situ rock resource locally. These ultimately originate from explosive eruptions of Icelandic volcanoes (see Newton, infra), coupled with favourable transport winds and ocean currents pushing them as flotsam towards Scottish shores. The abundance of this material in the assemblage is far greater than its likely local availability and suggests it was amassed and valued for its usefulness. Whether this material is immediately locally available is worthy of field investigation.

The Jurassic strata shown on the geological map (see Fig. 2.1) across Loch Slapin and to the south of the cave site down to the northern shore of Loch Eishort, are varied lithologically. They include bituminous and carbonaceous layers as well as shale (BGS 2005). It is possible that this material could represent the source of some shale objects at the site, and this should be investigated. It should also be noted that the various units of the Durness Group, representing the local limestone strata, list the occurrence of white and grey chert nodules and layers (BGS 2005) which may represent the source of some flint artefacts at the site.

Lithology – conclusions

The artefact assemblage at High Pasture Cave is lithologically diverse reflecting the abundant local geological resources. Large stone artefacts such as saddle querns are fashioned almost exclusively from locally abundant granitic blocks still common at the surface in the area today. Large rubbing stones are also of granitic lithologies, suggesting similar source and intentional selection of matching rock type for practical reasons. Rotary querns are less numerous but represent a greater range of lithologies, with arkose most commonly used, reflecting the need for a slab-like starting block, some of which may have been quarried from outcrops. Notable is a garnet mica schist rotary quern which is made from a rock type not available locally.

Cobble tools are abundant, no doubt due to the local availability of an ideal range of cobbles of all shapes and sizes and of useful rock types at the local shingle beach. Cobbles from this beach were taken into the cave, as evidenced by the occurrence of marine bioturbated samples found there. Simple analysis suggests selection of different rock types for different tool types. The dominance of arkose and dolerite in the cobble tool artefact assemblage is greater than their proportion in the naturally occurring cobble assemblage on the local shingle beach, suggesting intentional selection of these, the hardest rock types available. Shape may also play a role. Dolerite cobbles tend to be elongate due to their jointed geological source which may be the reason that they are most common as pounders. Arkose cobbles are more disc-like, with flat sides, making them the preference for flatter items like hide rubbers and palettes. Two greenstone hide rubbers are thought to be imported, as is a garnet mica schist palette.

Other artefact types were fashioned from more specialised rock types. Spindle whorls are made from talc schist that is petrographically consistent, suggesting a single source. This material is not available immediately locally. Comparisons to reference samples from Catpund

in Shetland showed petrographic similarities, but further work is required as more local sources have been reported in Glenelg. Haematite lumps were found showing strong abrasion, and a working surface was also found to have ground-in haematite, convincing evidence that this material was used at the site. Haematite-rich weathering zones between Palaeogene lava flows in the area are the likely source of this material, which would have been sought out and collected from outcrop. Water-worn basaltic pumice clasts have use wear and were probably collected at the shore or on lower-energy beaches elsewhere. Further fieldwork is required to investigate whether locally available carbonaceous shales and chert are the source of other artefacts in the assemblage. Finally, it may be significant that there are few samples of metalliferous rocks in the excavated assemblage, although the local abundance of igneous rocks of a suitable compositional range would suggest that various metals and ores had been locally available.

12.3.3 The assemblage

Gemma Cruickshanks, Fraser Hunter, and Dawn McLaren

Food preparation

Quern stones and quern rubbers make up 21% of the stone assemblage. Such stones were used to grind grain and probably other substances such as pigments or ores and would therefore have played a central role in daily prehistoric life. They come in two forms: the earlier saddle querns and their associated rubbing stones, and later rotary quern stones. The rotary querns are of singular importance, as eight of them come from dated contexts that confirm the use of such querns before the traditional date of *c*. 200 BC, supporting recent arguments that rotary querns were in use in Scotland from the 5th or 4th centuries BC (McLaren and Hunter 2008, 105) (Fig. 12.15). This is discussed further below. The querns show extensive evidence for deliberate damage and structured deposition; the evidence for this is described below and returned to in the discussion.

Saddle querns

Forty-two fragments from 34 saddle querns were recovered (Figs 12.16–12.18), comprising a variety of forms from deep U-shaped trough querns to relatively flat oval or sub-rectangular slabs, with complete lengths varying from 255 mm to 665 mm. Six querns (SF1.60, 6.150, 15.313, 15.309, 15.408, and 19.079) have deep U-shaped dishes worn into them (45–95 mm deep), indicating extensive use. Three of these (SF6.150, 15.313, and 15.408) have a distinct change in gradient on the steep sides of their grinding dish, suggesting a change in quern rubber, probably as space became more restricted. Two querns are double-sided (SF15.005 and SF15.445), indicating prolonged use. All have been manufactured from locally available stone, predominantly boulders and slabs of sandstones and granites but also including quartzite, siltstone, gabbro, and limestone, all of which would have been available in local drift deposits or outcrops. Scatters of peck marks around the edges and base of many of the querns indicate they were roughly dressed or shaped prior to use.

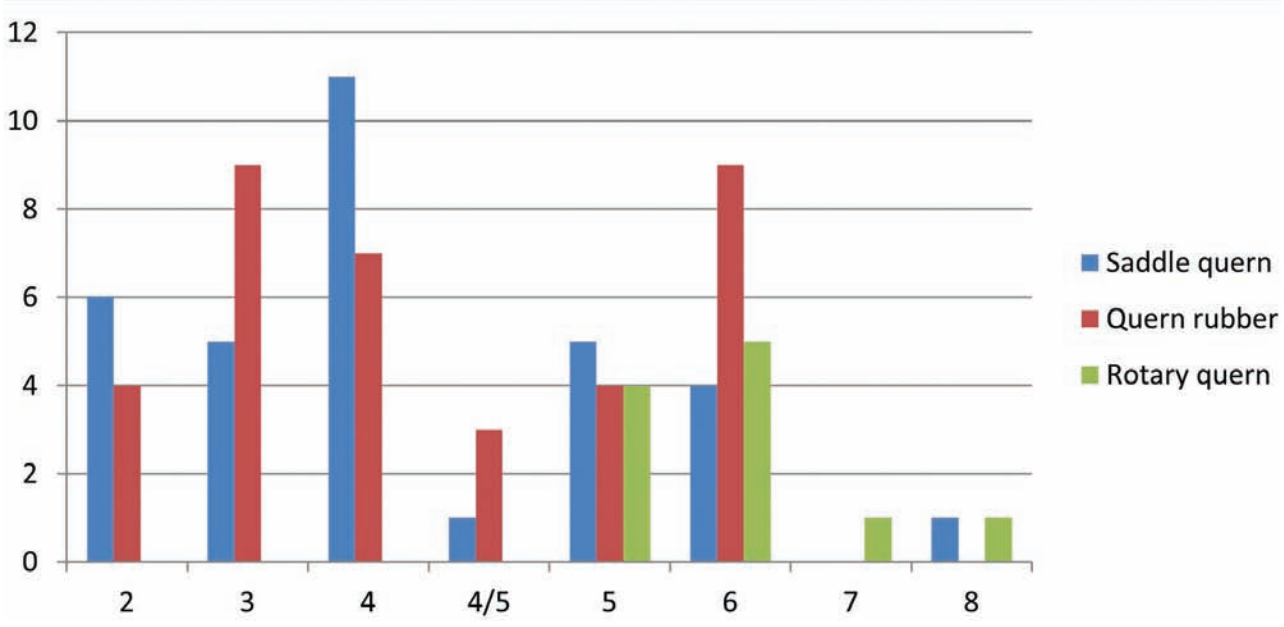


Figure 12.15. The phase distribution of saddle querns, quern rubbers, & rotary querns

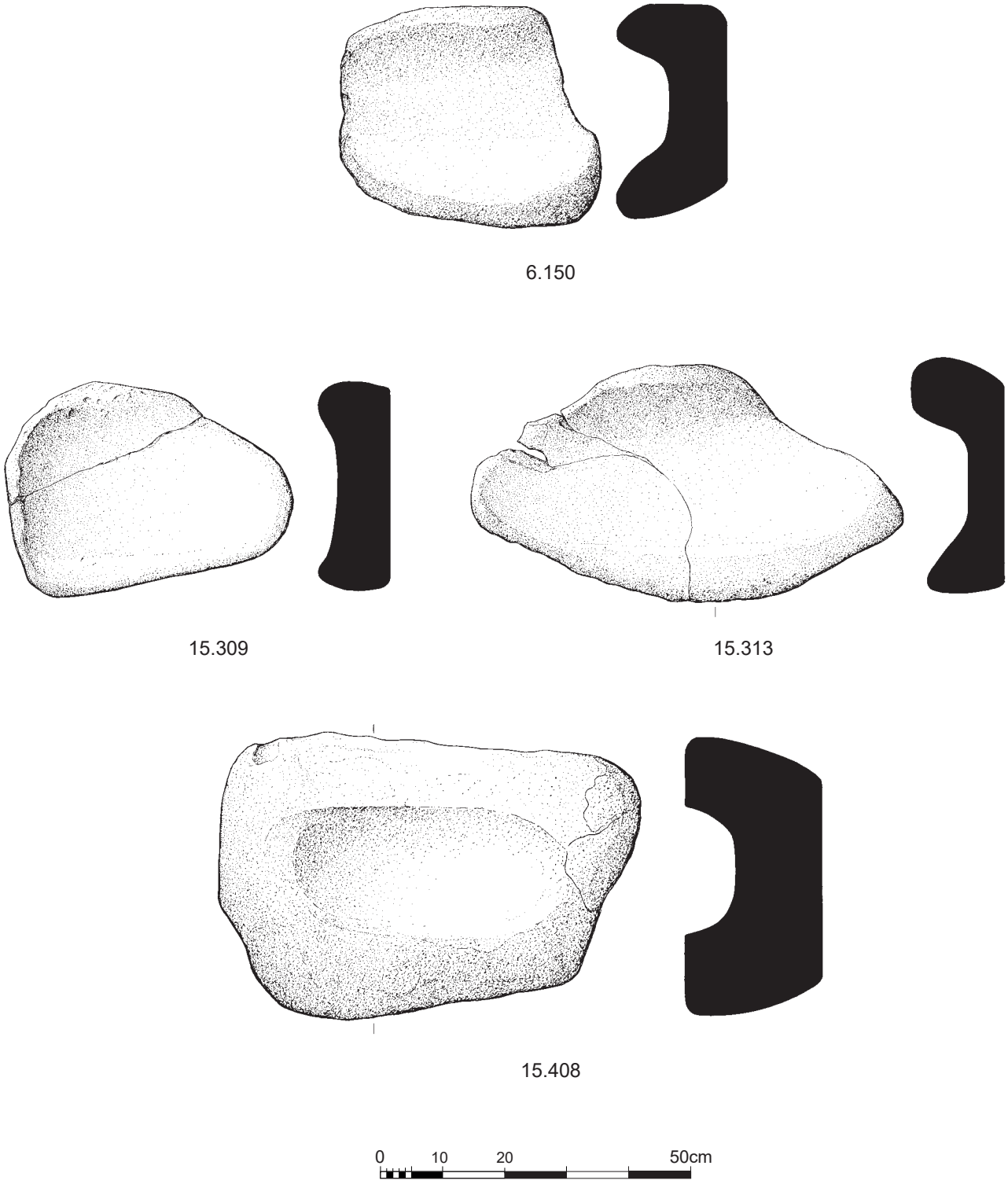


Figure 12.16. Large saddle querns SF6.150, SF15.309, SF15.313, SF15.408

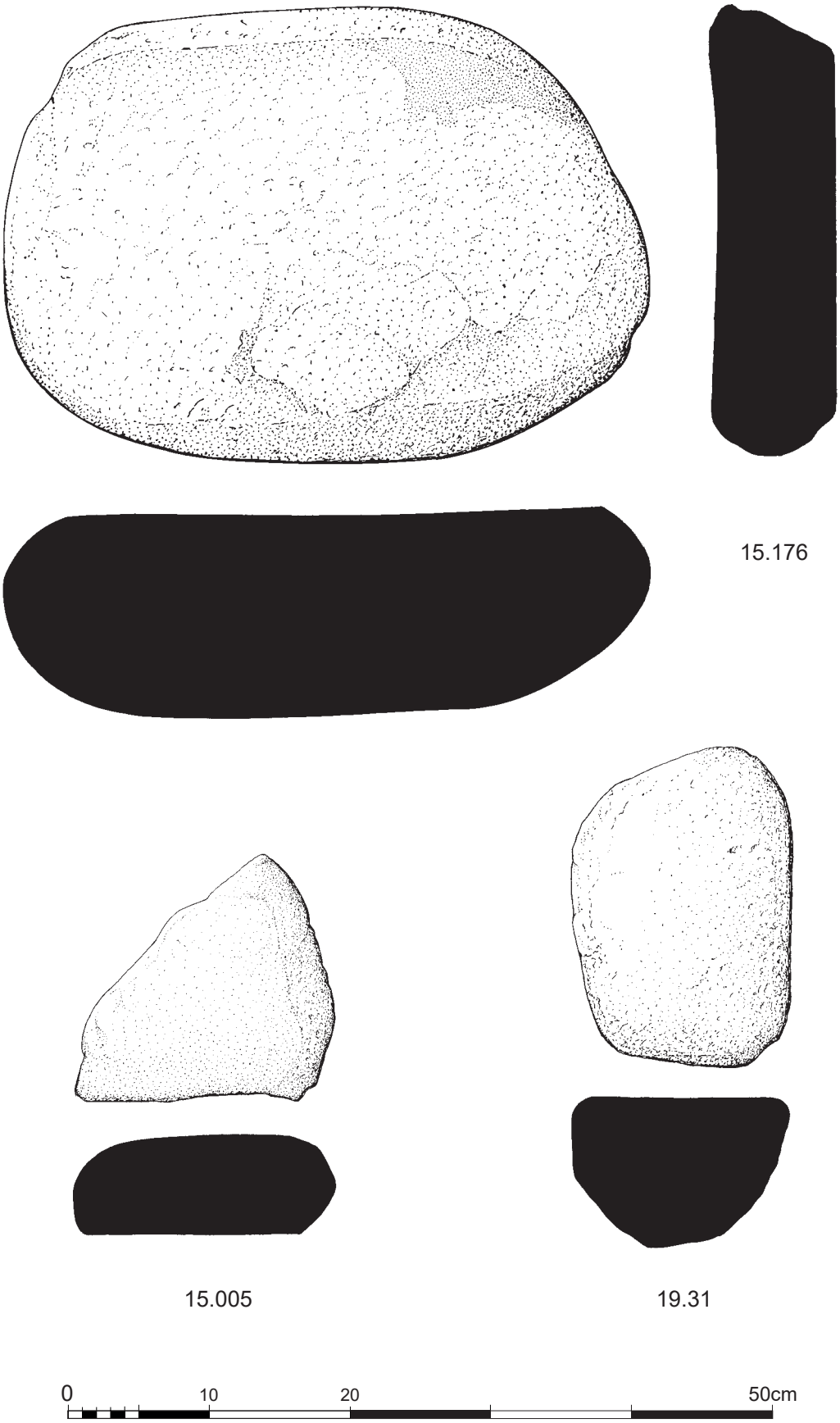


Figure 12.17. Small saddle querns SF15.176, SF15.005, SF19.131

Only two saddle querns are intact (SF15.408 and SF19.131). SF19.131 is unusually small and irregularly shaped, suggesting it may not be its original size, while SF15.408 is a very large trough quern found upside down in one of the earliest contexts (C15.68) and is likely to represent a foundation deposit for the construction of the walkway. Several others are intact but in refitting fragments, often found in different trenches or phases (summarised in Table 12.19), highlighting the complex object biographies and taphonomy here. There is evidence for deliberate breakage and damage to some saddle querns. SF2.407 and SF15.445 show the clearest evidence, with a series of distinct large, deep peck-marks along the broken edges, suggesting they were hit with a hard, sharp object,



Figure 12.18. Saddle querns/quern fragments: A. SF1.427; B. SF2.075; C. SF2.416; D. SF15.383

probably an iron tool. Regular flake-scars around the edges of others (*e.g.* SF2.416, 2.474, 15.176) overly the grinding surface, indicating post-use damage rather than initial shaping, though in the case of SF15.176 the bifacial flaking is concentrated around the ends, which could have been caused by secondary re-use as a large hammer.

Saddle querns were collected from most trenches, but predominantly Tr. 2 (13 fragments) and Tr. 15 (19 fragments). Only four were recovered from the cave, one of which was a substantially intact deep trough quern (SF1.60). This was found upside-down at the foot of the stairwell in the entrance to the cave, suggesting deliberate placement prior to closure of the cave.

Some of the querns have clearly been extensively used, particularly those with deep dishes and showing changes in quern rubbers. The largest querns, especially SF15.408, would not have been easily transportable, suggesting they were made and used on site. However, three of the largest, most extensively used querns (SF6.150, 15.313 and 15.309) were deposited in Phase 2 at an early stage of the site's development, most likely as foundation deposits given their prominent and inverted depositional locations. This suggests these querns may indeed have been brought from elsewhere despite their weight, or that there was considerably more activity going on at the site in Phases 1 and 2 than previously thought.

Quern rubbers

The 37 quern rubbers comprise a range of circular, oval, and sub-rectangular cobbles with plano-convex or oval profiles (Table 12.20; Fig. 12.19). They range in length from 154 mm to 405 mm (average 240 mm) and display characteristic wear on one side in the form of a smoothed convex facet and/or patches of polish from where the stone was repeatedly rubbed against the quern. Most are single sided, but one rubber (SF15.304) was used on both sides, indicating extensive use. Some (*e.g.* SF2.526, 15.307, and 15.312) show smoothed bevelled facets on opposing ends which may indicate they were previously used in a different orientation, or with a different shaped or sized quern. Ten display pecking across their ground face, indicating they had been redressed in order to extend their use. All were manufactured from locally available stones such as granites, microgranites, gabbro, and dolerite, and are predominantly water-worn cobbles or slabs which could have been collected from the nearby shingle beach.

Only 16 are fragmentary or damaged; the rest are intact. This is in stark contrast to the overwhelmingly fragmentary nature of the querns; clearly the quern rather than the rubber carried symbolic significance. Of the damaged rubbers, six show evidence of potentially deliberate damage with the ends and/or edges removed by regular and repeated flaking which is unlikely to have been accidental (SF2.368, 15.094, 15.114, 15.375, 15.418, 15.439a). This damage may have been incurred if the rubbers were re-used as hammerstones and was not necessarily undertaken solely to deface the quern rubber.

Three have calcite deposits formed over the grinding surface (Fig. 12.20A), indicating they had lain in the cave for a period of time (SF2.097, 2.368, 2.557) after being used. Interestingly, all three were recovered from Trench 2, outwith the cave, indicating the rubbers had subsequently been removed from the cave after a period of time. This provides a unique and fascinating glimpse of the biographies of these objects and the potentially complex taphonomy of artefacts at this site. It is an important reminder that we are only usually seeing the final depositional context.

The quern rubbers were mainly recovered from Trenches 2 (14) and 15 (15), with smaller numbers from Trenches 1, 6, 11, and 19; only five were recovered from within the cave. They are present from Phases 2– 6, with the largest amounts coming from Phases 3 (9) and 6 (10).

Rotary querns

Thirteen fragments from nine rotary quern stones were recovered (Table 12.21; Figs 12.21–12.23). Where determinable, all bar one (SF18.007b) are upper stones. Such querns can be broadly split into disc and bun forms, the former generally of a near-rectangular section with a vertical handle socket and perforated base stone, the latter with a rounded plano-convex form, horizontal handle socket, and socketed lower stone. Note, however, that many disc querns in the Atlantic area had a slightly convex upper surface, suggesting influence from bun querns, and that some bun querns likewise show influence from discs. In broad outline, bun querns are typical of central and southern Scotland (and much of the rest of Britain) while disc querns are predominantly an Atlantic Scottish type in the Iron Age, although the relationship is complex (MacKie 1971, 524, fig. 5; 1972).

The High Pasture Cave querns show the diversity nicely: both disc and bun types are present in varying forms. Seven can be categorised as disc querns. Three have a near-rectangular section (SF1.19, 2.233, 5.001), the first two being notably thick; three have a convex upper surface forming a low dome, related to the bun form but with a thinner or tapered edge (SF2.187, 15.070, 19.007); one is a very flat form with angled edges, like a truncated cone (SF18.007a). All have vertical handle sockets where they are preserved. The first two types are regularly found in Atlantic Scotland (*e.g.* MacKie 1972), and both are already attested on Skye, with thick rectangular ones from Dun Flodigarry and Dun Ardtreck (Martlew 1985, fig. 12 no 367; MacKie 2000, illus. 24 nos 29 and 30 [the latter slightly rounded, and with notable wear]) and low domed ones from Flodigarry, Dun Ardtreck, Dun Osdale, and Dun Beag (Martlew 1985, fig. 12 nos 5, 263; MacKie 2000, illus. 25 no.

Table 12.19 Summary of saddle querns

SF	*C*	*Ph*	*SB*	*Lithology*	*L*	*W*	*H*	*Notes*
15.176	15.59: lower walkway backfill	2b	6	Porphyritic	450	335	90	Sub-oval slab with smoothed, polished shallow dish worn into top. 1 end flake-scarred, suggesting either deliberate damage or secondary use as hammer. Dark shiny residues suggest quern was burnt.
15.309	15.63: backfill in lower walkway	2b	6	Arkose (Torridonian)	385	135	135	Long oval slab with sloping, fairly deep (45 mm) smoothed dish worn into top & flake-scarring around edges.
15.383	15.56: redeposited hearth residues	3e	7e					
15.313	15.59: lower walkway backfill	2b	6	Syenite	325	380	160	2 refitting frags forming almost intact, large, trough-shaped quern. Deep (95 mm) U-shaped grinding hollow has steep sides which change in gradient around halfway, suggesting change of quern-rubber.
15.435	15.64: redeposited hearth residues	3b	7b	Syenite				
15.303	C15.59: backfill in the lower walkway	2b	6	Sandstone	480	270	63	3 refitting frags from sub-oval, flat quern with shallow smoothed oval grinding surface & pecking indicating redressing.
15.295	15.42: backfill in lower walkway	4b	8b					
15.288a	C15.39: silting in & around collapsed enclosure wall	4/5	15					
1.315	1.07: redeposited midden in cave	2b	25c	Sandstone	102	83	40	V. fragmentary but with 2 concave faces, suggesting it was double-sided.
2.544	2.70: fill of first phase stairwell	3a	19	Granite	335	255	120	Sub-rectangular slab with 1 edge & end missing & sloped, concave, smoothed grinding surface.
2.096	2.26a: hearth debris in forecourt	3b	7b	Porphyritic granitoid	187	240	59	Around half thin, flat quern with smooth, polished grinding surface.
15.408	15.64: packing for limestone surface	3b	7b	Granite	665	445	220	V. large, intact trough quern which has seen extensive use. Surface redressed. Notch cut into 1 edge.
15.449	15.64: redeposited hearth residues	3b	7b	Gabbro	280	215	190	Frag. from edge with sloped, concave, polished grinding surface. Cracking & black staining indicate it was burnt.
2.530	2.110: fill to west of stairwell & within former entrance	4a	21b	Granite	165	130	80	Fragmentary, heat-affected frag. with flat/ slightly concave, polished grinding surface.
21.06	21.09/3: fill to west of stairwell	4a	21b	Sandstone (fine-grained)	260	230	55	Part of 1 end & edge with v. smooth, concave grinding surface. Centre worn v. smooth & shows red & black staining, suggesting have been re-used as palette.
2.435	2.53: backfill behind stairwell east wall	4a	21a	Syenite	480	200	160	Part of large sub-rectangular quern in 4 refitting frags. Grinding surface slightly concave (10 mm) & polished, particularly down edges.
21.09	21.09/4: fill to west of stairwell	4a	21b					
2.415	2.05d: redeposited midden	5a	9a					
2.413	2.05/3: redeposited midden	5a	9b					

(Continued)

Table 12.19 Summary of saddle querns (Continued)

SF	*C*	*Ph*	*SB*	*Lithology*	*L*	*W*	*H*	*Notes*
2.075	2.09: redeposited midden	4c	8c	Granite	390	305	130	Sub-rectangular boulder with concave, smoothed dish showing polished patches & pecking, indicating it had been redressed.
2.086	2.10: hearth debris in forecourt	4c	8c	Coarse-grained granite	315	275	132	Rounded end of boulder (other end missing) with sloped, concave, smoothed grinding surface with patches of polish.
2.474	2.15c: accumulated hearth debris	4c	8c	Sandstone	260	130	75	Curved edge frag. from flat quern with concave, smoothed grinding surface showing peck-marks from redressing & flake-scarred edges.
17.040	17.05 3/4: redeposited midden in cave	4c	27b	Quartzite	112	76	25	Edge frag. from fairly flat saddle quern with slightly concave & v. smooth grinding surface with pecking, indicating redressing.
19.079	19.06: redeposited burnt spread	4	33	Granite	310	258	120	2 v. fragmentary, heat-affected refitting parts forming most of quern with fairly deep concave, smoothed grinding hollow. Pecking around edges suggest it has been redressed.
19.129	19.09: redeposited burnt spread	4	33					
19.131	19.09: redeposited burnt spread	4	33	Granite	255	155	84	Fairly flat, small, irregularly shaped saddle quern with smoothed, concave grinding surface.
15.288b	15.39: collapsed enclosure wall	4/5	15	Syenite	120	170	90	Fragmentary, crumbly edge piece with concave, smoothed grinding surface.
2.416	2.05d: redeposited midden	5a	9a	Limestone	320	140	58	Edge frag. from fairly flat quern with polished & pecked/redressed grinding surface & flake-scarring around edges. Different coloured bands of ashy staining along 1 edge suggest it may have edged a hearth after falling from use as quern.
15.032	15.08 (2): redeposited hearth residues	6a	10	Porphyritic microgranite	180	130	70	Frag. from the edge of fairly flat quern with smoothed surface.
15.059	15.19: burnt spread	6a	10	Siltstone	170	250	95	Frag. with 2 edges surviving & slightly concave, smoothed & pecked/redressed grinding surface.
15.020	15.08 (1): redeposited hearth residues	6a	10	Gabbro	155	82	41	Thin slab frag. with 1 face worn smooth & concave.
15.276	15.08 (1): redeposited hearth residues	6a	10	Arkose (Torridonian)	141	108	70	Edge frag. from fairly flat saddle quern with slightly concave & v. smooth grinding surface & flake-scarring around edge.
14.35	14.15: redeposited burnt spread	6a	10	Sandstone (medium grained)	140	130	120	Curved edge frag. with flat/slightly concave, smoothed grinding surface & flaked edges. Patches of iron slag or bog-iron ore & vitrification towards centre indicate re-use in ironworking feature after it was broken.

(Continued)

Table 12.19 (Continued)

SF	*C*	*Ph*	*SB*	*Lithology*	*L*	*W*	*H*	*Notes*
6.150	15.59: lower walkway backfill	6b	29c	Granite/ granodiorite	415	340	180	Large trough-type quern, almost intact aside from limited flaking around edges. Deep (85 mm) U-shaped grinding bowl slopes from 1 end to other & sides steepen in gradient around halfway down, suggesting change in quern rubber, probably as space became more restricted.
2.407	2.03a: redeposited midden	7	11	Sandstone (fine-grained)	150	110	81	Rounded edge frag. from fairly flat quern with polished grinding surface, suggesting redressing. Distinct peckmarks along broken edge suggest deliberate destruction.
15.005	15.01: turf & topsoil	8	36	Porphyritic granite	180	180	70	Frag. with 1 intact edge & slightly concave, smoothed grinding surfaces on both faces, *i.e.* double-sided.
1.60	Tr 1: unstratified	–	–	Medium-grained sandstone	295	255	120	1 end & side survive of large, sub-rectangular quern with large oval concave grinding surface. Concentrations of peck-marks suggest secondary re-use as working surface or perhaps uneven redressing.
2.60	Tr.2: unstratified	–	–	Porphyritic felsite	390	320	90	Sub-rectangular with 1 end missing. Grinding surface concave & pecked from redressing.
15.445	Tr.15: unstratified	–		Sandstone	320	150	65	Slab frag. with smooth, polished, slightly concave grinding surface with part of only 1 original edge surviving.
15.445	Tr.15: unstratified	–		Arkose (Torridonian)	136	94	61	Curved edge frag. from fairly flat quern with both faces smoothed & concave through use. Distinct peck-marks along 1 broken edge suggest it was broken up using sharp metal tool.
15.446	Tr.15: unstratified	–		Granite	190	100	85	Curved edge frag. with sloping, flat ground surface which is so smooth & polished it would have required redressing to be functional.
15.447	Tr.15: unstratified	–		Granite	260	185	155	Frag. from edge of a quern with sloping concave, smooth working-surface. Pecking indicates it had been redressed while cracking & charring suggest it had been burnt.

Table 12.20 Summary of quern rubbers

SF	*C*	*Ph*	*SB*	*Lithology*	*L*	*W*	*T*	*Plan*	*Profile*	*Redressed*	*Notes*
6.486	6.08: redeposited midden in cave	2a	25a	Granodiorite	320	195	115	Ovoid	Ovoid	y	
2.545	2.71: cave entrance fill	2a	18	Ignimbrite/ 'Kilchrist Hybrid'	280	150	80	Ovoid	Plano-convex	y	
15.307	15.59: backfill in lower walkway	2b	6	Porphyritic granite	245	192	75	Ovoid	Flat ovoid	n	Roughened facets on ends suggests previous use in different orientation?
15.312	15.59: backfill in lower walkway	2b	6	Arkose (Torridonian)	230	190	105	Ovoid	Ovoid	y	Roughened facets on ends suggests previous use in different orientation?
2.097 & 2.098	2.26a: debris from hearths in forecourt	3a	7a	Granite, coarse-grained	300	197	65	Sub-rectangular	Flat ovoid	n	Calcite deposit over grinding surface, indicating it had lain in cave at some point
2.557	2.70: stairwell fill, first phase	3a	19	Granite	275	150	52	Ovoid	Plano-convex	n	Calcite deposit over grinding surface, indicating it had lain in cave at some point. Post-depositional iron pan adhering.
15.418	15.64: hearth residues	3b	7b	Dolerite	230	180	53	Ovoid	Flat ovoid	y	1 end removed in large flakes
15.439a	15.64: hearth residues	3b	7b	Granite	190	165	53	Ovoid	Flat ovoid	n	1 end is bifacially flaked
15.439b	15.64: hearth residues	3b	7b	Granodiorite	215	150	65	Sub-rectangular	Ovoid	n	Post-depositional iron pan adhering.
2.538	2.70: stairwell fill, first phase	3c	19	Granite	160	135	92	(Fragmentary)	Wedge	n	
2.501	2.66: fill between stairwell walls & landing	3c	20	Granite	405	230	100	Flat, oval	Flat ovoid	n	
15.365	15.83: silting & hearth debris in forecourt	3d	7d	Porphyritic microgranite	225	190	65	Ovoid	Flat ovoid	y	
15.375	15.52: hearth residues	3e	7e	Granite	220	190	80	Ovoid	Sub-triangular	y	Both ends removed by flaking
15.293	15.49: hearth residues	4a	8a	Microgranite	262	192	95	Ovoid/ sub-rectangular	Sub-rectangular	y	
2.525	15.48: hearth residues in forecourt	4b	8b	Porphyritic microgranite	240	220	76	Ovoid	Plano-convex	n	
2.526	2.15c: hearth debris	4c	8c	Granite	350	210	95	Ovoid	Flat ovoid	n	Roughened facets on ends suggests previous use in different orientation?

(Continued)

Table 12.20 (Continued)

SF	*C*	*Ph*	*SB*	*Lithology*	*L*	*W*	*T*	*Plan*	*Profile*	*Redressed*	*Notes*
15.114	15.20: hearth residues	4c	8c	Granite	180	160	71	Ovoid	Unclear	n	Edges & 1 end removed by flaking
15.285	15.38: hearth residues	4c	8c	Gabbro	154	123	55	Ovoid	Plano-convex	n	
11.002	11.07: wall core	4/5	15	Arkose (Torridonian)	200	187	113	Ovoid	Plano-convex	n	
15.287	15.39: collapsed enclosure wall	4/5	15	Granite	220	180	80	Ovoid	Plano-convex	y	
15.311	15.39: collapsed enclosure wall	4/5	15	Granite	275	185	78	Ovoid	Plano-convex	n	
19.048	19.05: burnt spreads	4	33	Granite	122	126	72	Ovoid	Ovoid	n	
19.113	19.11: burnt spreads	4	33	Granite	220	175	95	Round	Flat ovoid	n	
2.067	2.05d: redeposited midden	5a	9a	Granite	229	187	85	Ovoid	Plano-convex	n	
2.416	2.05d: redeposited midden	5a	9a	Granite	240	160	110	Ovoid	Plano-convex	n	
15.094	15.18: hearth residues	5b	9c	Granite	310	210	74	Ovoid	Plano-convex	n	1 end removed in large flakes
2.081	2.03a: redeposited midden	5b	9c	Granite, coarse-grained	284	226	410	Round	Ovoid	n	
1.25	1.05: redeposited midden in cave	5b	27c	Granite	210	205	77	Flat, sub-rectangular	Flat ovoid	n	
15.304	15.07: redeposited burnt spread	6a	10	Lithic arenite (medium grained)	138	77	63	Ovoid	Ovoid	n	Used on both sides. Fire-cracked.
2.046	2.03: redeposited midden	6a	10	Microgranite	196	161	62	Ovoid	Flat ovoid	y	
F1.116	1.01: redeposited midden in cave	6b	29c	Sandstone	175	124	54	Ovoid	Flat ovoid	n	
F1.124	1.01: redeposited midden in cave	6b	29c	Granite	277	156	71	Flat, sub-rectangular	Flat ovoid	n	
2.368	2.52: final deposition in cave prior to backfilling stairwell	6b	22a	Granite	385	195	115	Long oval	Ovoid	y	Calcite deposits on surface & charring along 1 edge.
2.295	2.48: stairwell backfill	6b	22a	Granite	225	290	54	Long oval	Flat ovoid	n	
?	6.08: redeposited midden in cave	6		-	88.5	145	73	Ovoid	Ovoid	n	
2.085	2.03a (1): redeposited midden	7	11	Granite	250	176	86	Sub-rectangular	Plano-convex	n	
15.446	Unstratified	u		Granite	175	130	85	Ovoid	Unclear	n	

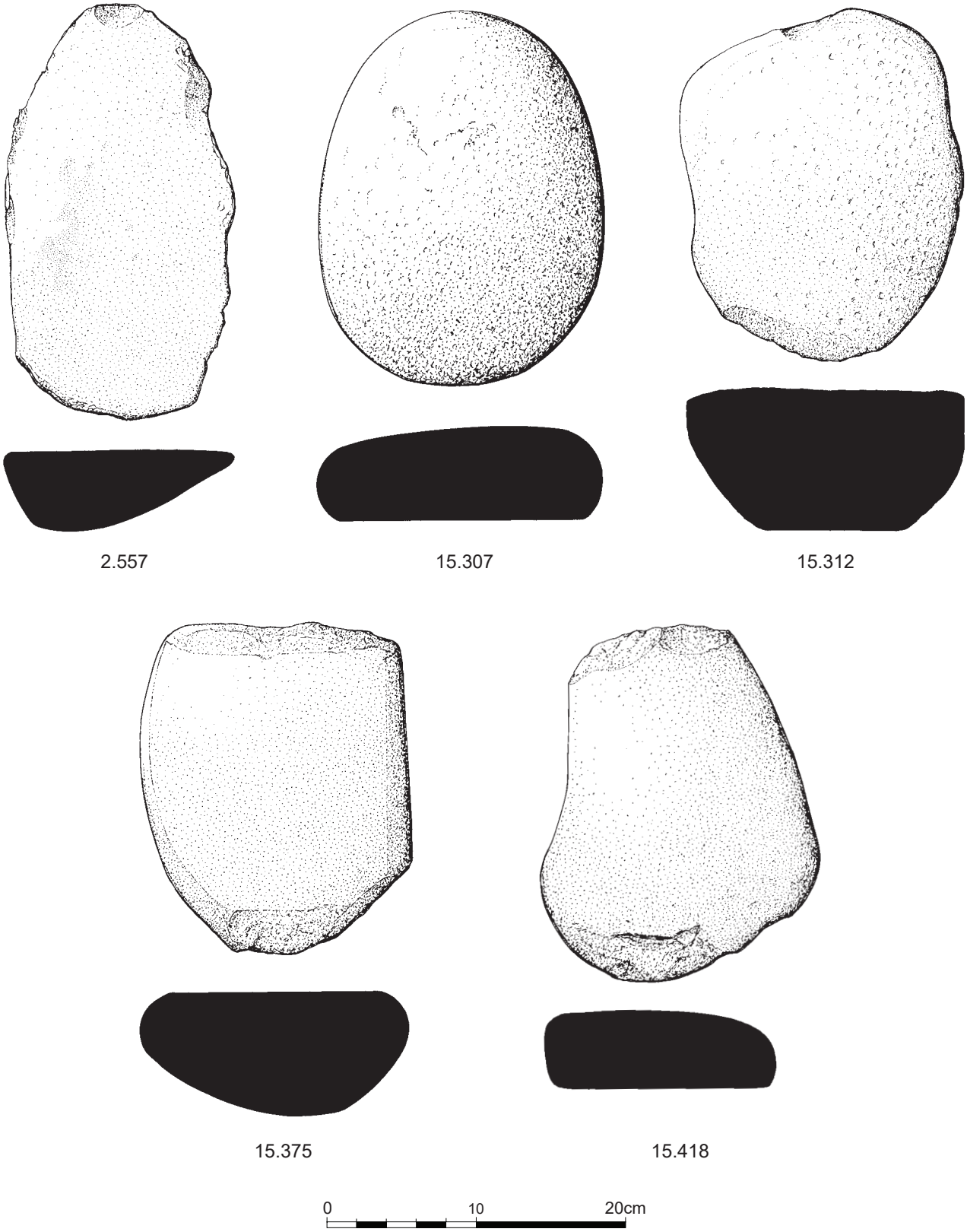


Figure 12.19. Quern rubbers: SF2.557, SF15.307, SF15.312, SF15.375, SF15.418

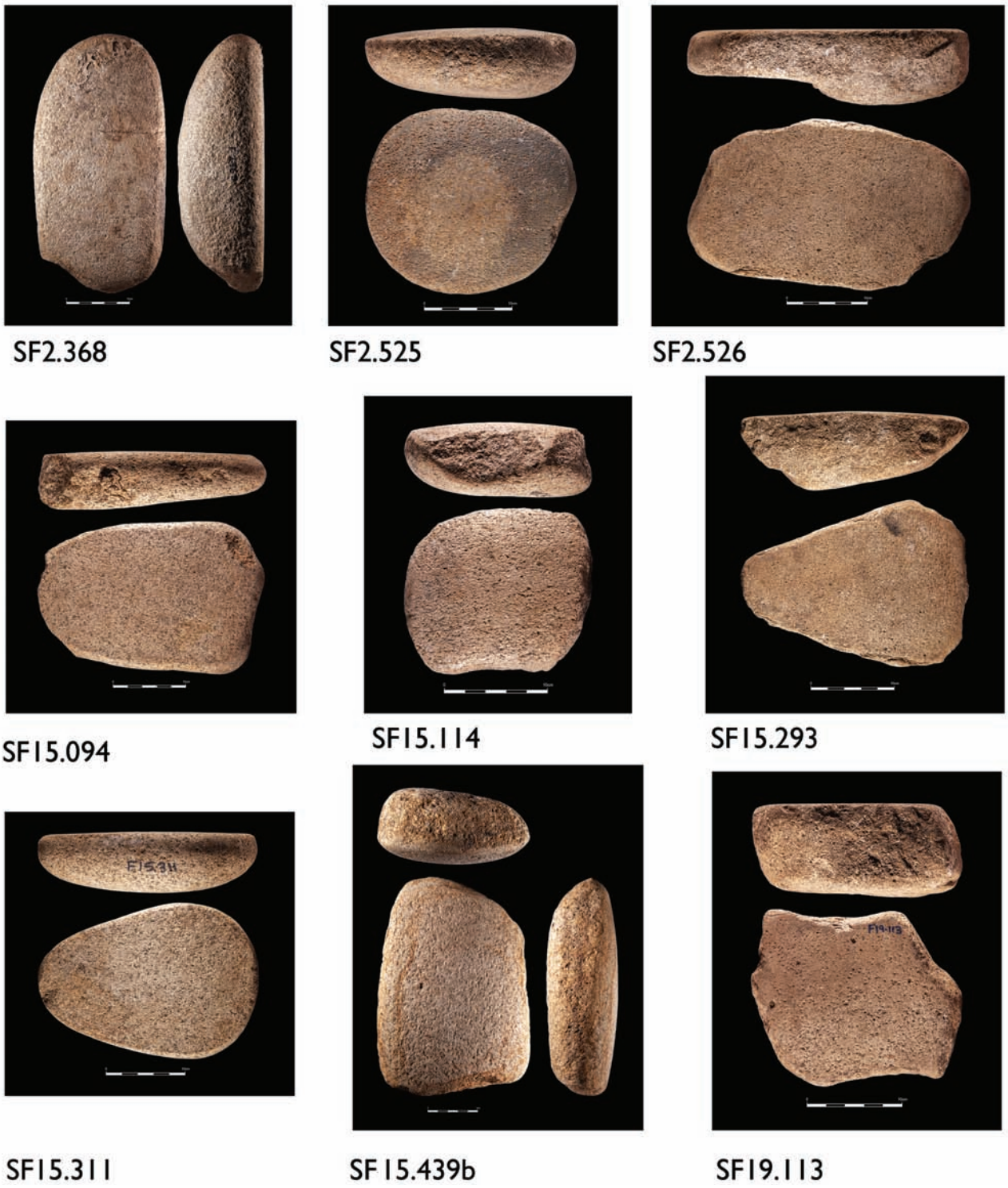


Figure 12.20. Saddle querns: SF2.368, SF2.525, SF2.526, SF15.094, SF15.114, SF15.293, SF15.311, SF439b, SF19.113

71; 2007, figs 8.19, 8.91). However, bun querns are also present, as conventional forms or close variants. Two are low buns with vertical handles (SF2.231 and 2.232/2.249/15.448); the third is a taller, hemispherical bun, its handle lost (SF15.048). The bun querns are smaller in diameter and thicker than the disc querns, although the ranges overlap, and thickness is affected by wear (bun diameter: 310–340 mm cf. disc 300–440 mm; bun thickness: 88–134 mm cf. disc 48–110 mm). All apart from SF18.007 (discussed below) are made

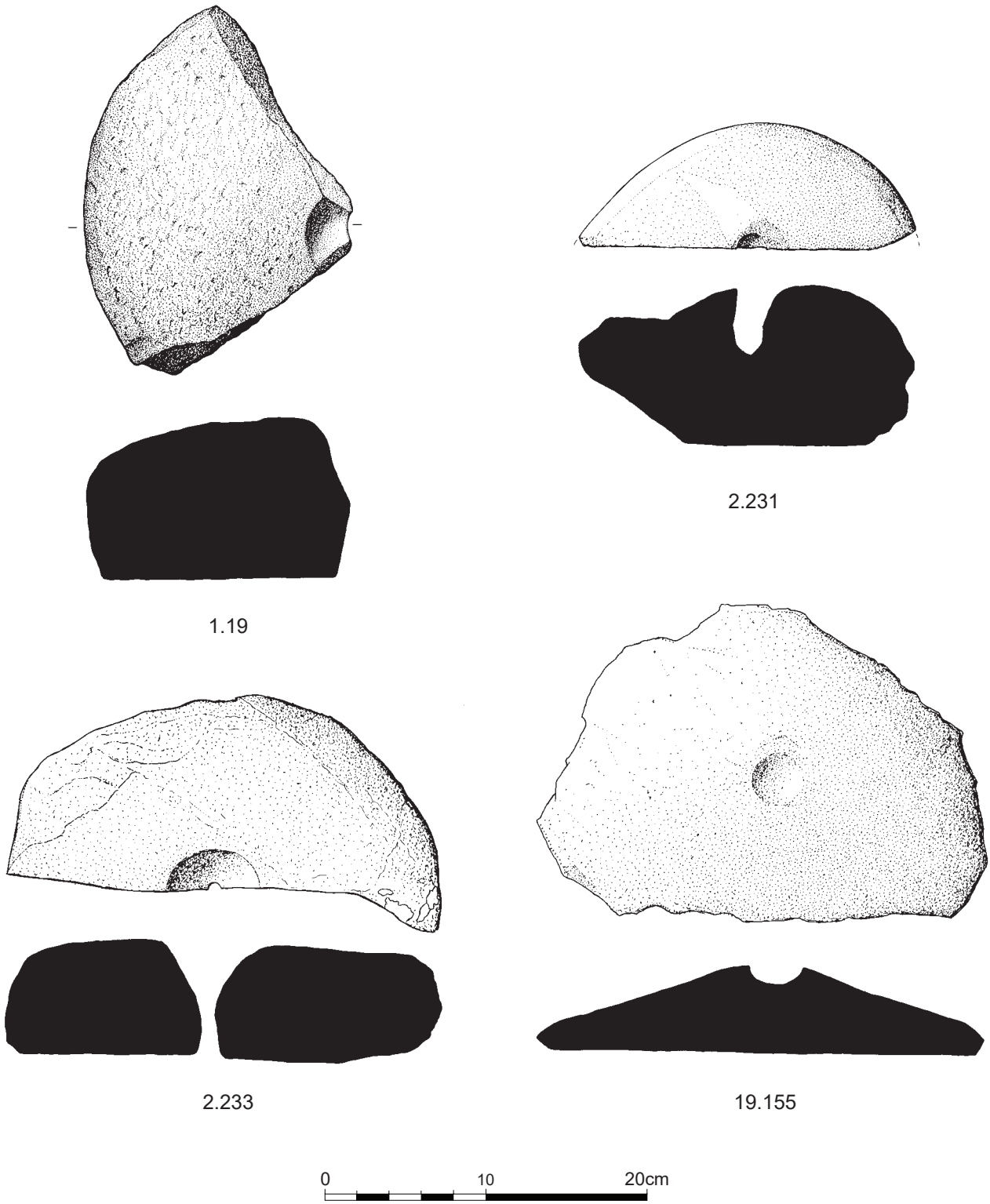


Figure 12.21. Rotary quern fragments SF1.19, SF2.231, SF2.233, SF19.155

from stones likely to be local to the site. It is clear that quern traditions in the area were diverse; terms such as 'bun' and 'disc' may express key original differences but struggle to capture the diversity and overlap.

Here the dating evidence may be reviewed. The transition from saddle to rotary querns in Scotland had been placed around 200 BC (Caulfield 1978; Armit 1991, 190–5). Subsequent work showed that in parts of Europe this took place markedly earlier, from the 5th century BC (Wefers 2011), and there is evidence from various parts of Britain to support this (Harding 2006, 73–4; McLaren and Hunter 2008, 105). The best Scottish evidence until now came from Howe on Orkney, with an example from phase III (6th/5th century BC; Ballin Smith 1994, 26; MacKie 1998, 28–9). The High Pasture Cave evidence provides additional data to support the early use of rotary querns in Scotland. Of the quern fragments recovered from dated deposits, four were recovered from contexts with modelled date ranges of 355–320 cal BC (although SF18.007a–b may have been deposited slightly earlier); three from contexts with a modelled range of 205–95 cal BC; with the remaining querns from contexts with a modelled date range of cal AD 70–135 (Table 12.21). One should note that all these querns had been heavily used before burial, so each context date is very much a *terminus ante quem* for the quern. This evidence confirms the early dating of rotary querns in Atlantic Scotland and shows the typological variety present within the assemblage. Wefers (2011) has noted marked regional variability in their spread, so one should not apply this dating more broadly as yet as it

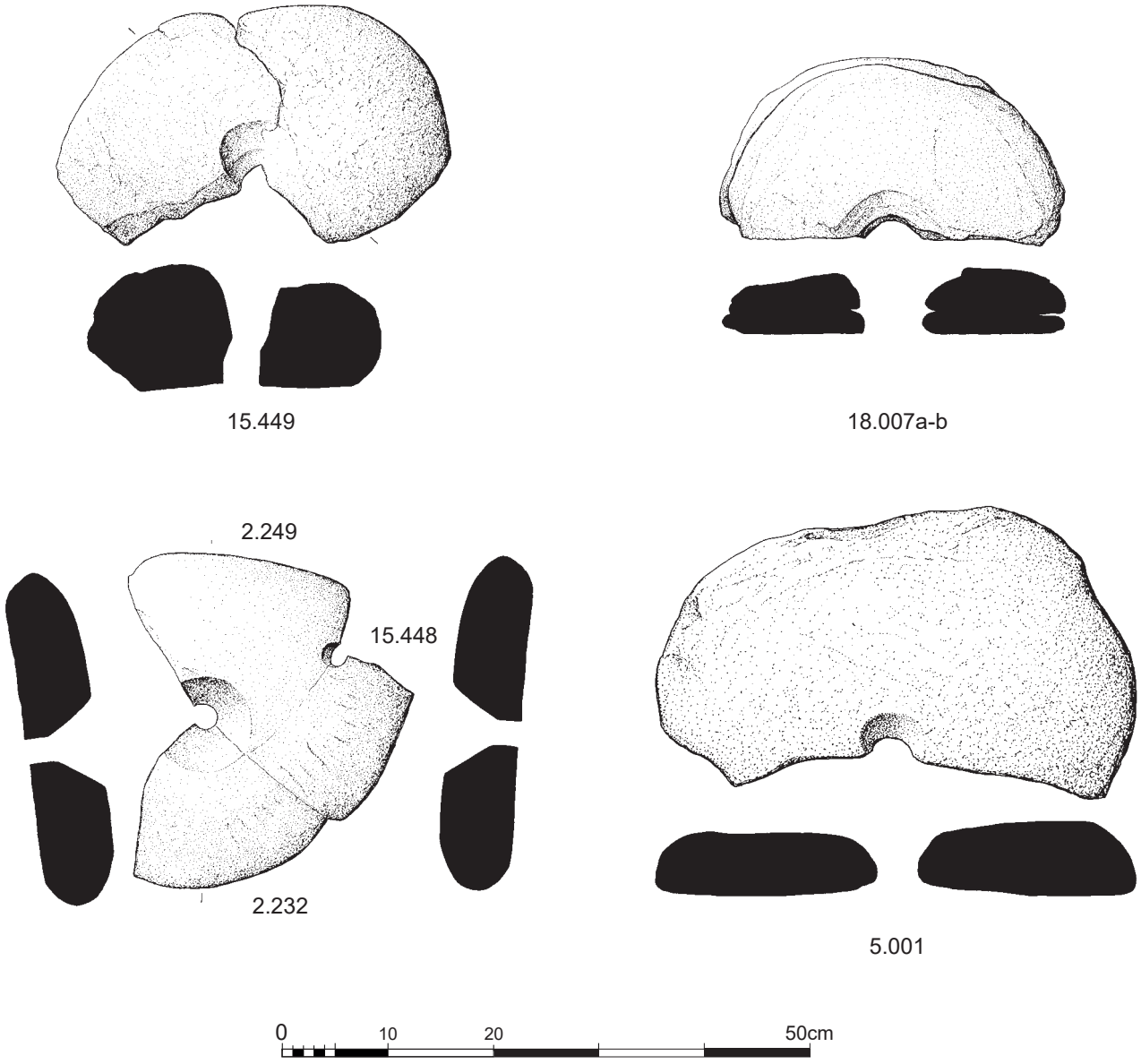


Figure 12.22. Rotary quern fragments SF15.449, SF18.007a–b, SF2.232, SF5.001

is too slender a hook to hang a typological progression on. However, the evidence is suggestive, and offers valuable new dating evidence.

Perhaps the most striking find is SF18.007a-b. This consists of half an upper and half of lower stone from a thin disc quern of sub-rectangular profile with angled edges (a truncated conical form), a broad hopper and a perforated lower stone. Both are heavily worn, and the grinding surfaces are badly weathered. Whereas all other querns from the site are most plausibly of local stone (granite, arkose [Torridonian sandstone], Jurassic sandstone, quartzite, and gabbro), Fiona McGibbon identifies these as a non-local garnet mica-schist derived from Dalradian deposits; such rocks are prevalent between the Great Glen and the Highland Boundary Fault, the nearest convenient sources being in Argyll.

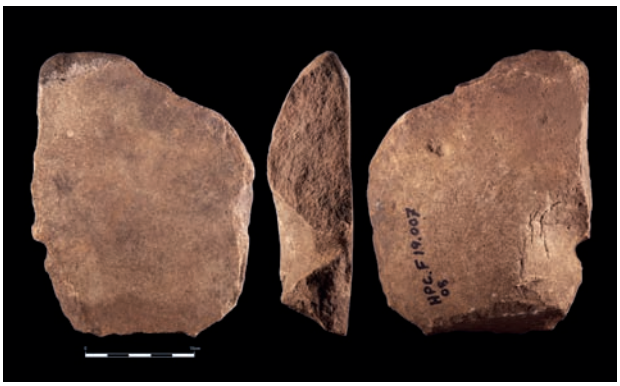


Figure 12.23. Rotary quern fragment SF19.007

The majority of these querns were deposited at the point when they were either used beyond repair or required complete redressing as the surface was worn smooth. SF1.19 and 15.048/15.449 still had some limited roughness on their grinding surface, but all others which preserved this surface were worn smooth; SF2.233, 15.070, and 19.007 had been worn into a concave surface and, in the case of SF18.007, any feeder pipe had been worn away and the stone was too thin to be functional.

Table 12.21 Summary table of rotary querns

SF	*C*	*Ph*	*SB*	*Lithology*	*Est. diam. (mm)*	*T (mm)*	*Notes*
15.070	15.18: redeposited hearth deposits	5b	9c	Gabbro	300	73	Frag. from rounded edge of disc quern upper stone, with part of vertical handle socket tapering from broad top to *c.* 30 mm diam. & perforating stone. Grinding surface worn smooth & concave. Fire-cracked
2.187	2.08: occupation deposit	5b	9c	Gabbro	?	48	Small frag. (*c.* 5%) from edge of disc upper stone with low rounded edge & slightly convex top. Grinding surface worn smooth
15.048	15.12 (2): redeposited hearth debris	5b	9c	Granite	340 × est. 280	134	*c.* 60% of steep-sided, near-hemispherical bun-shaped upper stone in 2 refitting frags, 1 of which is heat-damaged. Top of conical hopper present (D *c.* 100 mm, depth 80 mm), but feeder pipe has been flaked away & handle socket is missing. Top & edges extensively damaged by rough flaking. Well-worn but still usable
18.007a & b	18.03: burnt spread	5	34	Garnet mica-schist (non-local)	320	52	Matching halves of upper & lower stone from small, heavily worn disc quern. Both have gently angled edges & flat faces, grinding surfaces being heavily & asymmetrically worn; actual grinding surface eroded & spalled. Broad conical hopper (D 110 mm, depth 45 mm); feeder pipe entirely lost through wear. No handle socket in surviving frag. Lower stone has conical perforation tapering from 65–50 mm
1.19	1.01: redeposited midden in cave	6		Granite	340	96	Thick disc-type upper stone, *c.* 20% surviving; carefully shaped, sub-rectangular section with upright, slightly convex sides, low convex top & slightly convex grinding surface (worn but still usable). Pecking from manufacture still visible. No handle socket surviving. Conical hopper (D *c.* 50 mm, depth 50 mm) & slightly angled feeder pipe (D *c.* 25 mm)

(Continued)

Table 12.21 (Continued)

SF	*C*	*Ph*	*SB*	*Lithology*	*Est. diam. (mm)*	*T (mm)*	*Notes*
5.001	5.01: redeposited midden	6b	35	Quartzite	440	47-65	About half disc-shaped upper stone with irregularly sub-rectangular section, steep convex sides & irregular, slightly dished or sloped top, reflecting original stone. No handle socket surviving; deep pecked hollow may have been attempt at replacement, but as edge is also notably flaked here it more plausibly represents deliberate destruction. V. worn grinding surface, smoothed overall & polished at edge, with circumferential grooving. Hopper narrow & conical (D 80 mm, depth 35 mm), tapering to a sub-square feeder pipe (W 35 mm), slightly flared at base
19.007	19.01: surface burnt spreads	6b	35	Sandstone (fine-grained)	360-400	77	Around 25% of gently domed, disc-shaped upper stone, with low, slightly angled edge & unmodified domed top utilising natural stone shape. Broad conical hopper (D *c.* 120 mm, depth 45 mm) & cylindrical feeder pipe (D 30 mm). Handle socket missing. Grinding surface worn smooth, with sinuous profile, convex near feeder, concave elsewhere. Damaged by flake-scarring & deep peck-marks around edge & top
2.231	2.03a: redeposited midden	7	11	Quartzite	?	99.5	Around 15% of bun-shaped upper stone (210 × 75 mm) with well-rounded edge leading into convex face; fragmentary vertical handle socket (D *c.* 30mm, depth 42 mm). Grinding surface worn smooth. Sides & grinding surface damaged by large flake-scars
2.233	2.03a: redeposited midden	7	11	Arkose	405	110	Around half a thick, disc-type upper stone, section almost sub-rectangular with steep convex edges, gently convex top & concave, v. worn grinding surface. No handle socket survives. Part of grinding surface & much of edges flaked off. Conical hopper (D 100 mm, depth 45 mm) leads to cylindrical feeder pipe (D 19 mm, flaring to 25 mm); slightly misaligned, indicating it was drilled from both faces
2.232 2.249	2.03a: redeposited midden	7	11	Arkose	310	88+	*c.* 65% of bun-shaped upper stone in 3 refitting frags, with convex edges leading smoothly into low convex top. Vertical handle socket (D 29 mm, depth 50 mm). Conical hopper (D 100 mm, depth 45 mm) leads to slightly angled cylindrical feeder pipe (D 25 mm). Deliberately broken through hopper & handle socket; top has been defaced by series of deep linear scars; grinding surface entirely flaked off, & edges extensively so
15.448	Tr.15: unstratified	-		Arkose			

None of the rotary querns is intact and it is clear that there were recurring patterns of fragmentation. The largest single fragments are SF2.233, 5.001, and 18.007a–b, each comprising roughly half a stone, all split through the central perforation. Around 65% of 2.232 survives but in three refitting fragments, one of which (15.448) was recovered from a different trench; it was broken through both the hopper and the handle socket. This quern in particular shows extensive and convincing evidence for deliberate damage as its grinding face was entirely removed by flaking and most of its edges were roughly flaked off, while the upper surface displays a series of distinct linear scars. There are similar traces on some of the other querns: for example, SF2.233 also had its grinding surface and edges flaked and the top and edges of SF15.048 and SF19.007 have been extensively pecked and flaked.

The rotary querns were mostly recovered from Trenches 2 and 15; only one fragment was found within

the cave (SF1.19). They were predominantly in secondary contexts such as redeposited midden and burnt spreads and cluster around Phases 5 (5) and 6 (5), with no examples found earlier than this.

Cobble tools

Cobble tools are abundant on prehistoric sites and constitute 65% of this assemblage, with 258 examples present. Though common, they are not well understood, and without further experimental and analytical work we can generally only describe their wear patterns, leaving their precise function unclear. The cobble tools are predominantly manufactured from water-worn cobbles, all in stone types which were locally available, potentially from the nearby shingle beach at Camas Malag. The composition of the cobble tool assemblage is summarised in Table 12.17; each type is discussed below, with an emphasis on categorising wear-types (as in Ballin Smith 1998) in order to aid future comparative research.

Size data for grinders, pounders, and hammers were compared to see if particular stone sizes were preferred for particular functions but no patterns were observed: the different categories of grinder discussed below also showed no significant discrimination by size. There are, however, some differences when considered by weight rather than length and width (Fig. 12.24). Cobble tools range widely in weight from 20 g to 2.5 kg, but the overall distribution is notably bimodal, with a large peak in the 200–800 g range and a much smaller one above 1 kg. All the main tool types (pounder, grinder, and combination tools) are represented across this range, but there are differences. The majority, 60–70%, of both grinders and pounders weight under 700 g, but the weight spread of grinders is more evenly distributed while pounders peak strongly between 200g and 500 g. When combination tools are considered, grinder/pounders show a peak similar to that of pounders alone, suggesting the weight was a major consideration for pounders; pounders/hammers include notably heavier examples, suggesting that these were selected for the hammering function (too few single use hammers are present for a valid comparison). Grinder/hide-rubbers are overwhelmingly in the lighter 'peak'. The weight of a stone was clearly a major factor in its use.

Hammers

Hammerstones are characterised by bifacial flake-scarring, usually around one end (22 instances), less often at both ends (8 examples), indicating the stone had been hit against a hard material with physical force. A single stone (SF1.20) had three percussion points, on both ends and one edge. They vary in length and weight from 69–210 mm and 130–1342 g with averages of 131 mm and 596 g. Hammerstones would have been used for heavy-duty tasks such as dressing stones.

Of the 31 objects with hammering wear, only three are single function; all the others are multi-functional tools with between two and four other types of use-wear present (Table 12.22). Where flake-scarring is stratified with other types of wear, it is always later, suggesting hammers were picked up expediently rather than being selected specifically for that function. It is unsurprising that the most common other wear-type noted on the hammerstones is pounding (23), as the two are very similar actions and were probably undertaken simultaneously in most cases. They were recovered from Phases 3–7, with concentrations in Phases 4 (9) and 6 (8).

Pounders

Pounders were used in a similar fashion to hammers but with less force, typically creating pitted facets or peck-marks rather than flake-scars (Fig. 12.25). They are the second most common type of cobble tool in this assemblage with 33 single function pounders present and pounding wear noted on a further 83 multi-functional tools which display between two and four other types of wear (Table 12.23). Their length and weight vary from 55–210 mm and 58–2467 g with averages of 116 mm and 594 g.

The most common types of wear found with pounding on combination tools are grinding (54 instances) and hammering (23). Pounding and grinding wear can be difficult to separate and are likely to have taken place simultaneously whilst using the tool as a pestle. Most (85%) of the pounders (99) have wear concentrated on one (74) or both ends (24), while three have circumferential wear, six were worked on their long edge, and eight show wear on both ends and edges. They were collected from Phases 2–7 with most from Phases 3–6.

Pounders were likely to have been used for a wide range of tasks including processing grain or other foodstuffs, dressing stone objects, and crushing pigments or ores. Within this group there are hints of different functions, though their exact purpose remains enigmatic. A group of four pounders show restricted concentrations of very small peck-marks (SF2.494, 2.505c, 15.093, and 19.093), indicating they were fine tools, perhaps with a specialist craft function. In contrast SF15.366 shows extensive pitting and is a large heavy cobble which is likely to have required two hands to use, suggesting it was for a heavy-duty task like crushing ores for metalworking or stone for tempering pottery.

One pounder (SF15.124) has a line of iron panning around its middle, indicating it had been set on end in the ground for a long period of time. Though its pounded end was facing downwards, there was grinding and hammering wear on the upwards-facing end. Whether the stone was set like this to enable its use, or whether this is further evidence for structured deposition is unclear. Eleven of the pounders are fire-cracked, indicating they had seen secondary re-use as pot-boilers.

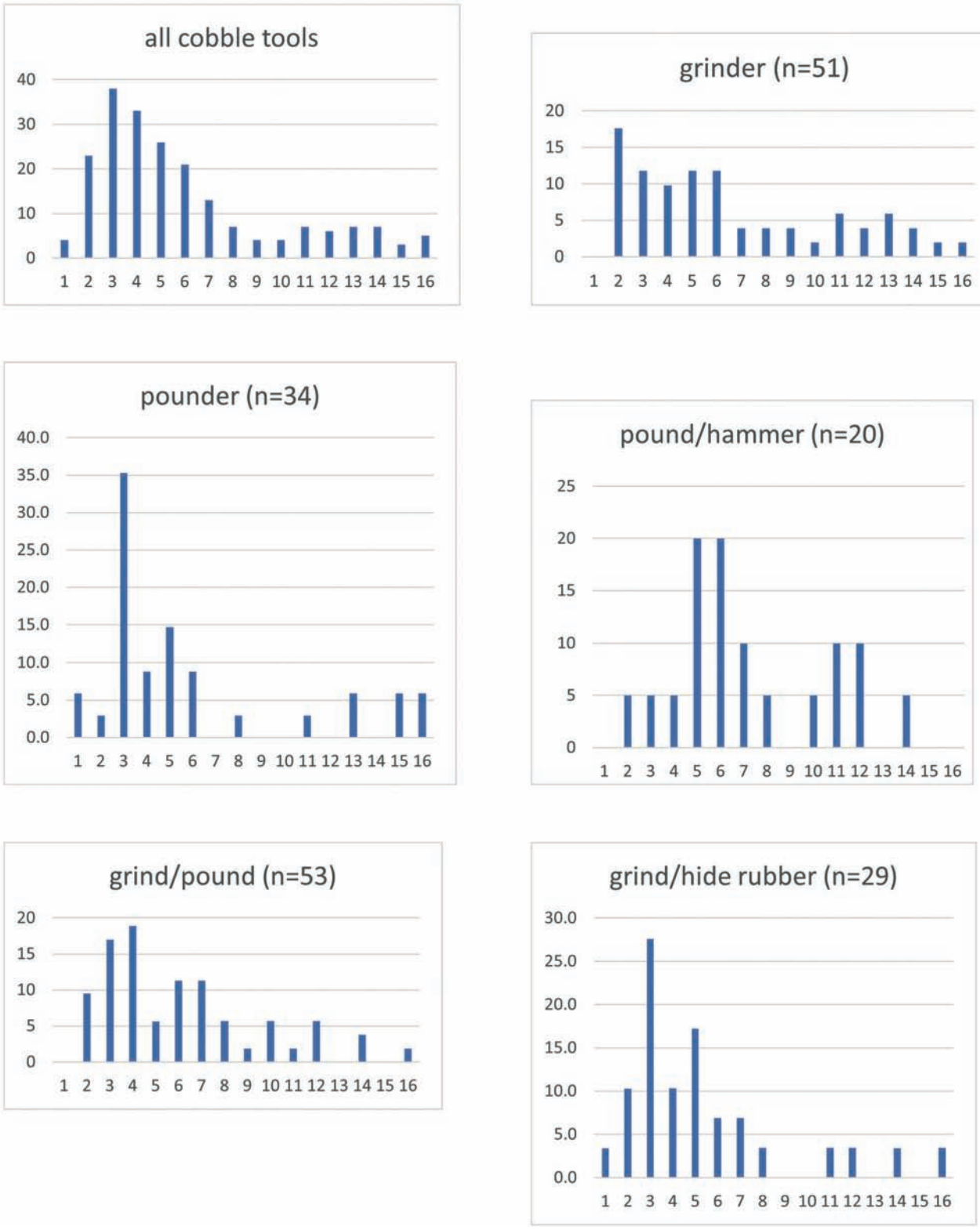


Figure 12.24. Overall weight distribution of cobble tools (absolute numbers) & of particular types (percentages, with sample sizes in captions)

Table 12.22 Summary of cobble tools: hammers

SF	*C*	*Ph*	*SB*	*Lithology*	*Shape*	*L*	*W*	*T*	*G*	*P*	*Ha*	*HR*	*Wh*	*WS*	*Pal*	*Sh*	*Hammer points*
2.453	2.26: hearth debris in forecourt	3b	7a	Dolerite	Ovoid	134	88	55	x	x	x						2
15.403	15.83: hearth debris in forecourt	3d	7d	White sandstone (fine-grained)	Flat, triangular	133	89	26		x	x						2
2.505a	2.18: hearth debris in forecourt	3e	7e	Sandstone (fine-grained)	Flat, sub-rectangular	128	94	28		x	x			x			2
2.523	2.10: hearth debris	4a	21b	Granite	Ovoid	150	88	63	x		x						1
15.124	15.38: hearth debris in forecourt	4c	8c	Arkose (Torridonian)	Discoid	126	115	48	x	x	x						1
15.134.1	15.38: hearth debris in forecourt	4c	8c	Sandstone	Flat, ovoid	193	83	29		x	x						1
15.134.2	15.38: hearth debris in forecourt	4c	8c	Sandstone	Long, ovoid	180	56	37		x	x						1
15.137	15.43: hearth debris in forecourt	4c	8c	Siltstone	Flat, ovoid	132	91	30		x	x			x			1
2.468	2.15a: hearth debris	4c	8c	Quartzite	Ovoid	141	90	62	x	x	x						1
2.479	2.15c: hearth debris	4c	8c	Dolerite	Flat, sub-rectangular	92	68	34		x	x						1
19.049	19.05: burnt spreads	4		Arkose (Torridonian)	Ovoid	88	64	38	x		x			x			1
19.110	19.11: burnt spreads	4	33	Limestone	Ovoid	69	55	27		x	x						2
19.125	19.06: burnt spreads	4	33	Microgranite	Ovoid? (fragmentary)	50	60	28	x		x						1
2.188	2.08: occupation deposit	5b	9c	Arkose (Torridonian)	Flat, long, ovoid				x	x	x	x				x	1
2.189	2.08: occupation deposit	5b	9c	Arkose (Torridonian)	Ovoid	99	59	32		x	x	x					1
6.240	6.05: redeposited midden	5b	27c	–	Flat, triangular	71	67	23			x						1
15.106	15.12: hearth residues	5c	9b	Quartzite	Long, ovoid	210	54	44		x	x						1
2.064	2.05: redeposited midden	5	9	Arkose (Torridonian)	Flat, sub-rectangular	145	97	33	x	x	x				x		1
2.106	2.05: redeposited midden	5	9	Dolerite	Flat, trapezoidal	127	83	26		x	x						1
2.044	2.03b: redeposited midden	6a	10	Microdiorite	Long, ovoid	129	48	38	x	x	x						1
15.011	15.09: hearth residues	6a	10	Sandstone	Flat, ovoid	119	110	32	x	x	x						2
15.028	15.08 (2): hearth residues	6a	10	Dolerite	Flat, ovoid	111	76	35			x						2
2.053	2.03b: redeposited midden	6a	10	Porphyritic dolerite	Flat, ovoid					x	x		x	x			1
6.23	6.03: redeposited midden	6b	29c	Quartzite/ psammitic schist	Long, ovoid	90	72	39		x	x						1
1.120	1.01: redeposited midden	6b	29c	Pyroxenite	Ovoid	175	83	59			x			x			3
2.038	2.03a: redeposited midden	7	11	Arkose (Torridonian)	Long, sub-rectangular	133	79	28		x	x		x	x			2
2.240	2.03a: redeposited midden	7	11	Granite	Flat, ovoid	165	80	54		x	x						1
2.005	2.01: redeposited midden	7	11	Porphyritic dolerite	Flat, ovoid	122	69	27			x						1

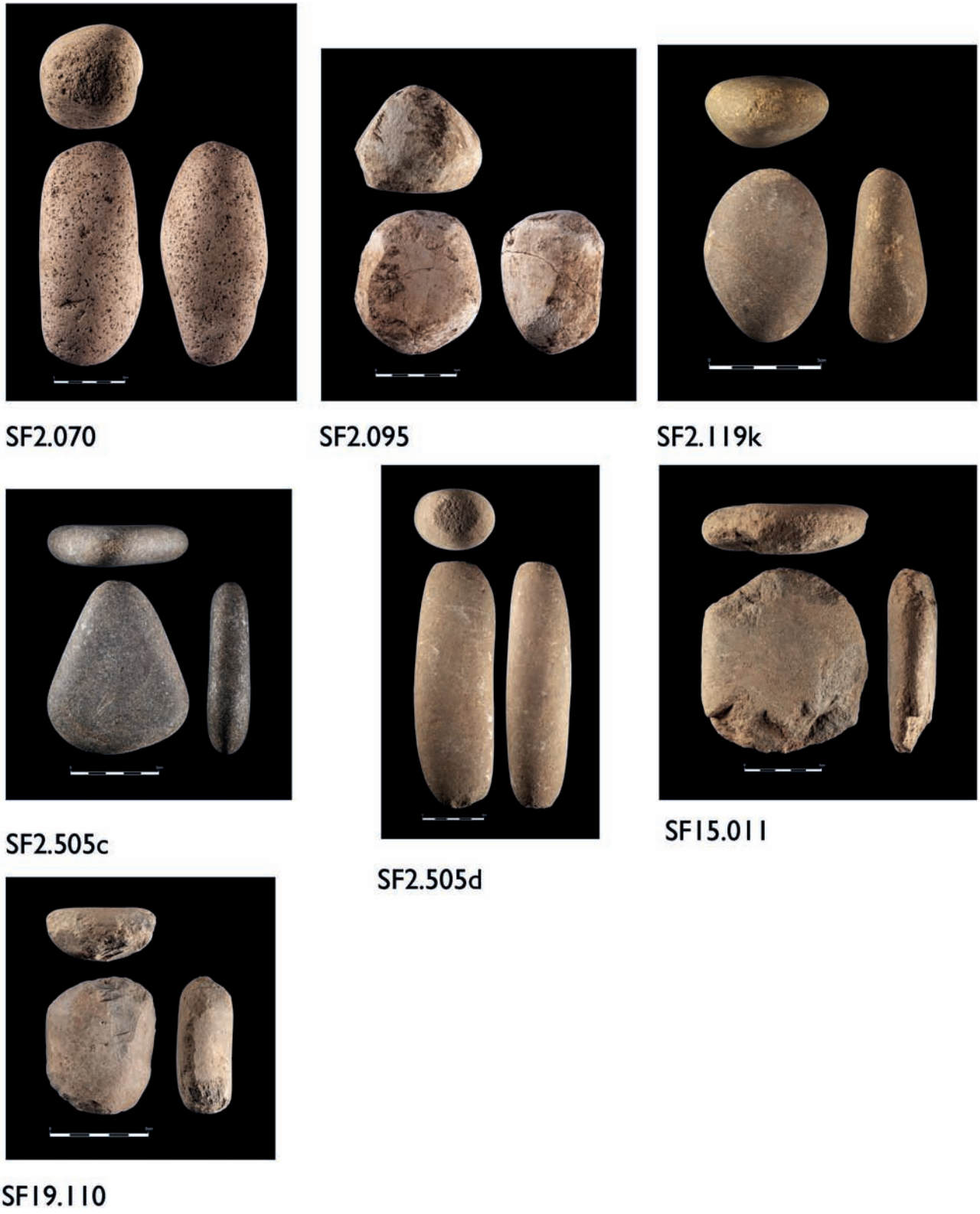


Figure 12.25. Cobble tools: pounders SF2.070, SF2.095, SF2.119k, SF2.505c, SF2.505d, SF15.011, SF19.110

Table 12.23 Summary table of cobble tools: pounders

SF	*C*	*Ph*	*SB*	*Lithology*	*G*	*P*	*Ha*	*HR*	*Wh*	*WS*	*Pal*	*SL*	*Sh*	*Shape*	*Use?*	*Type*	*L*	*W*	*T*
2.546	2.71: fill of cave entrance	2a	18	limestone	x	x								oval	heavy	end	80	63	63
19.064	19.10: redeposited hearth debris	2	31	porphyritic basalt	x	x								oval? (fragmentary)	medium	end	68	55	31
17.053	17.06: redeposited midden	3a	27a	arkose (torridonian)	x	x								oval? (fragmentary)	medium	end & edge	97	68	28
2.453	2.26a: debris from hearths in forecourt	3a	7a	dolerite	x	x	x							oval	medium	end	134	88	55
2.533	2.70: fill of 1st phase stairwell	3a	19	arkose (torridonian)		x								flat, oval	light	end & edge	97	64	30
15.412	15.64: hearth debris	3b	7b	amygdaloidal dolerite	x	x								discoid	medium	Circum-ferential, almost	100	94	42
15.426	As above	3b	7b	microgranite	x	x								oval	medium	end	140	71	41
15.429	As above	3b	7b	quartzite		x								flat, sub-rectangular	light	end	160	70	33
15.437	As above	3b	7b	dolerite		x				x				flat, oval	light	end	144	81	33
2.131	2.23: debris from hearths in forecourt	3c	7c	arkose (torridonian)	x	x								flat, oval	medium	end	151	87	44
15.403	15.83: debris from hearths in forecourt	3d	7d	white sandstone (fine-grained)		x	x							flat, triangular	medium	end	133	89	26
15.407	As above	3d	7d	microdiorite	x	x								oval	medium	end	84	57	30
15.414	As above	3d	7d	granite (leucogranite)		x								oval	medium	end	115	109	72
15.366	As above	3d	7d	arkose (torridonian)	x	x								long, oval	heavy	end: large	145	119	75
15.367	As above	3d	7d	dolerite	x	x								oval	medium	end	127	72	44
15.369	As above	3d	7d	dolerite	x	x								oval? (fragmentary)	heavy	end	50	76	76
2.442	2.18: debris from hearths in forecourt	3e	7e	dolerite	x	x				x				flat, oval	medium	end	132	83	29
2.517	As above	3e	7e	quartzite		x								oval	light	end	170	95	80

(Continued)

Table 12.23 (Continued)

SF	C	Ph	SB	Lithology	G	P	Ha	HR	Wh	WS	Pal	SL	Sh	Shape	Use?	Type	L	W	T
2.518	As above	3e	7e	dolerite		x								oval	medium	end	96	42	34
15.374	15.52: hearth debris	3e	7e	arkose (torridonian)	x	x								oval	medium	end	120	76	62
15.385	15.56: hearth debris	3e	7e	granite	x	x								oval	heavy	end	102	84	70
15.387	As above	3e	7e	sandstone (fine-grained)		x			x					fragmentary	light	end	85	50	28
15.380b	As above	3e	7e	white standstone (fine-grained)	x	x							x	sub-diamond	medium	end	142	92	23
15.380d	As above	3e	7e	white sandstone (fine-grained)		x								flat, sub-triangular	light	end	122	87	23
2.505a	2.18: debris from hearths in forecourt	3e	7e	sandstone (fine-grained)		x	x			x				flat, sub-rectangular	medium	end	128	94	28
2.505b	As above	3e	7e	sandstone (fine-grained)	x	x								flat, oval	medium	end	128	82	31
2.505c	As above	3e	7e	dolerite		x								flat, sub-triangular	fine	end	97	79	24
2.505d	As above	3e	7e	sandstone (fine-grained)	x	x								cylindrical	medium	pestle			
2.438	2.16: debris from hearths in forecourt	4a	8a	arkose (torridonian)		x								oval	light	end	103	36	17
15.134.1	15.38: debris from hearths in forecourt	4c	8c	sandstone		x	x							flat, oval	light	end	193	83	29
15.134.2	As above	4c	8c	sandstone		x	x							long, oval	light	end	180	56	37
15.134.3	As above	4c	8c	unknown - obscured by soot		x								flat, sub-triangular	light	end	140	73	35
2.083	2.10: debris from hearths in forecourt	4c	8c	dolerite		x								discoid? (fragmentary)	medium	edge	72	75	33
2.119b	2.30: hearth debris	4c	8c	dolerite	x	x								oval	medium	end	128	91	49

(Continued)

Table 12.23 Summary table of cobble tools: pounders (Continued)

SF	*C*	*Ph*	*SB*	*Lithology*	*G*	*P*	*Ha*	*HR*	*Wh*	*WS*	*Pal*	*SL*	*Sh*	*Shape*	*Use?*	*Type*	*L*	*W*	*T*
2.119c	As above	4c	8c	dolerite	x	x			x					oval	medium	end	157	64	26
2.119d	As above	4c	8c	dolerite	x	x				x				flat, oval	medium	end	130	72	36
2.119h	As above	4c	8c	dolerite	x	x			x			x		flat, oval	medium	end	120	52	28
2.119i	As above	4c	8c	dolerite/ basalt	x	x		x				x		flat, oval	light	end	101	53	25
2.119j	As above	4c	8c	-		x								oval	medium	end	111	52	25
2.119k	As above	4c	8c	dolerite/ basalt		x								oval	medium	end & edge	77	56	33
2.119g	As above	4c	8c	-		x								flat, oval	light	end	130	71	37
2.125	2.31: hearth debris	4c	8c	limestone		x								flat, sub-rectangular	medium	end	88	68	19
2.126	As above	4c	8c	arkose (torridonian)		x			x	x				long, oval	medium	end	153	79	53
2.468	2.15a: hearth debris	4c	8c	quartzite	x	x	x							oval	medium	end	141	90	62
2.479	2.15c: hearth debris	4c	8c	dolerite		x	x							flat, sub-rectangular	medium	end	92	68	34
2.490	2.15c: hearth debris	4c	8c	porphyritic microgranite	x	x								long, oval	medium	end & edge	115	44	32
2.494	2.15c: hearth debris	4c	8c	siltstone		x								flat, sub-square	fine	circumferential, almost	55	48	20
15.122	15.38: debris from hearths in forecourt	4c	8c	granite	x	x								oval	medium	end			
15.124	As above	4c	8c	arkose (torridonian)	x	x	x							discoid	medium	edge	126	115	48.5
15.125	As above	4c	8c	micro-gabbro	x	x								oval	light	end	78	70	31
15.128	As above	4c	8c	granite		x								oval	light	end	128	78	70
15.137	15.43: debris from hearths in forecourt	4c	8c	siltstone		x	x			x				flat, oval	medium	end	132	91	30
HP1.187	1.06: trampled floor deposits	4c	27c	dolerite	x	x								oval	light	edge	63	50	45
6.355	6.06: redeposited midden	4c	27b	dolerite		x								flat, oval	medium	end	63	85	41
6.357	As above	4c	27b	dolerite		x								oval	heavy	end	127	78	50

(Continued)

Table 12.23 (Continued)

SF	C	Ph	SB	Lithology	G	P	Ha	HR	Wh	WS	Pal	SL	Sh	Shape	Use?	Type	L	W	T
19.110	19.11: redeposited burnt spreads	4	33	limestone		x	x							oval	medium	end	69	55	27
19.050	As above	4	33	microgranite	x	x								sub-rectangular	medium	end	134	107	47
19.054	As above	4	33	sandstone	x	x								oval	light	end	70	57	27
2.068	2.05d: redeposited midden	5a	9a	dolerite	x	x			x					oval	medium	end	122	70	44
2.073	As above	5a	9a	sandstone (fine-grained)	x	x								oval	light	end	105	56	48
2.074	As above	5a	9a	microgranite	x	x								flat, oval	medium	end	117	91	42
2.402	As above	5a	9a	sandstone	x	x								long, oval	medium	pestle	127	37	34
2.246	2.05c: redeposited midden	5a	9b	microgranite	x	x		x						discoid	medium	edge	120	102	61
2.188	2.08: occupation deposit	5b	9c	arkose (torridonian)	x	x	x	x					x	flat, long, oval	medium	end			
2.189	As above	5b	9c	arkose (torridonian)		x	x	x						oval	medium	end	99	59	32
15.096	15.18: hearth debris	5b	9c	dolerite/ basalt		x		x						long, oval	light	end	122	48	31
15.106	15.12: hearth debris	5b	9c	quartzite		x	x							long, oval	medium	pestle	210	54	44
15.107	As above	5b	9c	arkose (torridonian)	x	x		x						long, oval	medium	pestle	81	59	38
15.334	15.18: hearth debris	5b	9c	sandstone (fine-grained)		x								flat, oval	light	end	131	92	25
15.340	15.28: redeposited hearth residues/ levelling in natural hollow	5b	9c	quartzite	x	x								oval	medium	end	124	80	35
2.054	2.05: redeposited midden	5	9	quartzite		x								oval	medium	end	76	76	40
2.064	As above	5	9	arkose (torridonian)	x	x	x				x			flat, sub-rectangular	light	end	145	97	33
2.106	As above	5	9	dolerite		x	x							flat, trapezoid	medium	end	127	83	26

(Continued)

Table 12.23 Summary table of cobble tools: pounders (Continued)

SF	*C*	*Ph*	*SB*	*Lithology*	*G*	*P*	*Ha*	*HR*	*Wh*	*WS*	*Pal*	*SL*	*Sh*	*Shape*	*Use?*	*Type*	*L*	*W*	*T*
6.151	6.05: redeposited midden	5b	27c	sandstone	x	x								flat, oval	light	end	120	71	27
6.263	As above	5b	27c	granitoid		x								oval	medium	end	110	132	88
14.036	14.11: redeposited burnt spreads	5	34	sandstone	x	x		x						oval	medium	end	70	56	28
18.004	18.03: burnt spreads	5	34	microdiorite		x								pear	medium	end	97	64	28
19.021	19.02: redeposited burnt spreads	5	34	microgranite	x	x								flat, oval	heavy	pestle	125	50	20
19.023	As above	5	34	arkose (torridonian)		x								flat, oval	light	end	125	70	20
19.093	As above	5	34	arkose (torridonian)		x								oval	fine	end	76	51	36
2.044	2.03b: redeposited midden	6a	10	microdiorite	x	x	x							long, oval	medium	end & edge	129	48	38
2.053	As above	6a	10	arkose (torridonian)		x			x					flat, oval	light	end	107	76	22
15.011	15.09: hearth debris	6a	10	sandstone	x	x	x							flat, oval	medium	end	119	110	32
15.019	15.11: redeposited burnt spreads	6a	10	arkose (torridonian)		x		x						long, oval	medium	edge	51	40	37
15.323	15.08b: hearth debris	6a	10	dolerite	x	x								flat, sub-triangular	fine	end	84	60	20
HP1.130	1.04: redeposited midden	6a	29a	granite		x								oval	medium	end	105	70	46
HP1.134	As above	6a	29a	porphyritic dolerite		x								oval	medium	end	111	92	65
HP1.257	As above	6a	29a	-		x				x				flat, oval	medium	end	98	83	39
6.91	6.04: redeposited midden	6a	29a	microgranite	x	x								long, oval	medium	end	112	93	43
HP1.121	1.01: redeposited midden	6b	29c	porphyritic dolerite	x	x								flat, oval	heavy	end & edge	78	117	45
HP1.132	As above	6b	29c	microgranite		x		x						discoid	medium	circumferential	74	74	36
HP1.252	As above	6b	29c	microgranite		x					x			flat, sub-rectangular	medium	end	151	105	28

(Continued)

Table 12.23 (Continued)

SF	*C*	*Ph*	*SB*	*Lithology*	*G*	*P*	*Ha*	*HR*	*Wh*	*WS*	*Pal*	*SL*	*Sh*	*Shape*	*Use?*	*Type*	*L*	*W*	*T*
HP1.253	As above	6b	29c	porphyritic dolerite		x	x		x	x				oval	medium	end			
6.121	6.01: redeposited midden	6b	29c	quartzite	x	x								long, oval	medium	end	175	76	68
6.143	6.03: redeposited midden	6b	29c	microgranite		x								oval	medium	end	67	58	54
6.15	6.02: redeposited midden	6b	29c	-		x			x					long, oval	light	end	104	34	17
6.23	6.03: redeposited midden	6b	29c	quartzite/ psammitic schist		x	x							long, oval	medium	end	90	72	39
19.10	19.01: turf & topsoil	6b	35	sandstone		x			x					long, oval	medium	end & edge	129	60	30
19.120	19.02: redeposited burnt spreads	6b	35	sandstone (fine-grained)	x	x								long, oval	medium	end	95	41	22
2.038	2.03a: redeposited midden	7	11	arkose (torridonian)		x	x		x	x				sub-rectangular	medium	end	133	79	28
2.070	2.04: redeposited midden	7	11	granite		x								oval	medium	end	160	75	76
2.229	2.03a: redeposited midden	7	11	arkose (torridonian)		x								oval	medium	end	79	65	34
2.240	As above	7	11	granite		x	x							flat, oval	medium	end	165	80	54
2.247	As above	7	11	granite		x								long, oval	medium	end	165	84	78
2.389	As above	7	11	microgranite		x								oval	medium	end	144	108	64
2.410	As above	7	11	limestone	x	x							x	oval	light	end	125	57	33
3.003	3.01: turf/ topsoil	7	11	arkose (torridonian)	x	x			x					flat, oval	light	end	110	65	32
7.002	7.02: redeposited topsoil	7	11	microgranite	x	x								flat, oval	medium	end & edge	92	80	30

Grinders

Grinding is the most common wear-type identified, with 53 single-function tools present and grinding wear on an additional 88 multi-functional tools (Figs 12.26, 12,27). Grinders are characterised by oval roughened patches or facets created by repeated rubbing against another material. Like pounders, they are likely to have been used for a multitude of tasks which have produced broadly similar use-wear, making interpreting the exact function of these tools very difficult (residue analysis may ultimately help but is currently undeveloped). The large size of this assemblage and variety of facet positions and types provides a good opportunity to categorise grinders into several types and then examine any spatial or chronological patterns which emerge from the different types, even if their different functions remain obscure at present.

Based upon the position of the facets it is possible to identify how the grinders were used (*e.g.* vertically, on edge, or at an angle). Categorising grinders is not simple; the ends and edges of a single cobble may display different forms of ground facet, essentially multi-functional grinders, but several distinct types were identified.

1. *Pestle/vertical grinders* (Table 12.24): usually long oval or cylindrical cobbles with central circular or oval ground facets on the ends from being used in a vertical position, either in a circular or back-and-forwards motion. In total, 80 were recovered, making them the most common type. Only six also had angled wear (see below). The facets are both flat and rounded, suggesting they were used on both flat and dished surfaces (*e.g.* a mortar or saddle quern).
2. *Edge grinders* (Table 12.25): 17 have distinct long, narrow facets of abrasion down the longest edge and are termed here 'edge-grinders'. They are predominantly made from flat cobbles in a range of shapes (ovoid, discoid, triangular *etc*.) and were recovered from Phases 2–6. All are made from types of sandstone, indicating deliberate stone selection. The long narrow facets suggest the stones were rubbed longitudinally which would have created a thin grinding area, suggesting a specialist function. Three also have angled facets.
3. *Angled grinders* (Table 12.26): many of the grinders were used at around a 45° angle, creating bevelled facets, usually on the ends but sometimes on the side. The stones were often turned around, creating bifacial ground facets; 43 tools have been used in this way, only nine of which also display vertical use on different facets. Angled use suggests a forwards-and-backwards motion rather than circular, suggesting a scraping and grinding action.
4. *Multi-faceted or conical* (Table 12.27): a small number of grinders display a cluster of small facets (6) or a conical facet (4), making it likely they were used in a combination of vertical and angled positions.

The small number of grinders displaying both vertical and angled use (nine of 141) suggests the two methods were for quite different tasks but unfortunately there are no spatial or chronological patterns to provide clues as to different dates or functions for the different types. They all appear to have been utilised throughout the use of the site.

Hide rubbers

Thirteen single function hide rubbers were identified along with 37 others amongst the multi-function tool assemblage (Table 12.28; Fig. 12.28). They are characterised by a combination of polished surfaces and the presence of red-brown-black staining. Cobbles with similar staining recovered from Dunadd were interpreted as hide rubbers (Lane and Campbell 2000, 178–9), though the category shows some variation which may imply differing functions.

Within this assemblage a division is possible between those with linear bands of glossy residues down the edge of one or more faces, implying concentrated use at around a 45° angle, and those with less coherent or fainter residues. The linear-stained group have all also been used as grinders and/or pounders while the 12 single function hide rubbers all belong to the group with less coherent staining. This strongly implies the linear-stained group may have had a specialist function in the hide working process which also included grinding and pounding, perhaps in the preparation of material to rub into the hide as a preservative.

The linear-stained group have a length of 74–145 mm (average 111 mm) and were recovered from Phases 4–6 while the others have a wider range of 40–153 mm (average 96 mm) and were collected from Phases 3–6. The more restricted size and chronology of the linear-stained group is further evidence for them being a distinct type. The hide rubbers utilised a range of stone types with sandstones dominating and smaller numbers of quartzite, microgranite, and dolerite.

Burnishers

Three tools have smoothed long facets along the ends or edges, suggesting they were used as burnishers (Table 12.29). The position of the facets is similar to edge grinders but the facets are much smoother or even polished. Such facets are likely to have been created by repeated rubbing against a smooth hard surface, such as metal. All three are single function, suggesting they were specialist tools. Although they are all different shapes, none are the simple ovoid water-worn cobbles which dominate the cobble tool assemblage, again suggesting deliberate selection. They were recovered from Phases 4 and 5 in Trenches 2 and 19.

Strike-a-lights

Strike-a-lights are cobbles with iron streaks caused by striking with a piece of iron or iron pyrite to create a spark. Of the four examples, two are single function and two are combination tools (Table 12.30). SF2.119h has indistinct linear striations across one surface while the

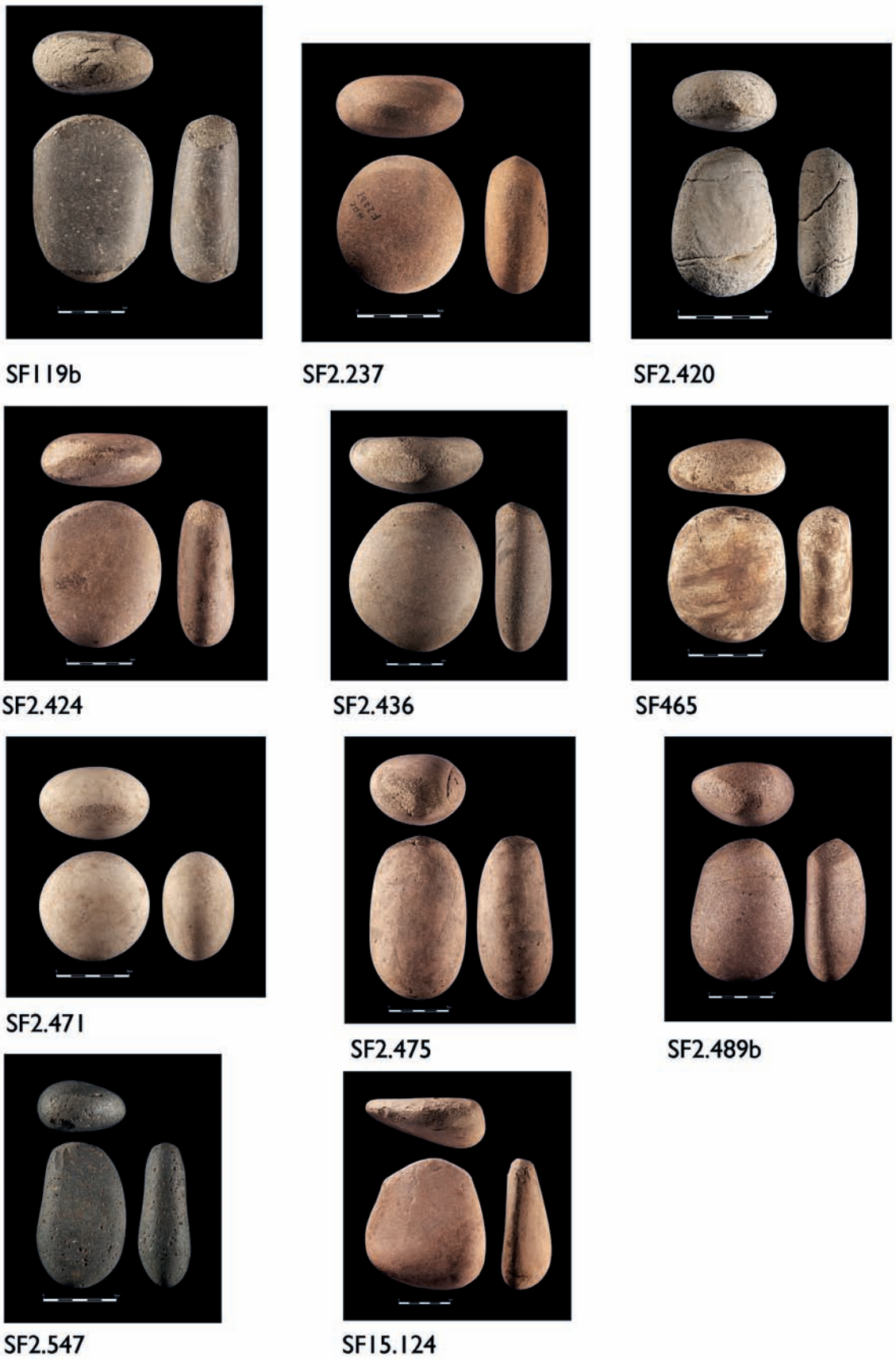


Figure 12.26. Cobble tools: grinders SF119b, SF2.237, SF2.420, SF2.424, SF2.436, SF2.465, SF2.471, SF2.475, SF2.489b, SF2.547, SF15.124



Figure 12.27 Cobble tools: grinders SF15.298, SF15.366, SF15.380a, SF15.385, SF15.404, SF15.426

others display streaks of iron staining. The most convincing example is SF17.051 which displays two parallel iron streaks on one face, one of which has a return loop at the end where the iron had not quite left the stone as the user drew their hand back to strike again. None shows the deep grooves found when a stone was used repeatedly for this purpose. They were collected from Phases 3, 4, and 6, and Trenches 2 and 17.

Whetstones

Whetstones were used to sharpen metal blades by repeatedly drawing the blade across a flat stone surface in the direction of the blade edge, creating smoothed, concave facets on the stone. This characteristic wear pattern was noted on 16 single function tools and 17 multi-functional tools, predominantly on long ovoid or rectangular sandstone or other fine-grained cobbles (Table 12.31; Fig. 12.29). Most of the whetstones (30) have been utilised on one or two edges or faces while four were worked on three or four areas. Where the whetstones had been used for other functions, pounding (12) and grinding (9) are most common. In most cases it was not possible to determine which function had taken place first, but on the five tools where the wear-types were stratified (SF2.53, 2.038, 2.126, 2.119c, and 15.401), whetting was always earlier, suggesting their primary function had been as a whetstone with other uses being expedient.

SF6.504 is the only whetstone whose shape has been modified, with all its edges having been abraded until they are neatly squared; all the other whetstones have utilised unmodified cobbles. It is noteworthy that it was recovered from one of the earliest phases (2), perhaps an indication of the value placed on metal blades at the early stage of the Iron Age. Whetstones have one of the widest chronological distributions of coarse stone tool-types at this site, being found from Phase 2 through to Phase 8.

Table 12.24 Summary table of cobble tools: grinder type 1

SF	*C*	*Ph*	*SB*	*G*	*P*	*Ha*	*HR*	*Wh*	*WS*	*SL*	*Grinder type*	*Intact*	*Shape*	*L*	*W*	*T*
19.064	19.10: redeposited fuel residues	2	31	x	x						reg	y	long oval	68	55	31
2.451	2.26: hearth debris in forecourt	3a	7a	x						x	reg	y	flat oval	91	63	30
15.181	15.62: redeposited hearth residues	3a-3c	12	x							circumferential	y	disc	111	104	61
15.191	Unstratified	3b	7b	x							reg	y	oval	85	67	26
15.409	15.64: crushed limestone surface	3b	7b	x							reg	y	flat oval	93	61	30
15.412	15.64: crushed limestone surface	3b	7b	x	x						circumferential, almost	y	disc	100	94	42
15.419	15.64: redeposited hearth residues	3b	7b	x							reg	y	pear	160	140	65
15.420	15.64: redeposited hearth residues	3b	7b	x							pestle & reg	y	long oval	160	65	44
15.421	15.64: redeposited hearth residues	3b	7b	x							reg	y	sub-rectangular	96	60	59
15.422	15.64: redeposited hearth residues	3b	7b	x							reg	y	flat pear	103	77	37
15.423	15.64: redeposited hearth residues	3b	7b	x							edge	n	flat oval	69	54	21
15.426	15.64: redeposited hearth residues	3b	7b	x	x						part-edge	y	oval	140	71	41
15.428	15.64: redeposited hearth residues	3b	7b	x							reg	y	oval	90	55	32
15.430	15.64: redeposited hearth residues	3b	7b	x							reg	y	flat diamond	88	48	14
2.131	2.23: hearth debris in forecourt	3c	7c	x	x						reg	y	oval	151	87	44
2.495	2.65: fill between stairwell & walls	3c	20	x			x				reg	y	oval	109	63	34
15.366	15.83: redeposited hearth residues	3d	7d	x	x						reg	y	oval	145	119	75
15.367	15.83: redeposited hearth residues	3d	7d	x	x						reg	n	oval	127	72	44
15.369	15.83: redeposited hearth residues	3d	7d	x	x						reg	n	-	50	76	76
15.404	15.83: redeposited hearth residues	3d	7d	x							reg	y	oval	110	88	59
15.407	15.83: redeposited hearth residues	3d	7d	x	x						part-edge	y	oval	84	57	30
2.442	2.18: hearth debris in forecourt	3e	7e	x	x				x		reg	y	flat oval	132	83	29
2.452	2.58: collapsed natural on stairwell	3e	7e	x			x				reg	y	long oval	240	88	58
2.505b	2.18: hearth debris in forecourt	3e	7e	x	x						reg	y	flat oval	128	82	31
2.505d	2.18: hearth debris in forecourt	3e	7e	x	x						pestle	y	long oval	205	67	55
15.374	15.52: redeposited hearth residues	3e	7e	x	x						part-edge	y	oval	120	76	62
15.385	15.56: redeposited hearth residues	3e	7e	x	x						reg	y	oval	102	84	70
15.392	15.56: redeposited hearth residues	3e	7e	x			x				reg	y	disc	83	76	27
14.028	14.20: fill of pit or posthole	3	32	x							reg	y	oval	95	76	60

(Continued)

Table 12.24 Summary table of cobble tools: grinder type 1 (Continued)

SF	*C*	*Ph*	*SB*	*G*	*P*	*Ha*	*HR*	*Wh*	*WS*	*SL*	*Grinder type*	*Intact*	*Shape*	*L*	*W*	*T*
2.093	2.16: hearth debris in forecourt	4a	8a	x							reg	y	oval	103	84	54
2.094	2.16: hearth debris in forecourt	4a	8a	x			x	x			reg	y	long oval	130	71	28
2.487	2.16: hearth debris in forecourt	4a	8a	x							reg	y	flat oval	114	57	29
2.499	2.16: hearth debris in forecourt	4a	8a	x			x				circumferential	y	round	79	75	43
2.119	2.30: hearth debris	4c	8c	x							reg	y	oval	76	46	31
2.475	2.15c: hearth debris	4c	8c	x							reg	y	oval	138	82	62
2.490	2.15c: hearth debris	4c	8c	x	x						pestle	y	oval	115	44	32
15.122	15.38: redeposited hearth residues	4c	8c	x	x						reg	y	flat oval			
15.347	2.15b: hearth debris	4c	8c	x							fine	y	irregular	64	50	26
2.119c	2.30: hearth debris	4c	8c	x	x			x			reg	y	long sub-rectangular	157	65	26
2.119d	2.30: hearth debris	4c	8c	x	x				x		reg	y	flat oval	130	72	36
2.119f	2.30: hearth debris	4c	8c	x			x		x		reg	y	long oval	145	56	30
2.119h	2.30: hearth debris	4c	8c	x	x			x		x	reg	y	flat oval	120	52	28
2.119i	2.30: hearth debris	4c	8c	x	x		x			x	reg	y	flat oval	101	53	25
2.119o	2.30: hearth debris	4c	8c	x			x				reg	y	flat oval	92	48	23
HP1.187	1.06: floor deposits over paving	4c	27b	x	x						edge & regular	y	sub-rectangular	63	50	45
19.047	19.05: redeposited burnt spreads	4	33	x							?	n	–	79	70	69
19.050	19.05: redeposited burnt spreads	4	33	x	x						reg	y	sub-rectangular	134	107	47
19.128	19.09: redeposited burnt spreads	4	33	x							reg	n	–	46	43	36
2.065	2.03d: redeposited midden	5a	9a	x							reg	y	oval	159	93	73
2.073	2.03d: redeposited midden	5a	9a	x	x						reg	y	oval	105	56	48
2.074	2.03d: redeposited midden	5a	9a	x	x						reg	y	flat oval	117	91	42
2.402	2.05c: redeposited midden	5a	9a	x	x						pestle	y	long oval	127	37	34
2.116	2.05c: redeposited midden	5a	9b	x				x			reg	y	oval	117	65	32
2.117	2.05c: redeposited midden	5a	9b	x			x				reg	y	long oval	130	61	33
15.111b	15.25: redeposited hearth residues	5a	9b	x			x				reg	y	oval	103	45	33
2.246	2.05c: redeposited midden	5a	9b	x	x		x				reg	y	round	120	102	61
15.340	15.28: redeposited hearth residues/ levelling layer in natural hollow	5b	9b	x	x						reg	y	flat oval	124	80	35

(Continued)

Table 12.24 (Continued)

SF	*C*	*Ph*	*SB*	*G*	*P*	*Ha*	*HR*	*Wh*	*WS*	*SL*	*Grinder type*	*Intact*	*Shape*	*L*	*W*	*T*
15.090	15.18: redeposited hearth residues	5b	9c	x			x				reg	y	oval	109	50	28
15.127a	15.26: redeposited hearth residues	5b	9c	x			x				reg	y	flat oval	117	75	28
2.057	2.05: redeposited midden	5	9	x			x		x		reg	y	flat oval	86	68	31
6.213	6.05: redeposited midden	5b	27b	x							reg	y	oval	60	49	39
17.041	17.04: redeposited midden in cave	5b	27c	x							part-edge	y	flat oval	119	73	32
19.021	19.02: redeposited burnt spreads	5	34	x	x						pestle & reg	y	flat oval	125	50	20
15.324	15.08b: redeposited ash & hearth residues	6a	10	x							reg	y	long oval	149	59	44
2.044	2.03b: redeposited midden	6a	10	x	x	x					reg	y	long oval	129	48	38
6.91	6.04: redeposited midden	6a	29a	x	x						circumferential, almost	y	flat oval	112	93	43
6.09	6.02: redeposited midden	6b	29c	x							reg	y	long oval	117	60	33
6.110	6.01: redeposited midden in cave	6b	29c	x							reg	y	oval	133	98	70
6.121	6.01: redeposited midden	6b	29c	x	x						reg	y	long oval	175	76	68
6.145	6.03: redeposited midden	6b	29c	x							reg	y	trapezoidal	82	61	28
HP1.121	1.01: redeposited midden in cave	6b	29c	x	x						reg	y	flat oval	78	117	45
HP1.251	1.02: redeposited midden in cave	6b	29c	x				x			reg	y	oval	120	66	35
2.360	2.52: final deposition of material in cave	6b	22a	x			x				reg	y	flat oval	116	98	42
2.466	2.03a: redeposited midden	7	11	x			x				reg	y	flat oval	153	95	45
2.408	2.03: redeposited midden	7	11	x							edge	y	flat oval	107	76	35
3.003	3.01: turf/topsoil	7	11	x	x			x			reg	y	flat oval	110	65	32
7.002	7.02: redeposited topsoil	7	11	x	x						reg	y	flat oval	92	80	30

Table 12.25 Summary table of cobble tools: grinder type 2

SF	*C*	*Ph*	*SB*	*Lithology*	*G*	*P*	*Ha*	*HR*	*Wh*	*Sh*	*Grinder type*	*Intact*	*Shape*	*L*	*W*	*T*
17.105	17.06: redeposited midden material in cave & floor horizon in Bone Passage	2b	25b	arkose (torridonian)	x						edge	y	flat triangular	89	65	24
15.410	15.64: packing for crushed limestone surface	3b	7b	sandstone (fine-grained)	x				x		edge	y	irregular	125	72	23
2.444	2.20: accumulation of material resulting from use of hearth F2.15	3d	7d	sandstone (fine-grained)	x					x	edge	y	flat oval	148	71	26
15.380b	15.56: redeposited ash & hearth residues	3e	7e	white sandstone (fine-grained)	x	x				x	edge	y	flat diamond	142	92	23
2.422	2.15a: accumulation of hearth debris from use of hearth F15.20	4c	8c	sandstone (medium grained)	x						edge	y	flat oval	105	72	25
2.418	2.15a: accumulation of hearth debris from use of hearth F15.20	4c	8c	sandstone (fine-grained)	x						edge	y	flat triangular	116	57	18
2.436	2.15c: accumulation of hearth debris from use of hearth F15.20. Phase 4	4c	8c	arkose (torridonian)	x						edge	y	disc	130	120	46
15.124	15.38: redeposited ash & hearth residues in forecourt area	4c	8c	arkose (torridonian)	x	x	x				edge	y	disc	126	115	48
2.068	2.05d: redeposited midden	5a	9a		x	x			x		edge	y	–	122	70	44
2.068	2.05d: redeposited midden	5a	9a		x	x			x		edge	y	–	122	70	44
2.188	2.08: occupation deposit overlying natural karstic clay	5b	9c		x	x	x	x		x	edge & regular	y	flat oval			
15.107	15.12: redeposited hearth residues	5b	9c	arkose (torridonian)	x	x		x			edge	n	long oval	81	59	38
6.151	6.05: redeposited midden	5b	27c		x	x					edge	y	oval	120	71	27
2.113	2.05: redeposited midden	5	9		x						edge	y	disc	99	90	46
19.120	19.02: redeposited burnt spreads	6b	35	sandstone (fine-grained)	x	x					edge	n	long oval	95	41	22
6.109	6.01: redeposited midden in cave	6b	29c		x						edge	y	flat oval	81	61	19

Table 12.26 Summary table of cobble tools: grinder type 3

SF	*C*	*Ph*	*SB*	*Lithology*	*G*	*P*	*Ha*	*HR*	*WS*	*Pal*	*SL*	*Sh*	*Intact*	*Shape*	*L*	*W*	*T*
2.547	2.71: fill of cave entrance between & underlying steps paving F.2.39	2a	18	vesicular basalt, water-worn	x								y	oval	99	59	35
17.105	17.06: redeposited midden material in cave & floor horizon in Bone Passage	2b	25b	arkose (torridonian)	x								y	flat triangular	89	65	24
2.453	2.26a: accumulation of material resulting from use of hearths in forecourt area	3a	7a	dolerite	x	x	x						y	oval	134	88	55
2.532	2.70: fill of first phase stairwell, overlying steps/paving	3a	19	altered limestone	x								y	oval	136	89	70
2.539	2.70: fill of first phase stairwell, overlying steps/paving	3a	19	arkose (torridonian)	x			x					y	flat oval	98	63	27
17.043	17.06: redeposited midden material in cave & floor horizon in Bone Passage	3a	27a	dolerite	x								n	oval	87	51	23
17.053	17.06: redeposited midden material in cave & floor horizon in Bone Passage	3a	27a	arkose (torridonian)	x	x							y	round	97	68	28
15.426	15.64: redeposited ash & hearth residues	3b	7b	microgranite	x	x							y	oval	140	71	41
15.420	15.64: redeposited ash & hearth residues	3b	7b	quartzite	x								y	long oval	160	65	44
2.444	2.20: accumulation of material resulting from use of hearth F2.15	3d	7d	sandstone (fine-grained)	x							x	y	flat oval	148	71	26
15.370	15.83: silting & redeposition of hearth debris in west side of forecourt area	3d	7d	dolerite	x								y	oval	91	58	32
15.404	15.83: silting & redeposition of hearth debris in west side of forecourt area	3d	7d	quartzite	x								y	oval	110	88	59
2.442	2.18: accumulation of material resulting from use of hearths in forecourt area	3e	7e	dolerite	x	x			x				y	flat oval	132	83	29
15.380a	15.56: redeposited ash & hearth residues	3e	7e	arkose (torridonian)	x								y	oval	146	103	49
2.129	2.16: accumulation of material resulting from use of hearths in forecourt area	4a	8a		x			x					y	flat oval	40	28	10
2.473	2.62: fill/matrix of east wall of stairwell F.2.23	4a	21a	granite	x								y	oval	108	87	75
2.523	21.10: stairwell wall fill	4a	21b	granite	x		x						y	oval	150	88	63
2.424	2.15a: accumulation of hearth debris from use of hearth F15.20	4c	8c	arkose (torridonian)	x			x					y	flat oval	112	91	41
2.467	2.15a: accumulation of hearth debris from use of hearth F15.20	4c	8c	arkose (torridonian)	x								y	oval	134	98	57

(Continued)

Table 12.26 Summary table of cobble tools: grinder type 3 (Continued)

SF	*C*	*Ph*	*SB*	*Lithology*	*G*	*P*	*Ha*	*HR*	*WS*	*Pal*	*SL*	*Sh*	*Intact*	*Shape*	*L*	*W*	*T*
15.125	15.38: redeposited ash & hearth residues in forecourt area	4c	8c	micro-gabbro	x	x							y	oval	78	70	31
2.428	2.15b: accumulation of hearth debris from use of hearth F15.20	4c	8c	sandstone (fine-grained)	x			x					y	oval	122	63	45
2.471	2.15b: accumulation of hearth debris from use of hearth F15.20	4c	8c	quartzite	x								y	disc	79	79	51
2.436	2.15c: accumulation of hearth debris from use of hearth F15.20. Phase 4	4c	8c	arkose (torridonian)	x								y	disc	130	120	46
19.125	19.06: redeposited burnt spreads	4	33	microgranite	x		x						y	round	50	60	28
19.056	19.09: redeposited burnt spreads in eastern sector	4	33	dolerite	x								n	oval	91	69	34
19.049	19.05: redeposited burnt spreads in eastern sector	4	33	arkose (torridonian)	x		x		x				y	oval	88	64	38
19.054	19.05: burnt spreads	4	33	sandstone	x	x							n	oval	70	57	27
19.046	19.05: burnt spreads	4	33	arkose (torridonian)	x								y	flat oval	117	84	49
15.115	15.32: component of the burnt spreads	5a	9a	sandstone (medium grained)	x								y	round	86	86	46
2.055	2.05: redeposited midden	5	9		x			x					y	oval	145	85	69
2.064	2.05: redeposited midden	5	9		x	x	x			x			y	flat sub-rectangular	145	97	33
2.237	2.05: redeposited midden	5	9		x								y	round	82	82	36
19.021	19.02: redeposited burnt spreads in eastern sector	5	34	microgranite	x	x							y	flat oval	125	50	20
14.036	14.11: redeposited burnt spreads	5	34	sandstone	x	x		x					n	oval	70	56	28
15.323	15.08b: redeposited midden	6a	10	dolerite	x	x							y	flat triangular	84	60	20
15.011	15.09: redeposited hearth residues	6a	10	sandstone	x	x	x						y	flat oval	119	110	32
17.047	17.03: redeposited midden material in cave	6a	29a	arkose (torridonian)	x			x					n	oval	86	42	46
6.42	6.03: redeposited midden	6b	29c		x								y	flat oval	27	19	9
19.122	19.02: redeposited burnt spreads	6b	35	dolerite	x								y	oval	71	78	51
2.369	2.03a: redeposited midden	7	11		x								y	flat oval	98	78	44
2.465	2.03: redeposited midden	7	11	quartzite	x			x					y	flat oval	90	78	37
2.410	2.03: redeposited midden	7	11	limestone	x	x						x	y	oval	125	57	33

Table 12.27 Summary table of cobble tools: grinder type 4

SF	*C*	*Ph*	*SB*	*Lithology*	*Angle 1*	*Angle 2*	*Intact*	*Shape*	*L*	*W*	*T*
2.546	2.71: fill of cave entrance between & underlying steps/paving F.2.39	2a	18	limestone	conical		y	flat oval	80	63	63
15.419	15.64: redeposited ash & hearth residues	3b	7b	sandstone (fine-grained)	vertical	multi	y	pear	160	140	65
2.119b	2.30: accumulation of material resulting from use of hearth F.1.520	4c	8c		multi	vertical	y	oval	128	91	49
2.420	2.15a: accumulation of hearth debris from use of hearth F15.20	4c	8c	sandstone	multi		y	oval	83	58	34
2.468	2.15a: accumulation of hearth debris from use of hearth F15.20	4c	8c	quartzite	multi	vertical	y	oval	141	90	62
2.489b	2.15c: accumulation of hearth debris from use of hearth F15.20. Phase 4	4c	8c	arkose (torridonian)	multi		y	oval	115	81	50
15.298	15.07: redeposited burnt spread	6a	10	quartzite	conical		y	oval	158	73	62
HP1.140	1.02: redeposited midden in cave	6b	29c		conical		y	oval	119	65	46



Figure 12.28. Stone tools: hide rubbers with staining/residues SF2.439, SF6.378, SF15.107, SF15.111b, SF15.324

Table 12.28 Summary table of cobble tools: hide rubbers

SF	C	Ph	SB	Lithology	G	P	Ha	HR	Wh	WS	SL	Sh	L	W	D	Shape	Notes on wear/residues	Linear-stained group
2.539	2.70: 1st phase stairwell, overlying steps/paving	3a	19	arkose (torridonian)	x			x					98	63	27	flat, ovoid	1 face shinier & slightly darker in colour	
2.495	2.65: earlier stairwell walls	3c	20	arkose (torridonian)	x			x					109	63	34	ovoid	Dark brown shiny staining on 1 face	
2.452	2.58: stairwell landing	3e	7e	sandstone (fine-grained)	x			x					240	88	58	long, oval	1 end shinier & slightly darker in colour	
15.392	15.56: hearth residues	3e	7e	arkose (torridonian)	x			x					83	76	27	discoid	Patches of shiny dark brown residues in various places	
2.129	2.16: debris from hearths in forecourt	4a	8a	sandstone (fine-grained)	x			x					40	28	10	flat, ovoid	1 face shinier & slightly darker in colour	
2.499	2.16: debris from hearths in forecourt	4a	8a	quartzite	x			x					79	75	43	ovoid	Dark brown shiny staining on 1 face	
2.094	2.16: debris from hearths in forecourt	4a	8a	quartzite	x			x	x				130	71	28	flat, ovoid	1 face polished & dark red-brown staining	
2.119o	2.30: debris from hearths in forecourt	4c	8c	dolerite/ basalt	x			x					92	48	23	flat, ovoid	1 face shinier & slightly darker in colour	
2.424	2.15a: hearth residues	4c	8c	arkose (torridonian)	x			x					112	91	41	flat, ovoid	Linear dark brown staining on both faces, inc. longitudinal dark brown stain down edge of 1 face	x
2.428	2.15b: hearth residues	4c	8c	sandstone (fine-grained)	x			x					122	63	45	ovoid	1 end shiner & slightly darker in colour	
2.119i	2.30: debris from hearths in forecourt	4c	8c	diorite/ basalt	x	x		x			x		101	53	25	flat, ovoid	Concentration of polish along 1 edge	x
2.119n	2.30: debris from hearths in forecourt	4c	8c	microgranite				x					75	54	28	ovoid	Dark browny-red staining on 1 face	
2.119r	2.30: debris from hearths in forecourt	4c	8c	greenstone				x					91	72	38	ovoid	Dark browny-red staining on 1 face	
2.119s	2.30: debris from hearths in forecourt	4c	8c	basalt				x					80	57	33	ovoid	1 face shinier & slightly darker in colour	
2.119u	2.30: hearth debris	4c	8c	greenstone				x					69	52	27	ovoid	1 face shinier & slightly darker in colour	
2.119f	2.30: debris from hearths in forecourt	4c	8c	diorite	x			x		x			145	56	30	long, oval	Dark staining & polish on 1 edge	x

(Continued)

Table 12.28 (Continued)

SF	C	Ph	SB	Lithology	G	P	Ha	HR	Wh	WS	SL	Sh	L	W	D	Shape	Notes on wear/residues	Linear-stained group
6.356	6.06: redeposited midden	4c	27b	fossiliferous mudstone				x					90	56	35	ovoid	Dark red/ brown residue on 1 face	
17.044	17.05: redeposited midden	4c	27b	quartzite				x					75	46	30	ovoid	Dark brown shiny staining on 1 face	
17.046	17.05: redeposited midden	4c	27b	limestone				x					62	42	22	ovoid	Both faces polished, but no staining. Poss. Hide rubber.	
2.244	2.05d: redeposited midden	5a	9a	dolerite				x					88	64	26	flat, ovoid	Small patch of red-brown staining	
2.117	2.05c: redeposited midden	5a	9a	arkose (torridonian)	x			x					130	61	33	long, oval	Dark staining & polish on faces, esp. concentrated along 1 edge of each side	x
15.085	15.25: hearth residues	5a	9b	leucogranite				x					33	24	18	ovoid	Dark glossy staining on both faces	
15.111b	15.25: hearth residues	5a	9b	quartzite	x			x					103	45	33	ovoid	2 linear dark brown stains on 1 edge & other patches of similar staining	x
2.246	2.05c: redeposited midden	5a	9b	microgranite	x	x		x					120	102	61	discoid	Both faces polished & slightly dark staining	
15.100	15.26: hearth residues	5b	9c	arkose (torridonian)				x					87	73	32	flat, ovoid	Dark brown shiny residues on 1 face	
15.090	15.18: hearth residues	5b	9c	arkose (torridonian)	x			x					109	50	28	ovoid	Dark brown shiny staining on 1 face	
15.096	15.18: hearth residues	5b	9c	dolerite/ basalt		x		x					122	48	31	long, oval	Linear shiny area down 1 edge	x
15.127	15.26: hearth residues	5b	9c	sandstone or quartzite (fine-grained)	x			x					117	75	28	flat, ovoid	Linear dark brown glossy stain down edge of 1face & other less-coherent dark shiny stains in various places	x
2.189	2.08: occupation deposit	5b	9c	arkose (torridonian)		x	x	x					99	59	32	ovoid	Polish & slightly darker colour on one face	
15.107	15.12: hearth residues	5b	9c	arkose (torridonian)	x	x		x					81	59	38	long, oval	Both faces polished & slightly dark staining	
2.188	2.08: occupation deposit	5b	9c	arkose (torridonian)	x	x	x	x				x				long, oval	Linear dark-stained facet down 1 edge	x

(Continued)

Table 12.28 Summary table of cobble tools: hide rubbers (Continued)

SF	*C*	*Ph*	*SB*	*Lithology*	*G*	*P*	*Ha*	*HR*	*Wh*	*WS*	*SL*	*Sh*	*L*	*W*	*D*	*Shape*	*Notes on wear/residues*	*Linear-stained group*
2.055	2.05: redeposited midden	5	9	–	x			x					145	85	69	ovoid	Linear red-brown stain down 1 edge	x
2.057	2.05: redeposited midden	5	9	arkose (torridonian)	x			x		x			86	68	31	flat, ovoid	Dark staining & polish on both faces	
14.036	14.11: redeposited burnt spreads	5	34	sandstone	x	x		x					70	56	28	ovoid	1 face shinier & slightly darker in colour	
15.019	15.11: redeposited burnt spreads	6a	10	arkose (torridonian)		x		x					51	40	37	ovoid? fragment	Brown shiny staining on 1 face	
15.271	15.08.01: hearth residues	6a	10	arkose (torridonian)				x		x			116	81	38	flat, ovoid	Patch of red staining on 1 side	
17.047	17.03: redeposited midden	6a	29a	arkose (torridonian)	x			x					86	42	46	ovoid? fragment	Black shiny staining on 1 face & 2 linear shiny dark red stains down 1 edge	x
HP1.136b	1.04: redeposited midden	6a	29a	diorite				x					67	54	30	flat, ovoid	1 face shinier & slightly darker in colour	
HP1.262	1.04: redeposited midden	6a	29a	–				x					79	61	21	flat, ovoid	1 face shinier & slightly darker in colour	
HP1.132	1.01: redeposited midden	6b	29c	microgranite		x		x					74	74	36	discoid	Dark brown-red staining around edge of 1 face	x
HP1.140	1.02: redeposited midden	6b	29c	microgranite	x			x					119	65	46	ovoid	Oval patches of dense dark brown staining on sides & 1 face	
HP1.131	1.01: redeposited midden	6b	29c	dolerite/ microgabbro				x					107	65	48	ovoid	1 face shinier & slightly darker in colour	
2.360	2.52: final deposit in cave at base of stairwell	6b	22a	microgranite	x			x					116	98	42	flat, ovoid	1 face shinier & slightly darker in colour	
2.036	2.03a: redeposited midden	7	11	arkose (torridonian)				x					116	115	21	sub-rectangular	1 face shinier & slightly darker in colour	
2.465	2.03a: redeposited midden	7	11	quartzite	x			x					90	78	37	flat, ovoid	Dark brown staining over whole stone, inc. linear stains	x
2.466	2.03a: redeposited midden	7	11	arkose (torridonian)	x			x					153	95	45	flat, ovoid	Dark brown shiny staining on 1 face	

Table 12.29 Summary table of cobble tools: burnishers

SF	C	Ph	SB	Lithology	Uses	L	W	T	Shape	Notes
2.491	2.15c: hearth debris	4c	8c	concretion in siltstone	1	92	37	23	sub-rectangular	Smooth, convex facets down edges with diagonal striations
19.055	19.05: redeposited burnt spreads	4	33	arkose (torridonian)	1	76	70	24	flat, sub-rectangular	Long, thin smoothed facets down edges & deliberately rounded corners. Some red staining on 1 side
19.039	19.02: redeposited burnt spreads	6b	35	arkose (torridonian)	1	124	83	27	flat, triangular	2 long, narrow, & smooth facets down 1 edge

Table 12.30 Summary table: strike-a-lights

SF	C	Ph	SB	Lithology	G	P	HR	Wh	SL	L	W	T	Shape	Notes
2.451	2.26a: hearth debris	3a	7a	sandstone (v fine-grained)	x				x	91	63	30	flat, ovoid	Several indistinct iron streaks across 1 surface
2.119h	2.30: hearth debris	4c	8c	dolerite	x	x		x	x	120	52	28	flat, ovoid	Indistinct linear striations across 1 surface
17.051	17.05: redeposited midden	4c	27b	quartzite					x	67	57	28	sub-triangular	2 parallel iron streaks on 1 side, 1 with 'return loop'
6.253	2.51: backfill of stairwell	5b	27c	quartzite					x	73	57	32	ovoid	Iron streaks & pitting across both faces

Sharpeners

Sharpening stones are identifiable by distinct surface grooves where points were drawn across in order to shape them. They could be used for bone, wood, of for finishing or sharpening metal blades. Seven examples were identified: two single function and six in combination with other wear-types (Table 12.32). The grooves are generally very fine and V-sectioned, suggesting they were for sharpening the tip of a point rather than the whole shank, which would have produced a wider, round-sectioned groove. The most common other type of wear present is grinding but only one example (SF15.257) has stratified wear-types, with grinding earlier than sharpening, making it difficult to interpret whether such sharpening stones were expedient or specially selected. Six of the eight sharpening stones are sandstone, the other two basaltic lava and limestone; all are known for their abrasive qualities. They were recovered from Phases 2–6 and predominantly from Trenches 2 and 15.

Palettes

Eleven palettes were found, two of which showed other forms of wear (Table 12.33; Fig. 12.30). Palettes were used for grinding or mixing substances such as pigments. They usually have concave smoothed wear on one or more flat surfaces, often accompanied by staining. They differ from whetstones in having concavity in two directions rather than one due to the circular grinding/mixing motion and tend to be broader with a larger stained surface. Eight of the palettes here have brown-red staining, suggesting they were used with pigments; in once case (SF2.540) this could be identified as haematite. Few show any other wear-types, indicating that palettes were specially selected tools.

Five were formed on unmodified flat cobbles whereas six have finely shaped edges: most were rectangular (4 examples), but there was also one fragmentary oval one and an unusual, handled disc-shaped palette (SF2.119e). One rectangular one (SF2.356) has concave long edges and incised decoration on the worked face, with two opposing 'V's creating a cross-like design. This is one of few decorated stone items from the site, the only others being spindle whorls. SF2.441 has been finely shaped and smoothed and is made from garnet mica schist, an attractive sparkly stone which gives it an ornamental quality; it was not available locally. The deliberate shaping, decoration, and lack of other wear-types indicates at least some palettes were specialist items and were likely to have been highly prized. The decorated and finely shaped palettes were possibly used to grind pigments or other substances as part of special events, while the unmodified types may have been for more everyday use. These may be precursors of the finely made polished stone discs known from the Roman Iron Age (for recent discussion, see Graham-Campbell and Hunter 2021, 233–7).

Table 12.31 Summary table: whetstones

SF	C	Ph	SB	Lithology	G	P	Ha	HR	Wh	WS	SL	Sh	L	W	T	Intact Y/N	Shape	Notes	Whetting points
6.504	6.09: redeposited midden in cave	2a	25a	–					x				83	40	8	y	Flat, sub-rectangular	1 face concave & smoothed. Shape of stone entirely modified, with all edges having been abraded until squared. Shaping likely to have been decorative rather than through use	1
2.548	2.72: fill of cave entrance	2a	3	Sandstone (fine-grained)					x				195	48	35	y	Long rectangular	1 edge & poss. 1 face smoothed & concave	1/2
6.378	6.07: redeposited midden in cave	2b	25c	Microgranite					x				110	74	22	n	Flat, sub-rectangular	1 edge smoothed & concave	1
15.436	15.64: redeposited hearth debris	3b	7b	Sandstone (fine-grained)					x				152	74	24	y	Flat, sub-rectangular	Both faces & both edges concave, smoothed & iron-stained	4
15.410	15.64: crushed limestone surface	3b	7b	Sandstone (fine-grained)	x				x				125	72	23	y	Irregular	1 face smoothed & concave	1
15.401	15.83: redeposited hearth debris	3d	7d	Sandstone (fine-grained)					x			x				y	Sub-rectangular	3 edges smoothed & iron-stained, 1 is concave	3
15.405	15.83: redeposited hearth debris	3d	7d	Sandstone (fine-grained)					x				139	99	40	n	Sub-rectangular	Both faces smoothed % slightly concave	2
15.387	15.56: redeposited hearth debris	3e	7e	Sandstone (fine-grained)		x			x				84	50	28	n	Fragmentary	2 edges & 2 faces smoothed & concave	4

(Continued)

Table 12.31 (Continued)

SF	C	Ph	SB	Lithology	G	P	Ha	HR	Wh	WS	SL	Sh	L	W	T	Intact Y/N	Shape	Notes	Whetting points
2.439	2.16: debris from forecourt hearths	4a	8a	Arkose (Torridonian)					x				72	19	35	n	Long, ovoid	1 face & 1 edge smooth & concave, staining	2
2.094	2.16: debris from forecourt hearths	4a	8a	Quartzite	x			x	x				130	71	28	y	Flat, long, ovoid	1 face concave, smoothed & polished	1
15.139	15.48: hearth debris in forecourt	4b	8b	Sandstone									107	107	20	n	Fragmentary	2 faces & 1 edge smoothed & concave	3
2.119c	2.30: debris from forecourt hearths	4c	8c	Dolerite	x	x			x				157	64	26	y	Long, sub-rectangular	Both faces smoothed & concave	2
2.119h	2.30: debris from forecourt hearths	4c	8c	Dolerite	x	x			x		x		120	52	28	y	Flat, ovoid	1 face concave & smoothed	1
2.126	2.31: debris from forecourt hearths	4c	8c	Arkose (Torridonian)		x			x	x			153	79	53	y	Flat, long, ovoid	Both faces smoothed & slightly concave	2
19.116	19.11: redeposited burnt spreads	4	33	Sandstone					x				45	29	17	n	Fragmentary	3 faces concave & smoothed with longitudinal fine striations	3
2.068	2.05d: redeposited midden	5a	9a	Dolerite	x	x			x				122	70	44	y	Ovoid	1 face concave, smoothed & polished	1
2.072	2.05d: redeposited midden	5a	9a	Arkose (Torridonian)					x				133	78	37	y	Sub-rectangular	1 face concave, smoothed & polished	1
2.116	2.05c: redeposited midden	5a	9b	Quartzite	x				x				117	66	32	y	Ovoid	1 face concave, smoothed & polished	1
2.239	2.05c: redeposited midden	5a	9b	Microgranite					x				166	39	25	y	Long, sub-rectangular	1 face concave, smoothed & polished	1

(Continued)

Table 12.31 Summary table: whetstones (Continued)

SF	*C*	*Ph*	*SB*	*Lithology*	*G*	*P*	*Ha*	*HR*	*Wh*	*WS*	*SL*	*Sh*	*L*	*W*	*T*	*Intact Y/N*	*Shape*	*Notes*	*Whetting points*
15.108	15.24: redeposited hearth debris	5b	9c	Quartzite					x				119	68	51	y	Irregular	1 face concave & smoothed.	1
5.018	5.07: redeposited burnt spreads	5	34	Dolerite					x				80	19	18	y	Long, ovoid	2 faces smoothed, polished & concave	2
2.053	2.03b: redeposited midden	6a	10	Arkose (Torridonian)		x			x				107	76	22	y	Flat, ovoid	1 face concave, smoothed & polished	1
HP1.251	1.02: redeposited midden in cave	6b	29c	Microgranite	x				x				120	66	35	y	Ovoid	On1e face smoothed & concave. Calcite deposits on surface	1
6.15	6.02: redeposited midden in cave	6b	29c	–		x			x				104	34	17	y	Long, ovoid	Both faces smoothed & slightly concave	2
HP1.253	1.01: redeposited midden in cave	6b	29c	Porphyritic dolerite		x	x		x	x						y	Flat, ovoid	1 face smoothed & concave	1
19.001	19.01: turf & topsoil	6b	35	Arkose (Torridonian)					x				46	55	10	n	Fragmentary	2 faces smoothed & concave	2
19.088	19.01: turf & topsoil	6b	35	Arkose (Torridonian)					x				33	28	19	n	Fragmentary	1 edge & 1 face smoothed & concave	2
19.010	19.01: turf & topsoil	6b	35	Sandstone		x			x				129	60	30	y	Long, ovoid	1 face concave & smoothed	1
3.003	3.01: turf & topsoil	7	11	Arkose (Torridonian)	x	x			x				110	65	32	y	Flat, ovoid	1 face slightly concave & smoothed	1
2.038	2.03a: redeposited midden	7	11	Arkose (Torridonian)		x	x		x	x			133	79	28	n	Long, sub-rectangular	Both faces smoothed & slightly concave	2
14.29	14.31: turf & topsoil	8	36	Microgranite												n	Fragmentary	Red & black staining.	2







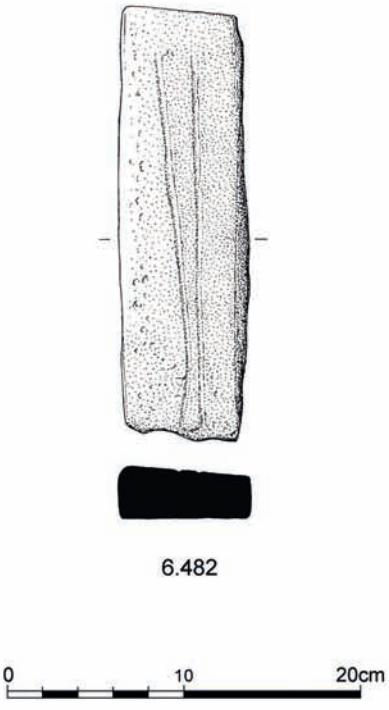


Figure 12.29. Stone tools: whetstones SF2.548, SF5.018, SF15.401; sharpening stone SF6.482

Table 12.32 Summary table: sharpening stones

SF	*C*	*Ph*	*SB*	*Lithology*	*G*	*P*	*Ha*	*HR*	*Wh*	*Sh*	*L*	*W*	*T*	*Shape*	*Notes*
6.482	6.08: redeposited midden	2a	25a	Sandstone (fine-grained)						x	242	75	32	Flat, sub-rectangular	Several deep grooves over 1 face
2.444	2.20: hearth debris	3d	7d	Sandstone (fine-grained)	x					x	148	71	26	Flat, ovoid	Clear, fine, diagonal groove across 1 face
15.401	15.83: hearth debris	3d	7d	Sandstone (fine-grained)					x	x				Sub-rectangular	Single diagonal groove over 1 face
15.380b	15.56: redeposited hearth debris	3e	7e	White sandstone (fine-grained)	x	x				x	142	92	23	Flat, sub-diamond	Deep longitudinal grooves on 1 face
2.472	2.15c: hearth debris	4c	8c	Basaltic lava						x	117	53	27	Sub-triangular	Multiple fine grooves over 1 face
2.188	2.08: occupation deposit	5b	9c	Arkose (Torridonian)	x	x	x	x		x				Flat, long, ovoid	3 distinct longitudinal grooves across surface
2.410	2.03a: redeposited midden	7	11	Limestone	x	x				x	125	57	33	Ovoid	Deep, diagonal, & longitudinal grooves across 1 face & 1 edge

The palettes were recovered from Phases 3–8, with no difference in phase distribution between modified and unmodified types. All the modified palettes were recovered from Trench 2 apart from one which was unstratified, while the unmodified palettes were recovered from Trenches 2, 6, 14, and 15. The concentration of modified palettes around the cave entrance is further evidence of their special status and suggests they are likely to have been deliberately deposited.

Work surfaces

Seventeen stone artefacts display pecking or cuts on one or more faces indicative of use as a working surface (Table 12.27; Fig. 12.30). The wear is on a flat surface rather than an end or edge (which would be more typical of a pounder). Most are cobbles but one, SF2.191, is a large boulder with smooth, dished surface, suggesting it may have been part of paving or steps and repeatedly walked over as well as seeing expedient use as a work surface. These artefacts will have had a range of functions, combining roles as an anvil and chopping board. Only three (SF2.045, 2.191, 7.014) had solely been used as work surfaces, though one (SF2.191) had evidently been a paving stone, suggesting they were chosen expediently as required. Where other wear is stratified with work surface use, the work surface is always the latest. They were recovered from Phases 3–7 and mostly from Trench 2 (9).

Multi-functional tools

Tools displaying a combination of wear-types indicative of two or more functions are classed as multi-functional cobble tools (Figs 12.32–4). These are far more numerous than any single function tool in the assemblage. The individual wear-types are all discussed under the cobble tool categories above, but it is worth examining the group as a whole to determine which combinations of wear most commonly occur together, and whether there is any spatial or chronological patterning which may aid our understanding of activities and depositional traditions at the site.

In total, 119 multi-function cobble tools were recovered, mostly with two different wear-types (77). Twenty-three stones have three wear-types, five have four, and a single stone displays five different wear patterns. There is a general increase in the number of wear-types found on each stone from Phase 2–4/5 (Fig. 12.33) and the most extensively used cobble tools were found in Trenches 1, 2, and 15, in and around the cave (Fig. 12.34).

Thirty-one different combinations of wear-types occur on the multi-functional cobble tools, with three standing out as most common: grinding/pounding (54), grinding/hide rubbing (26) and pounding/hammering (23). Twenty-one combinations only occur one or two times, suggesting coincidental, expedient use caused the wear combination. The high incidence of grinder/pounder and pounder/hammers is unsurprising as both types of action were probably undertaken simultaneously during the same

Table 12.33 Summary table: stone palettes

SF	*C*	*Ph*	*SB*	*Lithology*	*G*	*P*	*Ha*	*Pal*	*L*	*W*	*T*	*Shape*	*Notes*
2.540	2.70: fill of first Ph stairwell	3a	19	Arkose (Torridonian)				x	78	54	17	Flat, fragmentary	Ground facets along edges from shaping. Both faces smoothed, concave & have reddish-orange staining
2.441	2.18: hearth debris in forecourt	3e	7e	Garnet mica-schist				x	57	50	7	Flat, sub-rectangular	Rounded & faceted edges from shaping. 1 face concave & smoothed with hints of red staining
15.380e	15.56: hearth residues	3e	7e	White Sandstone (fine-grained)				x	139	95	23	Flat, sub-triangular	Both faces smoothed & concave
2.119a	2.30: hearth debris	4c	8c	Microgranite				x	107	97	23	Flat, sub-rectangular	All 4 sides have been neatly shaped by abrasion. Both faces flat & polished.
2.119e	2.30: hearth debris	4c	8c	Sandstone (fine-grained)				x	135	81	9	Discoid with handle	A disc with chipped & ground edges; 1 edge extends out before breaking, suggesting it had a handle
2.421	2.15a: hearth debris	4c	8c	Arkose (Torridonian)				x	160	108	24	Flat, ovoid	1 face with smoothed & stained red-brown area
2.064	2.05: redeposited midden	5	9	Arkose (Torridonian)	x	x	x	x	145	97	33	Flat, sub-rectangular	1 face has dark staining & polish
14.027	14.15: redeposited clay	5	34	Arkose (Torridonian)				x	200	97	26	Flat, sub-rectangular	2 smooth concave faces with dark red staining & striations.
HP1.252	1.01: redeposited midden in cave	6b	29c	Microgranite		x		x	151	105	28	Flat, sub-rectangular	1 face shiny & stained red-brown
2.356	2.52: final deposition at base of stairwell	6b	22a	Fossiliferous mudstone				x	70	47	8	Flat, sub-rectangular	Edges entirely shaped to rectangle with concave, long sides; 1 surface has cross-like decoration formed by 2 opposing incised 'V's. This face also smoothed & stained brown

tasks. However, the common combination of grinding and hide rubbing is interesting and suggests grinding was also a part of the hide working process.

Stone and bone spindle whorls
Lynne McKeggie

Excavation recovered a number of perforated stone and bone items, interpreted as spindle whorls. These stand out from the rest of the stone assemblage in several ways. First, their function is usually clear, aside from the few where size or irregularity suggests they may be beads or weights. Secondly, their shape is entirely modified, suggesting a great deal more effort went into their creation than most other stone artefacts. Thirdly, all are made of steatite (talc schist) apart from one in siltstone (SF15.138); steatite is not found on Skye. Either the whorls or the raw material must have been imported, though not necessarily from very far away as there is a source at Glenelg on the Scottish mainland. Finally, some of the whorls bear simple incised decoration, which is rare amongst the stone assemblage and marks them out as special.

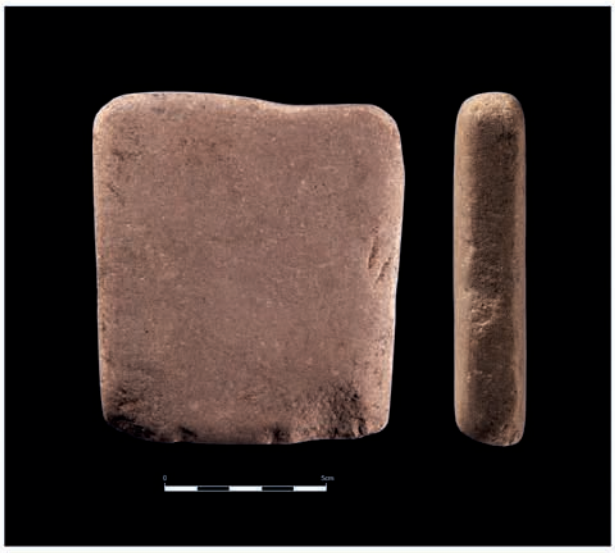










Figure 12.30. Stone tools: palettes & work surfaces SF2.119a, SF2.540, SF19.001; sharpening stone SF2.472; burnisher SF19.055

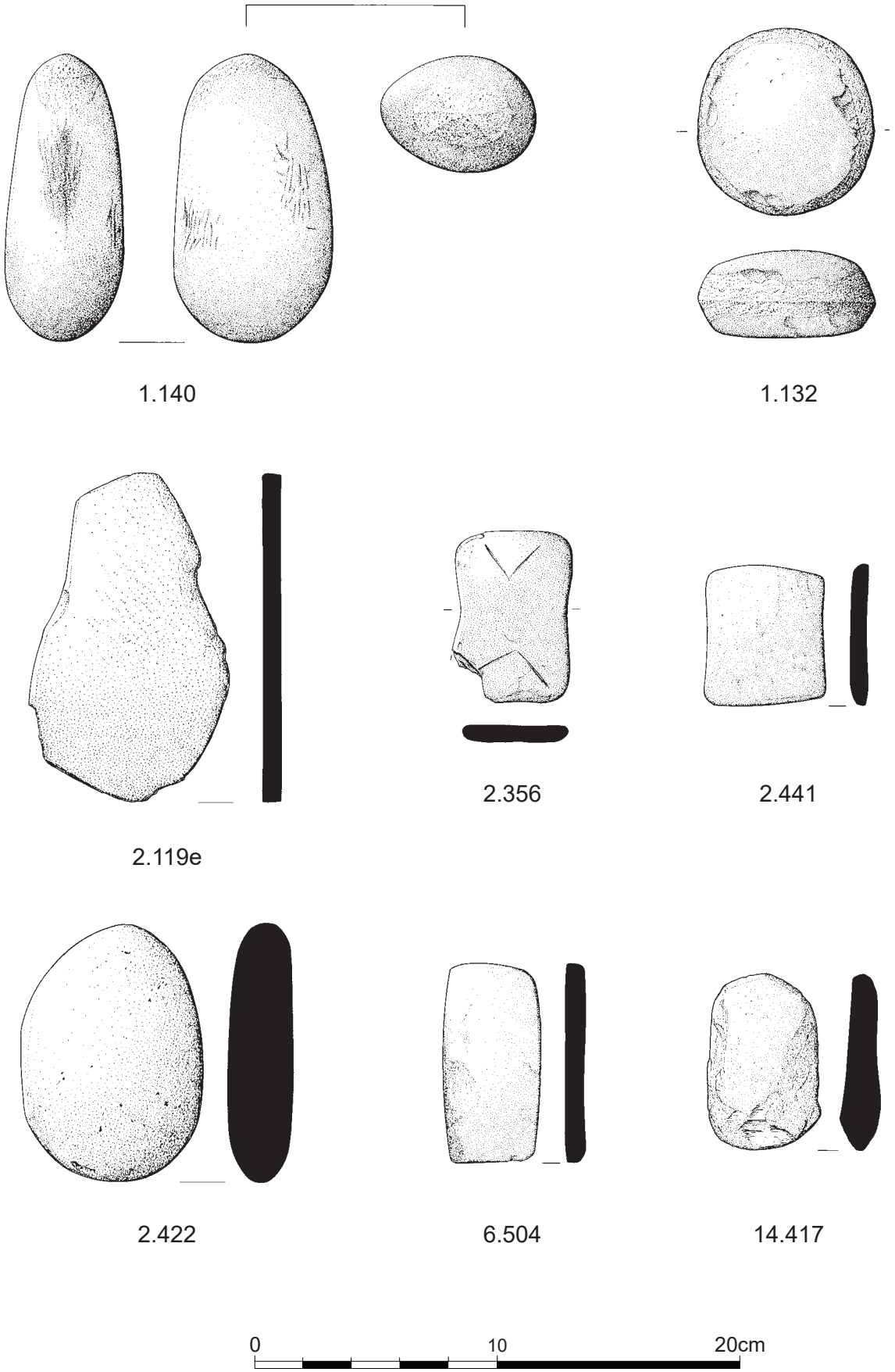


Figure 12.31. Stone tools: SF1.140, SF1.132, SF2.119e, SF2.356, SF2.441, SF2.422, SF6.504, SF14.417

Table 12.34 Summary table: stone work surfaces

SF	*C*	*Ph*	*SB*	*Lithology ID*	*G*	*P*	*Ha*	*HR*	*Wh*	*WS*	*L*	*W*	*T*	*Shape*	*Notes*
15.437	15.64: hearth residues	3b	7b	Dolerite		x				x	144	81	33	Flat, ovoid	1 face & edge have concentrations of pecking
2.442	2.18: debris from hearths in forecourt	3e	7e	Dolerite	x	x				x	132	83	29	Flat, ovoid	Scattered peckmarks on both faces
2.505a	2.18: debris from hearths in forecourt	3e	7e	Sandstone (fine-grained)		x	x			x	128	94	28	Flat, sub-rectangular	Small concentration of peckmarks on 1 surface
2.119d	2.30: debris from hearths in forecourt	4c	8c	Dolerite	x	x				x	130	72	37	Flat, ovoid	Shallow indistinct scratches over both faces & oval pecked areas on 1
2.119f	2.30: debris from hearths in forecourt	4c	8c	Dolerite	x			x		x	145	56	30	Long, ovoid	Bands of pitting down sides
2.126	2.31: debris from hearths in forecourt	4c	8c	Arkose (Torridonian)		x			x	x	153	79	53	Flat, ovoid	1 side has scattered pecking
15.137	15.43: debris from hearths in forecourt	4c	8c	Siltstone		x	x			x	132	91	30	Flat, ovoid	Concentration of pecking on 1 face
19.049	19.05: burnt spreads	4	33	Arkose (Torridonian)	x		x			x	88	64	38	Ovoid	Concentrations & scatters of pecking on both faces & edges
2.191	2.08: occupation deposit	5b	9c	Quartzite						x				Ovoid	Series of distinct short scratches & few peckmarks on surface
2.057	2.05: redeposited midden	5	9	Arkose (Torridonian)	x			x		x	86	68	31	Flat, ovoid	Scatter of peckmarks on 1 surface
15.271	15.08.01: hearth residues	6a	10	Arkose (Torridonian)				x		x	116	81	38	Ovoid	Concentration of pecking on 1 face
2.045	2.03b: redeposited midden	6a	10	Dolerite						x	124	55	54	Ovoid	Irregular but distinct peckmarks over much of faces
HP1.257	1.04: redeposited midden in cave	6a	29a	–		x				x	98	83	39	Flat, ovoid	1 face shows small concentration of indistinct peckmarks
HP1.120	1.01: redeposited midden in cave	6b	29c	Pyroxenite			x			x	175	83	59	Ovoid	1 face & both sides have irregular, deep peckmarks
HP1.253	1.01: redeposited midden in cave	6b	29c	Porphyritic dolerite		x	x		x	x				Ovoid	2 concentrations of peckmarks on 1 face
2.038	2.03a: redeposited midden	7	11	Arkose (Torridonian)		x	x		x	x	133	79	28	Sub-rectangular	Oval scatters of peckmarks on both faces
7.014	7.03: redeposited topsoil	7	11	Sandstone						x	139	103	34	Flat, ovoid	Scattered pecking across 1 face



Figure 12.32. Stone tools: multi-functional cobble tools SF2.247, SF2.402, SF2.410, SF2.442, SF2.451, SF2.453, SF2.467, SF2.479, SF15.106, SF15.321, SF15.410, SF15.419, SF19.110

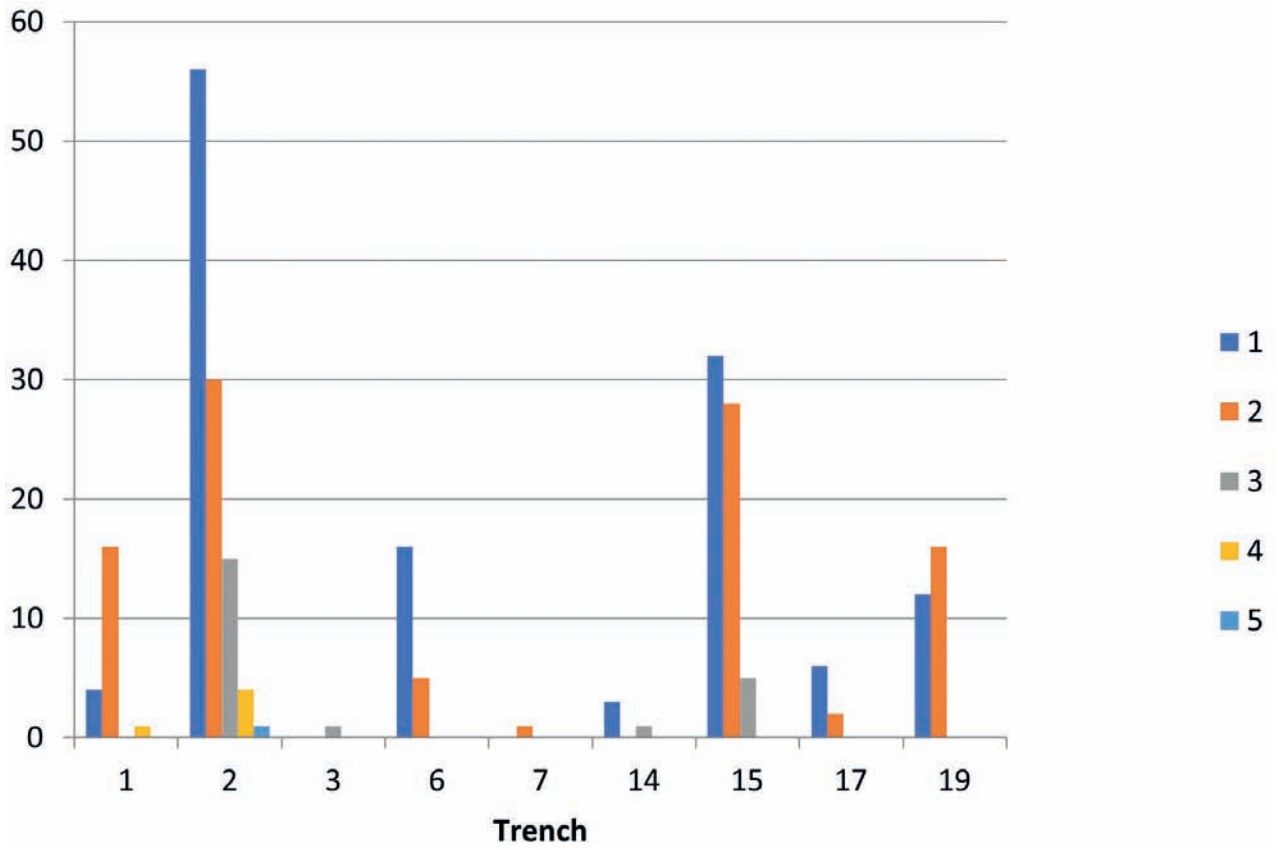


Figure 12.33. The distribution of number of wear-types present on each stone by phase

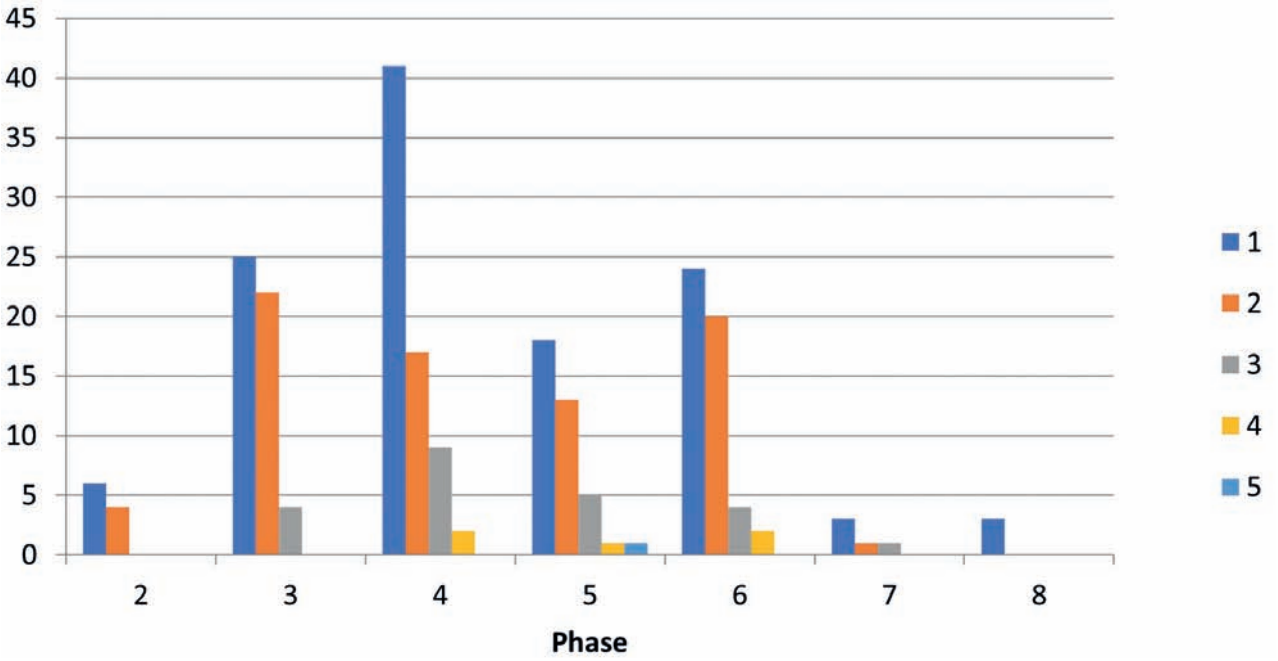


Figure 12.34. The distribution of number of wear-types present on each stone by trench

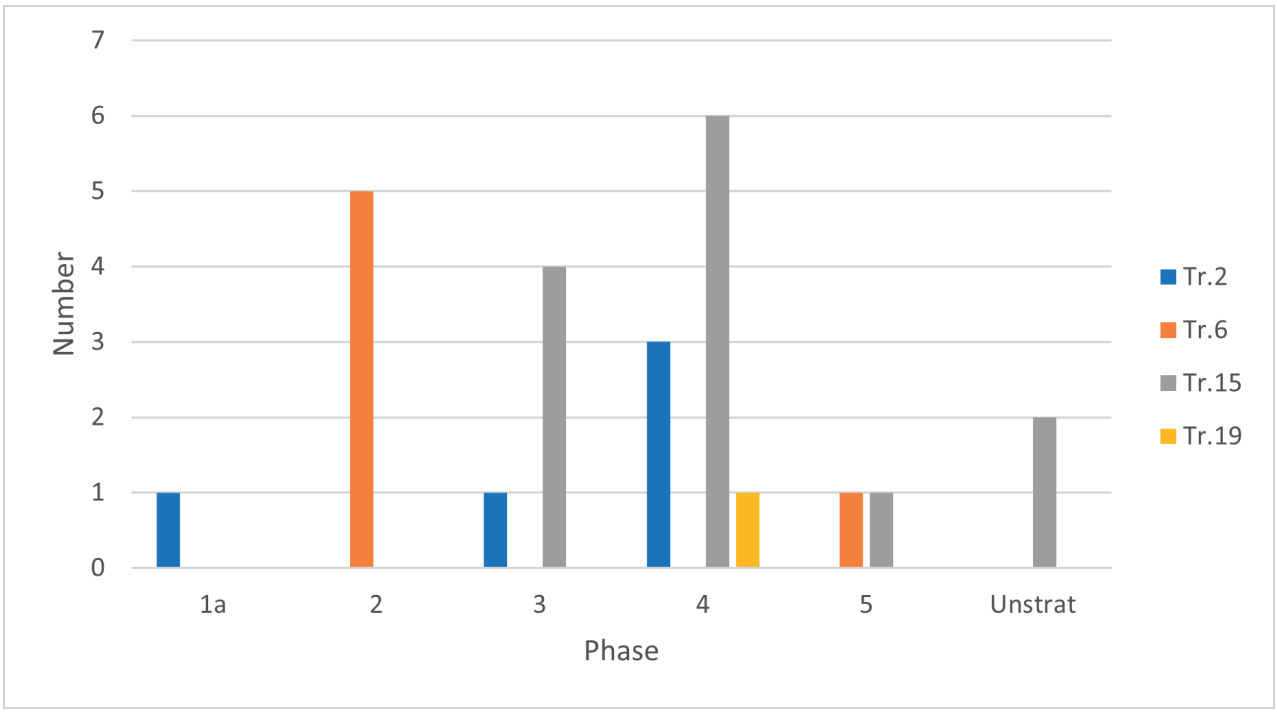


Figure 12.35. Distribution of spindle whorls by phase & trench

Of the 25 stone spindle whorls (Table 12.35), a group of four was found in a cache in Trench 6, while 13 others were recovered in close proximity to each other in Trench 15, strongly suggesting they had been placed as a cache and later disturbed. Whorls were recovered from Phases 2–5, with only two examples from Phase 5, suggesting the deposition of spindle whorls was a tradition during the earlier phases of the site but not the later. Figure 12.35 illustrates the phase and trench distribution of the spindle whorls. This shows a distinct cluster in Trench 6 during Phase 2 and a more diffuse pattern of whorl deposition in Trench 15 from Phases 3–5.

Items defined as spindle whorls were those which, when complete, had an approximately central perforation of 4–15 mm diameter and weight of 10–60 g. This range of perforation size and weight encompasses the qualities necessary for a functioning spindle whorl but the definition is loose enough to incorporate the wide range of shapes and sizes that whorls can be. These parameters are similar to those used by Walton Rogers in assessing English spindle whorls (2007, 24).

Spindle whorls are weights which aid the process of producing spun yarn from animal fleece or vegetable fibres. The central perforation allows the whorl to be fitted on a wooden spindle, usually a cylindrical length of wood up to *c.* 30 cm, often with a broader 'hip' to wedge the whorl into position (Earwood 2006, 134–5). The whorl then acts as a fly wheel lending the spindle more inertia as it is spun to introduce twist to the raw fleece or fibre. Whilst yarns can be produced by rolling or twisting without a spindle, it is a much slower process. This, alongside the relatively high number of whorls recovered from archaeological sites, suggests that spinning with a spindle and whorl was the principal method of yarn production in the home throughout Europe from the Neolithic to the modern era, even following introduction of the spinning wheel.

Two of the 35 artefacts from High Pasture examined were considered to be beads (SF2.549 and SF6.375) and one a weight (SF2.023). This left 32 artefacts: 25 stone and 6 bone. All were measured, weighed, and inspected for production or wear marks. Several are unfinished, with no central perforation or toolmarks left visible. Others are broken, usually with approximately half the artefact surviving, and estimates of their original measurements were made.

Production

The majority (24) of the whorls are made of 'steatite', commonly called soapstone due to its workable nature when freshly quarried. The material is better termed talc schist or, in one case, actinolite schist (McGibbon, above). A steatite source is reported at Glenelg and most of these whorls were probably produced locally, although the actinolite schist is non-local.

The stone whorls display clues to production. The hour-glass shape of many central perforations shows that the hole was produced by drilling both faces. This helps ensure that the base of the whorl does not fracture when the drill passes through, but can lead to slight misalignment, as was evident in many. Circular wear patterns within perforations suggest a circular motion during

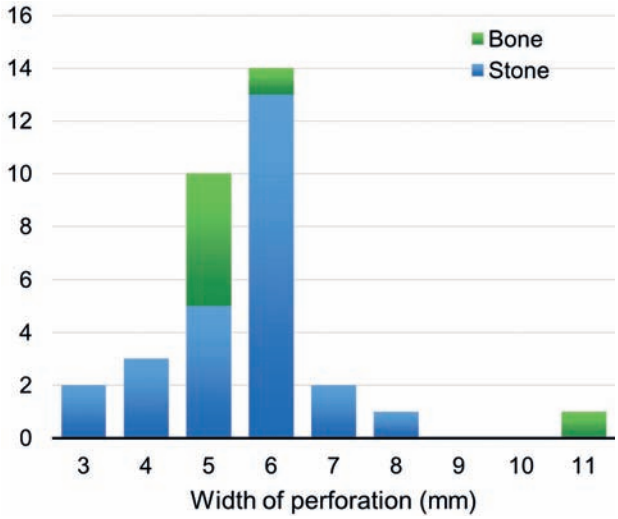


Figure 12.36. Perforation width in spindle whorls examined

production, for instance from the use of a wooden bow drill with sand to abrade the soapstone, or possibly a knife used in a twisting motion. The hour-glass shape was not necessarily a hindrance in fixing a whorl to a shaft as a hipped shaft may have incorporated the angle fairly well, and the narrow 'waist' of the perforation could help wedge the whorl into position.

It is possible that this method was also helpful in controlling the width of the perforation, which is remarkably consistent across the assemblage. Of the 33 artefacts with perforations, 24 have a perforation width of 5–6 mm (Fig. 12.36). When the three artefacts considered unlikely to be spindle whorls are removed, 28 of 30 whorls have central perforations of 4–7 mm. This is significant, as the common range for perforations is anywhere between 4 mm and 12 mm, so the tighter range of the High Pasture whorls is notable. Walton Rogers suggests that, in England, average whorl perforation gets steadily wider through time, from 4–6 mm in the pre-Roman Iron Age to *c.* 8 mm in the Saxon era and up to 10–12 mm in the later medieval period (Walton Rogers 2007). While the High Pasture whorls broadly fit this chronology, more work is needed to suggest a wider trend. However, it may suggest something about the design of spindle favoured by the people producing these whorls in Iron Age Skye: a narrow perforation indicates a narrow spindle. What methods would be necessary to produce a spindle shaft as narrow as 4 mm? Does this suggest a method or tradition for spindle style for this region? It may also suggest that consistency was desired, perhaps in order to 'stack' different whorls on a shaft for production of various thicknesses of yarn.

The craftsmanship of the whorls is markedly varied: some are beautifully shaped into even discs with very central perforations, with others only roughly shaped with poor perforations, some of which barely meet. In unfinished whorls, knife marks are visible on faces and sides from carving the whorls to shape (Fig. 12.37).

Considering the possible variety, form is fairly consistent. The stone whorls are usually discoid with relatively flat faces and slightly curving or flat sides. The six bone whorls utilise the head of a femur or humerus, mostly resulting in a bun-shaped whorl with a curved top, angled sides, and a flat base. This strategy made use of a good, hard-wearing portion of bone, but careful selection was required: one (SF15.192) was crafted from a femur head not fully fused and a portion of the whorl has come away, leaving a whorl too light to function at a mere 5 g. This was probably a mistake, as the bone whorls are on average larger than the stone in order to achieve a broadly similar weight.

One stone and one bone artefact are the right size and shape to be spindle whorls but lack a central perforation (SF6.531 and SF2.124), but with slight depressions where the perforation would be. This suggests that shaping was completed prior to the perforation being drilled, contrary to the assumption that drilling – the riskiest part of the production process – would be completed first.

Two stone whorls are decorated with incised lines. SF.15.382 is adorned with two concentric circles around the central perforation on each side. These lines are fairly deep, although not particularly even (Fig. 12.38). SF.2.132 has a single line deeply incised around the edge of the whorl (Fig. 12.39). It is noteworthy that both artefacts are adorned in a way which complements the rotational movement of the whorls.

Use

Both the shape and weight of a spindle whorl have significance to the spinning process. The combined weight of spindle, whorl, and yarn already spun will have some effect upon the thickness of the thread produced. A heavy spindle cannot be suspended from a very fine thread, whilst a light spindle will quickly lose momentum when trying to spin a thick yarn. A spindle (with whorl) could be anywhere between 10 g (which would benefit production of a very fine thread) and 60 g (which would help produce a thick thread).

The whorls from High Pasture fall in the lighter range (10–24 g; Figs 12.40, 12.41). This suggests that, when combined with a spindle, they would be used to produce fine to medium width thread suitable for sewing and weaving. Some grouping in the weights may suggest that there were more desirable weights used to produce a particular thickness of thread consistent across many spindles. However, the skill and methodology of the spinner will have the greatest impact upon the thread produced (Kania 2013).

Whorl shape, in particular height and width, has an impact upon the way the spindle behaves while spinning. A wide, flat whorl will spin for longer but more slowly, thus is best suited to long fibres and thicker yarn.

Table 12.35 Summary table: stone spindle whorls

SF	*C*	*Ph*	*SB*	*Weight (g)*	*max D*	*min D*	*max H*	*min H*	*Ratio*	*Type*	*Perf D*	*Notes*
6.484	6.08: redeposited midden in cave	2a	25a	7*	28		9		1/3.1	B2	6	Unfinished
6.488a	6.08: redeposited midden in cave	2a	25a	19	32		9		1/3.5	B1/2	6	
6.531	6.08: redeposited midden in cave	2a	25a	16	28	26	10		1/2.8	B1		Unfinished
6.418	6.09: redeposited midden in cave	2a	25a	24	30		12		1/2.5	B1	6	Unfinished
6.480	6.07: redeposited midden in cave	2b	25c	17	30		12		1/2.5	B2	7	Slightly squint perforation
15.183	15.65: hearth residues in forecourt area	3b	7b	18	31	30	9	8	1/3.4	B1	4	Unfinished
15.415	15.64: hearth residues	3b	7b	18	29		11		1/2.6	B1	5	Unfinished
2.132	2.27: silting in forecourt outside cave	3c	7c	18	30	27	10		1/3.0	B2	6	Decorated with incised line around edge. Slightly squint perforation
2.522	2.18: hearth residues	3e	7e	14	26		13	11	1/2.0	B3?	4	Perforation slightly squint & misaligned
15.382a	15.56: hearth residues	3e	7e	16	27		10		1/2.7	B2	6	Decorated with incised lines around perforation on both faces
15.382b	15.56: hearth residues	3e	7e	22	36	34	10	8	1/3.6	B2	7	
2.437	2.16: hearth residues in forecourt area	4a	8a	11	24	23	11	10	1/2.2	B1	5	Unfinished
15.389	21.10: stairwell fill	4a	21b	13	28		9		1/3.1	B2	6	Slightly squint perforation
2.469	2.15b: hearth residues	4c	8c	22	33		10		1/3.3	B2	6	
2.47	2.15b: hearth residues	4c	8c	14	32	29	8		1/4.0	B2	6	
15.123	15.38: hearth residues in forecourt area	4c	8c	21	34		9		1/3.7	B1	6	
15.126a	15.39: collapsed enclosure wall	4c	8c	14	28		8		1/3.5	B1	4	
15.126b	15.40: pit fill	4c	8c	16	31		9	7	1/3.4	A2	6	
15.138	15.43: hearth residues in forecourt area	4c	8c	19	37	34	11	8	1/3.4	A2	6	Perforation slightly misaligned
15.346	2.15b: hearth residues	4c	8c	13	28		8		1/3.5	B2	6	Faint incised line around perforation
19.051	19.05: redeposited burnt spreads	4	33	13	29		9	8	1/3.2	B2	6	Unfinished
15.336	15.25: hearth residues	5a	9b	18	30	28	12	11	1/2.7	B1	8	
6.191	6.05: redeposited midden	5b	27c	21	30		11		1/2.7	B1	6	
15.065	Unstratified - section collapse	-	-	18	33	32	9		1/3.7	B2	5	Slightly squint perforation
15.067	Unstratified - section collapse	-	-	14	33	31	7	5	1/4.7	A2	5	



Figure 12.37. Spindle whorl SF2.437



Figure 12.38. Spindle whorl SF15.382



Figure 12.39. Spindle whorl SF2.132

A tall, narrow whorl which holds its weight close to the shaft will spin faster but lose momentum quicker and is suited to shorter fibres and narrower yarns.

No correlation was found between the height:width ratio of the whorls and their weight. This implies that they were not being produced to conform to a pre-defined set



Figure 12.40. Spindle whorl SF6.191

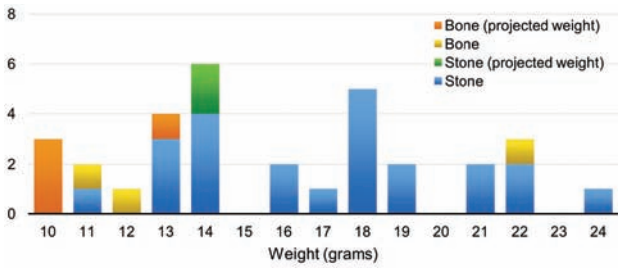


Figure 12.41. Weights & projected weights of spindle whorls

of dimensions based upon the desired yarn product. Most of the whorls fall between 1:2.5 and 1:3.5 height:width ratio, which would afford a good general purpose whorl.

Many are polished to a smooth finish with the odd irregular indentation (Fig. 12.40). This was likely acquired through regular handling and use rather than production, particularly given that steatite polishes easily. Indentations and irregular edges are frequent occurrences on the outer edges of spindle whorls used in the 'drop spinning' method (where the spindle is left suspended from the thread) as it can drop to the ground if the spun thread draws apart or breaks. The dent marks on the sides of these whorls may therefore suggest this rather than the 'supported' method of spinning, where the spindle is spun while resting upon a surface.

Concluding remarks

This remarkable assemblage is highly unusual for this period in its quantity. Whilst a cache of 25 spindle whorls was reportedly discovered at Glenelg, there is no contextual information or even dating for the find (https://her.highland.gov.uk/Monument/MHG5280). This assemblage provides an excellent opportunity to explore a group of 31 whorls from a secure context and identifiable period.

As a group (Fig. 12.42) the whorls are remarkably consistent in shape, size, weight, and most notably perforation size. Whilst they are by no means identical, the similarities are stark given the array of shapes and sizes possible.

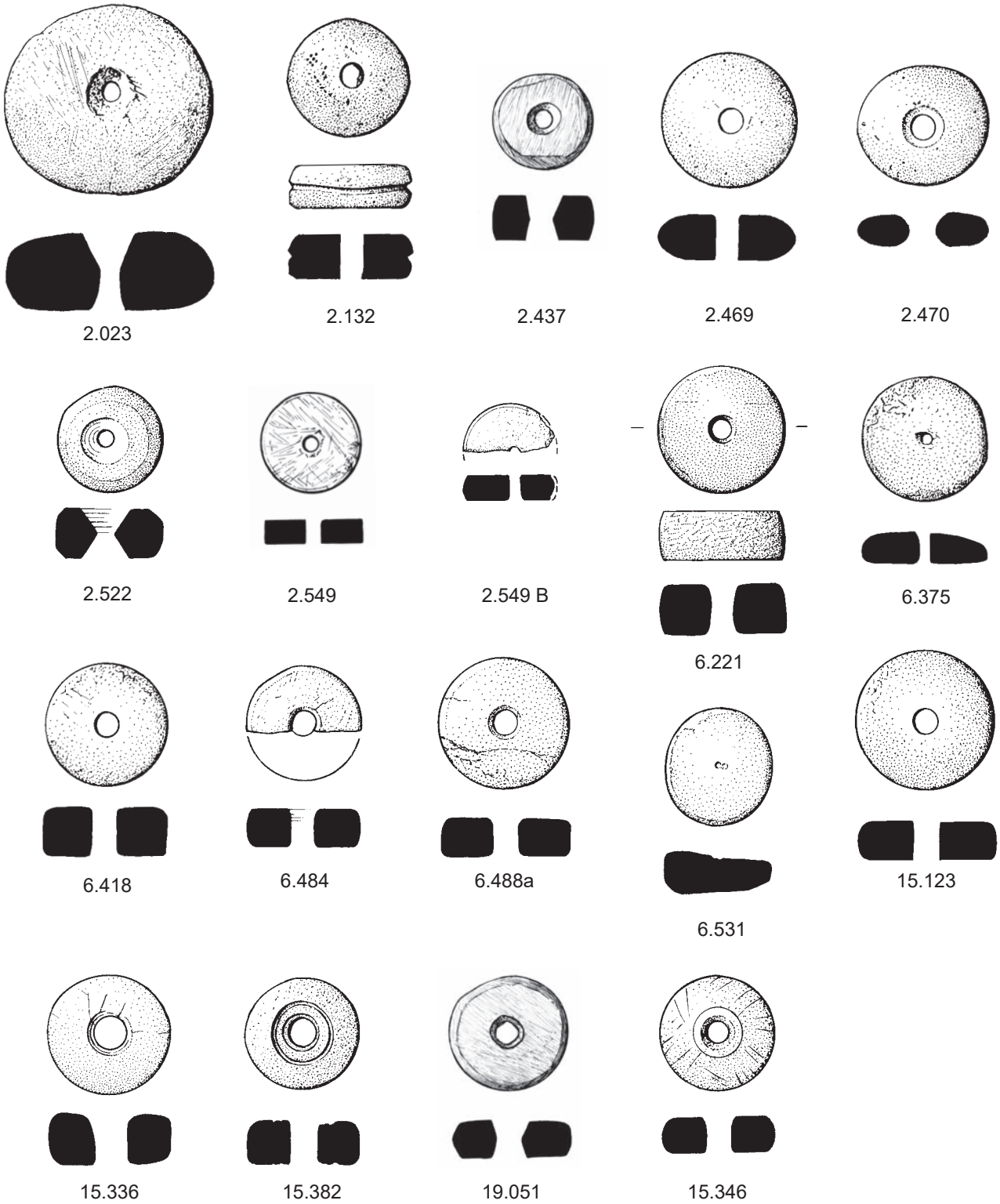


Figure 12.42. Stone spindle whorls

Table 12.36 Summary table: stone amulets or gaming pieces

SF	*C*	*Ph*	*SB*	*Lithology*	*Description*
6.511b	6.08: redeposited midden in cave	2		Hornfels (mudrock)	Amulet or gaming piece? Small ovoid banded pebble, polished throughout, perhaps as result of handling. L 27.5 W 22.5 T 15 mm. L 27.5, W 22.5, T 15. HPC 06, TR6, C.6.08
?	2.03: redeposited midden	6		–	Possible gaming pieces? 2 small quartz-rich pebbles. No obvious signs of use but v. similar in size & shape. L 27.5, W 24, T 18, L 26 W 23.5 T 18.5 mm. HPC 05, TR2, C.2.03, trench 2 ext.
2.079	2.03a: redeposited midden	7	11	Quartzite	?Gaming piece. Small flat ovoid quartzite pebble with slight sheen throughout surface, poss. through handling although may be natural. L 23, W 19, T 12.5. HPC 05, TR2, C.2.03 (feature 204, pit). 'pebble from between cobbles/stones'
?	2.04: redeposited midden	7	11	–	Gaming pieces? 2 small quartz-rich pebbles. No obvious signs of use but v similar in size & shape. L 27.5, W 24, T 18, L 26 W 23.5 T 18.5 mm. HPC 05, TR2, C.2.03, trench 2 ext

This suggests a tradition dictating how a spindle whorl should be in the communities interacting with High Pasture Cave during its use. This is likely rooted in the style of spindles manufactured and the thread types desired, most likely fine to medium threads suitable for sewing and weaving.

Finally, the deliberate deposition of these artefacts provides a unique opportunity to explore whorls at various stages of production and use, from unfinished blanks through perfectly functioning whorls to items that are broken and have ended their useful life. The highly polished patina of some highlights that these were regularly used items, a key part of life for the people around High Pasture Cave, and their placement around this highly ritualised site attests to their significance.

Amulets or gaming pieces?

Four small, smooth, ovoid pebbles are interpreted as probable amulets or gaming counters due to their small size and aesthetic qualities, though none shows any signs of shaping or wear, other than light polish which may have been caused by handling or storing in a pouch. They are 23–7 mm in length and were recovered from Trenches 2 and 6, in Phases 2, 6, and 7 (Table 12.36). It is difficult to prove the function of such pebbles and they may well be natural or have had a far more mundane function, but similar small, rounded pebbles have been recovered from other Iron Age sites, for example at Scalloway, Shetland, where they were found in association with clearly recognisable gaming items such as dice (Sharples 1998, 172).

Personal ornaments

Twelve items of personal ornament manufactured from stone were recovered, including nine shale/cannel coal and one finely shaped steatite (talc schist) bangle fragments (Table 12.37). The 'shale' bangles include both part-worked and finished items, some showing repair; there was also a block of what may be raw material gathered for use.

The bangles show a notably diverse range of profiles. Most unusual is SF15.384, with a decorative stepped profile (unfortunately incomplete). Decorated bangles were extremely unusual in the Iron Age; they are known from only a handful of sites, few well-dated. The most common form has diagonal grooves mimicking a twisted cable (Childe 1935, 235, fig. 69; they are now attested at six findspots). Parallels for the current example with circumferential steps or grooves are much rarer, but there are finds from Durcha (Sutherland) and Scatness (Shetland; Hunter 1999; Barron 2012, 33, fig. 12; Dockrill *et al*. 2015, 348, SF4457) and such decoration is found throughout the Iron Age on the continent. This was clearly a particularly valued item as it was repaired to extend its life, with further attempts at repair after it broke once more.

Two shale bangles and the steatite example have tall, narrow D-sections (SF15.140, 15.363, 15.406; Figs 12.43–12.45). On the continent this form is typically found in later Hallstatt and early La Tène contexts; well-dated examples in Britain come from east Yorkshire burials of Middle Iron Age date (*e.g*. Rochna 1962; Stead 1991, 90, fig. 66.2; Venclová 1998, 289). This is consistent with the Phase 3–4 contexts here, indicating participation in a widespread European tradition. Attempts were made to repair both the shale examples, suggesting they were of particular value. The type is rare in Scotland, with around 30 examples known from 17 findspots (from a dataset of almost 500 bangles; see Hunter 2019b; 2023a).

Three bangles have the typical simple D-sections which are the most common form for the type; two of these are unfinished, indicating local production (its character is discussed further below). One bangle (SF15.82) is oval in section, a much rarer form. Its worn surface obscures toolmarks, but the unusual internal angle suggests it was manufactured by removing a central core (the indications are suggestive rather than decisive, but such internal

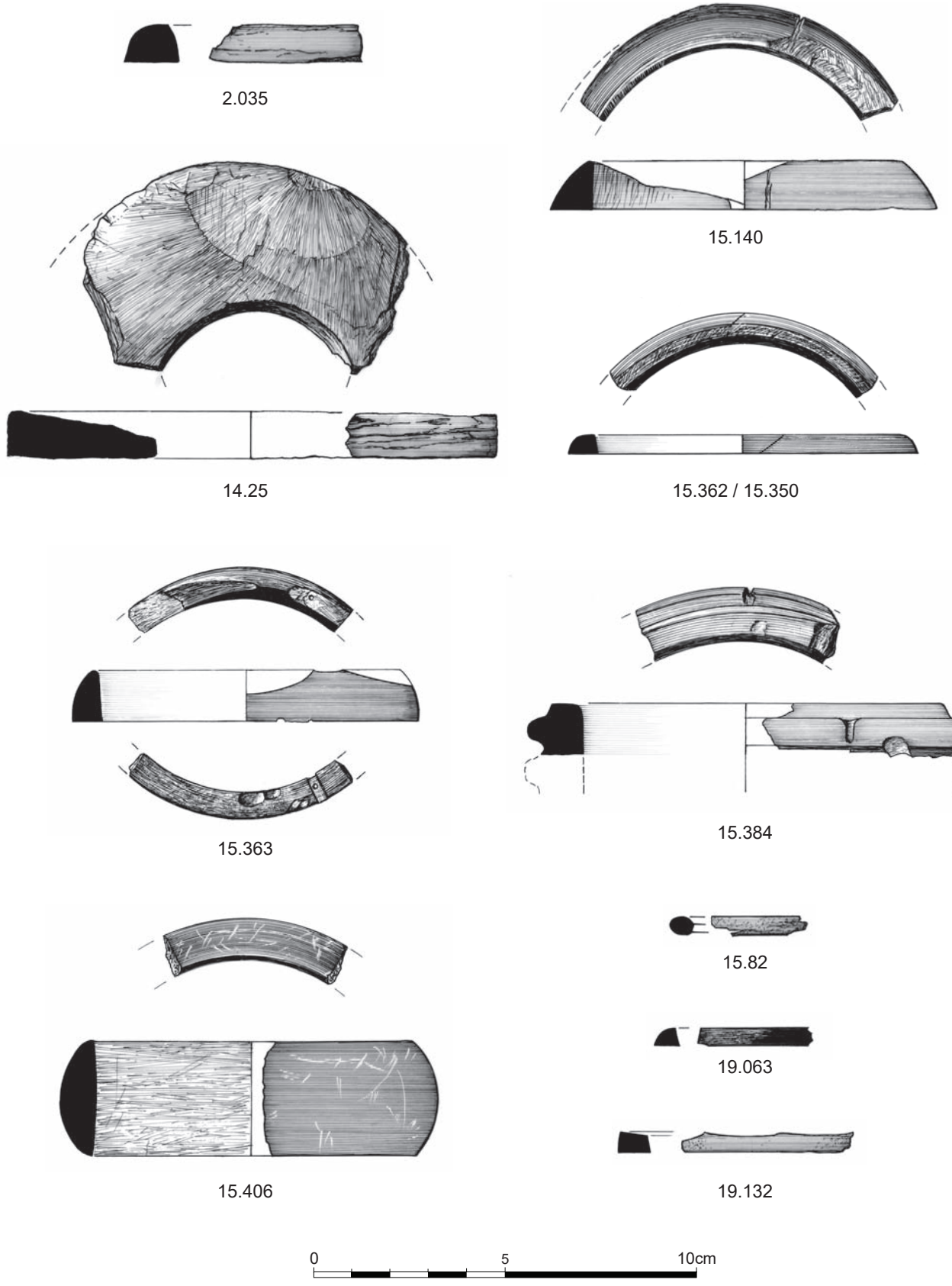


Figure 12.43. Shale jewellery

angles are an unusual feature and this is the most likely explanation). It is an atypical technology for the Scottish Iron Age, so far attested only in eastern Sutherland (Hunter 2015a, 232). The grey shale of this example is inconsistent with the Sutherland material, suggesting it may be an import from further south. Removal of a central disc is well-attested on shale in the southern British Iron Age (*e.g.* Cunliffe 2005, 506–9), though only the material from around Kimmeridge (Dorset) has seen detailed study, and one could not exclude a more northerly source.

The bangles are overwhelmingly at the larger end of the spectrum of internal diameters, ranging from 75–90 mm. This suggests they were intended as male ornaments (Hunter 2016, fig. 4) unless they were worn on the upper arm (although examples from burials are consistently found at the wrist). The exception is SF15.82, whose diameter of 55–60 mm suggests it was a female ornament. The dominance of larger bangles in an assemblage is unusual.

Bangles are typical finds in shale and similar materials in later prehistory, but they are not abundant from the west Highlands and the Hebrides compared to other areas of Scotland (Table 12.38). Working evidence is particularly sparse, and it seems most were imported as finished items. 'Steatite' bangles are better known on Shetland, near the main raw material sources, but there are rare examples from the Hebrides: one comes from Dun an Iardhard on Skye (Macleod 1915, fig. 12) and one from the Udal on North Uist (Ballin Smith nd, 14). It is likely that the raw material for these came from nearby Glenelg.

The two unfinished bangles had broken just before their final polishing (SF.2.035; 15.362/15.350). These are likely to reflect working on site or in the immediate area. Another item (SF.14.25) is a pre-formed blank, roughed out elsewhere and brought to site for final working. As such, it could have been brought from some distance. It confirms processes first recognised among the finds from Braehead (Renfrewshire), an early Iron Age seasonally occupied site where one task was the preparation of such roughouts for export (Hunter 2007). Clearly part-worked roughouts were widely exchanged.

Visual characteristics indicate the bangles are predominantly shale, with two perhaps being canneloid shale or cannel coal. One shale is an unusual grey colour, rarely attested in Scotland to the writer's knowledge. The precise source of the materials has still to be ascertained.



Figure 12.44. Shale jewellery: A. SF15.384; B. SF15.363; C. SF15.140; and shale roughout D. SF14.25



Figure 12.45. Two views of steatite bangle fragment SF15.406

Table 12.37 Summary table: personal objects in stone

SF	*C*	*Context summary*	*Ph*	*SB*	*Lithology*	
2.549	2.70	early access into cave	2a	18	Siltstone	Finely shaped pale grey siltstone disc-bead with central, cylindrical perforation & rectangular section. Faces & edges have many fine striations from shaping. Some flaking around perforation on 1 side from drilling through. D 24; perf. D 4; T 5.5.
6.375	6.07	redeposited midden material in cave	2b	25c	Talc-schist	Perforated steatite disc, roughly shaped. Edges have been roughly abraded to form irregular circle but lack any attempt to smooth & finish. Central perforation particularly narrow (D 3). 1 face slightly rounded, other has been flattened but loss of a large flake at edge along natural laminate fault may suggest that manufacture of object was discarded when surface fractured during thinning. D 30.5, T 8.5.
15.363	15.83	redeposited midden material in precinct	3d	7d	Cannel coal/ canneloid shale	Tall, narrow D-sectioned bangle frag.; interior near vertical; well finished. Clearly valued item, as after breakage ends were squared off & drilled transversely (D 2.5 mm) for repairs. Subsequently split horizontally, & 1 end broke again; attempts then made to turn it into pendant, with vertical perforation drilled bifacially at 1 end, through channel of earlier perforation (D 1 mm), but edge flaked off in course of this. L 58; internal D 75–80 (24% survives); W 8.5; H 13.5
15.384	15.83	redeposited midden material in the precinct	3d	7d	Lignite, poor conchoidal fracture, poorly compacted	Decorated bangle frag., repaired after fracture. Only part of complex profile survives, but assuming it was symmetrical it can be reconstructed. Smoothed interior only slightly rounded; flat face (using the natural surface) steps down into edge, creating prominent circumferential rib of rounded rectangular profile. Lower part lost, but edge of step below rib kicks out, suggesting section was symmetrical with 2 ribs. Tool traces from shaping still faintly visible, but polish implies it was completed. Repaired after breakage, with traces surviving of 1 squared end, & 2 transverse perforations drilled through bangle. These survive only as conical hollows, as subsequent fracture caused extensive damage. 1 perforation near an end, the other, unusually, about two-thirds along frag. Transverse groove cut into rib may relate to later attempts at re-use; it is not primary, as no attempt was made to polish away tool marks. L 54; internal D 85–90 (17% survives); W 15; H 13.5
15.362/15.350	15.83/2.15c	redeposited midden material in the precinct	3d/4c	7d/8c	Cannel coal/ dark compact, laminar, conchoidal canneloid shale	Unfinished bangle, in final stages of preparation. D-sectioned, interior only slightly rounded; generally well finished, but narrow flattened face between internal & external surfaces (utilising natural surface) has spalled, with file marks from repair. This & series of v. fine polishing scratches indicate it was unfinished. Split horizontally; 2 joining frags. L 68; int D 75–80 (29% survives); W 8.8; H 4.9
15.406	15.56	redeposited ash & hearth residues	3e	7e	Talc-schist	Tall, narrow D-sectioned bangle; interior near vertical with extensive circumferential abrasion scars; exterior beautifully finished, with deep polish. L 45.5; int. D 75–80 (18% survives); W 9.5; H 29

(Continued)

Table 12.37 Summary table: personal objects in stone (Continued)

SF	*C*	*Context summary*	*Ph*	*SB*	*Lithology*	
15.140	15.48	redeposited ash & hearth residues	4b	8b	Cannel coal/ dark, compact, laminar, conchoidal shale	D-sectioned bangle fragment with evidence for attempted repair. Internal surface vertical, with residual vertical abrasion scars blurred from use-polish; narrow flat facet at junction with external edge, which is very well-polished & quite steep, suggesting this came from a tall, narrow bangle. Different wear patterns indicate two phases of fracture. Initially a large flake detached from the top edge; vertical lines roughly incised on the outer edge at the limit of this fracture indicate an intent to trim the bangle fragment back, removing the damaged area to create a surface which could be joined, but it split horizontally before this could happen. L 83.5; int. D 75–80 (35% survives); W 11.5; H 13
?	15.38	redeposited ash & hearth residues	4c	8c	Lignite	Decayed lump, now v. fragmentary; no clear working traces. 1 surviving rounded corner suggests may be gathered block. 2 largest frags: 26.5 × 13.5 × 6.5, 33 × 24.5 × 9
19.063	19.09	burnt spreads	4	33	Oil shale, laminar, compact, good quality, slightly matt dark grey-black	D-sectioned bangle frag., well finished; spalled horizontally from larger bangle. Notably sharp angle between interior & exterior L 29.5; D cannot be reliably measured (*c*.10% survives); W 6.5; H 4.5
19.132	19.11	burnt spreads	4	33	Cannel coal/ compact, laminar, ?conchoidal canneloid shale	Mid-section of a bangle, probably D-sectioned; faces split off. Well finished. L45.5; internal D 80–85 (16% survives); W 8.3; H 5.2
15.82	15.25	redeposited ash & hearth residues	5a	9b	Oil shale, laminar, mid-grey	Frag. fine bangle, near-oval section with interior bifacially angled. Surface v. worn, no tool marks visible. Technology of this unusual piece is unclear; angled interior suggests removal of central core. L 25.5; internal D 55–60 (15% survives); W 6.1; H 5.4
14.25	14.13	burnt spreads	5	34	Shale/ canneloid shale, laminar, conchoidal	Frag. pre-prepared bangle blank. Naturally flat weathered surface forms 1 face; other has split in course of working.Unusual feature is form of outer edge & perforation; both have been filed smooth (regularity of marks indicates use of file rather than abrasive stone), outer edge being vertical, inner sloping. Most atypical as space manufacture & suggests staged production; a blank which was pre-formed elsewhere & neatened up for export. L 87.5; int. D 50-55; ext. D *c*. 130; W 36–41; T 13.5+
2.035	2.03	redeposited midden material in the precinct	7	11	Oil shale, laminar	Unfinished bangle frag., in final stages of preparation. D-sectioned, interior slightly rounded; circumferential abrasion scars all over, ready for te final polish. L 40; int. D 80–85 (13% survives); W 14.5; H 9.5+

Table 12.38 Finds of later prehistoric jewellery of black organic stone from the Inner & Outer Hebrides & adjacent mainland. MIA = middle Iron Age; IA = Iron Age

Site	*Island/area*	*Site type*	*Object*	*Date*	*Reference*
High Pasture Cave	Skye	cave	bangles, some unfinished	*c.* 700–100 BC	this report
Dun Ardtreck	Skye	broch	ring pendant, bead	MIA	MacKie 2000, 391–2, illus. 25 nos 56–7
?	Skye	moss	bangle, intact	?	Anon 1892, 217, FN 5
Applecross	Ross	broch	bangle	?	Unpublished
An Dunan	Lewis	ritual island site	penannular armlet	400–100 BC	Hunter 2013
Garry Iochdrach	N Uist	wheelhouse	bead	MIA	Beveridge and Callander 1932, 41
?	N Uist	stray	bangle	?	Close-Brooks and Maxwell 1974, 290
Clettraval	N Uist	wheelhouse	lump of raw material	MIA	Scott 1948, 67
Newton	N Uist	stray	bangle	?	NMS GT 1272
Bruthach Mor	Benbecula	wheelhouse?	bangle	MIA?	Cambridge University Museum Z20850 (Lethbridge collection)
Cladh Hallen	S Uist	settlement	bangles, beads, working debris	900–600 BC	Parker Pearson *et al.* 2021, 296, 302
Alt Chrisal	Barra	aisled roundhouse	bangle	*c*. AD 1–300	Gowans 2000, 188
Dun Mor Vaul	Tiree	broch	bangle, bead, ring, counter	MIA	MacKie 1974, 135, 141, fig. 15 nos 222–3; fig. 17 nos 325, 458
Dun Cul Bhuirg	Iona	fort	2 discs	MIA (*c*.100 BC–AD 300)	Ritchie and Lane 1980, 223, fig. 3 nos 91 & 94
Dun Mhurchaidh	Ardnamurchan	?	bangle	IA	P. Richardson, pers. comm.

Appropriate raw materials are found in north Skye and south Raasay, where Emeleus and Bell (2005, 175) reported Jurassic oil shales, although these have not been assessed practically for workability. McGibbon (above) notes that Jurassic strata in the area of the site may also have relevant materials. Other sources are markedly further afield (Hunter 2015, illus. 13.3; Gibson 1922): oil shales occur widely in the Central Belt and at Brora in Sutherland and can be found south of the border. Visual differences suggest three different sources were used, although there can be considerable variability within one source. One (unnumbered) item may be a block of material gathered for potential working, though it seems to be quite a poor-quality lignite. The evidence of repair attempts on three of the more unusual items (two tall D-sectioned bangles and the decorated example) indicates these were valued items which could not readily be replaced, arguing against a local source.

Two beads or pendants were also recovered. One is a finely shaped white siltstone disc-bead (SF2.549) and the other is a roughly shaped steatite disc, possibly unfinished (SF6.375; Fig. 12.46). Disc-beads have a long currency and are known from the Bronze and Iron Ages in Scotland in a variety of materials including shale/cannel coal and bone/antler/ivory. They are likely to have been strung on a necklace with other disc-beads and were perhaps graduated in diameter to create tapering ends, like the necklace of 59 amber disc-beads found beneath a hollowed stone at Dun an Iardhard on Skye (MacLeod 1915, 64). The steatite/talc schist bead or pendant is similar in size and form to the talc schist spindle whorls from the site but has a markedly narrower perforation (3 mm in diameter) thought to be too small for a spindle (McKeggie, above; Fig. 12.47). The division between bead/pendants and spindle whorls is not clearly defined and the identity of this one, so close in form to the many whorls from the site, remains unclear.



Figure 12.46. Steatite bead SF6.375

Ground materials

This category comprises stone artefacts which do not appear to have been tools in their own right but display abrasion consistent with use as a raw material (Tables 12.32 and 12.39; Figs 12.48, 12.49). Red-brown staining on some of the palettes (above) has already suggested the use of pigments at the site and the presence of abraded fragments of haematite-rich clay and red felsite is further evidence of this. Seven small fragments of haematite with abraded or rubbed faces were recovered from Phases 2–5. Also worth mentioning under this category are limestone cobbles (SF2.095 and SF2.546) with well-developed ground facets. As these stones are too soft to be effective tools it is much more likely they were being ground to retrieve limestone powder, either to use as a white pigment or perhaps as a flux in metalworking. An extensively abraded fragment of steatite (SF14.417) is also included here, as the abraded facets are so numerous and randomly positioned it is unlikely this was a roughout for an artefact and more probable it was being ground to produce talc pounder *e.g.* for use as a lubricant when drilling holes (see also perforated steatite object below).

Pumice

Eighteen fragments of pumice were collected (Table 12.40). Three are unworked but must have been brought to the site deliberately. Only one piece is shaped into an artefact: SF6.253 is oval with a conical perforation and is likely to have been a line-float for fishing. One fragment (SF2.63) has a notch worn into it, probably from shaping bone or wooden points. The other fragments display a range of flat, concave, or convex smoothed facets, indicating use as an abrasive. Pumice could have been used as an abrasive in a range of processes, including hide processing or finishing bone/antler or softer stone items such as talc schist or shale/cannel coal items.

Geochemical analyses and origins of the pumice

Anthony Newton

Five fragments of pumice were selected for geochemical analysis to identify its origins. The analyses confirm the pumice originated from the Katla volcanic system in southern Iceland which is consistent with pumice recovered from other archaeological sites in Scotland.

The pumice is light to dark brown in colour and is similar to pumice from Katla or found in archaeological sites around the coasts of Scotland (Binns 1971; Newton 1999a). Pumice is robust and floats in water, which is essential for it to have survived its journey across the ocean then the attrition experienced as it washed ashore.

To test whether the pumice was of the same type as found at other Scottish sites, five samples were prepared for electron probe micro-analyses to establish its major and minor element composition (SF.1.229, 1.230, 2.536, 15.325, 15.413). A small sample of each was incorporated into resin on a glass slide and ground to a thickness of 75 µm. The slide was then polished using 6 µm and 1 µm diamond pastes before being carbon coated. These slides were then placed into a Cameca SX100 five spectrometer electron microprobe (Tephra Analytical Unit, School of GeoSciences, University of Edinburgh). The instrument was run at an accelerating voltage of 15 kV and a beam diameter of some 8 µm was used. The beam current was 2 nA for the major elements and 80 nA for the minor elements. This allows for good precision on the elements present in small abundances but reduces Na mobility (Hayward 2012). All abundances were calculated as oxide and FeO as total iron.

All the analyses are dacitic in composition with a SiO_2 range of between 65.78% and 68.08%; full data are held in the archive. The analyses are indistinguishable between the five pumice pieces and with some variation in FeO, but very little in TiO2 (Fig. 12.50). This consistency suggests the pumice was produced by the same volcano and most probably the same eruption. Figure 12.49 also shows a field defined by 299 analyses of dacitic pumice pieces from Scotland (Newton 1999a). The analyses of the pumice from High Pasture sits within this field and therefore demonstrates it is of the same type and origin. There is no identifiable difference between pumice from different site phases.

Ocean-transported pumice has been found at sites across the North Atlantic region, from Arctic Canada, Greenland, Iceland, the British Isles, Scandinavia, and Svalbard (Binns 1971; Newton 1999a). Newton (1999a) found pumice at over 150 sites in the British Isles and in Scotland; the vast majority of these were

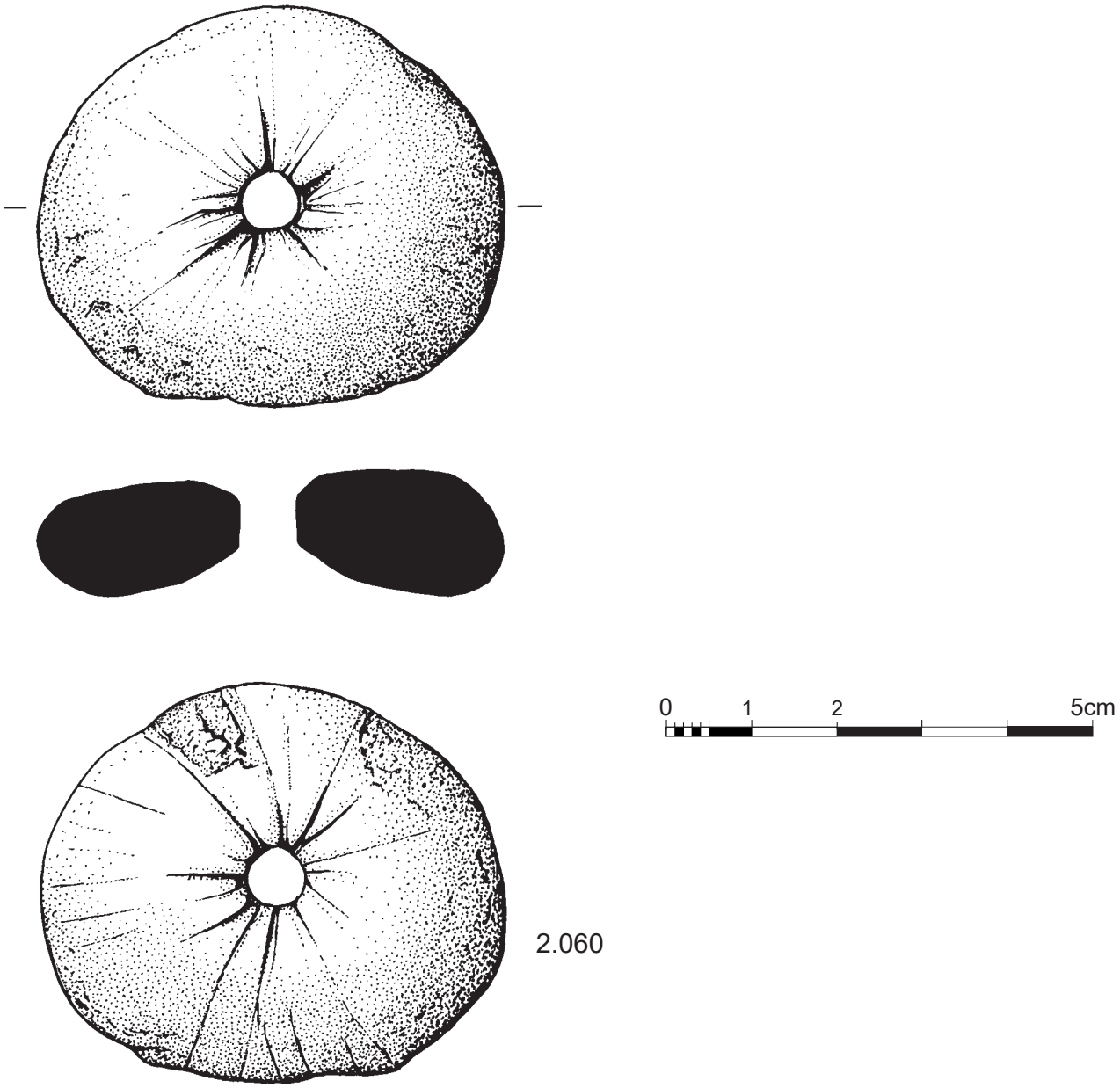


Figure 12.47. Perforated steatite objects SF2.060 & SF2.278

archaeological, predominantly located in the Western and Northern Isles, ranging in age from the Mesolithic, *e.g.* Camas Daraich on Skye (Newton 2004), to the Pictish monastic site at Portmahomack, where pumice was probably used in the preparation of parchment (Newton 2016, D114), and the most recent Norse-medieval finds at The Biggings on Papa Stour, Shetland (Newton 1999b). Scottish archaeological pumice is most frequently found in Neolithic to Iron Age contexts, mostly from the Iron Age (Newton 1999a). As well as the Mesolithic site of Camas Darach, pumice has also been retrieved from other sites on Skye: Dùn Beag and Dùn Ardtreck brochs and the Early Bronze Age site at Rudh'an Dùnain (Newton 1999a; 2000).

The Scottish dacitic pumice, along with other finds from Ireland, Norway, and the north of Iceland were erupted by the Katla Volcanic System in southern Iceland (Dugmore and Newton 1999; Newton 1999a; 1999b; 2001; 2004; 2006; unpublished; Newton and Dugmore 1995; 2003). The Neolithic and younger pumice have been correlated to several tephra (volcanic ash) layers which were erupted after around 5500 BC, with the last eruption around AD 400 (Newton 1999a; Larsen *et al*. 2001). These tephra layers are known to have erupted from Katla and scattered deposits of pumice found around the volcano confirmed the link. Although probable tephra layers associated with the pumice were identified (Newton 1999a), the pumice cannot be linked

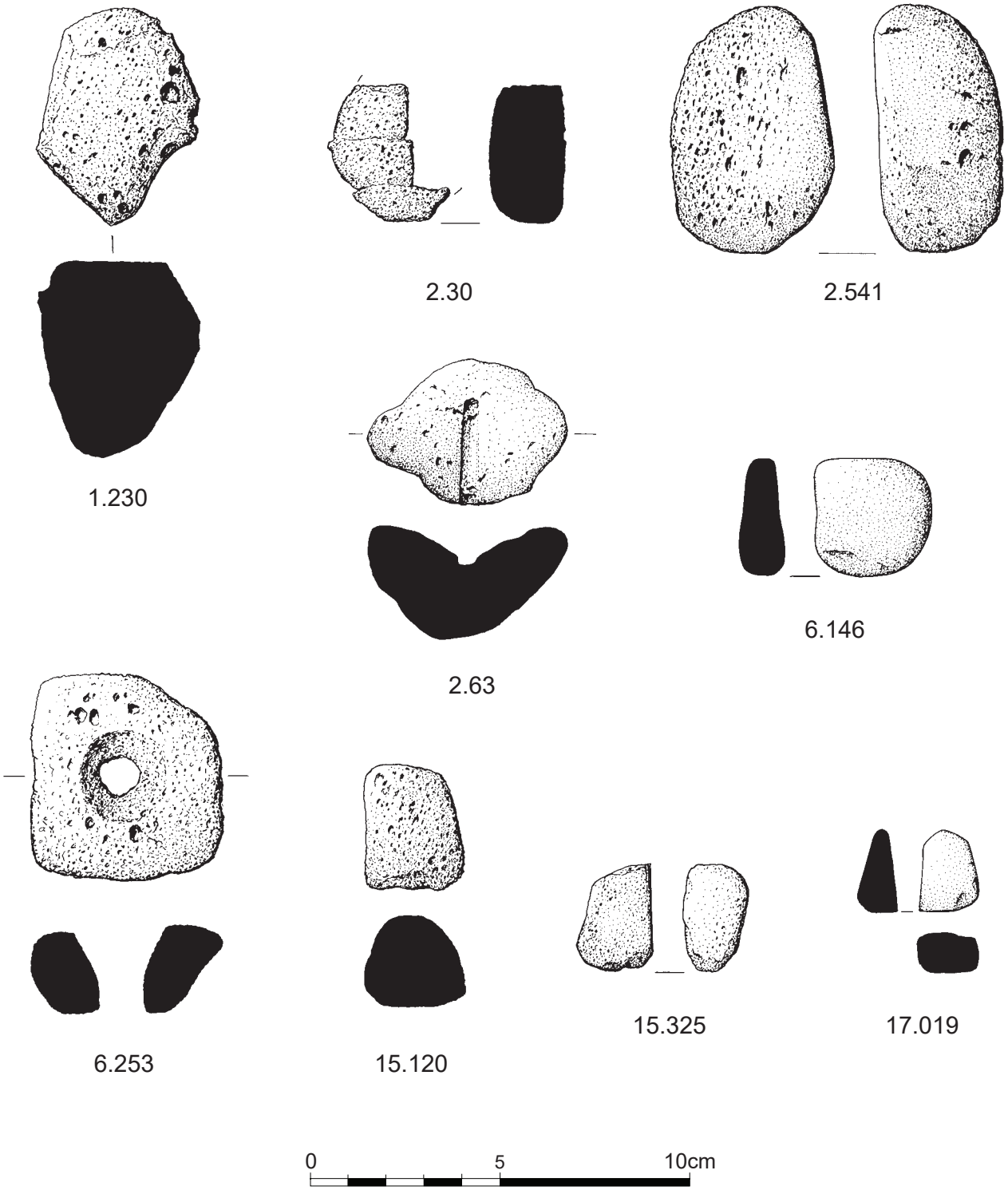


Figure 12.48. Ground stone objects including pumice & haematite



Figure 12.49. Top: limestone cobble SF2.095 ground for pigment; bottom: haematite SF15.186 polished through use

with certainty to individual eruptions as Katla has repeatedly erupted tephra and pumice with very similar geochemical characteristics. Glacial floods (*jökulhlaups*) caused by the partial melting of the ice cap overlying Katla during the eruption/s would have transported the pumice to the sea and ocean currents which, in turn, carried it to Skye.

High Pasture Cave adds to the known distribution of Scottish archaeological sites producing pumice. The frequency with which pumice is found at coastal Scottish sites highlights its utility to people from the Mesolithic through to the late Middle Ages, and particularly during the Iron Age. All the pumice in this assemblage erupted from the Katla Volcanic System and was transported via North Atlantic Ocean currents to beaches on Skye where it was collected and used by the people using High Pasture Cave.

Steatite vessel

A sherd from the curved wall of a steatite (talc schist) vessel (SF5.019) was recovered from Trench 5 (Phase 7; Fig. 12.51). It tapers in thickness (32–23 mm) towards the missing rim and would have had an estimated external diameter of at least 200 mm, making it too large to be a lamp (the most common type of Iron Age steatite vessel) and more likely to be a circular bowl. Steatite bowls are more commonly attested on Norse period sites and securely dated Iron Age examples are quite rare. Fragments of a steatite bowl were present in Iron Age contexts in the Northern Isles, at the brochs of Burland and Scalloway, Shetland (Sharman 1998, 139; McLaren and Hunter 2014, 288) and Skaill, Deerness on Orkney (Porter 1997, 105). The source of the material is uncertain (see McGibbon, above): while it could in theory have been brought from much further afield, there is a marked cluster of Iron Age finds from Skye and Lochalsh, suggesting a local source was exploited, and one has been reported from Glenelg (Hunter 2015, illus. 13.2).

Perforated stones

Three perforated stones could have had a range of functions (Figure 12.47 and Table 12.41). Two irregular steatite pebbles (SF2.060, SF2.278) each has an hour-glass perforation with several grooves around it, perhaps from where string was repeatedly pulled and possibly to lubricate or condition string with the soapy texture of the steatite. SF5.002 and SF2.023 provide few clues as to their function but could have been used as weights for fishing or weaving.

Roughouts and working debris

A flat, trapezoidal stone (SF2.191) with bifacial flaking around the edges may well have been an object in the process of manufacture, though its nature is obscure, while a large flat oval schist plate (SF2.241), broken in half through a rough perforation, may have been a rotary quern in the process of manufacturing (Table 12.42). Four of the shale/ cannel coal bangle fragments were unfinished and there is also a fragment of shale-working debris (no number). Seven of the spindle whorls still showed abrasion and tool marks, lacking the fine polish of others, and suggesting they were not finished. There is otherwise very little evidence for on-site manufacturing of coarse stone objects; indeed, these roughouts may well have been brought to the site and not made there.

Table 12.39 Summary table: ground/pigments

SF		*C*	*Ph*	*SB*	*Lithology*	*ID*	*Description*
15.186	15.65	redeposited ash & hearth residues in forecourt area	3b	7b	Felsite	Polished haematite	Rounded frag. with darker shiny polished areas. 46 × 29 × 26; abraded face 30 × 16.
15.417	15.64	redeposited ash & hearth residues	3b	7b	Steatite	Abraded steatite	Sub-oval flat piece with numerous abraded facets over both faces & around all edges & ends. Seems likely, due to extensive but random nature of abrasion that grinding was to achieve ground steatite particles/ talc, rather than from working separate substance. 72 × 46 × 17.
17.019	17.05	redeposited midden material in cave	4c	27b	Felsite	Abraded haematite	Wedge-shaped frag. with naturally flat faces & abraded edges. 22 × 15 × 11.
15.130	15.39	silting within & under stones of collapsed enclosure wall F1514	4–5	15	Felsite	Abraded haematite	Small flattened oval frag. with abraded facets & polishing on both faces. 29 × 24 × 10.
3.010	3.03	redeposited midden within former access to stairwell	5b	9c	Haematite-rich clay	Pigment	Nodule, 1 face smoothed & abraded, perhaps from use. L 46, W 35.5, T 18.
9.007	9.03	redeposited burnt spreads	5	34	Haematite-rich clay	Pigment	Amorphous, angular frag. with small abrasion facet (11 × 7.5 mm) on 1 corner. L 28.5, W 19, T 17.
15.125	15.10	–	6a	10	Felsite	Abraded haematite	1 flattened smoothed face & 1 concave face, possibly deliberately shaped. Flattened facet on convex outer face also caused though use. 34 × 24 × 14.
6.146	6.03	redeposited midden material in the cave	6b	29c	Haematite-rich clay	Pigment	Flat, sub-rectangular nodule. All edges abraded & polished through use, perhaps from grinding down material for use as pigment. L 31.5, W 31.5, T 12.

12.3.4 Discussion

Gemma Cruickshanks

This discussion will attempt to draw out and bring together the following broader themes from the stone assemblage:

- Resources
- Manufacturing and decoration
- Activities
- Spatial analysis
- Structured deposition
- Deliberate damage
- Biographies
- Chronology
- Wider context

Resources

Fiona McGibbon's report (above) discusses this question in detail. The vast majority of stone types selected to become artefacts were locally availably, either in glacial drift deposits or easily accessible outcrops. Many of the cobbles could have been acquired from the nearby shingle beach at Camas Malag; many of the larger items were made from boulders found at the site; for others, plausible outcrops are nearby. The shale/cannel coal bangles may have had a Skye source, though this cannot be demonstrated and at least one is suspected to be more exotic. A number of items of talc schist ('steatite') were found (Fig. 12.52); sources in Glenelg have been reported (Bray 1994; Section 12.12.8), and while no specimens were

Table 12.40 Summary table: pumice

SF	*C*	*Ph*	*SB*	*L*	*W*	*T*	*Notes on working*
2.541	2.71: fill of cave entrance between & underlying steps/ paving	2a	18	65	45	34	2 flat smoothed facets
2.536	2.70: fill of first Ph stairwell, overlying steps/ paving	3a	19	55	29	20	Smoothed concave facets
2.447	2.20: accumulation of hearth material	3d	7c	40	16	16	Concave smoothed facet
15.413	15.83: silting & redeposition of hearth debris in west side of forecourt	3d	7d	71	36	34	Flat smoothed facet & broken surfaces (off-cut)
HP1.228	1.06: trampled floor deposits over paving	4c	27b	15	4	3	Unworked
HP1.229	1.06: trampled floor deposits over paving	4c	27b	20	19	12	Concave smoothed facet
HP1.230	1.06: trampled floor deposits over paving	4c	27b	38	20	21	Flat smoothed facet
15.135	15.38: silting & redeposition of hearth debris in W side of forecourt	4c	8c	69	59	29	Convex smoothed facets
2.485a	2.15c: accumulation of hearth debris	4c	8c	33	24	18	Possible convex smoothed facets
2.485b	2.15c: accumulation of hearth debris	4c	8c	33	25	21	Off-cut, unworked
?	2.30: accumulation of hearth debris	4		56	45	45	Flat smoothed facet & broken surfaces (off-cut)
15.120	15.28: redeposited hearth residues/levelling layer in natural hollow	5b	9c	33	25	25	Flat & convex smoothed facets
HP1.263	1.05: redeposited midden in cave	5b	27c	54	32	39	Abraded notch
6.200	6.05: redeposited midden	5b		41	26	17	Unworked
6.253	6.05: redeposited midden	5b	27c	55	50	24	Line float. Oval with conical perforation.
6.261	6.05: redeposited midden	5b	27c	67	63	42	Off-cut, unworked
6.262	6.05: redeposited midden	5b	27c	32	17	11	Unworked
15.325	15.08a: redeposited hearth residues	6a	10	30	20	18	Flattened facets

Table 12.41 Summary table: perforated stone

SF		*C*	*Ph*	*SB*	*Lithology*	*Description*
2.060	2.05	redeposited midden	5	9	Steatite	Small, flat, ovoid pebble with rounded edges throughout, little modification prior to use. Slightly off-centre is small hour-glass perforation (D 16.5) with radiating abraded grooves radiating out from perforation to both faces, extending across surfaces to edges. Grooves a variety of lengths & depths, but thickness (1.5) consistent throughout. Abrasion continues within interior surface of perforation & appears to have formed by dragging line or string through perforation, perhaps as attempt to lubricate string using natural 'soapy' texture of the steatite. L 55, W 46, T 14.5.
5.002	5.01	redeposited midden material	6b	35	Schist	Frag. Small, sub-rectangular flat plate with remains of small perforation (D 13) on break surface. Both ends broken & no original surface remains; prob. further frag. of SF 5006 & 5007.
2.023	2.01	redeposited midden in cave	7	11	?Schist	Small, flat, ovoid pebble with small off-centre perforation (D 19); D-shaped section. L 51, W 47, T 19.

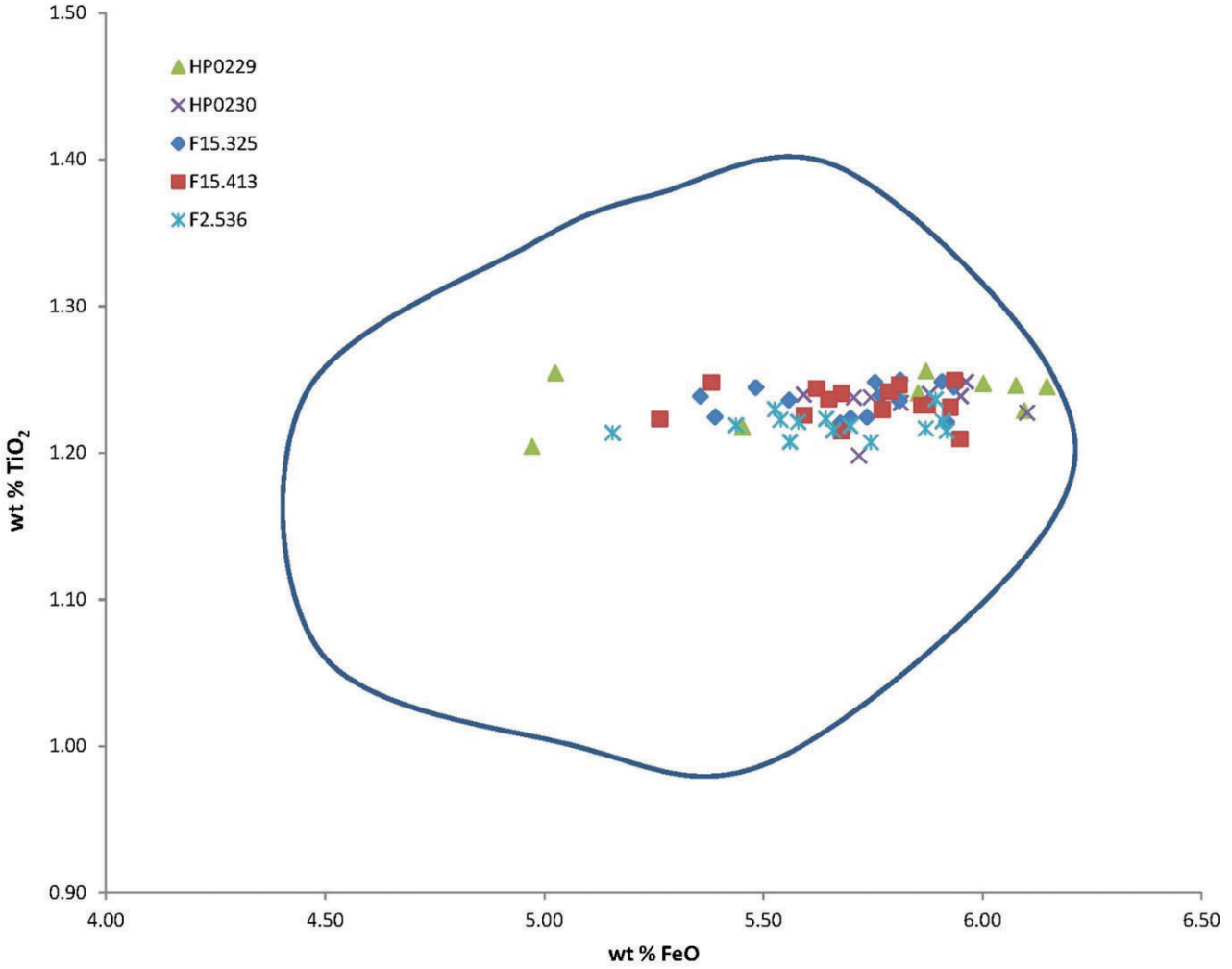


Figure 12.50. The pumice from High Pasture Cave is homogeneous in composition & overlaps with analyses of dacitic pumice found at other archaeological sites in Scotland (blue line: Newton 1999a)

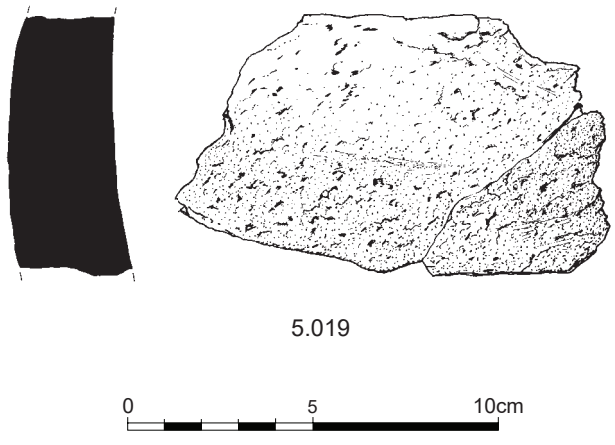


Figure 12.51. Refitting steatite vessel sherds SF5.019

available for comparison a local source is feasible, though these finds could come from much further afield. The notable cluster of steatite finds in the wider area of Skye and the adjacent mainland is, however, more suggestive of a local source, and one of the High Pasture Cave finds (SF6.375) is probably unfinished.

A small number of finds are geologically non-local and are unlikely to have come in through glaciation; these indicate movement of resources. All are from Dalradian geologies which span Scotland between the Highland Boundary Fault and the Great Glen, the most likely accessible regional occurrences being Argyll: one rotary quern and one palette of garnet mica schist, two greenstone hide rubbers, and a spindle whorl of actinolite schist.

Manufacturing and decoration

Most of the stone artefacts would not have required any modification prior to use, notably cobble tools, while some such as saddle querns received minimal shaping. Heavily modified stone artefacts include rotary querns, spindle whorls, beads, and bangles, all of which required perforating as well as extensive shaping. Some items, such as the shale/cannel coal items and steatite bangle were also finely polished after shaping. The vessel fragment, one whetstone and some palettes also have entirely modified shapes.

Table 12.42 Summary table: stone roughout

SF		*C*	*Ph*	*SB*	*Lithology*	*Description*
5.006 & 5.007	5.01	redeposited midden material	6b	35	Schist	Perforated stone. 2 conjoining frags, flat, sub-rectangular, remains of small conical perforation (D 23) on break surface. Stone has laminated across width & few original surfaces remain. 1end broken, other, like edges, rough & uneven with little evidence of modification. L 98, W 79, T 28.
2.241	2.03a	redeposited midden	7	11	Schist	Perforated stone. Large flat oval plate which has laminated across surface. Both ends broken, with remains of conical perforation seen in section across 1 break surface. Remaining edge roughly rounded. ?rotary quern in process of manufacture. L 185, W 180, T 39.

Evidence of manufacture associated with the site is sparse, and only a few unfinished objects are recorded: a rotary quern roughout (SF2.241), an unidentified roughout (SF2.191), and five fragments of unfinished shale bangles or working debris. Given the nature of this site, it is possible that the unfinished items were brought unfinished for deposition rather than being made here, although bangles may well have been transported from the source as part-finished items for final finishing elsewhere.

As with most Scottish Iron Age stone assemblages, decoration is rare. One palette (Fig. 12.53), two spindle whorls and a shale bangle are the only instances. The palette and whorls show simple incised designs, while the bangle has circumferential carved ribbing. There are also a few stones of a striking appearance, such as the black organic bangles and the garnet mica schist palette (SF2.441), this latter being non-local. Stone may also have been used for pigments: both haematite and limestone were ground up, though they could have had roles apart from colouring other items.



Figure 12.52. Perforated steatite object SF2.060 with grooving possibly used in textile manipulation



Figure 12.53. Decorated stone palette SF2.356

Activities

Many of the coarse stone artefacts have a broadly identifiable function which provide a glimpse of a wide range of activities. The nature of High Pasture Cave means it is not always certain whether the activities were taking place on site or had taken place elsewhere with the artefacts brought here for deposition. Arguably this should be a consideration when interpreting all assemblages but it is rarely suggested by the evidence; depositional activity here is so extensive and convincing it makes this more plausible. Even if the objects were all brought to site solely for deposition, their function still represents a particular activity and they were probably selected with this in mind. By understanding the various activities which are represented we can begin to interpret more effectively what activities and ideas were important to the communities here. A more thorough analysis of the activities which may have taken place here and those which are represented solely by the deposition of associated artefacts is in the overall find's synthesis, where artefacts of different materials but similar functions are considered together.

Food processing is well-represented due to the large number of saddle and rotary querns and quern rubbers. Many of the cobble tools could also have been utilised in the process of preparing foodstuffs, but this remains difficult to prove. This focus of food production complements the evidence for feasting events indicated by large deposits of animal bones. Around 10% of the cobble tools had been charred and/or heat-cracked after use as a tool, indicating a secondary function as pot-boilers, perhaps in association with feasting events.

Several crafts are clearly represented. The spindle whorls attest to hand-spinning yarn for textile manufacturing (McKeggie, above). Hand-spinning is likely to have been a common activity, though whorls are rarely abundant on Iron Age sites (Hunter 2015, 228); the particularly large assemblage here suggests hand-spinning may have been a particularly significant activity within the community using this site, or particularly relevant to practices of deposition. Hide rubbers attest to the processing of animal skins. Hide processing is likely to be under-represented in coarse stone assemblages, particularly from early excavations as rather ephemeral staining is the only clue to their use, but it was likely to have been a common craft. Burnishers were probably used in non-ferrous metalworking and whetstones attest to the maintenance of metal blades, complementing the other evidence for metalworking on site (Cruickshanks and Hunter, below).

Spatial analysis

Figure 12.54 summarises the trench distribution of the cobble tool assemblage and Table 12.43 shows the distribution of each artefact type by trench. There is a clear concentration of artefacts from Trenches 2 and 15, the forecourt and walkway area around the cave entrance, with 68% of the assemblage recovered from those two areas. This area was a focus of deposition not only of stone but for a wide range of artefacts. No difference in range or relative quantities of artefact types between the cave and the surface trenches is apparent to suggest differing depositional choices below or above ground.

There are no clusters of particular tool-types which could indicate specific craft or activity areas. Although caches of cobble tools and spindle whorls were recovered, they are more likely to represent structured deposits than *in situ* craft working evidence.

Structured deposition

Caches

Five groups of cobble tools and two groups of spindle whorls were found together in caches (Table 12.44). The caches range in size from three to 16 stones and comprise a range of tool- and stone-types (Fig. 12.55). Four of the caches also included unworked cobbles which may have been intended for future use or were used in a way which left no trace. The smaller cobble tool caches could be deposits of specific tool kits, but this seems less likely with the large cache (1) which may represent a collection of tools from multiple crafts or several individuals.

All six caches of stone tools were recovered from Phases 2–4, suggesting this was an Early Iron Age tradition. All five cobble tool caches came from accumulated hearth debris around the entrance to the cave (Trenches 2 and 15). Their deliberate placement in the debris of the hearths suggests they may have been deposited after feasting events, perhaps as closing deposits for a

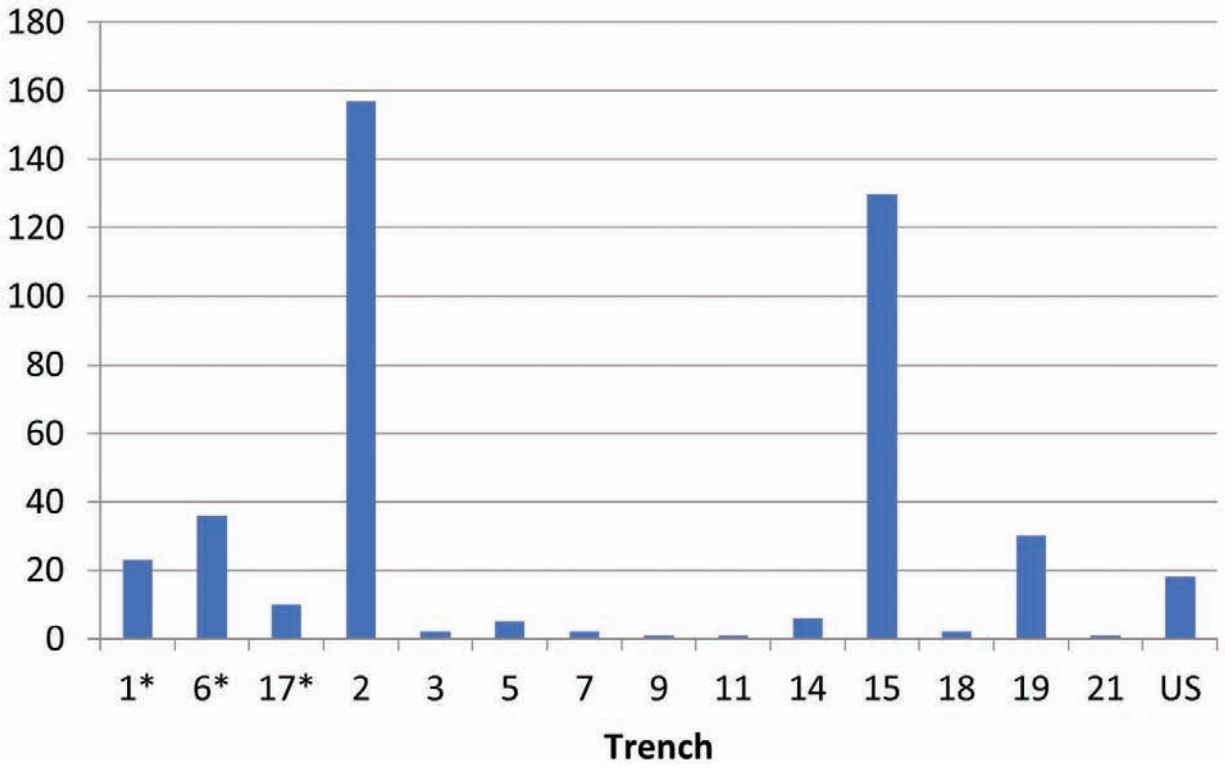


*Figure 12.54. Distribution of coarse stone artefacts by trench, *denotes trenches within cave*

particular event or phase of ritual activity; perhaps they were 'charged' or contaminated by this use and had to be left here.

Stone tools were not the only artefact type to be cached. There are two groups or antler points (Cruickshanks and Hunter, below), and other caches may have been disturbed at a later date; the cluster of nine spindle whorls from Phases 3 and 4 in Trench 15 is a likely example.

The deposition and damage of querns and the caching of cobble tools are the most obvious examples of ritualised activity within the stone assemblage. Many of the other stone tools could have been deliberately deposited but it is more difficult to demonstrate this for a single tool unless the depositional associations are distinctive; the iron-panned pounder (SF15.124) might be an example. The focus of modified palettes around the entrance area in contrast to the wider distribution of unmodified palettes is another plausible example.

Deliberate damage

The very fragmentary nature of the majority of the querns is evidence of deliberate breaking as accidental damage, particularly to some of the large saddle querns, is improbable. It is possible that the querns could have been broken up for some functional purpose, such as building material for the stairwell, but given the abundance of stone in the area and the likely value of such items during the Iron Age it seems much more likely their breakage, defacement, and deposition was symbolically charged.

Similar patterns of fragmentation and defacement have been noted in other Scottish Iron Age quern assemblages. For example, at Broxmouth hillfort, East Lothian, at least one fragmentary rotary quern had been deliberately damaged by roughly removing the collar around the hopper and large flakes from around the edge (McLaren 2013, 317). A disc-quern from Birnie, Moray displays very similar damage, with the collar having

Table 12.43 Trench distribution of coarse stone artefact types

Group	*Type*	*TR*															*Total*
		Cave			*Surface*												
		1	*6*	*17*	*2*	*3*	*5*	*7*	*9*	*11*	*14*	*15*	*18*	*19*	*21*	*US*	
Food preparation	Rotary quern	1	–	–	5	–	1	–	–	–	–	4	1	1	–	–	13
	Saddle quern	1	1	1	13	1	–	–	–	–	1	20	–	3	1	–	42
	Quern rubber	3	1	–	14	–	–	–	–	1	–	15	–	2	–	1	37
Cobble tool	Hammer	–	1	–	1	–	–	–	–	–	–	1	–	–	–	–	3
	Pounder	2	4	–	16	–	–	–	–	–	–	6	1	2	–	2	33
	Grinder	–	6	3	18	–	–	–	–	–	1	19	–	5	–	1	53
	Hide-rubber	2	1	2	6	–	–	–	–	–	–	2	–	–	–	–	13
	Burnisher	–	–	–	1	–	–	–	–	–	–	–	–	2	–	–	3
	Strike-a-light	–	1	1	–	–	–	–	–	–	–	–	–	–	–	–	2
	Whetstone	–	2	–	4	–	1	–	–	–	1	4	–	3	–	1	16
	Sharpener	–	1	–	1	–	–	–	–	–	–	–	–	–	–	–	2
	Palette	–	–	–	6	–	–	–	–	–	1	2	–	–	–	1	10
	Work surface	–	–	–	2	–	–	1	–	–	–	–	–	–	–	–	3
	Combination	9	5	2	50	1	–	1	–	–	1	32	–	9	–	9	119
Spindle whorls		–	6	–	5	–	–	–	–	–	–	13	–	1	–	–	25
Amulets/gaming		–	1	–	3	–	–	–	–	–	–	–	–	–	–	–	4
Personal ornament	Bead/pendant	–	1	–	1	–	–	–	–	–	–	–	–	–	–	–	2
	Bangle	–	–	–	1	–	–	–	–	–	1	6	–	2	–	–	10
Ground materials	Pigments	–	1	1	–	1	–	–	1	–	–	3	–	–	–	1	8
	Steatite	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	1
Pumice		4	4	–	5	–	–	–	–	–	–	4	–	–	–	1	18
Vessel		–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	1
Perforated		–	–	–	1	–	2	–	–	–	–	–	–	–	–	–	3
Roughouts/working debris		–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	2
Misc		–	–	–	1	–	–	–	–	–	–	–	–	1	–	–	2
Total		22	36	10	155	3	6	2	1	1	6	132	2	31	1	17	425

Table 12.44 Summary table: stone caches

Cache	*SF*	*TR*	*C*	*Ph*	*SB*	*Lithology*	*ID*
Cache 6	6.418, 6.484, 6.488a, 6.531	6	6.08/9: redeposited midden material in cave	2a	25a	Talc schist	Spindle whorl × 4
Cache 5	15.419–28	15	15.64: redeposited ash & hearth residues	3b	7b	Dolerite	Grinder
						Microdiorite	Grinder
						Microdiorite/dolerite	Grinder
						Quartzite	Grinder × 2
						Sandstone (fine-grained)	Grinder
						Microgranite	Grinder/pounder
						–	Unworked × 3
Cache 4	15.380a–e	15	15.56: redeposited ash & hearth residues	3e	7e	Arkose (Torridonian)	Grinder
Cache 3	2.505a–d	2	2.18: accumulation of material resulting from use of hearths in forecourt area	3e	7e	Sandstone (fine-grained)	Grinder/pounder × 2
Cache 2	2.489a–c	2	2.15c: accumulation of hearth debris from F15.20	4c	8c	Arkose (Torridonian)	Grinder
						–	Unworked × 2
						Dolerite	Pounder
Cache 1	2.119a–o	2	2.30: accumulated debris from F.1.520	4c	8c	–	Grinder
						Dolerite/basalt	Grinder & poss. hide-rubber
						Dolerite/basalt	Grinder, pounder, poss. hide-rubber
						Dolerite	Grinder/pounder/whetstone & poss. strike-a-light
						Dolerite	Grinder/pounder/work surface
						Microgranite	Hide-rubber
						Greenstone	Hide-rubber × 2
						Dolerite	Hide-rubber/grinder/work surface
						Basalt	Hide-rubber?
						Microgranite	Palette
						Sandstone (fine-grained)	Palette
						Dolerite/basalt	Pounder
						–	Pounder × 2
						Dolerite	Whetstone/grinder/pounder
						Sandstone (fine-grained)	Pounder/hammer & work surface
						White sandstone (fine-grained)	Palette
						White sandstone (fine-grained)	Pounder
						White sandstone (fine-grained)	Sharpening stone, pounder, & edge grinder
						–	Unworked

been roughly removed prior to the quern being broken up (Cruickshanks and Hunter in prep). Two fragments of this quern were then placed together with a fragment of its matching lower stone. Most of the High Pasture Cave rotary querns are split through the central perforation and/ or handle socket, which were natural points of weakness as querns wore thinner. However, although they had all undoubtedly been used, the querns here are still quite thick (all over 50 mm) and robust and it seems unlikely they broke accidentally.



Figure 12.55. Cache of 23 cobble stone tools SF2.119 recovered from the precinct enclosure



Figure 12.56. Refitted saddle quern fragments SF15.313 & SF15.435 showing impact scars

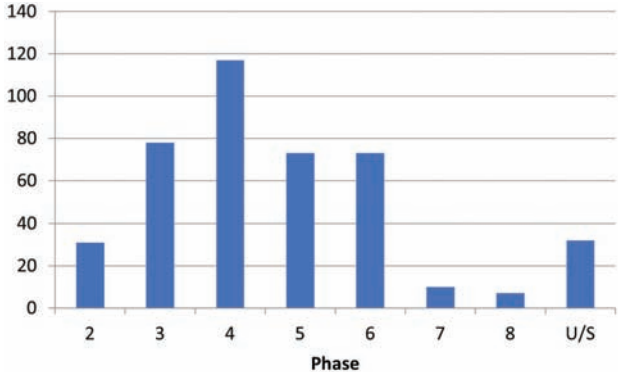


Figure 12.57. Phase distribution of the coarse stone tool assemblage

The relative lack of refitting fragments (20%) amongst the quern assemblage, even on this extensively excavated site, is in keeping with observations on quern fragmentation from Northern England, where it is believed parts were moved elsewhere after querns were divided, whether to a different part of the site or a separate site entirely (Heslop 2008, 71). The querns could have been broken up on other sites with parts brought here for deposition, or the ritualised breaking up could have taken place here, with fragments then taken away – it is impossible to tell.

Other Iron Age querns on Skye show evidence of deliberate damage or deposition. Half of an intensely heat-damaged bun quern in two refitting fragments was recovered from Dun Ardtreck, along with a quarter of a different rotary quern which had been 'damaged and reshaped after breakage' (MacKie 2001, 386, 393). A complete rotary quern top stone was incorporated into a primary rubble bank at the entrance to Dun Flodigarry (Martlew 1985, 41) and two refitting fragments of an upper rotary quern (forming half a stone, split through the middle) were found in the wall core at Dun Osedale (MacKie 1972, 137); both were incorporated during the construction of the sites and are therefore probable foundation deposits.

Chronology

The phase distribution of the assemblage is summarised in Figure 12.57 and Table 12.45. The main peak is in Phases 3–4, with a second smaller concentration in Phase 6 and relatively low quantities from Phases 2, 7, and 8.

Most of the artefacts are not chronologically distinct types but sit comfortably within an Iron Age timeframe. Only the steatite vessel is unusual for the Iron Age, providing the first evidence for Iron Age use of steatite vessels other than lamps outwith the Northern Isles in Scotland.

Detailed analysis of artefact types by phase (Table 12.45) shows surprisingly little variation in the types of objects being deposited over time, but a few interesting features are worth mentioning. The recovery of rotary querns in Phase 5 (with modelled start date of 520–415 cal BC and end date of 315–225 cal BC) supports the view that their use in Scotland preceded the traditional date of *c.* 200 BC (Caulfield 1978), perhaps from the 5th or 4th centuries BC (McLaren and Hunter 2008, 105).

The presence of whetstones from the earliest phases confirms the use of iron blades on the site from the Early Iron Age; the ironwork assemblage shows the metal was available. The Early Iron Age focus of spindle whorl deposition is confirmed by other evidence of textile related crafts in the earlier phases.

The small quantity of coarse stone artefacts recovered from Phases 7 and 8 (15 artefacts: 3% of assemblage) suggests their deposition had mostly ceased by this point and the few artefacts appearing could be residual. Stone artefacts often end up in secondary contexts due to several factors. Their robustness means they survive better than many other artefact types. Large stone artefacts such as querns can be re-used in walls and paving, whether for functional or symbolic reasons, while cobble tools can be re-used in cobbling layers or as pot-boilers. This re-use of stone tools means that they often end up in secondary contexts which can only be used to date the stones' deposition rather than use or manufacture.

Table 12.45 Phase distribution of stone artefacts

Group	*Type*	*Ph*									*Total*
		2	*3*	*4*	*4/5*	*5*	*6*	*7*	*8*	*US*	
Food preparation	Rotary quern	–	–	–	–	4	4	1	1	3	13
	Saddle quern	6	5	13	1	5	4	–	1	7	42
	Quern rubber	4	9	7	3	4	9	–	–	1	37
Cobble tool	Hammer	–	–	–	–	1	1	1	–	–	3
	Pounder	–	6	11	–	6	6	1	–	3	33
	Grinder	3	13	16	–	7	9	–	1	4	53
	Hide-rubber	–	–	7	–	3	3	–	–	–	13
	Burnisher	–	–	2	–	1	–	–	–	–	3
	Strike-a-light	–	–	1	–	–	1	–	–	–	2
	Whetstone	3	2	3	–	4	2	–	1	1	16
	Sharpener	1	–	1	–	–	–	–	–	–	2
	Palette	–	3	4	–	1	1	–	–	1	10
	Work surface	–	–	–	–	1	1	1	–	–	3
	Combination	4	25	29	–	23	27	1	1	9	119
Spindle whorls		5	6	10	–	2	–	–	–	2	25
Amulets/gaming		1	–	–	–	–	2	1	–	–	4
Personal ornament	Bead/pendant	2	–	–	–	–	–	–	–	–	2
	Bangle	–	4	3	–	1	2	–	–	–	10
Ground materials	Pigments	1	1	2	1	2	–	–	–	1	8
	Steatite	–	1	–	–	–	–	–	–	–	1
Pumice		1	3	7	–	6	1	–	–	–	18
Vessel		–	–	–	–	–	–	1	–	–	1
Perforated		–	–	–	–	1	1	1	–	–	3
Roughouts		–	–	–	–	–	1	1	–	–	2
		–	–	–	–	–	1	1	–	–	2
Total		31	78	116	5	72	76	10	5	32	425

Complex biographies

The potentially complex biographies of many artefacts in this assemblage are perfectly illustrated by the presence of calcite deposits on the surface of four artefacts recovered from Trench 2 (whetstone/grinder SF2.51, work surface SF2.191, and quern rubbers SF2.557 and SF2.368; Phases 6, 5, 3, and 6 respectively). In all cases the calcite deposit overlies the worked area, indicating they had lain in the cave after use for long enough that calcite deposits could form. However, all four were recovered outwith the cave, indicating they had then been removed. Such complex biographies would be invisible were it not for the specific conditions of the cave. Cobble tools with several different uses and attempted repairs to shale bangle fragments are other indications of long-used artefacts, while instances of fragments of one quern in different trenches provide a further indication of complicated deposition processes.

Wider context

High Pasture Cave has produced a considerably larger coarse stone assemblage than any other Iron Age site on Skye, with the closest being around 50 artefacts each from Dun Ardtreck (MacKie 2001) and Dun Beag (Callander 1921). To some extent the larger assemblage size and broader range of artefact types is a direct result of the site being more extensively excavated, and variable recognition/recovery of stone artefacts on (some) older excavations. Other extensively excavated sites have also produced large assemblages, such as over 800 from Howe on Orkney (Ballin Smith 1998, 185), and around 300 each from Broxmouth hillfort, East Lothian (Armit and McKenzie 2013) and Birnie, Moray (Cruickshanks and Hunter in prep). Direct comparison is difficult because of a marked regional diversity in artefact types; Northern Isles assemblages have large quantities of flaked stone implements, for instance, while those from southeast Scotland

(such as Broxmouth) often have large numbers of small stone balls, both types unattested on Skye.

There has been no regional study of the stone tools of Skye as yet and previously available assemblages were rather small. Instead, Figure 12.58 presents the data in broad categories for the large assemblage (272 finds) from the domestic Iron Age settlement of Birnie, Moray. This site was studied by the authors using the same methodology and from an area lacking the distorting regional stone types discussed above. In overview the basic categories are very similar, with a dominance of food preparation and cobble tools. The markedly higher number of spindle whorls at High Pasture Cave is noteworthy and there is also a slightly higher number of personal items, although this is strongly affected by the presence of 'shale' jewellery, which is extremely rare in Moray. If one goes into detail of the cobble tools there are differences in the spectra, with many fewer single use grinders at Birnie, for instance, but more work surfaces and palettes. However, a full comparison would require combination tools to be considered, and this is beyond the scope of this report. The key point is that the main categories are similar. High Pasture Cave looks like a domestic stone tool assemblage, but the quantity of whorls is striking.

The evidence of structured deposition and deliberate damage can be paralleled to varying degrees on other Iron Age sites on Skye and more widely across Scotland. This has long been recognised for querns (*e.g.* Hingley 1992, 32), but other finds categories have more rarely been studied. Caches of cobble tools are rarely considered, but seven (of between three and eight stones) were noted at the broch of Howe, Orkney (Ballin Smith 1994, 204), where they were found in floor levels, walls, and stone settings in phases 4 and 7 (5th–4th centuries BC and 1st–4th centuries AD). These also comprised a range of tool- and stone-types and were interpreted as being possible tool kits for metalworking (of which there is extensive evidence at Howe) or even children's toys. Cobble tool caches are paralleled more locally too, at Dun Flodigarry on Staffin, northern Skye, where it is briefly mentioned cobble tools 'were occasionally found in groups of four or five' (Martlew 1985, 41).

The stone assemblage therefore provides the juxtaposition of a fairly typical Iron Age assemblage with an atypical site, with none of the usual Iron Age structural remains present, and clear evidence in a number of instances of deliberate and often complicated deposition processes.

12.3.5 Conclusions

The large assemblage of coarse stone artefacts from High Pasture Cave provides a fascinating glimpse of Iron Age life. Everyday items such as quern stones and cobble tools are here in abundance along with smaller numbers of personal or decorated objects, providing a valuable dataset for wider study of the changing forms and functions of these items. Craft evidence is provided in the form of spindle whorls for manufacturing textiles and hide rubbers for leather working, while rare unfinished stone items provide evidence for stone-working. Calcite deposits over worked surfaces on stone tools found outwith the cave provide a unique sight of complex object biographies, with artefacts being moved in and out of the cave over long periods of time. Deliberate damage and fragmentation of querns and caches of cobble tools and spindle whorls concentrated around the cave entrance reveal the significance of this area of the site as a focus for deposition.

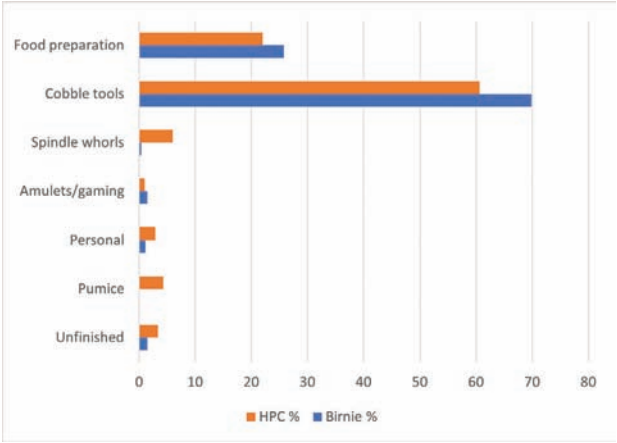


Figure 12.58. Comparison of stone assemblage composition (%) between High Pasture Cave & Birnie (Moray)

The composition and ritual treatment of this stone assemblage reflect wider traditions in the Iron Age world at the time, but here focussed around a cave rather than a domestic structure. This large assemblage from a long-used and securely dated site is an invaluable and fascinating resource from which to study the Iron Age use of stone and depositional traditions.

12.4 Lithics

Torben Ballin and Alan Saville

12.4.1 Introduction

An assemblage of 114 struck lithic artefacts was recovered during excavation at High Pasture Cave between 2004 and 2010. Although falling within the general category of stone tools recovered from the site, these comprise a typologically diagnostic group of artefacts relating to earlier activity, although some appear to have been deposited as curated objects during the Iron Age. This report characterises the lithic artefacts in general terms, with special reference to raw-materials and typo-technological attributes. From this characterization, it is sought to date and discuss the finds. Evaluation of the lithic material is based upon Alan Saville's interim reports and Torben Ballin's later examination of the full assemblage.

The lithics are thought to mainly represent residual early prehistoric elements mixed into later prehistoric (Late Bronze Age and Iron Age) contexts, although a

number of pieces may relate to the activity taking place at High Pasture during the Early Bronze Age. Due to the residual nature of the majority of the lithics, they are presented herein as one unstratified assemblage. The distribution of some particularly interesting artefacts and raw materials is discussed in connection with the presentation of this small, but interesting assemblage.

12.4.2 Key definitions

The definitions of the main lithic categories are as follows:

Chips: All flakes and indeterminate pieces the greatest dimension (GD) of which is < 10 mm.

Flakes: All lithic artefacts with one identifiable ventral (positive or convex) surface, GD > 10 mm, and L < 2W (L = length; W = width).

Indeterminate pieces: Lithic artefacts which cannot be unequivocally identified as either flakes or cores. Generally the problem of identification is due to irregular breaks, frost-shattering, or fire-crazing.

Chunks are larger indeterminate pieces, and in, for example, the case of quartz, the problem of identification usually originates from a piece flaking along natural planes of weakness rather than flaking in the usual conchoidal way.

Blades and microblades: Flakes where L > 2W. In the case of blades W > 8 mm, in the case of microblades W < 8 mm.

Cores: Artefacts with only dorsal (negative or concave) surfaces – if three or more flakes have been detached, the piece is a core, if fewer than three flakes have been detached, the piece is a split or flaked pebble.

Tools: Artefacts with secondary retouch (modification).

12.4.3 Lithic artefacts

Raw materials: types, sources, and condition

Skye, the northern part of the Inner Hebrides in general, and the adjacent parts of the Scottish mainland are characterised by the presence of a multitude of different lithic raw materials, many of which were used for tool production during the prehistoric period. The assemblages from High Pasture Cave include several of these, such as flint, various forms of flint-like chert, quartz, Rhum bloodstone, Staffin baked mudstone, agate, and some indeterminate lithic raw materials. In addition, one weathered polished stone axehead is thought to be based on Cumbrian tuff.

The distinction between flint and chert is complicated by the differing definitions of the two concepts used by American geologists (all forms of flint-like material are chert and flint is a poorly defined sub-group of chert) and British geologists (flint-like material from Cretaceous formations is flint proper, whereas flint-like material from earlier and later formations is chert; Luedtke 1992, 6). To avoid confusion, this report follows British nomenclature.

The assemblage includes 66 pieces which are typical forms of flint proper. This material is generally fine-grained and vitreous and, although most pieces are discoloured from exposure to either air or water, this category also contains grey, cream, brown, and orange pieces. Some flint-like pieces are more coarse-grained, frequently mottled, and they may have thicker cortex. Similar pieces were encountered in connection with the examination of a lithic assemblage from the inner parts of Loch Torridon (Hardy *et al*. 2015), and it was suggested that some fossil-free pieces from this location might derive from conglomerates at the lower part of the Precambrian Torridonian sandstone (the Diabaig Formation; Park *et al.* 2002, 68), but that pieces with fossils post-date this geological period. Some of those could possibly derive from the Cambrian/Ordovician Durness Limestone which previously covered large parts of northwest Scotland. Some pieces with chalky cortex may date to the Jurassic period; in the local area, rock dating to this period may be found on Skye and Raasay, as well as around Applecross (Hudson and Trewin 2002, 332). Altered flint-like cherts would have been available from Durness Limestone outcrops on Skye, near the Cuillin Complex (Hoersch 1981). A small number of flints (SF2.550, SF19.133, as well as an unnumbered piece from Trench 6) are based on light grey mottled flint, which may be imported from Yorkshire (probably dating to the Middle/Late Neolithic period).

Quartz from the site includes white milky quartz as well as saccharoidal forms. Quartzes and quartzites are discussed as one category, as it may be difficult to distinguish between the two groups (*cf*. Ballin 2008). One problem is the fact that the area's basal quartzite is visibly similar to what in other parts of Scotland is referred to as saccharoidal (or fine-grained) quartz. It is thought that all pieces belonging to the quartz/quartzite category are based on local sources (*cf*. Johnstone and Mykura 1989).

Fresh bloodstone, which is a form of jasper, is usually either light or dark green, and most bloodstone is characterised by the presence of small perfectly round globules, which tend to be red or rust-coloured, in some cases accompanied by red filaments (Hall 2000, 93). Technically, monochrome green variants without globules or red filaments are not bloodstone but plasma, but as it is impossible to be certain whether a small monochrome flake is from a nodule of one or the other, it is suggested in an archaeological context to simply refer to all material from the bloodstone/plasma group as bloodstone. This raw material would have been procured from sources on Rhum (Wickham-Jones 1990; for a recent discussion of archaeological bloodstone from the Inner Hebrides/west of Scotland, see Ballin 2014). The bloodstone artefacts from the High Pasture Cave excavations encompass a dark green monochrome piece (SF14.037), a dark green piece with red filaments (SF6.222), but also – highly surprisingly – a white piece with a chalcedonic lustre but also

Table 12.46 Lithics recovered during the High Pasture Cave excavations

Type	Flint	Flint-like chert	Quartz	Bloodstone	Baked mudstone	Indet. raw material	Others	Total
Chips	23	7	5	–	–	1	–	36
Flakes	22	4	10	3	2	1	–	42
Microblades	1	–	–	–	1	–	–	2
Indeterminate pieces	1	2	1	–	–	1	–	5
Single-platform cores	1	–	–	–	–	–	–	1
Irregular cores	1	–	1	–	–	–	–	2
Bipolar cores	2	–	–	–	–	–	–	2
Polished stone axeheads	–	–	–	–	–	–	1	1
Leaf-shaped arrowheads	–	–	–	–	–	1	–	1
Bifacial arrowheads	1	–	–	–	–	–	–	1
Microliths	1	–	–	–	–	–	–	1
Scale-flaked knives?	1	–	–	–	–	–	–	1
Short end-scrapers	2	–	1	–	–	–	–	3
Thumbnail-scrapers	1	–	–	–	–	–	–	1
Side-scrapers	–	–	1	–	–	–	–	1
Fire-flints	3	–	–	–	–	–	–	3
Pieces with edge-retouch	5	–	–	–	–	–	–	5
Flakes with use-wear	1	–	–	–	–	–	–	1
Crystals with wear	–	–	2	–	–	–	–	2
Crystals, unworked	–	–	2	–	–	–	–	2
Agate pebbles	–	–	–	–	–	–	–	1
Total	66	13	23	3	3	4	2	114

with the typical round globules, defining it as a variety of bloodstone (SF1.293).

Four pieces from the project were defined as baked mudstone (SF6.607, 15.079, and 15.144), and this raw material was probably procured from sources in the Staffin area at the northern tip of Skye (Saville *et al.* 2012). This raw material was formed by the alteration ('baking') of fine-grained sediments, and it occurs within local igneous rock formations. It ranges in colour from dense black through grey to light olive-grey and fawn, and it is always opaque. Colour and texture relate in part to the extent to which the local mudstone was exposed to heat. Slightly confusingly, this raw material has occasionally been referred to as banded mudstone, but although fresh samples do display very fine foliation, archaeological samples are generally monochrome (Saville *et al.* 2012, figs 23–4). Most archaeological samples are also notably affected by weathering, giving these pieces a powdery surface. The four pieces from the project are all heavily weathered, with somewhat obscured superficial features.

Agate is simply a form of chalcedony displaying concentric banding and it is usually found in igneous rock formations (Pellant 1992, 88). The raw materials of four pieces remain indeterminate. In addition, one polished axehead (SFTP13.001) is thought to be in Cumbrian tuff (Group VI; Clough 1988, table 3), and as such it represents importation from the Great Langdale area in the Lake District, northwest England (Bradley and Edmonds 1993).

12.4.4 The assemblage

General characterisation of lithic artefacts

As shown in Table 12.38, above, the excavated assemblage includes 114 lithic artefacts, distributed across a minimum of seven geological raw materials. Eighty-five pieces are debitage, whereas five pieces are cores and 18 are modified tools. Six are used pieces and two quartz crystals and one agate pebble may have been collected and kept either as potential raw material or for non-functional reasons.

Debitage: The flakes are generally hard percussion or bipolar pieces representing either waste from the decortication/shaping of cores, or blanks for tool production. Flint and baked mudstone microblades (W < 8 mm) were manufactured by the application of soft percussion and they may be datable to the later Mesolithic period or the earliest part of the Early Neolithic (Saville 2004; Ballin 2015a).

Cores: The cores include one single-platform core, two irregular (multi-directional) cores, and two bipolar cores. The single-platform core (SF20.022)

may have been intended for microblade production (21 × 21 × 13 mm), but it is a fairly unsophisticated piece with a cortical platform. One small flake was detached from the core's apex, possibly due to the use of an anvil, suggesting (in conjunction with the cortical platform) that it may in fact be an early stage, atypical bipolar core. None of the cores is diagnostic.

Tools: The tools include one polished stone axehead, one leaf-shaped arrowhead, the tip of a bifacial point, one microlith, a scale-flaked knife, three short end-scrapers, one thumbnail-scraper, one side-scraper, and three likely fire-flints. The tools are mostly in flint, although the axehead is in Cumbrian tuff, two scrapers are quartz, and the leaf-shaped arrowhead is a weathered piece in either coarse-grained flint-like chert or, more likely, a form of meta-sedimentary rock.

The stone axehead (SFTP13.001) is a rather plain piece (Fig. 12.59), with two fairly convex and uneven broad-sides. One lateral side was formed by merging the two broadsides (one knapping seam), whereas the other lateral side has an actual polished side-facet (two knapping seams). The two broadsides, as well as the side-facet, are only partially polished, leaving large visible flake scars. The butt may originally have been pointed or rounded but probably broke off, whereas the edge has been heavily damaged, either in prehistory or after deposition in the ground. The piece measures 121 × 58 × 33 mm, and it is heavily weathered (abraded/rounded). It was manufactured by the application of a variety of reduction techniques: initially a roughout was shaped by flaking; then one lateral side was formed by pecking; and finally, the two broad-sides and one lateral side were polished. The axehead, with its somewhat irregular shape, is clearly a functional piece and not a piece meant to impress (*cf.* presentation and discussion of the polished stone axeheads from Shetland Museum; Ballin 2015b).

The leaf-shaped point (SF19.009) is approximately drop-shaped, and measures 19 × 13 × 3 mm. The tip of a bifacial point (SF20.004) may be from a leaf-shaped, oblique, or barbed-and-tanged arrowhead (9 ×11 × 2 mm). The site's solitary microlith (SF5.012) is a hybrid between a scalene triangle and an asymmetrical crescent (15.3 × 5.1 × 2.1 mm), and it has fine retouch along its entire circumference. SF2.409 is the burnt fragment (37 × 51 × 10 mm) of a well-executed piece. Due to exposure to fire it has lost parts of its ventral face and probably also its left lateral side. Along its broad distal end it has a pressure-flaked edge, which may be a cutting-edge, defining this piece as most likely the remains of a scale-flaked knife (for distinction between scale-flaked and plano-convex knives, see Ballin 2011).

Short end-scraper SF20.030 is a simple piece with a slightly convex distal scraper-edge (36 × 30 × 11 mm); short end-scraper SF6.233 is a fairly well-executed piece with a pressure-flaked convex distal scraper-edge – with dimensions of 30 × 27 × 7 mm it is too large (see below) to be called a thumbnail-scraper, although it is typo-technologically related to such pieces; and SF14.015 is a distal scraper-edge fragment of a short end-scraper (GD = 17 mm). The collection includes one thumbnail-scraper, namely SF15.440; it measures 22 × 24 × 9 mm, and it has a neat pressure-flaked convex distal scraper-edge. In the analysis of the scrapers from Dalmore, Isle of Lewis, the author (Ballin 2002) suggested a maximum length of 23 mm for Western Isles thumbnail-scrapers, but they may be slightly larger in, for example, eastern Scotland where there is more, and better, flint available along the shores in the form of larger pebbles and cobbles (Ballin 2015a). One fragmented simple side-scraper (SF6.338) has a convex scraper-edge along its longest lateral side (GD = 35 mm).

Three fire-flints (SF2.024, GD 16 mm; SF14.034, GD 19 mm; SF2.537, GD 17 mm) are flakes which have been modified by simple flaking and from being struck by a steel strike-a-light (Ballin 2005). The latter tended to form lateral concavities. SF2/537 may be based on a 'decommissioned' gunflint. If this is the case, the amber colour of the piece defines the original gunflint as a French piece, and the general shape of the artefact defines the fire-flint as being based on an old-style, flake-based gunflint (a so-called gunspall; Ballin 2012). The assemblage also includes five simple edge-retouched pieces.

Several of the formal implement types are diagnostic (Butler 2005):

- The polished stone axehead is definitely post-Mesolithic, and most likely Early Neolithic; it is uncertain exactly when the exchange in Cumbrian tuff stopped, and it is therefore possible that the piece could be slightly later, but in southern Scotland Cumbrian tuff is frequently encountered as part of a 'material culture package', which also includes Arran pitchstone and pottery of the Carinated Bowl Tradition (Ballin 2009)
- The leaf-shaped arrowhead is Early Neolithic
- The tip of a bifacial arrowhead is datable to the Neolithic–Early Bronze Age period
- The size and shape of the site's solitary microlith defines it as Late Mesolithic
- The scale-flaked knife may be dated broadly to the Neolithic–Early Bronze Age period
- The thumbnail scraper and short end-scraper SF 6.233 are defined by their pressure-flaked working-edges as most likely Early Bronze Age pieces
- The fire-flints are generally datable to the period where steel strike-a-lights were used, that is, the Iron Age to post-medieval period, and
- if fire-flint SF2.537 is truly based on an exhausted French gunspall it probably dates to the 1600s AD.

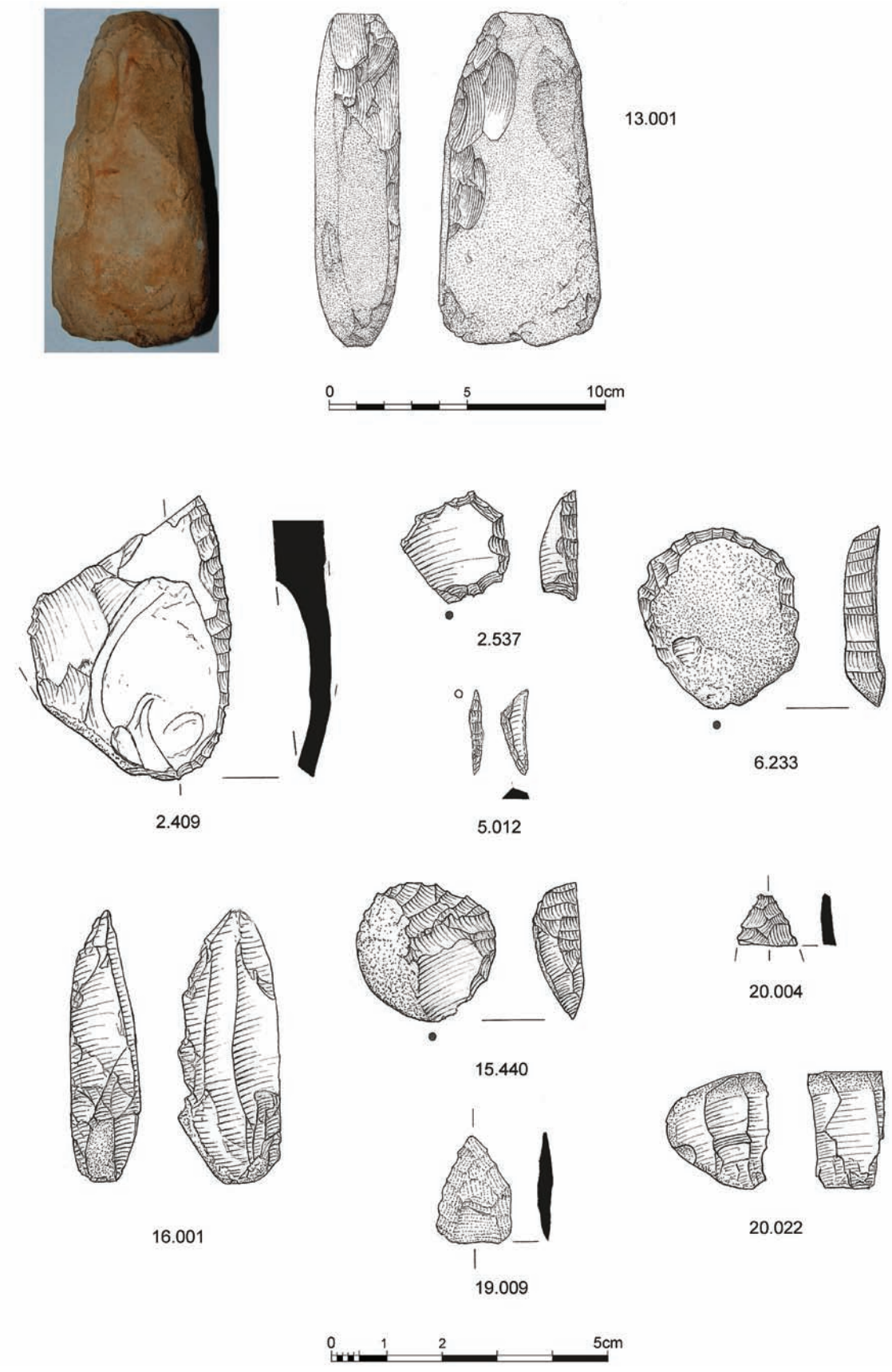


Figure 12.59 Lithics: Stone axehead SF13.001, burnt possible scale-flaked knife SF2.409, fire-flint SF2.537, microlith SF5.012, short end-scraper SF6.233, ??? SF16.001, thumbnail scraper SF15.440, bifacial point tip SF20.004, leaf-shaped point SF19.009, single -platform core SF20.022

This basically indicates activity at the site through the entire early prehistoric period, as well as in later prehistory and post-medieval times.

A small group of pieces formed by use, or possibly collected for later reduction, include one flint flake with lateral use-wear; two quartz crystals with terminal bruising (SF2.037; SF2.521); two unworked quartz crystals; and one agate pebble. The crystal SF2.521 has the most notable terminal wear; it is clearly abraded and may have been used either for finer lithic reduction, fire-making (by striking a piece of pyrite; Stapert and Johansen 1999) or possibly to rub other (as yet indeterminate) materials.

Distribution of the High Pasture lithic artefacts

Scrutiny of the site matrix and its associated radiocarbon dates shows that the High Pasture complex was used on a regular basis from the Early Bronze Age and through the pre-Roman Iron Age (*c.* 2140 cal BC to 1 cal BC). A number of artefacts pre-dating the Early Bronze Age are therefore most likely to be residual in relation to the main site activity, such as the microlith (SF5.012) and the leaf-shaped point (SF19.009). The polished Early Neolithic stone axehead (SFTP13.001) may represent an exception from this scenario. It was recovered from the top fill of an Iron Age feature (Context TP13.01; Block 11/Phase 7), and given its relative completeness, size, execution, and exotic raw material (probably Cumbrian tuff) might be a curated object, which was found in the landscape, kept, and venerated by later Iron Age people using the site. Well into the post-medieval period (Evans 1897, 57), prehistoric polished stone axeheads were collected by farmers and frequently buried within a house to protect against lightning strikes and fire in general ('thunder bolts').

C17.09 and C17.10 (Block 24/Phase 1b), located at the north end of Bone Passage in the cave (SUERC-23633; 1320–1110 cal BC) and C19.28 (Block 30/Phase 1a), a former ground surface (SUERC-28062; 2140–1920 cal BC), were well-sealed Early Bronze Age contexts. C19.28 was associated with a number of features at the surface above the cave including ard marks, small pits and stakeholes, a possible kerbed cairn with a recumbent squat standing stone, and Beaker and Food Vessel ceramics. The sediment comprising the old ground surface contained some lithics, although no diagnostic pieces. Three simple flint flakes (SF17.022, 17.103) were recovered from C17.09, while three simple flint and quartz flakes (SF19.142, 19.150, 19.151) were recovered from C17.10. These contexts also produced a large cache of Early Bronze Age ceramic sherds (see Section 5.4).

Three pieces were identified as being probably Yorkshire flint (SF2.550, 19.133, as well as an unnumbered piece from Trench 6), and they were recovered from C2.71 (Block 18/Phase 2a), C6.04 (Block 29a/Phase 6a), and C19.11 (Block33/Phase 4). In Scotland, Yorkshire flint is generally associated with the Middle and Late Neolithic periods, with the earliest and latest examples of use being dated to the latest part of the Early Neolithic and the earliest part of the Early Bronze Age (Ballin 2011). However, at High Pasture, these three pieces were recovered from contexts which all date to the Early to Middle Iron Age periods, and clearly represent residuality.

Three pieces (SF14.037, 6.222, 1.293) of worked bloodstone (which is generally associated with early prehistoric use; Wickham-Jones 1990; Ballin 2014), were all found in Early to Middle Iron Age contexts (Blocks 27c/Phase 5b; Block 29a/Phase 6a; and Block 32/Phase 3); three pieces (SF6.607, 15.079, 15.144) of baked mudstone (the use of which has been associated with early prehistoric exploitation, but with poorly defined dates of the earliest and latest use; Saville *et al*. 2012), were also retrieved from Early to Middle Iron Age contexts (Blocks 7e/Phase 3e; 8c/Phase 4c; and 25a/Phase 2a); and four pieces of unworked (SF15.270, 19.002) and worked strike-a-lights? (SF2.031, 2.521, and quartz crystals received similar dates.

Diagnostic prehistoric implements, such as the bifacial arrowhead (SF20.004), scale-flaked knife (SF2.409), and thumbnail-scraper (SF15.440), all typo-technologically datable to the Early Bronze Age, were recovered from Early to Middle Iron Age contexts (Blocks 8b/Phase 4b; 10/Phase 6a; and 11/Phase 7). Fire-flints SF2.024 and SF14.034 were retrieved from Early and Middle Iron Age contexts respectively (Blocks 7c/Phase 3c and 19/Phase 3a), while the possible gunflint SF2.537 was recovered from post-abandonment deposits at the surface (Block 36/Phase 8).

12.4.5 Conclusion

The lithic assemblage recovered from High Pasture includes artefacts from several early prehistoric periods (Mesolithic, Neolithic, and Early Bronze Age), while the fire-flints (including the re-used gunflint) may date to the Iron Age and later periods. Most early prehistoric finds from the site are residual, revealing little about the earliest activities there, while the Early Bronze Age material appears to relate more directly to activities taking place at the surface, above the cave. The only firm information gained through examination and analysis of this assemblage is that the site was continually visited throughout early prehistory, with some possible (unsystematic) use of lithics in later prehistory, as well as possibly curation of more impressive early prehistoric pieces by later settlers (*e.g.* the polished stone axehead SF13.001). The assemblage reveals that lithic raw materials were obtained by people using the site from a variety of mostly local Hebridean sources, such as the Staffin area at the northern tip of Skye (baked mudstone), and Rhum (bloodstone), although one piece – the polished stone axehead – derived from northwest England. Three pieces may be Yorkshire flint.

12.5 Worked bone and antler

Gemma Cruickshanks and Fraser Hunter with contributions by Julia Gerken and Sheena Fraser

12.5.1 Introduction

A well-preserved assemblage of 256 worked bone, antler, and tooth artefacts was recovered (Table 12.47). Most of the assemblage comprises tools, with 121 examples, overwhelmingly points of various sorts (75 examples). The second dominant category was manufacturing evidence, with a wide range of antler offcuts and prepared pieces, and bone and antler roughouts. Fittings of various sorts are also well represented. Other categories are sparser: 13 personal items (primarily simple pins, with two combs and one pendant) and three items of weaponry, comprising two spearheads and a decorative hilt fitting fashioned from a sperm whale tooth, most likely for a sword or dagger. This is the only evidence of cetacean exploitation.

The character of the assemblage is typical for Iron Age settlements, as discussed below, but given the nature of activity at the site it is not clear how much material was being actively used there or working debris being generated. There are two clear caches of tools within the cave and one plausible instance of a representative 'set' of antler-working debris being deposited, a reminder that this material need not all represent on-site working as would normally be assumed. The question of deposition circumstances is reviewed elsewhere; this report will review the raw materials being used; working evidence; production technology; a summary of the key categories present; and the wider context. The catalogue includes synthetic discussion of each category of finds.

Table 12.47 Bone object summary, including raw materials and phase

Group	*Type*	*Total*	*Raw materials*			*Ph*							*Identifiable roughouts (Ph)*
			Bone	*Antler*	*Other*	*1*	*2*	*3*	*4*	*5*	*6*	*?*	
Personal (13)	Combs	2	–	2	–	–	–	–	1	–	1	–	
	Pins	10	10	–	–	–	1	6	3	–	–	–	2 (3e/4a, 3e)
	Pendant	1	–	1	–	–	–	–	–	1	–	–	2 (5b, 6b)
Tools (121)	Hide-rubber/ scrapers	3	3	–	–	–	–	2	–	1	–	–	
	Spindle whorls	4	4	–	–	–	–	3	1	–	–	–	2 (4c)
	Needles	13	13	–	–	–	3	7	2	–	1	–	2 (2a)
	Anvils/ work-surfaces	6	–	6	–	–	2	2	–	–	1	1	
	Tool handles	8	–	8	–	–	2	2	–	2	2	–	6 (3, 3e/4a, 3 × 6b, us)
	Other	12	4	8	–	–	1	3	1	1	4	2	
	Double-ended points	4	4	–	–	–	–	–	1	–	3	–	1 (3e)
	Points	71	49	22	–	1	13	19	18	11	7	2	9 (2a, 2 × 2b, 2 x 3a, 3b, 4c, 5a, 6b)
Weaponry (3)	Spearheads	2	–	2	–	–	–	1	1		–	–	
	Hilt fitting	1	–	–	1	–	–	–	–	1	–	–	
Fittings (24)	Pegs	10	–	10	–	–	3	2	2		3	–	7 (5b, 6 × 6b)
	Mounts	7	–	7	–	–		2	–	1	4	–	1 (6b)6b
	Other	7	3	4	–	–	1	1	–	2	2	1	
Bone manufacturing (13)	Roughouts	13	13	–	–	–	5	4	3	1	–	–	
Antler manufacturing (82)	Offcuts	24	–	24	–	–	2	8	1	2	9	2	
	Prepared portions	28	–	28	–	–	4	3	3	3	13	2	
	Roughouts	23	–	23	–	–	–	6	–	2	13	2	
	Worked antler	7	–	7	–	–	–	1	–	–	4	2	
Total		256	103	152	1	1	37	72	37	28	67	14	
					Ph Total	1	26	50	30	20	28	6	

12.5.2 Raw materials

Of the 267 fragments studied (from 256 artefacts), 111 are bone or probable bone, 155 are antler, and one is tooth. Many items are heavily worked and manufactured from small fragments of larger bones, making it difficult to identify exact species or skeletal element. Selection of material type would have been based on several factors: availability, butchery techniques, and the physical properties of particular types in relation to artefact function.

Table 12.47 shows clear selection patterns for raw materials according to function. Antler's shock-absorbing properties made it ideal for handles, anvils/working surfaces, and a varied range of other expedient tools. It was also the preferred material for mounts and pegs, the former an obvious product from split strips of antler beam, the latter again because antler is a resilient material whereas bone would tend to shatter if put under stress. Antler was not restricted to purely functional items; a pendant and two combs are more personal objects. Bone was the preferred material for pins and needles because it could readily be sharpened and polished, and the form of femur heads made them ideal for spindle whorls. The working properties of bone, especially when split and shaped, made it the natural raw material for hide-scrapers and points. Antler was also used for an unusual and distinctive range of points, discussed below, which seem to be a textile tool; given the evidence of rotational wear on their tips, antler would be well-placed to resist any pressures it was put under. While this particular group of finds is unusual, the selection of raw material in relation to artefact type is otherwise quite typical for the Scottish Iron Age.

Of the 42 bone items which could be identified more specifically than just 'mammal', large mammal bones are most abundant (36). Sixteen could be more closely identified: three cow, 12 red deer, and one pony. Far fewer medium-sized mammals were present (6); these could be sheep, goat, or roe deer, but only sheep/goat was confirmed, although roe deer is attested by two antler fragments. A bird bone point (SF15.142) and needle (SF2.245) are too heavily worked or fragmented to determine species. The quantity of red deer bone attested is notable and confirms the evidence from the antler-working, where both shed and butchered antler is represented, although the former is more prevalent. The nature of red deer exploitation varied regionally across Iron Age Scotland, influenced at least in part by their rarity or absence on some island groups. Antler may have been exchanged as a desirable raw material as antler objects are widely distributed, but artefacts made from deer bones are more likely to reflect local hunting. The topic has not seen detailed synthesis, not all bone artefact reports include species identifications, and many bones are unidentifiable once modified, but a survey of major reports indicates that deer bone artefacts are absent or exceedingly rare on the Outer Hebrides (but see Hallén 1994b, 194–5), Tiree, Shetland, but are attested on Mainland Orkney (Ballin Smith 1994, 169) and within the wider archipelago (Davies 2007, 358, 360, 369; Smith 2007, 498), and on the Scottish mainland. There are, however, indications of varied use of deer bone in areas where antler was abundant, with deer bone tools present at Sculptor's Cave, Moray (Cruickshanks and Hunter 2020), but not certainly attested in the antler-rich assemblage from Broxmouth (Armit and McKenzie 2013), indicating cultural differences in perceptions of how deer should be treated: a topic requiring broader investigation than is feasible here.

Specific skeletal element could only be identified on 29 items (a further 21 could be identified simply as 'long bone'), mostly the less-modified items like points (Table 12.48). Aside from one scapula and one possible rib, the other identifiable elements are all limb bones, particularly metapodials.

Cetacean bone is notable by its absence; the only evidence of cetacean exploitation is the likely hilt fitting made from a sperm whale tooth (SF6.254; identification by Sonia O'Connor). Given how extensively cetacean bone was exploited elsewhere in Atlantic Scotland (Hallén 1994b, 198) this presents a curious anomaly. Other Iron

Table 12.48 Summary of identifiable skeletal elements by artefact types

Object type		*Skeletal element*						*Total*
		Scapula	*Rib?*	*Humerus*	*Femur?*	*Tibia*	*Metapodial*	
Personal	Pin	–	1	–	–	–	–	1
Tool	Whorl	–	–	4	1	–	–	5
	Hide-rubber/scraper	–	–	–	–	1	2	3
	Shaft point	–	–	–	–	–	9	9
	Splinter point	–	–	1	–	–	1	2
	Broken point	–	–	–	–	1	6	7
Roughout	Pin?	–	–	–	–	–	1	1
Other	Perforated disc	1	–	–	–	–	–	1
Total		1	1	5	1	2	19	29

Age assemblages from Skye are also lacking cetacean bone (either worked or unworked), *e.g.* Fiskavaig rock-shelter and Dun Ardtreck broch (MacKie 2000).

12.5.3 Working evidence

Working evidence forms a significant proportion of the assemblage and offers insights into both processes and products. It is dominated by antler-working debris (52), and antler roughouts (23); a small group of bone roughouts (13) is also present (Table 12.47). Only two fragments were identified as roe deer antler; the remainder of the antler is either red deer or undiagnostic. Surviving basal portions indicate both naturally shed antlers (9) and those from dead animals (5) were utilised.

Dismembering an antler followed a fairly standard process whereby the tines and junctions were removed by chopping or sawing, leaving reasonably straight beam sections which could be used to make a range of handles, combs, and various tools and fittings (*e.g.* MacGregor 1985, fig. 42). While beams and tines were the more desirable sections for creating objects, burrs and junctions were also occasionally utilised, for instance as hammers or parts of picks (Fig. 12.60).

The range and form of working evidence in an assemblage can provide clues as to which types of artefacts were being created. Tine offcuts and prepared beam segments and strips are the most common forms; this is not simply the leftovers of antler-working, but a valuable resource which was still to be used.

Antler-working debris was deposited throughout the use of the site in small quantities, with a distinct concentration comprising the full range of antler parts from Phase 6 (SB 29a–c) in redeposited midden material within Bone Passage (predominantly C.1.01, C6.03, and C17.03). This may represent a deliberate deposit of a representative suite of antler working-related material.

Bone-working is represented by roughouts rather than working debris (Figs 12.61, 12.62). The unfinished bone objects are all small objects, mostly formed from thin sections of mammal long bone too heavily worked to identify more closely. A few are worked sufficiently far to determine their intended function (*e.g.* unfinished needles SF3.35 and SF15.339; whorls SF2.124, 2.429) while others were at earlier stages of shaping and can only broadly be grouped as unfinished pins, needles, or points (*e.g.* SF6.359, 15.394, and 17.007).

12.5.4 Production technology

The toolmarks preserved on this assemblage provide a glimpse of manufacturing techniques (detailed in the archive catalogue and summarised in Fig. 12.63). A range of clean cut-marks indicate the use of fine metal blades for trimming and cutting, and heavy chopping blades, such as an axe or cleaver, for more major work such as dismembering antlers. There are nine occurrences of saw marks of varying widths, with fine saw blades (0.5 mm thick) used on the comb fragments and decorated handle (SF2.383, 15.316, 17.016) and more robust saws (1.5–2 mm thick) used for cutting antler portions. The tool marks are a valuable form of proxy evidence for the use of tools like heavy metal blades and saws, which very rarely survive archaeologically.

Techniques which did not involve metal tools are also evident, namely abrading and splitting. Along with blade-trimming, abrasion with sandstone or pumice was the main form of artefact shaping. Examination of toolmarks over time shows a shift from splitting and abrasion as the main identifiable manufacturing techniques, to the predominant use of metal blades. Similar analysis undertaken on the Broxmouth worked bone and antler assemblage showed a notable increase in sawing compared to other techniques over time (Hunter *et al.* 2013, illus 10.13). Saw marks are notably rare in the High Pasture assemblage, whereas analysis of the worked bone and antler from 1st/2nd century AD Fiskavaig showed a marked increase in the proportion of saw marks (51 of the 88 objects showing tool marks). This suggests that saws only came into common use after artefact deposition ceased at High Pasture.

12.5.5 Object range

The range of bone and antler artefact types is summarised by phase in Table 12.49. Tools, especially a diverse spectrum of points, dominate the assemblage, with smaller numbers of personal items, fittings, and weapons broadening the range of objects. The main artefact groups (tools, personal items, and fittings) are found in all phases though there are chronological trends within this. Table 12.49 provides the raw data; Figure 12.64 visualises this, and Figure 12.65 expresses it as a proportion of each phase.

At a broad level, personal material makes up a higher percentage of the assemblage in Phases 3 and 4; tools are proportionally most abundant in Phases 2 and 3; bone manufacturing roughouts are restricted to the earlier phases, while antler manufacturing, although found in all phases, is notably abundant in Phase 6. There are some striking subtleties within this (see Table 12.49). For example, textile-related tools (whorls and needles) are almost exclusively restricted to earlier phases (2–4), a pattern confirmed by roughouts, while the heavily modified forms of points are from later Phases 4–6. Anvils/working surfaces are likewise predominantly from Phases 2–4, and pins overwhelmingly from Phase 3 and, to a lesser extent, 4. It is clear there are shifts in patterns of use or deposition over time. Fittings such as handles and mounts, by contrast, occur consistently in both earlier and later phases (though Phase 4 is a little sparse).

The main categories are summarised below, followed by a general discussion; more detail and catalogue tables can be found towards the end of this report.

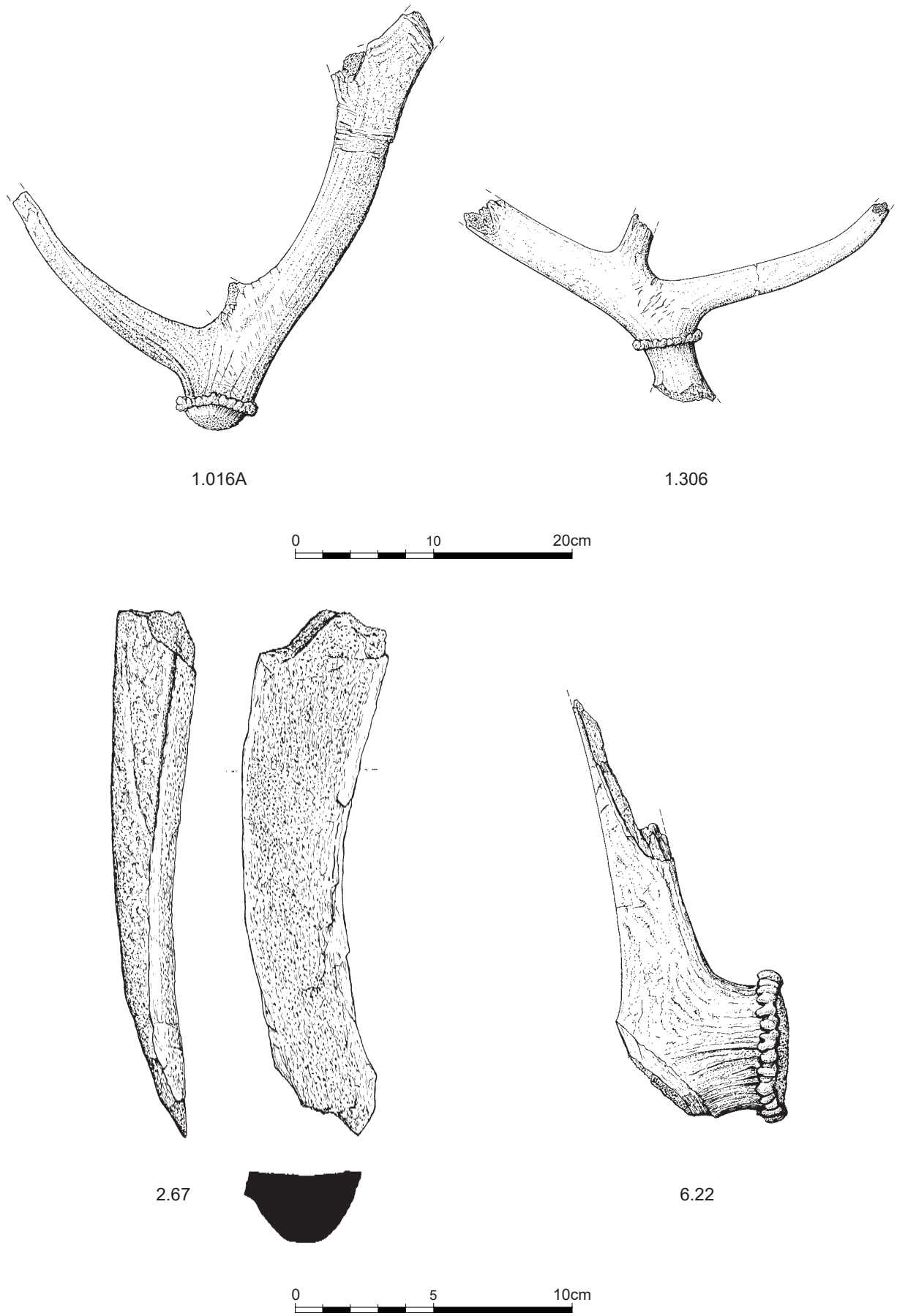


Figure 12.60. Worked antler: SF1.016a, SF1.306, SF2.67, SF6.22



Figure 12.61 Antler working including SF1.016a (top)



Figure 12.62. Hilt fitting SF6.254 manufactured from a sperm whale tooth

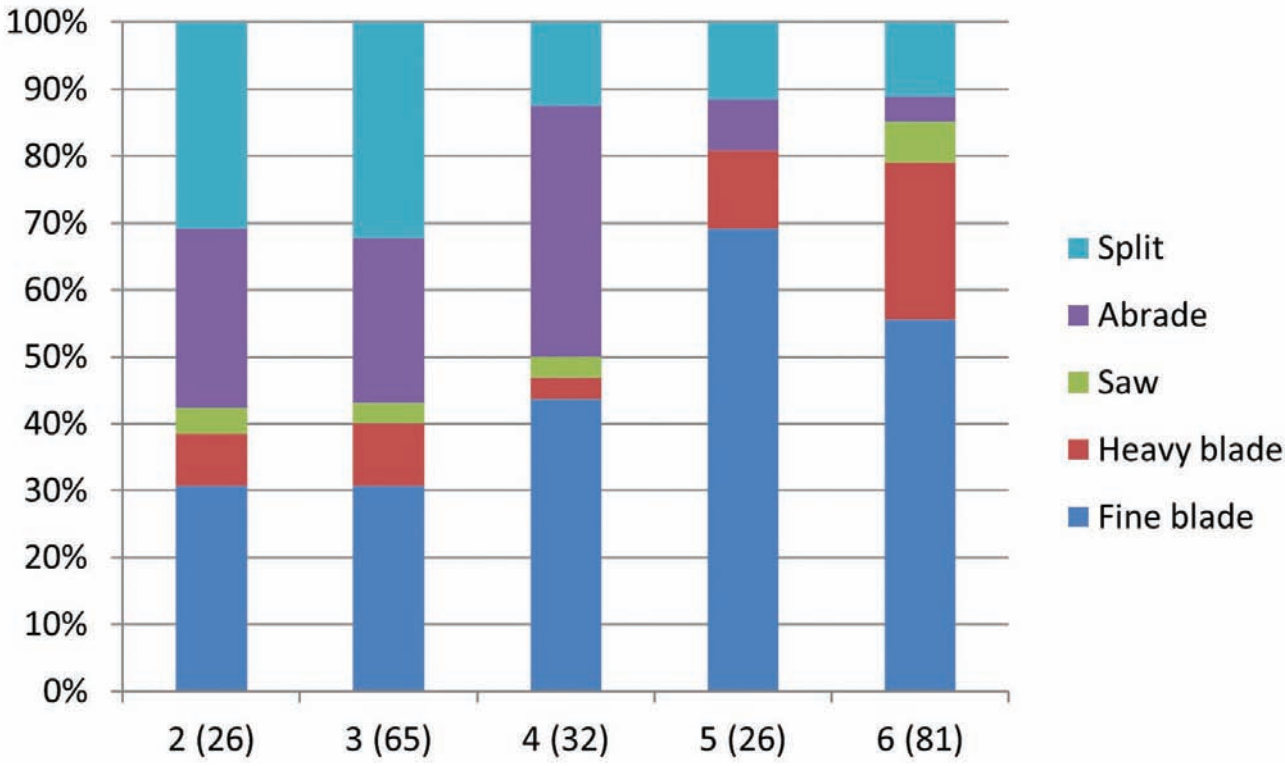


Figure 12.63. Manufacturing techniques noted on all worked bone & antler by broad phase (number of objects shown in brackets; note that one can show multiple toolmarks)

Table 12.49 Summary of broad artefact categories by Phase

Ph	*1*	*2*	*3*	*4*	*5*	*6*	*?*	*N*
Personal	–	1	6	4	1	1	–	13
Tool	1	21	38	23	15	17	5	121
Weaponry	–	–	1	1	1	–	–	3
Fitting	–	4	5	2	3	9	1	24
Bone manufacture	–	5	4	3	1	–	–	13
Antler manufacture	–	6	18	4	7	39	8	82
Total	1	37	72	37	28	67	14	256

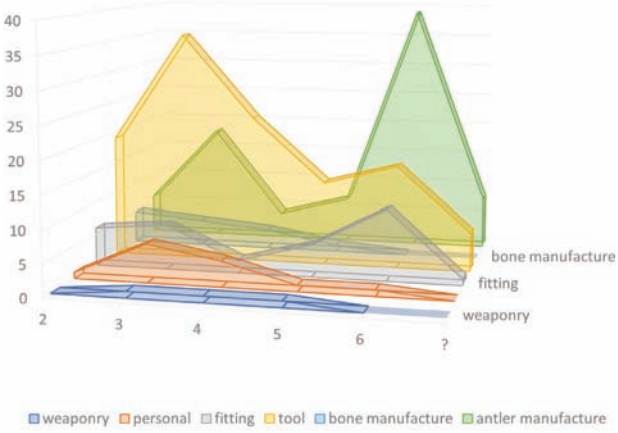


Figure 12.64. Variation in main categories of bone & antler object by phase (absolute numbers)

Tools

Tools form a significant component of the assemblage (47%). Points of varying form are the most common tool type, with 75 examples. They range from simple expedient types to heavily modified examples with distinct wear traces; this must indicate a range of roles, discussed more fully in the catalogue. Some examples are likely to be awls for hide-working; some show wear indicative of textile-working; but the range of potential uses for points is wide, and use-wear analysis to clarify this is an important element for future research.

The function of some tools is more certain than others. Textile-working is well represented: the 13 needles and four spindle whorls can probably be augmented by the groups of antler points with distinct polished rotary wear around their tips. Hide-working tools are also a recognisable component: hide-rubbers/scrapers for preparing hides, sharp awls for piercing hide, and a thong-stretcher for preparing leather thongs.

The use of some tools remains obscure. Among the fine tools, SF2.238 has been very finely shaped into a delicate strip with ring-head (for suspension?); it lacks the fine finish of a decorative object, but shows polish on the tip, indicating it had been used for some rubbing or polishing function. The suspension loop suggests it was quite a personal item. SF6.268h has a spatulate tip suggestive of a modelling tool, for use on pottery or wax, and the curious tools with facetted profile and rounded tips may similarly be craft related. Heavier tools include

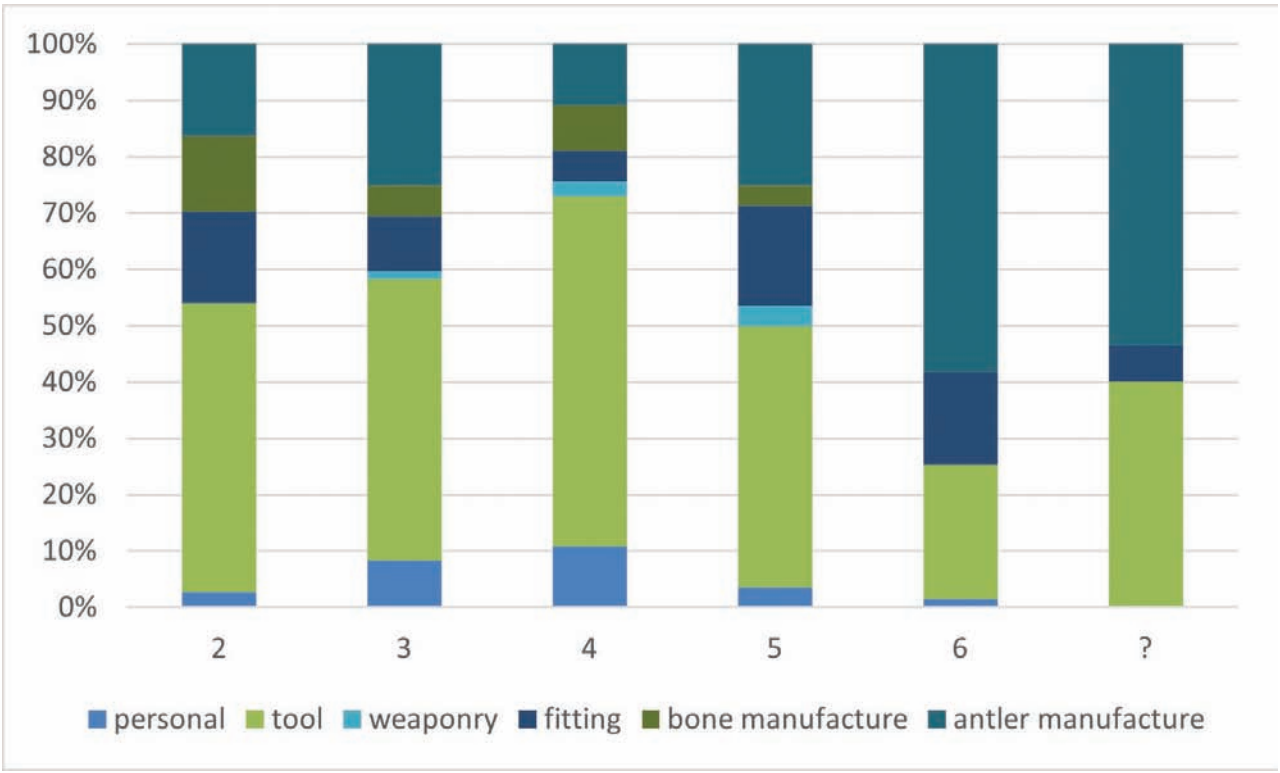


Figure 12.65. Proportions of different categories by phase. For data see Table 12.49

a few picks or related items, and some antler tool-heads, the inserted working tips now gone.

Eight antler handles had utilised beam or tine portions; most are broken, probably in use, and are most likely tool handles, their scale indicating a range of uses from fine tools (including one with a decorated handle; SF2.383) to heavy duty ones. A group of 11 antlers or antler parts display evidence of use as anvils or work-surfaces. The indents on the anvils are a range of shapes, including fine linear marks which may have been made with the tip of a knife or dagger, and oval, lentoid, and diamond-shaped indents from iron awls or similar tools. Antler is a good shock-absorber (better than bone; MacGregor 1985, 29) and would have made an ideal expedient anvil for tasks such as piercing hides.

Ornaments

Personal items comprise ten pins, two combs, and a pendant. There are also roughouts for a further two pins and two likely pendants, plus one needle reshaped to form a pin. The pins are simple and undecorated, with plain or splayed heads typical of the Early to Middle Iron Age (*e.g.* Hunter 2006, 145–7; Davies 2007, illus. 7.7.3). Further pin tips may lurk among the assemblage of point fragments; the polished tip along cannot be shown to be a pin rather than a needle.

Three small fragments come from two combs. These are most likely to be small single-piece combs; they are made from strips of antler too thin to be long-handled combs and the fragments of the better preserved one are too broad to come from a composite comb (which would anyway be surprising on a site of this date). Such single-sided combs are a known Iron Age type with clusters from broch sites in Caithness and the Northern Isles and a smaller group of hump-backed forms in southern Scotland, Ireland, and the Isle of Man (Hunter *et al.*, 269–70). Securely dated examples span the 3rd century BC to the 4th century AD. Two fragments from one comb (SF15.316a–b) display finely sawn decoration comprising a longitudinal groove intersected by a series of short, perpendicular grooves extending beyond the teeth; the other comb also has traces of linear ornament. Decoration is notably rare within this assemblage (see below), distinguishing these personal objects as special.

A simple antler ring has polishing around the edges suggestive of being worn as a pendant (SF264). Two further potential pendant roughouts are made from tine tips (SF15.099, perhaps SF61), but were not worked sufficiently to show how they would have been suspended.

Weapons

Only two certain weapons are present, both spearheads formed from socketed, sharpened antler tines (Phase 3b/SB7b and Phase 4b/SB8b). Fractures on one are likely to have occurred through use during hunting or inter-personal violence. Parallels are discussed in the catalogue section. A likely third example is a well-polished bead of sperm whale ivory. Its flattened faces suggest it was not a bead for wearing, either alone or in a necklace, but was fitted into another component. A plausible interpretation sees it as a sword or dagger hilt fitting. Examples of both pommels and hilt guards are known in both ivory and bone from the Atlantic Iron Age (Rynne 1983), and on some of the swords from the South Cave hoard, East Yorkshire (O'Connor 2013). None of these offers a specific parallel, but such bead-like hilt fittings in bronze are familiar on Late Iron Age swords (*e.g.* Stead 2006, nos 203, 205, 208, 234, 236). This fitting is the only evidence of cetacean exploitation in the assemblage; items of ivory are generally rare and would have been prestigious.

Fittings

Some 24 objects were types of fitting, mainly pegs and perforated mounts. Two antler mounts were probably attached to organic material, as decoration or for strength, and still contain attachment pegs, indicating a likely function for the other pegs. Other fittings include two crudely shaped hooks and perforated or hollowed antler which could have served a variety of expedient functions.

12.5.6 Decoration

Decoration is extremely rare in the assemblage. The two small combs (SF15.316, 17.016) have remains of linear ornament created with saws and knives, though too little survives to indicate the pattern. There are also fragments of a remarkable decorated handle with a spiralling pattern executed with a fine saw (SF2.383). Otherwise, the material is notably functional; the pins, for instance, show little elaboration. Decoration is an infrequent feature of Iron Age worked bone and antler assemblages, but it is particularly sparse here given the scale of the assemblage; Broxmouth, for instance, had 15 decorated items in an assemblage of 190 finished objects (Hunter *et al.* 2013, 260–1).

12.5.7 Use, re-use, and repair

The condition of the objects varies notably (Table 12.50). Most were broken or otherwise incomplete when deposited and had either reached the end of their use-life or were deliberately broken on deposition (the latter was not proven, but there has been little experimental work to differentiate the two). Most fittings such as handles or mounts were broken when deposited, for instance, and while pegs were generally complete, they represent only components of dismantled items. Other common categories have a notably higher proportion of intact and still usable items: pins, whorls, needles, and points. In the case of points, much of this arises from two caches which were clearly deliberately deposited in the cave (SF6.189 and SF6.268). While the other intact items could be accidental losses, these instances of deliberate deposits open the possibility that some of these other

Table 12.50 Condition of objects when deposited

Group	*Type*	*Intact*	*Broken*	*?*	*Notes*
Personal	combs	–	2	–	
	pins	4	6	–	
	pendant	1	–	–	
Tools	hide-rubber/scrapers	2	1	–	
	spindle whorls	3	1	–	
	needles	6	7	–	
	anvil/work surfaces	–	5	1	
	other tools	0/2	6/3	0/1	light/heavy tools
	double-ended points	4	–	–	
	points	25	40	6	2 caches of 13 intact points
Weapons	spearheads	1	1	–	
	hilt fitting	1	–	–	Component only
Fittings	pegs	8	2	–	Component only
	mounts	1	6	–	
	handles	1	7	1	
	other	–	5	1	
Manufacture	roughouts	20	33	11	
Totals		77	116	20	

intact items were likewise deliberately placed. There is no clear preference for intact items to be found in cave rather than non-cave deposits: with needles, 50% of cave finds were intact and 43% of precinct/surface finds, and with points, the figures were 41% and 33%, sufficient to treat as comparable.

It is perhaps noteworthy that no intact pins came from the cave; all are from non-cave trenches. Intact pins can readily be seen as tokens of an individual, and it is likely that whorls and needles were similarly personal, especially when the evidence for repair and extended use of needles is considered. Evidence of repair or re-use is sparse in the assemblage (11 instances; Table 12.51), and mostly consists of expedient use of pieces of antler as work-surfaces (five instances), but three of the needles show evidence of repair or re-use, indicating they were valued. One was reshaped as a pin, a highly personal item (and one further pin was also reworked). A number also show extensive polish or staining from wear (*e.g.* SF6.87, 15.187) which indicates they saw long lives.

12.5.8 The assemblage in context

The worked bone and antler assemblage from High Pasture exceeds all others on the Isle of Skye in scale. The closest comparison is that from Fiskavaig rock shelter which produced over 100 worked bone and antler artefacts. Around 20 such artefacts were recovered from Dun Ardtreck (MacKie 2000), plus an unquantified amount of antler-working debris. Other published assemblages from the island are sparse; Dun Iardhard produced no worked bone (Macleod 1915) and Dun Beag only two items (Callander 1920). The other worked bone/antler assemblages on Skye either date to later stages of the Iron Age or cannot be closely dated.

Although there have been important studies on Iron Age worked bone in Scotland (*e.g.* Hallén 1994b), there has been no synthetic overview. Discussion here focuses on sites studied in recent years by a consistent methodology at National Museums Scotland (Mine Howe, Orkney; Fiskavaig, Skye; Applecross, Wester Ross; Broxmouth, East Lothian; the site reports are all currently unpublished with the exception of Broxmouth: Hunter *et al.* 2013). To this are added two other assemblages where the artefacts (but not working debris) were assessed by the same methodology (Howe, Orkney; Scalloway, Shetland). Although not seen first-hand, the assemblages from Dun Ardtreck, Skye (MacKie 2000) and Tofts Ness, Orkney (phases 4–6; Davies 2007) were also analysed from images and descriptions as far as possible, the former to give another local parallel, the latter for an early Iron Age comparison.

From those sites studied at NMS where the full range of working debris was available for comparison, it is clear that the ratio of working debris and roughouts to finished objects seen at High Pasture Cave (37%) sits at the lower end of a consistent range where working evidence is *c*. 40–60% of the assemblage (see Fig. 12.66a); only the Fiskavaig rock shelter has a notably lower percentage, suggesting a different focus to activities there.

The nine sample assemblages can be compared in broad categories of tools, personal items (ornaments and

Table 12.51 Evidence for re-use and repair

SF	*Artefact*	*C*	*Ph*	*Raw Material*
2.137	Basal offcut & work-surface	2.34	2a	Antler
2.245	Needle	6.07	2b	Bone, prob.
17.006	Percussion tool & work-surface	17.07	2b	Antler
17.060	Prepared beam & work-surface	17.06	2b/3b	Antler
15.445A	Handle haft for tool; work-surface	15.64	3b	Antler
15.445B	Work-surface & pick	15.64	3b	Antler
2.185	Needle	2.24	3c	Bone, prob.
15.384	Needle, re-used as pin	15.56	3e	Bone, prob.
15.143	Pin	15.52	3e	Bone, prob.
6.46	Handle, repaired	6.03	6b	Antler
2.53	Reworked handle?	1.01	6b	Antler

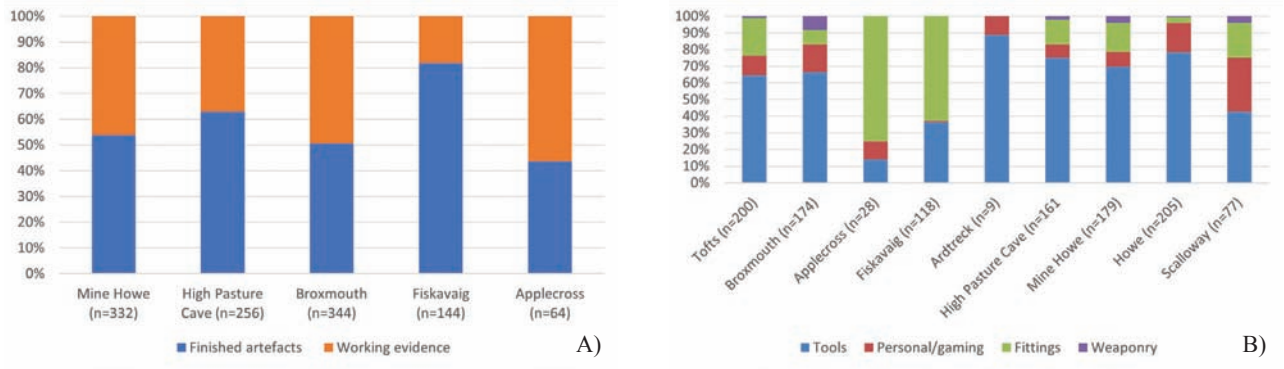


Figure 12.66 A. Ratio of working evidence to finished artefacts for five Iron Age sites studied to a consistent methodology; B. comparison of nine Iron Age bone/antler assemblages in broad artefact categories

gaming pieces), fittings, and weaponry (see Fig. 12.66b), though the latter is such a rare find its comparison is of little value. Unidentified fragments have been excluded. The Applecross and Fiskavaig assemblages stand out for the high number of fittings: in both cases there are large numbers of perforated antler cylinders whose detailed function remains unclear, but which are best interpreted as elements of larger, lost organic items, for instance as junction pieces on ropes or nets. In all other cases, tools are by far the dominant category, typically at 65–80% (the higher number at Ardtreck is unreliable given the assemblage size). This is less dominant at Scalloway (43%), where the assemblage has markedly more personal and gaming items, a reflection most likely of its significant later Iron Age component.

Personal and gaming items are otherwise typically in the 10–20% range; exceptions are High Pasture Cave, the Fiskavaig rock shelter, and also the workshop-dominated assemblage at Mine Howe. It is noteworthy that Early–Middle Iron Age settlement assemblages (Tofts Ness, Broxmouth) which are chronologically comparable to High Pasture Cave have a rather higher proportion of this personal material.

Some indications of regional traditions can be seen. The absence of cetacean bone from the Skye assemblages has already been noted, with the prestige find of an ivory bead the only instance from the site. The points with rotary wear are predominantly a Hebridean type on current evidence, although a set has now been found in Perthshire. It is suggested that they may have fulfilled a similar role to long-handled combs, given the similar wear patterns; the latter are notably absent from the site. Other forms are typical of wider traditions, such as the pins and the small combs, both with wide distributions.

12.5.9 Catalogue

This is arranged by functional groups as far as possible, organised by trench and then find number.

Personal items

PINS (SEE ALSO ROUGHOUTS SF2.109, SF15.56)

Pins were distinguished from other points by their finely shaped and well-finished appearance (Figs 12.67–70; Tables 12.52 and 12.53). The head forms are simple: including roughouts, six have plain heads where the shank

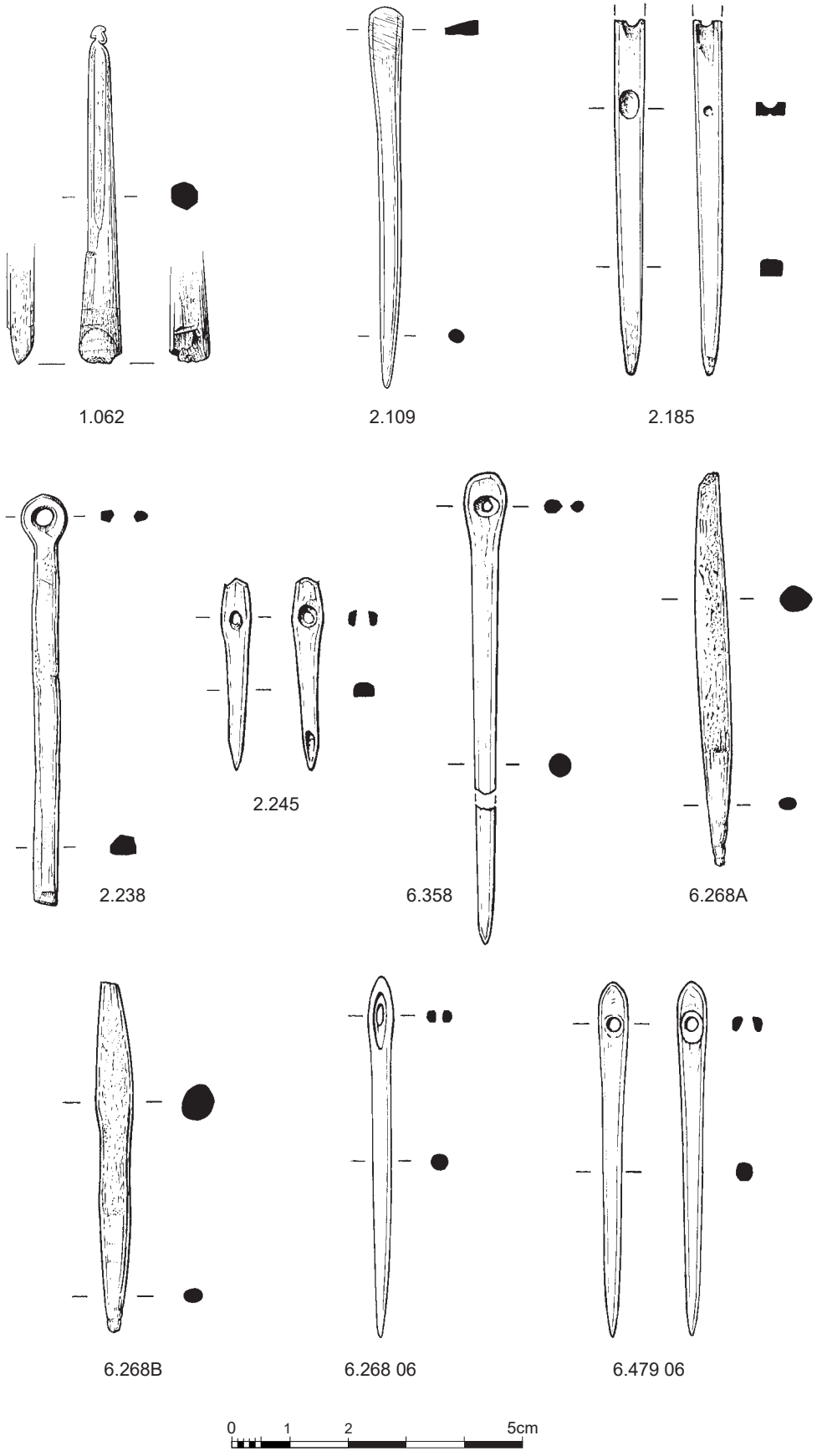


Figure 12.67. Bone & antler pins, needles, & points



Figure 12.68. Bone needle SF2.185



Figure 12.69. Fine bone needle SF6.268

is simply squared or rounded off, while five are splayed in slightly varying ways. Such simple forms are typical of the Scottish Early–Middle Iron Age (Hunter 2006, 145–7; Davies 2007, illus 7.7.3). Ten finely shaped broken point fragments could be from either pins or needles; they are classified under 'points'.

Combs

The parallels for these fragments from two small single-sided combs are discussed above (Table 12.53; Fig. 12.71).

Pendant (see also roughouts SF61, 15.099)

An antler ring (SF0264; Table 12.54) has polishing around the edges, suggesting it was worn as a simple pendant. Unusually, it was formed from a lengthways antler plate, rather than a transverse ring. Two antler tine tips had been roughed out into ovoid forms and may have been intended as pendants or beads; their intended function is otherwise obscure, but this is not readily paralleled.



Figure 12.70. Selection of bone & antler pins, and one ring-headed tool: left to right SF2.245, SF6.358, SF2.185, SF6.268, SF2.238

Tools

Hide rubbers and scrapers

Three tools are interpreted as hide rubbers (SF15.443) or hide rubber/scrapers (SF6.212, 15.444; table 12.55)). Two are formed from split cattle metacarpals (SF15.443–4); the other is a sheep tibia. All three are characterised by glossy polish on the ends, with the rubber (SF15.443) showing polish on the outer, rounded edge of the bone and the other two also showing polish on the sharper inside edges, suggesting they were used to scrape as well as rub. Such tools would have been used for rubbing oils into hides and scraping off remaining flesh or hair (Christidou and Legrand 2005, 386). SF15.443 and 15.444 were found together in redeposited hearth residues (C.15.64).

Thong-stretcher

A red deer antler with worn, circumferential grooves (SF.NN Zone 4; see Fig. 12.79) is an example of a class of artefact often termed 'turned objects' (*e.g.* Hallén 1994b, 216). Some have been interpreted as rotary quern handles (*e.g.* Lethbridge 1952, 187; Campbell 1991, 158) but the wear on this example does not circle the entire circumference and concentrates in the middle, creating a slightly waisted profile inconsistent with rotation in a socket. The wear is also smooth and polished, rather than the rougher abrasion one would expect from a stone socket. Similar wear was noted on leather thong-stretchers by Semenov (1964, 189–91), which all showed a similar waisted profile and often asymmetric wear. A similar function in the preparation of sinews or thongs therefore seems likely (Table 12.56).



Figure 12.71 Antler comb fragments SF15.316A & SF15.316B: top: front; bottom: reverse

Table 12.52 Pins

SF	*C*	*Ph*	*SB*	*Description*
2.543	2.71	2a	18	Tapering gradually from oval-sectioned flat head to tip showing slight use-polish. L 67, D 5
15.416	15.64	3b	7b	Straight cut head with curved shaft, tapering to fine, polished tip. L 52, D 4
15.360	15.83	3d	7d	Splayed head with flat top, circular-sectioned tapering shank & broken tip. L 53, D 3. [Fig.12.74]
15.142	15.5	3e	7e	Fine bone pin/point made from sub-triangular-sectioned, hollow bird bone, sharpened into polished diagonal point at 1 end & broken at other. L 37, W 4, T 3
15.143	15.52	3e	7e	Flat head, gradually tapering to polished, tip. Uneven tip tapers suddenly, suggesting was repaired then re-used. L 69, D 4. [Fig.12.74]
15.396	15.56	3e	7e	Flat, rectangular-sectioned, longitudinally knife-trimmed damaged head, tapering to circular-sectioned polished shaft, tip missing. Prob. broken pin. L 48; head 7 × 4; shank D 3
HP1.287	1.06	4c	27b	Flat, smoothed head, swelling then narrowing again to broken tip. L 43, D 4
2.192	2.31	4c	8c	Tapering from smooth, rounded head to pointed tip showing slight use-damage & polish. L 70, D 4 [Fig.12.74]
2.434	2.15c	4c	8c	Tapering, sub-rectangular-sectioned shaft with flat cut head, tapering towards broken tip. L 56, D 4 [Fig.12.74]
6.275B	6.06	4c	27b	Sub-triangular-sectioned, flat-topped head, tapering into circular-sectioned, broken shank. L 42, D 3

Table 12.53 Combs

SF	*C*	*Ph*	*SB*	*Description*
17.016	17.05	4c	27b	Antler splinter with 6 regularly spaced saw marks along 1 edge, & perpendicular incised decorative line above them on both faces. Sawn from both faces at slight angle, grooves extending beyond teeth to meet line. L 21.5, H 4; sawn groove W 2; 5.5 teeth per 10 mm
15.316	15.08	6a	10	2 frags from single-sided antler comb of overall L 42 mm. Frag. A preserves straight cut end; this may be present, but worn, on B. Both faces have shallow incised longitudinal groove at base of teeth, which are defined by fine grooves on both sides, extending beyond tooth to meet line (& in some cases going slightly beyond). On A grooves are sawn; on B surviving upper parts carefully knife-cut, suggesting initial sawing did not go far enough. A: L 17.5, H 9.5; sawn groove W 1; 4 teeth per 10 mm. B: L 25, H 9, T 3.5; saw W 1; 3 or 4 teeth per 10 mm [Fig.12.71]

Table 12.54 Pendant

SF	*C*	*Ph*	*SB*	*Description*
HP1.264	1.05	5b	27c	Annular antler ring with round section & off-centre biconical perforation. H 13, D 32; perf D 11

Table 12.55 Hide-rubbers/ scrapers

SF	*C*	*Ph*	*SB*	*Description*
15.443	15.64	3b	7b	Hide-rubber. Longitudinally split cattle metacarpal with articular end squared. Narrow tip rounded with use-polish on exterior. L 96, W 22, T 12 [Fig. 12.80]
15.444	15.64	3b	7b	Hide-rubber/scraper. Longitudinally split cattle metacarpal with broken head. Working end splayed & rounded with glossy polish on inside. L 85, W 29, T 13 [Fig. 12.80]
6.212	6.05	5b	27c	Hide-rubber/scraper. Sheep/goat tibia with articular end forming head, shaft then split at angle to form rounded, polished tip with lateral striations. L 91, W 22, T 14 [Fig. 12.80]

Table 12.56 Thong-stretcher

SF	*C*	*Description*
Zone 4	Unstrat.	Antler tine with chopped base & broken tip in 3 refitting frags. 3 worn grooves around centre which do not quite encircle whole circumference. Limited knife-trimming around base. L 92, D 25; worn band T 12 [Fig. 12.79]

Table 12.57 Needles. Where no eye diameter is recorded it was unclear

SF	*C*	*Ph*	*SB*	*Description*
6.550A	6.08	2a	25a	Broken across biconical eye (D 1) with tip missing. L 28, D 4
3.38	1.08a	2b	25b	Biconical eye (D 1). Most of shaft missing. L 14, D 4
2.245	2.23	2b	25c	Intact & finely polished with biconical eye (D 3). Short length suggests repair after break. Bird bone. L 33, D 5 [Fig. 12.67, 12.70]
6.479	2.23	2b	25c	Intact, well-polished with biconical eye (D 1.5). L 61, D 4 [Fig. 12.67]
2.458	2.32	3a	7a	Broken across biconical eye (D 1) with tip missing. L 51, D 5
6.268	6.06	3a	27a	Intact, v finely shaped & polished with lentoid eye (D 4 × 1). L 62, D 4 [Figs 12.72, 12.73, 12.75]
15.187	15.65	3b	7b	Groove on broken end poss. edge of eye? Tip missing. L 39, D .
2.185	2.24	3c	7c	Broken across biconical eye (D 2) with second attempted perforation misaligned & abandoned. Finely polished. L 60, D 5 [Figs 12.67, 12.68, 12.70]
15.371	15.52	3e	7e	V. degraded, broken across circular eye set in oval groove. L 38, D 5
15.377	15.56	3e	7e	2 refitting frags with cylindrical/steep biconical eye (D 2). Striations from shaping visible. L 67.5, D 4 [Fig. 12.74]
15.384	15.56	3e	7e	Broken across biconical eye then rounded off (re-used as pin?). L 44, D 3 [Fig. 12.74]
6.358	6.06	4c	27b	Biconical eye (D 1). Refitting frags with part missing & striations from shaping visible. L 54, L 7 [Fig. 12.67]
6.87	6.04	6a	29a	Finely polished, broken across biconical eye. Missing tip. L 24, D 6

Needles (see also SF 3.35, SF15.399)

Thirteen finished needles are present, plus two roughouts (Table 12.57). Most have circular, biconical eyes; one has an almost cylindrical perforation (SF15.377), and one a finely shaped lentoid eye (SF6.268). Seven are broken across the eye, which would have been a weak point; two of these were repaired, one of which was abandoned after the attempted perforation was misaligned (SF2.185) and another with the broken head rounded off, presumably to re-use as a pin (SF15.384). Another needle (SF2.245) made from a bird bone may also have had its head or tip refashioned after breakage as it is unusually short. Six display fine glossy polish from extensive use and handling (SF2.185, 2.245, 6.87, 6.268, 6.479, 15.187) while two still show striations from shaping, indicating they saw little use (SF6.358, 15.377). The needles deposited here

Table 12.58 Spindle whorls

SF	*C*	*Ph*	*SB*	*Description*
2.534	2.70	3a	19	Tall bun-shaped cow/deer femur/humerus head with central cylindrical perforation (D 5). Trimmed flat base & vertical trimmed sides. D 37, H 25.5. 21.8 g [Fig. 12.72]
15.192	15.64	3b	7b	Plano-convex red deer humerus head with central, biconical, slightly angled perforation (D 8). Trimmed base & bevelled facet around bottom edge. Lower edge lost along natural fusion line; slight use-polish on circumference; D 32, H 18. min 4.4 g [Fig. 12.72]
15.381	15.56	3e	7e	Flattened plano-convex cattle humerus head with central, conical perforation (D 5.5). Trimmed flat base & bevelled facet around bottom edge. D 40, H 14. 10.8 g [Fig. 12.72]
2.124	2.31	4c	8c	Plano-convex cattle femur head with incomplete perforation. Trimmed flat base & bevelled facet around bottom edge. D 36.5, H 20. 10.9 g
2.429	2.15B	4c	8c	Plano-convex cow/deer humerus head with incipient hollow for perforation. Base broken off. Trimmed bevelled facet around edge of base. Evidence of animal gnawing. D 38, H 22.5. 15.8 g [Fig. 12.72]
2.524	2.15B	4c	8c	Broken truncated conical cattle humerus head with central, conical perforation (D 5). Trimmed flat base & top, with bevelled facet around bottom edge. D over 37, H 23. min 8.2 g [Fig. 12.72]

therefore represent a spectrum of phases in a needle's life cycle; from manufacture to use, repair, and re-use. Aside from the example made from a bird bone (SF2.245) the others are too modified to determine which species or skeletal elements were selected to manufacture them. Apart from one (SF6.87: Phase 6b, SB29a), all were recovered from Early Iron Age phases (2–4).

The needles have an average maximum thickness of 4.7 mm (range 3–7 mm) and an average perforation diameter of 1.6 mm (range 1–3 mm). There are few contemporary assemblages in Scotland with similar quantities of bone needles with which to compare this. Broxmouth produced eight of similar length (average 48 mm) and perforation diameter (average 2 mm; Hunter *et al.* 2013, 276) but most other assemblages have produced one or two, often fragmentary needles.

Whorls

Three perforated and three part-perforated (and thus unfinished) shaped cattle/red deer femur or humerus heads were most likely spindle whorls (Table 12.58; Fig. 12.72). Their forms vary: three are plano-convex in shape (SF2.124, 2.429, 15.192), one is almost discoidal (SF15.381), one a fragmentary, truncated cone (SF2.524), and the other a tall bun-shape (SF2.534). The perforations also vary in shape, including conical, cylindrical, and biconical. All the whorls show some degree of shaping, with all but one showing a trimmed flat base, one also with a flat trimmed top and all, even the unfinished examples, have a trimmed bevelled facet around the bottom edge. Their weights (10.8–21.8 g) and perforation diameters (average 6 mm) closely match those of the steatite versions (11–24 g and 6 mm), reinforcing the interpretation that they had the same function. All were recovered from contexts in Phases 3–4c, placing them in the Early Iron Age. They are discussed more broadly along with stone examples by Lynne McKeggie (above).

Table 12.59 Facetted bone tools

SF	*C*	*Ph*	*SB*	*Notes*	*Dimensions (L × max W × T)*
6.187	6.04	6a	29a		14 × 7 × 4
6.55A	6.01	6b	29c	Old break; charred	7 × 5 × 3
6.55C	6.01	6b	29c		12 × 7 × 4
6.57 & 6.19B	6.02	6b	29c	Charred	50 × 5 × 3
6.17A	6.02	6b	29c	Tip	43 × 6 × 3
6.17B–D	6.02	6b	29c		L 19, 10, 13; section 5 × 3
6.19A	6.02	6b	29c	Tip; charred	48 × 6 × 3
2.359	2.52	6b	22a		19 × 6 × 4

Oval-sectioned facetted tools

A very distinctive type of oval-sectioned, facetted tool is represented by ten fragments (Table 12.59). All are neatly knife-trimmed to shape, the facets very visible, and tips, where present, are blunt and worn smooth. All but two were recovered from C6.01 and C6.02 in the cave (SB29c/Phase 6B) while one of the others was recovered from C6.04/SB29a, and the remaining example from C2.52 (SB22a/Phase 6b) representing final deposition of material in the cave and base of stairwell. Their spatial and chronological distribution is therefore notably restricted compared to most other artefact types at the site.

It is likely that all those from Trench 6 derive from a smaller number of broken-up items which were incompletely recovered; only one refit was found, but the character of the fragments is very similar, and most breaks are visibly modern. Two preserve original terminals, and one has an old break, suggesting one or (most likely) two

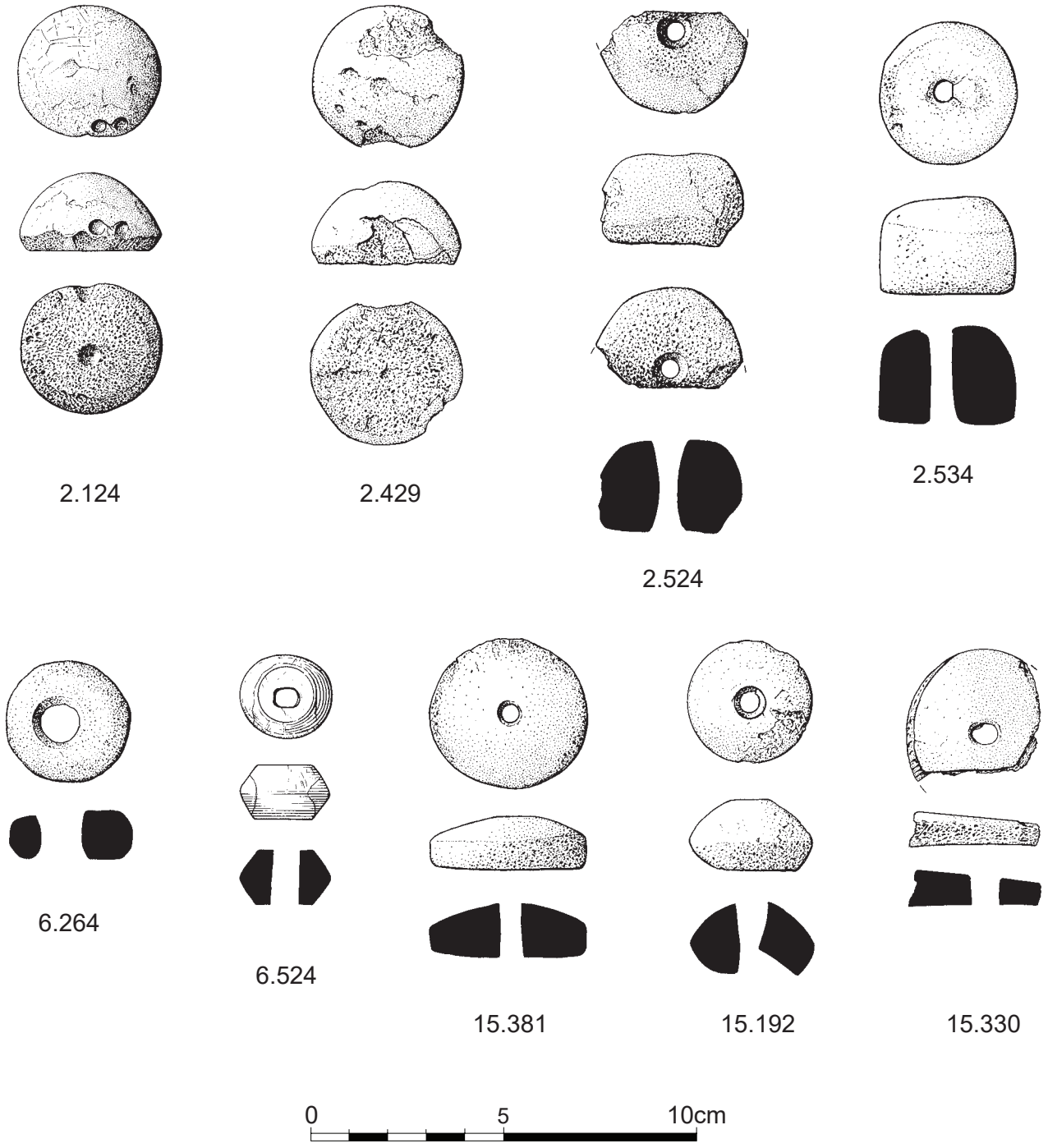


Figure 12.72 Bone spindle whorls & cetacean bone hilt fitting SF6.524

items were deposited; the fragment from Trench 2 could be from a third item, but seems more likely to be disturbed. Surface blackening is visible on three fragments (on the shaft rather than the tip). The Trench 6 fragments have a total overall length of 216 mm.

Their function remains unclear. They show a slight handling polish, which is slightly enhanced on the best surviving tip (SF6.19a), but only very slightly and only at the extreme tip. They are less well-finished than is typical for modelling tools – the facets have not been smoothed out – but this is a possible role given their size, rather fragile nature, and tip morphology.

Anvils and work-surfaces

Eleven antler portions display evidence of use as anvils or work-surfaces (Table 12.60): six are listed below,

Table 12.60 Antler anvils & work-surfaces

SF	*C*	*Ph*	*SB*	*Description*
1.306	1.07	2b	25c	Unshed burr, part of beam & brow tine. Concentration of short linear marks on 1 side of beam near burr. Stress fractures on opposite side. L 312, burr D 52 × 42, beam D 32, area of marks 35 × 36, cuts *c*. 5 mm long
17.062	17.07	2b	25b	Beam with base & crown tines broken, showing some lateral fine cuts. L 175, beam D 28 × 31
2.454	2.26a	3b	7b	Burr with pedicle. Tines & most of beam missing. V. abraded but faint remains of small indents at base of beam on 1 side; a few visible on other side. L 20, beam D 40
BNN15	2.18	3e	7e	Unshed burr with beam broken near top & tines all missing. At base of beam is collection of deep linear indents (7 × 1 mm); on other side are deep gouges, 1 is 18 mm deep. L 243, beam D 32
6.141A	6.03	6b	29c	Shed burr with bez tine & beam broken, with concentration of small oval indents at base of beam on 1 side. 168 × 92 × 28; burr D 47, work-surface area 50 × 25
BNN4	Unstrat.	–	–	Shed burr with most of brow tine & beam; broken around halfway along. Both sides of beam, close to burr, have concentrations of lentoid-shaped impressions & fine cut marks. L 352, burr D 68, beam D 54 × 40; impressions 1 × 3

while a further five represent expedient re-use of broken picks or hafts (SF15.445a–b, SF17.006), roughouts (SF17.060), or offcuts (SF2.137). Most of this group (10) have indents on one (8) or both (2) sides from being struck with a pointed object and are therefore more accurately described as anvils. One anvil (SFBNN4), and one other antler (SF17.062) display fine linear cut marks, indicating they had been used as work-surfaces. The indents on the anvils are a range of shapes, including fine linear marks which may have been made with the tip of a knife or dagger, and oval, lentoid, and diamond-shaped indents from iron awls or similar tools. The indents are always at the base of the beam, near the burr, on the thickest, most robust part of the antler; the depth of some indents (*e.g.* on SFBNN15) and stress-fractures on one (SF306) indicate some significant force. Antler is a good shock-absorber (better than bone; MacGregor 1985, 29) and would have made an ideal expedient anvil for tasks such as piercing hides.

Antler used in this way has now been noted in several other Scottish sites, *e.g.* Cnip (Hunter 2006, 144–5), Broxmouth (Hunter *et al.* 2013, 258–9; Hunter 2023b), and Fiskavaig. Examination of worked antler from Howe in Orkney by the authors revealed similar marks, and it is also evident on worked antler from Dunagoil, Bute. The practice of using antler as an anvil or work-surface was clearly widespread.

Points

Various forms of point are the most abundant bone/antler artefact form in this assemblage, with 71 single-ended and four double-ended examples present. Most are of bone (53); of the 22 antler points, those with surviving ends show distinctive wear patterns of blunt, polished tips, often with circumferential grooving. The range of forms is broad, with diversity in length, robustness, and tip morphology. They have been grouped here according to the scheme of Hunter *et al.* (2013) whereby the method of manufacture and tip form are considered, although most of the bone points are broken, probably in use, and cannot be fully categorised (Table 12.61). This classification does not correlate absolutely with function (for which experimental and use-wear studies would be required) but must be related to it. However, it does allow for comparison of manufacturing traditions and types between different assemblages. Some can be assigned more confidently to a specific task. For example, sharp points are likely to have been used as awls, while the unusual wear on the antler points suggests a role in textile production. The various forms are summarised below, and illustrated examples (Figs 12.73–12.78) are catalogued in Tables 12.62–12.65; a full catalogue is in the site archive.

Shaft points

Eleven shaft points can be identified, five complete (two more may have been but are now damaged). Where the head survives, treatment of the epiphysis varied: in four instances it was removed, in four it was complete, and in one case it was split. The sample is too small to consider patterns by phase meaningful. All identifiable bones were metapodials: strikingly, six utilised red deer, in contrast to only one cow; one was made of a pony metapodial, which is also unusual. Their typical length varies from 100–150 mm, with one smaller, at 59 mm long (average length 125 mm without the outlier, 117 mm with it). Where the tip survived, it was sharp and sturdy; two display glossy use-wear on tip and shaft (SF2.450 and 2.506a), suggesting they were used to pierce soft material such as hide (others have eroded surfaces, erasing signs of use-wear). These can be fairly confidently interpreted as awls.

Table 12.61 Summary of bone & antler point types by phase (roughouts are not included).

Form	Tip	Ph (SB)																no
		1b (24)	2a (3)	2a (25a)	2b (25b)	2b (25c)	3b (7b)	3c (7c)	3d (7d)	3e (7e)	4a (8a)	4c (8c)	4c (27b)	5b (27c)	6a (29a)	6b (29c)	Unphased	
Antler point (22)		–	–	1	–	–	–	–	–	1	–	–	7	9	1	3	–	22
Double-ended (4)	S	–	–	–	–	–	–	–	–	–	–	–	1	–	–	2	1	4
Pin/needle frag. (10)	S	1	–	–	3	–	–	–	–	2	–	1	3	–	–	–	–	10
Point/pin (1)	S	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	1
Shaft point (11)	S	–	–	–	1	–	–	2	–	3	–	–	1	–	–	–	1	8
	B	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0
	?	–	1	–	1	–	–	–	–	1	–	–	–	–	–	–	–	3
Splinter point (7)	S	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–	1	3
	B	–	–	–	–	–	1	–	1	–	–	–	–	–	1	–	–	3
	?	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	1
Broken (20)	S	–	–	1	1	1	–	1	2	2	–	–	1	1	–	2	–	12
	B	–	–	–	–	2	1	–	–	1	–	–	3	1	–	–	–	8
Total		1	1	2	7	3	2	3	4	10	1	1	17	11	2	7	3	75

Abbreviations: S sharp/ fine, B blunt, ? missing/ damaged, U unstratified

Table 12.62 Selected bone points

SF	C	Ph	Block	Description
254	1.08	2b	25b	Longitudinally split longbone shaft point with intact articular end forming head & abraded edges tapering to recently damaged, polished point. L 100, W 32, T 21
15.442	15.64	3b	7b	Longitudinally split longbone splinter point with abraded edges, tapering to oval-sectioned tip. Erosion has obscured use-traces. L 79, W 13, T 7.5
15.182	15.62	3c	7c	Longbone shaft point with articular end forming head, tapering to narrow point. Erosion has obscured use-wear. L 129, W 37, T 24
2.450	2.22b	3c	7c	Longitudinally split longbone shaft point with articular end forming head & abraded edges tapering to narrow fine point. Glossy use-polish extends *c.* two-thirds of way up shaft & tip discoloured from burning. L 147; head 26 × 14; shank 7 × 5.
15.179	15.61	3d	7d	Longitudinally split longbone point with abraded edges & missing head, tapering to sharp, polished point. Point & quarter of shaft polished from use & slightly waisted profile has been created by flaking around middle. L 167, W 15.5, T 15.61
2.506A	2.18	3e	7e	Longitudinally split longbone shaft point with intact articular end forming head & abraded edges tapering to narrow point which is polished about three-quarters the way up. Surface degraded. L 150, W 18, T 7
6.339A	6.06	4c	27b	Longitudinally split longbone shaft point with part of articular end forming head & abraded edges. L 59, W 16, T 11

Splinter points

Splinter points are formed from a splinter of bone rather than a recognisable long bone shaft. Seven are present here, with more variety of tip forms than in the shaft points: three sharp, three blunt and one missing. They are smaller than the shaft points, with an average length of 84 mm and a range from 60–99 mm. None have points as heavy as the shaft points. Their shorter length and lack of a head would mean less force could be applied to them. Sharp ones could still have functioned as awls, whereas blunt points may have had a range of functions; North American ethnographic examples include a role in basketry, bark stripping and fish preparation (Miles 1963, fig. 3.86).

Antler points: textile-working tools?

A total of 22 points fashioned from red deer antler were found; most form an intriguing and distinctive type. All those which are intact are characterised by roughly knife-trimmed, rectangular-sectioned heads tapering to blunt,



Figure 12.73. Bone points SF2.540, SF2.128, SF2.506a, SF2.450, SF2.460, SF15.179, SF15.360, 2.543, SF.17.012

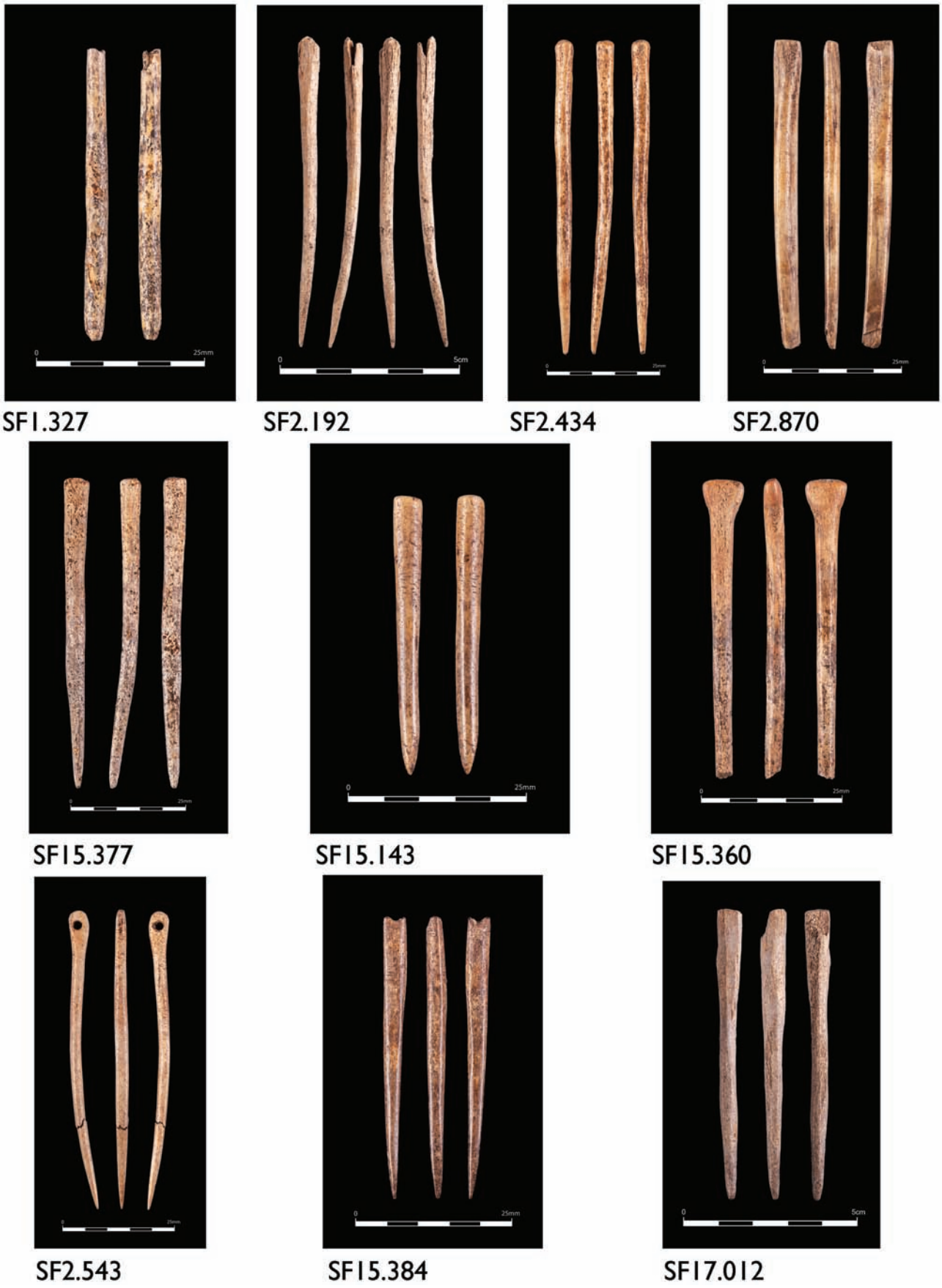


Figure 12.74. Bone & antler points SF1.327, SF2.192, SF2.434, SF2.870, SF15.377, SF15.143, SF15.360, SF2.543, SF15.384, SF17.012

Table 12.63 Antler points with rotary wear

SF	*C*	*Ph*	*SB*	*Dimensions (L × max W × max T mm)*	*Circumferential wear?*
Cache 1					
6.189A	6.05	3a	27a	76 × 5 × 4	Y
6.189B	6.05	3a	27a	83 × 7 × 4	N: blunt, polished
6.189C	6.05	3a	27a	52 × 6 × 5	Eroded
6.189D	6.05	3a	27a	81 × 7 × 5	N: blunt, polished
6.189E	6.05	3a	27a	83 × 6 × 3	Y
6.189F	6.05	3a	27a	82 × 7 × 2	Some grooving
6.189G	6.05	3a	27a	69 × 6 × 5	Slight
Cache 2					
6.268A	6.06	3a	27a	60 × 6 × 5.5	Y
6.268B	6.06	3a	27a	67 × 5 × 4	Y
6.268C	6.06	3a	27a	53 × 5 × 5	Y
6.268D	6.06	3a	27a	54 × 5 × 4	Y
6.268E	6.06	3a	27a	46 × 5 × 4	Y
6.268F	6.06	3a	27a	50 × 5 × 5	N: broken, continued in use
6.268G	6.06	3a	27a	33 × 5 × 4	Broken
Single finds					
6.550B	6.08	2a	25a	42 × 7 × 3	Broken
15.398	15.56	3e	7e	29 × 4 × 3	N: blunt, polished
6.188	6.05	5b	27c	56 × 7 × 4	N: blunt, polished
17.012	17.03	6a	29a	83 × 7 × 7	N: blunt, polished
1.062	1.01	6b	29c	58 × 7 × 4.5	Y
1.168A	1.03	6b	29c	21 × 5 × 4	Y
607	6.02	6b	29c	71 × 9 × 4	Eroded
6.192	6.05	6b	27c	69 × 6 × 5	Broken

polished, circular-sectioned tips; many display fine circumferential, polished wear (detailed in Table 12.63; fig. 12.75–12.77). Their crudely trimmed heads and worn tips suggest they are not ornamental pins but some sort of tool. A function as tuning pegs from a stringed musical instrument can be ruled out due to the lack of perforation or slot for the string to pass through (MacGregor 1985, 147, fig. 77) and the tip wear is not consistent with a tuning function.

Their depositional context may shed a little light on their function. Fourteen were recovered in two caches of seven (SF6.189 and SF6.268), suggesting they were used in groups. The others were recovered as single finds, and those lacking circumferential wear need not necessarily have a similar function. Cache 1 (SF6.189) consistently showed much less wear than cache 2; in the latter, most show circumferential wear and in one case the tip had broken but the point continued in use.

The blunt, polished tips is similar to tip wear found on Iron Age long-handled 'weaving' combs, and a number of these also show circumferential grooving. Such combs are a classic Iron Age artefact type, and their function has been extensively debated (Hodder and Hedges 1977, 17; Coles 1987, 105–6; Tuohy 1999, 56–9). While traditional interpretations have favoured a role in beating the wefts in a warp-weighted weaving loom, Tuohy suggests the wear patterns are more consistent with beating wefts during the production of narrow braided or webbed strips, or decorative borders around larger textile panels (Tuohy 1999, 57–8).

The discovery of these antler points in groups with such similar wear strongly suggests a similar role. While long-handled combs are found throughout northern and western Scotland, they are notably absent from Skye, despite other worked bone and antler assemblages being present on the island. A cache of 24 antler points found at Fiskavaig on Skye displayed similar wear and shaping. It is unclear how they were held together, but the roughly shaped ends suggest they may have been slotted into something. Perhaps these antler points represent a local craft tradition or regional variation of the better-known comb form. There are isolated examples from elsewhere in Scotland, including one previously interpreted as a possible lyre peg from Cnip wheelhouse, Lewis (Hunter



Figure 12.75. Antler points with circumferential wear around their tips from cache SF6.189a–g

2006, 147–8, illus 3.24a) and a 'peg with wear rings' from Kilellan Farm on Islay, suggested to have been used for stretching skins on a frame (Ritchie 2005, 146, fig. 92/10). A set of six was recently discovered at Moredun hillfort, Perth and Kinross (Hunter in prep.), indicating this was not just a Hebridean phenomenon, though it is currently best represented there.

Double-ended points (see also roughout SF15.378)

Three very fine double-ended points (SF1.097, 17.229, 18.001) have fine rotary wear around both ends and are so similar they must have had the same function (Table 12.64; Fig. 12.78). Small, double-ended points are often classed as gouges for fishing, but the rotary wear argues against such a function here. A role in fine textile working is possible. They are so small and fine they could easily be missed in sites with less thorough finds recovery, making it difficult to know if they were a common type or not.

A fourth double-ended point (SF6.368) is rather larger. It lacks any perforation to suggest it had a role in fishing, and its purpose is unclear. SF15.378 is a roughout of similar dimensions.

Broken/miscellaneous points, pins, and needles

Twenty bone points are missing their heads, probably from use-damage, which makes them difficult to categorise.

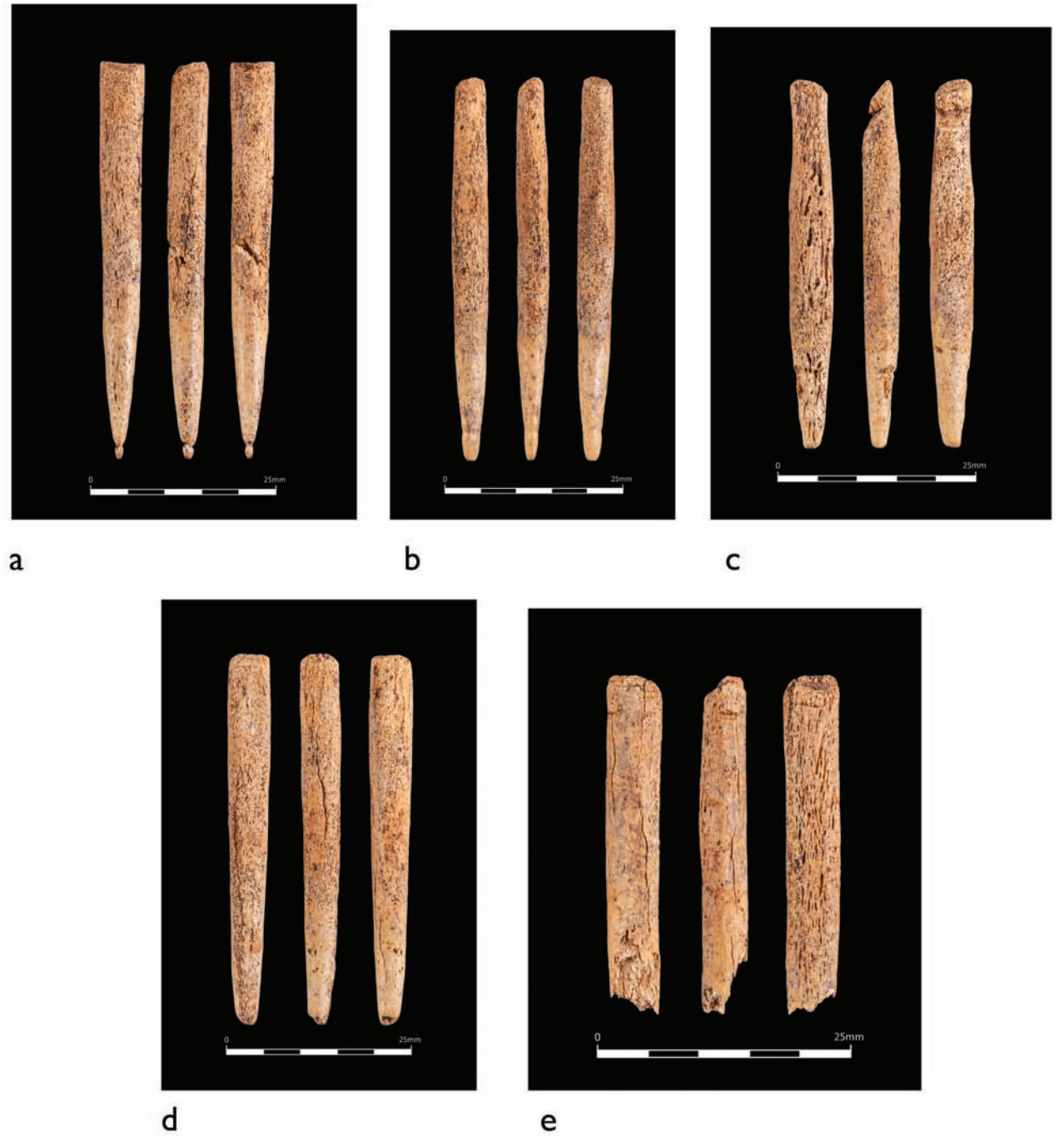


Figure 12.76. Antler points from cache SF6.268a–h with circumferential wear around their tips, with broken fragment from cache (e)

Twelve have sharp points (six heavy, three medium, three fine) while eight have blunt tips. Ten fine point tips could be from pins, needles, or (in some cases) fine points.

Point/pin

This category is used for points which are more finely shaped and finished than regular points tend to be but lacking the decoration or finesse of pins (Hallén 1994a, 215). SF1.327 is the only such example; the visible facets from shaping would be unusual on a pin (Table 12.65).

Other tools

Seven other antler tools have less certain or multiple functions (Table 12.66). Four antlers show clear evidence on their worn bez tines of use as percussion tools, probably picks (SF2.519, BNN16, 15.445B, 17.006), while a spatula-ended tool (SF6.268h) may have had several craft roles, such as decorating pottery or applying pigments. SFBNN2 and SF17.047a are hollowed out in places, suggesting they were intended as tool handles, though the double socket on SF17.047a is unusual.



Figure 12.77. Top. antler points with circumferential wear around their tips from cache SF6.268a–h; bottom. closer detail of three of the points showing circumferential wear

Handles and hafts (see also roughouts)

Hollowed-out antler tines or beam portions were often utilised as tool handles (Table 12.67; Figs 12.79 and 12.80). The eight recovered here vary widely in size and form, from fragments of a small, finely decorated handle (SF2.383) to large, crudely hollowed antler beam portions from heavy tools (SF2.108, 15,445a); five were formed from tines. SF2.53 was in the process of being reworked from a handle into something else, while two show stress-fracturing, suggesting breakage in use (SF15.400 and 15.445e). There were also seven antler handle roughouts (SF 0268, 2.112, 2.513a, 6.141c, 6.46, BNN9d, BNN9e), three utilising beam segments and four tines.

Weaponry

Spearheads

Two spearheads made from red deer antler tines were identified (SF15.132 and SF15.188/9; Table 12.68). Certain features distinguish these from antler tine handles: wider sockets (for fitting a shaft rather than a tang), sharpened points, and a perforation for a fastening pin. SF15.188/9 has all three characteristics and can confidently be interpreted as a spearhead, whereas SF15.132 is broken where the fastening pin would have been and does not appear to be sharpened but has a wide socket; its identification is therefore less certain.

Bone spearheads are known from other Iron Age sites, for example eleven from Broxmouth, East Lothian (Hunter *et al.* 2013, 259) and others outlined by Hallén (1994, 205). Sheep bones tend to be the most common material; the use of red deer antler here suggests differing local traditions.

Table 12.64 Double-ended points. The very fine double-ended points all have the same rotary wear around the ends

SF	*C*	*Ph*	*SB*	*Description*
6.368	6.06	4c	27b	Double-ended splinter point. L 40, W 4
17.229	17.03	6a	29a	V. fine double-ended point. L 24, D 1
1.097	1.01	6b	29c	V. fine double-ended point. L 29, D 2
18.001	18.01	6b	35	V. fine double-ended point. L 27, D 2



Figure 12.78. Group of double-ended bone points

Hilt fitting?

A finely shaped perforated ornament was created from a transverse section cut from a sperm whale tooth (SF6.254; identified by Sonia O'Connor). The sub-rectangular perforation and lack of finishing on the flattened ends would be unusual for a bead, indicating this is more likely to

Table 12.65 Point/pin

SF	*C*	*Ph*	*SB*	*Description*
1.327	1.08a	2b	25b	Curved, tapering antler splinter with longitudinal facets from shaping, polished away around tip through use. L 87, W 5, T 6

Table 12.66 Miscellaneous tools (all antler apart from SF2.238)

SF	*C*	*Ph*	*SB*	*Description*
Picks				
17.006/ 17.063	17.07	2b	25b	Shed burr with brow tine, bez tine & part of beam. Bez tine burred from use as percussion tool. Concentration of lentoid indents from fine blade tip on beam near burr. L 310, D burr 55
15.445B	15.64	3b	7b	Shed burr with tines snapped apart from brow tine (which has burred tip from use as percussion tool). Faint concentration of small indents at base of beam on 1 side. L 432; beam D 32; burr D 51; indents 2 × 1
2.519	2.65	3c	20	Unshed burr with beam neatly snapped (deliberately?) just before crown. Brow tine has cut & burred tip from use as percussion tool; retained butchered portion added weight to this end. L 367; beam D 28; burr D 51
BNN16	2.65	3c	20	Beam frag. with 1 end broken (in use?) & other burred, probably through use as pick. L 63, D 26
Tool heads				
17.047A	17.03	6a	29a	Beam/crown junction with inside of tines hollowed out to form sockets for double-headed tool of some sort? 75 × 50 × 24; tine Ds 20 & 17
BNN2	Unstrat.	–	–	Beam frag. with inside of brow tine partially hollowed. Probably composite tool handle/head. L 380, D 39 × 35
Other				
6.268H	6.06	3a	27a	Lentoid-sectioned tapering rod with 1 end spatulate & other broken. L 55, T 6 × 3
2.238	2.05b	b	9c	Narrow strip cut straight at 1 end & carefully knife-trimmed into flat ring with biconical perforation at other. Narrow end rounded a&nd polished from use; some handling polish. L 70, W 7, T 3; perf D 3

Table 12.67 Antler handles

SF	*C*	*Ph*	*SB*	*Description*
6.483	6.08	2a	25a	Tine with straight cut tip, broken wide end &, unusually, conical sockets in both ends. Calcite on surface. L 107, D 13–28 ext; socket D 6 (Fig. 12.79)
15.400	15.71	2a	3	Tine hollowed with large spall missing from edge, probably from stress fracturing during use. L 130 × D ext 25 × 20; socket D 9 × 13
15.445A	15.64	3b	7b	Large tool haft, broken in use, made from butchered antler with brow, bez & trez tines chopped off & butchered base rounded & smoothed. Top of beam deeply hollowed out (170mm deep) to take tool. Collection of small lentoid indents (3 × 1mm) at base of beam on 1 side shows was also used as anvil. L 590, D beam 43.
15.445E	15.64	3b	7b	Spall from edge of hollowed tine, possibly due to stress-fracturing during use. 57 × 24 × 11
2.108	2.05	5a	9a	Crudely shaped, hollowed beam with 1 end damaged. L 219, D 26–36; facet L 18, W 11; socket depth 195
15.34	15.25	5a	9b	Hollowed tine, broken at wide end (possibly during use). L 87, ext D 16, int D 5, socket depth 41
2.53	1.01	6b	29c	Tine with both ends cut & partially hollowed. Handle refashioned (after break?) by splitting & flattening on back with rough, partly broken, conical oval perforation. L 76, W 17, T 9; perf. W 9
2.383	2.52	6b	22a	Small, curved, burnt frag. with series of fine diagonal grooves across surface & hollowed inside. Decoration probably spiralled around handle. L 33, ext D at least 10; grooves W 1; 6 grooves per 10mm.

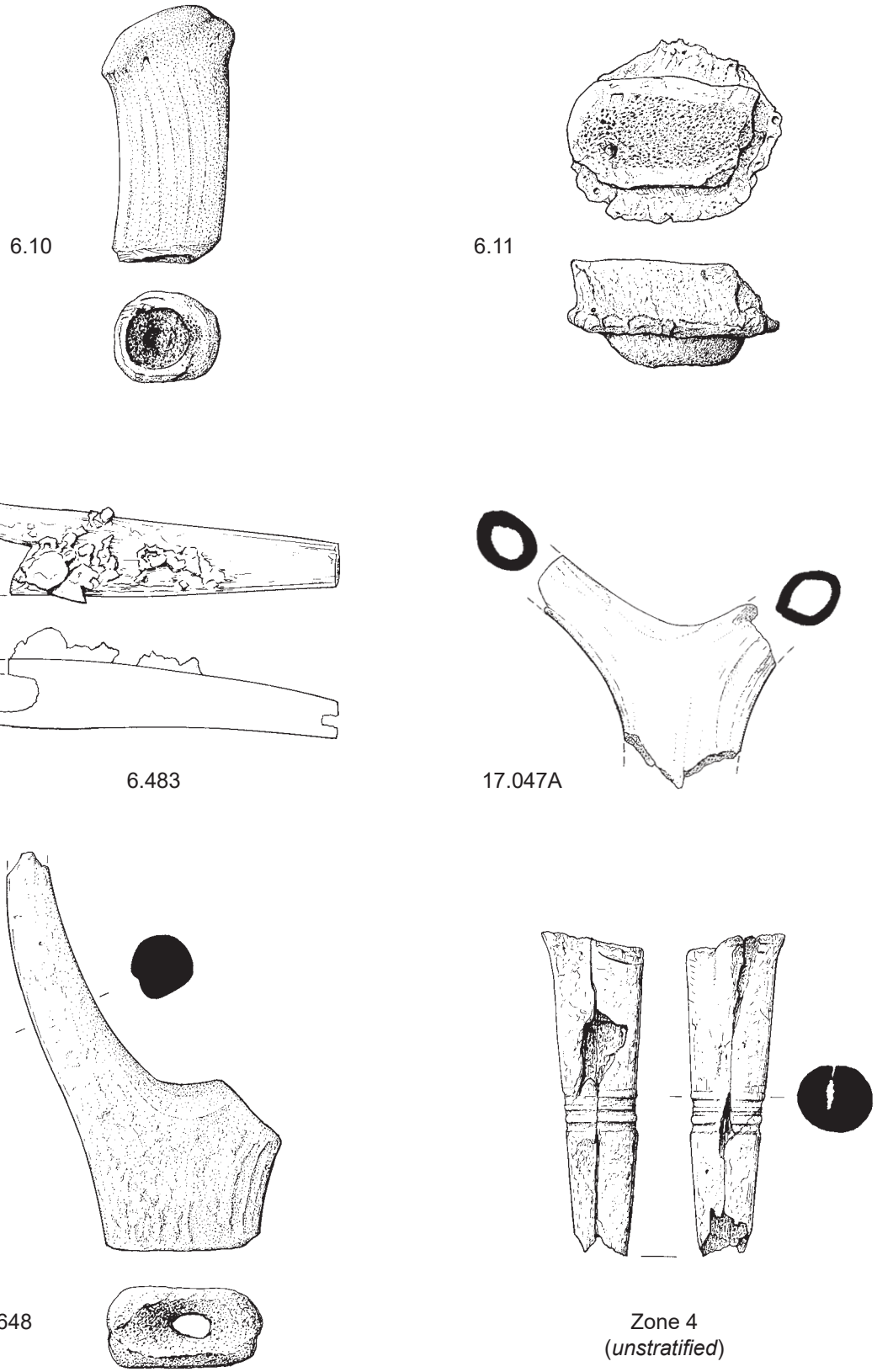


Figure 12.79. Worked bone & antler objects

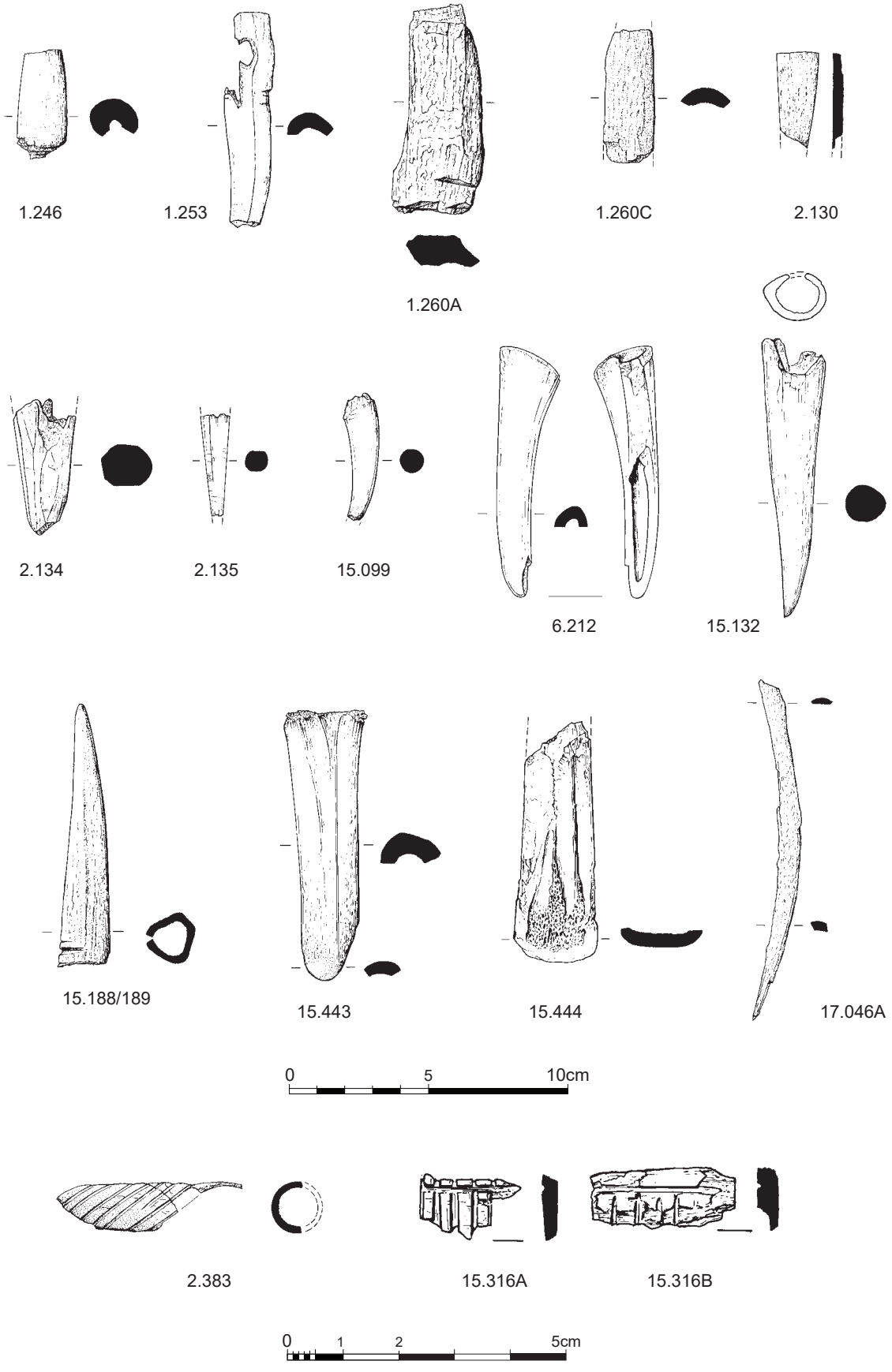


Figure 12.80. Worked bone & antler objects including comb fragments SF15.316a–b

Table 12.68 Weaponry

SF	*C*	*Ph*	*SB*	*Description*
15.188/9	15.65	3b	7b	Spearhead. Sharpened tine with wide conical socket. Deep, V-sectioned chop mark parallel to end. L 94; ext D 19; socket int D 12, depth 37 (Fig. 12.80)
15.132	15.42	4b	8b	Spearhead. Tine with broad, conical socket, broken at wider end (probably through use). L 100, ext D 22; socket int D 12, L 40 (Fig. 12.80)
6.254	6.05	5b	27c	Finely shaped & polished sperm whale tooth. Flattened ends still show abrasion marks from shaping while biconical edges are finely polished. Central perforation utilises naturally hollow root channel but has been augmented by rough gouging, creating sub-rectangular perforation. Part of dentine shows on edge, possibly deliberately left for decorative effect. H 14, D 23; flattened ends D 15; perf 7 × 5; 7.5g

Table 12.69 Pegs

SF	*C*	*Ph*	*SB*	*Description*
6.550C	6.08	2a	25a	Circular-sectioned tip with recently broken head. L 15, T 6
326	1.08a	2b	25b	Flat head & pointed tip. L 23, T 4
6.646	6.07	2b	25c	Tapering, oval-sectioned with flat head & broken tip. L 22, T 5
6.268I	6.06	3a	27a	Slightly angled head, tapering to point. L 15, T 3
2.448	2.22	3c	7c	Slightly angled smoothed head; tip broken through use. L 22, T 4
622	2.27	3c	7c	Flat, angled head. L 9, T 5
6.431	6.06	4c	27b	Flat smoothed head & use-damaged tip. L 21, T 4
1.168B	1.03	6b	29c	Blunt head & broken tip. L 20, T 5
1.171	1.03	6b	29c	Square-sectioned, flat polished head & use-polished edges. L 7, T 2
6.55B	6.01	6b	29c	Sub-oval sectioned with rounded ends. L 24, T 6

Table 12.70 Antler strip mounts

SF	*C*	*Ph*	*SB*	*Description*
2.500	2.65	3c	20	Strip with plano-convex section, straight cut edges & 4 biconical perforations along middle. Finely finished with slight handling polish all over. L 88, W 26, T 9; perf D 6 (Fig. 12.81)
15.386	15.56	3e	7e	Fine, tapering strip with wider end cut square & other broken, trimmed flat on back & edges. Two pairs of perforations, aligned transversely: 1 intact pair near wide end, other on broken edge. Intact perforations contain intact knife-trimmed conical antler pegs with flat heads. L 55, W 26, T 13; perf D 3; pegs L 7.5; pegs project 4mm from back (Fig. 12.81)
6.469	6.05	5b	27c	Flat, sub-rectangular frag. with faces trimmed flat, all edges broken, & edge of cylindrical perforation. L 19, W 11, T 2; perf D 3
1.169	1.03	6b	29c	Plano-convex-sectioned rectangular strip with all edges cut straight & 3 cylindrical perforations along middle; 1 on cut edge, suggesting re-use. Back abraded flat, front knife-trimmed. One perforations (complete, nearest end) slightly misaligned. L 26, W 17, T 7; D 4 (Fig. 12.81)
1.063	1.01	6b	29c	Slightly curved, plano-convex-sectioned strip with 1 end cut straight & other broken. Back abraded flat, some abrasion marks around edges & front from shaping. Four evenly spaced drilled perforations, 3 with antler pegs inside, all broken on underside. L 63, W 16, T 4; perf D 4 (Fig. 12.81)
6.02	6.01	6b	29c	Slightly curved, plano-convex-sectioned strip with 1 end cut straight & other broken. Four unevenly spaced, misaligned cylindrical perforations along middle. L 56, W 16.5, T 5; perf D 4 (Fig. 12.81)
2.351	2.52	6b	22a	Slightly curved, plano-convex-sectioned strip with 1 end cut straight & other broken. Four evenly spaced drilled perforations along middle & knife-trimmed facets around edges & back. L 63, W 15.5, T 5; perf D 3 (Fig. 12.81)
2.352	2.52	6b	22a	Slightly curved, plano-convex-sectioned strip with 1 end cut straight & other broken. Three evenly spaced drilled perforations along middle, 1 of which is on broken edge. L 41, W 14, T 4.5; perf D 4

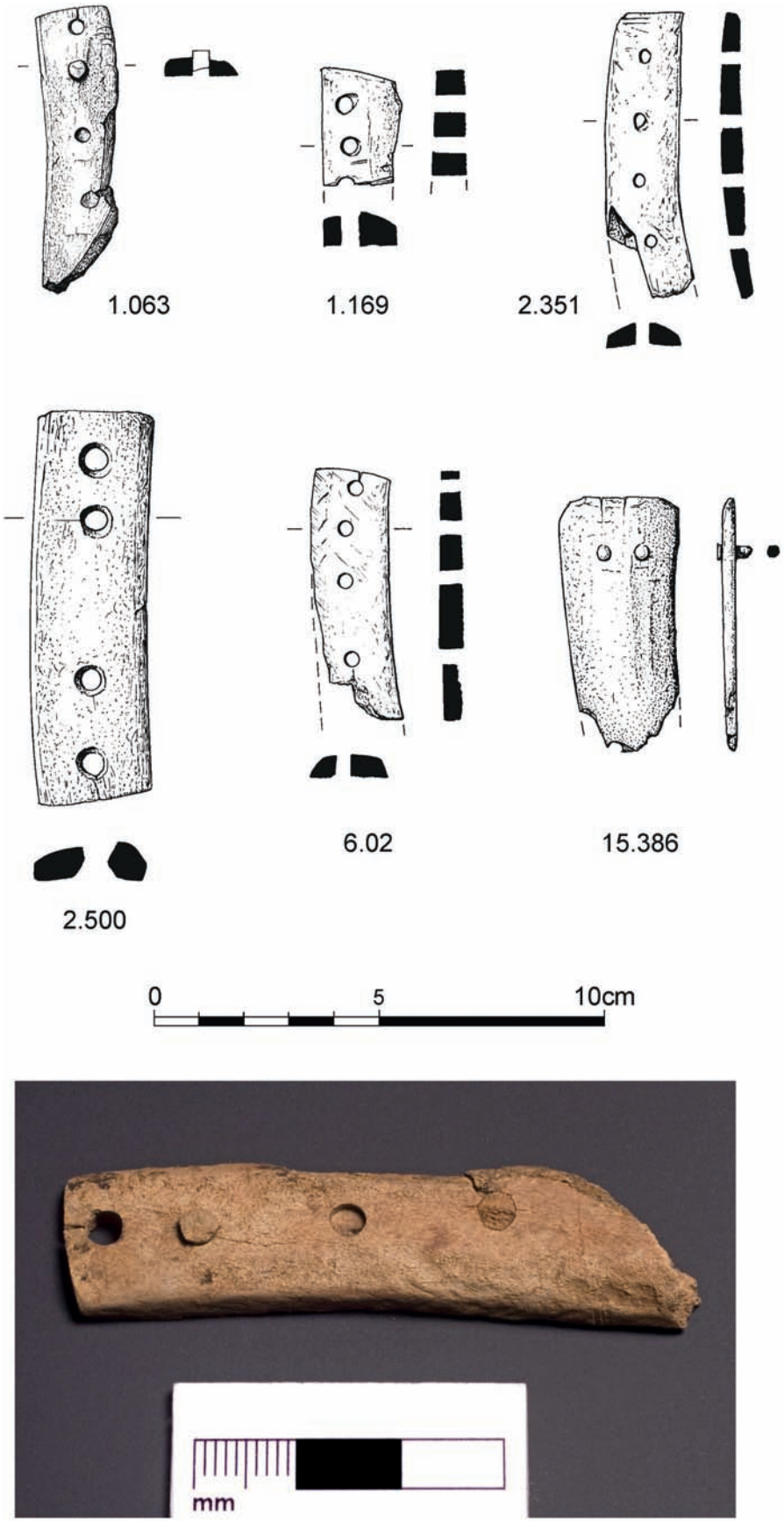


Figure 12.81. Antler mounts, SF1.063 below

Table 12.71 Other fittings (15.320 & 15.330 are bone, the others antler)

SF	*C*	*Ph*	*SB*	*Description*
2.136	2.34	2a	5	Splinter showing part of broken oval perforation with worn edges. L 64 × 5 × 4
2.122	2.27	3c	7c	Tine, diagonally chopped from beam with chopped wedge removed from opposite side & perforation roughly pecked through. L 240, W 28, T 29; perf D 10 (Fig. 12.84)
2.414	2.05(4)	5a	9a	Narrow antler strip carefully knife-trimmed all around edges & ends. One end straight & seemingly broken just below transverse cut, other rounded with 2 small notches cut into edges *c.* 3mm down from end. Similar in size & form (apart from ring-head) to SF.2238 from same context. L 65, W 5, T 1.5 (Fig. 12.84)
15.330	15.18	5b	9c	Scapula disc with trimmed edge & central sub-oval pecked perforation. Burnt, with most of 1 side missing. H 8.5, est original D 45; perf 9 × 5; min 4.7g.
6.10	6.02	6b	29c	Shed burr with wide, circular socket hollowed into chopped end of beam. L 78, W 41, T 34; socket D 19; socket depth 39.
6.48	6.03	6b	29c	Crown junction sawn from beam with 1 of two tines also sawn off. Other tine intact, but tip broken. Tapering oval socket from base to cut tine, suggesting this was some sort of fitting, perhaps an expedient hook. L 133, W 65, T 24; perf D 14 × 9, depth (Fig. 12.79)
15.320	Unstrat.	–	–	Sub-oval-sectioned rod, broken at 1 end & curving back around before breaking at other. Probably modified nasal bone. L 62; strip W 4, T 3; head W 9; gap in middle W 2

Table 12.72 Bone roughouts

SF	*C*	*Ph*	*SB*	*Description*
15.399	15.71	2a	3	Needle roughout. Widest around biconical perforation set in oval groove, then tapering to circular-sectioned shank. L 27, W 3.5, T 1; perf D 1
3.35	1.09	2a	25a	Needle roughout. Circular-sectioned fine point, broken at roughly shaped lentoid eye. L 19, W 3, T 4
6.487	6.08	2a	25a	Point roughout. Tapering point with straight cut head, sharp tip, & knife-trimmed edges. L 57, W 9, T 6
17.007	17.07	2b	25b	Pin/needle/point roughout. Splinter tapering to point at 1 end, other end broken. Edges shaped by knife trimming. L 53, W 4, T 3
6.647	6.07	2b	25c	Fine point roughout. Tapering point with facetted abrasion around edges. L 13, D 3
15.394	15.84	3a	7a	Pin/needle/point roughout. Longitudinally knife-trimmed strip, thicker in middle & tapering to both ends. L 38, W 5 × 3
15.19	15.64	3b	7b	Pin/needle/point roughout. Longitudinally knife-trimmed, tapering edges with wide end partly cut then snapped & narrow end broken. L 83, W 6.5, T 5.5
15.378	15.56	3e	7e	Roughout for double-ended bone point made from bone splinter, abraded to shape but no use-wear. One point notably finer than other. Thicker end burnt & some pale brown residues adhering to 1 side. L 62, W 6, T 3
2.109	2.16a	4a	8a	Pin with spatulate head, tapering into circular-sectioned shank with fine tip; longitudinal & lateral striations all over. L 66, W 6, T 3
6.359	6.06	4c	27b	Pin/needle/point roughout. Tapering rod with both ends missing & striations from shaping. L 36, W 6-4, T 4
15.112	15.25	5a	9b	Pin/needle/point roughout. Tapering burnt splinter shaped into rough rod with longitudinal knife-cut facets. One end cut & snapped, with others broken. L 9, W 5, T 4.5
258	1.04	6a	29a	Pin/needle/point roughout. Longitudinally knife-trimmed edges, both ends broken. L 17, W 10, T 7



Figure 12.82. Antler tine object SF2.122





Figure 12.83. Bone & antler hook fittings: top. SF15.320; bottom. SF2.136

have been a decorative fitting, such as a pommel on a dagger or knife handle. There are no metal corrosion traces visible within the perforation, demonstrating that it was unlikely to have been attached to the knife or dagger when deposited. This object is the only evidence of whale exploitation from the site and, along with its aesthetics, suggest it belonged to a decorative and important object. It was recovered within redeposited midden material in the cave (C.6.05) during Phase 5b/ SB27c.

Fittings

Pegs

There are ten single pegs in the assemblage, ranging in length from 7–24 mm, and a further seven roughouts (one from Phase 5b, six from Phase 6b). All are identifiable from their knife-trimmed edges and shaped, flattened heads. Such pegs would have been used to fasten other objects, such as mounts. Indeed, some of the perforated mounts (below) still retained pegs (Table 12.69). They were found from Phases 2–6, predominantly in the cave.

Mounts (see also roughout SF1.169)

The eight perforated mounts were all finely shaped from antler; one unfinished roughout (SF1.169) was also recovered (Fig. 12.81). Four are very similar in size and shape (SF1.063, 2.351, 2.352, 6.02): slightly curved strips with trimmed flat back and rounded front with evenly spaced drilled perforations, some still containing pegs. SF2.500 is very similar but larger, while SF15.386 differs in having pairs of perforations at the ends rather than arranged linearly along the mount. Similar antler mounts have been found riveted either side of metal tools (*e.g.* Hallén 1994b, illus. 12, 8–10), though these had iron rivets, and similarly formed mounts are known in the early medieval period on composite combs. The bone/ antler rivets here, and lack of staining from contact with metals, suggest

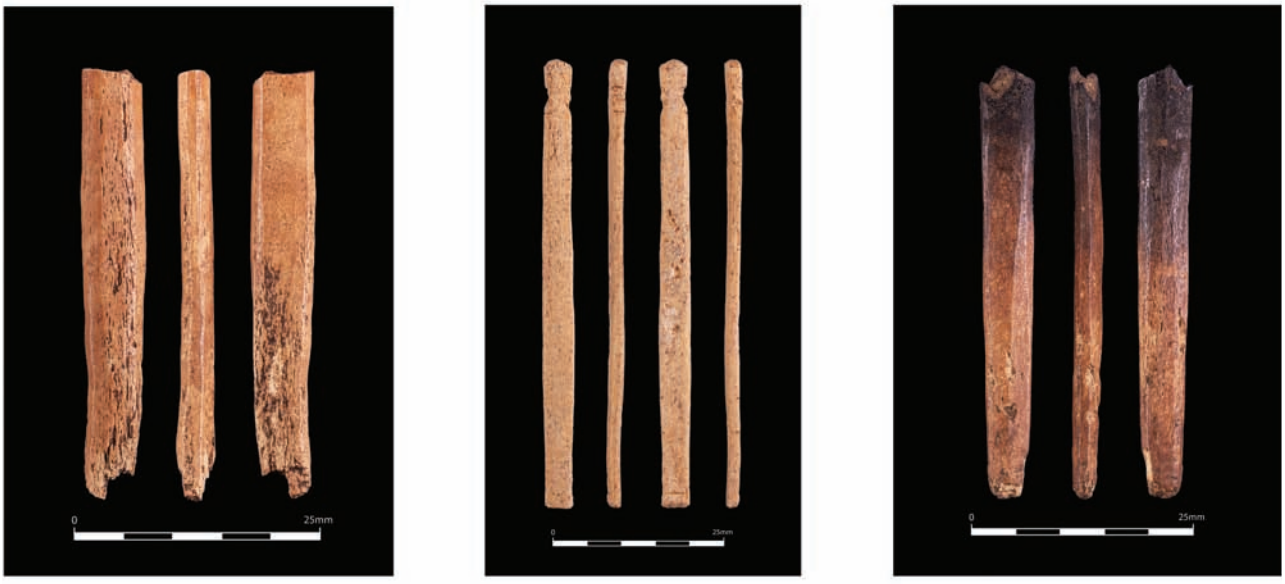


Figure 12.84. Worked bone & antler strips SF6.17a, SF2.414, SF6.19a

Table 12.73 Distribution of antler working evidence by phase

Ph	*2a*	*2b*	*2b/3b*	*3*	*3a*	*3b*	*3c*	*3e*	*3e/4a*	*4a*	*4b*	*4c*	*4c/5a*	*5a/5b*	*5b*	*6a*	*6b*	*7*	*u/s*	*No.*
Offcut basal	1	–	–	–	–		–	–	–	–	–	–	–	–	–	1	2	–	2	6
Offcut junction	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	2		–	–	4
Offcut crown	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	–	1	–	–	3
Offcut tine	–	–	1	–	1	2	–	1	–	–	–	1	–	1	1	–	3	–	–	11
Undiag. worked antler	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	1	3	–	2	7
Undiag. gathered antler	–	1	–	1	–	–	–	2	1	–	1	2	1	1	3	8	8	1	4	34
Prepared beam segment	–	–	1	–	–	–	–	–	–	1	–	–	–	–	–	2	4	–	2	10
Prepared strip	1	–	2	–	1	1	–	–	–	–	–	1	1	–	3	4	3	–	–	17
Roughout	–	–	–	1	1		2	1	2	–	–	–	–	–	2	–	13	–	2	24
No.	2	1	4	4	3	5	3	4	3	1	1	4	2	2	9	18	37	1	12	116

they were probably attached to an organic material, such as bone, leather, or wood (Table 12.70).

Other fittings

Seven other objects are likely to have been fittings (Table 12.71). There is a handle probably from a piece of furniture (SF6.10) and two crudely shaped expedient hooks (SF6.48 and 15.320), while antler tine (SF2.122) has a chopped, bevelled, and perforated facet at the wide end, suggesting it was fastened onto a flat surface, creating a robust hook, perhaps for hanging or tethering other items. A curious fine strip with a notched end (for attachment?; SF2.414) finds a parallel from Old Scatness, Shetland (Bond 2015, 447 no. 31380, fig. 7.13.3); it is interpreted there as a pin blank, which is implausible, but its role is unclear. A perforated long bone fragment (SF2.136), part of a burnt, roughly shaped perforated disc (SF15.330) made from a scapula may have functioned as a spindle whorl or been part of a fitting.

Manufacturing evidence

Bone roughouts

Simple cut marks on bone without further evidence of shaping are assumed to be butchery traces. Three

Table 12.74 Antler roughouts

SF	*C*	*Ph*	*SB*	*Description*
Handle roughouts				
2.112	2.16	3e/4a	7e/8a	Part of tine or beam with 1 end broken & other rounded. Inside partially hollowed; split longitudinally. L 58, T 17 × 9
2.513A	2.66	3	20	V. fragmentary beam segment in 2 refitting pieces with beginning of hollow in end. Most of outer surface eroded. L 91, D 27; socket depth 26
268/ 2.342	104, 2.52	6b	22a	Two refitting frags. Beam with top broken, trez tine chopped off & base broken but hollowed out, suggesting it was intended to be a handle. L 350, D 37, socket depth 37
6.141C	6.03	6b	29c	Tine: broken at 1 end while tip has been sharpened with knife-trimmed facets. Roughout, possibly for a handle. L 140, D 21
6.46	6.03	6b	29c	Handle roughout with evidence of re-use. Tine with narrower end cut, finely shaped & socketed. Fine surface toolmarks indicate was unfinished, & spall from 1 side suggests it broke in manufacture. Wider end roughly chopped & snapped; very different level of finish suggests this end was cut off, perhaps for re-use, when it broke. L 47, W 18, T 15
BNN9d	Unstrat.	–	–	Tine with straight cut end, partially hollowed. L 83, D 14; hollow depth 9
BNN9e	Unstrat.	–	–	Tine, both ends broken but 1 partly hollowed. L 44, D 15; hollow depth 6
Peg roughouts				
226	1.05	5b	27c	Tapering rod with irregularly facetted, knife-trimmed edges. Wider end cut flat, tip blunt. L 34, W 6, T 4
64A	1.064	6b	29c	Tapering rod with longitudinally knife-trimmed edges, straight cut head, & pointed tip. Partial cut part way along shank at same point as on F.672, suggesting they were roughouts to be portioned into pegs. L 30, D 4
64B	1.064	6b	29c	Tapering peg roughout with longitudinally knife-trimmed edges; wide end broken & narrow end cut. L 14, D 3
64C	1.064	6b	29c	Peg roughout with longitudinally knife-trimmed edges, 1 end crudely cut at angle, other broken. L 16, D 3
6.181	6.03	6b	29c	Tapering, knife-trimmed peg with 1 end cut, other broken. L 18, W 3, T 3
6.01	6.01	6b	29c	Unused peg with knife-trimmed, tapering edges, crudely cut head & square section. L 26, W 5, T 4
672	6.03	6b	29c	Small tapering rod with longitudinally knife-trimmed edges, broken head & tip. Partial cut part-way along shank. L 16, W 3, T 3
Other				
2.135	2.32	3a	7a	Tine tip with longitudinal striations & small lateral cut marks from abrading to shape. Base broken, tip chipped. L 36, D 11 × 8
2.134	2.23	3c	7c	Tine tip with knife-trimmed facets around most of surface. Tip trimmed but base broken, indicating it is not its original size. 48 × 22 × 16
15.245	15.60	3c	7c	Discoloured tine; cut & split from beam, with knife-trimmed facets down tip. L 49, D 15
15.388	15.56	3e	7e	Pin roughout with rectangular-sectioned head cut straight; longitudinally knife-trimmed edges lead to long circular-sectioned shaft with lost tip. Lateral & circumferential striations on shank suggest it was shaped by abrasion. Length, fineness, & finish of shaft indicate pin (or needle; less likely, given head form) rather than point. L 107; head 10 × 7; shaft D 5
2.130	2.16	3e/4a	7e/8a	Thin, tapering rectangular strip with narrower end broken & wider end & edges finely squared & smoothed. Destined to become perforated mount? L 34, W 15, T 4
15.099	15.27	5b	9c	Burnt tine in 2 refitting frags, with convex knife-trimmed base & longitudinal striations from shaping. Perhaps intended as pendant? L 44, D end 11
258	1.04	6b	29c	Point roughout with longitudinally knife-trimmed edges. Both ends broken & no sign of use. L 17, W 10, T 7

(Continued)

Table 12.74 Antler roughouts (Continued)

*S*F	*C*	*Ph*	*SB*	*Description*
169	1.03	6b	29c	Plano-convex-sectioned perforated rectangular strip, all edges cut straight, 3 cylindrical perforations along middle, 1 truncated by cut edge; this, the visible toolmarks on edges, & lack of damage from pegs being inserted, suggests discarded roughout or offcut. Back abraded flat, front knife-trimmed. One perforation (complete, nearest end) slightly misaligned. L 26, W 17, T 7; D 4
61	1.01	6b	29c	Tine tip with slight knife trimming on tip. Other end worked into blunt, knife-trimmed point. Perhaps intended as pendant? L 34, W 9, T 8
6.11	6.02	6b	29c	Shed burr removed by chopping from rest of antler. Knife-trimmed facets around underside. D 60, T 32

femur-head whorls have been catalogued with the other spindle whorls (SF2.124, 2.429, 15.192). The types are discussed in the catalogue above (Table 12.72).

Antler working evidence

The antler-working process has been outlined above. The process was fairly standard: the base and tines were removed, along with awkward junctions, to create lengths of straight beam. Tines were often worked into handles; beams could likewise be turned into a range of items, including handles, or the cortical tissue could be split off into rectangular strips.

High Pasture produced all stages of the process, though the percentage of offcuts to other working evidence (32%) is rather lower than in the Broxmouth assemblage (45%), which might suggest that some of the material was being brought to the cave area part worked. Unworked antler fragments were also examined since, unlike bone, they are not a natural by-product of the butchery process (especially shed antlers) but must have been brought to site as a raw material for craft purposes. In total, 134 unworked fragments were recovered, mostly small and degraded. As with the certain working debris, there is a cluster around Phase 6. They are included in Table 12.74 in outline (gathered antler), as their 34 finds numbers rather than 134 fragments, since much fragmentation occurred after deposition.

Roughouts are catalogued in Table 12.66 (above), with the exception of prepared beam segments and strips. The prepared strips were mostly broken, but more intact ones vary from 42–190 mm. The types have been discussed (where recognisable) in earlier catalogue entries and their distribution by phase is shown in Table 12.73.

12.6 Copper alloy

Fraser Hunter with a contribution by Gemma Cruickshanks

12.6.1 Introduction

High Pasture Cave produced a small assemblage of 22 copper alloy artefacts: five ornamental objects, 11 fittings and six miscellaneous pieces. Among these are some individually striking items.

12.6.2 The finds

Perhaps the most interesting and tantalising is the decorated sheet fragment SF1.067 (Figs 12.85 and 12.86). The chased and repoussé curvilinear decoration identifies this as a piece of La Tène art, with a series of non-concentric, curved motifs, one subdivided into two trumpet-like forms. Insufficient survives to offer any reconstruction of the pattern or form, though the raised border suggests it was a mount which fitted onto another item, but such trumpet-based sheetwork links it to some of the finest pieces of Celtic art in Britain – the so-called 'Torrs-Witham-Wandsworth' style and its successors of the 3rd–2nd centuries BC. This is best known from a series of spectacular shield covers and bosses, and is attested in Scotland by the Torrs pony cap. Several of the items (such as Torrs, the shield cover from the River Witham, and one boss from the Thames at Wandsworth) have convex repoussé, sometimes with additional elements such as crests, which is quite different in character from this fragment (Jope 2000, pls 60–6, 70–5, 100–1). However, closer parallels can be found within the tradition, notably on the round shield boss from Wandsworth, with its mix of concave and convex designs (Jope 2000, pl. 84). This is also seen on the ?2nd century BC shield mount from Moel Hirradug, Flint (Wales; Jope 2000, 94). Later sheet traditions revert to convex mouldings once more, such as the Deskford carnyx or the Llyn Cerrig Bach plaque (Jope 2000, pls 176–7, 184); Roman Iron Age finds show more diversity, but this is too late for this item, its context suggesting it was deposited in the last two centuries BC.

The fragment's main significance lies in the presence of such decorated metalwork in Atlantic Scotland, where it is otherwise exceedingly rare (MacGregor 1976). This is not necessarily because the area lacked contacts or fine metal-working traditions: our picture is biased because societies in Atlantic Scotland did not have a strong tradition of metalwork hoarding at the time (Hunter 1997, 113, fig. 12.1), and the thin but wide spread of La Tène brooches in Atlantic Scotland shows the inhabitants were

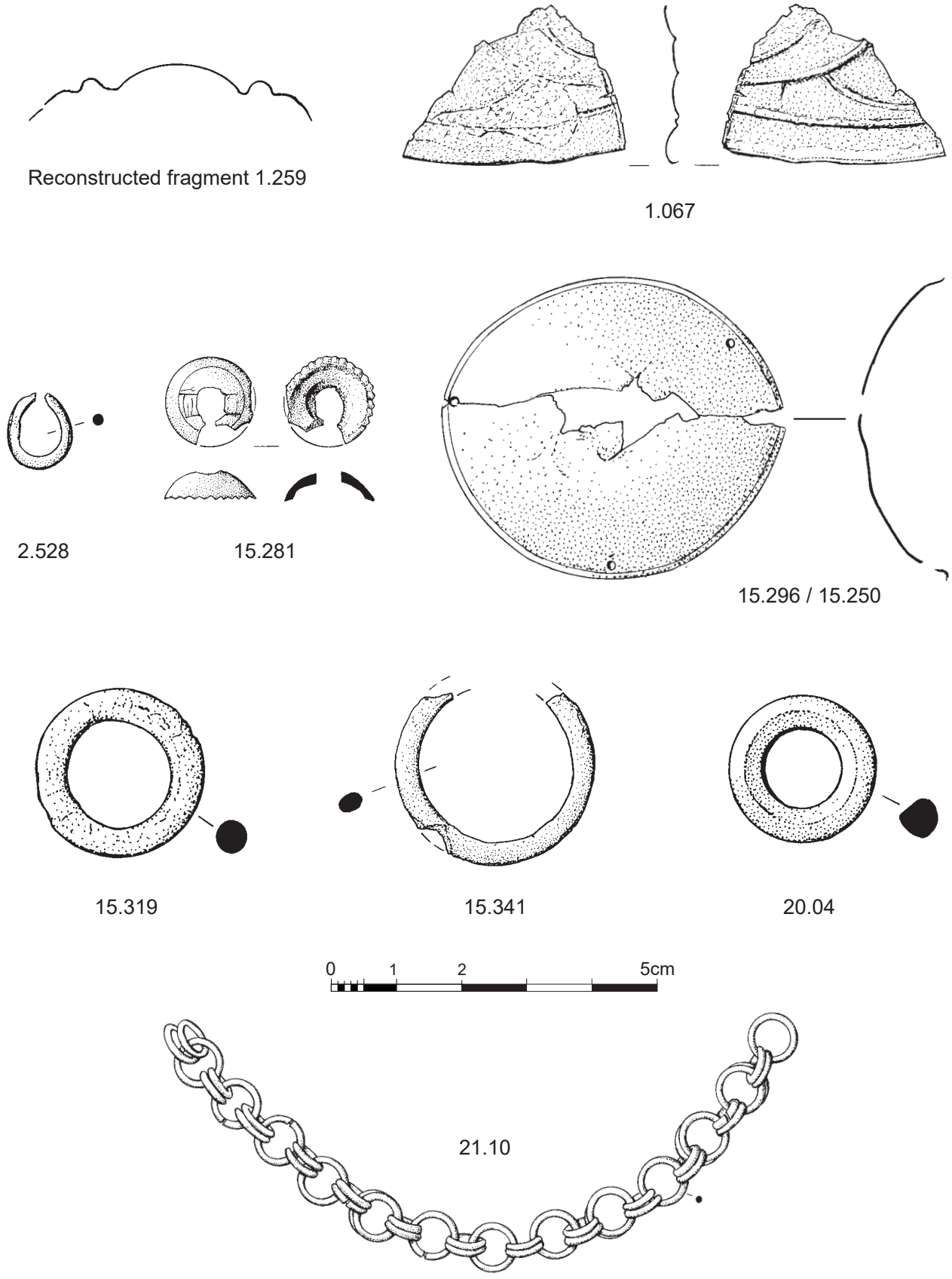


Figure 12.85. Copper alloy finds: fragment SF1.259, decorated sheet fragment SF1.067, penannular ring SF2.528, boss SF15.281, domed mount SF15296/15.250, rings SF15.319, SF15.341, SF20.04, double link chain SF21.10



Figure 12.86. Copper alloy objects: A. SF1.067; B. SF15.250/2.96; C–D. SF21.10

linked to wider connections (Hunter 2009). This bias is compounded by the poor survival of sheet metalwork compared to cast items (though there is evidence of the manufacture or repair of sheet items in the Atlantic west, from Cnip (Lewis) and Dun Lagaidh (Ross and Cromarty); Armit and Dunwell 1992, 145–6, figs 5–6; MacKie 1976, 217–8, pl x). This unimpressive fragment is a very valuable corrective to the existing picture and shows La Tène art was in circulation in the area and, indeed in this case, was deliberately destroyed and a fragment placed in the cave.

Fittings dominate the assemblage (Fig. 12.85). There are four mounts, most likely from organic items (one preserves leather traces). Three are decorative: the La Tène fragment noted above, and domed or bossed mounts. One had been deliberately detached, and the La Tène fragment had also been deliberately broken up. This might have been for re-use, although metalworking evidence is sparse

on the site, suggesting this may be deliberate fragmentation prior to deposition.

The other main fitting type is links and rings of various forms. Most striking is an apparently intact fine double-link chain (SF21.10; Fig. 12.86). These are known from several other Iron Age sites: from Dun Ardtreck on Skye (MacKie 2000, 389–90, illus. 25 no. 35); Clickhimin, Shetland (Hamilton 1968, 82, fig. 40.3); Scatness, Shetland (Dockrill *et al.* 2015, 404, pl. 7.11.8); Gurness, Orkney (Hedges 1987, fig. 2.43); Hurly Hawkin, Angus (Henshall 1982, 226, fig. 6 no. 9); Leckie, Stirlingshire (MacKie 2016, 82, fig. 4.6); and Birnie, Moray (Hunter in prep.). It thus seems to be a central and northern Scottish type. The Leckie example was used to join two Romano-British disc brooches, but such fine chains could have a variety of decorative uses. Several penannular links are likely to come from similar chains; such links are attested elsewhere as stray finds (*e.g.* Howe, Orkney (Ballin Smith 1994, illus. 132); Dun Mor Vaul, Tiree (MacKie 1974, 126, fig. 16, SF438.JT)). Initially attributed to a Phase 4a (SB8a) (Early Iron Age) context, new radiocarbon dates on human bone from the same context suggest the chain was deposited during the closure of the site in Phase 7 (SB 11). XRF analysis showed it was manufactured from a leaded gunmetal, and while the zinc levels are low, they are sufficient to indicate it included re-used Roman metal.

Plain rings are difficult to attribute to a particular function, but one cast ring with a bevelled interior is distinctive, if enigmatic. There is an identical piece from the Howe, Orkney (Ballin Smith 1994, 223, illus. 134 no. 7002), identified there as a possible pin head, but this is unfeasible for this example which lacks any plausible attachment point for the shank. This is clearly a recognisable type, but its function is uncertain.

The other main category is ornaments, including characteristic types of the Atlantic Iron Age such as a spiral ring (Clarke 1971; Fig. 12.87). Its small size suggests it acted as a fastener, twisted into cloth to hold it, rather than a finger ring. There has been an extended debate over the dating of this long-lived type (see Lane 1987, 53–4 for a summary); the Phase 6b context of this example places it in the last two centuries BC.

There are two pins, though neither is typologically diagnostic: one is simply a shank (SF2.384); one has an unfinished head (SF17.100), which must derive from a ring-headed or projecting ring-headed form (typical of the Early and Middle Iron Age), as only these were made in wire. Similarly unusual is the assemblage of broken-up fragments SF2.457, which includes a simple bracelet and a second item, probably a bracelet or ring. Such plainer items are rarely recognised in excavations; this example from Phase 3a is early Iron Age, a period when we know little of ornament use.

Among the miscellaneous items are two striking objects. One is a fragmentary pair of tweezers (SF15.082a; Fig. 12.87) from a Phase 6a context (modelled dates of *295–215 cal BC* to *cal AD 50–130*). Scottish examples have been summarised elsewhere (Coleman and Hunter 2002, 93); but also include three examples from Mine Howe (Orkney), one from Dun Ardtreck (Skye), one from Broxmouth (East Lothian), and several examples including one pair manufactured from silver from Sculptor's Cave (Moray); (Hunter 2000; MacKie 2000, illus. 24.43; Armit and McKenzie 2013, 373, illus. 10.55 sf533; Armit and Büster 2020, 137, 144–6, illus. 5.46, 5.47). Datable Scottish examples are Roman Iron Age or later, but tweezers and other toilet instruments appear in southern Britain in the late pre-Roman Iron Age (Hill 1997; Eckardt and Crummy 2008, 21–4; Hunter 2020b). The early date of the High Pasture Cave example is further evidence that groups in Scotland were actively participating in wider social trends rather than passively following sometime later; the only other recorded tweezers of this date in Britain come from Yorkshire (Stead 1979, 84) and Slade Farm, Oxfordshire (Eckardt and Crummy 2008, 23), though they are recorded on the Continent (Eckardt and Crummy 2008, 18–21).

The other notable find is the only Roman object from the site: an as or dupondius, probably of second-century date (SF19.003; Fig. 12.88), which comes from a post-abandonment phase. Roman coins are rare in Skye, and it is most unlikely this was a casual loss. It is much more likely to be a deliberate offering of a powerful, exotic item at a site of venerated memory. Roman items were often used as offerings within Iron Age rituals: a local example is the apparent foundation offering of a Roman terracotta model of a bale of goods from Dun an Iardhard (Curle 1932, 289, 395–6, fig. 2). Only two other Roman coins are known from Skye, both from findspots suggestive of deliberate offerings: a denarius of Marcus Aurelius from the banks of a river near Dunvegan, and a denarius of Trajan from a moor near the shore of Loch Grishornish (MacDonald 1939, 244; Robertson 1961, 148).

There was very little production debris in the assemblage: a single, tentative offcut (SF17.079) and an unfinished pin (SF17.100), suggesting some wrought-work took place on site as well as the casting attested by a few crucibles and other debris.

12.6.3 Phasing

The distribution of copper alloy objects by phase is given in Table 12.75

12.6.4 Alloys

Fraser Hunter and Gemma Cruickshanks

Most of the material was analysed by surface X-ray fluorescence analysis by Gemma Cruickshanks to obtain a broad characterisation of alloy type. Surface analysis gives a distorted picture owing to differential corrosion of elements leading to surface enrichment and depletion but provides an overview of an assemblage. In this case, leaded bronze and bronze were the dominant alloys used, as would be expected (Table 12.76). Arsenic and/or antimony were noted in about a third of cases, all bar

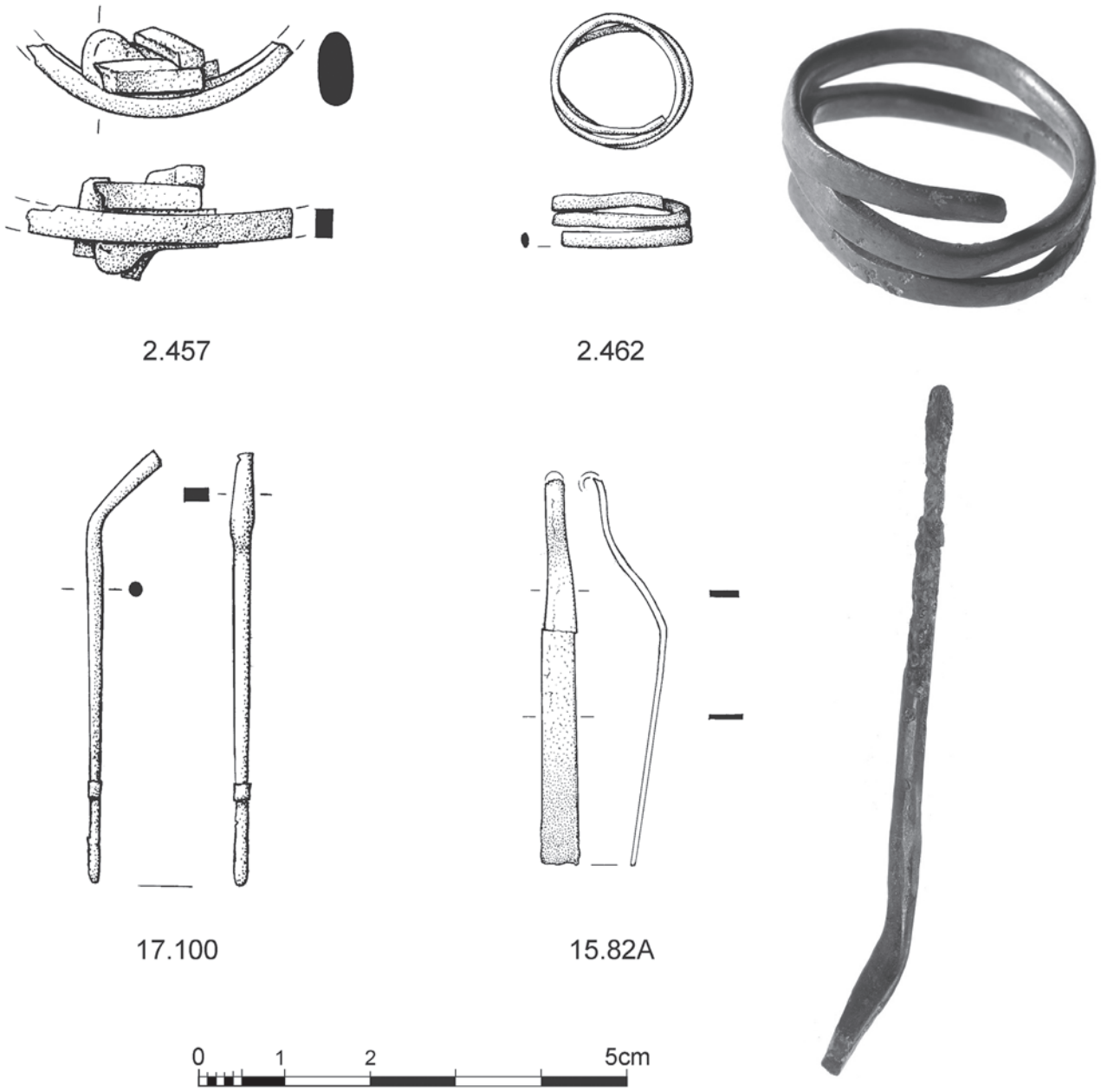


Figure 12.87. Copper alloy objects: bangle bundle SF2.457, spiral ring SF2.462 (& inset), unfinished pin SF17.100, arm from tweezers SF15.082a (& inset SF17.100)

one in leaded bronzes. There are slight technological preferences, but these are trends rather than clear divisions: leaded bronzes were more often used for castings and rods, bronze more often for sheet. The quantities are too small to see clear patterns in alloy use over time. The general absence of zinc-containing alloys is anticipated for a site which is essentially pre-Roman; this makes the exceptions interesting. One, unsurprisingly, is the Roman coin (SF19.003). Chain SF21.10 has low zinc levels, but they were detectable in three replicate analyses. It implies a different source from the other copper alloys, and while zinc can come from zinc-rich copper sources, this has not so far been demonstrated in Scotland. It is far more likely to reflect the recycling of Roman metal. Lastly, copper alloy mount SF15.250/15.296 has a notably high zinc percentage, yet both fragments are from Phase 3e (SB7e) deposits (modelled dates ranging from *650–570 cal BC*). Alloys with this level of zinc would be unexpected before the availability of Roman material for recycling; the suspicion is that these fragments are intrusive.

12.6.5 Deposition

Much of the material was fragmentary or, in the case of the links, was likely to have been lost or removed from a larger item, and would normally be seen as casual losses, but two aspects of the assemblage indicate special treatment. One

Table 12.75 Phase distribution of copper alloy finds, with significant finds named

Ph	*Ornament*	*Fitting*	*Other*	*No.*
2a	–	1	2	3
3a	1 bracelet	1	–	2
3e	–	1 domed mount	–	1
4a	–	1	–	1
4c	–	1	1	2
4	–	–	1	1
5a	–	1	–	1
5b	1 ?pin head	1	–	2
6a	1 unfinished pin	1	1 tweezers	3
6b	2, incl spiral ring	1 Celtic mount	–	3
7	–	2, incl chain	1 Roman coin	3

Table 12.76 Alloy types used in the manufacture of copper alloy finds

	Cast	*Rod*	*Sheet*	*Total*
Bronze	3		4	7
Leaded bronze	5	4	2	11
Leaded gunmetal	1		2	3
Total	9	4	8	21

is the few intact items: the unfinished pin SF17.100, the spiral ring SF2.462, and the coin SF19.003. These could all plausibly be deliberate deposits, though the ring may have been a component in a larger item, and the same is true of two complete plain rings (SF15.319, SF20.04). More striking is the evidence for deliberate destruction before deposition: mounts SF0067, SF0259, and SF15.250 had been removed and cut up or folded, while the bracelets SF2.457 had been cut into pieces and deposited in a bundle. This could represent preparation and storage of material for recycling, but metalworking evidence is sparse at the site. Given the other evidence for deliberate deposits, it is plausible that objects were being deliberately damaged prior to purposeful deposition. This needs to be considered in the wider context of deposition patterns.

12.6.6 Catalogue

Ornaments (5)

SF2.384 Four fragments of a pin shank. L 45, D 2 mm. Alloy: bronze (minor Pb, trace ?As, Sb). HPC06 C2.52 [Phase 6b, Block 22a]

SF2.457 Fragments of two items which have been cut up and deposited together (Fig. 12.87). There are three fragments of a curved rectangular-sectioned bar (total L 67 mm), with an inner diameter of *c*. 35–40 mm. One preserves a blunt terminal, suggesting it had a penannular form. It was probably a bracelet; the recorded diameter is small, but this may be the smaller diameter of an oval. The fourth fragment differs, with an oval section expanding markedly over its curving 20 mm length (3.5 × 1.5 to 8.5 × 4.5 mm). It could be from a bracelet or a finger ring. Seems to be deliberate destruction prior to purposeful deposition. Surviving L 31, section 3.5–4 × 2 mm. Alloy: bronze (minor lead). HPC09 C2.32 [Phase 3a, Block 7a]



Figure 12.88. Corroded bronze Roman As or dupondius coin SF19.003

SF2.462 Spiral ring of 2¼ turns made from an oval-sectioned strip, its edges flattened where they touch. Terminals squared or blunt; faint polishing scratches from manufacture (Fig. 12.87). Rather uneven or distorted from use; its size suggests it was for a small finger or, perhaps more likely, served as a fastener. D 16 × 15 (internal D 13.5 × 12.5), H 7, strip 1.8 × 1 mm. Alloy: bronze (minor lead). HPC10 C2.61 [Phase 6b, Block 10]

SF15.281 Decorative boss with central conical hole (D 5 mm), now perforated but probably originally with a solid base, as the rear shows remains of a raised bar which once ran across it. The inner edge is serrated, probably to aid adhesion of an inlay; it forms a tapered edge on the exterior surface. Convex exterior with cast decorative step; interior flat around perforation, with raised serrated rim which becomes thinner towards the broken edge; around a quarter of the rim is lost. Probably a decorative mount which once held an inlay of glass or coral. D 14 H 4 mm. Alloy: leaded bronze. HPC09 C15.18 [Phase 5b, Block 9c]

SF17.100 Unfinished pin, in process of forging from a bar (Fig. 12.87). The ends are rectangular in section; the circular-sectioned shank still bears hammer marks from forging. The upper 10 mm is bent at an angle of 45°, indicating this was to be drawn out into a head – the projection would be appropriate for either a ring-headed or a projecting ring-headed form. L 50.5, D 2 mm; head section 2.8 × 1.5 mm. Alloy: leaded bronze (trace As, Sb). HPC08 C.17.03 [Phase 6a, Block 29a]

Mounts and fittings (11)

SF1.067 Decorated sheet fragment, the curvilinear repoussé decoration identifying it as a piece of Celtic art Fig. 12.86). The front is rather obscured by corrosion, but the rear is very clear. One original slightly curved edge; other edges are slightly bent at the margins, implying they were folded to remove this piece. The border is slightly raised (W 6–7 mm), probably to fit over something. The dominant pattern is a series of three non-concentric arcs chased from the front. The one nearest the edge is broadest and is raised, with a marked step down to the remainder of the fragment where the resulting ribs have only low relief. This broad outer zone is subdivided by a repoussé curve. The piece is too small to reconstruct the pattern, but the curves are typical of La Tène art, which is exceedingly rarely attested in the area. 34 × 24 × 0.4 mm. Alloy: bronze (minor lead). HPC2004 cave zone 4, C1.01. [Phase 6b, Block 29c]

SF1.259 Fragments making up a sheet flanged bossed mount, folded before deposition. The whole profile is slightly domed; a step is chased into the flange *c*.2.5 mm from the edge, and the central boss (D 9 mm) is surrounded by a raised margin and a channel. It was attached to a substrate by fine rivet holes, one of which survives. Overall D *c*.35 mm. Alloy: leaded gunmetal. HPC06 C1.04 [Phase 6a, Block 29a]

SF1.004 Rod fragment, curving sharply at both broken ends; probably from a ring or link. L 9, D 2 mm. Alloy: leaded gunmetal (unusual Br levels). HPC06 C1.09 [Phase 2a, Block 25a]

SF2.385 Mount fragment. Three very corroded sheet fragments and two corrosion blisters preserve part of a straight edge, slightly rounded in section, and adjacent rivet hole (D 3 mm). Largest fragment 14 × 8 × 0.5 mm. Bagged with unworked copper-stained bone. Alloy: bronze (trace Pb). HPC06 C2.16a [Phase 4a, Block 8a]

SF2.528 Slightly irregular penannular loop formed from a circular-sectioned rod, the tips tapered. 11.5 × 10; rod D 1.5 mm. Alloy: leaded bronze (trace As). HPC10 C2.15b (wet sieve) [Phase 4c, Block 8c]

SF15.132 Curving rod fragment, probably from a small ring or chain link. L 5.2, D 1.1 mm. Alloy: leaded gunmetal (trace Sb; unusual Br level). HPC07 C15.27 (wet sieve) [Phase 5b, Block 9c]

SF15.250/15.296 Two joining fragments of a domed mount, now slightly oval in plan, with traces of leather on the underside (Fig. 12.85). Sheet work, with file marks from finishing. Decorated with an engraved channel around the edge, slightly crude in places. Three neat rivet holes (D 1 mm) are spaced equidistantly around the edge to fasten it. Removed before deposition; probably deliberately broken. D 52 × 45.5; original H *c*. 7; sheet T 0.3 mm. Alloy: leaded gunmetal. HPC09 C15.51 [Phase 3e, Block 7e]

SF15.319 Cast ring, circular in section, much of original surface lost; no clear use-wear. External D 26, internal D 16–17, H 5 mm. Alloy: leaded bronze. HPC10 Tr 15 unstrat

SF15.341 Penannular ring, oval section; one end squared, the other broken. External D 31, internal D 24, section 4 × 3 mm. Alloy: leaded bronze (trace As). HPC10 C15.32 [Phase 5a, Block 9a]

SF17.057 Tiny sheet fragment, slightly sinuous; preserves part of one straight edge. 7.5 × 5 × 0.2 mm. HPC07 C17.06 [3/1] [Phase 3a, Block 27a]

SF21.10 Double-link chain composed of 26 pairs of links (Fig. 12.85). Each butt-jointed ring is made of a circular sectioned rod, the ends squared or slightly angled; each link goes through both adjacent pairs. The inner face of each ring is flat, probably from wear rather than manufacture; many are slightly oval from wear. Total L 129 mm; ring D 7–7.5, rod D 1.5 mm. Alloy: leaded gunmetal (minor Zn). HPC10 C21.09 [Phase 7, Block 11]

Miscellaneous (6)

SF2.251 Sheet fragment; corrosion obscures surface. Two layers visible in places, and possibly two rivets with washers. 17.5 × 10.5 × 3 mm; sheet T *c*.0.2 mm. Alloy: bronze. HPC05 C2.15 [Phase 4c, Block 8c]

SF15.082a Half a pair of tweezers, broken as it curved into the U-shaped end. The S-profile implies it would have been bellied, coming in to meet at the tip. Flat rectangular-sectioned bar, increasing in width to the slightly rounded tip. Cast as a broad strip with upper end then wrought into narrower form. L 45; tip W 4.5 × 0.5 mm; hinge 2.2 × 0.7 mm. Alloy: leaded bronze. HPC07 C15.16 [Phase 6a, Block 10]

SF17.078 Slightly angled edge of a cast item with irregular slightly rounded terminal; too small to identify. 7.5 × 5 × 4 mm. Alloy: bronze (minor Pb, trace As). HPC07 C17.08 [2/3] [Phase 2a, Block 25a]

SF17.079 Offcut? Small sheet fragment, distorted, slightly curled, and almost ripped in half. Edges original. 5.5 × 5 × 0.1 mm. Alloy: leaded bronze. HPC07 C17.08 [3/3] [Phase 2a, Block 25a]

SF19.003 Roman coin (As or dupondius; Fig. 12.88); details extremely unclear due to corrosion and surface loss (rim lost over around half of the circumference), but Nick Holmes (pers. comm.) suggests it is most likely of 2nd century date. D *c*. 28.5 mm, m 8.2 g. Alloy: leaded gunmetal. HPC08 C19.02 [Phase 6b, Block 35]

SF20.04 Cast ring, the exterior rounded, the interior with a bifacial angle, slightly rounded off. The angle indicates this is not a finger ring. One side is slightly lower than the other, but this seems to arise from manufacture – there is no clear use-wear. External D 22 mm internal D 12, H 6–7 mm. Alloy: leaded bronze (trace As, Sb). HPC08 C20.04 [Phase 4 Block 33]

Table 12.77 Summary of ironwork assemblage

Group	*Type*	*Total*
Weapons (5)	Dagger	2
	Spearhead	3
Tools (13)	Awl	2
	Knife	2
	Punch	2
	Tracer	1
	Socketed adze	1
	Socketed axe	1
	Socketed gouge	1
	Tang	2
	Unidentified tool	1
Personal ornaments (10)	Ring-headed pin	1
	Crook-headed pin	2
	Loop-headed pin	1
	Pin shanks	6
Fittings & fastenings (10)	Cleat	1
	Conical mount	1
	Handle (tankard?)	1
	Ring	1
	Fine chain	1
	Fine wire	3
	Rivet/junction bar	1
	Unidentified fitting	1
Blank (1)	Partially formed object	1
Rod/ bar (2)	Rod or bar frags	2
Modern (12)	Cast iron bar	2
	Nails	4
	Wire/ rod/ bar frags	5
	Screw	1
Unidentified (1)	Unidentified objects	1
Total		54

12.7 Iron

Gemma Cruickshanks and Fraser Hunter

12.7.1 Introduction

An assemblage of 54 iron artefacts was recovered from High Pasture Cave (Table 12.77). For a relatively small assemblage, a wide range of artefact types are present, including weapons, tools, personal ornaments, and fittings. Forty-two artefacts date to the Early and Middle Iron Age while the remaining 12 are modern. Of particular significance are the items recovered from the earliest Iron Age phases, including a remarkably fine chain and a socketed axe; iron artefacts at this early date are rare, making these important finds. Several of the iron objects display traces of mineralised organic material, such as wooden handles and shafts, indicating they were complete when deposited and suggesting deliberate deposition in and around the cave. Evidence of deliberate damage was also discovered, for example a bent spearhead, and a ring-headed pin broken in two with the pieces then placed together. The votive nature of the site makes this a fascinating assemblage to interpret as such objects rarely survive in 'normal' contexts. This assemblage therefore presents a valuable opportunity to study some of the earliest iron artefacts in Scotland, and types which may once have been common but seldom appear in the archaeological record.

All the iron artefacts were X-radiographed and cleaned using air abrasion which has maximised their identification; many were unidentifiable or wrongly identified prior to this, highlighting the importance of such an approach.

12.7.2 The assemblage

Weapons

Spearheads

Two spearheads (SF15.076 and SF21.02) and a possible third example (SF15.344) were recovered. SF15.344 is missing most of its head and could potentially be a different type of socketed artefact though its shape, with socket tapering then expanding into a thick oval-sectioned head before breaking, is most like a spearhead. The top of the socket is decorated with two parallel circumferential incised lines. The two intact spearheads are markedly different in size and shape. SF15.076 is small (92 mm long) with a narrow tapering blade, while SF21.02 is long (390 mm) and slender with an exaggerated midrib, making it a sturdy and ostentatious weapon. SF21.02 (Figs 12.89 and 12.90) is particularly interesting as the closed socket contains mineralised wood, indicating it was hafted when deposited. The haft was secured with a copper alloy pin, which remains in place and would have added a decorative element. The tip is now detached but refits at an angle across a large corrosion blister, indicating it was attached but bent at the time of deposition: this suggests deliberate damage. The impressive appearance of this spearhead, along with its sheer weight in iron (328 g) would have made this a valuable object. The fact that this impressive item was intact but deliberately damaged when it was deposited strongly suggests it was an offering.

The three spearheads from High Pasture Cave are the first recovered from Iron Age contexts on Skye, where daggers or swords appear to have been the favoured weapon (see below). The deposition of weaponry is strongly constrained by cultural practices and status items like weapons generally only appear in special deposits. It is likely they would have been more common but were only rarely discarded or deposited.

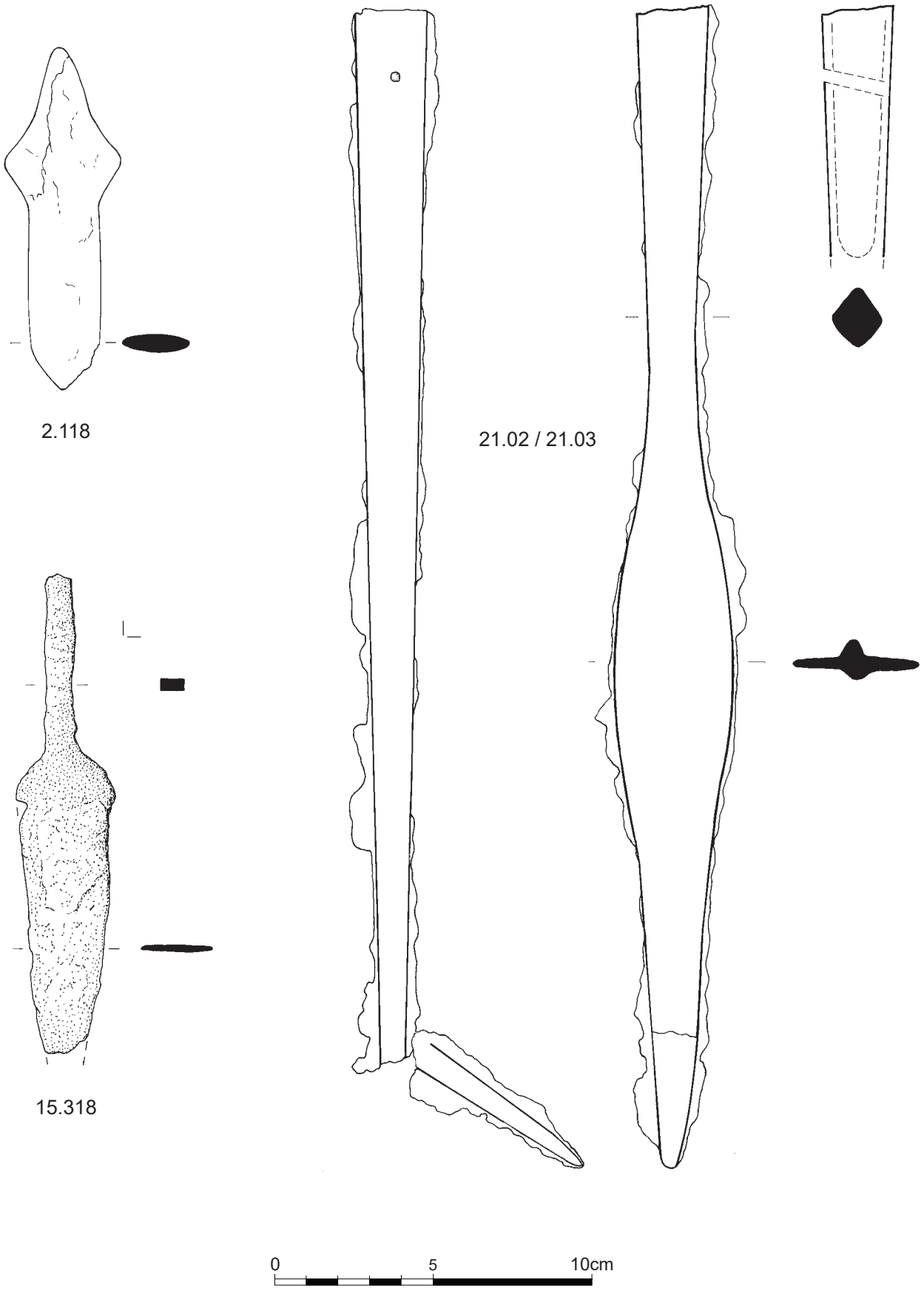


Figure 12.89. Iron weapons: daggers SF2.118, SF15.318, & spearhead SF21.02/21.03



Figure 12.90 Iron weapons: A. dagger SF2.118; B. socketed spearhead SF21.02/21.03; C. detail of copper alloy rivet in spear spherule

Daggers

Two daggers form an important addition to an expanding collection of Iron Age examples from the area. SF2.118 (Figs 12.89 and 12.90) has an unusual sinuous shape with pronounced shoulders and relatively short blade (75 mm). The form is likely to have been accentuated by sharpening, which would have worn the edges to a concave shape. The unusual, rounded tip and short blade may suggest the tip had broken and was then repaired. Mineralised leather traces on both faces indicate it was in a leather scabbard when deposited. The second dagger (SF15.318; Fig. 12.89) had also been sharpened, and has a blunt, asymmetric tip suggestive of repair. While both daggers had seen use and repair, they were intact and useable when left at the site, suggesting deliberate placement.

Five other daggers are known from Iron Age contexts on Skye: one from Suisnish souterrain on Raasay (Cruickshanks and Hunter in prep.) and four from Dun Ardtreck (MacKie 2000, 373); another from Dun Ardtreck has an incomplete length of 297 mm, placing it within the range of short swords rather than daggers (Stead 2006, 5). Five of the eight daggers/short swords from Skye were intact when recovered, and five have mineralised leather on the blade, indicating they were deposited within their scabbard. This Iron Age tradition of dagger deposition on Skye is in keeping with a larger cluster of Iron Age daggers recovered during recent excavations in an area around Skye and across to the Moray Firth (Cruickshanks in prep.).

Previous studies of blade weapons have focused on swords (*e.g.* Piggott 1950; Jope 1961; Stead 2006). Long swords were most commonly deposited in southern Britain, while short swords were preferred in the north. Daggers have seen less study. Jope's (1961) paper showed a predominantly Early Iron Age concentration of daggers in southern England. Recent work has produced many more daggers for Scotland, but these are generally poorly dated apart from one from Redcastle souterrain, Angus dating to the 1st and 2nd centuries AD (Hunter 2005, 85–6), two from Culduthel, Inverness-shire, dating to 2nd century BC–1st century AD and 4th–1st centuries BC (Hunter *et al.* 2021, 171–2) and the four from Dun Ardtreck date between the 2nd and 5th centuries AD (MacKie 2000, 373). SF2.118 from High Pasture Cave was recovered from Phase 4c, placing it in the 7th–5th centuries BC. Further work is required on Scottish daggers to better understand their dating, form, and contexts but early indications suggest that, unlike in southern England, they have a broad range of dates.

Tools

Knives

Two knives are present; on one only the tip survives (SF1.15) while the other (SF2.193) is an unusual form with the blade back angled *c.* 20° down from the tang. There is no indication that this has been caused by damage (*e.g.* cracking or distortion of the iron); it appears to have been the original shape. This unusual shape suggests a special function. Comparable knives are occasionally found on Roman sites (*e.g.* Manning 1985, 113 and pl. 54, Q25–7) and a similarly shaped but larger one was recovered from the Iron Age site at Fairy Knowe, Stirlingshire (Hunter 1998, illus. 28), though these examples bend part-way along the blade back rather than at the blade-tang junction. Their similarity to sickles or reaping hooks may suggest an agricultural function, *e.g.* for pruning or harvesting small plants.

Socketed tools

The socketed axe (SF17.001; Figs 12.91) is a classic Early Iron Age type which is consistent with the modelled dates for Phase 3a [SB27a] (*715–575 cal BC*). These are the earliest type of iron axe and emulate the form of Late Bronze Age bronze axes. As one of the first iron artefact types to appear in Scotland, they would have held a special significance, and their manufacture would have required a markedly different set of metalworking

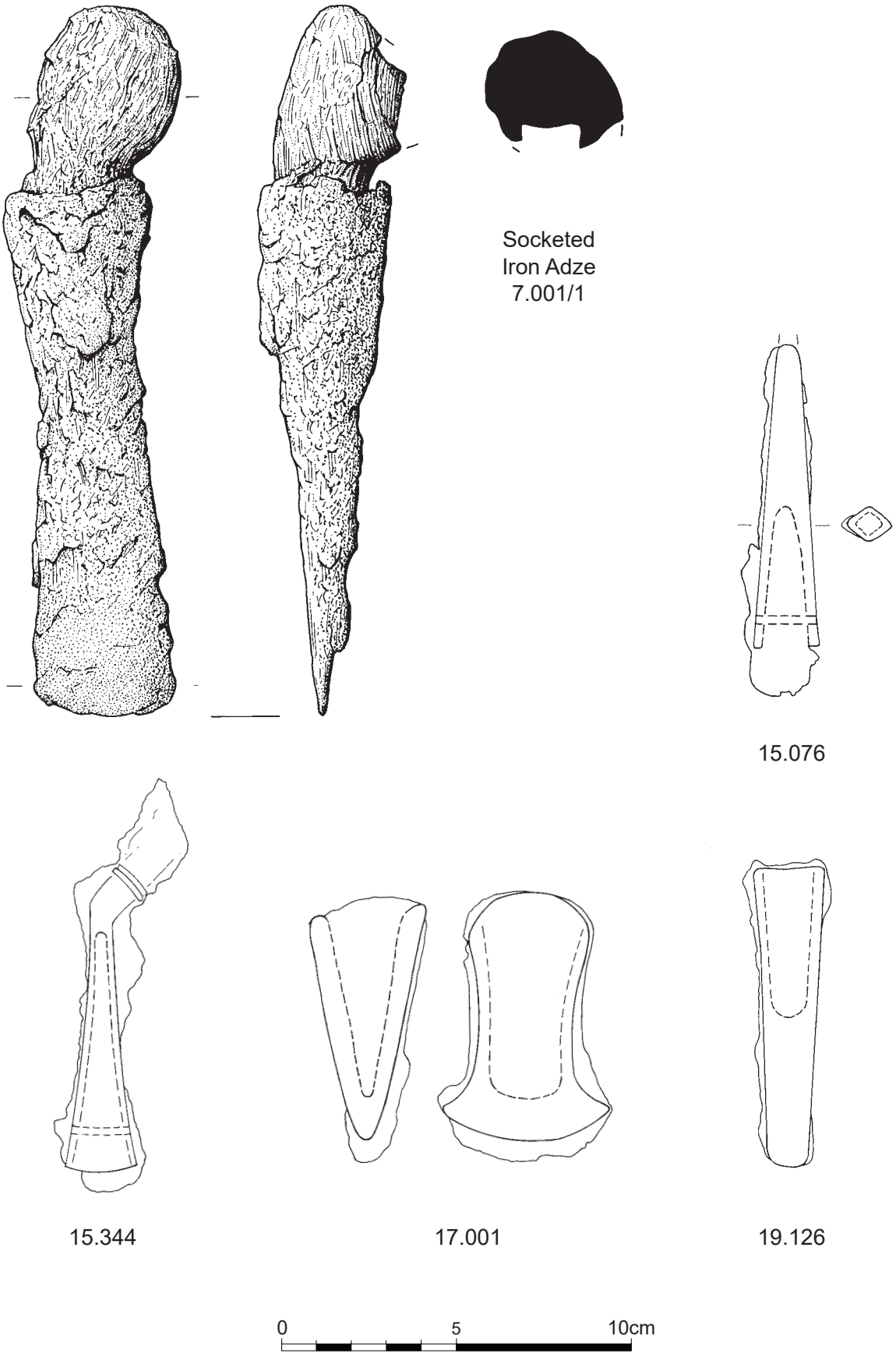


Figure 12.91. Socketed iron tools & weapons: adze SF17.001/1, spearheads SF15.076, SF15.344, axe, SF17.001, gouge SF19.126

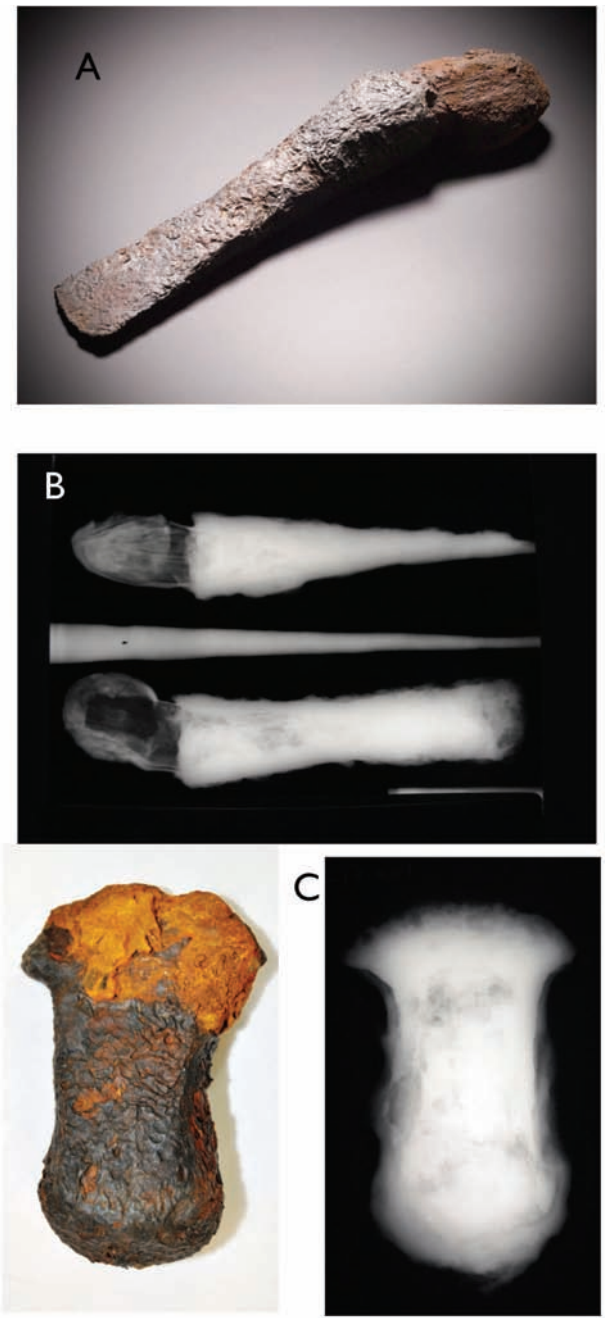


Figure 12.92. Socketed iron tools: A. adze SF17.001/1; B. x-ray images of the adze in two planes showing socket & remains of mineralised wooden haft; C. axe SF17.001 (left) & x-ray image (right)

skills from the earlier cast bronze versions. It does not fit with published typologies (Rainbow 1928; Manning and Saunders 1972) for iron socketed axes but is most similar to the bronze Late Bronze Age bag-shaped type, thought to have Irish origins and a western distribution in Scotland (Coles 1959, 33). It is unknown if iron socketed axes follow a similar pattern to those of bronze as so few survive, but it is of interest that the only Late Bronze Age bronze socketed axe found in Strath is also of this type, though other types have been found elsewhere on Skye (Coles 1959, 69).

The High Pasture Cave socketed iron axe is one of only six from Scotland: others come from Culbin Sands, Moray (NMS X.BI 29343), Traprain Law, East Lothian (Cree and Curle 1922, 216–7), Bishop's Loch, Coatbridge (Monteith and Robb 1937), Rahoy, Argyll (Childe 1937, 39) and a recently excavated example from Law of Dumbuils (Glasgow University's 'Strathearn Environs and Royal Forteviot' project). Along with the axe from Law of Dumbuils, this is only the second from a securely dated context.

Socketed adzes have a lengthier chronology than socketed axes, with examples from Iron Age, Roman, medieval, and later periods (Manning 1985, 16; Goodall 2011, 22) though this example (SF17.001/1; Figs 12.91 and 12.92) has a horizontal rather than vertical socket which is much rarer, and the dating of this type is uncertain. This was one of the first artefacts to be recovered from the cave, having been disturbed by cavers. The straight slender blade suggests this is an adze rather than the similarly formed (but wider and curved) hoe (Manning 1985, 16). Adzes differ from axes in having their blades at right-angles rather than parallel to the handle and were used by carpenters to roughly shape and trim wood. A substantial amount of mineralised wood preserves the top part of a knee-haft and indicates the adze was still hafted when deposited. Asymmetry on the blade tip is an indication of use-wear.

Socketed gouges were used during the Iron Age and Roman periods to shape wood. This example (SF19.126; Fig. 12.91) was recovered from burnt spreads in Phase 4 [SB33] (modelled dates *630–435 cal BC*) and traces of mineralised wood in the socket suggest it still had a wooden handle when it was deposited. Other Scottish Iron Age examples are known from the Blackburn Mill hoard in the Scottish Borders (Piggott 1952, 49), Buston Crannog, North Ayrshire (Munro 1882, 222) and Lochlee Crannog, South Ayrshire (Munro 1882, 124).

Fine tools

A range of fine hand-held iron tools was used during the Iron Age for a variety of different crafts. Their identification is fraught with difficulties for two reasons. First, if they are not conserved or X-rayed, they are easy to write off as nail shanks or unidentifiable bar/rod fragments. Secondly, different tools are often quite similar in form, and a single tool may have been used on different materials or for different tasks. The definitions used in Manning (1985, 11, 39, and 41) are followed here. Five fine tools were identified (Fig. 12.93). Two (SF2.482 and SF15.136) were interpreted as awls, which probably had a leatherworking role. SF15.282 and SF6.92 are similar to the awls, but the tips are too blunt to pierce anything, suggesting they are punches. The short handles indicate these were not used in

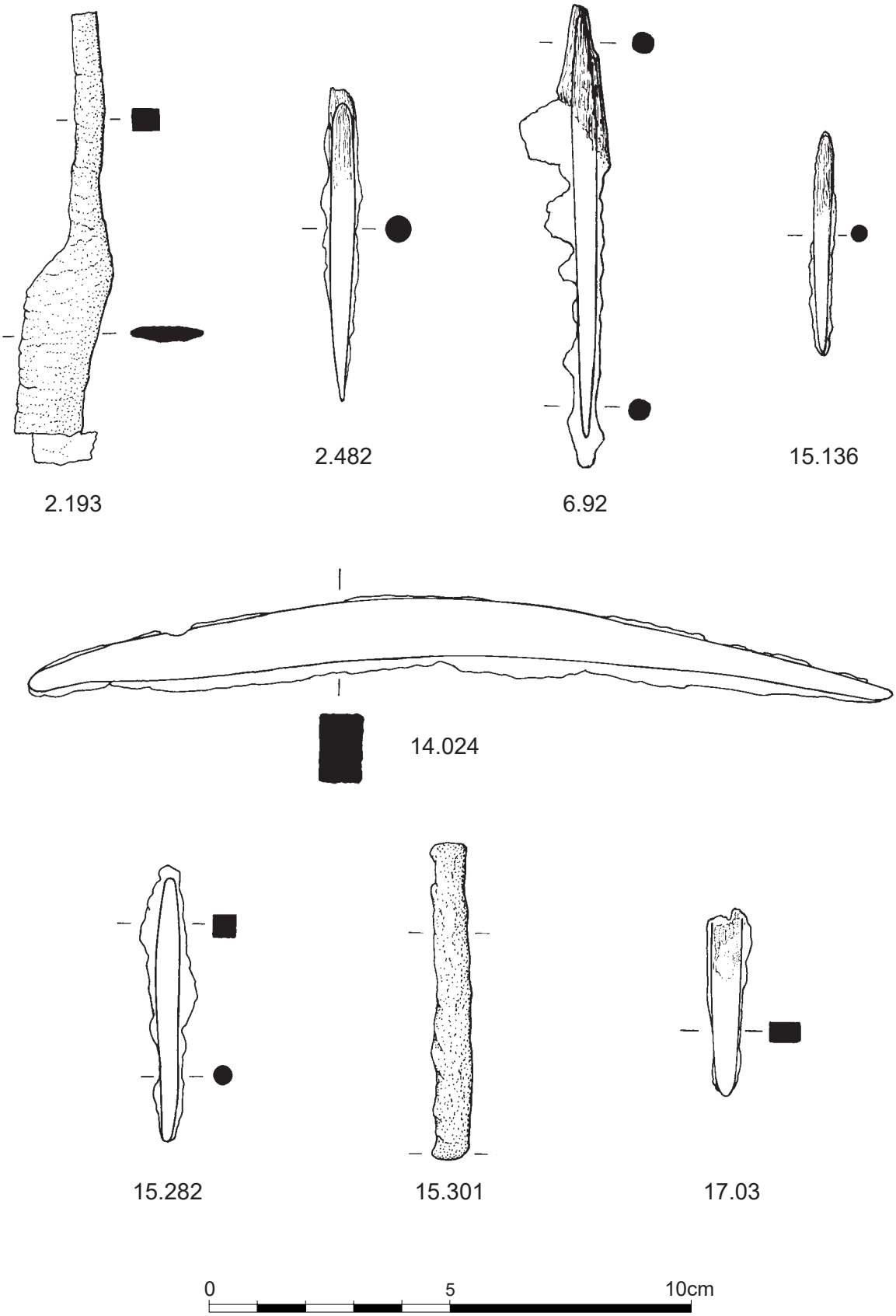


Figure 12.93. Iron tools: knife SF2.193, awls SF2.482, SF15.136, possible leatherworking tool SF6.92, possible punch SF15.282, tracer/chisel SF15.301, unidentified tools SF14.024, SF17.03

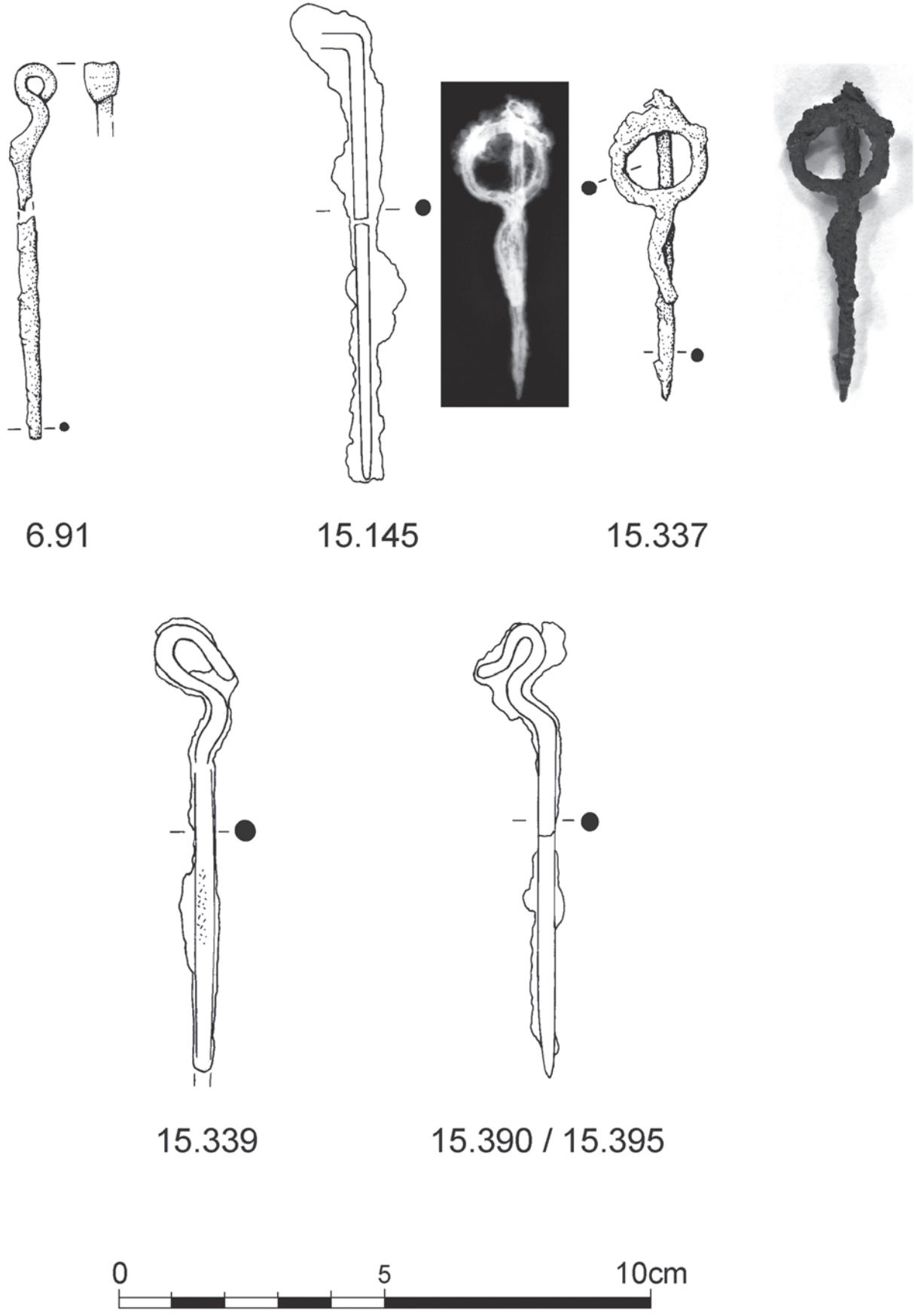


Figure 12.94. Iron pins SF6.91, SF15.145, SF15.339, SF 15.390/15.395 & ring-headed pin SF15.337 (insets including x-ray)



Figure 12.95. Loop-headed pin SF6.91

Table 12.78 Phase distribution of ring-headed pin types two refitting fragments of same pin (15.390/15.395)*

Type	*Ph*				
	2b	3c	4a/b	5a	6a
Crook-headed	–	x*	x*	x	–
Plain ring-headed	–	–	–	x	–
Loop-headed	–	–	–	–	x
Shanks	–	–	xx	x	xx

high-temperature crafts and were probably used to emboss leather or sheet metal. SF15.301 is probably a tracer, for decorating fine sheet metalwork. Its tip is asymmetric, probably from use-wear. Mineralised organic material on the ends of three tools (SF2.482, SF6.92, SF15.136) indicate they had wooden handles when deposited.

Other tools

Two tangs are likely to have been from knives or other tools but without the working end closer identification is impossible (both no number). SF14.024 (Fig. 12.93) is probably a tool, but its function remains enigmatic. It comprises a curved bar which tapers to both ends and is broadly similar to an iron object recovered from an Iron Age souterrain at Redcastle, Angus, interpreted as a potential leather-working tool (Hunter 2005, 84). The lack of any visible means of hafting is puzzling, and it may have served some other function.

Personal ornaments

Ring-headed pins

Ten pins were recovered; five are only shanks but the other five comprise two crook-headed, a loop-headed pin, a plain ring-headed pin, and a projecting-headed pin of uncertain type (Fig. 12.94). Ring-headed pins are also commonly made of copper alloy, or more rarely bone (*e.g.* Hunter *et al*. 2013, 264 and illus. 10.14). They are classic Scottish Iron Age ornaments, and this is the largest number of iron examples yet found on a single site in Scotland. Such pins have been studied, and their dating debated, for some time (*e.g.* Stevenson 1955; Foster 1990; Becker 2008); the range of types from secure contexts make this group of particular value.

The two crook-headed pins have typical, slightly squashed crook-heads (SF15.339 and SF15.390/5). These are thought to be the earliest form of ring-headed pin (Stevenson 1955, 288), and they are the earliest type securely attested at High Pasture Cave. SF15.339 has mineralised leather adhering to the lower half of its shank, indicating it had been within a leather pouch or garment when deposited.

The unusual small, squashed shape of the head of SF6.91 (Figs 12.94 and 12.95) is similar to one from Culduthel (Hunter *et al.* in prep.), where a few other parallels are noted. This suggests this is a distinct type, termed a loop-headed pin. The ring headed pin SF15.337 has a large circular head and distinct hump in the shank. It was found in two pieces which had been placed one on top of the other and corroded together over time. This suggests it was deliberately broken in two with the pieces carefully deposited together.

Most of the shanks are undiagnostic, but SF15.145 has a sharp right-angled bend at the top. This suggests it was a projecting ring-headed pin (Clarke 1971), but the context, in redeposited hearth residues from Phase 4b [SB8b], places it in the 7th–6th centuries BC, which is several centuries earlier than any other examples. It lacks the diagnostic head, and other rare Iron Age pins are known with projections, including some ring-headed pins (*e.g.* Becker 2008, fig. 4), so its identification cannot be confirmed.

At High Pasture Cave crook-headed pins are the earliest, overlapping with the ring-headed pin in Phase 5a, while the loop-headed pin is the latest, from Phase 6 (Table 12.78). One must remember the caveat of the possibility of extended life-histories or phases of secondary deposition on a complex site like High Pasture, but the main problem is that quantities are small, and the majority lack their diagnostic heads, spanning Phases 2–6. While the phasing of diagnostic examples thus offers a hint of a typological sequence, more examples will be needed before putting too much weight on it.

Fittings and fastenings

The ten fittings and fastenings are a variable and enigmatic group as they were often small components of a larger objects, making them challenging to understand on their own. They show a partial picture of composite objects where the leather, wooden or bone/antler components have rotted away.

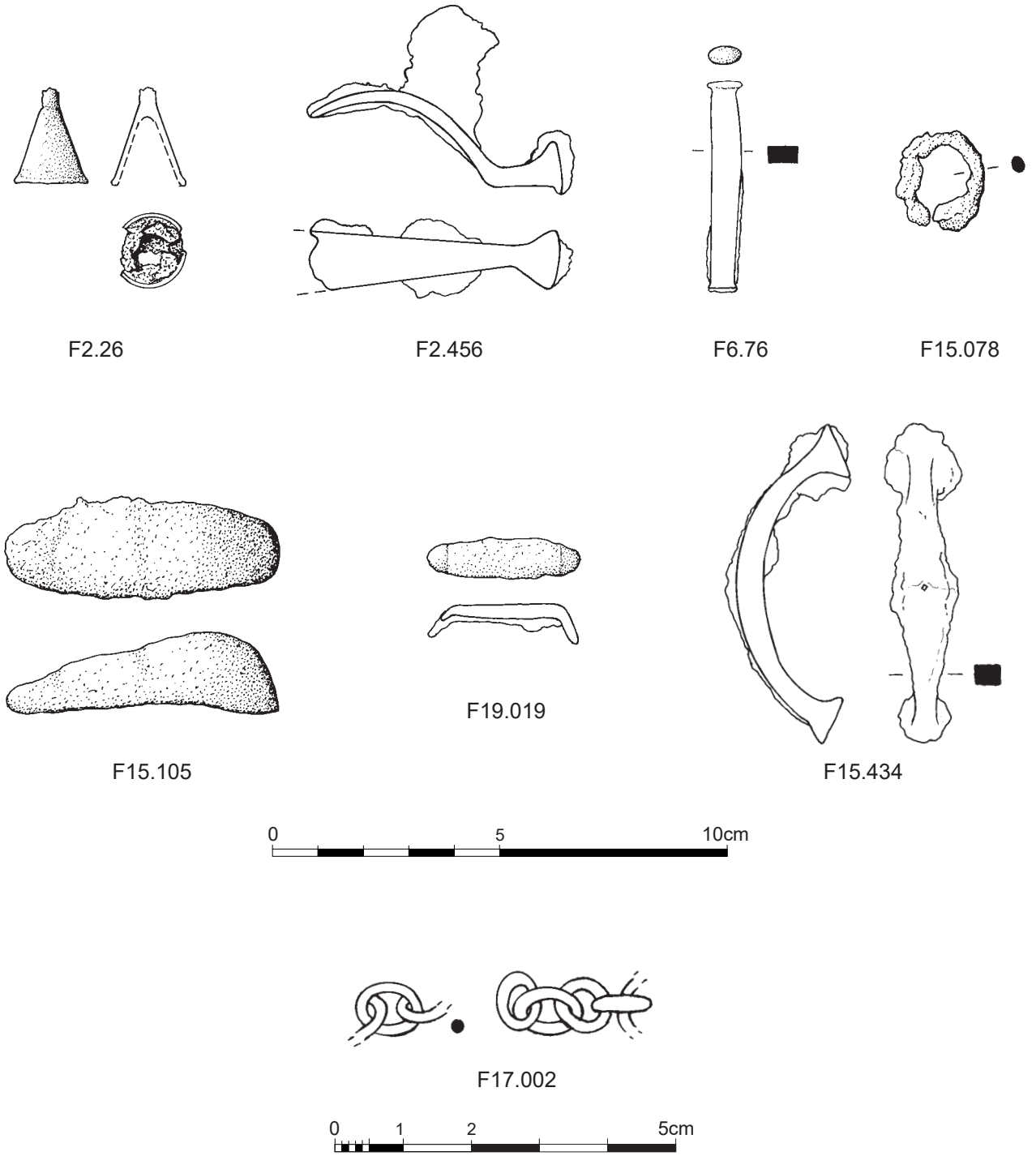


Figure 12.96. Iron fittings: cone SF2.26, bar SF2.456, rivet/junction bar SF6.76, chain link SF 15.078, possible blank/blacksmith's stock SF15.105, cleat SF19.019, tankard handle SF15.434, chain SF17.002

Tankard handle

SF15.434 (Fig. 12.96) comprises a curved iron strip, tapering to the ends which have flattened, disc terminals angled outwards. It was found in redeposited hearth debris (C15.64) in the forecourt area with modelled radiocarbon dates ranging from *730–570 cal BC*. Its form resembles the handle from a small concave-sided tankard, although iron tankard handles are very rare. The only confirmed British Iron Age example is from the Romano-British settlement of Salmonsbury, Gloucestershire, though it is a different form (Dunning 1976, 295 fig. 25). Tankards in general are a late phenomenon. Current dating evidence puts them in the period between the 1st century BC and 2nd century AD (Horn 2015; Jope 2000, 130) making

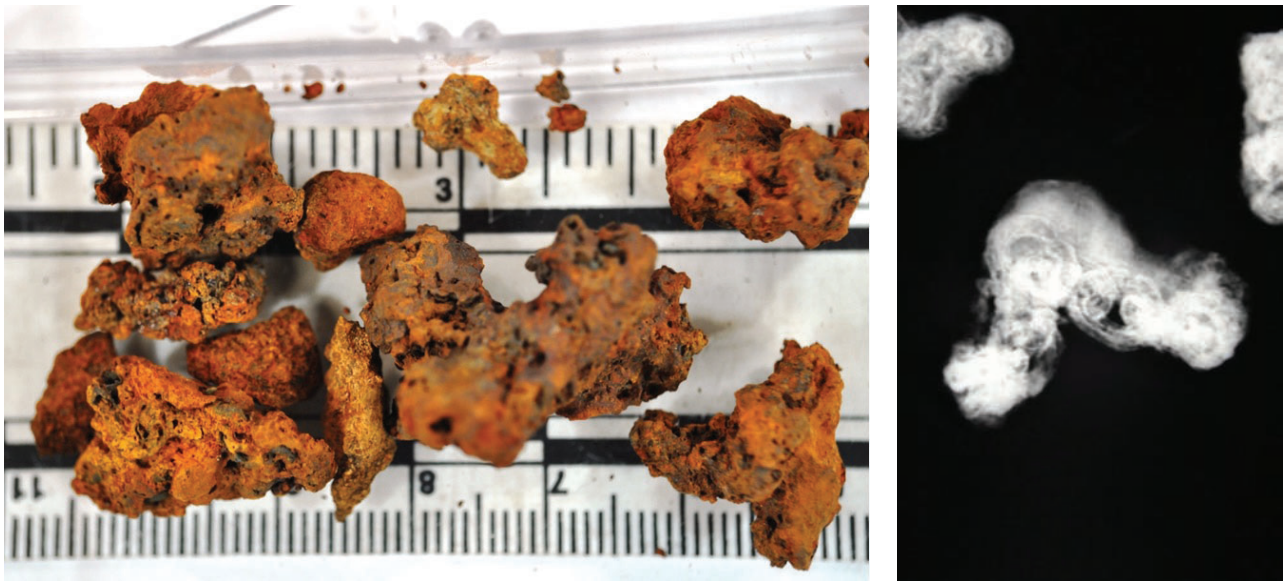


Figure 12.97. Corroded fine iron chain fragments SF17.002 (left) & x-ray image of chain links from SF17.002 (right)

this one several centuries too early. However, the form is very similar and is likely to have had a similar function. It was unrecognisable without X-radiography and cleaning, and similar iron objects could easily have been wrongly catalogued or ignored. Interestingly, a recent review of the iron assemblage from Dun Ardtreck, Skye (MacKie 2000) by the author discovered an object almost identical in size and shape, though with one of the heads missing, which had been catalogued as a nail. This suggests these items may not be quite so rare after all.

Fine chain

A collection of over 59 circular links (SF17.002), many joined to form a single-link chain, was recovered in a corroded mass from a layer of redeposited midden within the cave (Phase 3b [SB27a]) with modelled radiocarbon dates of *715–575 cal BC* (Figs 12.96 and 12.97). The links are around 5 mm in diameter, formed of drawn wire 1 mm thick with butted joins. Such a fine iron chain would have required very delicate, skilled blacksmithing. No exact parallels are known but it is very similar in size to the chain mail in the 1st/2nd century AD Carlingwark hoard (Piggott 1952, pl. ii), though each link there is joined to several other links rather than being a single link chain. Given that this is also one of the oldest iron artefacts at the site, it highlights the high level of skill some of the earliest blacksmiths were capable of. Its function remains enigmatic; sturdier iron chains would undoubtedly have been used to secure something or bear weight *e.g.* a cauldron chain, but this delicate chain is more likely to have been decorative, perhaps attached to a leather or textile garment. Three small fragments of fine wire (1 mm thick) were also recovered from Phase 2b and are likely to be related to this (SF6.645a and b, SF17.076).

Other fittings

A fine sheet-iron cone (SF2.26) with mineralised organic remains inside, and a curved bar with disc terminal (SF2.456) showing mineralised wood on the inside had clearly been attached to organic material such as leather and wood; precise parallels have proved elusive. A small ring (SF15.078) could have had many functions while the cleat (a type of staple) (SF19.019) and rivet/ junction bar (SF6.76) were most likely used for fastening wood (Fig, 12.96).

Other

X-radiography of an unusual slug-shaped lump of iron (SF15.105; Fig. 12.96) showed it to be only partially consolidated, *i.e.* at some point between bloom and solid iron, suggesting it was a blank or stock for a blacksmith. A rod with blunt ends (SF19.06) may also have been blacksmith's stock while a bar fragment with both ends missing (SF2.071) could have been part of a variety of objects.

Twelve modern objects were recovered, including nails, wire, and cast-iron fragments. All were recovered from turf and topsoil contexts with ten from over the shieling in Trench 14. Only two objects are completely unidentifiable due to their small, fragmentary, and very corroded nature (SFTP 802 and SF2.433). the distribution of iron finds is summarised in Tables 12.79 and 12.80 with a summary of the assemblege provided in Table 12.81.

Table 12.79 Distribution of iron finds by area & stratigraphic block

							SB (Ph)																		
		Cave					Precinct area												Stairwell		Surface				
Group	*Type*	*25b (2b)*	*25c (2b)*	*27a (3a)*	*29a (6a)*	*29c (6b)*	*7a (3a)*	*7b (3b)*	*7c (3c)*	*8b (4b)*	*8c (4c)*	*9a (5a)*	*9b (5a)*	*9c (5b)*	*10 (6a)*	*11 (7)*	*38 (8)*	*Unstrat*	*20 (3c)*	*21b (4a)*	*11 (7)*	*33 (4)*	*34 (5)*	*35 (6b)*	*Total*
Weapon	Dagger	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	1	–	–	1	–	–	–	2
	Spearhead	–	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	1	–	–	–	3
Tool	Awl	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1	–	–	–	–	–	2
	Knife	–	–	–	–	1	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	2
	Punch	–	–	–	1	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	2
	Tracer	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	1
	Socketed adze	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
	Socketed axe	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
	Socketed gouge	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1
	Tang	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	2
	Unidentified tool	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1
Personal ornament	Crook-headed pin	–	–	–	–	–	–	–	1*	–	–	–	1	–	–	–	–	–	–	1*	–	–	–	–	3
	Loop-headed pin	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
	Ring-headed pin	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	1
	Pin shank	–	1	–	2	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	1	–	–	6
Fittings & fastenings	Cleat	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1
	Conical mount	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
	Handle (tankard?)	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
	Ring	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	1
	Fine chain	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
	Fine wire	1	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3
	Rivet/junction bar	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
	Unidentified fitting	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Blank	Partially formed object	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1
Rod/bar	Rod or bar frags	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	1	–	–	2
Modern		–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	10	–	–	–	–	–	–	–	11
Unidentified		–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	1	2
Total		3	3	1	5	2	1	2	1*	1	5	2	2	4	1	2	10	1	1	1*	1	3	2	1	54

* denotes two parts of the same pin

Table 12.80 Distribution of iron finds by trench

Group	*Type*	*Trench*											*Total*
		Underground			*Surface*								
		1	*6*	*17*	*2*	*9*	*14*	*15*	*19*	*20*	*21*	*TP8*	
Weapon	Dagger	–	–	–	1	–	–	1	–	–	–	–	2
	Spearhead	–	–	–	–	–	–	2	–	–	1	–	3
Tool	Awl	–	–	–	1	–	–	1	–	–	–	–	2
	Knife	1	–	–	1	–	–	–	–	–	–	–	2
	Punch	–	1	–	–	–	–	1	–	–	–	–	2
	Tracer	–	–	–	–	–	–	1	–	–	–	–	1
	Socketed adze	–	–	1	–	–	–	–	–	–	–	–	1
	Socketed axe	–	–	1	–	–	–	–	–	–	–	–	1
	Socketed gouge	–	–	–	–	–	–	–	1	–	–	–	1
	Tang	–	–	1	1	–	–	–	–	–	–	–	2
	Unidentified tool	–	–	–	–	–	1	–	–	–	–	–	1
Personal ornament	Crook-headed pin	–	–	–	1*	–	–	1	–	–	1*	–	3
	Loop-headed pin	–	1	–	–	–	–	1	–	–	–	–	2
	Ring-headed pin	–	–	–	–	–	–	1	–	–	–	–	1
	Pin shank	–	1	2	1	–	–	1	–	1	–	–	6
Fittings & fastenings	Cleat	–	–	–	–	–	–	–	1	–	–	–	1
	Cone mount	–	–	–	1	–	–	–	–	–	–	–	1
	Handle (tankard?)	–	–	–	–	–	–	1	–	–	–	–	1
	Ring	–	–	–	–	–	–	1	–	–	–	–	1
	Fine chain	–	–	1	–	–	–	–	–	–	–	–	1
	Fine wire	–	2	1	–	–	–	–	–	–	–	–	3
	Rivet/junction bar	–	1	–	–	–	–	–	–	–	–	–	1
	Unidentified fitting	–	–	–	1	–	–	–	–	–	–	–	1
Blank	Partially formed object	–	–	–	–	–	–	1	–	–	–	–	1
Rod/bar	Rod or bar fragments	–	–	–	1	–	–	–	1	–	–	–	2
	Cast iron bar	–	–	–	–	1	–	1	–	–	–	–	2
	Nails	–	–	–	–	–	4	–	–	–	–	–	4
	Wire/rod/bar fragments	–	–	–	–	–	5	–	–	–	–	–	5
	Screw	–	–	–	–	–	1	–	–	–	–	–	1
Unidentified	Unidentified objects	–	–	–	–	–	–	–	–	–	–	–	1
Total		1	6	7	9*	1	11	13	3	1	2*	1	54

12.8 Metalworking material and other vitrified material

Gemma Cruickshanks and Fraser Hunter

12.8.1 Introduction

Vitrified material can form during a wide range of high-temperature processes, from different forms of metalworking to a domestic hearth. Certain types of vitrified material have diagnostic characteristics associating them with a particular process while others are undiagnostic and may have formed during a variety of processes. The vitrified material from High Pasture Cave can be split into four groups which are discussed separately below: ironworking debris, non-ferrous metalworking debris, tuyères which may have been used for ferrous or non-ferrous metalworking, and undiagnostic vitrified materials.

12.8.2 Ironworking evidence

Summary

Just under 25 kg of ironworking debris and associated material (*e.g.* bog iron ore) was recovered during

Table 12.81 Summary table: catalogue of iron finds

Find	*TR*	*C*	*Ph*	*SB*	*Type*	*Notes*
Weapon						
2.118	2	2.3	4c	8c	Dagger	Tang (missing tip) expands to distinct shoulders & waisted blade, swelling to rounded tip. Preserved organics on blade. L 102.5; blade L 75, shoulder W 35, max W 24.5, T 6; tang 13 × 5
15.344	15	15.18	5a	9b	Spearhead?	Socket, possibly from spearhead. Circular-sectioned open socket narrows to top of socket before bending. After bend, object begins to expand again & is encircled by 2 parallel decorative lines before breaking. Thick oval section at break suggests it was robust form of spearhead, if was spearhead. L 113, D socket 25, broken end 16 × 13
15.076	15	15.18	5b	9c	Spearhead	Narrow, leaf-shaped spearhead with blunt tip. Tapers almost continuously from tip to socket. Closed socket contains part of mineralised wooden shaft with circular-sectioned fastening pin in place. Head L 62, T 9.5, H 8-15; socket L 29.5, D 18.5; pin L 15, D 2
21.02/3	21	21.09	7	11	Spearhead	Long, slender spearhead (21.02) with detached tip (21.03) bent *c.* 50° from central axis. Blade's pronounced midrib extends part-way down closed socket. Tip refits with spearhead at large corrosion blister, indicating tip was still attached but bent when deposited, becoming detached through corrosion. Mineralised wood survives within socket. Circular-sectioned copper alloy fastening pin. L 390, max W 40; socket L 135, D max 22, D min 17, depth 78; pin L 22, D 2
15.318	15	U/S	–	–	Dagger	Tang (missing tip) expands into sloped shoulders. Blade edges straight with slight concavity from sharpening. Tip blunt & asymmetric (possible repair). L 155; tang L 56.5, T 4 × 7; blade max W 30 (shoulders), T 5; tip W 12
Tool						
17.001	17	17.06	3a	27a	Socketed axe	Wedge-shaped with 1 convex sub-square end & other end flattening & expanding into convex blade edge. Socket & side loop obscured by corrosion but visible on X-rays. L 77, T blade 49.5, T rounded end 34.9, H 34.5
F17.001/1	–	C17.06	3a	27a	Socketed adze	Flared, conical socket closed but has visible seam from folding. Convex blade edge has asymmetrical use-wear, upper part of knee-haft survives as mineralised wood. L 152.5; socket outer D 40 × 33 T 5; seam L 85.5; blade W 38; wood L 54, T 29 × 39; socket depth 58
2.482	2	2.6	3c	20	Awl	Rod tapers to point, mineralised wooden handle on other, blunt end. L 65, D 6; wood L 22
15.136	15	15.43	4c	8c	Awl	Rod tapering to point, mineralised wood on other end. L 46, D 2.5–1.5, L wood 16.5

(Continued)

Table 12.81 Summary table: catalogue of iron finds (Continued)

Find	*TR*	*C*	*Ph*	*SB*	*Type*	*Notes*
2.193	2	2.31	4c	8c	Knife	Straight blade back at *c.* 20° to tang. Tip missing. Tang L 55, T 6 × 5; blade L 33, T 16.5 × 4
19.126	19	19.11	4	33	Socketed gouge	Chunky, tapering rod with narrower scooped end & socket in wider end. Possible remains of mineralised wood in socket. L 87, ext D socket 23; socket depth 41; tip W 14, L 16
15.282	15	15.18	5b	9c	Punch?	Square-sectioned bar at 1 end turning into circular-sectioned rod at other, tapering to blunt tip. Too blunt to be awl but may have been used as punch. L 56, T 5 × 6
14.024	14	14.13	5	34	Tool?	Bar, curved slightly in middle & tapering towards blunt ends. L 180.5, H 7.5–15, T 9.5
6.92	6	6.04	6a	29a	Punch	Circular-sectioned rod pointed at both ends. Remains of mineralised wooden handle cover 1 end. L 96.5, D 5.5, L wood 51
15.301	15	15.07	6a	10	Tracer?	Square-sectioned bar with broken end, changing into lentoid-sectioned rod at other. Tip tapers to asymmetric wedge. L 66, T 6.5; tip W 7.5
17.182	17	17.03	6a	29a	Tang	Tapering rectangular-sectioned tang with 1 end blunt & other broken. Traces of bone handle survive. L37 max, W 6.5, T3
1.15	1	1.03	6b	29c	Knife	Blade's section can be seen in recently broken edge. L 42, H 14.5, T 3
2.028	2	2.01	7	11	Tang	Rectangular-sectioned bar broken at both ends. L 23.5, T 2.5, H 4.5
Personal ornament						
6.377	6	6.07	2b	25c	Pin shank	Fine rod with both ends broken. Beginning of curve at 1 end suggests from type of ring-headed pin. L 34, D 2.5
15.390/15395	2 & 21	2.68 & 21.10	3c & 4a	7c & 21b	Crook-headed pin	Circular-sectioned shank pointed at 1 end & curves into squashed crook-head at other. In 2 refitting frags (old break). L 86; shank D 3.5; head L 18, W 17
15.145A&B	15	15.42	4b	8b	PR-H pin	Thin rod, tapering to point at 1 end, with right-angled bend before breaking at top. Size & shape indicate this a projecting ring-headed pin which has lost its ring. L86, D3
20.01	20	20.04	4	33	Pin shank	Pin tip. Thin rod; pointed at 1 end & broken at other. L 22, D 2
15.339	15	15.28	5a	9b	Crook-headed pin	Circular-sectioned shank tapers to broken point at 1 end & curves into slightly squashed crook-head at other. Mineralised leather halfway up shank. L 86, D 5; head 14 × 15
15.337	15	15.25	5a	9b	Ring-headed pin	Circular-sectioned shank; pointed at 1 end with ring-head at other. Broken in middle, but 2 pieces are now corroded on top of one another. Original L 95; head ext. D 18, T 2
2.235	2	2.05	5a	9a	Pin shank	Thin rod, broken at both ends. Beginning of curve at 1 end suggests this is from pin of ring-headed family. L 27.5, D 2.5

(Continued)

Table 12.81 (Continued)

Find	*TR*	*C*	*Ph*	*SB*	*Type*	*Notes*
6.91	6	6.04	6a	29a	Crook-headed pin	Circular-sectioned shank has intact blunt tip; head is small & rectangular-sectioned, creating cylinder. L 68.5; shank D 2.5; head T 6 × 2
17.175	17	17.03	6a	29a	Pin shank	Probable pin shank. Circular-sectioned rod, broken at both ends. L 39, D 2
17.017A	17	17.03	6a	29a	Pin shank	Curved, tapering rod, tapering to point at 1 end. Recent break at other. L31.5, D3.5
Fittings & fastenings						
17.076	17	17.07	2b	25b	Fine wire	Small, curved frag. of circular-sectioned wire, expanding at 1 end before breaking. Probably associated with fine chain 17.002. L 17 D 1.5
6.645	6	6.07	2b	25c	Fine wire	Two wire frags: 1 slightly curves to tip (a) & other is bent into an oval loop (b). Both probably from fine chain 17.002.(a) L 16, D 1.5; (b) L 10, D 1.5
2.26	2	2.26	3a	7a	Conical mount	Thin sheet iron cone with point extending out slightly into beginning of circular sectioned rod. Traces of mineralised ?leather on interior. L 21, D tip 3.5, D opening 16.5
17.002	17	17.06	3a	27a	Fine chain	At least 50 oval links forming single-link chain formed of 1mm thick wire, corroded together in number of frags. Butt joins visible on X-ray. Links are 4.5–5mm in diam
15.434	15	15.64	3b	7b	Handle, (tankard)?	Curved strip narrows at each end, terminating in angled flattened knobs which are angled outwards. Possible perforation in middle of widest point. L 70, max W 18, T 8; terminals D 10
2.456	2	2.26	3b	7b	Fitting	Curved bar, breaking at widest point. Other end bends & narrows into rod, terminating in discoidal head. Mineralised wood on inside of curve. L 52, W 15, T 2; terminal 13 × 4
15.078	15	15.20	4c	8c	Ring	Fine oval ring with butt joint. Ext. D 12.5, T 2
19.019	19	19.02	5	34	Cleat	Rectangular-sectioned strip, with tapering rounded ends bent *c.* 70° to the same side. L 28, W 8.5, T 4, L of object being clamped: 23
6.76	6	6.03	6b	29c	Rivet/ junction bar	Sub-rectangular bar frag., thickening slightly in middle. Both ends burred which would have secured bar in another object. L 46.5, H 6.5-5, T 3.5
Blank						
15.105	15	15.26	5b	9c	Blank	Oval-shaped with well-rounded sides, tapering to 1 side. X-ray shows iron is poorly consolidated, indicating it is partly formed. L 59.5, T 21.5 x 18 at thickest part
Rod/bar fragments						
19.060	19	19.09	4	33	Rod	Rod with blunt ends, thickening then tapering again towards 1 end. L 41 D 2–5
2.071	2	2.05	5b	9c	Bar	Sub-oval sectioned bar, tapering to tip with both ends broken. L 51, T max 4

Table 12.82 Summary of ironworking debris from excavations at High Pasture Cave

Process	*Material type*	*Weight (g)*
Iron smelting	Smelting slag	7000.6
Iron smithing	Hearth base	1427.5
	Hammerscale	261.4
Ironworking: undiagnostic	Dense slag	1350.2
	Runned slag	379.8
	Unclassified iron slag	4065.8
Bog iron ore		10,422.8
Total		24,908.1

excavations at High Pasture Cave (summarised in Table 12.82). The ironworking debris is concentrated in Phases 4–6 spanning the later Early to Middle Iron Age, though the earliest smelting evidence, a furnace fragment, was recovered from Early Iron Age Phase 3/4 and is amongst the earliest evidence for iron smelting in Scotland. Very small amounts of hammerscale were recovered from Phase 1 onwards but are likely to be intrusive. Most of the vitrified material was recovered from redeposited contexts with debris from a series of hearths in Trench 2 (Phases 4–6) providing the only evidence of *in situ* blacksmithing. It seems likely some of the larger debris (*e.g.* furnace fragment and bog iron ore deposit) was deliberately deposited at the site rather than being in situ craft debris.

The material was visually examined and catalogued using common terminology (*e.g.* Crew and Rehren 2002; Paynter 2002; McDonnell 2007) based upon characteristics such as size, morphology, and density. The different types are discussed below, followed by discussion of their context and phase distribution. A full catalogue is in the archive.

The assemblage

Smelting Slag

Two fragments of smelting slag, weighing 7 kg, were recovered, comprising a plano-convex furnace base fragment (SF2.390) and a heavily vitrified sandstone slab with iron smelting slag adhering (SF2.110) (the sandstone slab accounts for most of the weight). The large size, high density and large charcoal impressions of the slag adhering to the slab indicate it is likely to be smelting rather than smithing slag. The intense vitrification of the slab indicates exposure to very high temperatures, reinforcing the interpretation that it derived from a smelting furnace. This is of particular interest as no smelting furnaces are identified on site, suggesting smelting took place somewhere in the vicinity and the fragments were brought to the site.

Smithing Hearth Base

Three smithing hearth base fragments were collected, weighing 1.4 kg: two small edge-fragments (SF2.230 and SF19.011) and an almost complete example (SF19.006). Smithing hearth bases are plano-convex accumulations of iron slag which form in the hottest part of the smithing hearth (just below the bellows hole) and are therefore diagnostic of blacksmithing. They are formed when small particles of slag are dislodged as the hot iron is moved in and out of the hearth between being hammered into an artefact. There is a blurry line between furnace bases and smithing hearth bases; both are plano-convex in shape, but furnace bases are generally larger, denser and include many more charcoal fragments than smithing hearth bases (McDonnell 1994, 230). The almost complete example here is at the large end of the scale for smithing hearth bases, but its chipped edge, creating a D-shape, is typical of smithing hearth bases which adhered to the hearth wall by the bellows-hole and were broken away during removal. This suggests it is more likely to be from a smithing hearth than a furnace.

Hammerscale

Both flake and spheroidal hammerscale were recovered during sample processing, weighing 261.2 g. Hammerscale flakes are dislodged while the hot iron is hammered and are part of the oxide/ silicate crust which forms on hot iron due to oxidation and/or the use of a flux. Slag spheres form when molten slag droplets are expelled from hot iron during hammering, solidifying before reaching the ground and creating the characteristic spheres or droplets, sometimes called ‘prill’ (*e.g.* Spearman 1997, 164).

When present in large quantities, hammerscale is a good indicator of in situ blacksmithing as, unlike larger slag fragments, the tiny flakes and spheres are generally too small to have been removed easily and dumped elsewhere. Trenches 6 and 17 in Bone Passage, and 2 and 15 in the precinct produced all the hammerscale here. There was no indication of an iron smithing hearth in the cave and so, unusually, in this instance the material seems to have been brought into the cave, though probably unintentionally included in redeposited midden.

Dense Slag

In total, 1350.2 g of dense, magnetic slag was recovered with characteristic dark grey colour, smooth shiny surface, and straight broken edges. The exact origins of this type of slag are currently elusive, with both iron smelting (*e.g.* Starley 2000, 338) and blacksmithing (*e.g.* Crew

Table 12.83 Spatial distribution of metalworking & vitrified residues by trench

		TR												
		Cave		Surface										
Process	*Material type*	*6*	*17*	*2*	*4*	*9*	*14*	*15*	*16*	*19*	*20*	*TP4*	*TP6*	*Weight (g)*
Iron smelting	Smelting slag	–	–	7000.6	–	–	–	–	–		–	–	–	7000.6
Iron smithing	Hearth base	–	–	60.5	–	–	–	–	–	1367	–	–	–	1427.5
	Hammerscale	3	55	202.8	–	–	–	0.4	–	–	–	–	–	261.2
Ironworking - undiagnostic	Dense slag	–	–	–	721.3	142	374.3	91.5	–	–	21.1	–	–	1350.2
	Runned slag	–	–	–	–	–	–	8.9	–	263.1	92.1	15.7	–	379.8
	Unclassified iron slag	78.8	2.8	398.4	–	409.1	–	418.9	22.1	2615.3	2.2	–	118.2	4065.8
Ores	Bog iron ore	7.5	–	10370.6	–	–	–	–	–	44.7	–	–	–	10422.8
Total		89.3	57.8	–	721.3	551.1	374.3	519.7	22.1	4290.1	115.4	15.7	118.2	–

and Rehren 2002, 86) suggested. Chemical analysis of this type of slag from and Birnie (Cruickshanks and Dungworth in prep.) has not clarified the issue as its composition is not diagnostic of a particular part of the ironworking process.

Runned Slag

A total weight of 397.8 g of runned slag with typical smooth, flowed surface was recovered. Such slag is often referred to as 'tapped slag', implying iron smelting (*e.g.* McDonnell 1994, 229; Starley 2000, 338), but many of the fragments here are very small (< 20 g) and could have been produced during either smithing or smelting.

Unclassified Iron Slag

Just over 4 kg of iron slag was too small or fragmentary to be diagnostic of a particular stage of the ironworking process. With both diagnostic smelting and smithing slag present on site this material could have derived from either process.

Bog Iron Ore

Over 10 kg of bog iron ore was collected and was identified due to its iron-rich appearance, rough, nodular texture, and abundance of small rootlet channels. There was no evidence of heating (*e.g.* vitrification or charcoal impressions), indicating it is in its raw, unmodified state. Bog iron ore forms when iron minerals are leached out of surrounding rocks and soils by acidic, slow-moving water (*e.g.* bogs), then accumulating into a compacted iron mineral pan. Most of the bog iron ore here (99.5 %) was recovered from Trench 2, with small fragments also collected from Trenches 6 and 19. Most was recovered from phase 3 (91%), with smaller amounts from Phases 2, 5, 6 and 7 suggesting most of the bog iron ore was not necessarily associated with ironworking (which mainly occurs in Phases 4–6, discussed below).

12.8.3 Context

The full suite of ironworking debris is present at High Pasture, from ore to artefact. Examining the context is essential if we are to understand whether every stage of this complex process was taking place on site, or whether the material was being brought there for deposition.

Table 12.83 summarises the spatial distribution of each type of vitrified and related material by trench and shows the largest concentrations were recovered from Trenches 2, 3, 15, and 19 although, of these, only Trenches 2, 15, and 19 produced diagnostic metalworking debris. It is notable that most of the ironworking debris was recovered from non-cave trenches rather than within the cave. This suggests that the ironworking activity was taking place above ground, or, if being undertaken in the cave, the debris was subsequently dumped on the surface.

Spatial analysis of the magnetic micro-residues (hammerscale and vitrified residues) helps to shed light on likely ironworking locations as they were unlikely to have been deliberately removed due to their small size. Most of the vitrified residues are naturally magnetised small stones and are therefore not diagnostic of ironworking; they are not discussed further here. Hammerscale, however, is diagnostic of blacksmithing and is of particular interest.

The distribution of hammerscale shows the largest concentration from Trench 2 (78%) with smaller amounts from Trenches 6, 15, and 17. All the contexts within the cave (Trenches 6 and 17) which produced hammerscale (C.6.01–C6.04, C17.03–C17.06) were interpreted as redeposited midden material, *i.e.* secondary contexts. It is therefore unclear whether the hammerscale was moved into the cave with the midden material or whether it was created by a blacksmith working within the cave, with the hammerscale sparks then landing on, and becoming incorporated within, the surface of redeposited midden material; the rarity of other iron slag suggests the former.

Table 12.84 Broad-phase distribution of the diagnostic ironworking debris

		Ph									
Process	*Material type*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*US*	*Weight (g)*
Iron smelting	Smelting slag	–	–	–	6652.8	–	–	347.8	–	–	7000.6
Iron smithing	Hearth base	–	–	–	–	–	1367	60.5	–	–	1427.5
	Hammerscale	0.2	0.2	0.2	171.6	1.8	86.1	1.3	–	–	261.4
Ironworking: undiagnostic	Dense slag	–	–	–	21.1	142	721.3	–	374.3	91.5	1350.2
	Runned slag	–	–	–	92.1	147.1	124.9	–	15.7		379.8
	Unclassified iron slag	–	–	–	164.5	2560.5	751.7	393.4	173.6	22.1	4065.8
Ores	Bog iron ore	–	220.3	9482.2	–	44.7	7.5	668.1	–	–	10422.8
	Total	*0.2*	*220.5*	9482.4	*7102.1*	*2896.1*	*3058.5*	*1471.1*	*563.6*	*113.6*	24908.1

A small amount of the hammerscale from precinct Trench 2 (36.5 g/18%) and all (0.4 g) from Trench 15 were also recovered from secondary/redeposited contexts (C.2.03, C2.48, C2.52, C15.25, C15.32) but, more interestingly, 82% of the hammerscale from Trench 2 was recovered from contexts interpreted as having accumulated from the use of hearths in the forecourt area (C.2.15, C2.16). This suggests this is a primary deposit of hammerscale from blacksmithing activity at the hearths outside the cave.

In the assemblage as a whole, most of the vitrified material was recovered from contexts interpreted as redeposited, primarily midden layers in and around the cave, redeposited burnt spreads around the non-cave trenches, and backfill from the stairwell closure. This is not surprising given the lengthy use of the site and the amount of deposition and landscaping which was taking place. The only primary contexts to produce vitrified material are those which produced hammerscale, which included the accumulated debris from the multiple hearths in the forecourt area. In addition to the hammerscale, both fragments of smelting slag and four undiagnostic fuel ash slag fragments were recovered from the debris of the Trench 2 hearths. Unlike hammerscale, the large size of smelting slag makes it easier to move around; indeed, smelting debris is often cleared away from furnaces and dumped elsewhere. Thus the presence of smelting debris does not necessarily indicate this is where smelting was taking place, particularly as the area around the cave entrance was a focus for the deliberate deposition of many other types of material. Given the lack of any furnace structure, it seems likely that the two fragments of smelting slag were deliberately placed rather than being residues of *in situ* iron smelting.

12.8.4 Chronology

The broad phase-distribution of the diagnostic ironworking debris is summarised in Table 12.84. Phases 1, 2 and 3 produced very small quantities of hammerscale (0.6 g). They provide the only evidence of ironworking prior to Phase 4, but such a small quantity is likely to be intrusive or could easily have travelled downwards via roots or burrowing.

Phase 3 produced the largest quantity of metalworking residues (9.5 kg), though all of it is bog iron ore. The presence of tuyère fragments (see below) in Phase 3 suggests metalworking was taking place at this time but it is unclear if it was ferrous or non-ferrous in nature. Most of the bog iron ore recovered from the site was from Phase 3 (91%), though aside from small quantities of hammerscale there is no ironworking debris present before Phase 4, suggesting the bog iron ore was not necessarily used for ironworking. Its context in the fill of the first phase of the stairwell (C.2.66, 2.70, and 2.71) suggests it could have been a deliberate deposit.

Phase 4 produced the earliest evidence of iron smelting, in the form of a vitrified stone with smelting slag adhering (SF2.110), probably part of a furnace wall. The presence of this fragment in Phase 4 suggests iron smelting had been taking place in the vicinity around or before this point. The modelled radiocarbon dates for Phase 4 within the precinct [Block 8] range from *630–435 cal BC*, placing this furnace fragment in the Early Iron Age. Evidence of iron smelting in Early Iron Age Scotland is rare, making this an important discovery.

Phases 4–6 produced the widest range of diagnostic metalworking debris, comprising smelting slag, smithing hearth bases, hammerscale and dense, runned, and unclassified iron slag. Non-ferrous slag and a range of undiagnostic material were also recovered. As discussed above, most of this material was recovered from secondary contexts, making it difficult to pin-point where and when ironworking was taking place; only the hammerscale from a deposit of hearth debris suggests in situ ironworking. The range and concentration of diagnostic ironworking debris in Phases 4 to 6 does however suggest there was ironworking taking place around this time. Radiocarbon dates puts these phases in the later Early and Middle Iron Ages. Phases 7 and 8 produced only small quantities of vitrified material from secondary contexts, suggesting this material is likely to be residual.

12.8.5 Discussion

The assemblage of vitrified material from High Pasture Cave is a challenging one to interpret due to the nature of the site's formation; centuries of deposition and movement of material have created a complex stratigraphic sequence. This makes it difficult to establish where and when the metalworking was taking place, as the debris may have been moved from its original spot or brought to the site for deposition.

Both blacksmithing and iron smelting debris were recovered but determining whether both these stages of the ironworking process were actually taking place there is challenging. Hammerscale recovered from hearths in Trench 2 is a good indication blacksmithing was taking place there. The small amount of hammerscale suggests the activity was small scale or the debris was cleared away: the latter may explain how hammerscale ended up in redeposited contexts around the site, including inside the cave. Though several stone work-surfaces/anvils were recovered from in and around the cave entrance (see Section 12.3), they are predominantly small (130 × 80 mm average) and have very faint working traces; none is consistent with being a blacksmith's anvil. The iron smelting debris is more difficult to interpret as there are only two large fragments with no actual furnace found: they could have been brought to the site for deposition. It is notoriously difficult to identify deliberately deposited ironworking debris from casually discarded; such debris could become incorporated into deposits in a range of ways. The extensive evidence for ritual activity and deliberate deposition at this site adds weight to some of the metalworking debris having been associated with the rituals taking place rather than being incidental debris of a craft.

Three other Iron Age sites on Skye have produced ironworking evidence in association with caves or rockshelters, suggesting a connection between metalworking and underground spaces during this period on Skye. Blacksmithing and copper alloy working debris were recovered from contexts dating to the 1st and 2nd centuries AD at Fiskavaig rockshelter (Wildgoose and Birch 2009b). Iron smelting debris and a furnace were excavated in Rudh an'Dunain Cave, Bracadale and were associated with Early Iron Age pottery (Scott 1933–344). However, re-assessment of the stratigraphy indicates the furnace and smelting slag were also associated with post-medieval artefacts and their date is therefore uncertain (Cruickshanks in prep.). Excavations at Leitir Fura Cave, Sleat uncovered smithing slag in a hearth dating to early in the 2nd century BC (Wildgoose 1998). The only non-cave site to produce definite Iron Age ironworking evidence is Dun Ardtreck, Bracadale, where iron smithing slag was recovered, mostly from Phase 3, dating to around the 2nd and 3rd centuries AD. Other published sites on Skye refer to ironworking debris being recovered, *e.g.* Dun Beag, Struan (Callander 1920, 125), Dun Flodigarry, Kilmuir (Martlew 1985, 42) and Dun an Iardhard/Fiadhairt, Dunvegan (MacLeod 1915, 67) have recently been re-assessed and are either not ironworking debris, or post-Iron Age in date (Cruickshanks in prep.).

Two aspects of this assemblage are particularly significant. First, the Early Iron Age date of furnace fragment (SF2.110) places this amongst the earliest securely dated evidence for iron smelting in Scotland, and indeed Britain (McDonnell 2013, 398). It was recovered from Phase 4, with modelled radiocarbon dates of *630–435 cal BC*, in the Early Iron Age. The only comparably dated smelting evidence from Scotland is from Broxmouth hillfort, East Lothian, where the earliest smelting slag appeared in phase 1, dating to between the 7th and 5th centuries BC (McDonnell 2013, 398). The early date of the smithing evidence at High Pasture Cave is an important addition to our limited knowledge of early Scottish ironworking.

The second important aspect of this assemblage is that some of it may have been deliberately deposited. It is difficult to interpret a waste product in such a way, but the overtly ritual nature of this site lends weight to this interpretation. Two and a half millennia ago, when ironworking was relatively new, the impact of this visually dramatic and transformative craft must have been great. As such, the act of ironworking, the products (iron artefacts), the debris (slag) and the ironworkers are likely to have been viewed as symbolically charged and their presence at this site is in keeping with this.

12.8.6 Non-ferrous metalworking debris

A small assemblage of non-ferrous metalworking debris was recovered, comprising six sherds of crucibles, one item which may be a crucible stand and two fragments of vitrified ceramic with non-ferrous residues (undiagnostic vitrified ceramic lacking residues is discussed later). There were no moulds to indicate what was being manufactured. All the items have adhering residues, their colours consistent with the melting of copper alloys; this was confirmed in some cases by X-ray fluorescence (qualitative surface analysis conducted by Gemma Cruickshanks), although several did not produce detectable metal traces. The elements detected were copper (4 instances), tin (2) and lead (1), suggesting the casting of bronze or leaded bronze. Table 12.85 summarises the occurrence of the material by trench and phase. It is predominantly from Phase 6 (though present on the site from Phase 3) and concentrated

Table 12.85 Non-ferrous metal-working debris by trench & broad phase

Ph	*3*	*4*	*5*	*6*
TR 2	–	1	1*	1*
TR 6	–	–	–	1*
TR 11	1	–	–	–
TR 14	–	–	–	–
TR 15	–	–	1	1*
TP 6	–	1*	–	–

* indicates the presence of a crucible

Table 12.86 Characteristics of the High Pasture Cave crucibles

Find	*Form*	*Wall T*	*Ph (SB)*	*Notes*
FTP6.04	?; spouted	11.5	4 (33)	Deformed & failed
F2.190	Circular, with gently rounded base	<15	5b (9c)	Distorted; attempts to reline it
F14.003	Circular in plan	5–6	5 (34)	Organic temper; failed in use
F15.013	?	13.5	6a (10)	Relined
F6.58	Pear-shaped (spout)	8–14.5	6b (29c)	Failed in use
F2.355	?	9.5	6b (22a)	Broken in use

in Trench 2. There were no joining fragments, so this was not a primary dump of debris, but the nature of the material is consistent with scattered debris from *in situ* metalworking in the vicinity; it seems less likely to be token fragments brought from elsewhere as it includes small pieces of incidental debris such as vitrified ceramic. The objects were found in deposits with a wide range of other finds; there is no clear indication they were separated for special deposition, with the possible exception of the crucible fragment from the cave.

Table 12.86 summarises the crucibles. They show intensive use (though this need not all have occurred at the site), and all except SF15.013 were unusable when deposited, having broken or failed in use. SF2.190 had been relined to extend its life, and attempts had been made to reline SF2.190 (Fig. 12.98). They offer only hints of their original shapes. All except SF.14.03 are notably thick-walled, and they seem to be circular or pear-shaped with protruding spouts, upright slightly curved walls, rounded rims, and gently rounded bases. The thick walls and especially the pear-shaped form can be paralleled in other early-middle Iron Age finds. The type's origins lie in the late Bronze Age (Tylecote 1986, fig. 50 nos 23–4); examples are rare but widespread in Scotland, coming from Bu (early Iron Age) and Howe (Roman Iron Age) on Orkney, Dowalton Loch, Wigtownshire, Lochan Dughaill in Argyll (neither closely dated), and, closer to home, Fiskavaig on Skye (Roman Iron Age) (Munro 1882, fig. 15: re-identified by the writer; Munro 1893, fig. 7; Hedges 1987, fig. 1.47; Ballin Smith 1994, illus. 154 no. 7875; Hunter in Wildgoose and Birch in prep.). They are notably different from the thin-walled triangular crucibles which are the dominant form of the Middle Iron Age. The dating is consistent with this. While there is always a risk of residuality or intrusive finds in such a long-lived site, small quantities of debris from Phases 3–4 show there was casting taking place in the area in the earlier Iron Age, though most is from the later 1st millennium BC (Phases 5–6). Crucible SF14.03 is differentiated by its thin walls and use of organic rather than quartz temper and represents a different technological tradition from the other crucibles. This might suggest a metalworker from a different area coming to the site, though our knowledge of technological traditions in the Scottish Iron Age does not yet allow suggestions as to where this might be. The highly vitrified character of the fabrics means that fabric analysis is unlikely to yield useful provenancing information.

SF2.478 (Fig. 12.98) is a variant of a type often termed a 'thumbpot'. These simple ceramic vessels need not be linked to metalworking, but the heat-affected surface and residues on this one suggests it had a related role. What this might have been is less certain. One possibility is as a crucible stand, to hold the rounded base stable during heating. Against this is the presence of two hollows rather than a single one; given the size of crucibles attested at the site, two could not have been rested together, and it remains possible that it was connected with some other pyrotechnological process. No good parallels for it have been found. (I am grateful to Dr Ewan Campbell and Dr Sophia Adams for their comments on this piece.)

Evidence for non-ferrous metalworking is rare on Skye and comes from two different kinds of sites. A small group of Roman Iron Age finds from the inaccessible rock shelter at Fiskavaig (Hunter in Wildgoose and Birch, in prep.) provides a parallel for the High Pasture Cave material in suggesting this was a special activity taking place in an unusual place. There are also finds from two settlement sites, Dun Ardtreck and Dun Beag; the latter is not well dated, but other finds at Dun Ardtreck mark it out as a site of some status (Callander 1920, 123, 126–7, fig. 7; MacKie 2000, 326, 345). This evidence is informative: its rarity suggests that non-ferrous metalworking was a restricted, special activity.

12.8.7 Non-ferrous metalworking debris catalogue

Crucibles

SF2.190 Large fragment of a heavily vitrified crucible, the exterior entirely caked in a distorted red/green vitrified layer (Fig. 12.98). This distortion makes the form unclear in detail, but it appears to be circular in plan with a thick, gently rounded base, upright sides, and a simple rounded rim; no spout survives. Heavily tempered with fine quartz. Very small capacity. The cracked inner surface indicates it was no longer usable when deposited; a very thin buff-coloured skin in the base of the interior suggests attempts

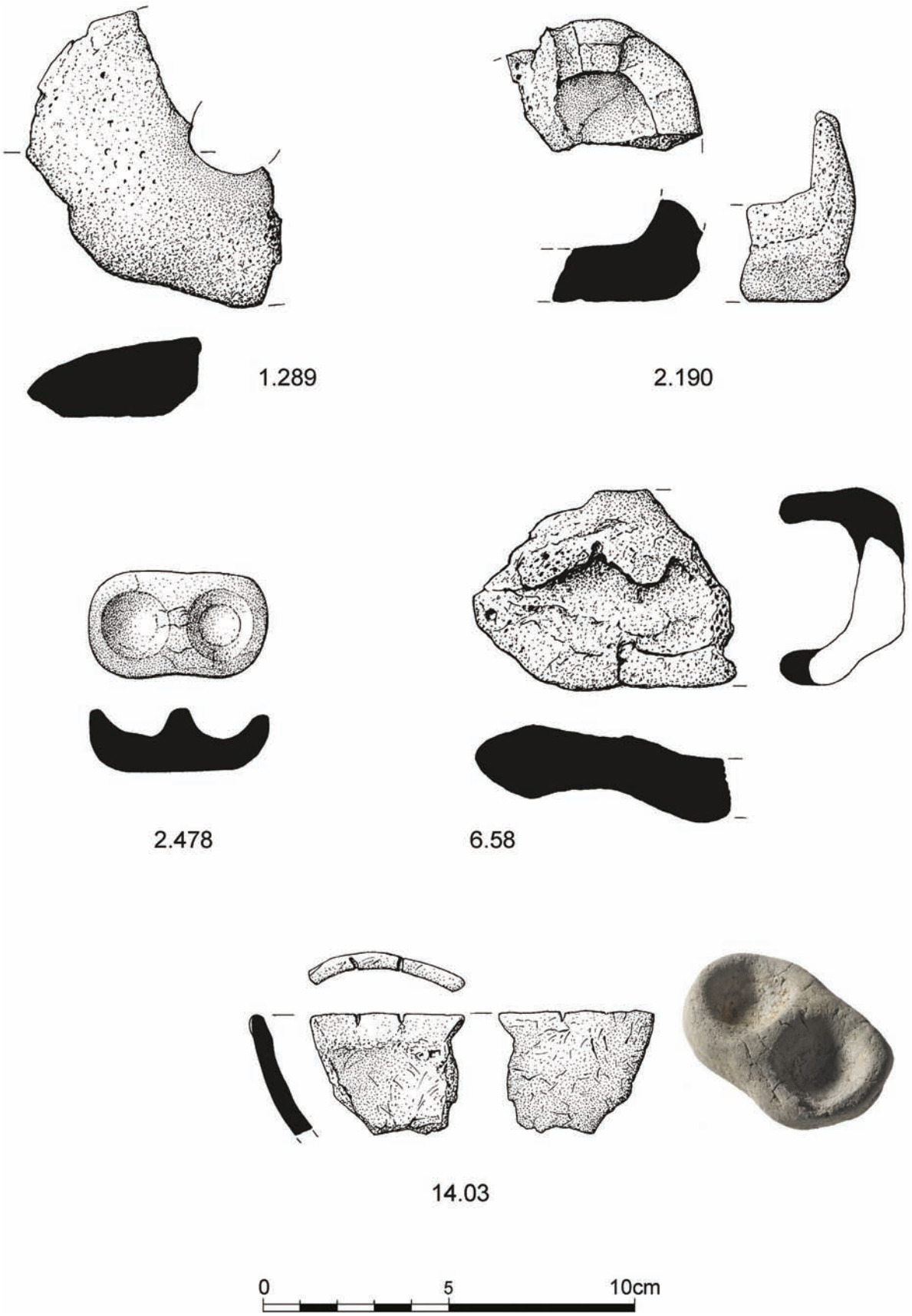


Figure 12.98. Metalworking ceramics: tuyère SF1.289, double 'thumbpot' SF2.478 (& inset), crucible fragments SF2.190, SF 6.58, SF14.03

to repair and reline it, but this was unfired. XRF of residue: Cu. H 50; internal D *c.* 40; walls up to 15 mm thick, tapering to 6 mm at the rim; base T 12.5 mm. HPC05 C2.08 [Phase 5b/SB9c]

SF2.355 Heavily vitrified crucible body fragment, slightly curved but form unclear. Exterior traces of red residue; interior coated in a purple glassy residue which runs in places onto the edges, indicating it failed in use. XRF: no metal traces in analysed areas. 31 × 26.5 × 9.5 mm. HPC06 C2.52 (stairs) [Phase 6b/SB22a]

SF6.58 Crucible spout fragment, triangular as it survives, the spout pulled out from the crucible wall (Fig. 12.98). Form unclear – could be a large triangular crucible, though the side profile suggests a pear-shaped form is more likely. Deformed and almost totally encased in purple-red glassy residue; the deformation indicates it failed in use. XRF: no metal traces. Original H *c.* 41, L max 70, W 50; wall T 8–14.5 mm. HPC05 C6.02 [Phase 6b/SB29c]

SF14.03 Rim sherd from a crucible with angled curved sides and rounded rim; thin-walled (Fig. 12.98). Curving in plan: too little survives to be certain of the form, but the features are consistent with a circular crucible, *c.* 70 mm in diameter, with a pulled-out spout creating a more pear-like form. The fabric is different from others in the assemblage: there is some quartz but it is mostly organic. This consists of fine, short hollows, their circular section suggesting they were hair. The diameter is larger than human hair, so it may be horse or another animal. It seems the crucible failed in use: cracking in the rim and spout has glazed residue, there is a very red glassy residue around the rim and a water-line with adhering debris suggesting it failed with a charge still in it. XRF on interior residues: Cu, Sn. H 34, L 43.5, wall T 5–6 mm. HPC07 C14.04 [Phase 5/SB34]

SF15.013 Thick base sherd from a very vitrified crucible with exterior glassy red/green residue. Dent on exterior from tongs or stand; Interior relined – a thin layer 1 mm thick overlies the original red glassy surface. The fabric is quartz-rich, the relining being particularly highly tempered. XRF of vitrified surface: Cu. 22 × 17 × T 13.5 mm. HPC07 C15.09 [Phase 6a/SB10]

SFTP6.04 (TP6) Very vitrified and deformed fragment preserving the corner, perhaps the spout, of a crucible, its form unclear. Clear and green glaze on exterior indicates use for copper alloys, though ×RF was inconclusive. Heavily quartz tempered. 21 × 16 × 11.5 mm. HPC10 test pit 6 C6.04 [Phase 4/SB33]

Other

SF2.478 Double 'thumbpot', perhaps used as a stand for crucibles (Fig. 12.98). Small oblong fired clay slab, the ends rounded, the base near flat. The upper surface has two hemispherical hollows (D 20–1 mm, depth 6–7 mm). Grey fabric with some temper (fine quartz and dark stone); it appears to be heat-affected with slight vitrification and some cracking of the upper surface. There is no clear vitrified or glassy residue, but one hollow has a noticeable circular tidemark at the base (D 12 mm) and a scatter of dark granules over this; the other has a more amorphous orange stain, which is also found externally in places. Perhaps used as a stand for crucibles? XRF of the interior surface showed no metal traces. 48.5 × 30 × 18 mm. HPC10 C2.15c [Phase 4c/SB8c]

SF11.011 Vitrified ceramic. Its L-shaped section suggests it was a structural element, but it could be a failed and distorted thick crucible. One arm is 21 mm thick, the other 14 mm. The heavy vitrification of the fabric implies extended use, with all surfaces covered in red/yellow/orange glassy residue. Heavily quartz-tempered fabric. XRF: Cu, Sn, Pb. 47.5 × 44 × 32 mm. HPC07 C11.09 [Phase 3/SB32]

SF.15.058 Vitrified ceramic. An amalgam of vitrified ceramic and slag. Although there are some iron-rich patches most of it is dark grey/red/pink – similar colours to those found on crucibles in non-ferrous metalworking, suggesting it formed a structural element in that process, *e.g.* hearth lining. 8.1 g. XRF: no metal traces. HPC 07, C.15.12 [Phase 5b/SB9c]

Tuyères

Tuyères are clay or stone discs or tubes which protected the nozzle of the bellows from the extreme heat of a metalworking hearth. The three fragments recovered here are all from clay disc-tuyères which are the most common type recovered from Scottish Iron Age sites. None of the fragments has any adhering slag, which would have helped to identify which type of metalworking they were associated with. XRF analysis was inconclusive as although one fragment revealed a high iron signature, iron is naturally present in clay and does not necessarily indicate contact with ironworking debris. As such, it is uncertain whether they were used for ferrous, non-ferrous or both types of metalworking. The fragments were recovered from Phases 3 and 4 from redeposited midden deposits in the cave and from a spread of burnt material in test pit 6.

12.8.8 Catalogue of tuyère fragments

SF1.289 Around a third of a slightly oval tuyère with a central perforation (D 25 mm) pushed through from the rear (Fig. 12.98). Plano-convex section with glazed residue all over the convex side, concentrated near the hole. Fabric shows a low percentage of quartz temper. XRF: high iron, no non-ferrous traces. 88 × 50 × T 25 mm. HPC06, C.1.06: midden in cave [Phase 4c/SB27b].

Table 12.87 Summary of undiagnostic vitrified material by trench

	TR									
	Cave			Surface						
Material	*1*	*6*	*17*	*2*	*7*	*14*	*15*	*19*	*20*	*Total (g)*
Fuel ash slag	0.1	–	–	193.7	–	–	311	–	21.7	526.5
Vitrified ceramic	–	–	–	57.1	39.7	24	176.7	–	–	297.5
Vitrified residues	104.5	108.8	1021.3	–	–	–	71.6	195.9	–	1502.1
Total (g)	104.6	108.8	1021.3	250.8	39.7	24	559.3	195.9	21.7	2326.1

Table 12.88 Summary of undiagnostic vitrified material by broad phase

Material	*Ph*						*Total (g)*
	2	*3*	*4*	*5*	*6*	*7*	
Fuel ash slag	0.1	16.3	236.1	267.5	–	6.5	526.5
Vitrified ceramic	–	–	–	24.0	176.7	57.1	257.8
Vitrified residues	–	77.1	525.0	88.9	793.5	63.3	1547.8
Total (g)	0.1	93.4	761.1	380.4	970.2	126.9	2332.1

SFTP6.04 Possible tuyère fragment comprising orange ceramic with glassy vitrification on one side and a concave edge, possibly part of a perforation. XRF: no metal traces. 8.1 g. HPC10, C.TP6.04: redeposited burnt spread deposits [Phase 4/SB33].

12.8.9 Undiagnostic vitrified and related materials

Various types of slag were recovered which are not diagnostic of a particular process, including fuel ash slag, vitrified ceramic, and magnetic residue. 2.3 kg of such material was recovered here (summarised in Tables 12.87 and 12.88).

Fuel ash slag

Fuel ash slags form during the high-temperature reaction between the ash from fuels (*e.g.* charcoal) and silica-rich materials like clay, sand, or soil. Such slags can therefore be formed during a variety of high-temperature processes and are not necessarily derived from metalworking activity. 526.5 g of fuel ash slag was recovered here, predominantly from Trenches 2 (193.7 g) and 15 (311 g), suggesting much of it was associated with the many hearths and burning events in the area surrounding the cave entrance.

Vitrified ceramic and fired clay

Fragments of vitrified ceramic weighing 298 g were recovered, all from Phase 6. Most are orangey brown ceramic with one or more faces vitrified to a dark glassy state due to exposure to intense heat. Clay can come into contact with intense heat during a variety of processes and is not necessarily related to metalworking, though some fragments may have derived from the clay wall of a furnace or hearth. A single fragment of fired clay (39.7 g) may have originated from a range of processes.

Vitrified/magnetic residues

Soil sample processing recovered a range of magnetic particles, some of which was diagnostic (*e.g.* hammerscale, discussed above) but other magnetic material which has unclear origins. Just over 1.5 kg of magnetic residues were recovered, predominantly from Trench 17 (1.1 kg) within bone passage with smaller quantities from Trenches 2, 6, 15, and 19. Most of this material comprises tiny naturally magnetised stones around 1–3 mm in diameter, while a small amount is tiny, vitrified fragments which are likely to have formed during a high temperature activity. They are too small to be diagnostic of a particular process.

12.9 Glass beads

Fraser Hunter and Mary Davies

12.9.1 Introduction

A small collection of glass beads was recovered from High Pasture (Table 12.89; Fig. 12.99), their dating evidence making them of particular importance. Five beads were found, one an intrusive piece dating to the early medieval period or later. All bar one were found by sieving, emphasising the importance of such a strategy to obtain a realistic picture of bead use. It is notable in this regard how few beads were recovered given the extensive sieving programme, suggesting that they were genuinely rare at the site. The small size of beads makes one instinctively wary of how reliable the find-contexts are, as they can be highly mobile, while redeposition of material is clearly an issue on the site. Nonetheless, the contextual information suggests glass beads first appeared on the site in the early Iron Age (from Phase 4c) and continued through Phases 5 and 6. Most have been quite badly affected by burial, with the surfaces rather decayed.

12.9.2 The beads

Three translucent blue glass beads (two mid-blue: SF2.477, SF6.162; one dark blue: SF2.358) are representatives of

Table 12.89 Catalogue of glass beads from High Pasture Cave

SF	*C*	*TR*	*Ph*	*SB*	*Notes*
2.477	2.15c	2	4c	8c	Translucent mid-blue annular glass bead, rounded D-section. Fairly bubbly. Surface worn, probably from wet sieving. H 3.5, D 7.7, perforation D 3.3
15.083	15.25	15	5a	9b	Translucent mid-green cylindrical bead with oval section & neatly squared. Longitudinal striations indicate glass was extruded or drawn, an unusual technique for prehistory; this & equally unusual colour suggest this is an intrusive modern item. Slightly oval perforation indicates bead was squashed slightly when still warm. Some use damage at ends: slight chipping & use-polish. L 7.0, D 2.7 × 3.5, perf D 1.1 × 1.7
6.162	6.01	6	6b	29c	Tiny translucent mid-blue annular bead, D-sectioned, ends rounded, form & perforation a little irregular. Guido (1978, 68, group 6 (vii)). H 1.5, D 3.0, perf D 1.4
2.358	2.52	2	6b	22a	Half globular translucent dark blue bead, D-sectioned with slightly flattened ends (Guido 1978, 70, group 7(iv)). Surface badly affected by decay, revealing angled striations from manufacture by winding strand of glass around rod (3 turns visible). H 5.6, D 7.6, perf D 3.2
19.022	19.02	19	6b	35	Half annular decorated bead of Guido (1978, 87–9) class 14. Almost perfectly circular section: slight, rather crude facet on perforation wall squashed & distorted glass. Translucent deep blue base glass (high-quality, almost bubble-free) decorated with 17 fine opaque circumferential white glass trails. Unusual near-circular section & squashing of glass (& trails) in perforation strongly indicates that trails were applied to straight glass rod which was then bent into bead form, rather than on circular bead. In latter scenario, distorted trails in perforation are hard to explain & regular spacing would be much harder to maintain; consistent slight sinuosity between trails confirms they were laid down in lines & then all distorted as bead was formed. Two adjacent breaks on contiguous strands suggest trail was accidentally rubbed off in bending. Less care was taken with trails in what became perforation; 1 has blob where trail started, another shows more variation in strand thickness & spacing. D 20.5, H 8, perf D 5.5

a long-lived and widespread type; it is very valuable to get examples from well-dated contexts. One (SF.2.477) comes from Phase 4c (*495–415 cal BC*) the others from Phase 6b (*275–85 cal BC*).

A single annular bead of Guido (1978, 87–9) class 14 decorated with white horizontal trails, is notably well-made (SF19.022). The type clusters in northeast Scotland north of the Mounth, but the diversity in colour and design suggests a decentralised tradition, and there is a notable secondary cluster from the west coast. Another is known on Skye, from Dun an Iardhard, with further Hebridean examples from Dun Cul Bhuirg on Iona, Dun Mor Vaul and Ballevulin on Tiree (MacKie 1974, 147–8; Guido 1978, 199–200; Ritchie and Lane 1980, 219, fig. 3.105); none is closely similar to this example. (Guido (1978, 200) suggested there are related examples from Dun Ardtreck, but the final report (MacKie 2000, 326, illus. 24) does not support this). It was deposited in C19.02 with two radiocarbon dates ranging between 550–350 BC. However, the bead had been deposited on the surface of this context, along with a Roman coin (As or dupondius SF19.003), suggesting a later date is more likely. Guido (1978, 88) saw this type of bead as essentially Roman Iron Age, but in general her dating was unduly conservative; it is only with the regular application of radiocarbon dating to contexts with significant finds that the true date span of Iron Age material culture in northern Britain is being revealed.

Few others are well-dated, and those which are sit rather later. The Dun Mor Vaul example comes from early Phase 3, probably *c.* 100 BC–AD 100, while two examples from Howe on Orkney (Henderson 1994) are from early Phase 7 (probably 1st–2nd century AD). In the northeast, there is one from a Roman Iron Age cache of charms from Monquhitter (Aberdeenshire), while an example from Seafield West comes from a site dated to *c.* 200 BC–AD 200 (Guido 1978, 198; Hunter 2011, 19). The example from High Pasture is very expertly made, with an almost circular section and very neatly applied trails; it seems likely that these were applied to the glass rod before it was bent into a circle (see Table 12.89 for details).

12.10 The carbonised wooden artefacts

Ann Crone

12.10.1 Introduction

Over 90 fragments of carbonised worked wood were recovered. The bulk of the assemblage consisted of flat fragments and, using grain and surface feature alignment, conservator Pieta Greaves was able to join together many of the fragments to reconstruct three composite objects. At least 12 of the fragments from Trench 15 could be assembled into one skilfully worked, stave-like object (SF15.353–6). Table 12.90 lists the fragments remaining

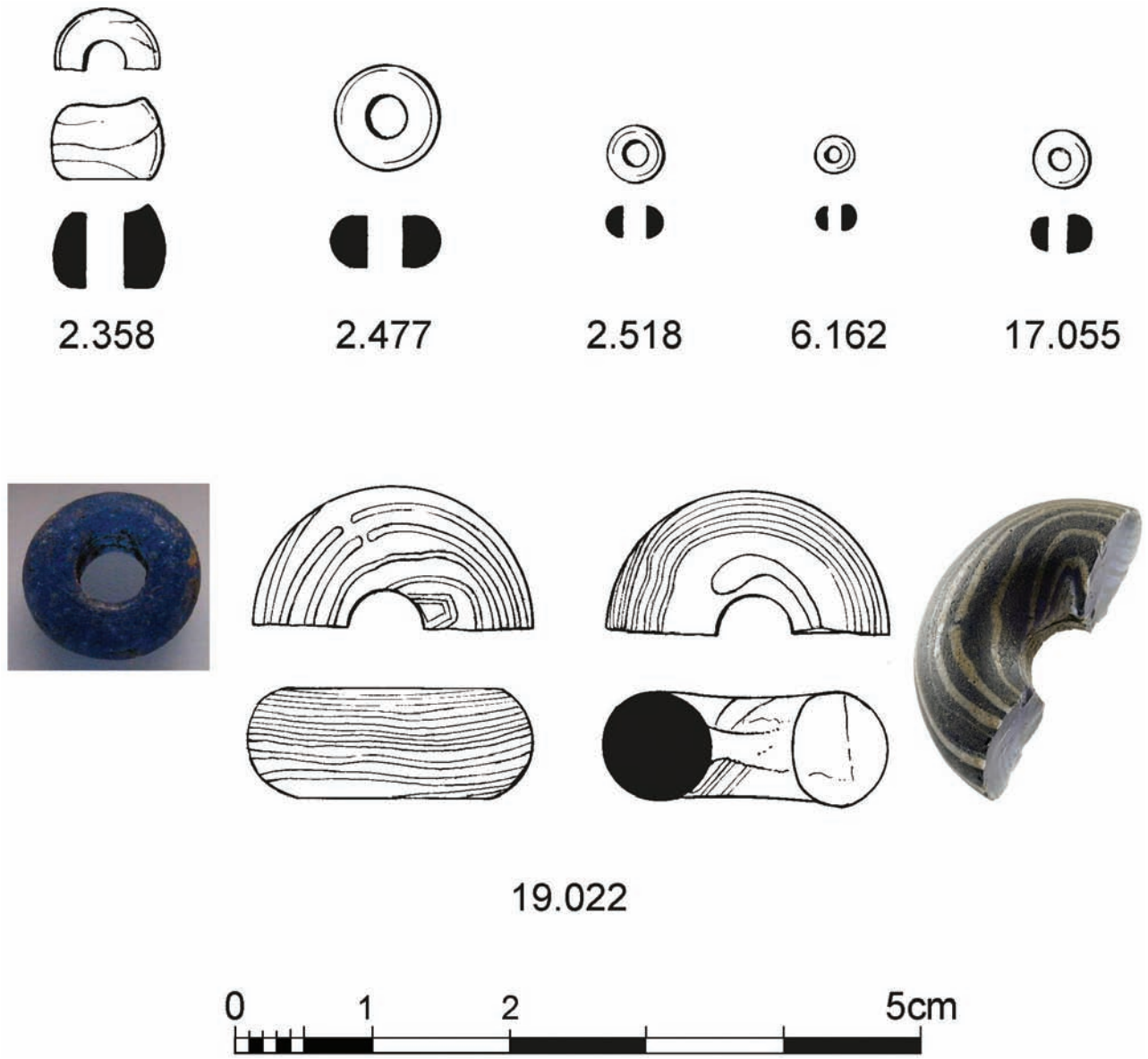


Figure 12.99 Glass beads 2.358, 2.477 (& inset), 2.518, 6.162, 17.055, 19.022 (& inset)

in the original finds groups after the removal of the SF15.353–6 components. It is clear that, although they could not be joined to SF15.353–6, there were other fragments from both Trench 15 and Trench 2 which probably belong to the same object (starred in Table 12.90). The other two composite objects were formed out of these fragments and are referred to as SF2.257a and SF2.257b. The other bags of fragments have been arbitrarily labelled with letters in the same sequence.

Apart from a small assemblage from C15.32 [Phase 5a, Block 9a] all the carbonised fragments came from C2.15a [Phase 4c, Block 8c], which extended across Trenches 15 and 2. In Trench 15 the fragments were hand-retrieved on site and recorded as discrete small finds while those from Trench 2 were retrieved during sample processing.

12.10.2 Discussion of the artefacts

Of the 29 flat fragments retrieved from Trench 15, at least 21 are components of a single artefact (SF15.353–6), a stave-like object which has been tangentially split from an alder log. Some fragments from Trench 2 are also likely to belong to this object (shown in Table 12.90). The thickness of some of the additional fragments indicates that they come from either the thicker end (*i.e.* SF15.355 (a–b), 11 mm thick) or the thinner end (*i.e.* SF15.353 which is 6 mm thick). Although they do not join their inclusion adds to the overall surviving dimensions of the object, making it at least 181 mm long and tapering from at least 11 mm to 6 mm in thickness. The faint cutmarks visible on one surface may have resulted from the fashioning of the board; despite the charring it is clear that the surfaces have been smoothed and the regularity in

Table 12.90 Carbonised wooden artefact summary

C	*SF*	*Description*	*Frag.*	*Species*	*No. IDs*	*Component of SF15.353-6*
C2.15a (Ph 4c, block 8c)	15.351	withy frags × 7		*Corylus avellana*	4	
	15.352	flat frags × 7	a–g	*Alnus glutinosa*	2	*
	15.353	flat frags × 2	a–b	*Alnus glutinosa*	1	**
	15.354	flat frags × 3	a, d	*Alnus glutinosa*	2	**
			b	*Sorbus* sp.		
		? rim	c	*Alnus glutinosa*		
	15.355	flat frags × 4	a, b, d	*Alnus glutinosa*	2	***
			c	*Sorbus* sp.		
	15.356	flat frag × 1		*Alnus glutinosa*	1	*
	15.353 - 6	flat frags × 12	a–p	*Alnus glutinosa*	2	
	15.357	rw frag × 1: split & bent		*Corylus avellana*		
	15.358	lyre bridge		*Quercus* sp.		
	2.527a	flat frags × 11: joined		*Corylus avellana*	1	
	2.558	peg		*?Alnus glutinosa*	1	
C2.15b (Ph 4c, block 8c)	2.560	rw frag × 1 with? hole		*Corylus avellana*	1	
C2.15c (Ph 4c, block 8c)	2.527b	flat frags × 5: joined		*Corylus avellana*	1	
	2.527c	flat frags × 6		*Corylus avellana*	3	
	2.527d	flat frag × 1 with? hole		*Prunus avium*	1	
	2.527e	thin frags: multiple		*Prunus avium*	4	
	2.527f	flat frag × 1		*Corylus avellana*	1	
	2.527g	flat frags × 3		*Alnus glutinosa*	2	***
	2.527h	flat frags × 3		*Corylus avellana*	2	
				Sorbus sp.	1	
	2.527i	flat frags × 7		*Alnus glutinosa*	1	
		rw frags × 2		*Corylus avellana*	2	
	2.527j	rw frag × 1		*Corylus avellana*	1	
	2.527k	rw frag × 1		*Corylus avellana*	1	
	2.527l	rw frag × 1		*Corylus avellana*	1	
	2.527m	flat frags × 2		*Alnus glutinosa*	2	**
		rw frag × 1		*Corylus avellana*	1	
	2.559	fragment		*Quercus* sp.	1	
C15.32 (Ph 5a, block 9a)	15.342	turned bowl frags × 4	a–d	*Sorbus sp.*	d)	

thickness across the width of the object suggests that it has been skilfully worked.

Some of the other alder fragments in SF15.352 (b–e), as well as F2.257g, are of similar thickness to SF15.353–6 but their growth rings are more radially than tangentially aligned. However, the growth rings of a tangentially split piece would become more radially aligned towards the outside of the log, so it is possible that they also form part of SF15.353–6. This would add to the width of the object; the composite is 70 mm wide and the largest of the radially aligned fragments is 32 mm, making the overall width of the object at least 102 mm.

SF2.527i also contains tangentially split fragments of alder but these are only 2 mm thick and must represent a separate lath-like object. SF2.257d and SF2.257e contain thin tangentially split fragments of wild cherry which must represent a separate lath-like object. SF2.257a and SF257b are strips, or laths of tangentially split hazel which may form part of the same artefact. The tangentially split hazel fragments in SF2.257c and SF2.527f are also probably part of the same

artefact, as they are all of similar thickness. There is distinct group of hazel withies with tapered ends, ie F15.351 (a–b), and F2.257 (j–k), which are all 24 mm diameter except for the latter which is 30 mm diameter. There is also a group of split hazel roundwood 10–13 mm in diameter which may be part of the same object. These include SF15.357, which appears to have been deliberately bent around something angled, and SF2.257i, SF2.267l, and SF2.560.

SF15.354(b) and SF15.355(c) are two fragments of rowan which join to form a piece 63 mm long and 38 mm wide. It has been tangentially cleft from close to the centre of a small log. One of the fragments in SF2.257h is a tangentially split fragment of rowan of similar thickness and probably belongs to the same object.

In summary, there are 12 objects present in C2.15a, and one in C15.32.

SF15.358: the lyre bridge (see Section 12.11, below)
SF2.558a: small peg
SF15.353–6a: stave-like object of alder, 181 mm long and 102 mm wide
SF2.527i: a very thin tangentially split lath of alder
SF2.257a–c, f: a tangentially split lath of hazel, 230 mm long and 43 mm wide
SF2.257d–e: a very thin tangentially split lath of wild cherry
SF15.351a: a hazel withy with tapered end
SF15.351b: a hazel withy with tapered end
SF2.257j: a hazel withy with tapered end
SF2.257k: a hazel withy with tapered end
SF15.357: a split & bent length of hazel twig (may include SF2.257i & l, & SF 2.560)
SF15.354(b), 355(c), 2.257h: a stave-like object of rowan
SF15.342: a lathe-turned bowl of rowan

Perhaps the most distinctive feature of the assemblage is the lack of any extraneous material. Apart from SF15.354c, an amorphous fragment of alder, and SF2.559, a fragment of oak, all the material retrieved from this context belongs to one or other of the objects listed above, implying that all that was burnt in the deposit was this collection of objects.

The assemblage is dominated by thin fragments of tangentially split hazel, alder, wild cherry, and rowan, all species that would have been readily available on Skye. However, these species do not grow to any great size and tangential splitting may have been employed because it would have produced wider laths than those produced by radial splitting of the same diameter of log. Considerable skill was needed to convert the slender, regularly sized laths from the log and once converted, their surfaces appear to have been smoothed.

Given the presence of the lyre bridge (see below) it is a possibility that at least some of these objects formed part of the body of the instrument and it is therefore perhaps unwise to conjecture on their function. However, there are some objects which could have been part of other artefacts. The curvature displayed by SF2.257a–b could have resulted from drying out during slow burning but the lath is reminiscent of those used in bentwood boxes. The box was formed by curving a thin lath around a solid base, to which it was fixed with small pegs, similar in size to peg SF2.558. Several examples were found at Glastonbury Lake Village bearing Hallstatt-style decoration (Earwood 1993, 43–4). SF2.257a–b survives to a maximum width of 43 mm; allowing for the loss of the pierced edge the parent box might have been as much as 60 mm in height. The boxes from Glastonbury ranged in height from *c.* 55–95 mm (Earwood 1993, 44) and most other recorded boxes fall within this size range (Morris 2000, 2293–7).

12.10.3 Catalogue

Trench 15

SF15.353–6: 12 fragments have been assembled to form an incomplete stave-like object at least 130 mm long and at least 70 mm wide, made of alder (*Alnus glutinosa*). The board tapers in thickness along its length from 9 mm to 6 mm but its thickness remains regular across its width. The grain runs down its length and the growth-rings lie tangentially across the thickness; this indicates that it has been fashioned from the inner face of a chord cleft of a log. It is also gently curved along its length; the 'inner' surface of the curved object is relatively smooth apart from a series of faint but sharp cuts which run tangentially across the grain, mainly towards the thicker end of the object. The 'outer' surface is crazed and has spalled off in places. One edge follows the grain and is remarkably straight suggesting that this may be an original edge.

SF15.342**:** This finds group consists of four small fragments, the largest of which is 27 × 29 mm across. They vary between 5–7 mm in thickness and all display a pronounced curvature. These are fragments of a wooden vessel fashioned from a *Sorbus* species, probably rowan, or mountain ash. The largest fragment (d) has faint striae on the outer surface indicating that it was probably lathe-turned. The varying alignment of the grain on the fragments indicates that the vessel was fashioned from a half-log in such a way that the grain runs across the width of the vessel, the standard means of conversion for lathe-turned vessels. None of the fragments conjoin but the alignment of grain shows that (b) came from the side wall while (a), (c), and (d) came from near the base of the vessel.

SF15.351**:** This finds group consists of seven fragments of carbonised roundwood, of which three join together to form withy (a) and two join together to form withy (b). Withies (a) and (b) and the remaining two fragments were all identified as hazel

(*Corylus avellana*). Withy (a) was 52 mm long and 24 mm diameter. A single oblique chop mark down one side fashioned the tip. Withy (b) was 59 mm long and 21 mm diameter. Two oblique chop marks on opposing faces fashioned the tip to a chisel edge. There is no evidence of buckling at the tip which can be caused by insertion into the ground or sill beam, so these were not used as stakes.

The other two fragments are both 21 mm diameter.

Trench 15

SF15.352**:** This finds group consists of seven fragments, all flat and regular in cross-section, with the exception of two small fragments which are more amorphous. (a) is probably a component of SF15.353–6. It is alder and the growth-rings lie tangentially across its thickness. It also bears the distinctive cuts on one face. The fragment is 30 mm wide, 20 mm deep and 10 mm thick. Although similar in morphology, *i.e.* flat and regular in cross-section, four of the other fragments (b–e) may come from another object because their conversion is different. They are similar in thickness to the components of SF15.353–6, 8–10 mm, but the growth rings are aligned at right-angles to the faces, as if radially split from the trunk. One fragment was identified as alder.

SF15.353**:** This finds group consists of two flat fragments which join together to form a piece 44 × 18 mm and 6 mm wide. This is almost certainly a component of SF15.353–6; it is alder, and the growth rings lie tangentially across its thickness. Given its thickness it probably came from the thinner end of the object.

SF15.354**:** This finds group consists of four fragments, none of which clearly belong together. (a) is a flat piece of alder, 21 × 39 mm across and 9 mm thick. The growth rings are more radially aligned than tangential, but it is probably a component of SF15.353–6. (d) is almost certainly a component of SF15.353–6. Measuring 39 × 30 mm and 10 mm thick it is made of alder, its growth rings are tangentially aligned, and it has shallow knife cuts on one surface. (b) is flat piece of rowan, 36 × 38 mm across and 10 mm thick. (c) is a more amorphous piece of alder, 15 × 17 mm across. It is roughly triangular in cross-section, two original surfaces forming a rounded right-angle while the third face is broken. One of the faces is aligned with the grain of the wood; it is possibly a rim fragment.

SF15.355**:** This finds group consists of four flat fragments. (a) and (b) are probably components of SF15.353–6. Both are alder, 11 mm thick and display the tangentially aligned growth rings characteristic of that object. They also display the distinctive cuts on one face. They measure 33 × 42 mm and 17 × 36 mm respectively. (d) is also a likely component; it is alder and displays tangentially aligned growth rings although it does not display any cuts. It is 44 × 41 mm across and 9 mm thick. (c) is fragment of rowan, 25 × 28 mm across and 9 mm thick. It displays some curvature across its width.

SF15.356**:** This finds group now consists of a single fragment of alder which is probably a component of SF15.353–6. It is 36 × 39 mm across and 8 mm thick. It displays tangentially aligned growth-rings and cuts on one face.

SF15.357**:** This find consists of a length of hazel roundwood, 13 mm in diameter which has been split in half and bent around a square or rectangular object while still green, so that an angle has been formed by the inner edge of the twig. The surviving arms of the angle are 17 mm and 20mm.

SF15.358**:** The lyre bridge (Fig. 12.100) has been fashioned from a radially split lath of oak (*Quercus* sp.) so that the grain runs along the width of the object. It stands 20 mm high and is roughly triangular in cross-section, tapering from 10 mm at the foot to 2 mm at the tip of the string grooves. The pad of the foot is oval in shape, 22 × 10 mm, and angled to one side; this appears to be part of the design as there is no evidence that the carbonised wood has spalled off. The base arches gently upwards from the foot, and the under surface has been carefully rounded so that the bridge is teardrop shaped in cross-section at its central point. The bridge is incomplete; one end has been broken off and there is damage to the upper ridge at the surviving end. The surviving fragment is 51 mm wide but assuming a symmetry at the midpoint of the arch, the bridge would have been 74 mm wide. At the complete end a hole 3 mm in diameter has been drilled through the thickness of the object; x-rays show that the hole is shaped like a sand-timer indicating that it

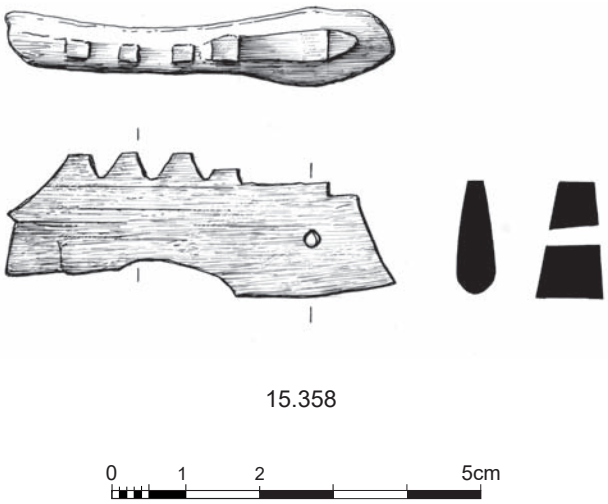


Figure 12.100. Lyre bridge SF15.35

had been cut out from both faces. There are three complete string grooves on the surviving fragment (see Section 12.11).

Trench 2

SF2.527a**:** This object consists of 11 fragments which join to form a strip of wood, 145 mm long and 41 mm across at its widest surviving point. There is a pronounced curvature along its length. One edge is straight and appears to have been squared; the object is 5 mm thick on this edge, tapering to 3 mm on the other, broken edge. The object has been converted tangentially from a small log of hazel, in such a way that the grain runs along the length of the object. The surfaces appear to have been deliberately smoothed.

SF2.527b**:** This object consists of 5 fragments which join together to form a strip of wood, 85 mm long and 43 mm across. It is curved along its length. One edge is straight while the other is more fragmented. It is 5 mm thick from one edge to the other. The object has been converted tangentially from a small log of hazel, in such a way that the grain runs along the length of the object. The surfaces appear to have been deliberately smoothed.

SF2.527c**:** This find group contains 6 pieces which are composed of 2–3 fragments each. All are flat, tangentially converted pieces, most of which vary in thickness from 4–4.5 mm, although one piece is only 3 mm thick. The largest piece is 40 mm wide; one edge of this piece is very straight, as though deliberately shaped. At least three of the pieces are hazel.

SF2.527d**:** This is a small irregularly shaped fragment with the possible remnants of a small hole, 3 mm across, on one edge. It is a flat, tangentially converted fragment of wild cherry (*Prunus avium*).

SF2.527e**:** This finds group contains numerous fragments of flat, tangentially converted wild cherry 2.5–3.5 mm thick.

SF2.527f**:** This is a single fragment of flat, tangentially converted hazel, the faces of which appear to have been deliberately smoothed. It varies in thickness from 3–4.5 mm from one edge to the other, and there is a slight curvature across the width of the fragment.

SF2.527g: This finds group contains three flat fragments of alder, all of which are 7 mm thick. flat, tangentially converted; these are probably components of SF15.353–6.

SF2.527h**:** This finds group contains three flat, tangentially converted fragments. There are two thin fragments 4 mm thick which are hazel, while the third is rowan and is 7 mm thick.

SF2.527i**:** Of the seven small fragments in this group four are flat and tangentially converted and no more than 2 mm in thickness. One was identified as alder. There were also two short lengths of split hazel roundwood, both 11 mm in diameter.

SF2.527j**:** This is a length of hazel roundwood, 24 mm in diameter and 40 mm long. There is a single oblique chop mark down one face.

SF2.527k**:** This is a length of hazel roundwood 30 mm in diameter and 44 mm long. There are oblique chop marks on opposing faces reducing it to a lenticular cross-section.

SF2.527l**:** This is a length of split hazel roundwood, 13 mm in diameter and 39 mm long.

SF2.527m**:** This finds group contains three pieces. Two are flat, tangentially split fragments of alder, one 23 × 36 mm and 10 mm, and the other 38 × 27 mm and 12 mm thick; these are probably components of SF15.353–6. The third piece is a length of hazel roundwood, 38 mm long and *c*. 27 mm in diameter, which had dried out before being carbonised.

SF2.558**:** A small peg was retrieved from this context. It is 14 mm long and is flat at one end and slightly flared at the other. It is 4 mm in diameter at the flat end, expanding to nearly 5 mm at the other. It has been converted from a larger, radially cleft piece, possibly of alder.

SF2.559**:** A single, small fragment of oak was retrieved from this context.

SF2.560**:** A single fragment of split hazel roundwood was retrieved from this context. The fragment is 10 mm in diameter and there is a possible hole, 3 mm in diameter, which lies at an angle to the split face.

12.11 Musical instrument bridge and related finds from High Pasture Cave, and their context

Graeme Lawson and John Purser

12.11.1 Introduction

Among the carbonised remains of wooden objects from C2.15a was found a small, delicate, arched object (F15.358; Fig. 12.100), consistent in all technical respects with the bridge of a stringed musical instrument and almost certainly a lyre (a typological definition can be found in Lawson 1982[2010] and Annexe A, site archive). Lyre bridges are familiar from the post-Roman Iron Age, but this is by far the earliest example found anywhere in Europe (Lawson and Purser 2019). For a similar wooden bridge from the 6th century AD: Theune-Grosskopf 2004; 2006; 2008; 2010; for a wooden bridge from 10th century York: Morris 2000, 2355; also 2076, table 191). It confirms the existence in the Early Iron Age of similar musics and, through the lyre's universal association with song, serves as a powerful material proxy for poets, oral text, and tradition (Lawson 2019a). Structural adaptations evidence sophistication in musical technique and help inform the shape of the absent instrument. The following analysis approaches the object and its context as material culture, placing the find within its regional and global setting, and summarising its implications for historical musicology and for Classical Studies. A fuller account is available in the site archive.

Musical potential was recognised in several objects recovered from this most unusually situated and well-preserved site: initially, a set of seven antler points found bundled together between paving stones within Bone Passage, and a range of perforated antler mounts. The mounts resembled two finds from Dùn an Fheurain, Gallanach, Argyll & Bute, interpreted as potentially parts of a lyre by Vincent Megaw (Megaw 1974). Could these mounts too be musical, and the points be tuning pegs or keys for a similar instrument? Seven strings were used on ancient Greek lyres, the introduction of the seventh string famously attributed by Strabo (*Geographica* XIII, 2.4) to the 7th century BC poet Terpander. In 2009–2010, the first carbonised wooden finds and ultimately the small burnt object in the shape a lyre bridge were recovered, for which Graeme Lawson, after preliminary microscopy, was able to confirm a probable musical identity. The identification was duly announced to the press, and continuing examination of the associated carbonised wood showed that some of the worked pieces were suggestive of ancient music technology, notably the manufacture of fine sheet wood. Some of this was remarkably delicate. As excavation progressed, structural aspects of the site itself demanded acoustical consideration: but neither the wooden sheeting nor antler plates and pins proved to exhibit features that could be shown to be exclusively musical in purpose or use. Wear on the pins was inconsistent with use as tuning mechanisms, and the perforations in the bone plates proved polygonal, not round, in cross-section, precluding any element of rotation. The bridge therefore remains the sole definite musical find.

The presence of such a strong indicator for music has brought a new dimension to the wider interpretation of site context. There is growing interest in sensory approaches to spatial studies, especially the acoustical phenomenology of prehistoric monuments and landscapes (Scarre and Lawson 2006; Watson 2006, 11–22; Pollard 2009; Till 2009; 2020; Kolltveit and Rainio 2020). But while acoustimetric techniques have contributed much descriptive data, cultural meaning – sonorous purpose and exploitation – remains an interpretive challenge. It is very rare to find physical traces of acoustical behaviour and, until identification of the lyre bridge, High Pasture Cave followed tradition. The hubbub of fire events, the many sonorous craft activities evidenced, the primacy of the subterranean access with its flowing, crashing water, the ringwork of masonry enclosing the central area all invited consideration of a frustratingly unprovable sensory element to the use of the cave and environs. As a contribution to methodology, therefore, the lyre bridge has been empowering. Like the bone pipes recovered from French and German Upper Palaeolithic caves (*e.g.* Lawson and D'Errico 2002; Conard *et al.* 2009, 737–40) it elevates interpretation to a new level: proof of the presence of organised sound is here in this small object. During Phase 4, at least one person at High Pasture Cave was accustomed to exploiting sound in a conscious and sophisticated way. The ramifications of this step change can be seen elsewhere in this volume. For the musicologist too it raises new philosophical challenges. Why, when we have been searching all over prehistoric and ancient Europe for just such a bridge, should the first specimen have chosen to emerge here on Skye?

12.11.2 Description, organology and music technology

Examination prior to conservation revealed in detail the object's form and condition (Figs 12.101 and 12.102). Although damaged, the central span and most of one end remain, the whole delicately shaped from a single piece of oak (*Quercus* sp., probably *Q. robur*). It appears to exhibit bilateral (mirror) symmetry and also (broadly) bifacial symmetry, each face smoothly rounded, the span exhibiting a symmetrical tear-drop section: round beneath and tapering upwards to a narrow, flattened ridge. The span is slender, with a slight curve that might be due to distortion. In elevation, the surviving end expands downwards to a foot with a flat, oval, slightly convex sole (Fig. 12.103a). Above the foot is a small conical hole, bored presumably for a now-absent cord or wire. The underside of the span describes a shallow arch, springing from the heel of the foot in an even, shallow curve. At its broken end, this curvature implies development towards a second, identical foot. The ridge, which was straight, bears a partial series of one incomplete and three complete V-shaped notches, evenly spaced (Fig. 12.103b). They are precisely cut, their forms consistent with use of a fine, sharp metal blade. Assuming bilateral symmetry, the distribution of the surviving notches indicates an odd number, probably seven in all, certainly no fewer than five or more than nine.

Neither the notches nor sole of the foot subtend right-angles to the vertical plane of the object: instead the notches are depressed through approx. 8–8.5° and the foot is raised through 12–13°, indicating an oblique stance on the table (resonating surface) of the instrument and a consequent angle of 20–23.5° between table and strings at point of contact (Fig. 12.104).

This is a design choice, not the result of taphonomy. There are no clear traces of working, reworking, or damage prior to charring. The granular texture of the carbonised wood, although fine, prevents any of the surfaces exhibiting polish attributable to use. However, the absence of reworking and the crisp external angles above and between the notches suggest that the object was comparatively new and/or little used when burnt. Traces of ochre coloured clay from the surrounding deposit were ingrained in the surface.

Key research questions focused on the potential for further musical identification, and on a programme of optical microscopy initiated post-conservation. Were the notches evidence of adaptation to receive strings, or

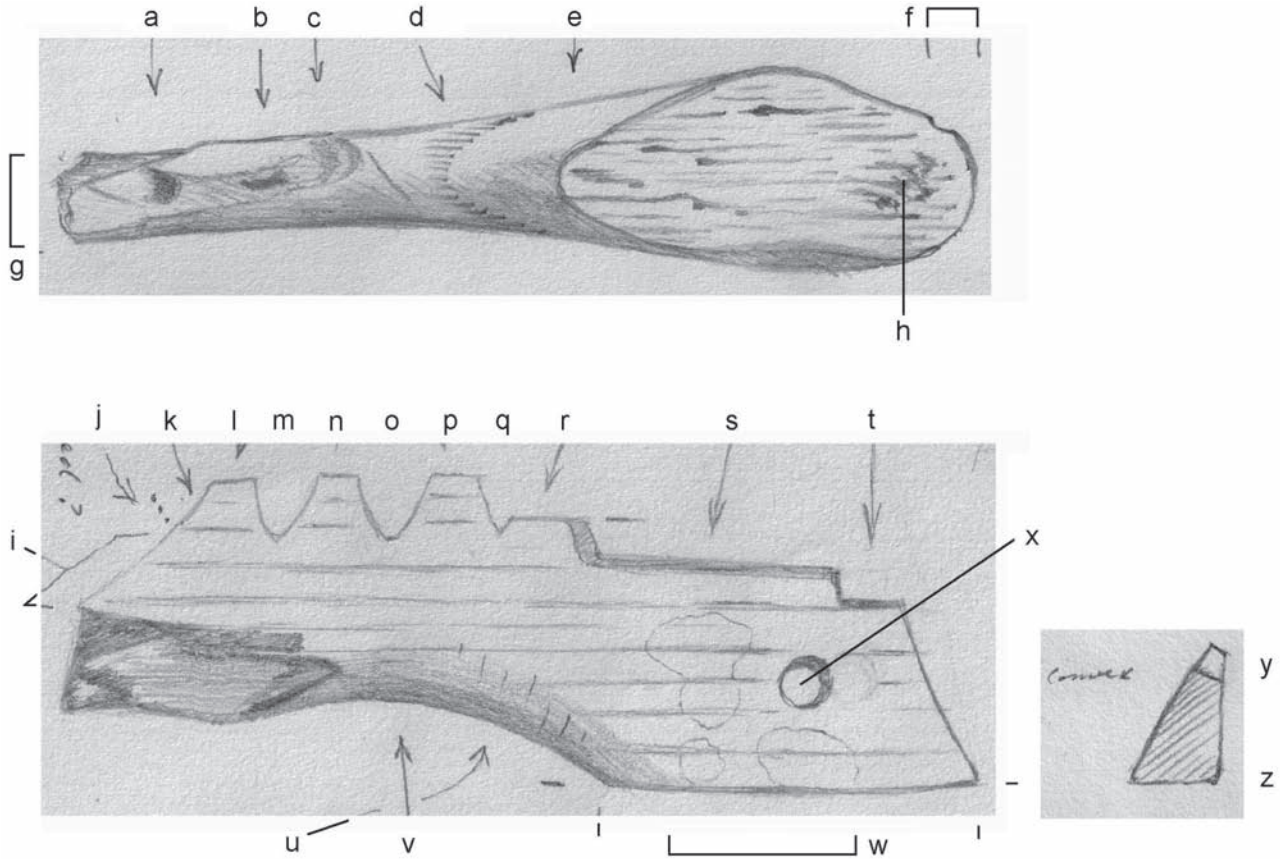


Figure 12.101. The musical instrument bridge, drawn before conservation, showing principal made features, damage, mineral adhesions, & parallel planes of weakness. (Key: a, b, c: fracture surfaces associated with loss of second foot; d, e: expansion towards surviving foot; f: raised toe; g: beginning of expansion towards missing foot; h, w: traces of ochreous clay on sole & face; i: oblique fracture plane extending from point of notch j; j, m, o, q: notches; k: cut face of notch j; l, n, p: plateaux between notches; r, s, t: fractures along weaknesses in wood grain; u: rounded underside of arch; v: mid-point of arch; x: perforation; y, z (inset, not to scale): schematic section showing (y) tilt of notches & overall stance relative to sole of foot (z) (pencil drawing: G Lawson)

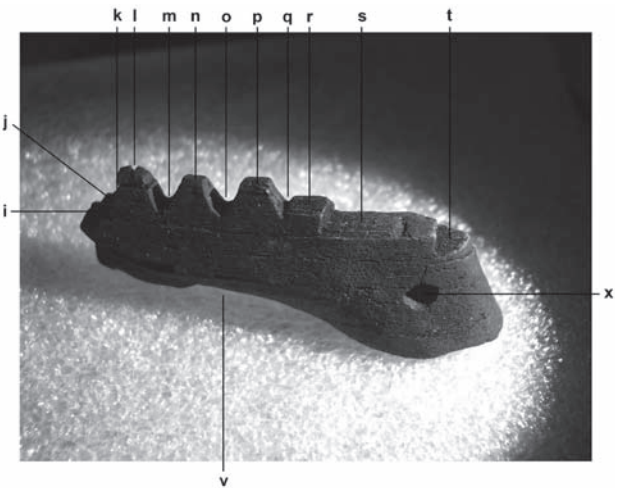


Figure 12.102. The musical instrument bridge, imaged after conservation. H. 18.5 mm; L. 52 mm

potentially indicative of some other, non-musical function? Did the impression of bilateral symmetry reflect its original, unbroken form, and thereby permit reconstruction? Was the object's oblique stance intentional, or could the sole be merely a fracture following a weak plane in the brittle charcoal? Under low-power microscopy, the sole of the foot appeared too uniform to be accidental. Nor could its shallow convex profile be attributed to the grain of the wood (Fig. 12.105a): it appeared engineered expressly to stand on a flat or slightly concave surface. The shape therefore seems both deliberate and original, and a copper alloy ?lyre bridge from early medieval Gamlebyen, Oslo, Norway, also exhibits such a tilt (Kolltveit 1997, 70; fig. 1).

The notches reveal further detail. The regularity and precision of their spacing is matched by that of their cutting (Fig. 12.103b). The slopes of the intervening pyramids are smooth, with especial care taken in forming the

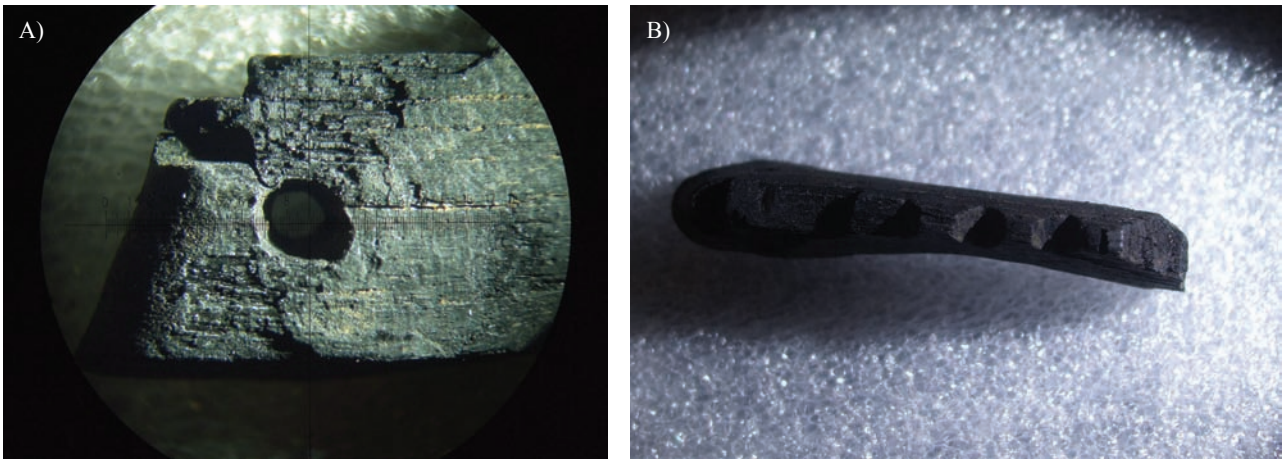


Figure 12.103 The musical instrument bridge: A. elevation of foot area, showing the perforation & (bottom) the flattened but slightly convex sole, after conservation; B. view from above, showing the series of notches in plan, after conservation (photographs: G Lawson)

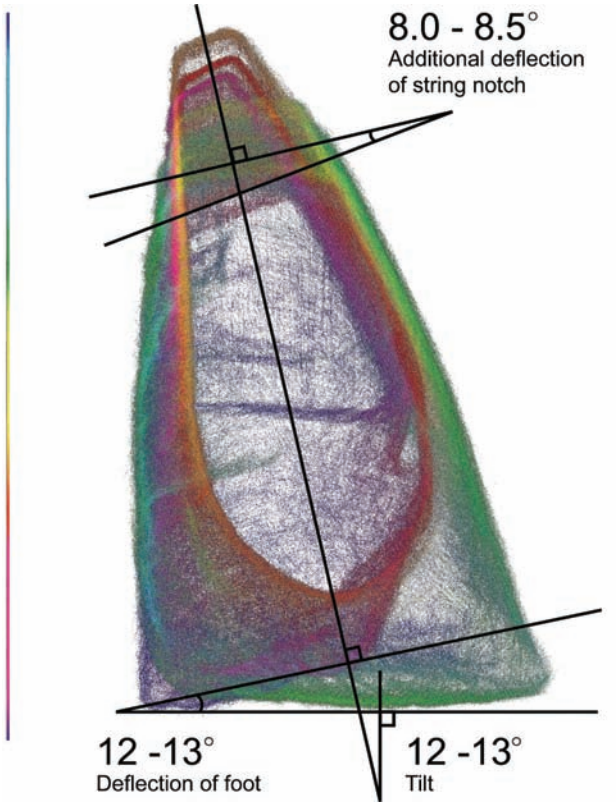


Figure 12.104. The bridge: laser scan, viewed orthographically from the broken end & colour-filtered along the X axis, showing the asymmetries of the foot & notches (scan by G. Cavers, AOC, using FaroArm® Platinum CMM & laser line scanning probe, the data processed in Geomagic® Studio 10. ©2011 AOC)

gullies within their depths. Whereas in generic notches the converging blade strokes might join up to form a sharp V, here they stop short, leaving a narrow platform, each of which was rendered distinctly and smoothly concave (Fig. 12.105c–d). Whether shaped using a fine round file or via compression is unclear; but the form seems expressly adapted to cradle a filament, cord, or wire. It is undoubtedly anthropogenic, and such smoothing is a frequent feature of musical bridges, reducing stress on a string already under considerable tension. The absence of wear or bruising at either end of each bearing is also consistent with the rigidity of musical strings under tension.

As is usual with excavated bridges, no physical traces of the strings survive: later comparanda suggest animal gut, sinew, hair, and wire (Lawson 2019b). Under the microscope, measurement of the curves yields radii that suggest gauges of between 0.75 mm and 1.0 mm. This may suit organic strings better than metal: today the gauges of gut used on baroque lutes, for example, are typically between 0.4–0.45 mm and 0.8–0.95 mm, while on baroque viols and violins the thinnest tend to be 0.55–0.65 mm. A string of 0.75–1.0 mm gauge would thus be consistent with these ranges, albeit at their broader extreme. However, the properties and implications of different stringing materials and gauges involve numerous variables, and their assessment is inevitably subjective. (On the practicality of gold and silver medieval harp strings, see Heymann and Heymann 2003; Cathcart 2009).

Our evidence seems to place the object's musical identity 'beyond reasonable doubt'. There is no friction wear indicative of textile manufacture, and no traces of abrasion suggesting combed or impressed decoration of clay: both activities appear unsuited anyway to the object's delicate form and the natural texture of oak. No other alternative, historically attested use matches the observable facts. One difficulty is the apparent freshness of the surfaces and edges, and the lack of abrasion, damage, or patina that would suggest of ancient musical handling and use: but instead, further research questions arise. Why, if the object was new, was it placed in the fire? How did it survive the burning? Was it a ritually significant act – funerary, commemorative, magical? More prosaically, might we be looking at random craft residues from the burning of workshop debris?

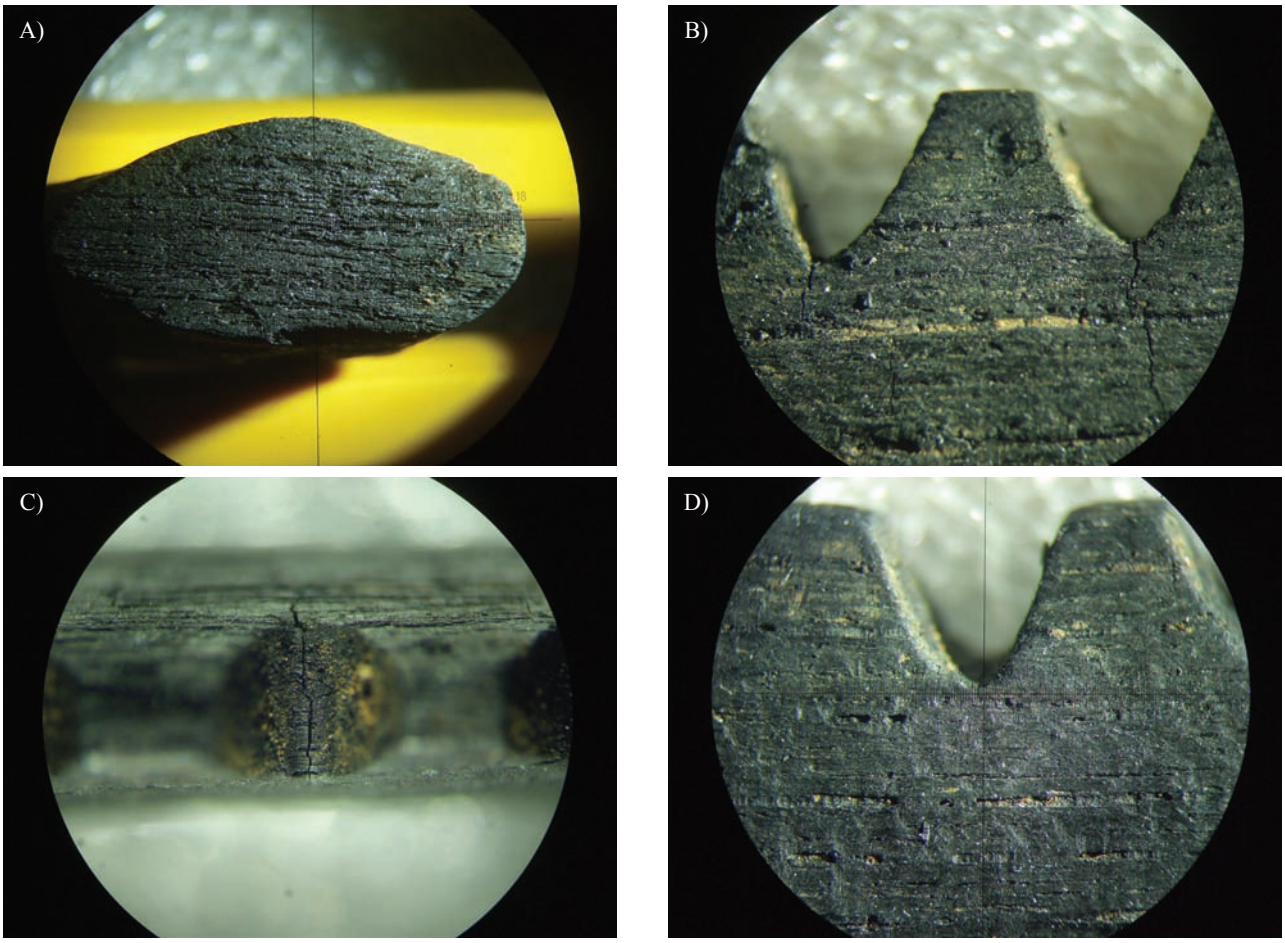


Figure 12.105. The musical instrument bridge: A. the sole of the foot from beneath, after conservation (scale: 1 numbered unit = 1 mm); B. detail of ridge after conservation, showing the even spacing & precise cutting of the notches (magnification as Fig. 12.104B); C. detail of notch 'o' viewed from above, after conservation, showing the roundness of the string-bearing surface (magnification as Fig. 12.104B); D. detail of notch 'o' viewed in profile, after conservation, showing roundness of the string-bearing surface (scale: 1 numbered unit = 0.5 mm) (micrographs: G Lawson)

Numerous sites of music-related industry, primarily medieval and early post-medieval, are identified in the archaeological record. They commonly comprise scatters of debitage in which the occasional trial piece and unfinished specimen is found, either complete or broken (for bell-casting pits, see Weare 1977, 208–9). Typically, little of the product remains. Richest in woodworking is medieval Novgorod (Kolchin 1968, 178, pls 81–3; 84.3; 1989i, 134–44, 140–3; ii, pls. 139–40, 141–2, 157; Povetkin 1992), while a memorable example of bone-working comprising *c.* 70 bone pipes, in various stages of preparation, was identified at Plessenstrasse, Schleswig (Reimers 1979; Reimers and Vogel 1989; Lawson 2004, 73–4). Bone tuning pegs offer insights into stringed instrument manufacture and repair. Widespread in urban and monastic settings, sometimes as stray finds, many appear discarded because damaged or worn out. Arguably the least parsimonious site to date is a late medieval dwelling in Oxford, which produced a scatter of bone waste and a small handful of pegs, some worn out, some freshly made, others incomplete (Henig 1977, 165–6; Page 1978; Lawson 2004, 70–3; Lawson and McLaren 2017). The recurring archaeological reality is thus a very few small items and waste: the freshness of the High Pasture Cave bridge and the presence of other carbonised pieces does not constitute proof that musical crafts were being practised there, but it establishes it as a possibility.

Examined for their organological relevance, the 'flat wood' fragments appear to represent both tools and products. The largest refit (SF15.353–6) forms one corner of a rectangular board of alder (*Alnus* sp.) (see Section 12.10). This refit is 7.4 –9.9 mm thick with evidence of use as a cutting board. The next largest (SF2.527a) preserves the straight, squared edge of a somewhat finer sheet of hazel (*Corylus* sp.), 5.8 mm thick. 140 mm of the straight edge remains. Both sides are unmarked. The third (SF2.527b) is of still finer work, also hazel, preserving a single squared edge only 4.8 mm thick. Other individual thin fragments are 2.5 mm thick. Of the 'round wood' (typically circular or oval in cross-section and *c*. 17 mm diameter), most

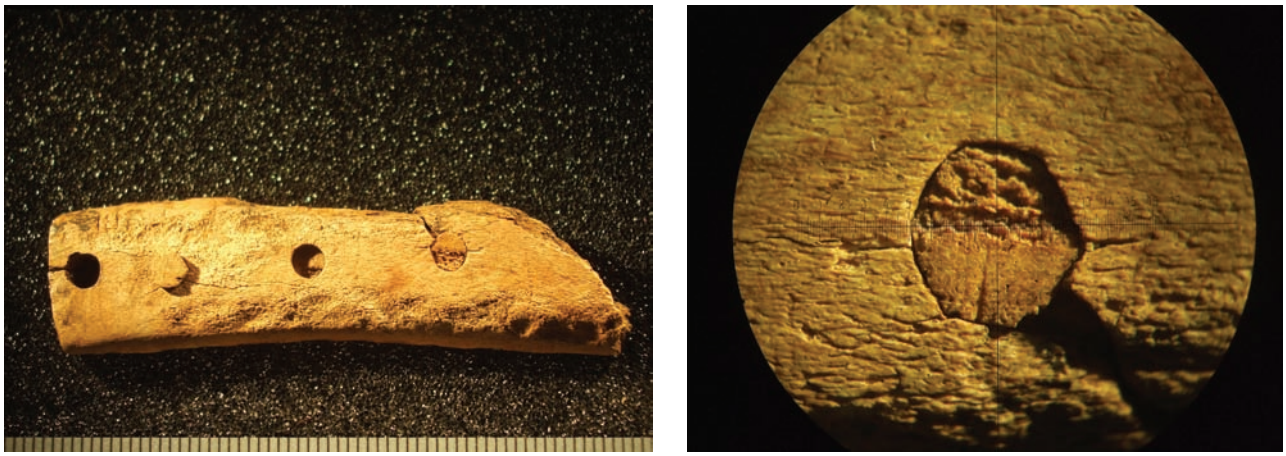


Figure 12.106. Left: antler mount SF1.063 with 3 antler dowels preserved in situ; right: antler mount, detail of dowel showing the polygonal cross-section which prevents it from rotating (scale: 1 numbered unit = 1 mm; photo and micrograph G Lawson)

appears consistent with straight dowels, rods, or staves. Some preserve a trimmed end which in several cases terminates in a bifacial wedge.

Some of these finds recall the delicate sound boxes and sturdy frames of stringed instruments, but none exhibits the slightest diagnostic adaptation, such as holes for tuning pegs, or signs of the use of tuning levers of the kind seen in the roundwood elements of ancient Greek and earlier instruments. There is none of the jointing typical of lyre or harp frames. The flat wood bears no evidence of assembly into boxes. One fragment of flat alder (group 15.353) preserves the eroded remains of a perpendicular upstand, indicating a three-dimensional, hollowed structure such as a tray or shallow box, perhaps consistent with the sound-box of a stringed instrument. A piece of hazel (SF15.357, also from C2.15a) bent at a right-angle might be a reinforcement for the corner of a box. That is all – an inconclusive survey, but one which nevertheless evidences skills and materials that could facilitate musical construction of the quality indicated – and demanded – by the delicate complexity of the bridge.

A number of High Pasture's antler objects resemble mounts (Fig. 12.106a): previously proposed as re-inforcements for the yokes of lyres (Gardner and Savory 1964; Bruce-Mitford and Bruce-Mitford 1970; 1983, 717, fig 522, 718–9); Megaw 1974, 106–7; see Fig. 12.113a–c, below). Smoothly rounded on one face, sawn on the other, here indeed are sockets for pegs, some with pieces of antler dowel still in place. Each mount describes a slight curve as though intended to adorn a curved object like a comb or a knife handle – or the yoke of a lyre. The sockets are however much too slender to receive functional tuning pegs, and those pegs that remain in situ have been trimmed flush with the surface (Fig. 12.106a–b). Microscopy shows that both pegs and sockets are polygonal in cross section and could not rotate. They also lack use wear of any kind that can be attributed to stringing or tuning.

The antler assemblage also includes thin antler-strip points, 50–70 mm long, one end spatulate, the other tapering to a point (Figs 12.75a–g; 12.76a–d; 12.77a–b). Some are rounded; others display a more specialised, hook-like form. They bring to mind another tuning mechanism: the external tuning lever, associated with some of the most ancient lyre traditions. However, use-wear analysis indicates probing and perforating, the sculpted tips manipulating a fine thread (Fig. 12.77b) which must have been free to move across the bone to achieve such wear. There is thus no trace of winding under strong tension, and no friction wear attributable to leverage. A burnt antler decorative mount fragment from Trench 2 also lacks diagnostic musical features.

12.11.3 Historical and cultural background, and significance

Several sources of evidence help to identify the bridge with particular instrument types and investigate its behavioural and cultural associations, including musical and poetical genres, and beginning with the earliest references to musical instruments in Insular texts. These are acknowledged to represent Iron Age cultural traditions, despite being written somewhat later: Gaelic represents the still-surviving cultural inheritor of those who deposited the bridge at Uamh an Ard Achadh, the oldest substantial vernacular literature in western Europe. Its earliest texts include many references to plucked-string instruments, asserting their physical beauty and enshrining in law the high status of their performers. The 8th century Old Gaelic *Bretha Nemed déodenach* accords an *eneclann* (honour price) to both the *cruit* (string player) and the *cuislennach* (piper) (Gwynn 1942); and the legal tract *Críth Gablach* places the *cruitti* (string players) closer to the king than other musicians (Binchy 1941, 23.590). The 8th–9th century laws in the *Uraicecht Becc* assign

an honour price to the *crott*-player (Kelly 1988, 64, no. 198), whereas the pipers are given none.

Texts combine with other evidence to suggest that the lyre was the predominant stringed instrument. Three Gaelic words denote plucked stringed instruments: *crott*, *tiompan*, and the later term *clàrsach*, each of which has distinct morphological implications. According to the Merovingian Latin poet Venantius Fortunatus, writing in the 6th century AD, the Britanna (Briton or Breton) sings to the *chrotta* (George 1995, 62–4). The etymology of *crott* implies something curved or arching. Its earliest known vernacular use dates from the late 6th or early 7th century AD (Clancy and Márkus 1995, 117, 239).

hUile bith, ba háe hé: The whole world was his:
Is crot cen chéis, It is a cruit without a key,
Is cell cen abbaid. It is a church without an abbot.
(Clancy and Markús 1995, 104–5)

This posthumous praise poem for Saint Columba by Dallán Forgaill powerfully emphasises the significance of the instrument, which seems quadrangular. The following quotation is from *The Second Battle of Moyturra*, uniquely found in the 16th-century British Library MS Harley 5280 but based on 9th century material (Stokes 1891, 53; Murphy 1955, 19):

Tair Daur-dablao, Come Daurdabla!
Tair Coir cetharchuir, Come Coir-cethar-chuir!
Tair sam, tair gam, Come summer, Come winter!
Beola crot & bolg & buinne. Mouths of cruits and bags and pipes!

Stokes (1891, 109) translates *crot* as 'harps', for which '*cruits*' has been substituted here. Daur-dablao is obscure, but Stokes suggests 'Oak of two greens', which might imply an instrument made of a combination of hard- and soft-wood oak. *Coir-cethar-chuir* means 'four-angled-music'.

The *tiompan* was distinct from the crott, although their meanings may occasionally overlap. The word derives from Greek *τύμπτω* (I strike) yielding *τύμπανόν* or timbrel. This may imply that the *tiompan* had a skin rather than a wooden belly, and that the skin was stretched over a frame or bowl. Modern orchestral timpani are made of stretched skin, but over a kettle-shaped metal vessel, hence 'kettle drum'. *Timpán* first appears in the 8th or 9th century *Aislinge Oengusso*. There a woman appears to Angus in a dream:

Co n-accae timpán inna láim as bindem boie.
a tiompan in her hand, the sweetest that ever was. (Shaw 1934, 44)

The strings are always described as metal and the instrument as sweet-sounding and often made of *creda* –sometimes translated as tin, but also as bronze:

Timpan creda inlaim chli in gilla. (Bergin *et al.* 1907, 2)
Timpán creda. (Best and O'Brien 1967, 1252)
Do thimpán creda is fiu main,
Binnithis lic Locha Laig. (Buckley 1977)

The 9th–10th century *Scéla Cano* describes the retinue of Cano MeicGartnáin as including 50 gillies (retainers), each carrying a *tiompan*:

Fithchell for muin cach gilla[i] co feraib óir 7 airgid; timpán créda i(n) láim chlí in gilla[i]; da mílchoin ar slabra[i]d airgit ina láim deis. (Binchy 1963[1975], 2, ln 35–7)
on the back of each gillie, a chess-board with its men of gold and silver; in his left hand a bronze tiompan, in his right hand, two deerhounds on silver leads.

This is of particular significance. MeicGartnáin's main residence was probably Dùn Cana on the Island of Raasay, which neighbours Skye and is therefore not far from the site (MacLean 1997, 174–5).

It is noteworthy from a musical viewpoint that the name of the district in which the site lies, CilleBhride, or Kilbride, also connects with music, through its identification with the Christian saint Brigid and her pre-Christian persona, Bride. Both as a daughter of the Dagda and in her own right, tradition closely associates Bride with musical instruments (for the Dagda and his *cruit*: Murphy 1955; for Bride and her relation to the find and the site location see Annexes A and B, site archive).

12.11.4 Stringed music and instruments in insular Celtic art

To these early Gaelic literary traditions may be added a considerable body of pictorial evidence, notably in stone carvings from the same period (Purser 2004, 223–4; 2007, 33–5). Stringed instruments of both quadrangular and triangular forms are routinely portrayed in high status Christian contexts during the 7th–10th centuries, exhibiting a variety of morphologies and a confidence in presentation which suggests a long standing tradition. Evidence from Ireland from the same period supports the presence of quadrangular instruments (those with frames exhibiting varying degrees of bilateral symmetry) and there too their high status is made manifest, on such crosses as Muiredach's at Monasterboice, Co. Louth. Other examples from the 7th–10th centuries are at Carndonagh, Co. Donegal, Castledermot, Co. Kildare, and Durrow, Co. Offaly (Rensch 1969, pl. 9; Sanger and Kinnaird 1992, 12–13). Assuming long term cultural stability and homogeneity of the kind already implicit in the long continuity of use now witnessed at Uamh an Ard Achadh, these examples indicate that, at least by the 7th century, such instruments were well established in the region. But do they mark a recent arrival, or are they - along with the texts – merely the visible manifestations of an ancient and indigenous line – the Dark Matter, so to speak, of music's prehistory?

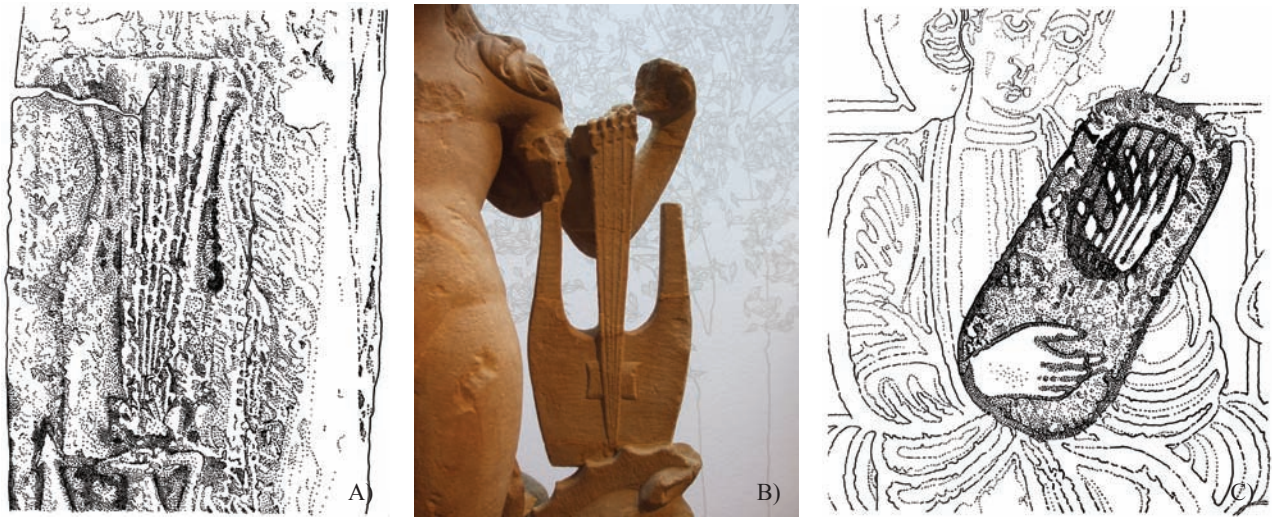


Figure 12.107. A. lyres in Roman art: Apollo's lyre. Side panel of a Mithraic altar from Inveresk Park, Musselburgh, East Lothian. Late 1st or early 2nd century AD (drawing: G Lawson); B. lyres in later Roman & Late Antique art: the Hochscheid Apollo, Hunsrück, Germany. Limestone statue, provincial Roman, 2nd–3rd century AD (photograph: G Lawson, courtesy of Rheinisches Landesmuseum, Trier); C. lyres in later Roman & late Antique artistic traditions: the Psalmist portrait from the 'Vespasian' Psalter (British Library MS Cotton Vespasian A.I, folio 30 verso). Ink & (corroded) silver foil on vellum; Canterbury, England, 8th century AD (drawing: G Lawson.)

For earlier Greek and Roman authors, the music of the North is complicated by cultural and political considerations that make them doubtful witnesses for organology (for contemporary accounts of Barbarian music and instruments see Rocconi 2019; Vendries 2019). For them, music's value is primarily metaphorical: an opportunity to assert cultural superiority by emphasising the martial qualities of the savage. There is a consequent emphasis on trumpets, percussion, and the noise of battle: for example, Tacitus references the traditional songs of tribal Germania without mentioning a lyric component (*Germania* 2). Such bias is also a feature of Roman pictorial art, where, however, the far greater quantity and diversity of the evidence does allow an occasional escape from Classical convention: in the northwest provinces, we see occasional and sometimes vivid glimpses of singers and their instruments – almost all play lyres.

In Roman Britain, lyres display a variety of forms, from the elaborate example on a relief from Compton Dando, Somerset (Lawson 2008, 182–3, fig. 13) to the simpler types of the Orpheus mosaic at Brading, Isle of Wight (Lawson 1981a, figs 4.20 a, 5.24 d), and the famous silver lanx from Corbridge, Northumberland (Strong 1966; Lawson 1981a, 86, fig. 5.36 c; 2008, 182–3, fig. 12; Potter and Johns 1992). Among recent discoveries is the lyre on one of a pair of altars dedicated to Apollo-Mithras, near the legionary fortress at Inveresk Park, East Lothian (Fig. 12.107a) (Hunter *et al.* 2016, 137–9). Dating from the late 1st or early 2nd century AD, the execution presents a reassuringly provincial quality. Perhaps the most credibly detailed specimen, however, adorns a fine sandstone statue of Apollo from Hochscheid in the Rhineland, towards the end of the 2nd century AD (Rheinisches Landesmuseum, Trier, Inv. 1939, 150). Its bridge is clearly visible, and its form corresponds closely to those shown in 8th century insular manuscripts (Fig. 12.107b–c) (Lawson 1981b). The player's clumsy posture again lends it an unaffected quality. Could this portray a native Iron Age type?

Strictly vernacular images are harder to interpret, being sparse and rarely unambiguous. Fraser Hunter senses lyre-like shapes in native sculptures from Carrawburgh, Northumberland and Whitley Castle, Cumbria (Hunter *et al.* 2016, 153–4, fig. 26; pers. comm.), while Vincent Megaw suggests the existence, or at least knowledge, of lyres in the late Iron Age via Gaulish and British coins and Late Urnfield art and its successors in Central Europe (Megaw 1968a, 351–2, fig. 77; see also Seewald 1934; 1960; Behn 1954;). His most vivid Continental example is the Certosa di Bologna situla, northern Italy (Megaw 1968a, pl. xivb; see also Behn 1954, 128, pl. 79, fig. 161; Lucke and Frey 1962, no. 4, pls 16–20; Eibner 2011, fig. 33; Lochner 2011, 14–16), and the similar but unprovenanced Providence, Rhode Island, situla (Lucke and Frey 1962, no. 4, pls 16–20). Another is a bronze repoussé bucket from the Hallstatt C tumulus, the Kröll-Schmiedkogel, at Kleinklein, Steiermark, Austria (Schmid 1933, 253–4, fig. 45; Behn 1954, 12–13, pl. 5, fig. 11; Seewald 1960, 161, unnumbered fig., no. 5; Megaw 1968a, fig. 77.3; Reichenberger 1985; Lochner 2011, 11, fig. 4). Six can be tentatively identified on ceramic urns from the Sopron-Burgstall Hallstatt C cemetery, Hungary (Sándor

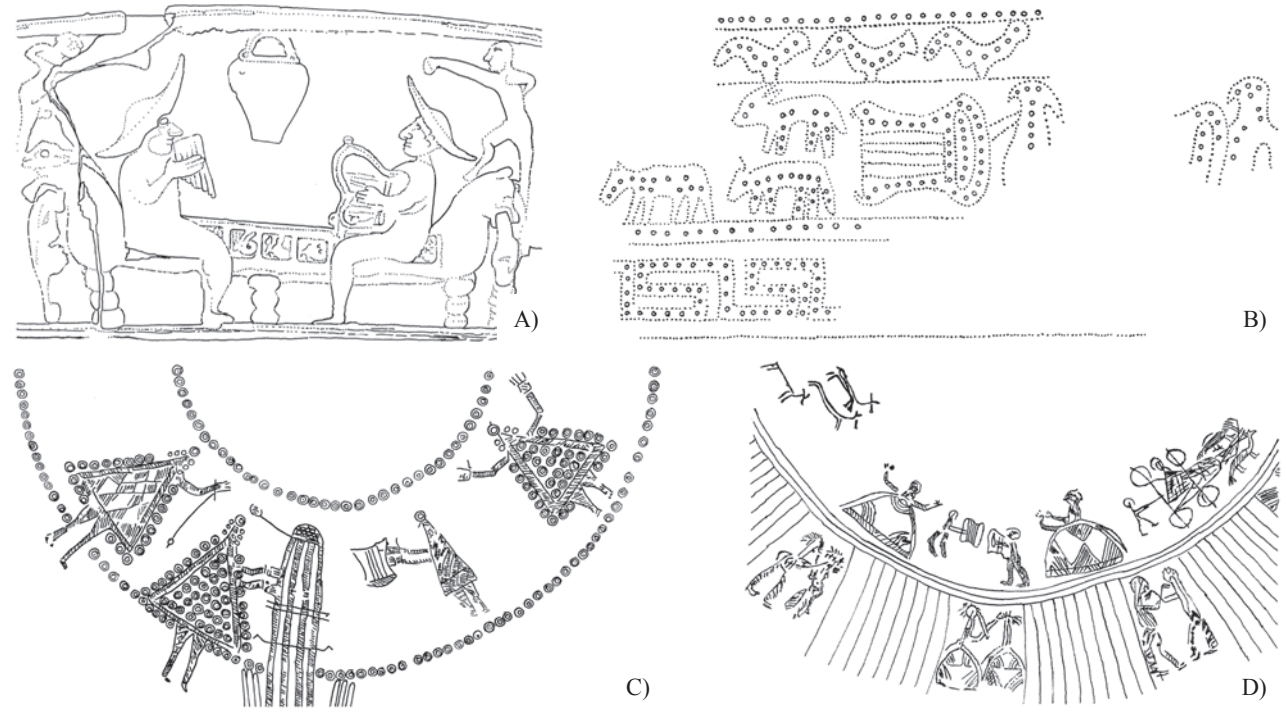


Figure 12.108. Lyres & lyre-like elements in Hallstatt ceramic & situla art of the 7th–5th centuries BC: A. rejoined bronze repoussé fragments of the Certosa di Bologna situla, showing musicians on a couch with lyre & panpipes. Northern Italy, 5th century (drawing: G Lawson); B. fragments of a bronze situla from Kleinklein, Steiermark, with punched decoration showing two figures with ?lyres, & animals. Austria, 7th century (after Schmid 1933, fig. 45); C. pottery urn from Sopron-Burgstall, with scratched & stamped design containing figures engaged in ?textile production, a ?lyre player & a ?dancer. Western Hungary, 7th century (after Frey 2011, fig. 9.14); D. second urn from Sopron-Burgstall (Mound 28), sgraffito design showing two ?lyre players, two ?dancers, a wagon, & figures engaged in hunting & ?fighting. 7th century (after Eibner 2011, fig. 32). Drawings not to scale

1934, 39, 41, pls iii.7, vi.3, vii.1, xiv.1; Behn 1954, 12–13, Taf. 5, Abb. 10 (Sopron, location unattributed); Seewald 1960, 161, unnumbered fig., nos 1–4; Piggott 1965, 181, 199, fig. iii; Megaw 1968a, fig. 77.2 (Sopron-Burgstall mound 27); Frey 2011, fig. 9.14; Eibner 2011, 31, fig. 32; also 1980; 1987; 1994). Pre-Roman coins populate certain gaps in this patchwork, including in Megaw's treatment specimens from southeast England and five from the Continent (Megaw 1968a, 352 n. 156, fig. 76.2; 1968b, 132). But excepting the Certosa and Providence lyres and coins with designs based on Roman prototypes, all identifications remain open to interpretation (Fig. 12.108a–d) (Lawson 2019b).

Along Europe's Atlantic seaboard, the evidence improves. Nine Late Bronze Age stelae from southern Portugal and southwestern Spain show convincing lyre images, some skilfully executed (Fig. 12.109a–c) (Celestino Pérez 2001; Celestino Pérez and Salgado Carmona 2009; Jiménez Pasalodos 2012; 2015). Like the Late Celtic lyres they exhibit elements of bilateral symmetry. One is associated with 8–7th century BC cremated remains. A fine example embellishes a La Tène statue of *c*. 170 BC from St-Symphorien-en-Paule, Brittany Fig. 12.110a; Ménez and Arramand 1997; Ménez 1999; Megaw and Megaw 2001, 153, fig. 239). The figure is unquestionably Celtic, the instrument unquestionably a lyre, with a well-defined sound box, arms, and yoke. (Annexes A and B, site archive). This too clearly evidences a knowledge of lyre-like forms in the Atlantic West which is difficult to deny. But if such lyres really did exist amongst the Barbarians, where are the finds?

12.11.5 The artefactual background

For specialists in the archaeology of music the answer is, simply: chance, and the vagaries of taphonomic processes: the Iron Age is rich in musical instruments of other sorts. The finds record attests to intense investment in music technologies, with more resilient products amply represented in metal. From the Late Bronze Age, Northern and Western Europe matched the Mediterranean world in manufacture of metal horns and trumpets, British Isles examples clearly enjoying elite status (Holmes 1987; 2008; 2013; 2015; Holmes and Stanbury 1987; Cross 1999; O'Dwyer 2004; Lawson 2020). There is no reason to suppose that lyres and other less robust instruments were not also prominent – and prestigious – contributors to Iron Age musics at the highest cultural levels. The likely extreme antiquity of wooden instruments is exemplified by the long wooden pipes preserved in an anaerobic deposit at Charlesland, Co. Wicklow (Holmes

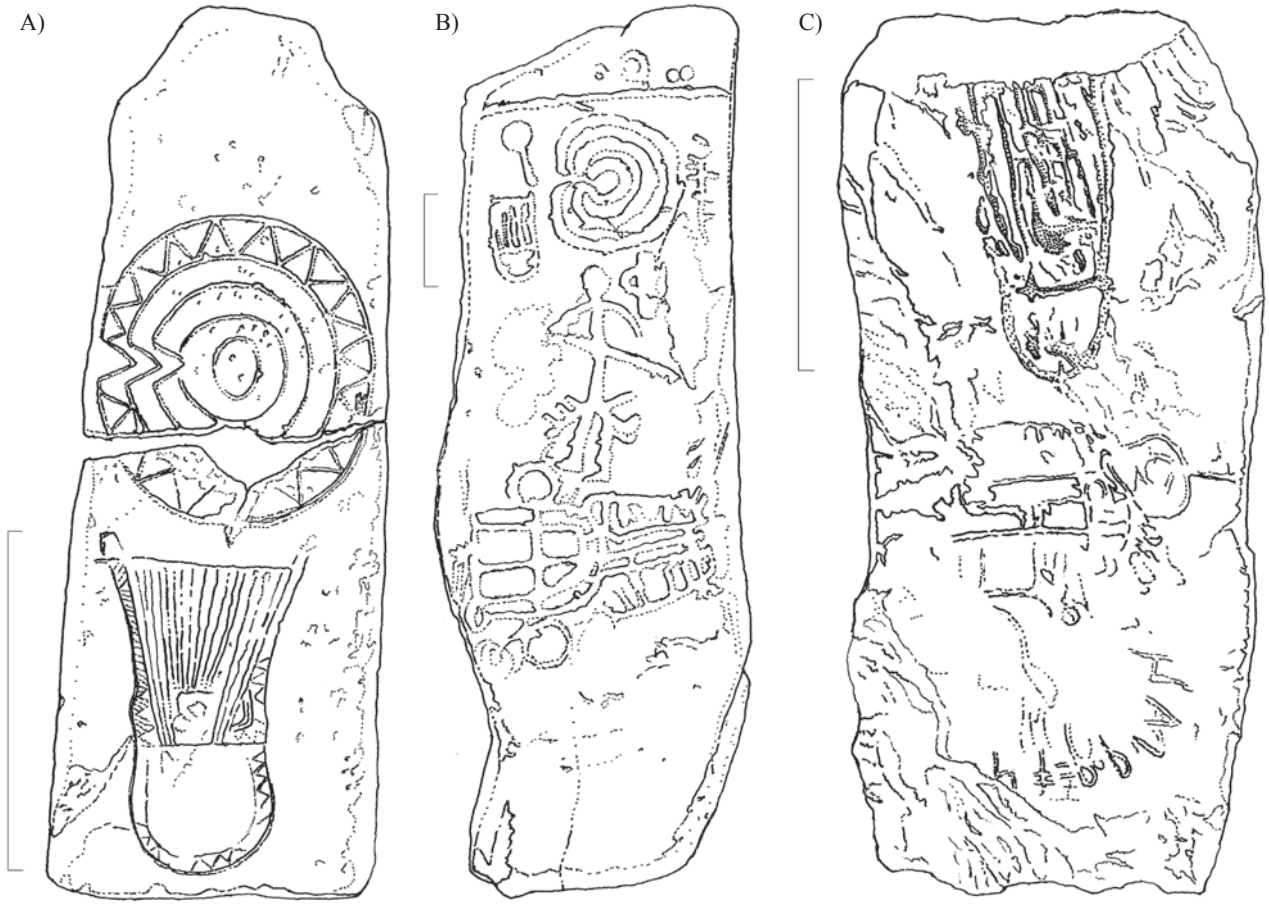


Figure 12.109. Lyres & lyre-like motifs in Iberian rock art of the Late Bronze or Early Iron Age, in context: A. stone stela from Luna, Zaragoza, Spain; B. stela from Zarza Capilla I, Badajoz, Spain; C. stela from Capote, Badajoz, Spain (drawings: G Lawson, from photographs in Jiménez Pasalodos 2012, figs 5, 1, & 4 respectively)

and Molloy 2006): where there are wooden pipes, wooden stringed instruments surely cannot be far to seek. They are already widespread at the end of the Roman Iron Age, where wooden elements, now benefitting from deliberate burial in cemeteries, are sometimes preserved whole: by waterlogging, or as fragments mineralised through corrosion of copper and iron fitments.

The first remains were recovered in 1846, and a complete specimen in 1892 (Fig. 12.110b) from a waterlogged post-Roman cemetery at Oberflacht, south Germany (Paulsen 1992; Schiek 1992). Numerous examples, in varying states of preservation, have since followed, both via excavation and systematic searches of curated finds – such as the fragmentary Sutton Hoo (Suffolk) lyre, excavated in 1939 (Bruce-Mitford and Bruce-Mitford 1970; 1983). A complete waterlogged lyre emerged during 2001–2 from grave 58 at Trossingen, northwest of Oberflacht (Fig. 12.111a). Deposited in the autumn of AD 580 (Theune-Großkopf 2008, 218; 2010, 2–3), its form compares closely with the fragments and dark silhouette found at Prittlewell, Essex, in 2003, believed to date from *c*. AD 600–620 (Lawson 2019c). Still others await publication. Today we know more about lyres of the post-Roman Iron Age than we do of almost any other ancient musical instrument. It is true that as grave finds they occupy a narrow temporal range (*c*. AD 500–700), but it is also clear that their tradition persisted: a bridge of antler from an urban context at Birka (Björkö), Sweden, dates from the 9th century (Lawson 1981a, 202–3; Bruce-Mitford and Bruce-Mitford 1983, 693–4; appendix A no. 9, pl. 22 A; Lund 1984, 23), while part of a wooden lyre yoke was identified amongst wooden objects of the 10th and 11th centuries from waterlogged ground at Hedeby (Haithabu) near Schleswig in North Germany (Lawson 1984). Their form changes little. The wooden bridge from 10th century York exhibits all essential features of the type: the smallness, the flat feet, the straight upper ridge with its compact row of evenly spaced notches. Although most have six notches, Birka and Trossingen have seven, lending Trossingen an especially close resemblance to the form seen at High Pasture Cave. Together these represent a tightly defined continuity of musical technique within a robust and geographically widespread tradition. Moreover, the first examples of the 5th century AD are already fully developed, clearly the outcome of some ancient evolutionary process. But

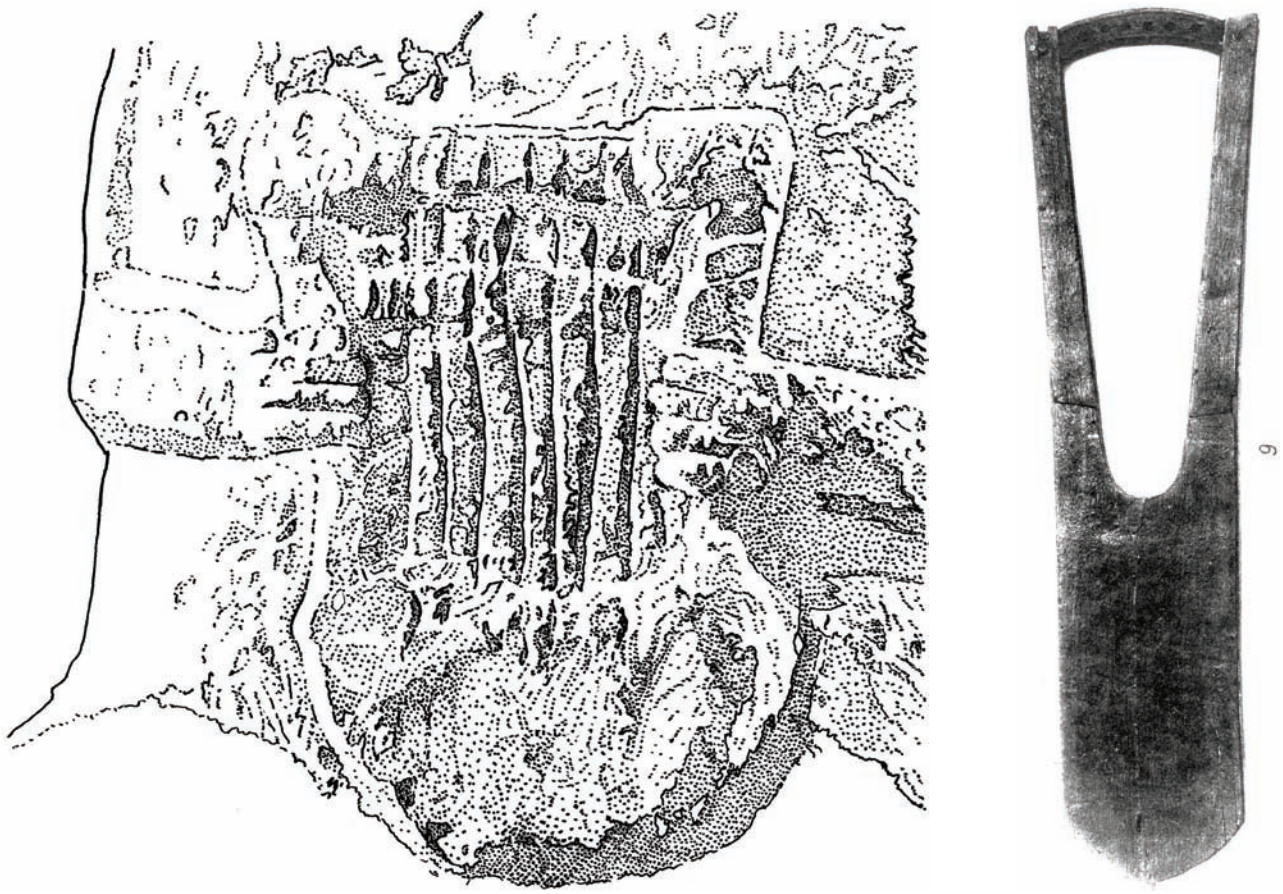


Figure 12.110 Lyres in Later Iron Age & Roman art: left. St-Symphorien-en-Paule, Côtes d'Armor (Brittany), France. Male figure with torc around neck, holding a lyre. Stone, 2nd century BC (drawing: G Lawson.); right. the lyre from Oberflacht grave 84, Baden-Württemberg, Germany. L. 81 cm. 6th century AD, preserved by waterlogging (from Veeck 1931, pl. 4 B, no. 9)

how ancient, and from where? A presumed origin outside the region was firmly contradicted by a piece of lyre of the 1st century AD – another yoke – found in 1983 at Bremen-Habenhausen, northwest Germany (Bischop 2002a; 2002b). Although at least 400 years earlier, its form compares: jointed at each end and perforated for six tuning pegs (Fig. 12.112). Whilst the tradition may well have parallels in Southern and Eastern Europe, it is clearly indigenous.

Habenhausen only heightens frustration at the continuing absence of earlier archaeological evidence – and archaeologists' determination to seek remedy. From among finds of worked bone and antler from Dinorben Iron Age hillfort near Abergele, North Wales (Gardner and Savory 1964, 169–70, fig. 26.3, pl. xxxiv b 2; Megaw 1968a, 351–2, fig. 76.3), and subsequently from the Roman Iron Age coastal stronghold of Dùn an Fheurain, Argyll, Vincent Megaw brought together three artefacts, suspected of being strengthening plates from the tops of lyres, similar to a fragmentary pair from an élite 5th century grave at Abingdon, Oxfordshire (Saxton Road, Abingdon, grave B42; Leeds and Harden 1936, especially 38–9, pl. ix; Bruce-Mitford and Bruce-Mitford 1970; 1983, 716–8, fig. 522). Each shared features with Abingdon: polished and lightly rounded on one face, the whole object describing a gentle curve, each bearing a single row of perforations which might be the mouths of sockets for rotating tuning pegs (Fig. 12.113a–c; Megaw 1968a; 1968b; 1974, 106–7; Ritchie 1974, fig. 4, 31–2, pl. 17 a, 105). Their slightly uneven surfaces and irregular placement of the holes contrasts with Abingdon's finer engineering but this may simply indicate a more primitive or commonplace kind of lyre: not all ancient lyres need have been kingly or elite, even when found in elite milieux. Today, re-examination of the finds and their documentation leaves such claims exposed. No supporting evidence was found at either site. Parallels are difficult to identify which are not equally attributable to entirely different functions. At Dinorben, musical identification rested largely upon the presence of putative peg holes, but they lack the smooth cylindrical bores of the kind preserved at Abingdon: an adaptation essential to their use as friction-braked journal bearings. In our own microscopic re-examination of their bores, neither Dùn an Fheurain piece was found to exhibit the necessary patterns of wear (Fig. 12.113b). (For friction wear on medieval bone tuning pegs see Lawson and McLaren 2017)

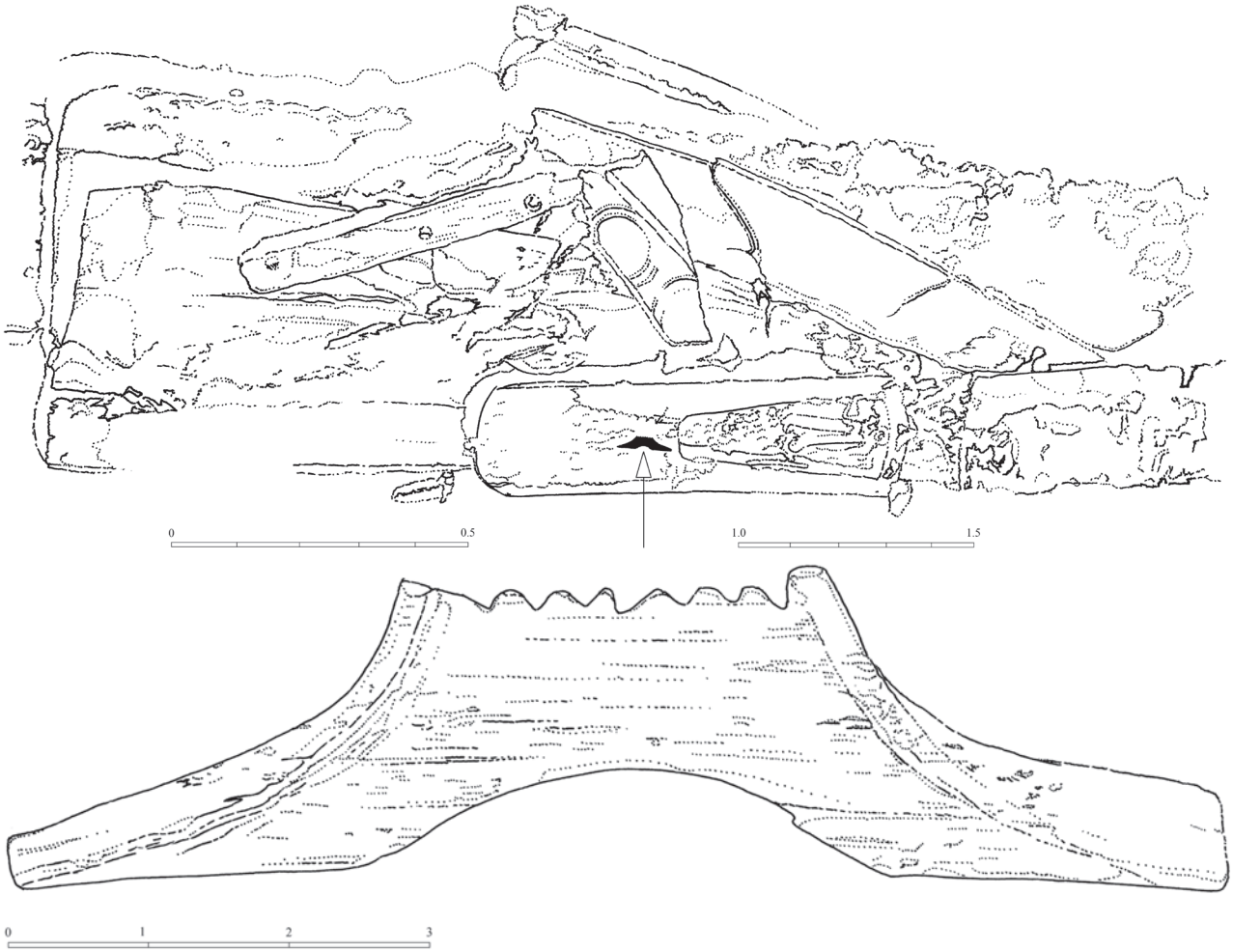


Figure 12.111 Top: the lyre from Trossingen grave 58 in situ. Oblique overview of grave contents before conservation, with bridge (hidden beneath clay deposit) shown as subsequently revealed. Baden-Württemberg, Germany, 6th–7th century AD. (scale in metres; drawing: G Lawson, based on published photographs & grave plan including Theune-Grosskopf 2006, fig. 7; 2010, 17); bottom: the Trossingen lyre bridge, detail (scale in cm; drawing: G. Lawson, based on published photograph in Theune-Grosskopf 2004, 9)

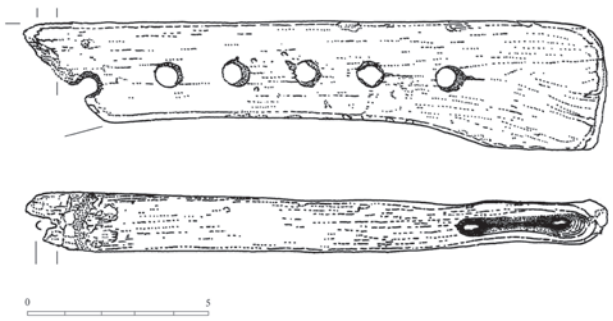


Figure 12.112. Detached lyre yoke from northern Germany, preserved by waterlogging. Bremen-Habenhausen, Niedersachsen, 1st century AD. Alder (Alnus sp.) (scale in cm; drawing: G. Lawson, after G. Kruse in Bischop 2002a, fig. 2).

Several explanations for the void present themselves. Changes in funerary practice are perhaps the most obvious: the profusion of post-Roman finds is undoubtedly attributable to fashion in grave furnishing as well as to the increasing practice of cemetery inhumation in a way not seen in north and west Britain. Taphonomy is another, with humid aerobic soils subjecting Iron Age finds to sometimes intensive degradation. The circumstances which enabled the survival of the High Pasture find are very unusual. And yet, it is to such circumstances that we owe so many musical survivals, worldwide. Whilst carbonisation is inherently unlikely to preserve, requiring timely quenching or an entirely anaerobic environment such as required for charcoal-making, such circumstances

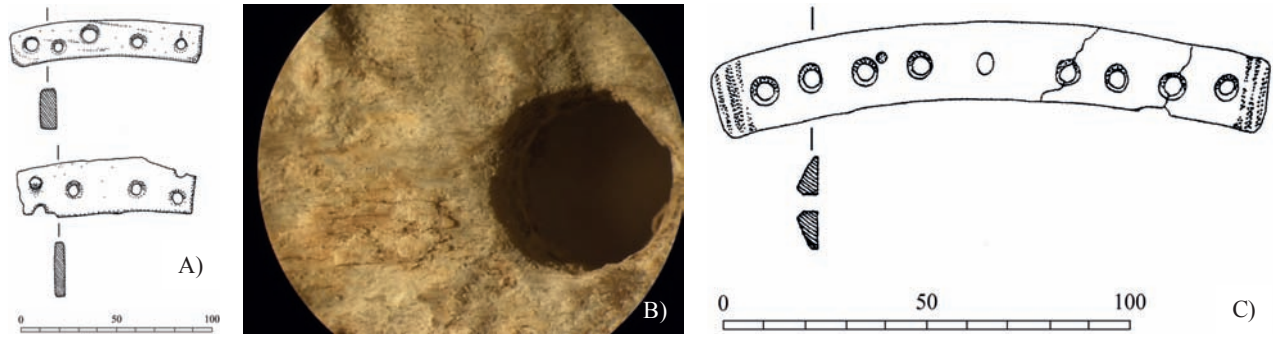


Figure 12.113. Insular Iron Age comparanda: A. antler mounts from Dùn an Fheurain (Gallanach), Argyll & Bute. 2nd century AD (scale in mm; drawings: G. Lawson, after Lawson 1981a, fig. 9.10 a); B. detail showing perforation on Dùn an Fheurain mount (micrograph: G. Lawson); C. antler mount from Dinorben, Clwyd, Wales. 3rd century BC (scale in mm; drawing: G. Lawson, after Lawson 1981a, fig. 9.9 b)

do occur accidentally. Excavation of the remains of a replica wooden building at West Stow, after it burned down, showed how the wood of pencils lost by visiting schoolchildren survived intense heat when buried in accumulated sand beneath a gapped timber floor (Tipper 2012, 53–62, fig. 3.11). An unpublished carbonised oak object from the Worlebury Iron Age hillfort, Somerset, may be another lyre fragment (Fig. 12.114; Lawson 1981a, 200–1, appendix A no. 5, fig. 9.11a). During the present study, exceptional circumstances delivered a potential parallel from Oakbank crannog, Loch Tay: an equally small, delicate, notched wooden object of similar date. Preserved by waterlogging, the shaping and precise spacing of the notches correspond closely to those seen at High Pasture Cave. Interpretive outcomes for these two objects are intertwined, even if we do not yet understand exactly how.

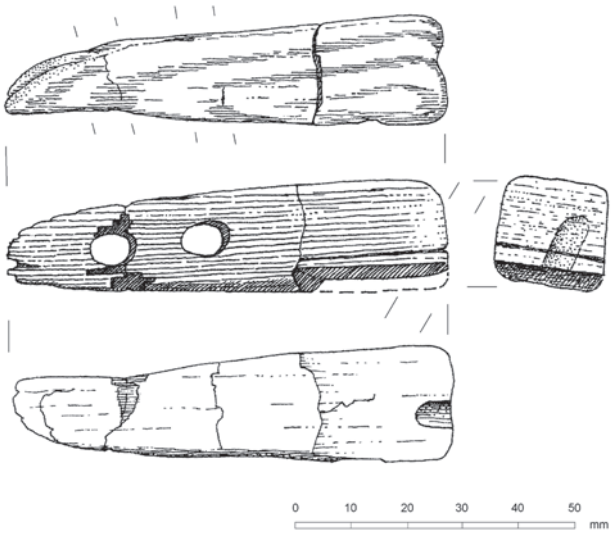


Figure 12.114. Insular Iron Age comparanda: carbonised wooden object from a pit within the hill fort at Worlebury Hill, North Somerset. Ash (Fraxinus sp.). Probably 1st century BC (drawing: G. Lawson, after Lawson 1981a, fig 9.11 a)

12.11.6 Conclusions

Taking a broad diachronic perspective we have no difficulty in identifying F15.358 as a bridge for a musical instrument, and for musicologists its early date should come as no great surprise. It is merely the first time that we have seen an example from the Early Iron Age. The surprise is rather in its location, on Europe's 'far' Atlantic margin, for those accustomed to thinking of Greece and Rome as the centre of early European culture. But what kinds of instrument should we imagine it to represent? For now, we are dependent on Continental, and even Mediterranean, parallels with glimpsed images from the European Iron Age. A good deal known about contemporaneous instruments from Greece and Italy, diverse in shapes and sizes (*e.g.* Fleischhauer 1964; Wegner 1970; Roberts 1981; Bélis 1985; Maas and Snyder 1989). Dare we interpret High Pasture Cave in similar terms?

All pictorial parallels, including Greek and Etruscan images, are broadly consistent both with the craft skills evidenced in Context 2.15 at the High Pasture Cave complex and with the bridge's form, especially its symmetry. It is surely meant for a lyre. But what kind? Helpful indications are preserved in the four subtle variations distinguishing its design from other bridge finds: the tilting posture, the angled notches, the small hole through the leg, and the subtly convex shape of the sole of the foot. These anomalies clearly represent functional specialisation, and thus invite practical experiment.

An account of our experimental aims and method is within the site archive. Several identical bridges in native oak were prepared, and a series of generalised lyre-like test rigs with flat, birch laminate sound boards were built. Across each rig, a flat array of seven gut strings converged towards one end. When tensioned and the bridge inserted there was an immediate consequence: when placed at the centre of the sound board in the post-Roman manner, the bridge collapsed when played vigorously. The strings sat uncomfortably in their notches: making contact only at one edge: a weakening (as well as pointless) arrangement. The bridge's

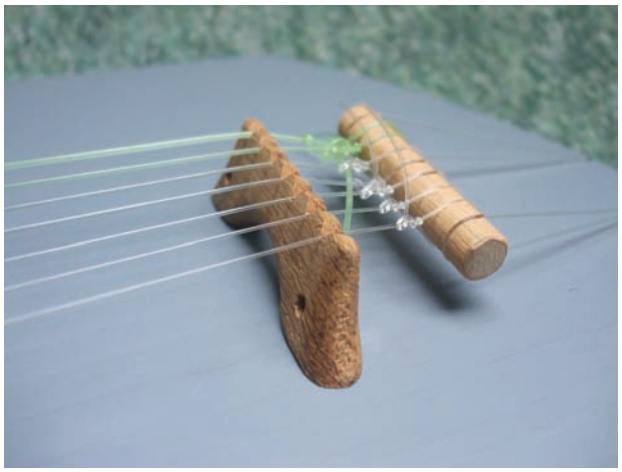


Figure 12.115 Replica of the bridge positioned low on the sound board of a generalised wooden lyre (replica & photograph G Lawson)

geometry was clearly not adapted to such a position. But moved closer to the end of the strings, it proved more stable (Fig. 12.115). The strings were now comfortably cradled within the notches, with similar angles of entry and exit. The resulting sound was not especially satisfying to a modern Western ear: thin, harsh, somewhat like a banjo or the rim tone of a drum. This did not explain the perforation; but was clearly compatible with the sound boards of some of the all-wooden lyres of Ancient Greece, including the large instrument which organologists call *kithara*. *Kitharas* in 6th–5th century BC pottery paintings show the bridges similarly positioned, near the ends of the strings (Fig. 12.116; Lawson 1974, nos 47, 50). But the closest match was to a replica tortoise-shell lyre, or 'lyra', so far, the only Greek type to benefit from actual remains. These typically have wooden arms and a tortoise carapace sound box. Known also from Etruscan tomb-paintings, they are perhaps the quintessential

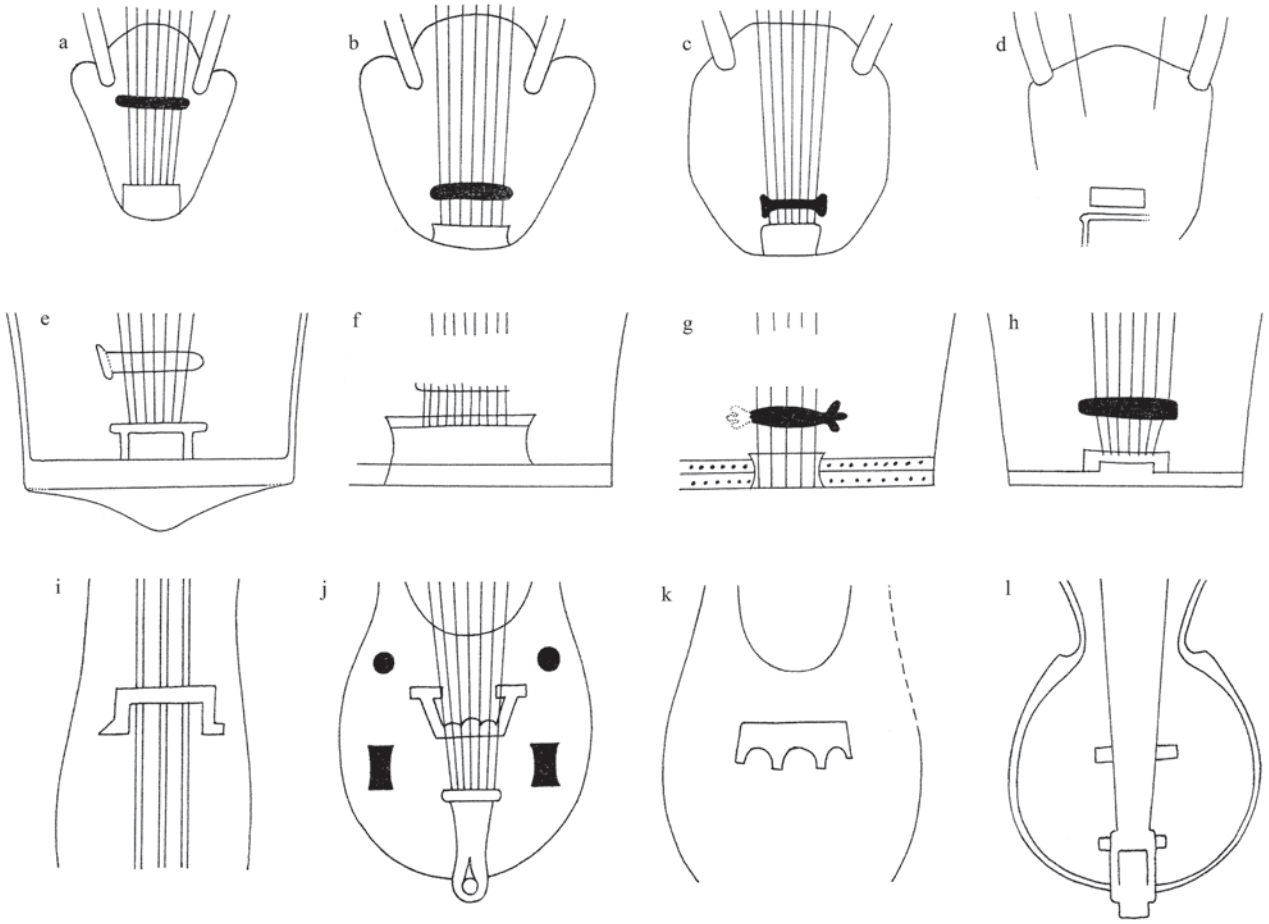


Figure 12.116 Attempts at representing shapes & locations of lyre bridges in ancient art: a–d: on tortoise-shell lyres in Greek red figure pottery paintings (a–c) & (d) in Hellenistic sculpture (after Lawson 1981, fig. 6.7 a–d); e–h: on wooden bodied lyres in Greek red-figure pottery paintings (after Lawson 1981a, fig. 6.11 a–d); i–l: on lyres in early medieval art; i–j: manuscript miniatures; k: wall-painting; l: wood carving (after Lawson 1981a, fig. 6.49 b–e)



Figure 12.117. Left: replica of the bridge positioned on the parchment membrane of a bowl-bodied lyre, in this case a reconstruction of the remains of a tortoise-shell instrument in the British Museum: the so-called Elgin lyre, c. 5th century BC; right: replica of the bridge demonstrating the aptness of the hole for the insertion of a retaining cord, to counteract slippage (replica & photographs: G. Lawson)

Ancient Greek instrument: here too the bridge is close to the string-ends.

The tortoise lyre also has a curious geometry: the wooden sound board was replaced by a skin membrane, stretched like a drum skin over the rim of the shell, the arms entering the shell at an angle. Unlike the strings of later lyres, 'lyra' strings do not lie parallel to the membrane but at an angle (for a rare side view: Lawson 1981a, figs 5.21 b and 6.23; Brussels, Musées Royaux d'Art et d'Histoire de Bruxelles, inv. no. A1020). When we inserted the bridge into this angle, we found it an almost perfect fit (Fig. 12.117a). At the notches the entry and exit angles of the strings were equal. If this was not remarkable enough, when the membrane deformed under compression, the slight convexity of the bridge's sole accommodated the deformation. This seemed suggestive. When the strings were strummed, friction was still insufficient to hold the bridge in place: it needed to be secured. The means immediately presented itself. Figure 12.117b shows the bridge independently suspended from the base of the instrument by a cord, making effective use of the otherwise enigmatic perforation.

Could the High Pasture bridge have belonged to such a lyre? Careful survey of the finds produced no supporting evidence. A fragment of human cranium bears no trace of adaptation or use; a rim fragment from a copper alloy vessel with repoussé decoration might be suspected (a Roman instrument with a copper sheet sound box is reported from Kerch, Crimea: Lawson 2008, 182–5), but its context is remote from that of the bridge.

We should not of course imagine that an ancient Greek lyre somehow found its way to Skye in the 6th–5th century BC, still less an ancient Greek musician. There are shared traits, and for now that is almost all that can be said: the intervening distances of space and time are too vast and empty. Of other bridges our closest in date and appearance is Trossingen in 6th century AD Germany, some 900 years later. Of other wooden lyre fragments, the nearest is Bremen-Habenhausen, still some 400 years in the future. Examples of tortoise shells with perforations and iron fitments are identified from 5th–4th century BC graves, but these are more than 2000 km away, in Greece and southern Italy (Psaroudakēs 2006, 61; Castaldo 2008). Yet the bridge's form clearly implies some broader connexion, with simply too many points of similarity for it to be unrelated, betraying a shared familiarity not only with lyres but also practical elements of instrument design and, presumably, musical practice. So the question arises: why Skye?

In contemplating the theoretical implications of such continuity, previous hierarchical, Romano- and Graeco-centric models of Iron Age music may draw us outside the Northern or Atlantic regions to some more 'civilised' source. But despite its prime socio-cultural influence and the wealth of its archaeological records, to the prehistorian, Greek culture is only a small window on a wider world, and our continuing sense of the tributary character of that world merely perpetuates the prejudices of Greek and Roman writers (for Greek views of Barbarian music see Rocconi 2019; for Roman attitudes to Barbarian musics see Vendries 2019). Our evidence for at least one other family of Late Bronze/Early Iron Age musical instruments – metal horns and trumpets – sees the Baltic Sea, Irish Sea, and North Sea regions outshine the Aegean in both technical investment and intellectual achievement (Holmes 1987; 2008; 2013; 2015; Holmes and Stanbury 1987; O'Dwyer 2004; Lawson 2019c; for music's importance to human origins: Cross 1999). Rather we need to think in terms of continuums: at one theoretical extreme we might imagine Early Iron Age musical knowledge as a matrix of loosely woven strands

Table 12.91 Summary of whole assemblage, by material & group

Material	*Group*							*Total*
	Personal ornament	*Tool*	*Weapon*	*Fitting*	*Food/ drink*	*Craft debris & roughouts*	*Other*	
Coarse stone	8	292	–	–	93	14	18	425
Bone, antler, tooth	13	121	3	24	–	95	–	256
Ceramic	–	–	–	–	379	–	–	379
Iron	10	13	5	10	–	1	15	54
Copper alloy	4	–	–	11	–	2	5	22
Glass	8	–	–	–	–	–	–	8
Shale	5	–	–	–	–	5	–	10
Lithics	–	19	2	–	–	5	52	78
Wood	–	–	–	1	1	–	10	12
Metalworking debris	–	–	–	–	–	193	–	193
Total	48	445	10	46	437	315	100	1437

Unfinished objects, *e.g.* pins or whorls, are included in craft debris. Ceramic & wood numbers represent the minimum number of objects (total sherds 673 & total worked wood frags 90), therefore total number of individual artefacts is *c.* 1700. Lithic 'chips' are not included since they are not certainly artefacts. Metalworking debris number represents number of bags rather than fragments (since it is not possible to count *e.g.* hammerscale in this way)

criss-crossing Europe (including the Mediterranean), glimpsed in the archaeological record as chance permits; at the other, we might imagine isolated local and regional musical traditions, lacking living connexion but related by ancient, shared lineages. Such choices affect more than just ancient music within our incomplete archaeological record. The cosmologist's notions of Dark Matter and Dark Energy are as applicable to theories of music as to any other archaeological endeavour.

The find's implication for Classical archaeology is somewhat different. From a Mediterranean/Aegean perspective and after so many years of music-archaeological research, it is of concern to many to have found not a single lyre bridge from the Hellenic world, and especially regrettable considering the benefit that early medieval bridges have been to understanding of later lyres and lyre techniques. Now, thanks to High Pasture Cave, it seems that those early medieval finds may no longer be quite so irrelevant to earlier experience as previously supposed; and by the same token the cultural significance of the High Pasture bridge may extend far beyond Iron Age Scotland: archaeology demonstrates that there is still such a thing as *Zeitgeist* in the ancient world just as today. Trade, exchange, and networks of goods and materials begat networks of ideas and communities of practice. Tangible proofs of the scale of such networks are preserved both in the distributions of traded materials and in relics of the infrastructures that underpin them by land and sea. We know that northern and Mediterranean traders alike plied the oceans in search of wealth, and thus knowledge as well as things travelled fast and far in many directions. During the 6th or 5th century BC, Early Iron Age people on Skye strummed their lyres under the same sun that shone on Sappho and Pythagoras, Socrates, and Pindar. We may consider the High Pasture bridge our first evidence of a vigorous native tradition, but it should be of no less interest to the Classicist.

12.11.7 Postscript: an acoustical and musical overview

Although the preceding is written primarily as a find report, the bridge cannot be discussed in isolation from the rest of the assemblage, the site, and its ancient landscape. Viewed thus, a certain sensory quality emerges, not only amongst the activities represented, but also in the site's architecture, especially its unique underground feature. These make High Pasture Cave of especial relevance to archaeologies of the senses, not least in the controversial matter of archaeoacoustics. For the archaeoacoustician struggling to promote acoustic interpretations of hitherto neglected auditory phenomena, High Pasture Cave and its environs now join a small but growing band of sites whose acoustical interpretation benefits from clear physical evidence of music-making. The issues raised, touched upon elsewhere in this volume, are further explored in Annexes A and B, site archive.

12.12 Artefact discussion and wider context

Gemma Cruickshanks

12.12.1 Introduction

A large assemblage of over 1700 artefacts was recovered from High Pasture Cave (summarised in Table 12.91). While the material specific reports focus on the details of particular types of artefacts, broader themes such as resource

exploitation, structured deposition and site function require the various materials to be brought together for discussion.

Almost all the materials available in later prehistoric Scotland are present here, including rarely preserved organic objects such as the wooden lyre bridge. Along with the lyre bridge, decorated fragments of La Tène metalwork, an intricate spiral glass bead, decorated bone comb fragments, and a Roman bronze coin are all stand-out finds which suggest well connected people were using this site. These finds are a minority, though. Large quantities of everyday cobble tools, bone points, pottery sherds, and craft debris dominate and should form the basis for our understanding of what people were doing here and how this changed over time.

12.12.2 Artefact groups and functions

The assemblage can be divided into broad functional categories which provide a useful starting point for understanding who used this site and what they were doing there.

Tools

A large proportion of the finds (over 450) can be classified as tools, mainly cobble tools and bone points; ubiquitous but poorly understood later prehistoric artefacts. Amongst these basic multifunctional tools are more specialist items, such as an unusual, angled iron knife (SF2.193), an iron socketed adze (SF13.001), and groups of antler points with distinct wear on their tips (see Fig. 12.77a–b, above). Some tools, such as spindle whorls or hide rubbers, are an excellent form of proxy evidence for organic crafts, the products of which rarely survive. The evidence for various crafts is abundant here, including craft debris as well as tools, and is discussed in more detail below.

The frustrations of understanding the functions of cobble tools and bone points are discussed in their respective reports. While many may have had a craft function, other uses are likely, particularly food preparation. The large number of querns recovered along with the faunal and botanical assemblages indicate food and feasting were particularly significant here, making it likely many of these basic tools had a food-preparation role.

Weaponry

Weaponry is generally rare on later prehistoric sites, usually only surviving in special contexts such as hoards, burials, or structured deposits on settlements. The assemblage from High Pasture Cave is relatively plentiful, though the numbers are still small. Seven weapons were recovered: five spearheads (three iron and two antler) and two iron daggers. They were recovered from Phases 3, 5, and 7, and all were recovered above ground but within the precinct and cave entrance zone (Trenches 2, 15, and 21).

As a group they illustrate the complexity of depositional habits at the site. Large spearhead SF21.02/03 was deliberately damaged or 'killed' prior to deposition, while dagger SF2.118 was not only intact but in a leather sheath when left. Rare evidence of decoration on spearhead socket SF15.344 and traces of sharpening and repair on daggers SF2.118 and SF15.318 add to the picture of valued objects.

The weaponry also reflects a wider regional pattern of weaponry deposition with iron daggers dominating (Cruickshanks 2017, 273; Hunter 2020, 140), and glimpses of local preferences such as the use of antler instead of bone for spearheads.

Personal ornaments

Some 44 objects can be classed as personal ornaments, comprising 20 pins in bone/ antler, iron, and copper alloy, ten glass and stone beads, and 11 fragments from shale, steatite, and copper alloy bangles. Other items include antler and stone pendants, an intricate double-linked chain, and a spiral ring. Personal ornaments were recovered from Phase 2–7, within the cave and on the surface, but numbers are too small to determine whether certain types or materials were preferentially deposited at different times.

The range of ornaments present is typical of later prehistoric Scotland, including classic Scottish types such as a projecting ring-headed pin (SF15.145) and a spiral decorated bead (SF19.022). Most of the pins, especially those in bone, are very simple forms, as is typical of the Late Bronze Age and earlier Iron Age.

Certain personal ornaments were deliberately broken before deposition, as seen with iron pin SF15.337 and copper alloy bangle SF2.457, which were broken up, but the pieces deposited together. Others, such as iron ring-headed pin SF6.91 and copper alloy spiral ring SF2.462, were intact, while others are represented only as fragments, *e.g.* steatite and shale bangles. In total, 15 of the 40 personal ornaments were found intact, two were broken with pieces deposited together, and 23 were fragments. Slightly more of the personal ornaments deposited in the cave were intact (40%) compared to 17% outside the cave. This could reflect either less movement and redeposition of cave contexts than non-cave contexts, or preferential deposition of intact objects within the cave.

Fittings

A range of small fittings in bone/antler, copper alloy and iron mainly comprise handles, strip mounts, and pegs, providing glimpses of what were once larger composite objects. Some unusual and rare elements to this group include a decorated La Tène mount (SF1.067) and a probable dagger handle fitting (SF6.254) made from a sperm whale tooth.

Craft debris

A large number of finds fall under this category, including iron slag, crucibles, bone, antler, and copper alloy offcuts. They add to the evidence for craft activities on site and are discussed further below.

Food preparation, storage, and consumption

A significant proportion of the assemblage comprises querns and pottery, grouped here as evidence of the preparation and storage of food and drink. Other stone tools may also have had a role in food processing but are less diagnostic, while a possible iron tankard handle adds to the evidence of consumption.

Residue analysis of sherds from ten vessels showed four (V122, V192, V313, V360–1) were used for heating meat based foods such as a broth or stew and six pots (V190, V197, V210, V284, V342, and V353) were used for processing milk products (see Section 13.2.11). Two of the vessels (V201 and V313) had layered adhering residues, suggesting multiple uses, but the residues could not be sampled individually. That all ten of the sampled vessels showed use for food preparation is a good indication that this was the dominant role for pottery (Table 12.92). There is no obvious chronological pattern to the preparation of milk or meat based foods, but the sample is small.

Table 12.92 Results of residue analysis on ceramic sherds

Vessel	*Ph*	*Block*	*Results*
V122	2a	25c	Meat
V190	6a	10	Milk
V192	6a	10	Meat
V197	6a	10	Milk
V210	6a	10	Milk
V284	1b	24	Milk
V313	2b	6	Meat
V342	7	11	Milk
V353	4a	21a	Milk
V360–1	3c	20	Meat

Other

Some functions are only represented by a few or single objects. The musical instrument bridge (see Section 12.11) is difficult to contextualise within the overall assemblage given the rarity of wood's survival unless waterlogged or burnt. Four small, smooth pebbles were interpreted as possible gaming pieces or amulets (see Section 12.3). Unambiguous evidence of gaming is rare in the pre-Roman Iron Age (Hall and Forsyth 2011, 1335), suggesting amulets may be a more plausible interpretation. In addition to the personal ornaments discussed above, a small group of objects comprising antler comb fragments (SF15.316 and SF17.016) and half a pair of copper alloy tweezers (SF15.82a) attest to personal grooming.

Artefact function: conclusions

The assemblage is overwhelmingly composed of basic tools and craft related debris along with objects relating to food preparation and consumption. Much smaller quantities of weapons, fittings, and personal ornaments are present. Figure 12.118 shows the main groups by phase, illustrating a broadly similar range of object functions over time. The large quantity of tools and craft debris show some changes within the group, which is discussed below.

12.12.3 Craft

Around half of the individual finds in this assemblage can be categorised as tools or craft debris, suggesting craft production at the site is worthy of closer scrutiny. On a typical domestic site, such as a roundhouse settlement or broch, such an abundance of craft debris and tools could comfortably be used to imply that craft production was a major part of that site's role. The unusual nature of High Pasture Cave and ample evidence for structured deposition leads us to question the craft evidence more closely. For example, do the spindle whorls, some part-made, indicate yarn production and whorl production at this site or the symbolic deposition of items which were used and made on nearby sites? In many cases it is simply not possible to know, but there are clues amongst some of the craft related artefacts which can start to piece together some of the activities which are likely to have been taking place here, and others less likely.

Range of crafts

Later prehistoric craft can be divided into two broad groups; inorganic crafts involving metal, glass, clay, and stone-working, and organic crafts comprising textiles, hides, wood, and osseous materials (Hunter 2015, 228). While the remains of organic crafts generally survive less well unless in special conditions (*e.g.* waterlogged or burnt), proxy evidence can provide a valuable insight. The inorganic crafts tend to involve high temperatures and a different range of specialist skills and knowledge than the 'cold' or organic crafts. This assemblage provides evidence of a range of organic and inorganic crafts. The various strands of evidence for each craft are outlined below.

Non-ferrous metalworking

Evidence here is sparse but reveals several different elements of the craft (see Section 12.8.6). Six crucible sherds (SFTP6.03, SF2.190, 2.355, 6.58, 14.03, and 15.013), one possible crucible stand (SF2.478), and two fragments of vitrified ceramic (SF11.011 and SF15.058) with non-ferrous residues provide evidence of non-ferrous metal casting. The crucibles were heavily used, in some cases to destruction. No moulds were recovered to reveal what artefact forms were being made but an unfinished pin (SF17.100) indicates one type. XRF analysis of crucibles and the unfinished pin indicates the casting of bronze or leaded bronze alloys. In addition to casting,

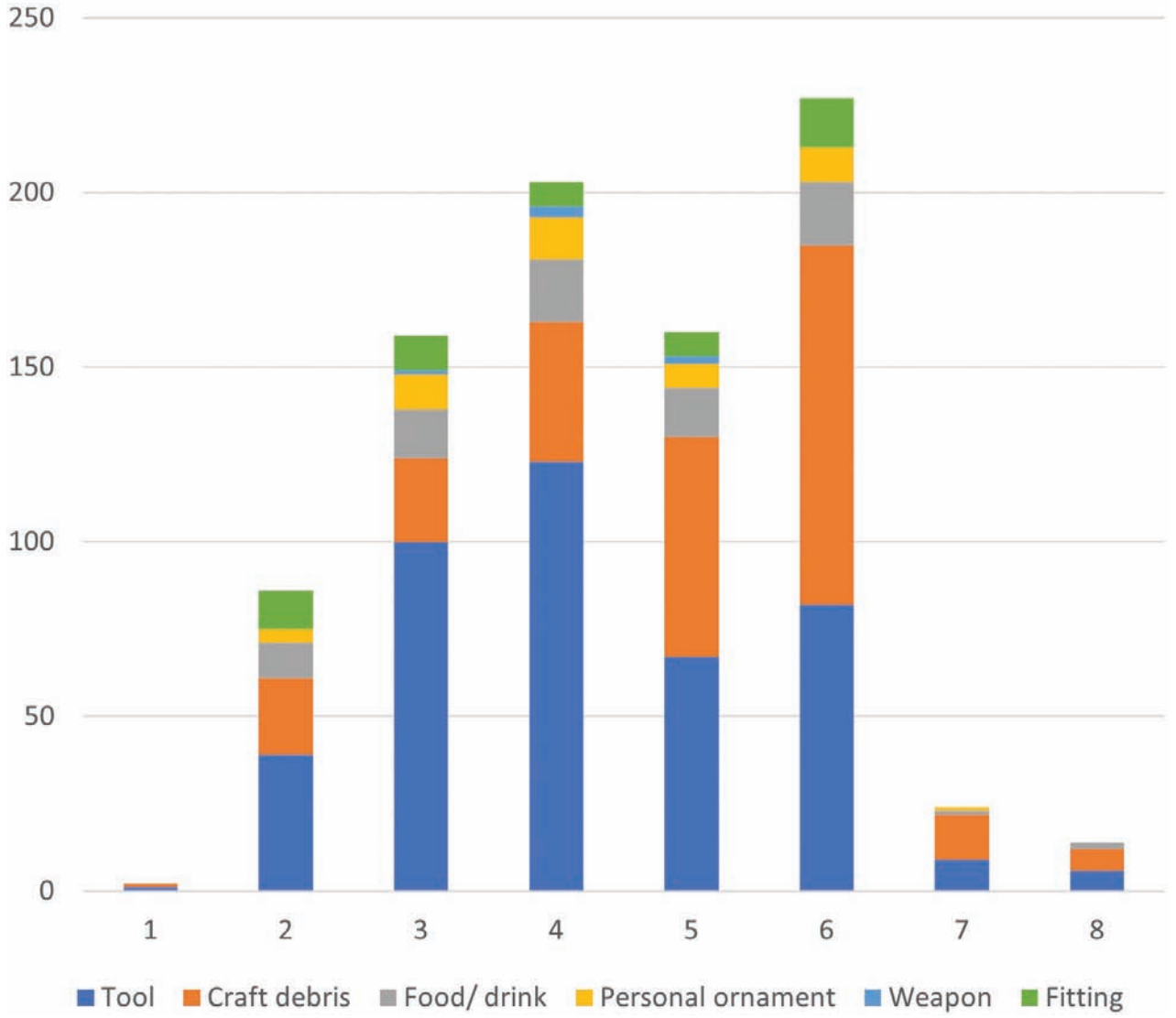


Figure 12.118. Main artefact groups by phase

stone burnishers (SF2.491, 19.039, and 19.055) and an offcut (SF17.079) are evidence of the working of sheet metal. Such evidence is rare; these scraps are usually only retrieved during careful soil sample processing. An iron tracer or small chisel (SF15.301) could have been used to decorate sheet metal.

The non-ferrous metalworking assemblage is small and spread through the site sequence. The crucibles may have been intensively used but the lack of other debris suggests that not all this use took place at High Pasture Cave. It presents a picture of sporadic and small-scale casting of objects including pins, and the working and decorating of sheet metal objects; the casting and sheetwork need not have been connected.

Ironworking

The whole ironworking process, from ore to artefact, is represented here and is discussed in detail in Section 12.8. While it seems likely blacksmithing took place at the site, as evidenced by hammerscale retrieved from some of the Trench 2 hearths, it is less clear where smelting took place. The large fragment of smelting furnace lining from Early Iron Age Phase 3/4 is one of the earliest examples of iron smelting yet known from Scotland, revealing the communities using High Pasture had access to a new and probably restricted craft. How far away the furnace was situated is unknown, but it was not within the excavated area, raising the possibility that the single chunk of furnace wall was deliberately deposited.

Ceramic

Ten fragments of a distinct type of facetted bone tool were possibly modelling tools for decorating pottery or shaping metalworking moulds and are the only potential evidence of ceramic crafting on site. There is no evidence within the pottery assemblage itself of on-site

manufacturing, but localised production seems to be typical throughout the Western Isles (Topping 1987, 82). Ceramic petrology however (see Section 12.2.10) suggests a diverse range of temper groups within the pottery assemblage from High Pasture, which may indicate different production centres.

Bone and antler

Osseous material was worked extensively, especially antler, with at least 75 fragments of working debris. Both shed antlers and those from dead animals had been used, indicating access to a network of resource gathering. Prepared beam segments and strips, along with tine offcuts dominate, indicating much of this 'debris' was yet to be used. This raises questions regarding the nature of its deposition, particularly since a large concentration of antler working material came from Phase 6 in the cave, perhaps as a token deposit. It also raises the question of the form in which the material was carried: primary offcuts are relatively less common than on other sites, suggesting some antlers may have been part-processed elsewhere. This would certainly make them more readily transportable for a population travelling to the cave.

Unfinished antler and bone objects indicate a range of items including handles, pegs, and pins/needles were being manufactured. Well preserved tool marks show the crafters' tool kits comprised a range of flat metal blades, including heavy chopping blades and sandstone or pumice to abrade, as well as rarer traces of saws in varying widths.

Hide Processing

Hide processing is illustrated by a range of stone, metal, bone/antler, and probably pumice artefacts. Some 49 cobble tools display staining consistent with use as a hide rubber, often along with a number of other wear types, indicating they were multifunctional tools. Bone rubbers and scrapers (SF6.212, 15.443, and 15.444) and fragments of pumice with flattened faces (*e.g.* SF2.30 and SF15.325) could have been used in the initial preparation of hides, to abrade remaining flesh or hair off and to rub in preservatives. Awls of iron (SF2.482 and SF15.136) and bone (*e.g.* SF2.450 and 2.50A) could have pierced hides to aid sewing or riveting. A fragmentary thong-stretcher (SFZone 4, NN) reveals the preparation of thongs from sinews or strips of hide. Traces of mineralised leather on some of the metal objects provide examples of what hides may have been used for, such as the scabbard on iron dagger SF2.118. Leather traces on the back of decorative copper alloy mount SF15.250/15.296 indicate the use of decorative leather items too.

Textiles production

The large assemblage of 25 bone and stone whorls and 15 bone or antler needles would have been essential tools

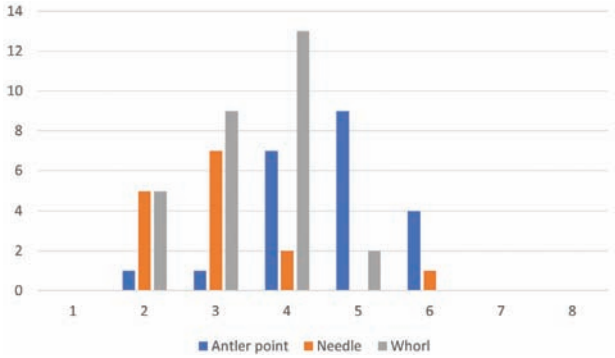


Figure 12.119. Broad phase distribution of textile tools

commonly employed on most sites for spinning fibres and sewing fabric. Many of the 22 antler points, some with circumferential tip wear, may be a local equivalent to long-handled combs, used in sets for textile working, perhaps for decorative embellishments such as braided borders (Tuohy 1999, 57–8). Both everyday and more elaborate areas of textile crafting are represented here. Several of the needles have been extensively used and some repaired, while two whorls are decorated, which is notably rare on early-middle Iron Age examples (SF2.132 and SF15.382). Four of the object caches discovered at the site comprise textile tools: two caches of whorls and two of antler points. The finer details and contexts of these seemingly basic tools therefore suggest they were of great significance to their owners. Both whorls and needles are also represented at all stages of their life-cycle, from roughouts through pristine examples to heavily used and reworked examples.

The overall chronological distribution of craft evidence is discussed below (Table 12.93 and Fig. 12.119) but a closer look at textile tools is useful. Figure 12.119 shows the basic textile tools, whorls, and needles are overwhelmingly concentrated in Early Iron Age Phases 2–4, while the more unusual antler points are marginally later in Phases 4 and 5. The presence of four caches of whorls and points indicates they were undisturbed, and this pattern is likely to be a reliable representation of when they were deposited; the risk of later disturbance is minimal.

Woodworking

An iron socketed axe (SF17.001), adze (SF17.001/1), and gouge (SF19.126) are all woodworking tools. Such valuable, intact objects are unlikely to have been discarded, suggesting they were deliberately deposited. Basic woodworking is likely to have been undertaken on most sites and the rare survival of burnt wooden objects here, such as a stave-built object and turned wooden bowl (see Section 12.10), illustrates some of the ways it may have been used.

Stone-working

Two unfinished coarse stone tools of schist and siltstone indicate the use of local stones, while five unfinished

Table 12.93 Craft-related objects by phase (tools without certain/ probable function are omitted)

Craft	*Objects*	*1b*	*2a*	*2b*	*2*	*3a*	*3b*	*3c*	*3d*	*3e*	*3*	*4a*	*4b*	*4c*	*4*	*5a*	*5b*	*5*	*6a*	*6b*	*7*	*8*	*Unstrat*
Non-ferrous metalworking	Crucibles, sheet metal offcuts, unfinished pin, burnishers	–	1	–	1	–	–	–	–	–	1	–	–	1	2	–	3	2	5	2	1	–	–
Ironworking	Smelting & smithing slag, part-consolidated bloom	1	1	3	–	3	–	1	–	–	–	2	–	6	4	3	5	36	19	17	4	–	2
Metalworking, general	Tuyère frags	–	–	–	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	6	–
Whetstones		–	3	1	–	–	2	–	2	1	–	1	–	1	1	2	1	–	–	2	1	3	1
Bone/antler working	Roughouts, prepared antler portions, offcuts	–	2	8	–	5	5	7	10	4	–	6	1	7	10	4	10	1	24	31	1	0	13
Hide processing	Hide-rubbers, thong stretcher, awls	–			–	1	2	2	–	2	–	3	–	11	–	5	8	2	8	5	–	–	6
Textile crafts	Spindle whorls, needles, antler points with circumferential wear	–	8	3	–	2	4	3	–	8	–	2	–	19	1	1	10	–	2	3	–	–	2
Shale manufacture	Unfinished bangle frags & raw material	–	–	–	–	–	–	–	2	–	–	–	1	1	–	–	–	–	1	1	–	–	–
Coarse stone	Unfinished objects	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–
Woodworking	Axe, adze, gouge	–	–	1	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1
Colour	Palettes, ground pigment	–	–	1	–	1	1	–	–	2	–	1	1	5	–	–	1	3	1	1	–	1	3
Ceramic	Possible potting tools	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	2	9	–	–	–

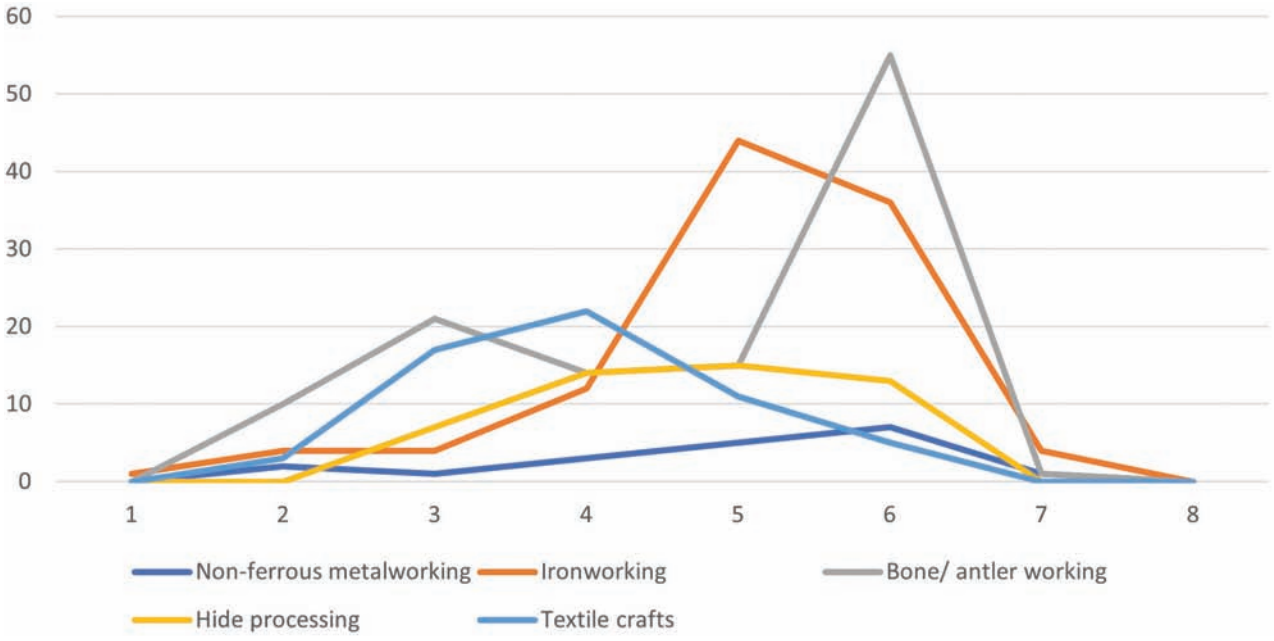


Figure 12.120. Main craft categories by broad phase

Table 12.94 Non-pottery decorated items

SF	*C*	*Ph*	*Material*	*Type*	*Decoration*
17.016	17.05	4c	Bone/antler	Comb frag.	Incised/sawn groove
2.383	2.52	6a	Bone/antler	Handle frag.	Diagonal grooves
15.316A-B	15.08	6a	Bone/antler	Comb frag.	Perpendicular grooves
15.250/15.296	15.51	3e	Copper alloy	Domed mount, broken	Engraved channel around edge
15.281	15.18	5b	Copper alloy	Decorative boss	Serrated edge & stepped profile
15.344	15.18	5b	Iron	Spearhead socket	Pair of parallel incised encircling lines
15.384	15.83	3d	Stone	Shale bangle frag.	Stepped profile
2.356	2.52	6a	Stone	Palette frag.	Incised diagonal lines
15.382	15.56	3e	Stone	Spindle whorl	Two concentric incised lines on face
2.132	2.27	3c	Stone	Spindle whorl	Incised groove around edge
1.067	1.01	6b	Copper alloy	Sheet fitting frag.	Repoussé curvilinear decoration, La Tène

shale/cannel coal bangle fragments and a possible fragment of similar raw material, along with five unfinished steatite spindle whorls, indicate more exotic types of stone were also being imported and worked on in Skye.

Craft: chronology and distribution

Craft-related objects were recovered from all phases (Table 12.93; Fig. 12.120). A comparison of the main craft types across broad site phases reveals some clear patterns in deposition. Textile crafts concentrate around the Early Iron Age Phases 3 and 4, bone and antler-working has a distinct peak in Phase 6 and ironworking in Phase 5–6, while hide processing has a more general distribution from Phases 4–6, and the small numbers of non-ferrous metalworking debris were found throughout the site sequence. Certain crafts, namely textile, ironworking, and bone/antler-working appear to have shifted in significance throughout the site's use while others remained at a smaller scale but more constant level.

Does the large quantity of craft evidence here therefore suggest craft was a major activity taking place at the site? There is certainly evidence that some craft took place on site. Blacksmithing took place in the Trench 2 hearths and iron smelting took place at an unknown location nearby. The dispersed and fragmentary or ephemeral nature of some craft debris, such as non-ferrous metalworking and hide processing, suggests they were likely to have taken place here too; the debris was visually indistinct and unlikely to be brought here deliberately. Against this backdrop of ephemeral craft debris there are distinct structured deposits such as the four caches of textile tools which, while not necessarily indicating that craft took place there, do illustrate its wider significance at that time.

12.12.4 Decoration and colour

Only the pottery shows any consistent decoration. Ornamentation was otherwise a very rare feature of the assemblage, with only 12 non-ceramic objects decorated; most (ten) are from non-cave trenches (Table 12.94). They typically employed simple incised lines; the only exception is the piece of copper alloy with repoussé decoration characteristic of early Celtic art. Most of these decorated items are visibly personal, such as combs, bangles, and probably the palette; a number of others may have been parts of personally significant items, such as the handle and spearhead. Whorls are an interesting category, as these basic tools were clearly important (as the caches indicate), and may well have been personal, favoured items. These non-ceramic decorated items occur in Phases 3–6, with marginally more from Phase 3 and 6 (although the latter is generally rich).

Around 10% (69 sherds) of the pottery was decorated, with incised designs (25 sherds) slightly more common than impressed (17) or applied (19) forms. The range of decoration is consistent with assemblages elsewhere on Skye or adjacent islands. Decorated sherds are common in Bronze Age Phase 1 (19), scarce in Phases 2–5, then peak in Phase 6 (34).

The question of colour and the aesthetics of appearance should be considered alongside decoration. Several of the stone palettes were nicely shaped and utilised attractive, sparkly stone types, although only one was formally decorated. The existence of ground-up pigment fragments implies colour was an important feature of activities (see stone report for more detail). In terms of aesthetics, the visual appearance of the ivory hilt-bead also merits attention; it catches the eye with its extreme whiteness.

12.12.5 Chronology

Artefacts were recovered from every phase of the site's use, from small numbers of objects in Bronze Age Phase 1, intensive bouts of deposition throughout the Early and Middle Iron Age, and a few scattered objects after the site's closure (Fig. 12.122). Untangling the chronology of

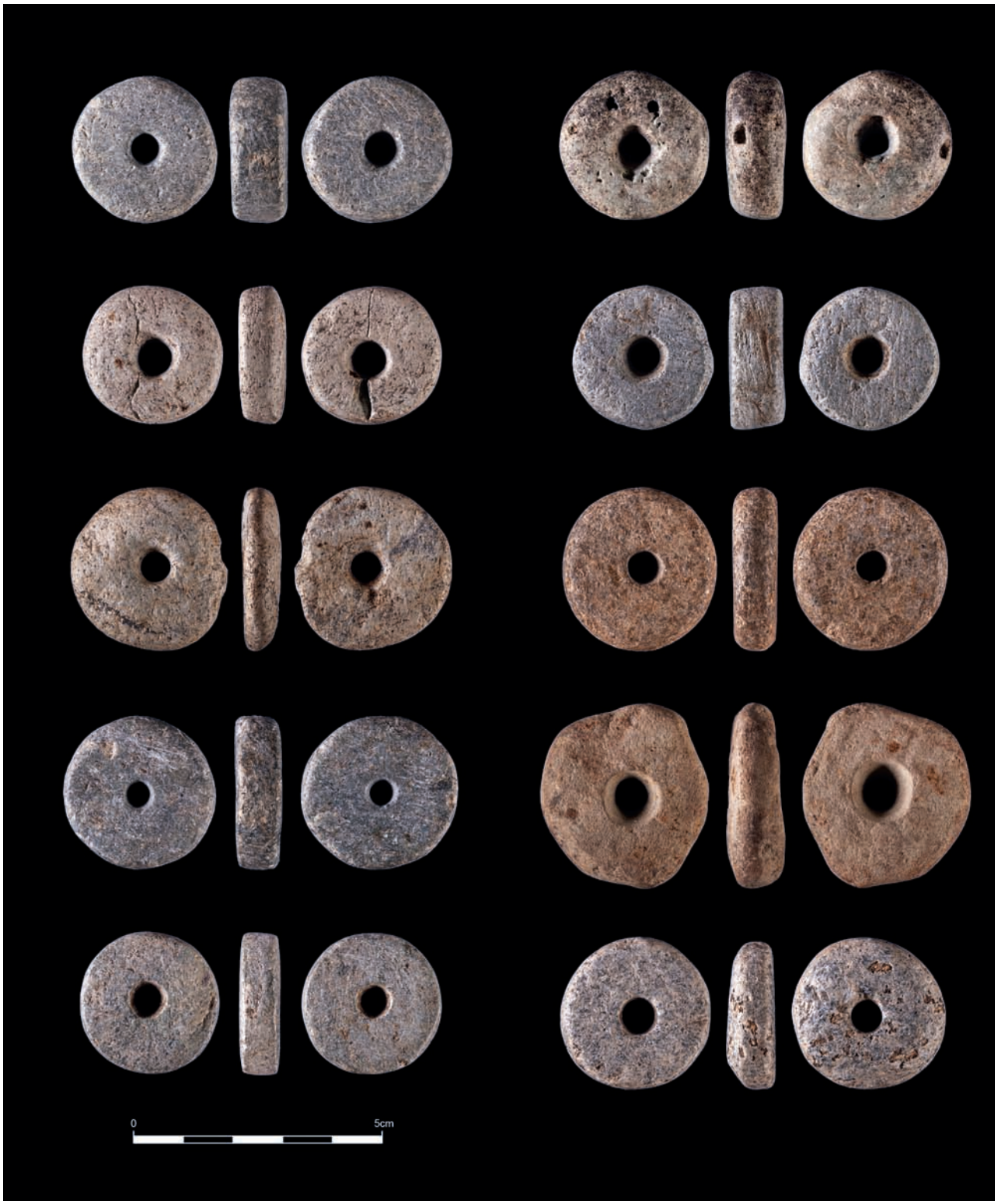


Figure 12.121. Stone spindle whorls from the High Pasture Cave complex

this large assemblage is hindered by extensive reworking and redeposition of material. As with all finds, even where secure, their context only dates when they were finally deposited, not necessarily their manufacture, use, or primary deposition. This is accentuated by the general lack of distinctive Early Iron Age artefact types compared to preceding and later periods, meaning we rely more heavily on contextual dating, though the 'Hallstatt plateau' in the calibration curve means radiocarbon dating is less useful for the Early Iron Age.

While we can usually only theorise that artefacts may have been moved several times between their initial use

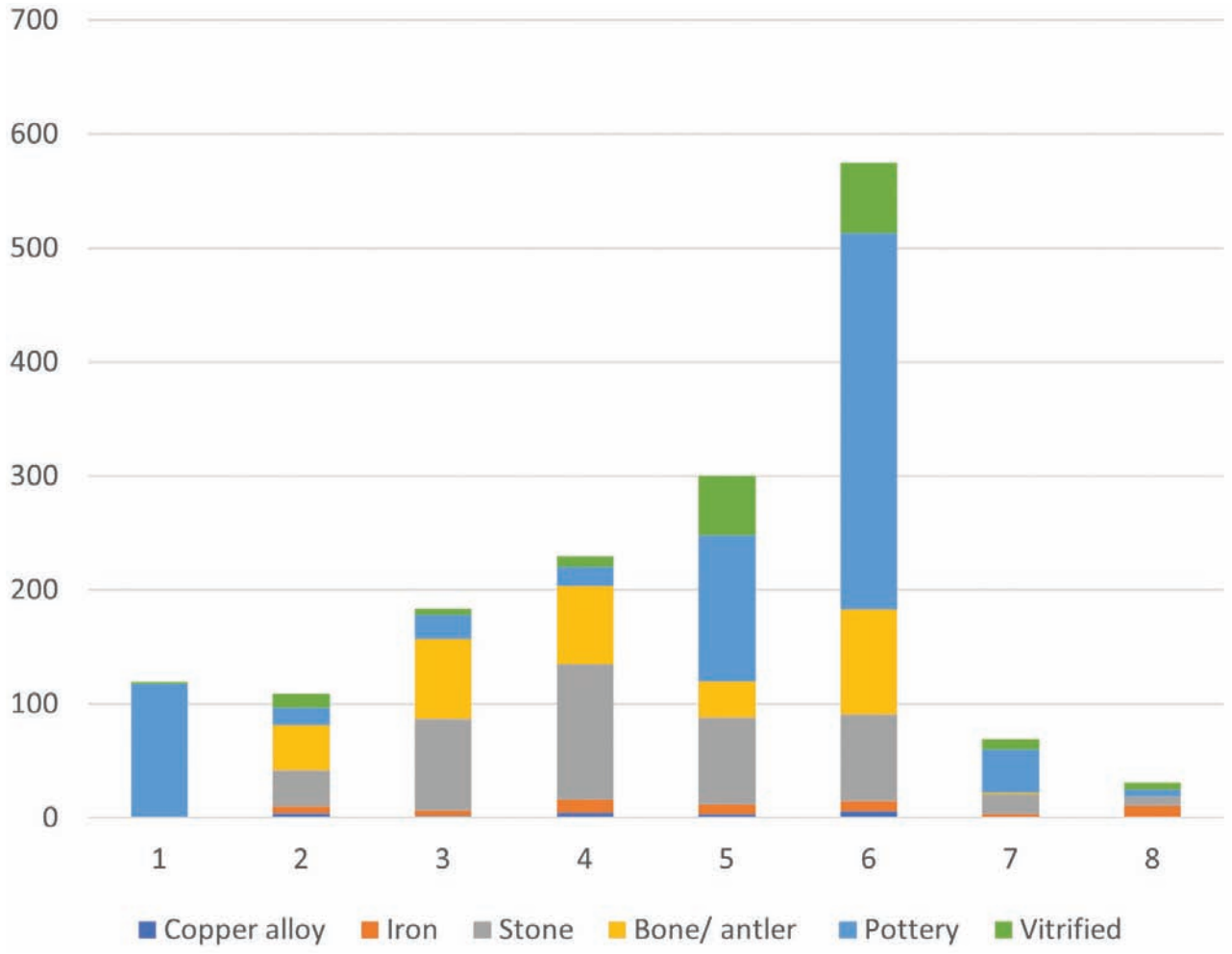


Figure 12.122. Broad phase distribution of main material groups

and final deposition, a small number of artefacts here vividly illustrate this process. Three stone artefacts were found with calcite formations coating part of their surface (see Section 12.3.4). The layer of calcite formed over the worked surfaces on the artefacts while they lay exposed within the cave. However, these objects were discovered outside the cave during excavation, revealing they had been moved at least once more after sitting in the cave for some time. Without the calcite deposits such movement would be invisible. This acts as a caveat that we may be missing a large part of the depositional history of these objects. The following phase summary of key finds can therefore only inform us of the last stage of each object's deposition, and while valuable is a partial picture.

Phase 1

Phase 1 finds were all from Bone Passage and are dominated by over 100 pottery sherds, a few struck lithics, a fragment of bone needle or pin (SF1.337), and a few hammerscale flakes (SF6.644) which are likely to be intrusive. The pottery includes sherds from two Beaker vessels in Phase 1a and a larger deposit of 95 sherds from Phase 1b water-washed silt and gravel in Bone Passage. The Phase 1b sherds are earlier in form than the Late Bronze Age radiocarbon dates for this phase, indicating they are probably residual.

Phase 2

A similar number of finds were recovered from Phase 2 contexts but in a broader range of materials. There were only 16 pottery sherds but several dozen stone and bone/antler objects, while small numbers of copper alloy and iron objects appeared. Notable finds include a very large intact saddle quern (SF15.408) found upside down by the first walkway into Bone Passage (SB6) and a cache of six steatite spindle whorls placed in redeposited midden in the cave (SB25a).

Phase 3

The overall composition of the Phase 3 assemblage is very similar to Phase 2 but increased in number to nearly 200. Phase 3c in particular is dominated by bone and antler

finds. Against a background of objects found throughout redeposited midden and hearth residue deposits, evidence of structured deposition becomes more apparent. For example, a large deposit of bog iron ore (SF2.552 and SF2.555) weighing just under 9 kg was found overlying the paving at the base of the earliest stone stairwell between the precinct and Bone Passage [Phase 3a/SB19]. A small bundle of broken-up copper alloy bangle fragments was also found amongst the hearth deposit sequence [Phase 3a/SB7a] and had clearly been carefully placed there, corroding together over time. Amongst a large quantity of environmental material and artefacts (particularly bone and antler finds) introduced to Bone Passage during this phase, were two caches of antler points (SF6.189 and SF6.268), deposited during Phase 3a [SB27a], while iron artefacts also deposited in Phase 3a [SB27a] are particularly significant owing to their early date, making them some of the earliest known from Scotland. And three caches of cobble tools were discovered in deposits associated with the use of the superimposed hearths in the precinct (one from Phase 3b/SB7b and two from Phase 3e/SB7e).

Phase 4

While the Phase 4 assemblage is similar to Phases 2 and 3 in composition, the number of artefacts deposited continues to increase, especially in Phase 4c. A small number of diagnostic pottery sherds from this phase appear to represent redeposited material from earlier phases (Beaker pottery from Phase 1a and flat rimmed pottery from Phase 2a; see Section 12.2.6). However, most ceramic sherds recovered from the Phase 4–5 contexts have decoration and forms more typical of the Middle Iron Age.

A key find from this phase was the burnt, wooden musical instrument bridge (SF15.358) recovered from a deposit of hearth residues in the precinct [C.2.15a, Phase 4c, SB8c] including other types of burnt objects. The largest cobble tool cache (SF2.119) and a small cache of spindle whorls (SF15.123, SF15.126a–b, SF15.138, and SF15.346) were found in the same group of deposits. Stone objects peak in Phase 4, particularly quern fragments and a range of cobble tools incorporated into different phases of stairwell construction [SB21a, b, and d] and amid the deposits of fire-cracked stone and hearth residues beginning to accumulate outwith the precinct enclosure [SB33].

Phase 5

Phase 5 sees a further increase in the number of finds and a noticeable shift in assemblage composition, with pottery finds becoming dominant again and ironworking debris peaking while other materials decrease. Much of the ironworking debris and pottery sherds were recovered from the accumulations of burnt stone and fuel residues outwith the precinct [SB34] and mark the final phase of deposition in those areas. While much of the burnt spread material appears to have been informally deposited there, probably because of increasingly restricted space in the precinct, a few finds suggest valued objects were being deliberately placed there too. Examples included a matching pair of upper and lower rotary quern fragments (SF18.007), significant owing to their potentially early date and non-local stone type (see Section 12.3).

Within the precinct large numbers of stone tools and other artefacts continued to be deposited in association with the use of a series of large hearths. Significant finds from the hearth residues include iron ring-headed pins: one had been broken, with parts placed together (SF15.337); the other (SF15.339) was coated in mineralised leather, suggesting it had been deposited in a pouch (both SB9b). A large quantity of material was also deposited in Bone Passage in Phase 5b [SB27c] including a rare marine ivory dagger fitting [SF6.254].

Phase 6

Artefact deposition notably peaks in Phase 6, with almost double the number of objects that were recovered in Phase 5. Pottery and bone/antler objects increase while others remain more constant. Despite the increase in artefact deposition, or perhaps because of it, clear evidence of structured deposition, such as the caches seen in earlier phases, is less apparent. Up until this point, Bone Passage held far fewer artefacts than above ground but artefact deposition within the cave increases dramatically during Phase 6, even producing slightly more objects than above ground. This increase in deposition immediately followed the construction of a walkway through the cave, suggesting the increased depositional activity was regular and formalised. Bone and antler finds are particularly abundant, such as the concentration of antler-working resources in Phase 6B (SB 29c) representing all aspects of the antler-working process, including many pieces which could still be utilised and are therefore not typical refuse. Some fragments of unusual facetted bone points (F6.17) found in the same deposit may have been a cache. Notable finds of other materials from Phase 6 in Bone Passage include another iron ring-headed pin (SF6.91), an unfinished copper-alloy pin (SF17.100) and a rare copper alloy sheet mount decorated with La Tène art (SF1.067).

While deposition outwith the precinct mainly stopped in Phase 5, a Roman coin (SF19.003) and half of a spiral-decorated glass bead (SF19.022) were retrieved from post-abandonment deposits above the burnt spreads (SB35), revealing later visitors to the site; perhaps around the time the site was closed and human and animal remains were deposited in the top of the backfilled stairwell F2.23 (see Phase 7 below and Section 8.4.2).

Phase 7

Artefact deposition dramatically decreases in this phase, with only around 75 finds retrieved. The stairwell had

been backfilled, closing Bone Passage, and the intensive activity in the precinct was replaced by backfill and landscaping, effectively closing the site. The artefacts recovered from this phase include a range of stone tools, struck lithics, pottery sherds and occasional metal, bone, and antler objects, most of which were likely to have been redeposited during the landscaping and closure period (SB11).

The fine copper alloy double-link chain (SF21.10) and large and deliberately bent iron spearhead (SF2102/3) deposited during the closure of stairwell F2.23 stand out amongst the scatter of redeposited finds. The same context (C.21.09) also included fragmentary human remains, a fragment of burnt saddle quern (SF21.09), and a natural stalactite (SF21.11) from the cave.

Phase 8

Finds decrease further in Phase 8 (31), with 11 iron objects probably relating to post-medieval shieling activity. The others comprise a scatter of residual stone tools, pottery sherds, and industrial debris.

12.12.6 Distribution

The broad distribution of finds across the site shows a concentration in Bone Passage (Trenches 1, 6, and 17), the stairwell (Trench 21) and precinct (Trench 2 and 15). The number of finds recovered diminishes rapidly outwith this area, for example in the burnt spreads (mainly Trench 19). Examination of finds deposited within Bone Passage shows marginally more (246) were recovered from Trench 6, closest to the entrance of the cave passage, compared to Trench 17 at the back of the passage (212). The smaller number (153) retrieved from the middle of the passage (Trench 1) may simply reflect the smaller size of that trench, but the limited space in the central narrow zone most likely suggests the increased deposition of objects here. The number of different artefact materials and functions were compared by phase across each trench but showed little evidence of changing preferences for where certain types of artefacts were deposited over time. For example, all three areas saw minor peaks in artefact deposition in Phases 2 and 4, decreases in Phases 3 and 5, and a distinct peak in Phase 6 before deposition ceases. Only Trench 17 differs in having a notable Phase 1 peak, formed almost entirely of residual pottery sherds (Fig. 12.122).

The material and functional compositions of the assemblages from each of Bone Passage's three trenches are very similar; there is little evidence of a preference for depositing particular types of objects in different areas of the cave. Fewer tools and more craft debris in Trench 17 compared to Trenches 1 and 6 stand out as different (Fig. 12.123), much of which can be attributed to a large deposit of antler-working debris in Phase 6 in Trench 17 (and an increase in 'magnetic residue' which was examined alongside the metalworking debris but may be natural).

Looking more broadly at finds within Bone Passage compared to outside reveals some patterns worthy of closer scrutiny. In terms of overall quantity of finds, a little over 1000 were retrieved outside and just over 600 from Bone Passage. This varies considerably by phase, with fluctuating lower levels of finds in Bone Passage until the Phase 6 peak, while finds outside increase more steadily throughout the use of the site before also peaking in Phase 6 (Fig. 12.123). We know from the three stone finds with calcite found outside the cave that some material was placed in Bone Passage and then moved back outside, and this may account for the lower numbers of finds in earlier phases.

Artefact materials show some variation between Bone Passage and outside (Fig. 12.124). Most find categories are more common outside than inside, by a factor of around 2:1, but significantly more stone objects were deposited outside than in the cave (4.9:1). By contrast, bone and antler finds were markedly more common in Bone Passage.

The striking difference in number of stone finds underground compared to the surface suggests this was deliberate. While the large size of many of the querns, for example, would have made them difficult to deposit in Bone Passage, this was clearly done when desired, as seen from the large, upside-down saddle quern (SF6.150) deposited at the cave's entrance, at the base of the stairwell access. We also know from the calcite deposits that at least some stone objects were originally in the cave and then moved out; significantly more may originally have been left in the cave at some stage, but here we can only consider their final placing. If many of the stone finds were utilised in the preparation and consumption of food in the precinct area they may have been discarded on the surface as part of that activity, rather than deliberately deposited in the cave. However, pottery vessels were also part of that food-related activity and pottery sherds were abundant in Bone Passage. We may be seeing the result of certain social rules or superstitions surrounding appropriate materials to deposit underground.

Here it is perhaps striking that bone and antler objects and working debris were considered suitable for deposition in the cave – as were whole or partial animals – but cetacean finds are conspicuous by their absence. It seems there was a constraint on placing artefacts related to the sea in or around this underground location, although fish bone and marine shells recovered from the site were almost exclusively found in the cave. Again, this indicates wider social views of appropriateness.

Examination of functional groups in the same way reveals no clear pattern regarding which objects were deposited underground compared to outside (Figs 12.125 and 12.126). While all seven weapons were found outside,

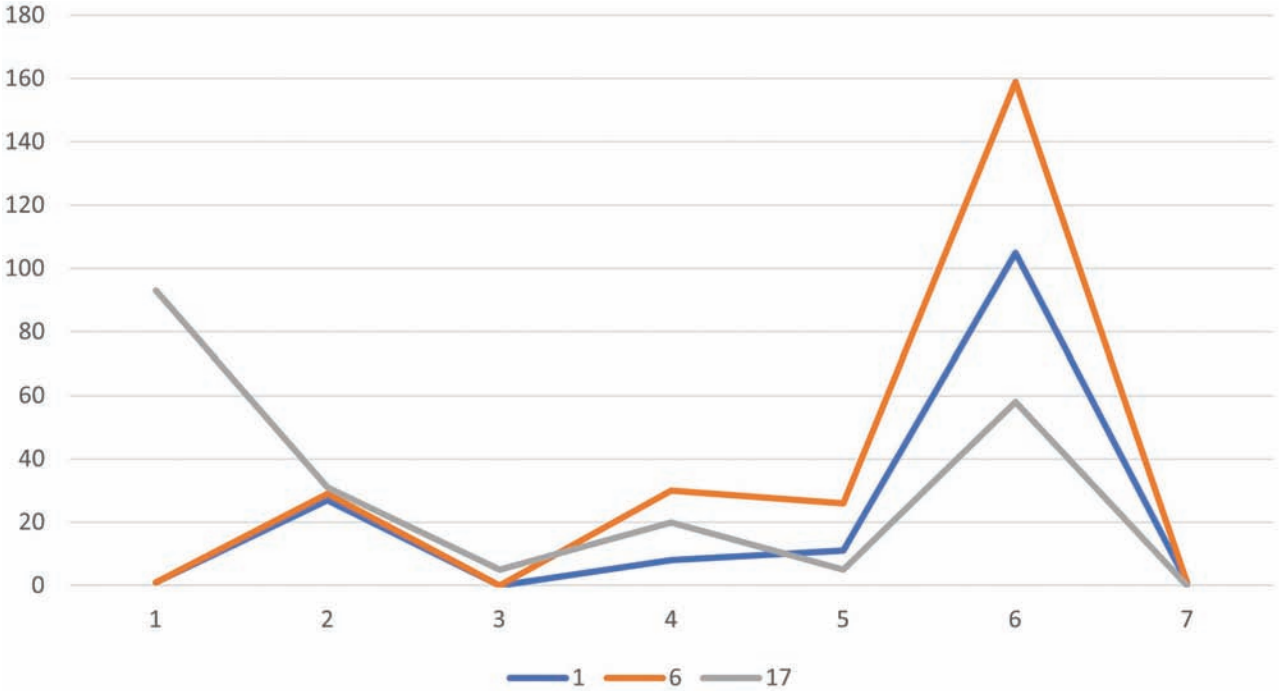


Figure 12.123. Quantity of artefacts in Bone Passage trenches by phase

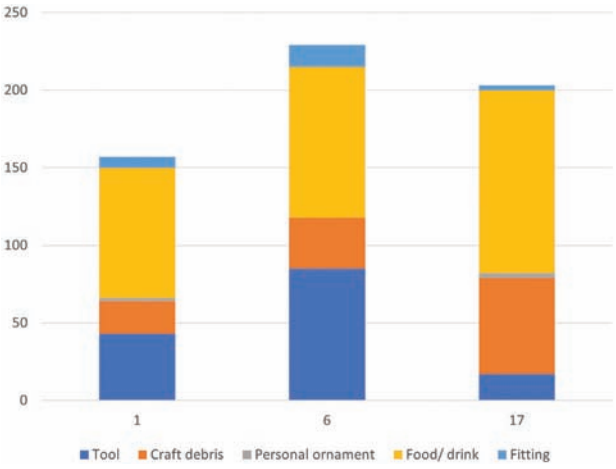


Figure 12.124. Main artefact groups in Bone Passage trenches

the numbers are too small to argue that they were deliberately excluded from the cave. All other categories were more numerous outside reflecting the overall distribution of finds.

12.12.7 Object deposition

On any site objects are deposited in a number of ways, including casual loss, discarding as rubbish, and symbolic or structured deposition. Examining how objects in an assemblage were deposited, especially on an enigmatic site like High Pasture Cave, is essential if we are to understand what activities were taking place at a site and therefore what the site's function was. Yet this site's unusual character is not of itself an argument that all objects were deposited deliberately, or as a result of a wider range of specific behaviours: people came to the site for more than just a fleeting visit, it seems, given the evidence for large-scale cooking events, and this creates a context in which crafting could be undertaken, finds lost or pots broken. For instance, there is some evidence of on-site crafting, such as smithing hearths, while the presence of small scraps of undiagnostic material like vitrified ceramic also suggests production on site; it would have been challenging to recover such scraps for deliberate deposition. Given the scale of feasting and food preparation, with the quantities of hearths and huge amounts of burnt mound material, animal bones, charred grains etc., many of the stone items and pottery vessels could have been associated with this.

How can we identify structured deposition amongst the wide range of material here? A number of characteristics can be identified, within which are some apparent contradictions.

Caches/hoards

Groups of cobble tools, antler points, spindle whorls, and arguably antler-working debris were discovered in deposits surrounding the precinct hearths and in Bone Passage. As the number of artefacts present in each phase increases, such caches or hoards become less common (or perhaps more difficult to identify?). Three clear caches of cobble

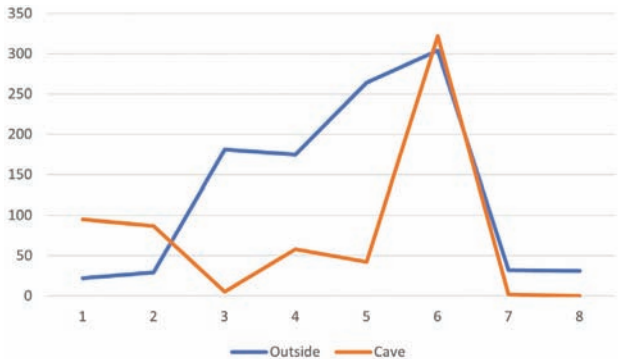


Figure 12.125. Number of finds outside & in the cave by phase

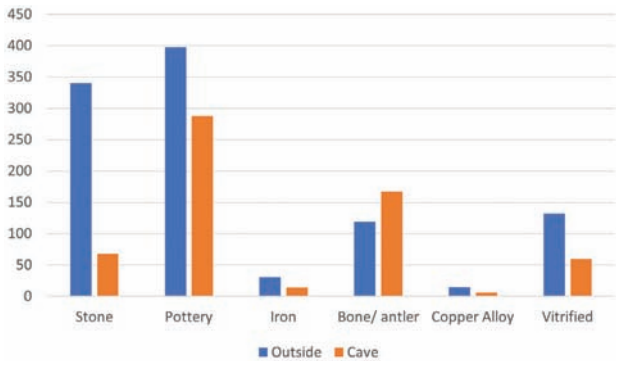


Figure 12.126 Comparison of artefact materials in Bone Passage & outside

tools were placed in Phase 3 and another in Phase 4, groups of whorls in Phases 2 and 4, and antler points in Phases 4 and 5. Distinct deposits of bog iron ore in Phase 2 and antler-working debris in Phase 6 are less typical materials when considering caches but their concentrated placement and value as raw materials suggest they can also be included as such. Identifying caches on such an artefactually busy site where there has been frequent movement of deposits is challenging and it seems likely we are only seeing rare, undisturbed examples; other aspects of the assemblage may originally have been part of unrecognisable caches. That these caches are clearly undisturbed adds to their value archaeologically since we can be more certain they were deliberately deposited in the phase they were found in.

Intact items

Items which are found intact, and therefore still useable, are unlikely to be casually discarded or lost and often indicate a particular depositional habit. The iron artefact assemblage is a good example. Half of the 42 objects were intact when deposited, including large tools like the socketed adze, gouge, and axe. Not only were the iron objects intact but several preserve mineralised wooden hafts, such as the spearheads and adze, indicating they were still hafted when deposited. Other mineralised organic traces indicate one of the daggers was in a leather scabbard, and a ring-headed pin was in a leather pouch. A great deal of effort would have gone into producing such tools, especially at such an early date; placing them out of use at the site would have been a considerable sacrifice.

Fragmentation

Deliberately broken items also suggest ritualised treatment and deliberate deposition. This includes fragments which are kept together after breakage (such as the iron ring-headed pin and copper alloy bangle bundle) or where a hard-to-break object has been deliberately smashed, such as a quern. In some instances, one might even talk of 'overkill', with deliberate cut marks like those seen on one of the rotary querns. Another clear example here is with the large spearhead with tip bent over, echoing the treatment of weapons in hoards across Europe in later prehistory (see Section 12.7).

Deliberately moved items

This can be seen in some stone items here, which have a calcite 'cave skin' but were found on the surface. The deliberate removal of them from the cave after they had evidently lain exposed in there for some time, illustrates a complex and rarely glimpsed post-depositional biography.

The above categories stand out from material which looks much more like midden, with fragments of broken stone or bone tools, or a few sherds from multiple different ceramic vessels. It is not impossible, of course, that these too were deliberately broken, but methodologically it is far harder to prove. Single finds within mixed deposits are far more difficult to interpret in this way but certain objects stand out. Among these we may note the Roman coin, too unusual in this area to be a casual loss and more likely to have been a powerful object left at an ancient site. The huge intact saddle quern placed upside down in the earliest walkway to the cave, provides a further example. There is also the roughout for a Neolithic axe manufactured from Langdale Tuff (SF13.001) deposited in the upper, Iron Age fill of a ditch feature, and most likely a rediscovered or curated object.

12.12.8 Discussion

Who was using the site?

The lack of traditional domestic structures here raises questions about where the people using the site were living and how far they travelled. While the artefacts cannot provide a definitive answer to this question, they can shed light on it. The artefact assemblage is overwhelmingly manufactured from locally available materials; very few would have been originally sourced outwith Skye. All of the species used for bone and antler objects lived locally and almost all the stone types could have been

found in local outcrops, beaches, or drift deposits (see Section 12.3.2).

Exceptions are few, but interesting. The Roman coin is visibly exotic, but it was a late deposit at the site, after the main phases of activity. Most of the copper alloy finds fit local traditions, although one cannot say with any confidence where they were made, but the piece of decorative sheetwork with La Tène decoration is exotic to the area. The alloys used were typical Iron Age ones, reflecting wider metal supply systems (presumably through the movement of ingots and by recycling). The exception is the double-linked chain, which was a leaded gunmetal incorporating recycled Roman metal, but this too became a widespread habit during the Roman Iron Age. The glass beads are all most likely imports – there is no sign of their manufacture on Skye – but they are known from other sites on the island, indicating that they were in wider circulation.

The stone assemblage provides a few intriguing instances of items non-local to the immediate area. There is a notable quantity of steatite (talc schist) items; their provenance is discussed elsewhere, but it is most plausibly from the Glenelg peninsula on the adjacent mainland. Oil shale and related material was also found in some quantity; there are sources of this available on Skye, but it is also quite plausible that some of the items travelled into the area, although it is not currently possible to offer detailed provenances. There are also four items from Dalradian deposits, most likely from Argyll (although this is an argument based on plausible logistics rather than scientific demonstration). A pair of quernstone fragments and a decorated palette are of garnet mica schist, while there is an actinolite schist spindle whorl and two greenstone rubbers. What should be made of these finds?

The quernstones are a valuable additional example of a known, but rare, phenomenon: most Scottish querns seem to use local stone types, as good stone was quite widely abundant, but there are indications of both local supply systems and occasional longer-distance movements (Hunter 2015, 228–9, 242 n.1). Given the early date of these querns, this resonates with the movement of this technology up the Atlantic seaways, suggesting the movement of querns as well as of concepts.

Palette SF2.441 is a decorative item, and the use of ornate stone for this is unsurprising; the later incarnation of such palettes as polished stone discs in the Roman Iron Age often used striking stones (*e.g.* Goldberg and Hunter 2015, 116–7). In that sense, the palette can be seen like other decorative materials such as glass or shale; one can anticipate that regional supply networks were in place for such materials.

The best evidence of directed contacts comes not from these examples, which reflect supply systems well known in the Iron Age, but from everyday finds: the greenstone hide rubbers and actinolite schist whorls. There are no such obvious social reasons for these items to have been acquired at a distance, so they provide stronger evidence for the presence of people with links to Dalradian geology at the site. They are, however, very much occasional finds, representing under 1% of the assemblage.

The range of object types is consistent with other later prehistoric assemblages in Atlantic Scotland. Indeed, there are glimpses of traditions which add weight to the assemblage having local origins. Aspects of the bone and antler assemblage provide suggestions of regional traditions, such as the use of red deer antler for spearheads, the lack of cetacean bone, and the groups of antler points which may be a regional version of long-handled combs. The pottery vessel forms, and decorative styles and techniques can all be readily paralleled in other assemblages from Skye and nearby islands.

Certain aspects of the assemblage, such as decorated objects and metalworking debris, indicate some people using the site had access to a range of restricted goods and skills. Such objects form a very small component of the assemblage though; the majority are cobble tools, pottery sherds, and bone points; the most common finds found on later prehistoric sites. Are we therefore seeing objects from a representative cross-section of later prehistoric society here? Such ‘everyday’ objects were still ‘valuable’; indeed, potentially more so, considering the life-giving qualities of querns and other items connected to food preparation, while tools were very personal and important to craftworkers. What we are not seeing is a focus on unusual objects like prestige metalwork, or a particular kind of object relevant to a particular deity. Instead, objects imbued with daily practices were deposited.

The assemblage at the site was overwhelmingly a local one, drawing on materials and traditions that were current in Iron Age Skye. Where the material can be provenanced (notably the stonework), it is predominantly local, from Skye or the immediate mainland. It could even have been a small area of Skye. Some people depositing material at the site had links to Argyll (most likely); this is the only clearly attested external connection, and only in a tiny minority of cases. The finds thus do not provide evidence for any wider regional population using the site habitually; the dominant participants were populations based locally. The site is an absolutely remarkable one, but for the acts taking place rather than the material being brought in. It is not marked by rich exotica, nor by a clear focus on one particular kind of artefactual offering. Instead, material from daily lives was taken to, used in, or worked at this special place.

Wider context

The overall assemblage sits comfortably within the Atlantic Iron Age in terms of number and range of artefacts and would not have raised undue suspicions if recovered from a broch or wheelhouse. Details such as caches of stone tools, fragmentation, and re-use of querns and structured deposits of other artefacts can also be paralleled

throughout later prehistory. It is the overall context on a site without a domestic structure which makes this assemblage unusual and a challenge to interpret.

The focus on craftworking also finds parallels across Scotland (but also in other caves across Britain and Ireland). Crafts and craftworkers, particularly those associated with metals, have long been associated with superstition, ritual, and magic. The tradition of metalworking in caves is covered in Section 12.8 but this sits within a wider pattern of craftworkers inhabiting liminal and seemingly impractical parts of the landscape. Fiskavaig rockshelter, also on Skye (Birch in prep.), provides a local parallel, albeit slightly later in date. The site is difficult to access along a challenging rocky shoreline and is set into the base of steep high cliffs facing the force of the Atlantic. Any assumption that craftworkers would logically place themselves close to their resources can be dismissed here. Evidence of bone and antler working, textile tools, ironworking, and non-ferrous metalworking, along with a range of other activities, indicate all the necessary raw, materials, tools, and fuel would have required transporting to this liminal place, rather than the activities taking place on a nearby settlement such as Dun Ardtreck.

While not always so extreme in terms of access, craftworking appears in many other unusual places around Scotland. Extensive evidence of craftworking, including a dedicated workshop, was discovered outside an unusual subterranean structure at Mine Howe, Orkney (Card and Downes 2003). Ironworking, non-ferrous metalworking, and bone/antler-working took place on the exposed promontory of Knowe of Skea, Westray, over an older settlement and infant burial ground (Moore and Wilson in prep.). Yet craftworking was also common on roundhouse settlements, brochs, and hillforts; the distinction between ritual and domestic remains difficult to untangle, as on these domestic sites too, some crafts may have had a potency. The topic of craft evidence in later prehistoric Scotland is one with great potential to examine the subtleties of craft production in different settings. For example, feasts involving a large number of adult cattle and craft related activities have been identified at the Fiskavaig Rockshelter, on the island of Skye.

A number of artefact discoveries from elsewhere on Skye can be interpreted as structured or votive deposits. For example, objects deposited in peat bogs, such as the copper alloy zoomorphic spiral bracelet from Duntulm, Staffin, cauldrons and wooden kegs containing bog butter found at Kyleakin, a stone lamp from Kilmuir, and a ring-headed pin from Sasaig (Hunter 2019a, 65, nos 1 and 6; 70, table 6) are very likely to have been votive deposits. A Roman terracotta model from the foundations of Dun an Iardhard (Hunter 2019, 72, table 7; see also Curle 1932, 395-6) and caches of cobble tools from Dun Flodigarry (Martlew 1985, 41) attest to similar activity on settlement sites. These examples provide a local context for the activity at High Pasture Cave which, though on a far more intensive scale, mirrors local traditions.

Part V

Offerings from the land

13

Offerings from the land: the environmental assemblages

Jo McKenzie

With contributions from Carrie Drew, Rob Batchelor, Ruby Cerón-Carrasco, Mike Cressey, Sheena Fraser, Chris Gleed-Owen, Mhairi Hastie, Carl Heron, Emma Horton, Zoe Outram, Claire Pannell, Sandra Pratt, Peter Rowley-Conwy, and John Summers

13.1 Introduction

The following sections present the environmental assemblages recovered from High Pasture Cave – a vast and diverse set of materials, ranging from a zooarchaeological dataset comprising over 54,000 fragments of animal bone (Section 13.2), to a delicate fragment of resin only a few millimetres wide (Section 13.12).

Recovery of a wide range of organic materials demonstrates the utilisation of numerous animal species, the presence of well preserved carbonised grain and associated plant materials, alongside supporting evidence from organic entities such as coprolites. Particularly large assemblages, especially of animal bone and burnt grain (Fig. 13.1), have illustrated patterns of deliberate movement of environmental material through different areas of the site through time. Analysis into the fine detail of these rich deposits has been particularly valuable. The application of soil micromorphology to the intensive deposit sequence in the precinct has revealed the minute detail of events in both the cave and its surrounds. Complementary assessments provide valuably different viewpoints – such as the pollen analysis afforded by the coprolite assessment (Section 13.13), or the fibre matting analysis (Section 13.9) complement to the botanical assessment (Section 13.8). Links beyond this chapter are seen, such as the significance of the charcoal analysis (Section 13.10) to our understanding of the worked wood assemblage recovered from the precinct (see Section 12.10). Section 13.15 brings together the analyses in this chapter and explores what these can tell us about the use of High Pasture – what was brought here, how it was used, and where (and perhaps, why) it was deposited.

One thing these assemblages do not represent is a straightforward representation of a 'subsistence economy'. As a special place in the landscape – arguably, a significant ritual centre – the context in which organic, edible, usable material was brought to, and deposited, at High Pasture Cave was clearly outside what we can safely interpret as the everyday. One of the challenges in analysing and interpreting these environmental assemblages is to what extent they can be used to explore questions such as resource use, local availability, and the wider Iron Age environment (Section 13.16). Most significantly, the question of how far people in the Iron Age were prepared to travel to visit High Pasture, and to what extent they brought with them the resources they needed for both sustenance and celebration, is a question that the environmental assemblages can help us address.

In contrast to such 'big picture' considerations, the High Pasture datasets also provide us with important insights into local conditions at the site and what materials and resources were likely to be available, set against other just as important datasets informing on taphonomic processes at the site, and the relative likely survival levels of perishable organic materials. This is a theme which runs through all the datasets but is perhaps especially

addressed by the bulk soil analyses at Chapter 13.14, which tackles, in particular, the unique environmental conditions prevailing in both the limestone cave, and the ash-soaked, bone-packed deposits making up much of the precinct stratigraphy.

One of the most important contributions of environmental assemblages is their ability to offer an insight into past events – of the things that were done – in the way that other assemblages cannot, embodying as they do the results of processes, of actions. Butchery marks on our animal bone assemblages tell us, in graphic detail, what spectacles at least some of the visitors to High Pasture Cave must have witnessed (Section 13.2), micromorphology can tell us what burned on the fires which now survive only as ash (Section 13.15). For a site like High Pasture, the ability of environmental assemblages to 'colour in' this picture of activity is vital to understanding. The complementary record that we have for depositional patterning helps build a detailed picture of past activity, with even smaller assemblage groups playing a vital role in highlighting not only where things were, but also, where they were not, e.g. as seen in the fish bone assemblage (Section 13.4). At High Pasture, it mattered where things were put – placed, not scattered, discarded, but with intent, perhaps – even for organic materials – curated. Thus, the following sections focus not only on their materials, but where they were placed, how and where they were discarded. The environmental assemblages play a vital role in understanding activity at High Pasture, the relationship between cave, precinct, and environs, and how the people who came to High Pasture used and curated these spaces.

13.2 Animal bone

Carrie Drew and Peter Rowley-Conwy

13.2.1 Introduction

Extensive faunal deposits were recovered from High Pasture, where conditions enabled good bone preservation, particularly in the limestone cave, where bone was protected by the alkaline in-cave environment as well as from scavengers. Most of the bone derives from Iron Age deposits (Phases 2–7), with limited earlier and later material. Most bone deposits were characteristic of heavily processed consumption waste, and most came from the cave. However, bone from the final phase of cave use (Phase 6, SB29b/29c) forms an extremely unusual deposit, strongly suggestive of structured deposition of butchered cattle and pig remains, including significant articulated material and perhaps indicating the incorporation of pig rich feasting waste. Subsequent (Phase 7) deposits relating to the infilling of the cave stairwell are also unusual, incorporating animal burials placed with human remains, interpreted as part of a closure event. Outside the cave, most bone was recovered from the precinct surrounding the cave entrance, mainly from waste deposits relating to its numerous hearths. The largest of these dates to Phases 3 and 4, slightly earlier than the unusual deposits within cave and stairwell. Stratigraphic assessment indicates complex biographies of deposition and redeposition of bone between (especially) cave and precinct, with the cave entrance area containing smaller assemblages, with increased proportions of tiny indeterminate bone. Bone recovery from the 'surface' areas beyond the precinct boundary was far less, and much more poorly preserved.

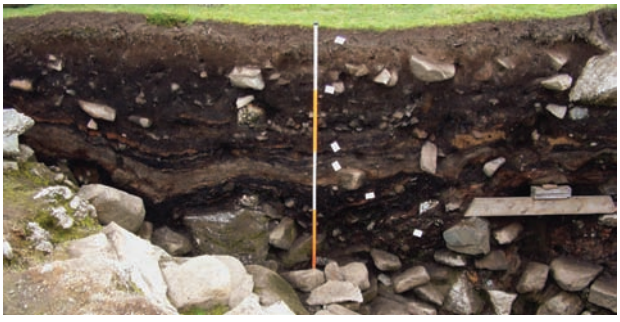


Figure 13.1. Section through the precinct: lenses & layers of ash, bone, & grain

13.2.2 Method

Faunal assessment

Bone was collected by hand, with all cave and precinct contexts 100% wet-sieved. In total, 57,571 discrete fragments were counted and, where possible, identified to element, side, and species, with evidence for gnawing, working, heating, or pathology noted, using zooarchaeological reference collection material and relevant zooarchaeological texts. Where species identification was impossible, lower-order size categories were employed: 'Large Mammal' (cattle, horse, red deer size fragments) and 'Medium Mammal' (pig or sheep/goat). Ribs and vertebrae were recorded only to these categories. As morphological separation of sheep and goat elements is problematic (O'Connor 2000) these were identified to a single category: it is likely that the majority are sheep. Worked antler was included within the worked bone assemblage (see Section 12.5). Measurements where complete spans were present followed Von Den Driesch (1976), with modifications as recommended by Davis (1992). Immature bones were not measured (Davis 1996). Ageing was considered from both teeth (eruption and wear stages) and bone (epiphysial fusion). Wear stages used to age domesticate jaws followed Bull and Payne (1982) and Grant (1982) for pig, Grant (1982) for sheep/goat, and Grigson (1982) for cattle. Eruption data followed Rowley-Conwy (1993) for pigs, Grigson (1982) for cattle, and Silver (1969) for sheep/goat. The fusion stage of post-cranial bones was related to age ranges after Dobney *et al*. (1995). Sexes of pig canines were

separated using morphological characteristics as described by Schmid (1972).

Data integration

Fish, shellfish, and amphibian are analysed individually (Sections 13.4, 13.5, 13.6). Heavily burnt/calcined bone is also considered separately, due to its potential to incorporate cremated human remains (Section 13.3). This represented around 14% of the total bone assemblage, predominantly tiny calcined, heavily burnt, brittle, and highly fragmented material. The total bone assemblage data discussed herein, and presented in the site archive and figures, includes both fish and burnt bone. With amphibian remains only assessed for limited in-cave contexts (Section 13.5), amphibian counts are excluded in order not to skew numbers towards the cave. Species, body part distribution and ageing data for burnt bone largely mirrors that of the main assemblage. Few large burnt bones were recovered, mostly charred cattle longbones. Large mammal fragments dominated the burnt bone.

13.2.3 Assessment: overview

Sixty-one per cent of the almost 58,000 High Pasture bone fragments were recovered from the cave and the remainder from the surface, stairwells, and precinct (Table 13.1; Fig. 13.2). Much of the latter was recovered from the deep precinct midden deposits (17,933 fragments), with much less bone from the stairwells (2221) and surface (2517). Material from this last was particularly fragmentary, with only 156 elements identifiable to species (Tables 13.1–13.2). Comprehensive sieving of the cave and precinct deposits produced high numbers of indeterminate, undiagnostic fragments, many of which were very small in size, leading to a huge fragment count for the whole assemblage, of which only *c*. 20% could be identified to species. Such a strategy is however effective in preventing bias towards larger elements/species (Payne 1972a 1972b; 1975). Bone condition was generally good, with that from the cave generally excellently preserved. Poorer condition bones were seen in some precinct and surface deposits, and material deposited in the active cave streamway. Here, deterioration limited identification, with bone appearing white, 'chalky' and with surface cracking.

Species

Assemblage composition was typical of the Scottish Iron Age: dominated by cattle, with smaller proportions of sheep/goat and pig, and a limited presence of other species. Relatively few wild mammal or bird remains were noted. Species represented included sheep/goat (*Ovis/Capra* sp.), cattle (*Bos* sp.), pig (*Sus Scrofa*), horse (*Equus* sp), dog (*Canis* sp.), and deer. Deer was predominantly red (*Cervus elaphus*) with few roe (*Capreolus*

Table 13.1 Summary of total bone count from all faunal reports by area

Area	*Ident. to species*	*Total frag. count*	*% Ident.*
Precinct	2517	17933	14.04
Stairwell	610	2221	27.47
Other surface areas	156	2517	6.20
Cave	8213	34900	23.53
Total	11496	57571	19.97

Table 13.2 Summary total bone count breakdown by species or lower-order size group by area, incorporating data from all faunal reports

Species	*Area*				*Total*	*Frags from special deposits (Cave Phase 6)*
	Precinct	*Stairwell*	*Other surface areas*	*Cave*		
Cattle	1127	165	113	1846	3251	601
Dog	22	42	2	45	111	2
Fish	18	1	0	2037	2056	0
Horse	20	3	1	4	28	0
Pig	337	94	5	1911	2347	987
Deer	121	15	5	156	297	13
Sheep/goat	385	74	30	747	1236	108
Bird	6	2	0	31	39	1
Amphibian	3	7	0	194	204	1
Otter	0	0	0	2	2	0
Rodent	478	207	0	1240	1925	10
S/M mammal	1644	106	266	2842	4858	
Large mammal	3132	287	463	2653	6535	
Unidentifiable	10640	1218	1632	21192	34682	

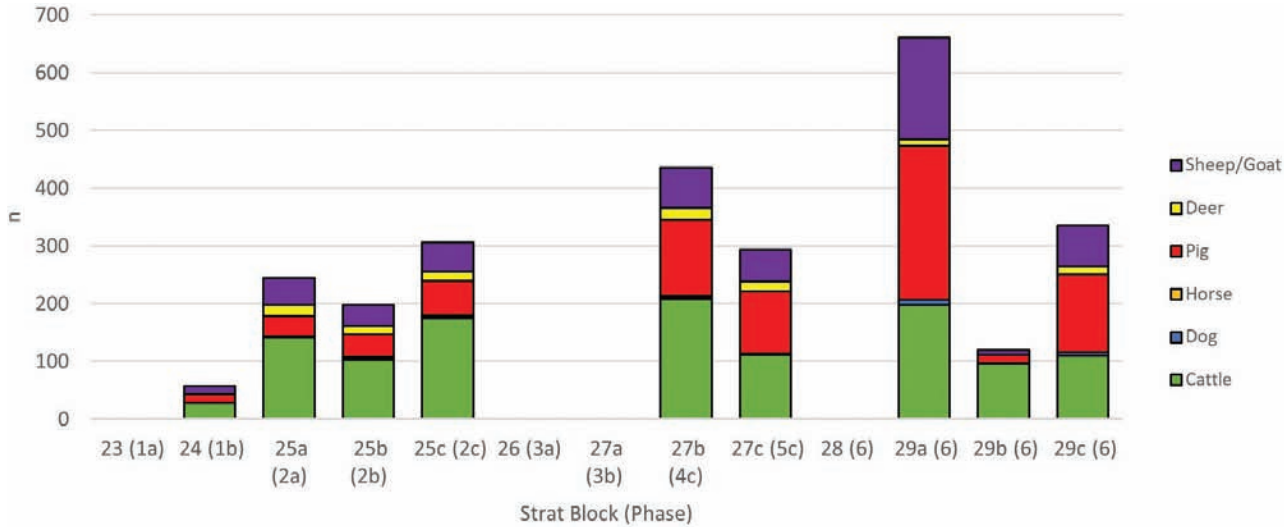


Figure 13.2. Animal bone: number of fragments identifiable to species by stratigraphic block, for excavated cave deposits

Capreolus) noted only from out-of-cave deposits (but with antler inside the cave). Fish and a limited number of amphibians were almost all recovered from cave deposits (Sections 13.4; 13.5). Minimal bird bones suggest little exploitation of wild resources, and included gull (*Larus* spp), duck (*Anas* sp) and *cf.* gannet (*cf. Morus* sp). The few dog bones were mainly medium size, although some larger examples (including a very large dog canine from C1.08) were present. Small rodent bones were moderately frequent, particularly from cave and entranceway deposits, and although most were undiagnostic both vole (*Mictotus agrestis*) and mouse, including wood mouse (*Apodemus sylvatica*), were noted.

Spatial and chronological distribution

Approximately 31,000 fragments were recovered from in-cave Trenches 6 (front), 1 (centre), and 17 (rear), of which *c.* 9% were identifiable to species/size (Table 13.2). A clear gap in deposition into the cave is seen, with material recovered from Phases 1–2, 4–6, but not Phase 3, despite sizeable faunal assemblages building up in the precinct at this time. Roughly equal total fragment and identifiable bone counts were recovered from each cave trench, but central Trench 1's smaller space suggests a focus for deposition, and deliberate transport into specific points in the cave. Interrogation at the sub-phase 'Stratigraphic Block' (SB) level reveals further depositional patterning (Fig. 13.2). While most Phase 4–6 cave deposits appear to derive from general midden spreads, the Phase 2 material suggests some early deposits transported into the cave. Material from central Trench 1 was less, and more fragmentary, during Phases 4–5 (SBs 27b-c) than that from Trenches 6 and 17, although the material was similar in character. The final series of in-cave deposits from Phase 6 (SB29c), accounting for approximately 9% of the cave assemblage, are however of extraordinary character and clearly differing from the general midden spreads. Although subject to some post-depositional disturbance, these deposits demonstrate clear structured deposition of specially selected and processed faunal material, rather than consumption waste, and show an extremely unusual species ratio, dominated by young pig showing unusual butchery and deliberate deposition of articulating remains. Discrete caches featuring three more heavily processed individual cows were also recovered from against the cave wall and from a ledge above the streamway (SB29b).

The precinct accounted for 87% of faunal-rich deposits outside the cave (Trenches 2 and 15, Table 13.1). Most of this (65.8%) was concentrated in hearth residue deposits associated with stairwell and walkways leading into the cave (Fig. 13.3). Precinct accumulation starts later than the cave, and limited Phase 2 bone (SB3–5) perhaps suggests material from Phase 2 precinct activity entered the cave. A series of bone-rich precinct deposits then form in Phases 3-4, each containing over 3% of the total site assemblage. Limited identifiable fragments from Phase 2 precinct walkways (SB3/4, 6) and no bone at all from Phase 3 walkways (SB12–13) suggests that walkways in both precinct and cave were kept clear of bone accumulation or did not see carcass processing or disposal. In the stairwell, approximately half the total Trench 2 material derived from four successive stairwell/entranceways to the cave (SBs 19, 21a–f, 22a–b), mainly Phase 6 contexts. Bone was recovered from both stairwell construction events and deposits relating to stairwell use. Excepting the final stairwell closure (Phase 7-22b) this stairwell material was very limited compared to precinct deposits of the same period and were dominated by indeterminate fragments.

Species distribution, butchery, and burning

Generally, across the complex, the animal bone was similar in species ratios, fragmentation, butchery, and burning, indicating that the cave material is directly linked with (especially) the bone-rich midden deposits of the precinct.

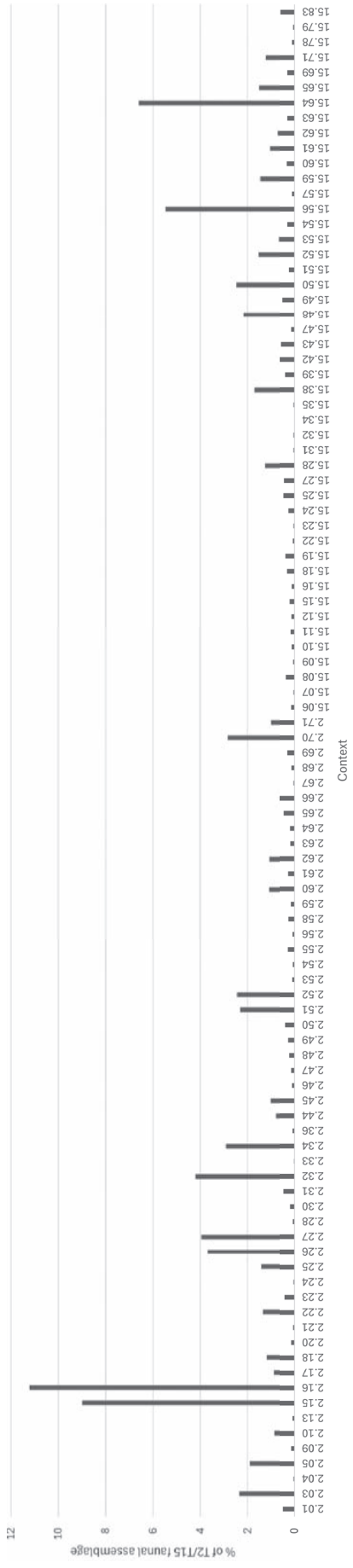


Figure 13.3. Distribution of precinct & stairwell animal bone assemblages by context

This is a typical late prehistoric midden assemblage, with burning, fragmentation, and deliberate butchery observed throughout. There was very limited dog/rodent gnawing, suggesting swift deposition of material.

Subtle differences in species frequency between cave and precinct is seen from Phase 4 on, with cave deposits somewhat more pig-rich (Figs 13.4 and 13.5). Body parts from across the skeleton were represented for all main species in all larger deposits, indicating primary butchery on site. Evidence of butchery was noted on both red and roe deer (the latter all from the precinct). Cut and chop/hack marks appeared to have been created by metal tools, with working clustered around joint articulations, with fragmentation high. More chop marks were noted on bones from larger mammals. This patterning indicates disarticulation into smaller parts for easier processing or disposal and the removal of meat. High fragmentation suggests deliberate and intensive processing to access marrow within the bone cavity. No working was identified on any dog or bird remains.

Horse was represented only through single teeth and so butchery could not be considered. In cave and larger precinct deposits, heavily butchered cattle generally dominated unburnt and burnt bone assemblages. Heating was seen throughout, with moderate burnt bone in most, and some in all, Iron Age deposits, predominantly brown/black (indicating direct heat, but not at high enough temperatures to calcify the bone) and calcined (burnt at above 360–525°C). Calcined bone is discussed in Section 13.3, and less highly heated material recorded herein. Burn profiles indicate a range of intensities, compatible with experimental 'campfire' profiles, and include pig, sheep/goat, cattle, and red deer. Some fish bone from both cave and precinct were also burnt, indicating domestic rubbish disposal for fish as well as mammal remains, and a small number of amphibian bones, which may be deliberate (perhaps for consumption) or accidental. Some Phase 1 (SB23–24) and 2 (SB25a–c) bone was heavily calcined and/or charred, although the Phase 1 assemblage was small. Particularly heavy burning was seen in Phase 2a cave midden deposits (SB25a), and contemporaneous precinct deposits associated with hearth F15.36 (SB5). Cave Trench 6 showed a particularly high proportion of charred bone, and material from precinct hearth deposits were generally more heavily burnt. There is no evidence of deliberate animal cremations, or of special deposits of burnt bone from individual animals, and no selection of particular species for processes involving heating, such as roasting, are noted. The Phase 6 'special deposits' were notable for low burning, in contrast to the general assemblage. Only surface trenches 14 and 19 contained a dominance of Iron Age calcined bone, and little unburnt bone.

Population: ageing and biometrics

Ageing evidence was limited, with only individual teeth or extremely fragmented partial mandibular rows recovered and very few complete post-cranial elements from the non-special Phase 6 cave deposits. A broad age at

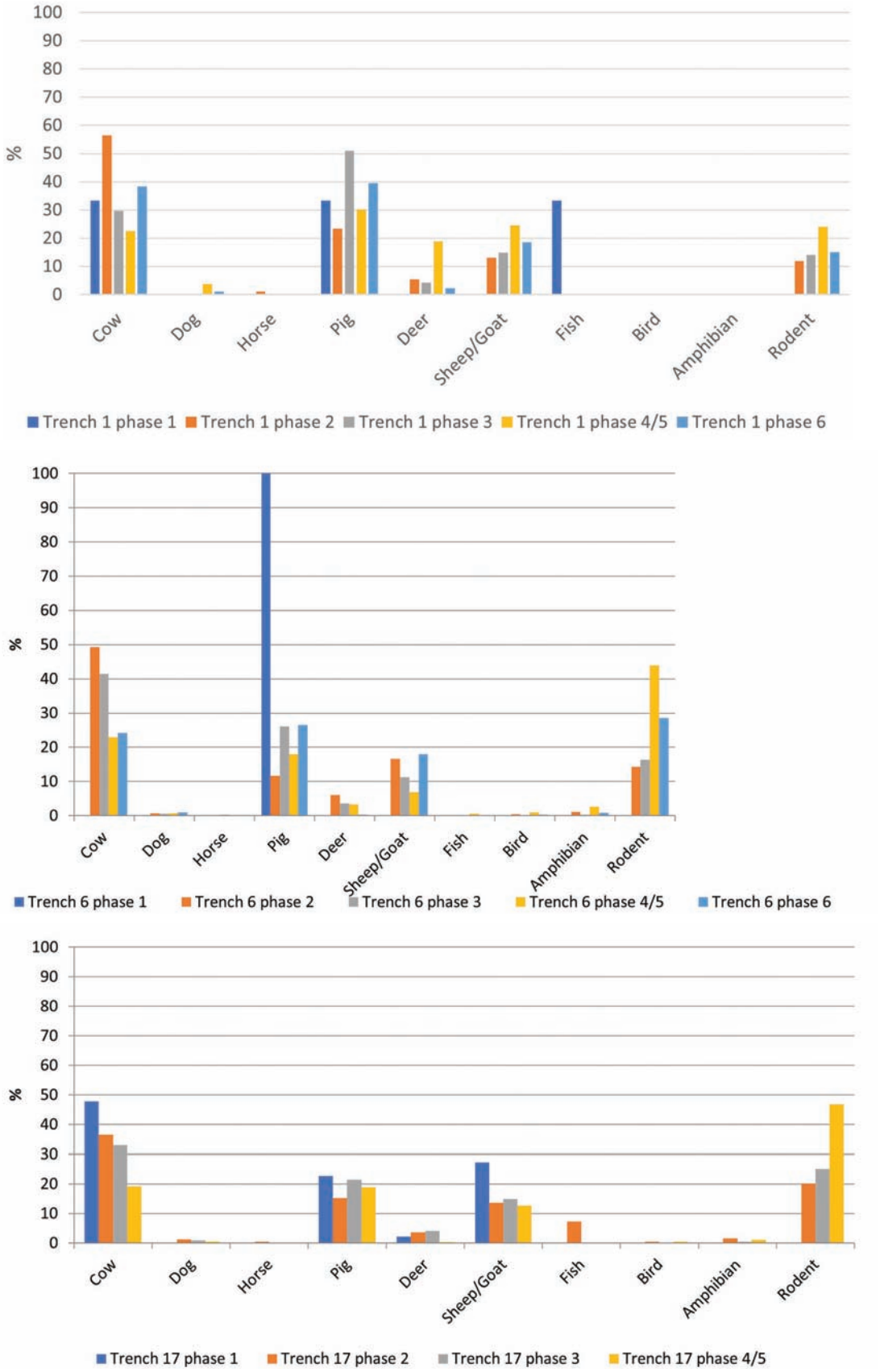


Figure 13.4. Animal bone species ratio of all identifiable species, by phase for cave trenches

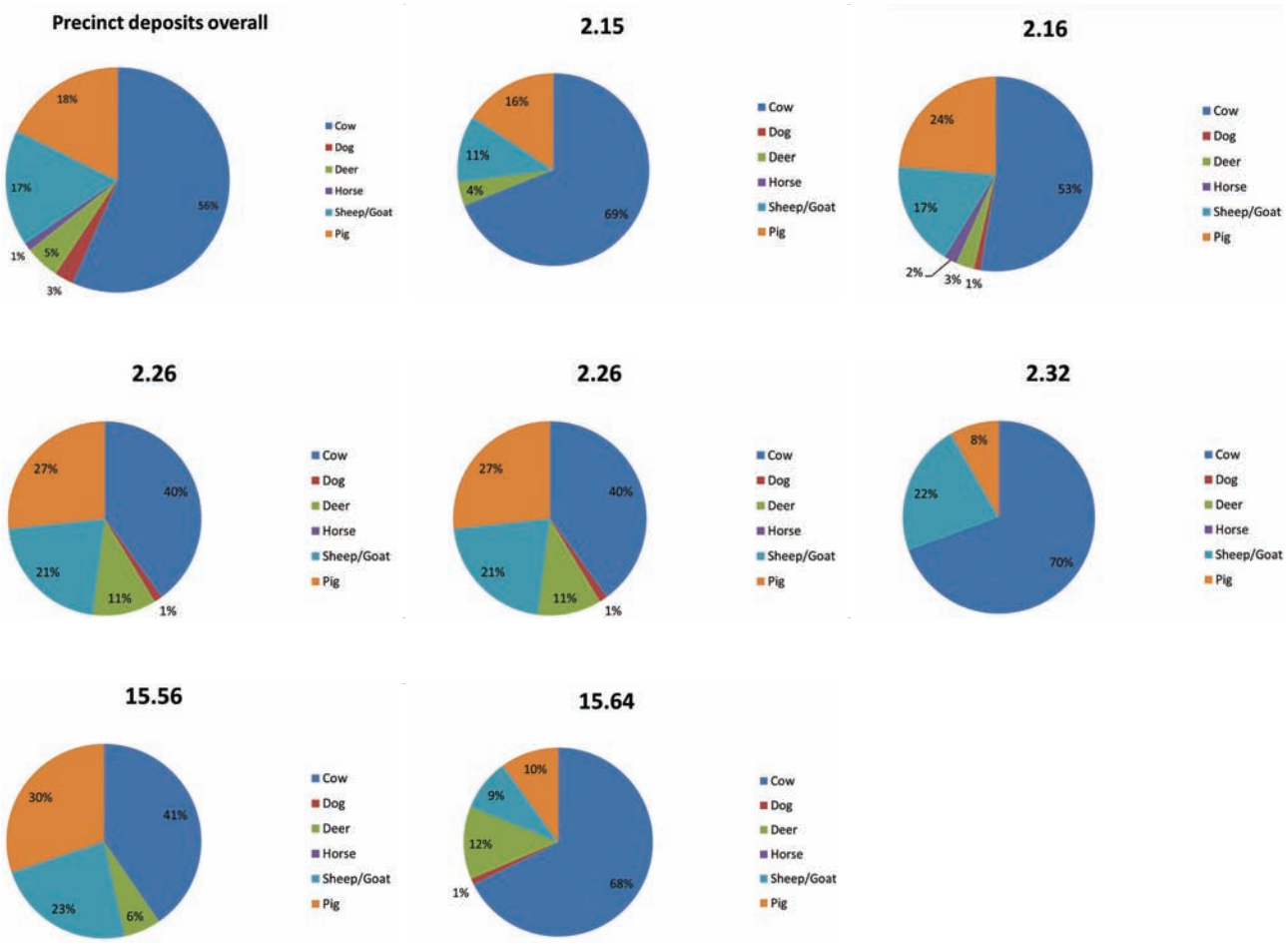


Figure 13.5. Summary charts for the main animal species within contexts containing over 3% of the total faunal material from the precinct area (all hearth midden deposits), in comparison to the overall precinct area combined species ratio

death profile for the three main domesticates was established by aggregating data from all Iron Age material (Phases 2–7) providing a reasonable dataset, albeit one to be treated with caution. This excludes the unusual cave deposits from SB29b–c and also the burnt bone assemblage, although observations on ageable elements within the burnt bone report are incorporated (Section 13.3). Horse elements (all teeth) were from mature animals, and red deer elements mostly adult, however evidence from both was too limited to determine age trends. Dog included both juvenile and adult, predominantly from medium to large individuals. For cattle, where reasonable ageable remains were recovered, much of the population was sub-adult or adult with some elderly (using O'Connor 1989 after Dobney *et al*. 1995 for aging categories). This age profile has been considered (*e.g.* Dobney *et al.* 1995; Mulville *et al.* 2005) to indicate a broad multipurpose herd profile. The assemblage lacks proportions of extremely young calf noted from sites where dairying has been positively identified (Mulville *et al*. 2005) although residue analysis at High Pasture identifies milk lipids, indicating some dairy utilisation, and a very few young calf remains were recovered. The burnt bone assemblage (Section 13.3) included no young calves, with a mortality profile suggesting some animals at or above the optimal culling age for meat, similarly suggesting a broad multipurpose herd profile. Evidence for sheep/goat was limited, but identified predominantly individuals younger than three years, with a peak at 2–3 years (categories: Dobney *et al.* 1995). This again suggests a multipurpose herd profile, with animals consumed at a reasonable meat weight, rather than producing significant wool clips. For pig, evidence for ageing outside of the 'special' pig-rich Phase 6 deposit was extremely limited, with few even partially complete tooth rows present and extremely fragmented post-cranial elements. Some mature and elderly pig was present in and out of the cave, younger pig remains were more common, with a predominance of immature individuals killed at over a year old. This suggests a domesticated

pig herd reared for meat, killed when reaching suitable meat-weights (if not fully reaching maximum potential). This contrasts with the Phase 6 deposit, where average age at death was under a year. Several mature canines of a size to indicate wild boar suggest hunting. No evidence for wild boar was present in the 'special' Phase 6 deposit. The extremely limited biometric data available for the three main domesticates fits approximately with equivalent Iron Age populations from Scotland. No clear differences in average measurements were observed between the Phase 6 'special' pigs and the general pig assemblage.

Structured deposition

Notable evidence for the structured placement of bone is indicated throughout the assemblage, either by the bone itself (species, number, treatment, placement) or by associated materials with 'special' characteristics, such as caches of artefacts or other environmental material (Section 13.6).

13.2.4 Assessment by phase

Phase 1

The limited quantity of Phase 1 bone both within initial silting into the precinct area (SB2) and the cave (SB24) may derive from inwash of material. However, the association of in-cave fragments from this phase with a small ceramics cache suggests at least some deliberate disposal of bone into the cave during the Bronze Age. Much of this was calcined, and present as small, indeterminate fragments (see Section 5.4.1).

Phase 2

The start of significant in-cave deposition (Fig. 13.2) with material typical of late prehistoric cattle rich consumption waste (but also sheep/goat, red deer, and pig) all showing butchery and burning, with a higher proportion of smaller fragmentary bone than later deposits. Significant burnt/calcined material was seen in some contexts (*e.g.* C1.09; C6.09, SB25a and C1.08, SB25b) but not others, suggesting a range of inputs. Cattle was particularly dominant in Phase 2b central cave deposits C1.07 and C1.08 (59% and 55%). Some 'cached' deposition is suggested, with much of the mainly unburnt bone from C1.08 (SB25b) concentrated in a discrete area behind a slab to the side of the cave, though the deposit is generally mixed, fragmented, and contained no refitting bone. Four damaged cattle skull fragments (frontal/orbit regions) and two very young cattle femurs were recovered from C6.08 (Phase 2a, SB25a). Pathological traits included evidence of mild osteoarthritis from a mature cattle calcaneus and astragalus from C1.07, and a cattle calcaneus and metacarpal from C6.07 (both Phase 2b, SB25c). Two cattle phalange and a red deer ulna from C6.08 also demonstrated areas of exotosis of the phalange and eburnation of the radial-ulna articulation respectively. A cattle third phalanx from C1.07 displayed some bone growth on the proximal articular plate, although not to a degree to have affected mobility.

Phase 2a

This shows a focus of deposition to the front of the cave (SB25a) (fragment count: Trench 6: n=2047, Trench 1: n=1049, Trench 17: n=265), with more bone identifiable to species (T6: 10.7%, T1: 1.9%, T17: 6%). A substantial (although lower) quantity is seen in central Trench 1 where several larger elements such as heavily-fragmented long bone shafts were recovered. Fragments from rear Trench 17 were smaller but easily identifiable elements such as teeth (cattle, red deer, sheep/goat, and pig) and small appendicular limb elements such as phalanges alongside tiny indeterminate fragments. Phase 2a (SB25a) material thus seems focused at the cave entrance, with filtering of smaller bone fragments further into the cave, perhaps by disturbance or trampling. However, no clear difference in species distribution was seen: Trench 17 (C17.08a; b) contained a higher proportion of smaller domesticates (40% pig v. 10–13% in Trenches 1/6), but this may relate both to the relatively small numbers of identifiable bones, and also proportionally smaller elements being transported further back in the cave. More heated (burnt brown/black or calcined) material was noted in Phase 2a deposits from C1.09 and C6.09 than for any later contexts except C1.08 (Phase 2b). By comparison, relatively little material was recovered from the precinct during Phase 2a, save walkway silting deposit C15.71 (SB3) and basal walkway infill C15.69 above this (SB4). Near the cave entrance, small amounts of bone in C2.71 and C2.72 (SB18) shows slightly less cattle than other Phase 2a precinct deposits. More bone from SB5 deposits, almost all C2.34, are associated with hearth F15.36 (no material was recovered associated with hearth F15.33). This is cattle rich, heavily processed with similar ratios of indeterminate fragments, and significantly with equivalent raised levels of burning (63%) and domesticate species ratios (9-14%) to contemporaneous cave deposits C6.09/C6.08/ C1.09. Bone from across the skeleton is present with no focus on meat-rich portions, suggestive of primary butchery. It seems possible that Phase 2a cave material originated from this hearth. Notably, much less evidence for burning is seen in the SB3–4 precinct walkway deposits than either these hearth or cave deposits (SB3–4 10.5–15%: typical of much of the High Pasture assemblage) suggesting these deposits may instead come from processing or transport of bone prior to heating rather than redeposited hearth material. No deer was observed in the walkway deposits (SB3/4), but two red deer elements were present in the large assemblage from hearth F15.36 (SB5).

Phase 2b

This phase starts with a compacted floor horizon in the cave (SB25b), which contained bone in C1.08 (centre) and C17.07 and C17.06b (rear). This was well preserved, mainly cattle (especially in C1.08) displaying high levels of burning, especially to the cave rear. A concentration of cattle bone, mainly unburnt, was located behind a limestone slab against the east cave wall in C1.08. This may be a deliberate cache forming a structured deposit, as may a concentration of fish bone, mainly herring, deposited in a concentration in the south part of the same context. C17.07 and C17.06b contained increased quantities of red deer antler, mainly worked. Deer remains included loose teeth, a mandible fragment, and bones from the lower limbs, while a single molar was the only element identified to horse. A large dog or wolf calcaneum was recovered from C17.07, while other elements identified to dog from this deposit included an astragalus, a single incisor and another burnt bone. A canine from a medium-sized dog was recovered from C1.08. Phase 2b deposits (SB25c) – middens C6.07 (cave front, above paving) and C1.07 (cave centre, above C1.08) - included substantial burnt/calcined bone, along with unburnt and butchered material. Cattle, sheep/goat, and small amounts of red deer were present. Much of C1.07 comprised medium-sized mammal, although identified species was dominated by cattle, with fewer pig, sheep/goat, deer, and horse. Deer was represented by a mandible fragment, a loose molar tooth, and two lower limb bones, while horse included two maxillary molar teeth. If material from SB25b (C1.08, C17.07, C17.06b) and SB25c (C6.07, C1.07) are considered together, closely equivalent numbers of cattle dominated, heavily fragmented bone are recorded for each trench for Phase 2b, with the only variation an increase in burnt bone in C1.08. The few indicators for structured elements also appear maintained through Phase 2b, such as the deposition of fish only into central Trench 1 in both 25b and 25c. Burnt bone provides the clearest evidence for differences in depositional practice between 25b and 25c: although there are fairly equivalent bunt bone counts between subphases, there is an increase in burnt bone deposition by weight in later SB25c, indicating that earlier SB25b burnt bone, skewed to the cave centre/rear, was more heavily fragmented, echoing Phase 2a. Overall, the assemblage indicates that patterns of deposition were similar through Phase 2b, rather than clearly separated 25b and 25c events.

No comparable material was recovered from the precinct during Phase 2b. A limited amount of material, largely unidentifiable, was recovered from deposits associated with the closing of walkway F15.37 (SB6), mostly C15.59. These are also cattle-dominated, with species ratios and overall levels of working and heating similar to the cave. Some dog gnawing is noted in Phase 2b cave material, indicating that bone may have been exposed on site prior to disposal, suggesting that cave material may well derive from the SB6 assemblage. While rodent, fish, and indeterminate bone fragments are more limited from the walkway deposits, this data are potentially affected by the rigorous sieving strategy employed for the cave. Burning in the SB6 material is also similar to the cave in SBs 25b–c, rather than the raised levels observed in C1.08. A limited amount of bone and burnt bone was recovered from a potential old ground surface or possibly redeposited burnt material pre-dating the burnt spreads, within surface Trench 19 (C19.10, SB31). Identified material was generally cattle.

Phase 3/4

Phase 3 saw the first development of large midden deposits in the precinct. However, no Phase 3 material was recovered from the cave, suggesting that this precinct midden was not transported into it. The next cave deposits date to Phase 4c (SB27b), the same period as the largest above-ground assemblages of SB8c. This cave assemblage is *c.* 50% larger than the equivalent precinct deposit, suggesting that, once again, the majority of the bone from the precinct was entering the cave. Phase 4 cave bone is similar to the above-ground material from Phases 3–4 in that cranial and post-cranial elements were present for cattle, pig, and sheep/goat, indicating butchery of domesticates close to site. However, for the first time, clear differences between cave and above-ground deposits are observable. Cattle dominate the cave assemblage, but pig increases significantly (36%, from a Phase 2 frequency of *c*. 18%). Cattle is present in the cave at a lower ratio than the precinct assemblages (48% cattle overall within Phase 4c cave deposits, 65% from above ground). In the cave, pig is raised in comparison to sheep/goat, a trend which continues from this period onwards; above ground, however, the ratio of sheep/goat to pig remains relatively equivalent. Although the precinct hearth deposits contained raised levels of pig in comparison to many Scottish Iron Age assemblages, they contained much lower levels than the cave during the same phase. Cave context C1.06 (27b), a potential Phase 4 closing deposit, contained a particularly high frequency of pig- including elements from both very old and young individuals, with fewer indeterminate fragments also recovered from Trench 1, suggesting the main cave deposit focussed on this central area than elsewhere in the cave at this time. Neither cave nor precinct deposits show contexts with notable burning, as in Phase 2, except in precinct Phase 3 deposits associated with hearth F2.15 (SB7e), a period where there was no material recovered from the cave. All of the Phase 3–4 assemblages are heavily fragmented and reflect intensive processing.

Seven Phase 3–4 hearth waste deposits contained the largest concentrations of precinct bone, with other contexts containing only very limited material. These

large middens start during Phase 3a (SB7a), with the largest assemblages recovered in Phase 3e (SB7e), 4a and 4c (SB8a, 8c). Deposits directly associated with hearth features (*e.g.* F2.10 and F2.27) contained limited bone. The distribution of bone in the precinct, close to the cave entranceway and hearths, suggests that waste was not being removed or deposited far from the site of processing or heating. Material is well-preserved and burning relatively low (*c*. 10–15%). This contrasts with Phase 2a hearth F15.36 (SB5) and indicates that faunal material from these phases may derive from processing prior to heating, perhaps disarticulation into joints and removal of meat. Some contexts do contain higher levels of calcined or blackened bone, *e.g*. Phase 3e hearth deposit 2.15 (SB7e), Phase 4 (SB8a) context C2.16, the largest out-of-cave assemblage of faunal material, and Phase 3c hearth F2.10/C2.27 (SB7c). These indicate burning at high temperatures. Several fragments from C2.32 contained charcoaled marrow cavities but no external burning, indicating breakage before exposure to direct heat. This suggests that these contexts may derive from hearth waste post-burning, rather than from carcass processing. Heavily processed cranial and post-cranial elements were present for cattle, pig, and sheep/goat, indicating butchery of domesticates close to site. There are few observable differences between the Phase 3 and 4 precinct assemblages other than this proportion of burning, although a slightly greater number of fragments identifiable to species were recovered during Phase 3b, a trend which continues through the large Phase 3e and 4c deposits.

Key deposits

C2.26a (SB7a) contained a greater amount of bone than typical for surface deposits in the precinct, with pig comprising 27–8% of material identifiable to species. Post-cranial and cranial elements were present for all three main species, with some very juvenile pig identified, and a single dog humerus fragment. It is possible that this material related to the use of hearth F15.36 and the closure of walkway F15.37 in Phase 2b. Alternatively, it may have formed foundation deposits associated with the construction of stairwell F2.35 [Block 19] at the start of Phase 3a. Contexts related to hearth F15.30 (SB7b) produced no burnt grain, but large quantities of well-preserved animal bone including cattle, lesser quantities of juvenile pig, mature sheep/goat and notable red deer elements; especially within C15.64. Some cattle bones displayed heavy chopping around articular ends, indicative of butchery for carcass division and/or limb removal. C2.27 (SB7c) produced more bone than is typical for precinct deposits, heavily butchered and fragmented, mostly cattle/large mammal, although some sheep/goat and a number of deer (red and roe, mainly teeth) were also recovered. The context also contained a notable quantity of bone with evidence of heating (both charred and calcined elements), with cut marks also noted on a number of the fragments, and also material from a very young dog. Hearth deposit C2.15 (SB7e) is of particular interest as a focus of deposition producing a number of significant artefacts as well as large quantities of charred plant remains. An extremely young piglet metapodial along with a calf metatarsal and femur were recovered. The presence of young animals is interesting, particularly considering their later significance within closure events, although evidence is too limited to draw significant conclusions. C2.15 is otherwise predominantly typical heavily butchered consumption waste, albeit atypically heavily burnt. Some young animals would be expected within the death assemblage. Hearth F15.20 (SB8c) contained a number of unusual deposits including a lyre bridge fragment, human remains, and evidence of metalworking residues also contained one of the largest concentrations of faunal remains within the precinct area, largely comprising heavily processed cattle remains, plus a concentration of rodent bones, largely rib and micro-vertebrae. Hearth F15.30 (SB7b) contained a raised frequency of red deer elements from across the skeleton (molars, phalanges, and fragments of calcaneum, pelvis, radius and metapodial- n=27) compared to both cave and precinct Phase 3–4 deposits. C15.56 (SB7e) showed by contrast the greatest concentration of pig (30%) seen outside the cave. However, many fragments were loose teeth (29 of the 44 identified pig elements), several of which may have derived from the same individual, though appendicular limb and cf. pig vertebrae/ribs were also observed. Of particular interest is a large deposit of animal bone recovered from C15.56 which partially covered hearth F2.15. This contained a range of cattle elements, including mandible fragments, scapula, and several carpals. Much bone was relatively complete, with cut marks noted in close proximity to articulations, indicative of carcass processing. Little heating suggested it was not exposed directly to fire. Although cattle dominate, red deer was represented through loose teeth and a maxillary fragment which may have derived from a single individual. Pig and sheep/goat comprise mostly head elements, pig slightly raised with both mature and juvenile elements present. Considering its deposition over hearth setting F2.15 it is possible that it relates to closure after what had been a long and intense period of activity.

Stairwell deposits

Approximately half of the total Trench 2 bone derived from four successive stairwell/entranceways to the cave (SBs 18, 19, 21a–f, 22a–b), with the majority of this material coming from Phase 6. In all phases except for its final closure (Phase 7-22b), stairwell bone was extremely limited compared to precinct deposits of the same period and dominated by indeterminate fragments. For several Phase 4 stairwell features F2.23 (Landings F2.25, F2.43, F2.44), no bone was recovered. The largest, albeit still

small, Phase 4 stairwell assemblage derived from Landing F2.40 (SB21a). No Phase 5 stairwell material was recovered. Bone from the stairwells prior to Phase 7 were similar to that both from contemporaneous surface midden deposits and in-cave deposits, with cattle dominant and butchery evident, with it probable that much material may have been accidentally deposited. A large percentage was unidentifiable to species or mammal-size (80.1%) with comparable levels of heavy fragmentation between stairwell and in-cave material. Considering the similarities between cave and precinct, stairwell bone may largely be residual from either infilling of the successive cave entranceway with material from the surrounding precinct area (from deep bone rich middens of Phases 3–4) or accidental deposition during transport of bone into the cave. Two worn horse molars were present on Phase 4 (21c) stairwell F2.23 landing F2.42: horse is not identified from other landing features or contemporary precinct deposits (8b–c), and horse is generally limited in the faunal assemblage. No deer was noted within the smaller stairwell deposits (a single example noted in Landing F2.40), whereas a very small proportion of the precinct assemblages comprises deer, largely red deer, during this time.

A slight raise in the proportion of pig is seen in two of the landing features (Phase 4: SB21a, 21c) in comparison to earlier stairwell material and other Phase 4 landing deposits from the same stairwell but limited identifiable material from these deposits means it is difficult to interpret too closely. The dominance of pig within 21c derives from a number of pig teeth, which potentially may all have originated from the same mandible. A greater proportion of rodent bones, predominantly, ribs and micro-vertebrae, were present in the later stairwell deposits, particularly from Phases 6–7, from stairwell 3, but in general absence of rodent gnaw evidence, these are likely to be intrusive. While little of the stairwell bone exhibited pathology, two sheep/goat metatarsals from C2.65, potentially from the same individual, displayed bone growth on the shaft suggestive of healed fractures.

Phase 5

The cave (SB27c)

Significant bone was recovered within the cave during Phase 5c (SB27c), although no material in the cave is associated with earlier Phase 5(a–b) surface deposits. This is concentrated within Trenches 6 and 17, with a particular concentration of bone identifiable to species within C17.03. Butchery included heavy chop and finer cut marks indicative of consumption, with high fragmentation. A very large male pig canine from C6.05 indicates hunted boar. A small amount of dog included a fragment of immature radius and a partial dog mandible, with some loose teeth also present in C17.03 and a medium-sized dog cranium (most of the upper skull complete) in C6.05, where a large dog canine was also recovered. A cattle incisor with a large carious lesion was present in C6.05. Bird and amphibian bone were also present in low quantities. A significant proportion of rodent bone was recovered from Phase 5c, predominantly rib and micro-vertebrae and individual incisors and molars. Cattle dominated, with sheep/goat, pig, and red deer all present. If domesticates only are considered, a much greater proportion of pig is present in the cave deposits (SB27c) than the precinct material (9c: 37% versus *c.* 11%), with fewer cattle present than in the precinct, and a reduction in the comparable presence of sheep/goat. These trends, and ratio of pig within Phase 5c cave material compares to the Phase 4c cave deposits and may relate to a closing deposit at the end of Phase 5. While these deposits seem likely to represent midden deposited into the cave from the precinct, some selection of material entering the cave is therefore still indicated. Similarly, while evidence of heating of precinct material was typically limited, the cave assemblages showed even less calcined bone, perhaps suggesting that material had been gathered from processing rather than hearth deposits. While context C2.05 contained a larger proportion of heated bones (23.9%) burnt fragments were still limited in comparison to the identified Phase 3–4 burnt deposits. Despite the association with some hearth features in Phase 5, a minority of the bone from the bone-rich deposits was burnt, generally correlating with the low levels of burning in cave material of the same phases. A number of pathological bones and teeth were observed in the Phase 5 cave assemblage, but no examples were noted from the contemporary precinct material. C6.05 included several ribs with areas mid-shaft displaying bone thickening indicative of recovery from mild damage, a cow metacarpal with an abnormal distal articulation and a cattle calcaneus exhibiting some mild eburnation of the major articulation.

The precinct (SB9) Cattle dominate with sheep/goat and pig significant domesticates. While a few examples of dog were noted, few traces of either dog or rodent gnawing suggest swift deposition after processing. Phase 5a material from hearth F2.13 (SB9b) contained greater proportions of pig than hearth F2.05 (SB9a), but the limited number of bones identifiable to species make it difficult to determine whether these are true variables. A high level of fragmentation suggests deliberate and intensive processing to access marrow. Heavy chopping on post-cranial elements around articular ends was observed. The frequency of pig observed in the precinct material is generally comparable to the cave and stairwell material. The range of bones included cranial and post-cranial elements, again suggesting processing for consumption, with both waste elements and meat-bearing parts of the skeleton deposited rapidly in the same locations.

No Phase 5 material was recovered from the stairwell, and surface trenches possess so few elements identifiable to species (n=19) that assessment is difficult. Outside of the hearth deposits, other precinct features contain limited

amounts of bone of little diagnostic value, often poorly preserved.

Phases 6–7

The precinct Bone from Phase 6–7 deposits, contemporary with the pig rich and cattle deposits within the cave and the stairwell burials, was limited: 169 fragments in total, many indeterminate, from six hearth debris contexts. In contrast to much of the assemblage, heavily burnt fragments dominated deposits C2.01. This material is extremely fragmentary, with only 21% of material from Phase 6–7 surface deposits identifiable to species or species size. No refitting or articulating bones were observed. There was no dominance of pig, unlike the in-cave material. It clear that these surface assemblages cannot be clearly associated with the unusual remains found within the cave. Although poor preservation precludes further interpretation, this material appears generally similar to the cave midden material dated to Phase 6, rather than the Phase 6 'special' deposits. Cattle dominate, with only small amounts of sheep/goat, pig, and deer (predominantly red, although roe was also noted). The limited quantity of material perhaps indicates that bone during these later phases was largely deliberately collected and deposited within the cave with only remnants of heavily burnt hearth refuse remaining, unlike earlier phases where larger midden deposits were allowed to accumulate at ground level. The presence of Phase 6 midden within the cave indicates that it was used for disposal of surface rubbish, of a similar nature to the limited material found at ground level, during this period, as well as for more significant depositions prior to its closure.

The cave (SB29a–c)

Phase 6 deposits in the cave generally represent 'normal' consumption waste, largely similar to preceding material. Cattle dominate the fragmentary butchered assemblage and while pig was again extremely high for a late prehistoric domestic assemblage, this pales in comparison to the C001 'special' pig-rich deposit discussed below. In these more typical deposits, no concentration of young pig remains was noted and bone condition was generally poorer. Around 10% of the fragments displayed heating (compared to just 2.7% from C001) mostly brown/black with very little calcined material, suggesting the bone had not been exposed to high temperatures. Both material from floor F6.01 (SB29a) and the smaller midden deposit (SB29c) were pig-rich (41% and 42% respectively). A greater number of indeterminate bone fragments was present compared to C001, likely due to sieving, whereas the unusual cave-surface deposits were hand collected, with similar ratios of indeterminate fragments, as well as ratios of cattle, deer, and sheep/goat, were seen in all excavated Phase 6 deposits. Some differences were noted. A clear concentration of identifiable material was recovered from F6.01 floor deposits (SB29a–b) at the cave rear (C17.03), and only limited material recovered from Trenches 1 and 6. The Phase 6 midden (SB29c) did not contain any material from the back of the cave. The floor deposits (SB29a) contained a number of pig vertebrae cleaved along the spine, and similarly cleaved cattle vertebrae, correlating with the special deposits, whereas the midden did not. However, some mixing with the special deposits, due to caving activity, is suspected (Birch pers. comm.). The midden (SB29c) contained a number of examples of very juvenile pig, including several skull fragments and a few appendicular elements in C6.03. However, older pig was observed, and the dominance of relatively young pig seen also in C001 (below) is not present. These assemblages were more heavily broken than the succeeding special deposits, with no articulating bone observed, and represent an assemblage processed for consumption. Few pathological bones were noted, except a dog ilium fragment with an area of unusual bone porosity, and a red deer tibia fragment displaying some minor bone modification mid-shaft. No refitting fragments were observed except six medium mammal cranial fragments (*cf*. pig) in C6.03, indicating undisturbed material. A neonate dog Ilium and ulna recovered from C6.03 may have filtered down from the later blocking deposits of the entrance stairwell (Phase 7), from which further neonate dog elements were recovered. From C1.04 two *cf*. cattle thoracic vertebrae with pathological lesions and areas of necrosis were noted. A pathological sheep/goat radius, two medium mammal rib fragments with thickening of the bone mid-shaft and a large mammal vertebrae with further pitting and necrosis were present in C17.03. More pathological bone is seen in this phase, but most does not suggest injuries or disease that would have caused severe mobility problems. The *cf*. cattle vertebrae from C1.04, however, displayed enough bone modification to indicate that the animal would have been in some distress.

Phase 6 special cave deposits (SB29b–c)

Likely deposited just before the cave was finally made inaccessible (Birch 2013; Section 8.3) these deposits are markedly different from both preceding deposits within the cave and those of the precinct. Two distinct deposits are recorded: a spread of pig-rich material across the surface of the cave (C001, SB29c), and three separate discrete caches of articulating cattle bone recovered from niches at the side of the cave or the active streamway beyond (SB29b). C001 was extremely well preserved, with (in contrast to the highly fragmented nature of much of the assemblage) many complete bones present, and 42.7% of fragments identifiable to species. Preservation was so good that, for the pig bones, many epiphyses could be refitted with their associated diaphyses (Fig. 13.6). Four pig bones give a Late Iron Age date range of (390–160 cal BC) for the deposit. Pig

dominated, at 74% of identifiable bone, unprecedented for an Iron Age Hebridean site, and a clear deviation from the wider cattle rich assemblage from both cave and above ground. Sheep/goat and cattle in C001 included cranial and long bone fragments, suggesting that waste from all parts of the carcass had been deposited, as observed generally in the assemblage. Butchery on both sheep/goat and cattle took the form of cut and chop marks, and bone was typically fragmentary, suggesting butchery for marrow access for these species. Both juvenile and adult cattle and sheep/goat were noted, with some sheep/goat loose teeth from elderly individuals – fitting the age at death pattern seen across the assemblage. Some of this more typical bone material may derive from mixing with underlying cave deposits (Birch pers. comm.). By contrast, pig bones showed no evidence of breakage for marrow, with extremely little fragmentation. The pigs had, however, been butchered with working comprising numerous fine and deep cut marks: 40.2% of the pig bones exhibited evidence of working (Fig. 13.10), much higher than the general level of butchery in the High Pasture assemblage. Pig butchery demonstrated regularity in working patterns on the bones, focused on points of disarticulation (Fig. 13.7). The majority are interpreted (following Binford 1981) as dismemberment and filleting to remove meat, while the carcasses were still fresh. Cranial fragments from two individuals indicated that skulls had been removed and also split sagitally down the medial line (Fig. 13.9). Division into left and right down the saggital line was also noted for a significant number of the *cf*. pig vertebrae. Division into sides is unusual in Iron Age faunal assemblages, with no similar examples from contemporary Scottish sites. The splitting of the skull may perhaps have been to access the brain for consumption. All parts of the appendicular skeleton were present in the C001 pig, suggesting relatively complete butchered carcasses were deposited rather than simply meat-rich joints. As well as refitting epiphyses-diaphyses, articulating limbs could be recreated (Fig. 13.7). Meat-bearing long bone elements were particularly well represented, with smaller elements such as phalange more poorly represented (Table 13.3). This may reflect preferential recovery of larger, robust elements by hand-collection, or may indicate that pigs were processed elsewhere, and bone material then gathered and transported into the cave, with some loss of smaller elements.

The C001 pigs demonstrate several pathologies, with two ribs showing healed fractures and a further rib with notable osteophytosis around the articular facet. A pig mandible with bone reformation caused by a misaligned molar growing through the jaw was observed. Two primary pig phalange presented massive quantities of cavitation pitting and bone formation indicating severe and permanent lameness, with bone growth likely to have taken a long time to accumulate. It is unlikely that a pig with such foot problems would have been able to forage – further evidence that the pigs were sustained or supported by humans. While a mixture of mostly domestic pig with some hunted wild boar is not unusual for late prehistoric assemblages, C001 showed no inclusion of wild boar. While the presence of domesticated pig is typical for Scottish Iron Age assemblages the location of High Pasture, with no domestic settlement identified, raises questions about where these animals were being husbanded. The presence of increased cranial/head elements suggests primary butchery of the pigs occurred nearby, as it is unlikely that such elements would have been transported far (O'Connor 2000). The quantity and preservation of the C001 bones enabled a minimum number of individuals (MNI) count to be calculated for pig, considering fusion status, bone completeness and size, and tooth-wear and eruption status for mandibular elements (Bourdillion and Coy 1980). Eruption stages of pig dental development were aged using Rowley-Conwy (1993), allowing ageing even of fragmentary mandibles. A number of mandibular and maxillary tooth rows could also be visually matched (Fig. 13.8). Appendicular elements gave a MNI of twelve pigs, of which one was extremely young. The mandibular and maxillary tooth rows, when paired and aged using tooth wear and eruption data, gave a MNI of almost double: 21 individuals (Table 13.3). This discrepancy might indicate an additional deposition of cranial elements with up to twelve more complete carcasses or limbs. While tooth rows calculated more individuals than post-cranial elements suggested, the number of pig-sized ribs and vertebrae in the assemblage was more limited than anticipated, again indicating some deposition

Table 13.3 Summary table of C001 pig MNI by side for post-cranial elements

Element	*Left*	*Right*	*Overall MNI*
Scapula	4	6	6
Humerus	11	9	11
Radius	7	12	12
Ulna	10	10	10
Carpals	3	3	3
Metacarpal pairs	4	6	6
Pelvis	7	8	8
Femur	8	9	9
Patella	4	3	4
Tibia	8	12	12
Fibula	7	–	7
Astragalus	3	3	3
Calcaneus	7	5	7
Tarsals	5	5	5
Metatarsal pairs	6	11	11
Phalange	5	–	5



Figure 13.6. A. C001 pig tibiae, illustrating preservation & completeness of the bones; B. pig forelimb bones (humeri) with refitting epiphysis; C. C001 refitting pig forelimb (images: Jeff Veitch, Archaeology Department, Durham University)

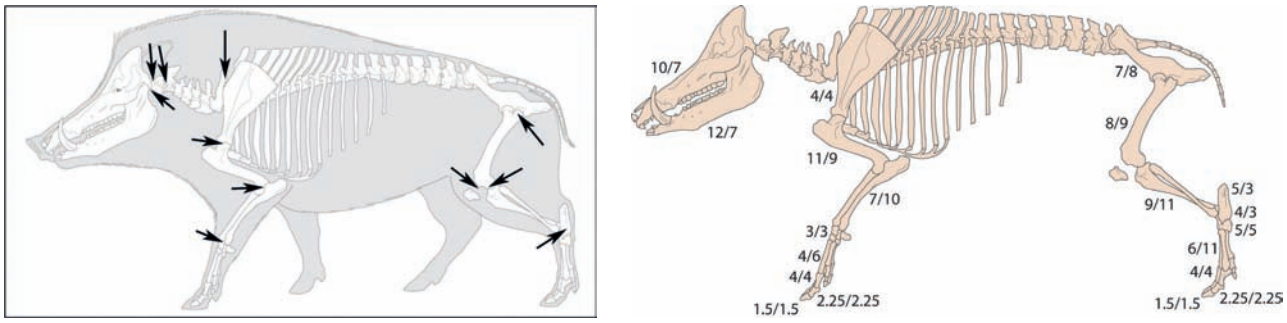


Figure 13.7. Left: points of disarticulation of the context 1 (SB29c) pigs as identified from working (base diagram ©1996 ArcheoZoo.org: Michel Coutureau (Inrap) with Vianney Forest; after Pales and Garcia 1981, pl. 45); right: C001 pig MNI by side for cranial & post-cranial elements

of areas of the skeleton rather than whole carcasses. One clear grouping of pig mandibles with an age at death of 7–9 months was noted (MNI: 12), as well as nine other individuals of varying ages, one only a few months old. Pigs do not reach their full size and weight until 2/3 years old (Maltby 1996) and so this indicates that the pigs were not being utilised to their full nutritional value. Only three of the individuals were over 21 months, so few were reaching full size and weight and no individuals of clearly over 2 years were identified through teeth aging. This is unusual for Iron Age pig, where a predominance of older subadult and adult individuals would be expected. Theis also contrasts with the rest of the High Pasture Cave pig – although comparable data are more limited, a greater proportion of pig elements from individuals over a year old were noted. Similar age profiles of predominantly juvenile pigs are seen occasionally elsewhere, for example at Howe, Orkney where 52.5% of the pigs died before 1 year old (Smith 1994). Similarly, at Crosskirk, 61% of the pigs were juvenile (Fairhurst 1984).

Pigs are born in a relatively short season, with reproduction dependant on food availability (Lauwerier 1983; Noe-Nygaard and Richter 1990). It is likely that one breeding season a year would occur around April. Using a presumed April farrowing date, it was possible to consider specific 'season' of death (Fig. 13.11). On at least one occasion there were deposits of pigs killed in mid-winter, with a peak killed in their first winter and an additional group approximately 12 months older (Fig. 13.11). This suggests deposition in a one-off, midwinter event. Overlapping radiocarbon dates somewhat support this suggestion. However, a small number of jaws do not fit this kill pattern. These may represent a separate deposition event or be present via mixing of C001 with underlying midden (Birch pers. comm). The overwhelming trend of a mid-winter kill event is most likely. Epiphysial fusion of the C001 pig bones confirmed that the majority of the pigs were juveniles under 1 year, but also included two older individuals of *c.* 3½ years of age. The very young piglet scapula of at most a few days of age also reflected an age not identified from the dental data. As well as largely confirming age at death, epiphyseal fusion identified three further individuals, bringing C001 pig MNI to 24. While well-preserved articulating material is present, material from 24 entire pig carcasses has not been recovered. Few C001 bones showed burning (only 2.7%). This may mean meat was removed from the bone prior to cooking or cooking methods such as boiling were used. An almost total lack of gnawing or weathering indicates that the bone was deposited swiftly.

Three discrete caches of heavily processed cattle bones were also identified, and recovered separately to the C001 spread, providing further evidence of deliberate structured deposition. These are believed to have been deposited at a similar time to C001, with two of the caches producing overlapping date ranges (but separated with Bayesian analysis. These caches must have been deliberately placed by hand. Two were identified as discrete bone piles in recesses by the cave wall (Features F.001 (350–30 cal BC) and F17.205), one placed in a boulder setting against the east wall, and the other within an alcove at the north end of the passage. The third was placed on a ledge further into the cave complex, above the active streamway (C001/5: 370–90 cal BC). A very small amount of material recovered from Lake Passage is potentially associated with this cache, displaced into Lake Passage via water transport. These caches comprised material from three individual cows, one in each location, two aged at 15–16 months and adult (over 3½ years) respectively, with the other also an adult (Fig. 13.12). None could be sexed, and no evidence for burning, or dog/rodent gnawing was apparent.

In contrast to the C001 pig, all three cattle were heavily fragmented, probably for marrow access, with butchery evidence on over 60% of the bones in all three caches. Deep chop marks and finer cut marks indicated dismemberment with a heavy tool before filleting to remove meat, typical of Iron Age consumption butchery. The skull of cow F.001 had been cut along the medial line, with knife-cut clearly visible, similar to the C001 pig skulls. Many bones in all three deposits could be refitted despite their breakage in antiquity. The spine of cow F.001 could be reconstructed almost entirely, including the refitting of vertebral plates. The cattle remains therefore appear to have been gathered and deposited after meat was removed



Figure 13.8, Left: refitting pig mandible & maxillary tooth row fragment; right: examples of pig mandibles from C001 assemblage (photo: Jeff Veitch, Archaeology Department, Durham University)



Figure 13.9 Pig skull cleaved on saggital line using a metal knife (photo: Jeff Veitch, Archaeology Department, Durham University)

and the carcass broken down, with bone piles indicating that effort was taken to transport the waste to specific points within the cave. The rearmost, streamway cache (F17.205) showed a full set of left fore-limb carpals preserved in an articulated position by covering calcite, indicating that this limb was placed as an articulated joint. Other bone in the calcite block was jumbled together, demonstrating gathering together after processing. The absence of major body parts including any cranial material or femora from C001/5 may suggest either post-depositional disturbance of this material or the deposition only of specific portions of the cow in this location, above the active streamway rather than in Bone Passage itself.

Phase 7

Final stairwell closure deposits (SB22b)

Phase 7 contexts C2.44 and C2.45 (SB22b), associated with a human burial in the final closure event of the final stairwell, included unusual bone deposits (Table 13.4) indicating structured deposition of individual animals in association with the burial of an adult



Figure 13.10. Cut marks on pig bones using metal knives (photo: Jeff Veitch, Archaeology Department, Durham University)



Figure 13.11. Season of death: C001 pig from tooth row aging. Each line represents a single ageable mandibular or maxillary fragment. Where jaws were too fragmentary to identify to one stage, lines are longer to encompass all possibilities

female and associated juvenile. While the faunal remains are extremely fragmentary, much of a perinate piglet is present, with enough recovered to identify that a single piglet was deposited (Fig. 13.14). Although fewer bones were present, elements including both head and limb of an extremely young puppy were also recovered (Fig. 13.13). There was no evidence of butchery of either animal. The position and orientation of the animals was not recorded during excavation, although the foetal pig was deposited with two small bundles of perinatal and foetal human bone including cranial, vertebrae, and rib elements in a void between a limestone wall and stairwell infill deposits, at

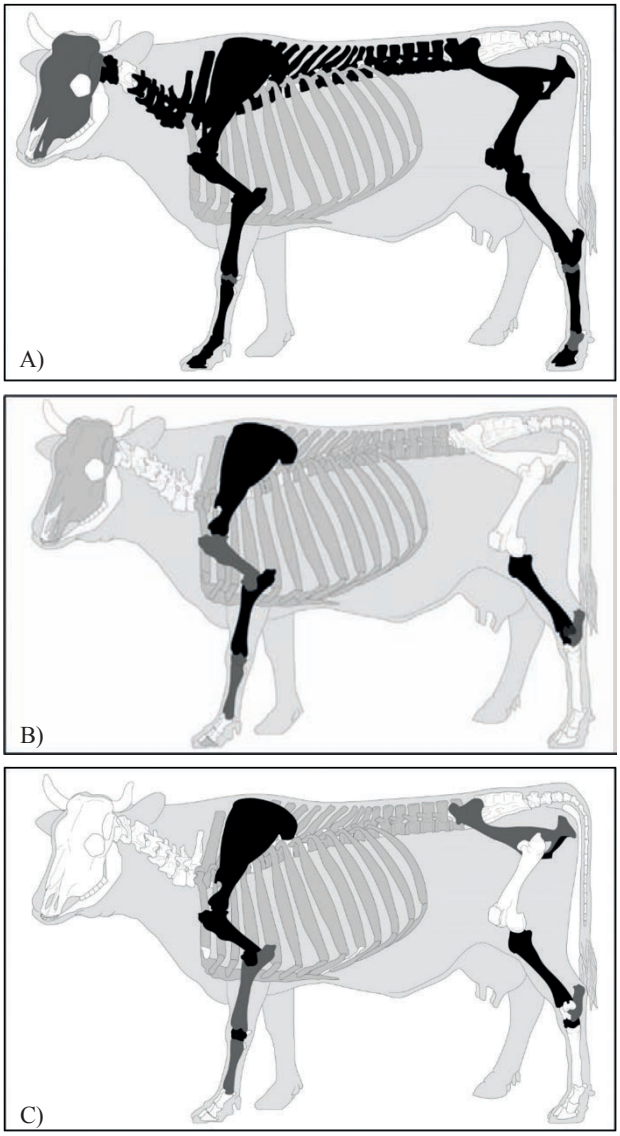


Figure 13.12. Elements present of: A. the F17.002 (SB29b) cow: B. the F.17.001 (SB29b) cow (only 9 cranial, 6 thoracic/lumbar vertebrae, & 26 rib frags; for single-side elements: left calcaneus, metacarpals, carpals, & ulna only, right humerus only; C. the C.001/5 (SB29b) cow (only 3 cervical & 8 lumbar vertebrae & 55 rib frags; for single-side elements: left calcaneus, left Ilium, & ischium,. right ulna (both radii present), right metacarpals. All: black both sides present; dark grey: 1 side only present; light grey: present (not sided); white: absent (base diagram ©1996 Archeo-Zoo.org: Michel Coutureau (Inrap) with Vianney Forest; after Baron 1976, 22 pl.7)

a slightly lower level than the feet of the adult female. A small amount of fragmentary cattle, sheep/goat, and older pig bone were also present, perhaps accidently incorporated from midden material. A large adult male pig canine was also present in C2.45. A very few fragments of juvenile cattle bone were also noted, although too few and fragmentary to age or interpret as a calf burial. The burial of young unprocessed remains is observed in other Scottish Iron age sites, such as Baleshare, North Uist (Barber 2003) and this deliberate placement of very young skeletons of two species suggests ritual deposition in this final closure event. While some very juvenile pig, cattle, and dog were recovered from a small number of other contexts at High Pasture, there is no clear evidence for other individual burials other than the accumulation of a few fragmentary young pig elements, including skull, in C1.06 which may derive from a single individual. Extremely juvenile remains (cattle, dog, or pig) were identified from hearth deposit C2.15 and cave contexts C6.03 and C17.03. It is probable that the presence of such young material in the general assemblage merely reflects natural occurrence.

Table 13.4 Summary of fragments from deposits considered in main faunal report associated with the stairwells

	Stairwell 1: F2.35 (SB19)	*Stairwell 2: F2.32 (SB20)*	*Stairwell 3: F2.23 (SB21)*
Bird	2	–	–
Cattle	47	17	73
Dog	11	–	30
Horse	1	–	2
Sheep/goat	21	9	33
Rodent	6	–	183
Pig	17	17	55
Red deer	7	2	4
Large mammal	98	75	148
Small/medium mammal	46	31	52
Indeterminate frags	1666	1248	1139

Surface trenches

Outside of the precinct area, few non-hearth features contained any faunal remains, and no significant assemblages were present. For these, data was too limited to consider species ratios but is recorded in the overall species list (site archive). Bone from pit fill C2.68 was unusually heavily burnt, with 44% of fragments blackened or calcined. The general lack of bone outwith the precinct area demonstrates how focused faunal deposition was around the cave entrance. Much of the faunal assemblages in ground level trenches was extremely degraded, making identification difficult, and few conclusions could be drawn. Most material contained limited evidence of direct exposure to flame (a sheep/goat fragment from C3.03 and a tooth enamel fragment from C19.03 demonstrated burning to the cortex and tooth enamel suggestive of direct heating) and a few fragments from context C18.03 were calcined, indicating exposure to high temperatures. A notable proportion of the bone from C21.04 was calcined (33%), with no burning noted from other material from this trench. Material from these trenches is typical of utilitarian faunal assemblages

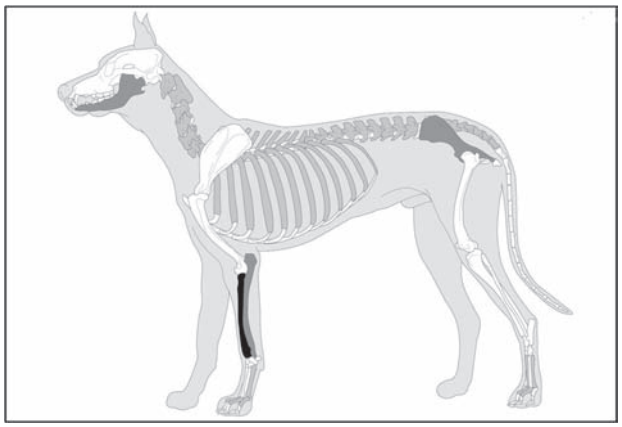


Figure 13.13. Elements of neonate dog present in contexts 2.44/2.45 (SB22b). Phalange & meta-podia not determined to fore/rear limb. Few vertebrae & rib fragments present, for single-side elements: left ulna & pelvis frags, right mandible only. For key see Fig. 13.12 (base diagram ©1996 ArcheoZoo.org: Michel Coutureau (Inrap) with Vianney Forest: after Barone 1976, 25)

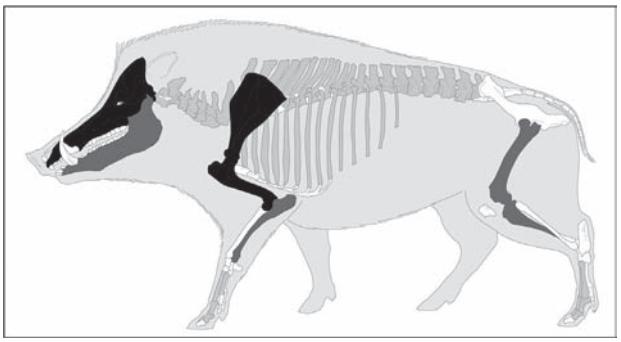


Figure 13.14. Elements of perinate pig present in contexts 2.44/2.45 (SB22b). Phalange & metapodia not determined to fore/rear limb. Few vertebrae & rib fragments present, for single-side elements: Left ulna & Tibia only, right femur & mandible only. For key see Fig. 13.12 (base diagram ©1996 ArcheoZoo.org: Michel Coutureau (Inrap) with Vianney Forest; after Pales and Garcia 1981, pl.45)

from prehistoric Scotland, with limited evidence for use of wild resources. Burnt mound deposits (Trenches 9 and 14) contained a particular paucity of bone, typical for burnt mound features in Britain, with little interpretation of such features possible.

13.2.5 Discussion: the assemblage

One challenge when placing High Pasture in context with other Scottish Iron Age assemblages is its lack of evidence for the domestic activity from which most of these derive. The range of animals at High Pasture is, however, typical for Scottish Iron Age sites. Pigs are routinely present in Scotland, including island settings, from the Early Iron Age, as the third most common domesticate after cattle and sheep/goat (Smith 2000). With pig typically *c.* 3–4% of an assemblage, at most no higher than 22% (Drew 2005), pig at High Pasture Cave is relatively high for the Iron Age, through cave and precinct deposits, with this dwarfed by the dominance of pig in the Phase 6 'special' cave deposit.

The High Pasture assemblage is interpreted as the remains of highly processed consumption waste, albeit not from a typical domestic setting, with the numerous precinct hearths suggesting that much of this happened in the immediately vicinity of the cave. It is possible that the cave was used as a convenient repository for animal refuse from precinct events, where large quantities of similar waste also built up. Bone was deposited in the cave as large, heavily fragmented spreads, relatively swiftly after butchery, with limited evidence for specific placement of material within the cave for much of its use beyond some subtle differences across deposits.

Relatively few wild resources were utilised, mainly deer (predominantly red). A few companion animals, particularly dog, are noted, with no evidence for consumption. While this is not unusual for Iron Age sites, it is maybe surprising considering High Pasture's location. A lack of occupation evidence raises questions over where domestic species were kept in the landscape, with faunal evidence suggesting slaughter and processing close to site, and isotopic evidence indicating differing management, while alive, of the 'special' deposit pigs compared to those from other deposits (see Section 11.4). Dominant domesticate fauna (cattle, sheep/goat, and pig) were generally being managed for meat, although other products such as milk and wool were also utilised.

As well as heavily processed midden, more unusual faunal deposits are seen in contexts specifically associated with the ending of access to the cave (Phases 6–7). While it is difficult to determine the motive behind their creation, it appears that a single event (or events) saw the deposition of butchered pig remains, potentially from animals reared on a special diet and predominantly killed in mid-winter, onto the cave floor in Phase 6 (SB29c). Three butchered cattle carcasses were also placed in the cave at a similar time (Phase 6, SB29b), shortly before cave use ceased. During the final closure of cave access (Phase 7, SB22b) two very young animals, a piglet and a puppy, were deliberately placed with human remains.

Climate and habitat reconstructions for the Scottish Iron Age (Birks 1973; Gordon and Sutherland 1993) suggest that pigs were unlikely to thrive naturally in large numbers on the windy, treeless islands (Halliday 1993), nor were these locations conducive to domestic pig keeping. Considering the effort required to produce large numbers of pigs, a deliberate and atypical purpose behind the creation of the pig rich deposit is indicated. Much of the 'special' pig group was significantly younger than pig from other deposits, with many under a year, again indicating a difference in husbandry. These pigs were not raised to full nutritional value and despite the mid-winter kill peak, would be unlikely candidates for winter storage as carcass size would be inefficient for preservation (Smith 2000). One interpretation is that this

Table 13.5 Summary of unusual features of the High Pasture Cave faunal assemblage

Context 1 Pig-rich assemblage (Phase 6)	• 74% dominance of pig in Context 1: atypical compared to usual domestic assemblages where pig is typically third most dominant species. • Bones not smashed for marrow as is normal for domestic assemblages & no evidence of burning. • Appears to have been deliberate division of some pig & cattle skeletons into l. & r. parts, with division down spine & skull centres: an unusual butchery technique. • Dichotomy between number of skulls & post-cranial elements, suggesting some skulls placed into cave along with whole skeletons or joints. • Bones deliberately placed into cave, a non-domestic context. • Ageing & biometry of pigs suggests a predominantly winter season of kill, potentially indicating single deposit or deposit at restricted time of year. Age structure not representative of whole herd: mainly juveniles which have not reached maximum meat weigh selected. • Butchery evidence suggests processing nearby. Access to place bones, some of which refit, into cave would have been difficult.
The 3 individual cattle deposits (Phase 6)	• 3 individual cows deliberately placed into cave: 2 in high-level Bone Passage, 1 on ledge in main passageway. Access to these areas would have been difficult with some effort expended to bring material to these locations. • Bones have been smashed for marrow, with 1 cow (F.001) also exhibiting splitting of skull similar to Context 1 pigs. No evidence of burning. Cattle are either adult or sub-adult (12–18 mths). • Cattle differ in skeletal elements present. 2 contain body parts from all areas, the other is missing head & feet suggesting waste from this may have been discarded elsewhere. • Butchery evidence suggests cattle were processed nearby.
Young animal in stairwell (Phase 7)	• Extremely young (neonate) dog remains noted underlying human burial, prob. representing single animal. • Extremely young (perinate) pig remains also present underlying the human burial inc.scapula, tibia, humerus, femur, phalange, cranial frags. These again prob. from single animal.
Other material	• Generally raised levels of pig in comparison to other Scottish Iron Age sites. Much material from above ground & cave may reflect typical refuse from domestic consumption. Similarity of material from cave & above ground suggests much of the cave material may be associated with precinct midden assemblages.
Location	• As well as unusual aspects of the faunal assemblage, it must be remembered that the location is unique in itself. Few cave faunal assemblages have been excavated from Scotland & there are no parallels, particularly considering evidence for access & deliberate sealing of cave, rather than cave just being used as an area for refuse disposal.

deposit represents waste from a one-off mid-winter pig feast and/or a symbolic deposition of butchered young pig, along with cattle carcasses. Evidence for ritualised behaviour around pig husbandry is supported by isotopic evidence, with indications that these pigs were fed a different diet to pigs recovered from the 'midden' deposits.

While it is difficult to identify feasting in the archaeological record (McCormick 2009), as feasting debris may differ little from domestic waste, several factors in the 'special' deposit suggest feasting. Alongside the unusual species concentration, it is clear that this material, including the cattle carcasses, must have been placed carefully via deliberate deposition, at some considerable effort (Birch pers. comm.) – with such deposition interpreted elsewhere as indicative of ritualistic activity (Whittle *et al*. 1999; McCormick 2009; Table 13.5). The dominance of pig represents a profligate use of resources, with pig perhaps particularly extravagant to use (Hambleton 1999), killed in winter, with an unusually large presence of juveniles and no processing for marrow consumption. This last demonstrates that maximum nutrient value was not extracted from the carcasses, perhaps due to the abundance of meat at a feasting event. If all individuals were killed at the same time, there may have been such a surplus of pig meat that there was no need to extract extra nutrition.

Feasting may have been accompanied by ritualistic slaughter or butchery, with tentative evidence for unusual division of animals. As Crabtree (2003) notes the spectacle of ritualised butchery or sacrifice would be more dramatic than bringing prepared joints to a feast. The unusual and potentially significant setting of High Pasture Cave, with no known domestic settlement in the near vicinity, fits well with our understanding of links between ritual ceremonies and areas separate from domestic use. At Dun Ailinne in Ireland, the unusual location of animal bones within a ceremonial Iron Age henge monument, rather than a domestic setting was used to support the hypothesis of a feasting event of symbolic value, as was the winter killing (November–March) (Crabtree 2004) – very similar to the midwinter kill focus at High Pasture Cave.

The use of faunal remains as a reflection of excess is also not without precedent. Consumption of an over-abundance of food, particularly with an unusual and

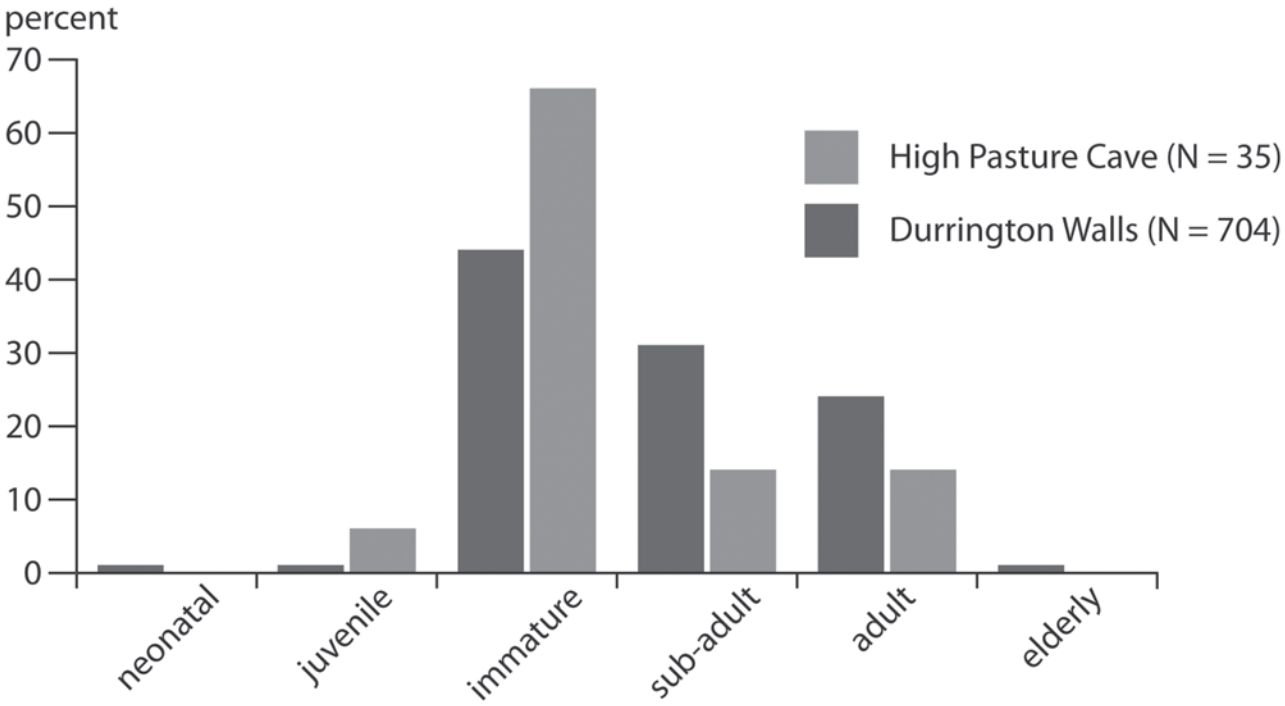


Figure 13.15. Comparison between age groups of pigs represented at High Pasture Cave (C001) & Durrington Walls, Wiltshire (see Albarella and Serjeauntson 2002)

'wasteful' butchery strategy, would have been a potent symbol especially when food was generally scarce (Van der Veen 2007), such as in mid-winter. As McCormick (2009) notes, such activity often formed part of the religious practices of early societies. At both Durrington Walls, Wiltshire (Albarella and Serjeantson 2002) and Dun Ailinne, Ireland (Crabtree 2004), large quantities of animal bones dominated by pig were interpreted as ceremonial and feasting waste (Fig. 13.15). Like High Pasture, the Durrington Walls bones were mostly complete (Albarella and Serjeantson 2002) with similar evidence for swift burial without butchery or working, and similar age profiles. At Fiskavaig, Skye, a cattle-rich assemblage (over 80%) with unusual butchery featuring entire, articulating animals with similarly no marrow breakage was interpreted as demonstrating an abundance of meat with an impetus to quickly process, consume and dispose of the remains (Mulville 2009).

The location of the unusual deposits at High Pasture required considerable effort, transporting complete cattle carcasses and articulating pig limbs (if not whole carcasses) down a rough stairwell and into the cave. This indicates deliberate internment, rather than casual waste disposal, implying significance not only in consumption, but also disposal. Throughout the Iron Age there is a long tradition of structured deposition into 'watery' places (Merrifield 1987), in particular of items of value, and structured deposition of the High Pasture bones is strongly indicated.

In Scotland, pigs are occasionally identified as treated differently to other species – *e.g.* at Sollas, where articulated pig remains were always cremated and placed exclusively in the hearth area (Campbell 1991), and elsewhere in the Outer Hebrides, where pig was associated with high status sites (Parker Pearson *et al.* 2004). However, only rarely are pigs noted in special deposits, with cattle, deer, or dog more typically used (Drew 2005). Inclusion of pig (alongside other animals) is noted within funerary deposits, *e.g.* in cists at Lauder and earlier prehistoric burials at Clisbow, Queenafjold, Longniddry, Gairneybank, Dalenun, and Uppermill. At Longniddry, Gairneybank, Uppermill, and Dalenun pigs (see Smith 2000) were deposited in a funerary setting as pork joints (particularly shoulder joints in graves). Similar trends are seen elsewhere in Britain, for example the Iron Age 'Arras' culture of Yorkshire, where pig humeri or complete skeletons are associated with funerary remains (Stead 1979), and the large Late Bronze Age–Early Iron Age pig dominant assemblage associated with a skeleton at Llanmaes (Lodwick 2004). The final High Pasture Cave stairwell deposits of young piglet and puppy may fit into a wider funerary tradition. There is also evidence for the use of young animals within special non-funerary deposits, for example, the burial of very young animals within a passageway of a domestic structure at Baleshare, North Uist (Barber 2003). At Sollas, many foetal or extremely young remains including piglet, calf and lamb are seen in apparent ritual deposits (Finlay 1984).

High Pasture fits into wider Iron Age patterns of structured disposal involving faunal remains, both in association with funerary deposits and in symbolic disposal into unusual locations or from special events (feasting). This complex assemblage presents several stories, even if interpretation of the meaning behind them must remain tentative. A picture of general consumption, focusing on the role of the precinct area, is complemented by the final cave deposits, created by disposal of the remains of a pig-focused event – possibly in a mid-winter feast linked to the closure of the cave, along with the placement of the butchered cow carcasses at a very similar time. Thirdly, at the very end of the closing of the last stairwell into the cave, a piglet and a puppy were deliberately interred within a human burial. The High Pasture faunal assemblage clearly demonstrates there was deliberate intention and purpose behind bone deposition at the site.

13.2.6 Feasting at High Pasture: an ethnographic and archaeological perspective

Peter Rowley-Conwy

Introduction

High Pasture Cave is, to put it mildly, an unusual site. Its deposits are emphatically not characteristic of a 'normal' settlement: its extensive surface hearths, coupled with the placing, and then sealing, of human and animal remains and a wide range of artefacts underground, mark this site as a very 'special' location indeed.

Archaeologists occasionally encounter materials that do not appear to derive from everyday activities – though rarely so spectacularly different as those from High Pasture. It is a truism that under such circumstances we tend to reach for the word 'ritual', as a catch-all term for phenomena that we do not understand. Few would argue that this word is not appropriate for whatever was taking place here, but we can do better than this. We argue that these deposits, particularly the pigs and cattle inserted into the cave before its final sealing, derive from feasting, probably one single major event – and that ethnographic studies of feasting may permit us even to determine what broad category of feast this was.

The ethnography of feasting

Feasts have been defined in various ways. One influential volume states that 'feasts are events essentially constituted by the communal consumption of food and/or drink' (Dietler and Hayden 2001, 3). A difficulty is immediately apparent: just about any meal involving two or more people would fall into this category. A more useful definition is 'any sharing between two or more people of a meal featuring some special foods or unusual quantities of foods (*i.e.*, foods or quantities not generally served at daily meals)' (Hayden 2014, 8). This highlights the two key aspects: sharing foods, and ones which in quantity and/or composition are unusual. The smallest feast may occur very frequently, but the larger they are the more seldom they occur, as we see in our own society: from the Sunday roast (weekly); through university matriculation feasts (seasonal); Christmas dinner (annual); wedding breakfasts (occasional); to a royal coronation (generational).

Ethnographic or ethnoarchaeological studies subdivide feasts into various types. Adams (2004) examined feasting among the Toraja of Sulawesi and divided most feasts into two fundamental types: 'solidarity' and 'promotional'. The complexities of the situation mean that no feast falls entirely into just one category but the fundamental division is useful. Solidarity feasts are used to reinforce group solidarity among the Toraja: between individual households, different villages, or groups of villages. They involve the pooling of animals and rice by the different groups, ideally with equal contributions from each, and focus on bringing the community together: they do not involve display of prestige items because they are not intended to enhance the social status of particular individuals or families. In contrast, promotional feasts are hosted or sponsored by individuals who provide the food, often at great cost: the largest, albeit very rare, events recorded by Adams involved the slaughter of more than 16 water buffalo and 36 pigs over 27 nights. These are designed to enhance the social status of the host by impressing socio-political supporters, potential marriage partners, *etc*., and typically involve the display and sometimes destruction of high prestige items. A crucial aspect is that a debt relationship is created: attendees are obliged to return the favour. Since the guests are usually not as wealthy as the host, the debt is repaid in other ways: work, military service, or political support (Adams 2004).

These two basic feast types occur in many societies. New Guinea pig feasts are usually solidarity feasts, although prominent individuals (termed 'big men') may gain status by taking a leading role. The largest events are spectacular: the Grand Valley Dani's 12 major political units each hold occasional feasts to which the others are invited, and, in May 1970, one of these lasted 17 days, with *c*. 150 pigs killed on one day alone (Heider 1972, 183). A pattern of hosting between communities in different years is common and long planned: in the 1950s the Kuma hoarded and fattened pigs for several years, until their 1955 Pig Ceremonial in which they killed 700 animals (Reay 1959). Such megafeasts are prominent in the anthropological literature, but smaller events are much more common. Among the Massim, four recorded village feasts involved 10, 19, 10, and 10 pigs respectively (Young 1971). Often just a few or single pigs are killed. 'This pattern of relatively small-scale events occurring throughout the year stands in sharp contrast to that characteristic of the major pig festivals' (Hide 2003, 109).

Promotional feasts in contrast enhance differences, exalting the status of one or a few individuals over others – for example, the 'potlatch' feasts of the tribes of the Northwest Coast of America. Pioneer anthropologist

Franz Boas attended a Kwakiutl potlatch in 1895–96 which lasted several weeks. Chiefs provided food and destroyed prestige items like canoes, elaborate copper artefacts, or numerous blankets, to show their disregard for property and thus, acquire rank: Boas noted that 'the underlying principle [of the potlatch] is that of interest-bearing investment of property' (Boas 1897[1970], 341). Social status depended on successful potlatching. Among the Tsimshian, there were no fixed rules of succession. When claimants vied for an inheritance, the first to accumulate the resources and to hold a potlatch gained the succession. Among all tribes, 'potlatching… concerns either accession to a position of rank or the manipulation of rank' (Rosman and Rubel 1971, 180).

Adams's distinction between solidarity and promotional feasts is mirrored in other classifications. Dietler (2001) identifies empowering feasts, corresponding largely to solidarity feasts, and patron-role and diacritical feasts, which are largely promotional. Hayden (2001) makes the same distinction: promotional/alliance feasts stress the social solidarity of the group, and competitive feasts involve social aggrandisement by individuals, using more prestige items. Hayden adds two further categories, differentiated largely by size. Minimally distinctive feasts, involving just a few people, are really just small solidarity feasts. Although less likely to be archaeologically visible (Hayden 2001, 54–5), one particular trait may render them so: Serjeantson (2006) points out that animal bones are usually broken into fragments so that the fats can be extracted. Bones left largely intact imply that lots of meat was temporarily available, so nutrient extraction was not maximised. A glut implies a feast – even if only at the scale of one animal and a few people (also Rowley-Conwy 2018). At the feasting location of Durrington Walls, Wiltshire, there were many unbroken bones (Albarella and Serjeantson 2002, table 5.3).

At the other end of Hayden's range are tribute feasts – an extension of the competitive feast. Typical of chiefdoms, often held at regular calendric intervals, these connect to rituals venerating deities (Hayden 2001, 58). That the feasts at Durrington Walls (Wright *et al.* 2014) took place in winter might align this site with this category of feasting. Religious connotations may also create an archaeologically visible result: in Hawaii,

> the disposal of the remnants of feasts sometimes differed from the ways in which ordinary household food remains were disposed of. The detritus of religious feasts might be given special treatment, for such ritually charged garbage could be dangerous to those who came into contact with it. (Kirch 2001, 169)

The concept of 'ritually charged garbage' is important because it may lead to archaeologically visible deposits, of considerably varying size. A small example comes from Saqqara in Egypt, where a sealed rock-cut passage near the Step Pyramid contained the skulls of a hartebeest, a donkey, and two pigs (Ikram 2002). At the other end of the scale, in the Palace of Nestor at Bronze Age Pylos bones were burnt and then buried: only mandibles, humeri, and femora represented, the largest group comprising 19 cattle, two sheep, and single pig and red deer. Bones were unbroken, with cut marks showing that the meat had been removed; the largest group would have yielded in excess of two tons of meat (Halstead and Isaakidou 2004).

Feasting at High Pasture

The discussion above demonstrates that the pig bone deposit in Bone Passage (C001, Phase 6b) indicates feasting in a number of aspects, detailed in Section 13.2, above, and enumerated here.

Unusual food

Pigs are relatively uncommon in western Scottish Middle Iron Age assemblages, as shown in Table 13.6 and Figure 13.16. High Pasture has (except in the cave) more cattle and fewer sheep than is typical. Pigs are rarely above *c.* 15% at other sites: High Pasture shows somewhat higher frequencies throughout – but the 'special' deposit C001 in Bone Passage is unique with its 68% pig. It may seem curious that pig could be considered 'special', but Grant (2002) points out that pig is unusually common on British high status sites through the Iron Age, Roman, and medieval periods, and argues that this is because other species (*e.g.* cattle, sheep) are used not just for meat but also for traction, milk, and wool. The pig produces nothing until the day it is killed for its meat: 'Viewed in this way, a pig becomes a "luxury" animal endowing status on those who can afford to feed and eat it' (Grant 2002, 18).

Mass kill

Some 13 pigs were apparently killed at once – presumably not normal practice. If each produced *c*. 25 kg meat, then 325 kg of pork – about one-third of a ton – was made available. If the three cattle were part of the same event, and each produced *c*. 100 kg beef, then the amount of meat would be doubled, implying consumption on a huge scale.

Unbroken bones

Most pig bones were unbroken, although numerous knife cuts are visible. The meat was therefore filleted off the bones but the marrow inside was not exploited. As argued above, this implies that a glut of meat was available, with marrow exploitation superfluous to requirements.

Ritually charged garbage

The deposition of the pigs – in a cave difficult to access, and then sealed – clearly argues that the bones were not seen as just 'normal' refuse, as does the caching of the bones of one of the cattle on a ledge above the

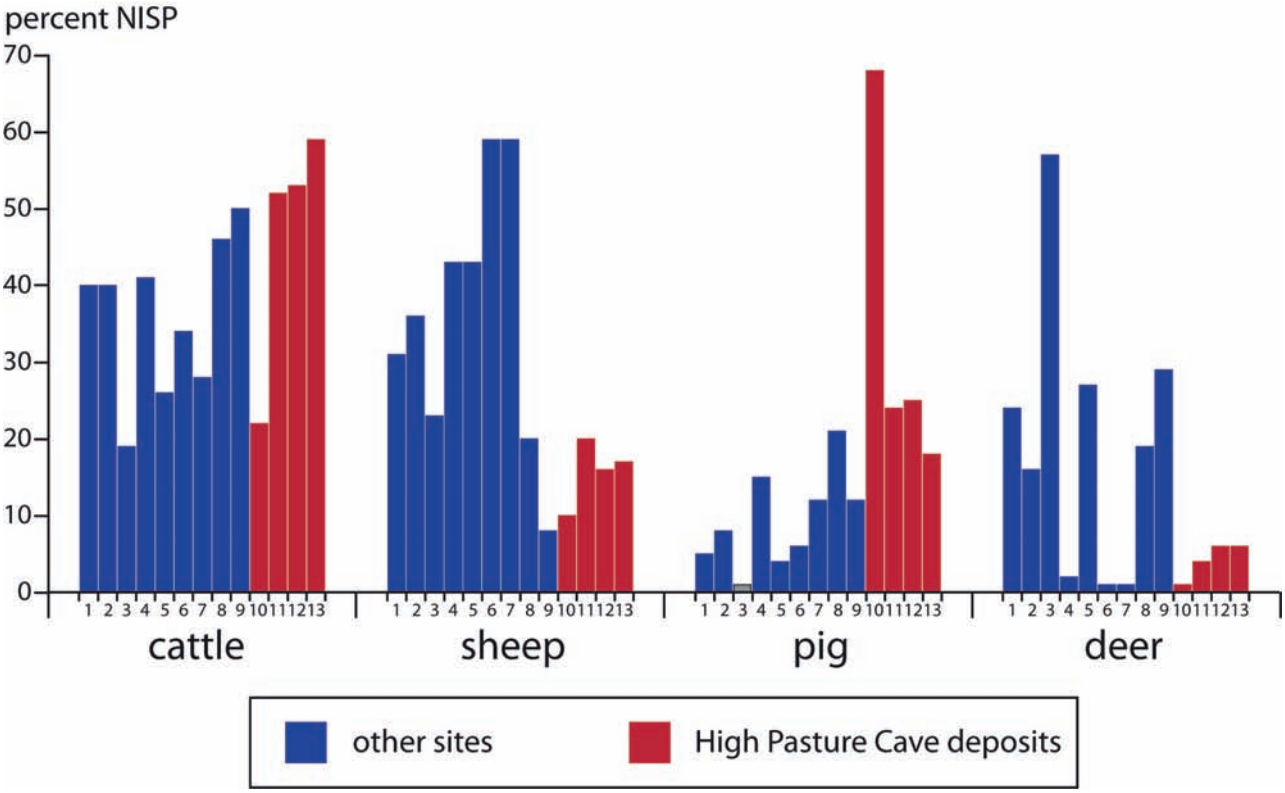


Figure 13.16 Frequencies of large terrestrial mammal bones at various Middle Iron Age sites in western Scotland. Sites are numbered as in Table 13.6

Table 13.6 Number (NISP)/frequency (%) of large terrestrial mammal bones at various Iron Age sites from western Scotland.

Site	*Cattle*	*Sheep*	*Pig*	*Red deer*	*Roe deer*	*Total*	*Reference*
1. Cnip	621/40%	484/31%	81/5%	366/24%	0	1552	McCormick 2006
2. Kilellan Farm	243/40%	223/36%	49/8%	100/16%	0	615	Serjeantson *et al.* 2005
3. Northton	74/19%	92/23%	2/1%	225/57%	0	393	Finlay 2006
4. Dun Vulan	1461/41%	1555/43%	535/15%	43/1%	3/1%	3597	Mulville 1999
5. Dun Mor Vaul	348/26%	574/43%	54/4%	256/19%	111/8%	1343	Noddle 1974
6. Baleshare	696/34%	1206/59%	119/6%	19/1%	0	2040	Halstead 2003
7. Hornish Point	123/28%	260/59%	53/12%	4/1%	0	440	Halstead 2003
8. Dun Cul Bhuirg	80/46%	34/20%	36/21%	30/17%	3/2%	173	Noddle 1980
9. Dun Ardtreck	666/50%	107/8%	166/12%	364/27%	29/2%	1332	Noddle 1980
10. HPC (C001)	452/22%	198/10%	1410/68%	5/1%	0	2065	This chapter
11. HPC (other cave contexts	1565/52%	585/20%	717/24%	120/4%	0	2987	
12. HPC stairwell & walkway	287/53%	84/16%	135/25%	31/6%	0	537	
13. HPC hearth	924/59%	267/17%	275/18%	99/6%	0	1565	

At some sites various phases are amalgamated (see Fig. 13.17)

subterranean stream. The cave had a long history of 'special' deposition, going back several centuries before the pigs were deposited, including various high-status items (see Chapter 12). It is not clear how the human female and infant skeletons came to be in the overlying deposits, but if these were deliberate interments or sacrifices, they could be interpreted in the same way. Much of the cave's contents was redeposited ash, presumably brought down from the surface. High Pasture is not the only place where ash was apparently treated as 'special' in the Scottish Middle Iron Age: at the possibly ritual site of An Dunan, on a tidal islet on the Isle of Lewis, a large multi-layered

ash mound accumulated despite the absence of any hearth. This suggests that 'the central ash mound was comprised of imported materials already burnt elsewhere' (Church *et al*. 2014, 214).

SEASONALITY

Most or all of the pigs were killed in winter. If all were indeed killed in one event, some calendric link is a possibility: for example, the mid-winter solstice, which has been, and still is, of considerable importance. Another possibility is the Celtic festival of Imbolc, on 1 February, linked to the goddess Brigit who was the patroness of fire and smithing and who was associated with streams and springs (Rees and Rees 1961; MacKillop 2005). It may be significant that there is evidence of smithing at High Pasture; the large hearths attest to fire; and the cave has a running stream. All Brigit's major associations are thus in place, but it is questionable whether the date of a festival first recorded about a millennium after this event may legitimately be extrapolated that far back in time.

In conclusion, the High Pasture Cave pig assemblage takes its place as one of archaeology's classic deposits of feasting detritus. All the criteria listed above establish this as 'ritually charged garbage', with the site fulfilling the likely requirements of a tribute feast as defined by Hayden (2001). This category is itself an extension from the category of competitive feasts, likely to have been hosted by a person or persons of high political and/or religious status, in order to reinforce and enhance that status.

13.3 Burnt and calcined bone

Sheena Fraser

13.3.1 Introduction

A total of 9348 burnt bone fragments, weighing 6,005 g and representing *c.* 17% of the total faunal assemblage, was recovered from Trenches 1, 2, 6, 11, 14, 15, 18, and 19 at High Pasture Cave. A number of additional burnt bone fragments were identified and are reported on within the unburnt bone assemblage (Section 13.2).

Fragments analysed weighed 0.1–30.4 g, with an average weight of 0.6 g, the largest bone being a charred fragment of a distal cattle humerus from cave front deposit C6.02, Phase 6b (SB29c). Fifty-one per cent of the assemblage could be allocated to long bone shafts (3516g). The analysis aimed to determine whether human bone was present and to identify bone fragments, examine burning patterns, identify skeletal portions associated with burning, and comment on special treatments and/or patterns of burnt bone deposition.

13.3.2 Method

Bone identification

Bones were identified to taxonomic group and element by reference to specimens stored at the University of Edinburgh/National Museum Scotland Collections and key texts (Schmid 1972; Amorosi 1989; Hillson 1992; 2005; White and Folkens 2000). Bones were weighed to 0.1 g and identified elements measured to 0.1 mm with dial callipers (Von den Driesch 1976). Bones were identified individually and not by association. Diagnostic bones differentiating sheep and goat were not recovered so bones were assigned sheep/goat. Assessment of burning was by macroscopic study of bone colour, using six categories of burning (slight burn, partial burn, charred, local calcined, dominant calcined, and fully calcined), after Stiner *et al*. (1995). The colour reflects temperatures that the bone achieved, not necessarily the temperature of the heat source (Nicholson 1993).

Burning bone

Burnt bones may be the result of human or natural activities (Gifford-Gonzalez 1989; Lymen 1994; McKinley and Bond 2001; Whyte 2001; Costamagno *et al*. 2005). Human activities include cooking, waste disposal, use as fuel, cremation/ritual disposal, disposal adjacent to or below a fire, or within an area of hot ash deposits. Anthropogenic activity also includes forest or brush fire, and *in situ* burning of organic material.

Burning creates a continuous process of modification and colour change on bone. Initial release of water and carbonisation of organic collagen is followed by oxidisation of this carbon with increasing heat, resulting in bone becoming calcined (Shipman *et al*. 1984; Lymen 1994; 2008). Carbonisation peaks at around 330°C, with most organic matter being lost at 360–525°C. By 600°C virtually all organic matter is absent (Shipman *et al*. 1984; Lymen 1994). At temperatures over 800°C there may be fusion or melting of the inorganic component, hydroxyapatite (Shipman *et al*. 1984).

Burnt bones shrink (*e.g.* Shipman *et al*. 1984; Buikstra and Swegle 1989) but with no reliable shrinkage factor (Correia 1997; McKinley and Bond 2001) the reliability of burnt bone measurement is disputed (*e.g.* Davis 1987). Bones also fragment, sometimes comprehensively, after burning (*e.g*. Costamagno *et al*. 2005, 56), though prior bone breakage from butchery reduces the level of burning fragmentation. Large bones break up into more and smaller fragments (Bond 1996). Unerupted teeth and roots protected by bone tissue may survive burning, while exposed crowns fall apart (Correia 1997). Burning therefore changes the size, strength, and appearance of bone, both microscopically and macroscopically. However, short intensive exposure and longer exposure to lower temperatures may result in similar modifications (Bennett 1999).

The fragmentation and brittleness resulting from collagen loss makes bones susceptible to diagenic processes and trampling (Stiner *et al*. 1995) leading to bones being 'analytically destroyed' (Lymen 1994, 39). Experiments on fleshed/recently unfleshed bone indicated that it was not possible to determine flesh coverage prior to burning via burnt bone, although dry bones produce a different response (Buikstra and Swegle 1989; Cain 2005).

Anthropological studies suggest that only articular ends of long bones char during roasting, the rest of the bone being protected by meat (Gifford-Gonzalez 1989).

With even a small campfire able to reach 800°C (McKinley and Bond 2001), presence of calcined bone does not indicate deliberate cremation. In an experiment using a wood hearth and long bones from various animal species 76.1% of the bones became calcined (Costamagno *et al.* 2005).

Distribution by area

Figure 13.17 shows the distribution, by fragment number and weight, of burnt bone for each site area. Most material (just under 50% by fragment count and 53% by weight) derives from the cave and demonstrates that the majority of this was recovered from the front of the cave, Trench 6. The precinct is the next most prolific area at *c.* 34%/35%, with far fewer burnt bones found in the surface and especially stairwell areas.

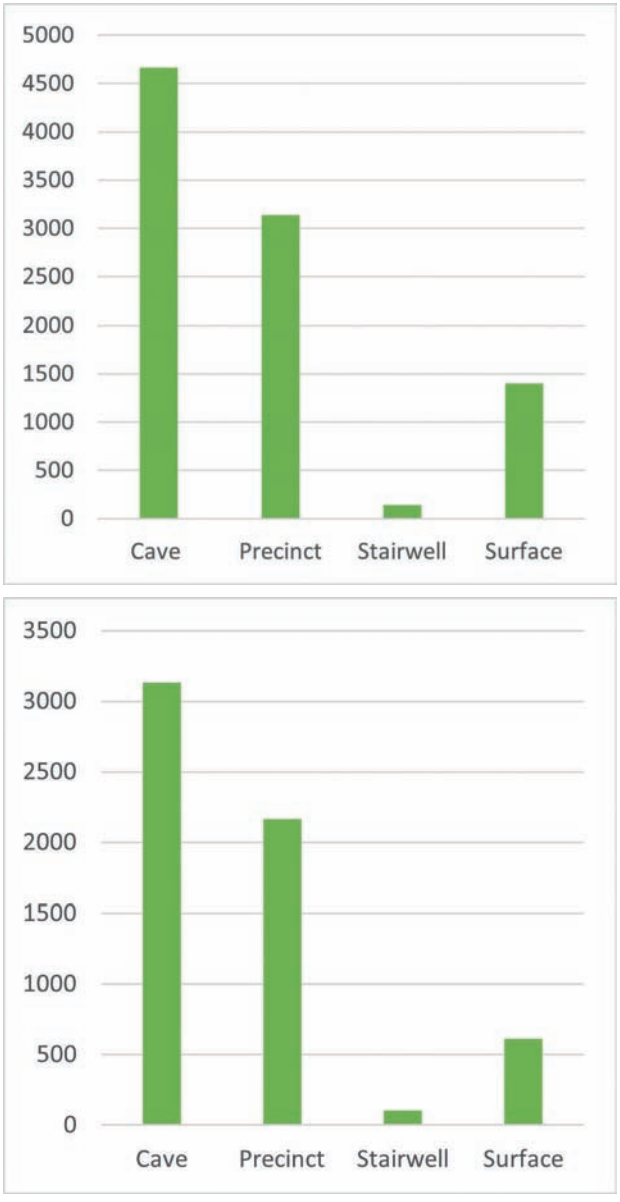


Figure 13.17. Burnt bone distribution by total weight (g): above: by area; below: by fragment count (n)

Distribution by phase/stratigraphic block

Figure 13.18 shows burnt bone fragment counts and total weight for each phase, by site area. Material is concentrated in Phases 2–4, with far less burnt bone in Phases 5–6 and minimal amounts in Phases 1, 7, and 8. Material from Phase 2 is concentrated almost entirely in the cave while for Phase 3, the precinct dominates. The peak at Phase 4 sees burnt bone recovered from cave, precinct, and, to a lesser extent, the surface trenches.

Burn profiles

Burn categories recorded included calcined (divided into calcined, dominant calcined, and local calcined), charred, partially and slightly burned and black. Table 13.7 shows the relative frequency of these categories and the average weight of fragments of each type. Figure 13.19 shows their distribution by phase. The assemblage is dominated by calcined bone, with smaller proportions of charred, dominantly calcined, and locally calcined bone, and far fewer blackened, lightly, or partially burned bones. Most phases display this patterning. Phase 3 diverges the most, with a larger relative proportion of lower frequency burn types seen, especially ‘slight burn’. Charred bone is almost absent, in contrast to Phases 2 and 4. Burn category distribution by key area demonstrates that there is a difference in burn type frequency between cave and precinct (Fig. 13.20). With no cave bone from Phase 3, it seems to be mainly this which is reflected in distribution by phase: charred bone is a feature of the cave assemblage which is near absent from the precinct. The precinct shows higher proportions of dominantly calcined, locally calcined, and especially slightly burned bone compared to the cave. Within the cave, the data can be further separated into front, central and rear trenches (Fig. 13.21) and this charred fraction is concentrated to the front and central trenches, while the rear shows a burn type pattern more like the precinct.

The far smaller stairwell assemblage has calcined bone dominant and smaller amounts of dominantly and locally calcined material, while bone from surface contexts is almost entirely calcined. In addition to the burnt colours, some calcined bone from Trench 6 also displayed blue/green patination on some bones.

Burn patterning indicates bones exposed to a range of burn intensities and is compatible with profiles for campfire experiments. The proportion of long bones to axial, feet and skull bones indicates that other body parts were processed on site and that disposal was not only from meat-bearing bones. Long bone shaft fragments have on average a slightly higher weight than other bones. They display a mixed pattern of burning, except Trench 14,

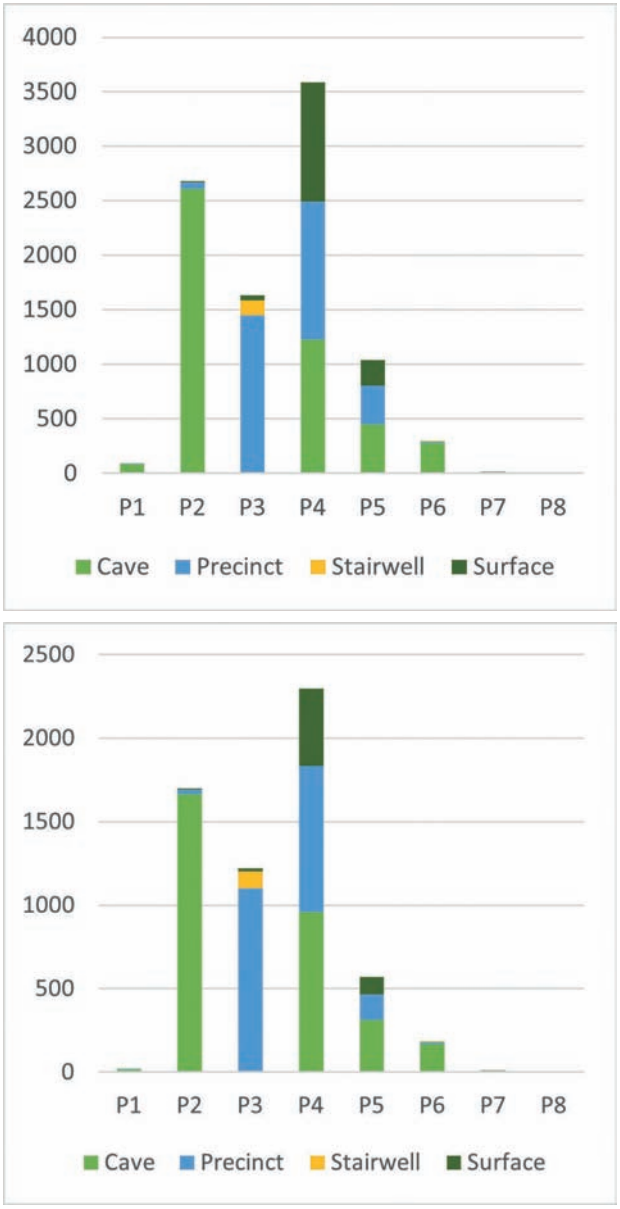


Figure 13.18. Burnt bone distribution by total weight (g): above: by Phase; below: by fragment count (n)

Phase 5 which shows only large and medium mammal, and unidentified calcined shaft bones. None of the diaphysis fragments from Trench 14 could be ascribed to species or sub-family. As expected, based on the greater fragmentation of bones which have lost all organic material, charred long bone fragments have a higher average weight than totally or partly calcined ones.

Large/complete bones and modification

A summary table of burnt bones weighing more than 5 g is in the site archive. Cattle bones over 5 g are most frequently long bones, with axial bones absent: axial fragments were however recovered among unidentified >5 g bones so this may reflect the difficulty of allocating these bone fragments to species. Twenty-two cattle bones and 19 unidentified make up almost all this group, with four red deer, three sheep/goat, and one (only slightly burned) pig also present. They are split almost evenly between cave and precinct, with one surface bone recovered, and concentrate in Phases 2–3.

Table 13.7 Burn categories

Burn type	*Total frags*	*% frags*	*Total wt (g)*	*% by weight*	*Average wt (g)*
Calcined	6875	73.5	3744.84	62.4	0.54
Charred	986	10.5	1066.58	17.8	1.08
Dominant calcined	732	7.8	448.90	7.5	0.61
Local calcined	466	5.0	460.40	7.7	0.99
Light/slight burn	189	2.0	206.70	3.4	1.09
Partial burn	100	1.1	77.40	1.3	0.77
Total	9348	100.0	6004.82	100.0	

Sixteen complete bones were also identified, most coming from the cave, especially front Trench 6 (site archive). Nine were sheep/goat, four cattle, and three pig. All pig were from the cave and all cattle from the precinct, and almost all sheep/goat (bar one) from the cave. Foot bones predominate, in line with observations for Anglo-Saxon animal cremations (Bond 1996, 80) and the site of Barnhouse, Orkney, where 52 of 109 bones identified from a total of 14,000 (calcined) were tarsals/carpals and phalanges (King 2005).

No pathological lesions were noted for burnt fragments. Cut, scrape, and some hack marks were present, but not sufficient to indicate the type of butchery undertaken.

Species: frequency and distribution

Figure 13.22 shows proportion by fragment and weight identified to species. This represents only 4% by fragment and 11.5% by weight, reflecting an expected bias in identification towards larger bones. Fifty-six per cent of fragments (35% by weight) are unidentified, while the remainder are identified to size category (large/medium mammal). Further identified were cattle, sheep/goat, pig, red deer, small/medium carnivore, rodent, and bird. Distribution by area is shown in Figure 13.23, and by phase in Figure 13.24. All three main domesticates were present in all areas (and main trenches) and in all main Iron Age phases (2–7). Cattle numbers may reflect the tendency for larger skeletons to contribute more to weight of bones recovered. Unidentified bones dominate all phases, with generally large mammal and then medium/small mammal the next most numerous categories. In Phases 5 and 6, slightly more M/SM than LM are present.

Species profiles by phase are as follows. Phase 1 shows very small amounts of cattle, sheep/goat, and one red deer. Phase 2 is the second most prolific, with

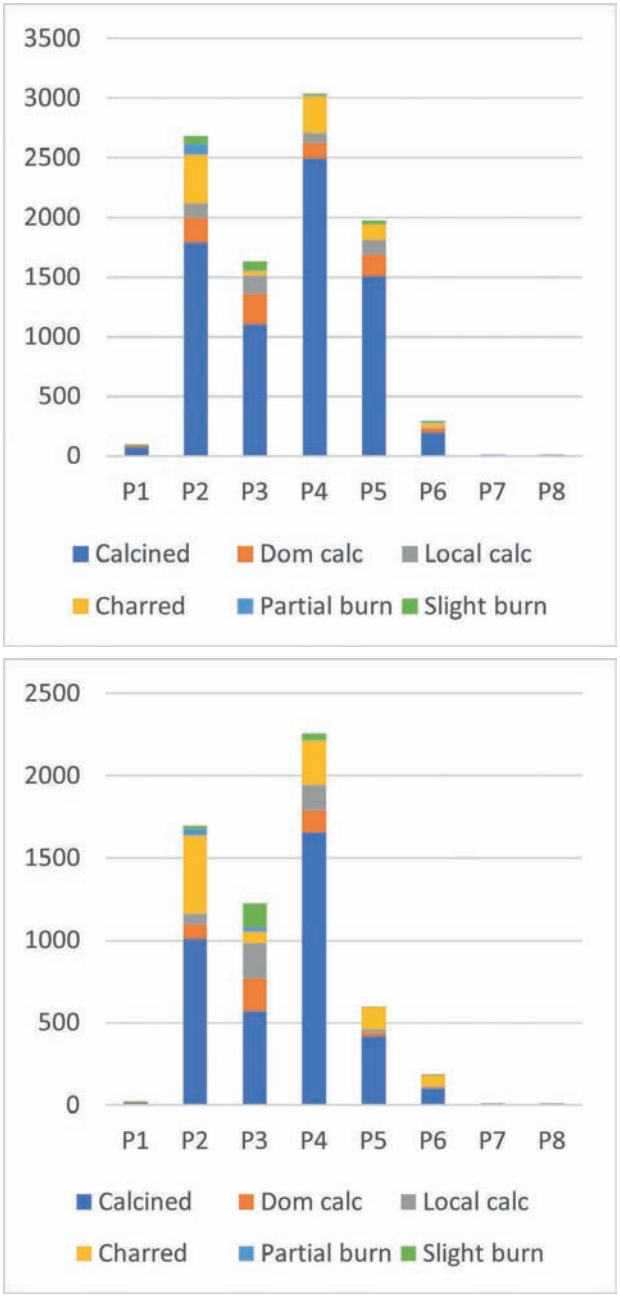


Figure 13.19. Burn categories by total weight (g): above: by phase; below: by fragment count (n)

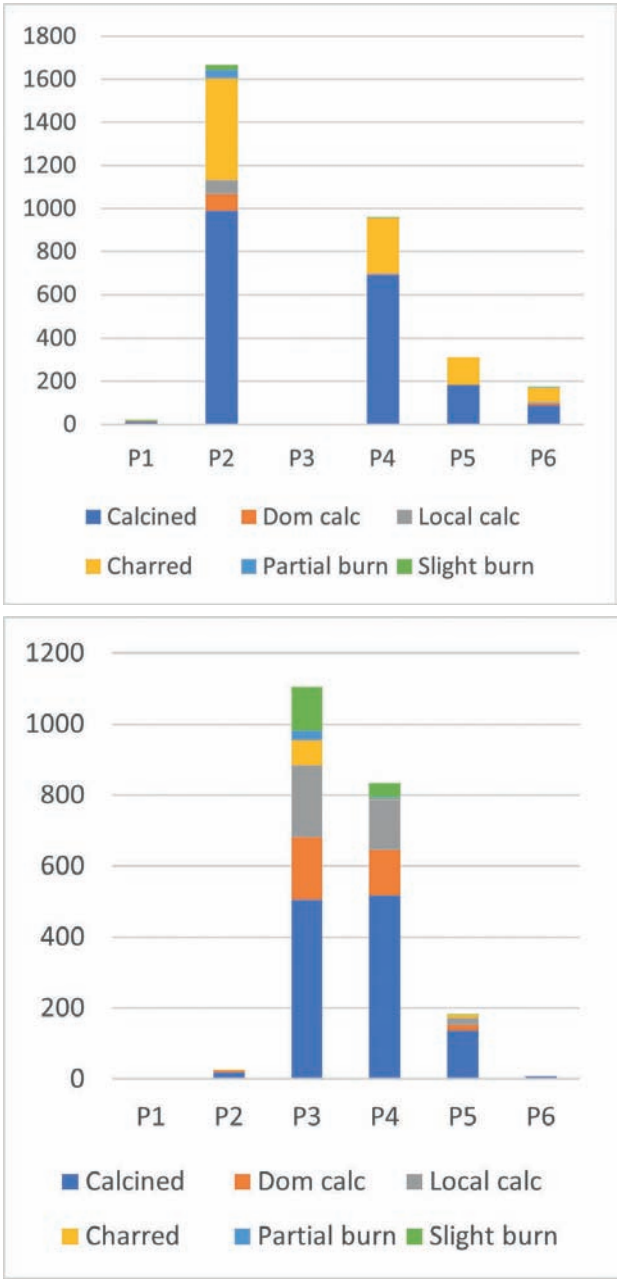


Figure 13.20. Burn categories by phase by weight (g): above: in cave; below: in precinct

all major domesticates as well as 16 red deer, a dog, and a bird present, with sheep/goat the most numerous. Phase 3, containing no cave bone, shows no deer, few pig, and relatively few cattle bones (24 frags) and even fewer sheep (16). Phase 4 is highest in burned bone, all from the precinct. Roughly equal numbers of cattle, sheep/goat, and pig (34–5 bones) and 15 red deer are present. Numbers drop sharply into Phase 5, with smaller amounts of the three main domesticates, no deer, and one bird bone. Even less Phase 6 material was recovered from the cave only, and includes cattle, sheep/goat, pig, red deer, and two rodent bones. Minimal Phase 7 and 8 material was recovered and includes no elements identified to species.

Cattle (*Bos taurus*) were recovered from all phases, concentrated in Phases 2–5 with a spike in Phase 2, over half the bones coming from the cave. The greatest weight of cattle bones from an individual context is Phase 2 Context 6.08 at 66.3 g. All body parts were recovered: head, axial, forelimb, hindlimb, foot, and isolated teeth. More charred than calcined bones were recovered, but these may be easier to identify. Recovery was insufficient to produce a mortality profile, but ageing profiles were carried out using Silver (1969), although these figures were derived

from 19th century cattle, possibly from one gender, and provide general guidance only. Older animals at, or above, the optimal age for meat culling were present, there were no young calves, but some animals greater than 12–18 months were culled. Only three cattle bones, all charred, could be measured. Bones were examined for evidence of different or special treatments, *e.g.* for meat bearing bones, but no significant patterning was apparent (see archive for details).

Sheep/goat (Caprinae) were absent from Phases 7–8 and were most frequent in Phase 2, with most bones calcined to some extent. All body parts were recovered. The assemblage was dominated by foot bones and isolated teeth fragments. A breakdown of skeletal portions by number and weight is provided in the archive. Some fragments could be given tentative ages (after Popkin *et al.* 2012). All ages were represented, ranging from neonatal to over 60 months. Bones able to be measured and/or aged are listed in the archive. In areas/phases with sufficient fragments, a pattern of mixed burning was noted.

Pig (*Sus scrofa*) were present in Phases 2–5 and, like sheep/goat, most frequent in Phase 2. The pig assemblage was dominated by isolated teeth and foot bones. A number of the teeth are unworn and may have not been erupted at time of death. Only two limbs were recovered, both forelimbs: a locally calcined distal humerus from C15.48 (Phase 4b), and a slightly burnt proximal scapula (butchered) from C2.32 (Phase 3a). Only two bones could be aged, from animals from under a year and less than 24 months (see archive for details).

Red deer (*Cervus elaphus*) is present in Phases 1, 2, 4 and 6 as bones from skull, forelimb, hindlimb, foot, and axial skeleton, as well as isolated teeth. Their distribution is of interest, with 21 of the 34 total bones concentrated in Phase 2 and 4 front cave deposits C6.07, C6.08, and C6.06, with the remainder isolated fragments in cave, precinct, and stairwell contexts. Only three fragments were found outside the cave.

Other mammals: a fragment of dog tooth, two rodent, and two bird bones were also recovered. The identification of a caddisfly larval case (C2.15), likely introduced during bone washing with stream water, highlights a source of entry for modern material into the assemblage, and it is possible that the rodent bones recovered may be intrusive.

13.3.4 Discussion

Burnt bone total weight is less than that of one small sheep skeleton, with an average fragment weight of 0.6 g. The largest burnt bone was a charred cattle distal humerus (30.4 g). Few bones weighed over 5 g and most of these were charred cattle long bones. The only complete bones were feet and axial elements. A range of burning patterns was noted and, while calcined bones were the most frequent, some phase and area patterning to this was noted, especially a shift to charred fragments within the front and central cave deposits, and a preponderance of the less 'usual' burnt categories in Phase 3 (represented mainly by precinct deposits). Calcined bones must have been exposed to temperatures greater than 360–525°C. The range of burn categories may indicate that bone has been burnt on campfires as waste or as fuel, although, it is noted that the proportion of calcined is sometimes greater than the 76.1% calcination achieved in experimental laboratory wood hearth experiments (Costamagno *et al*. 2005). Most diaphysis fragments had been burnt, indicating contact with fire once the meat had been removed. The majority of cattle bones were charred, not calcined, but this pattern was reversed in sheep. Cattle forelimbs and hindlimbs included some distal and proximal portions of bones, too small to determine if only the ends were charred, perhaps indicating roasting (Gifford-Gonzalez 1989). Bones may also have been discarded at the periphery of campfires or burnt if boiled in containers where the liquid had been lost to evaporation.

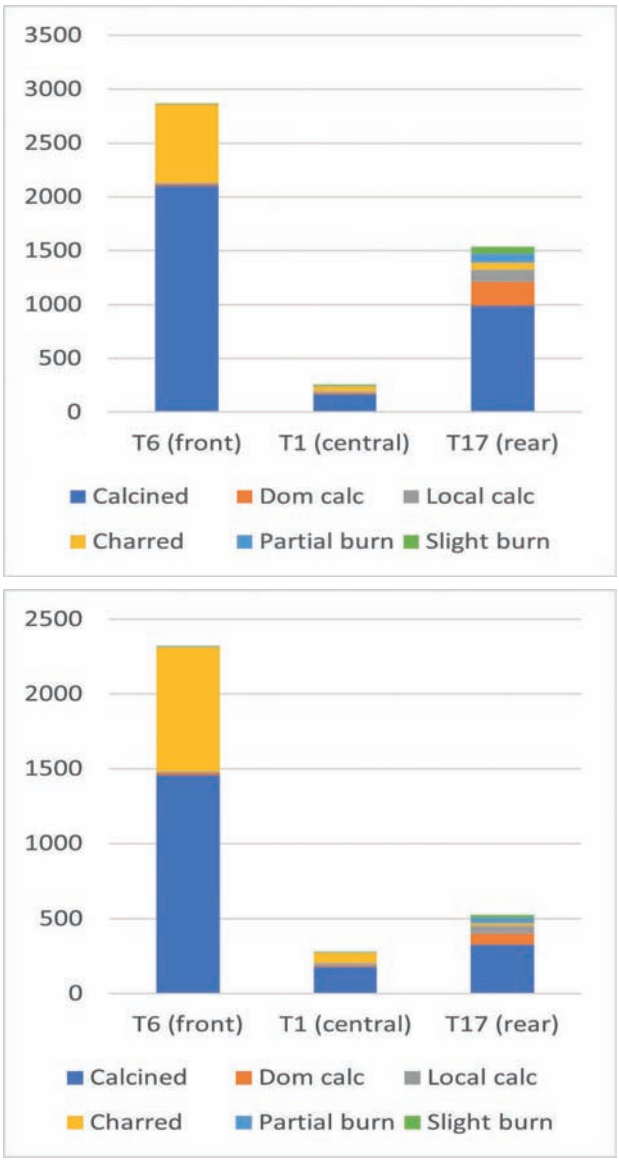


Figure 13.21. Burn categories in the cave by weight (g): above: by cave area; below: by fragment count

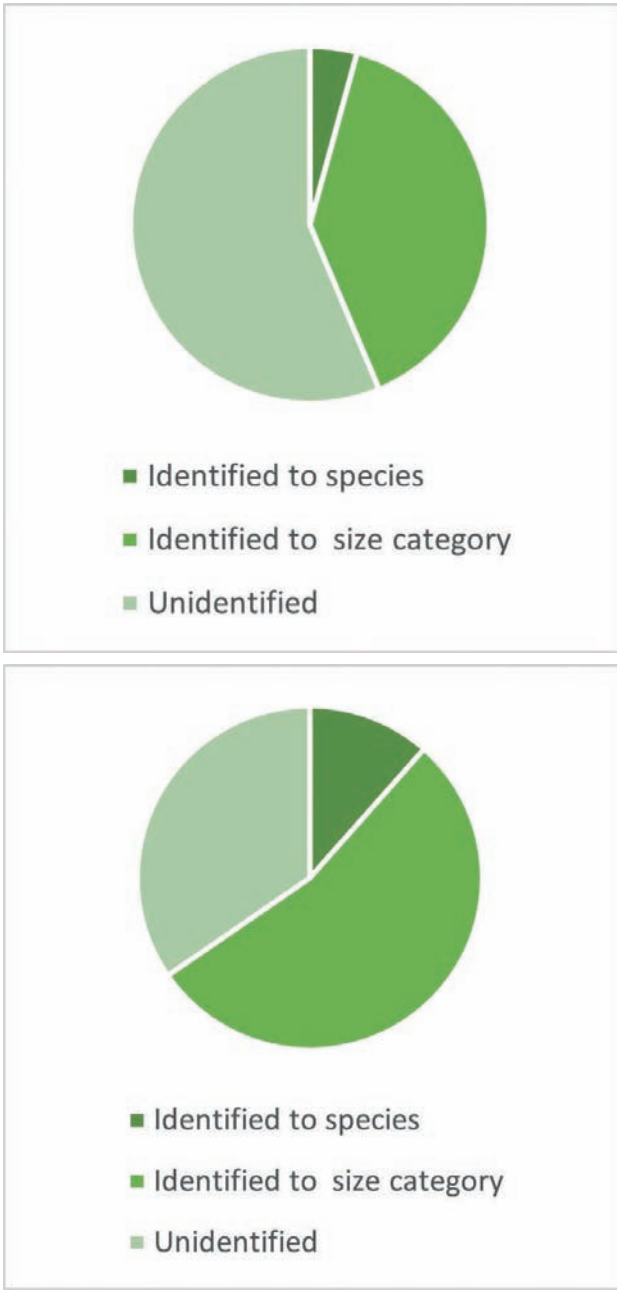


Figure 13.22. Burnt bone species/category identification rate: above: by fragment count; below: by weight (g)

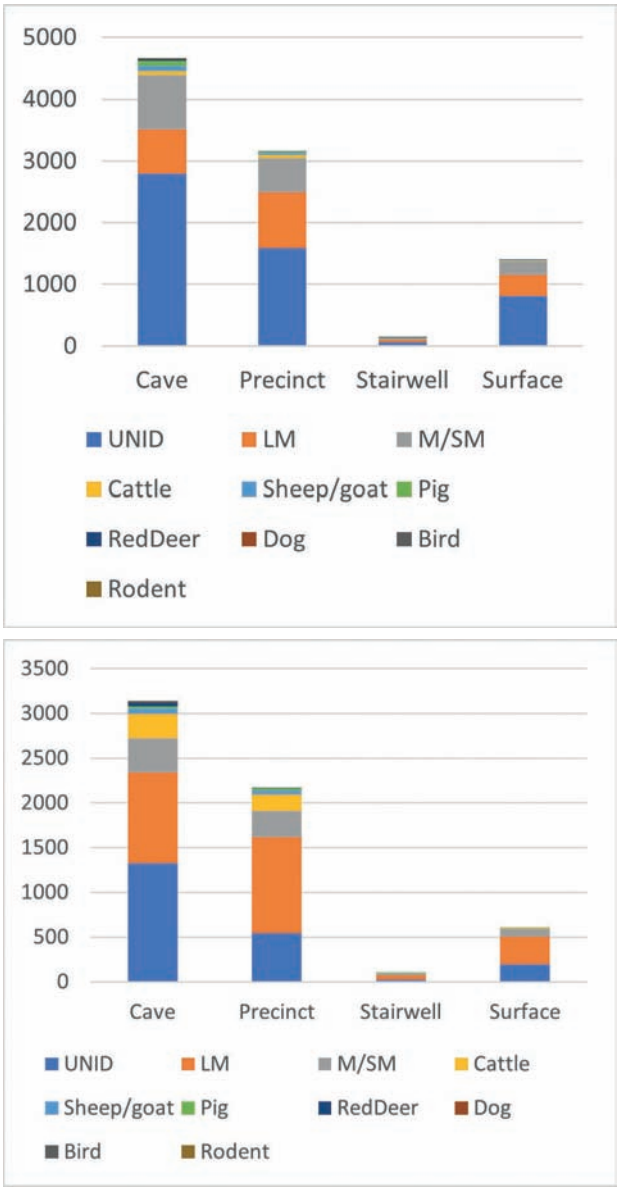


Figure 13.23. Species/category distribution by site area: above: by fragment count; below: by weight (g)

Under 5% of bone fragments could be identified to species/subfamily, with significantly more identified to large or medium/small mammal. Cattle and sheep predominate, with pig and especially red deer far rarer. All body parts were represented, indicating processing of carcasses *in situ.* Sheep of all ages were present, but no cattle below 12 months. Pig was almost entirely represented by foot and isolated tooth fragments. These bones could be associated with primary butchery waste. The rest of the pig skeleton may not have been burnt or rendered unidentifiable during cooking/waste disposal or have been removed from site. No pigs greater than 24 months were noted.

Burnt bones were found in all periods of occupation, including pig, sheep/goat, cattle, and red deer from pre-Iron Age phases, indicating early mammal processing activities. Bones were found mainly in the cave and to a lesser extent the precinct, with far fewer examples in surface or (especially) stairwell. Breakdown by Phase shows that an early bias (Phases 1–2) towards deposition in the cave swings by Phase 4 to almost equal deposition between cave, precinct, and surface in Phase 4, after which burnt bone recovery drops sharply and once again shows a bias towards the cave.

There is no clear evidence of deliberate cremations as 'burnt offerings' (Hamilakis and Konsolaki 2004), although it is not easy to detect sacrifices that are then consumed – where the only difference is intention (Russell

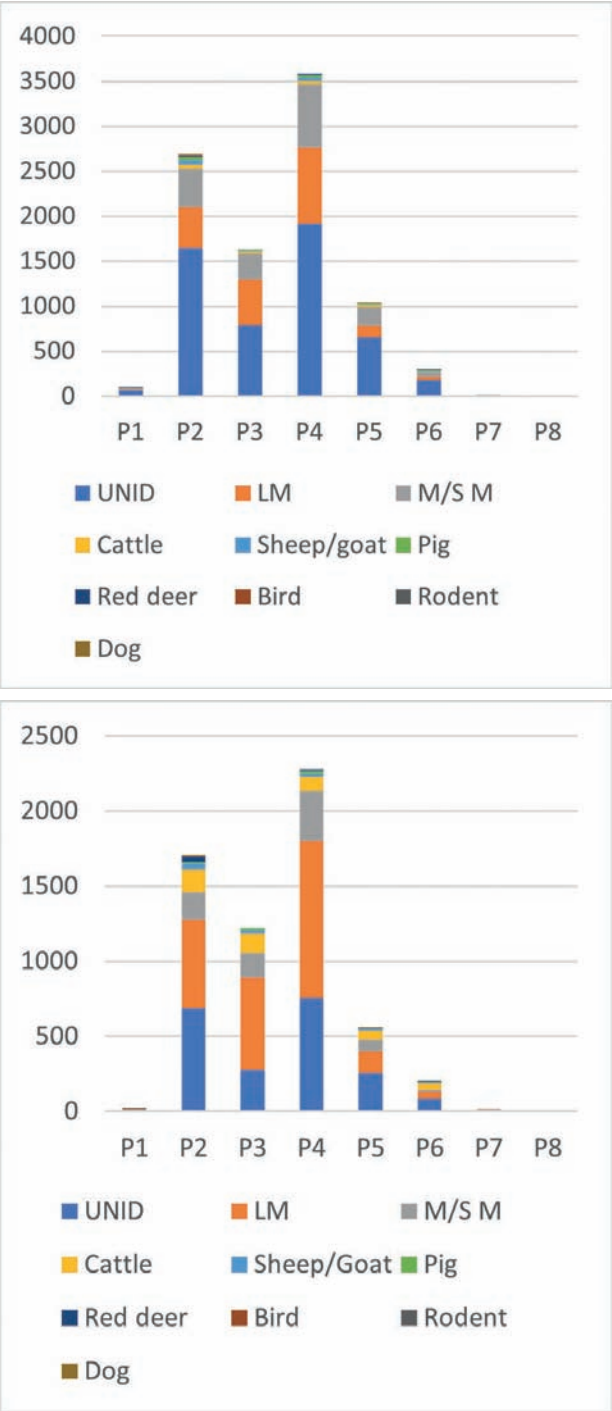


Figure 13.24. Species/category distribution by phase: above: by fragment count; below: by weight (g)

2012, 88). No 'special deposits' can be positively identified, although four cattle bones found in the same context as a human bone in the front of the cave (C6.06, Phase 4c) contained fragments from four hindfoot and hindlimb bones. A focus on the deposition of red deer bones at the front of the cave through Phases 2–4 is also interesting. The presence of non-meat bearing bones suggests that this deposition did not necessarily focus on 'meat joints'.

13.4 Fish bone

Ruby Cerón-Carrasco

13.4.1 Introduction and method

The fish remains from High Pasture Cave were recovered mainly by sieving through a 1.5 mm mesh. In total 2026 bone fragments were recovered, of which 1146 (56%) could be identified to species level or family group. Identification was by reference to a modern collection and standard guides (Watt *et al.* 1997). Nomenclature follows Wheeler and Jones (1989, 122–3). All elements were examined for butchery and burning. Burnt bone colour was recorded to investigate burning activity (cooking, rubbish disposal, *etc*.).

Approximate sizes of cod family species (Gadidae) were recorded through comparison with modern fish skeletons of known size based on 'total body length'. Elements were categorised as 'small' (15–30 cm), 'medium' (30–60 cm), and 'large (60–120 cm). Non-gadoid species were classified as 'juvenile' or 'adult' by comparison to modern specimens.

Preservation was recorded via erosion (E) on a scale of 1–5 (none to extreme) and texture (T) on a scale of 1–5 (fresh to extremely crumbly). The sum of both is used as an indicator of bone condition, with fresh bone scoring 2 and extremely poorly preserved bone 10 (after Nicholson 1991).

13.4.2 Results and discussion

Results are presented in Table 13.8. A total of 13 taxa were present, ten identified to species and three to family level, representing several family groups of mainly marine fishes. Herring (*Clupea harengus*) and herring family dominate, followed by saithe (*Pollachius virens*), cod (*Gadus morhua*) and cod-family, mackerel (S*comber scombrus*), haddock (*Melanogrammus aeglefinnus*), and single elements from plaice (*Pleuronectes platessa*) and butterfish (*Pholis gunnelus*). Eel (Anguila anguila) and salmon (*Salmo cf salar*) were also present as well as a species of tuna (*cf Thunus thynnus*). The assemblage contained well preserved as well as quite eroded and very fragile bone. Condition generally scored in the range of 4–8 indicating good to extremely poor preservation. Elements were most frequently 50–70% complete. Unidentifiable fragments consisted of mainly cranial fragments and tiny fragments of ribs and fin rays, their large number mainly attributable to post-depositional and post-excavation damage. A number of elements were burnt or partially burnt.

None of the fish remains recovered showed any signs of digestion or gnawing by other mammals such as otter (*Lutra lutra*) or rodents. One species, the small butterfish (*Pholis gunnelus*), is presumed derived from the stomach contents of other species in the assemblage and may have been used as bait for catching larger specimens such as cod. The fish present are assumed to be derived from species caught by humans to be consumed on site.

Table 13.8 Fish recovery from High Pasture Cave

Ph	*SB*	*TR/C*	*Species*	*N*	*Element*	*Size*	*E*	*T*	*Cond.*	*Comp. (%)*	*Comments*
2a	25b	1.08	Herring	8	caudal vertebrae (vert.)	1 A, 7 J	3	4	7	60–70	Juveniles burnt: 3 white, 1 black, 3 unburnt
		1.08	Clupeidae	3	frags		4	4	8	50	clupeidae skull frags
		1.08	Unknown	5	Vert.						
2b	25c	1.07	Herring	12	9 caudal vert., 2 precaudal vert., 1 optical valve	A	3–4	4	7–8	50–70	2 burnt/white, 2 burnt grey/white
		1.07	Cod?	1	caudal vert.	M	3	3	6	70	
		1.07	Unknown	8	7 frags, 1 spine		3–4	3–4	6–8	10	< 5 cm (spine 70% complete)
3b	27a	17.06	Herring	13	11 caudal vert, 2 precaudal vert.	A	3–4	4	7–8	60–70	2 burnt/white
		17.06	Gadoid	10	Vert.						
		17.06	Saithe	1	precaudal vert.	VS	4	4	8	60	
		17.06	Mackerel	1	caudal vert.	A	4	4	8	60	
		17.06	Unknown	13	7 ribs, 1 vert., 5 frags		4	4	8	10	< 5 mm
4c	27b	1.06	Herring	1	caudal vert.	A	3	3	6	70	
		1.06	Unknown	5	frags		4	4	8	5	< 5 cm
		17.05	Herring	467	248 caudal vert., 207 precaudal vert., 6 ceratohyal, 3 epihyal, 1 premaxilla (r. prox.), 2 ottic	A	3–4	4	7–8	60–70	2 burnt/white, 1 is 40% complete
		17.05	Saithe	23	21 caudal vert., 2 precaudal vert.	18 VS, 5 S	3–4	4	7–8	60–70	All caudal vert. small
		17.05	Clupeidae	5	2 epihyal, 3 ceratohyal	A	4	4	8	60–70	
		17.05	Cod	4	caudal vert.	S	3	4	7	70	
		17.05	Haddock	4	caudal vert.	S	3	4	7	70	
		17.05	Mackerel	1	precaudal vert.	A	4	4	8	60	
		17.05	Unknown	120	10 fin rays, 110 frags		4	4	8	5–40	
5b	27c	1.05	Herring	7	5 caudal vert., 2 precaudal vert.	A	3	4	7	40–70	
		1.05	Unknown	7	frags		4	4	8	5	< 5 cm
		6.05	Gadoid?	1	vert.						
		6.05	Unknown	1	rib						
		17.04	Herring	93	72 caudal vert., 21 precaudal vert.	A	3–4	4	7–8	60–70	
		17.04	Saithe	4	caudal vert.	2 VS, 2S	3–4	4	7–8	60–70	
		17.04	Salmon	1	caudal vert.	A	3	4	7	60	*c.* 60 cm total length fish
		17.04	Mackerel	1	caudal vert.	A	4	4	8	60	
		17.04	Unknown	23	20 frags, 3 fin rays		4	4	8	5–40	

(Continued)

Table 13.8 (Continued)

Ph	*SB*	*TR/C*	*Species*	*N*	*Element*	*Size*	*E*	*T*	*Cond.*	*Comp. (%)*	*Comments*
6a	29a	1.04	Herring	15	11 caudal vert., 4 precaudal vert.	14 A, 1 J	3–4	4	7–8	70	juvenile is precaudal
		1.04	Clupeidae	10	fin rays		3	2	5	70	
		1.04	Mackerel	1	precaudal vert.	J	3	4	7	70	
		1.04	Saithe	1	precaudal vertebrae	VS	3	4	7	70	
		1.04	Unknown	10	fragments		4	4	8	5	< 5 cm
		17.03	Herring	114	93 caudal vert, 19 precaudal vert., 1 ceratohyal, 1 articular l. proximal	111 A, 3 J	3	4	6–7	60–70	juvenile all precaudal, 7 caudal burnt/white
		17.03	Saithe	22	15 caudal vert., 6 precaudal vert., 1 pharyngeal plate	15VS, 7S	3–4	4	6–8	60–70	VS: 11 caudal 4 precaudal vert.
		17.03	Haddock	7	5 caudal vert., 2 precaudal vert.	6VS, 1M	3	4	7	70	M is precaudal
		17.03	Mackerel	6	caudal vert.	A	4	4	8	50–60	
		17.03	Cod	3	1 caudal vert., 2 precaudal vert.	M	3	4	7	70	
		17.03	Plaice?	1	dentary/right	J	4	4	8	60	proximal
		17.03	Salmon	1	caudal vert.	A	4	4	8	60	
		17.03	Unknown	51	frags		4	4	8	10–20	
		6.04	Unknown	1	jaw						
6b	29c	1.03	Herring	121	86 caudal vert., 21 precaudal vert., 2 dentary (prox l.&r.), 1 premaxilla (prox. l.), 2 articular (prox. l.&r.), 1 cleithra (prox. l.), 2 opercular (prox l.&r.), 2 preopercular (prox l.&r.), 1 quadrate (prox. l.), 2 hyomandibular, 1 ceratohyal	A	3	2–4	5–7	50–80	caudal: 3 burnt/black, 1 burnt white
		1.03	Clupeidae	20	15 fin rays, 5 spines	A	3	2	5	60	frags <5 cm (spines); <10 cm (fin rays)
		1.03	Saithe	7	26 caudal vert., 7 precaudal vert.	VS	3	3–4	6–7	60–70	1 burnt/grey/white
		1.03	Mackerel	4	caudal vert.	2 A 2 J	3	4	7	70	
		1.03	Cod	2	1 caudal vert, 1 precaudal vert.	M, L	3	4	7	60–70	L caudal, M precaudal
		1.03	Gadidae	2	ceratohyal	1 VS, 1S	3	3	6	60	VS is burnt/black
		1.03	eel	1	caudal vert.	J	3	3	6	70	
		1.03	Unknown	225	220 frags, 5 vert. core		3–4	2–4	5–8	5–10	Vert. cores flattened/distorted, species < 20 cm. Frags < 5 cm, 20 burnt/black
		1.02	Herring	17	12 caudal vert., 4 precaudal vert., 1 r. cleithra	A	3–4	4	7–8	50–70	1 caudal partially burnt
		1.02	Saithe	5	4 caudal vert., 1 l. quadrate	3VS, 2S	3–4	3–4	6–8	50–70	Quadrate is S
		1.02	Gadidae	2	1 premaxilla, 1 l. articular	1VS, 1S	4	4	8	40	both medial, S premaxilla,VS articular
		1.02	Eel	2	caudal vert.	J	3	4	7	70	burnt/white
		1.02	Mackerel	1	caudal vert.	J	3	4	7	70	

(Continued)

Table 13.8 Fish recovery from High Pasture Cave (Continued)

Ph	*SB*	*TR/C*	*Species*	*N*	*Element*	*Size*	*E*	*T*	*Cond.*	*Comp. (%)*	*Comments*
		1.02	Butterfish	1	precaudal vert.	A	3	3	6	70	
		1.02	Unknown	120	frags		4	4	8	5	< 5 cm
		6.02	Mackerel	2	caudal vert.	1 A, 1 J	3	4	7	60–70	
		6.02	Tuna fish	1	caudal vert.	A	4	4	8	60	
		6.02	Herring	7	6 caudal vert., 1 precaudal	A	3	4	7	70	
		1.01	Herring	60	38 caudal vert., 22 precaudal vert.	A	3	4	7	70	1 caudal burnt/white
		1.01	Clupeidae	22	20 fin rays, 2 ceratohyal	A	3–4	4	7–8	50–70	
		1.01	Cod	2	precaudal vert.	M	3	3	6	70	
		1.01	Saithe	8	4 caudal vert., 4 precaudal vert.	VS	3–4	4	7–8	50–70	
		1.01	Gadidae	22	20 fin rays, 1 articular, 1 ceratohyal	S	4	4	8	50	medial
		1.01	Mackerel	5	3 caudal vert., 2 precaudal vert.	A	3	4	7	70	
		1.01	Pleuronectidae	1	premaxilla/l.	J	3	4	7	70	proximal
		1.01	Eel	10	caudal vert.	J	3	4	7	70	
		1.01	Unknown	250	frags		4	4	8	5	< 5 cm
		6.01	Herring	1	precaudal vert.	A	3	4	7	60	burnt/white
3c	7c	2.27	Herring	1	caudal vert.	A	3	4	7	70	burnt/white
		2.27	Saithe	1	caudal vert.	VS	3	4	7	70	burnt/white
		2.27	Unknown	1	vert.						small bones
3e	7e	15.50	Cod	2	1 caudal vert., 1 precaudal vert	L	4	4–5	8–9	60–70	
		15.56	Unknown	6	vert.						
4c	8c	2.15	Salmon	1	caudal vert.	J	3	4	7	70	burnt/white
		2.15	Unknown	3	vert.						burnt?
5b	9c	3.03	Herring	2	caudal vert.	A	3	4	7	70	
		3.03	Saithe	1	caudal vert.	VS	3	4	7	70	
7	22b	2.45	Mackerel	1	caudal vert.	J	4	4	8	60	

E = Erosion; T = Texture; Cond. = Condition; Comp. (%) = Percentage complete

Larger concentrations are derived from redeposited midden material, all within the cave (below). A large amount of these were partially burnt to white and black and are likely to represent domestic rubbish disposal.

Distribution of fish bone showed an overwhelming bias to the cave interior, with only nine fragments recovered from the precinct (Trenches 2 and 15) and stairwell (Trench 3) outside the cave. Within the cave, distribution was heavily skewed, first towards the rear (Trench 17) in Phases 2–5/6a, and then to the centre (Trench 1) in Phase 6b, with almost no fish bone recovered from the Trench 6 area nearest to the cave entrance (Fig. 13.25). There may also be some preferential distribution by species. Prior to Phase 6, saithe, mackerel, and haddock are only found in the rear of the cave (Trench 17), and the percentage of fragments identified to species, especially herring, is far higher than that seen in Trench 1, which overall shows a majority of unidentified fragments (Figs 13.25–13.26). It is possible that both of these observations are at least partly the result of greater fragmentation of the Trench 1 fish bone, which overall shows a slightly poorer condition than that of Trench 17 (Table 13.8).

13.4.3 Species overviews

The following species represented (taxonomical description based on Wheeler 1969; 1978).

Herring (Clupeidae) is one of the most important species in Scotland's fishing history, with migratory habits securing its presence on the west coast, particularly in winter (Gray 1978). Herring grow up to 45 cm length and most of the elements recovered from High Pasture were from mature specimens of 35–45 cm.

Saithe (Gadidae) is common in northern inshore waters. Juveniles are found among weed covered rocks and open bays, with adults slightly offshore. Annual growth is *c*. 15 cm length for years 1–3, followed by *c*.10 cm for years 4–6, up to 100 cm. Although elements from large (60–120 cm) specimens were recovered, most were 'very small' (< 15 cm) and 'small' (15–30 cm).

Cod (Gadidae) is another important Scottish food fish, its firm flesh allowing for preservation as 'stock fish', dried or salted, used for winter consumption or trade. Growth rate varies by population, with North Sea cod growing an average of 18 cm in year 1, 36 cm in year 2, 55 cm in year 3, and 68 cm in year 4. Mature cod can reach 150 cm length and weigh up to 40 kg. Cod is widely distributed in a variety of habitats from the shoreline to depths of 600 m at the continental shelf. Younger fish usually remain close inshore. Cod at High Pasture were from specimens of 30–120 cm length.

Haddock (Gadidae) is also an important food fish whose size and quality varies with location. Although it may reach 120 cm, *c.* 65 cm is more usual, with the best fish coming from deep water. Haddock needs appropriate handling and is generally gutted at sea, the skin kept on avoiding tearing the flesh and is mainly cured by drying and smoking (Lockhart 1997). Remains were of medium size, up to 60 cm length.

Mackerel (Scombridae) is a common North Atlantic fish which lives near the sea surface in large shoals, seasonally close inshore. It attains a maximum length of 66 cm. Elements of Mackerel recovered at High Pasture were from specimens of up to 40 cm total length.

Plaice (Pleuronectidae) is widespread in northern European waters, found on a variety of substrates, from sand and gravel to rocky grounds. It is mainly found during spring and summer and attains 60 cm. Remains were from juveniles of less than 30 cm length.

Tuna (*cf* Tunny) live in subtropical and temperate waters in the North Atlantic, Black Sea, and the Mediterranean. Tuna range as far north as Norway and down to northern West Africa. The Atlantic tuna is a pelagic, schooling fish. They tend to group according to size and may achieve 500 cm and live up to 30 years. Boyd and Boyd (1996, 62–3) note tuna as one of the rare and exotic species recorded on the west coast of Scotland. The single recovered tuna vertebra belonged to a juvenile of 60–100 cm length and may be an Atlantic tuna – a homeothermic (warm-blooded) fish whose thermoregulation allows adaptation to colder waters.

Butterfish (Pholidae) is a common fish found mainly on rocky shores and may attain 25 cm. Remains were from individuals of less than 15 cm which were probably used as fishing bait, entering the assemblage as other species' stomach contents.

Eel are found throughout Europe and the British Isles. Most enter freshwater habitats while some remain near the coast, particularly on rocky shores. Their migration from the Sargasso Sea to Europe is well known. Male specimens may attain a length of 50 cm while females may reach 100 cm. Eel was represented mainly by vertebra from specimens of less than 45 cm. Salmon vertebrae were recovered from 'adult' specimens of less than 60 cm.

13.4.4 Conclusions

Fishing from rocks for young saithe would have caught juvenile cod and other species such as plaice and mackerel. The use of boats and handlines would have been required for catching mature cod and haddock, and also the tuna. This may have been a juvenile tunny of 60–100 cm. Its presence is significant since these species are normally found in temperate waters; however, the range and migratory habits of the tunny means that it is more likely to occur in the west coast of Scotland than any other tuna species.

Eels are usually present in assemblages from different periods and have probably been systematically exploited throughout Scotland. They are easily caught using wicker traps in freshwater streams or coastal waters.

Herring is the main species represented and indicates that boats and nets may have been used, although they can occasionally be caught using line or close inshore

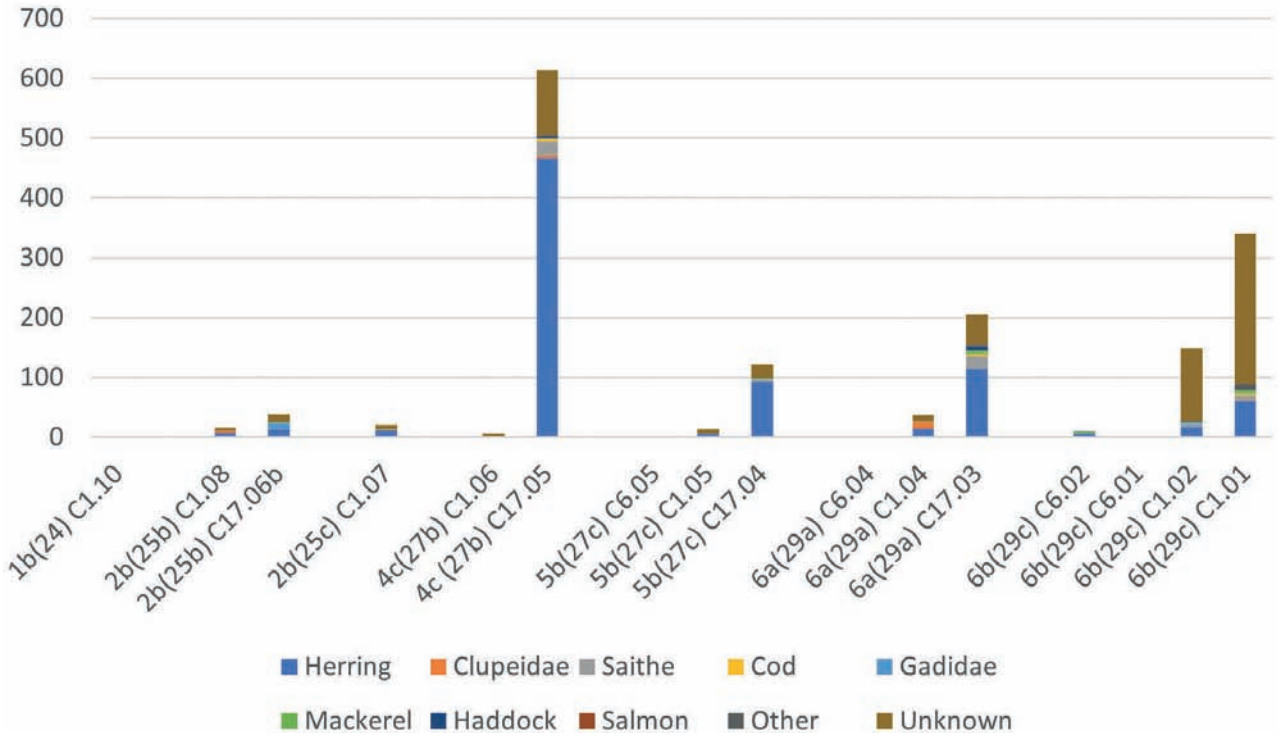


Figure 13.25. Distribution of fish remains by context/phase, by species

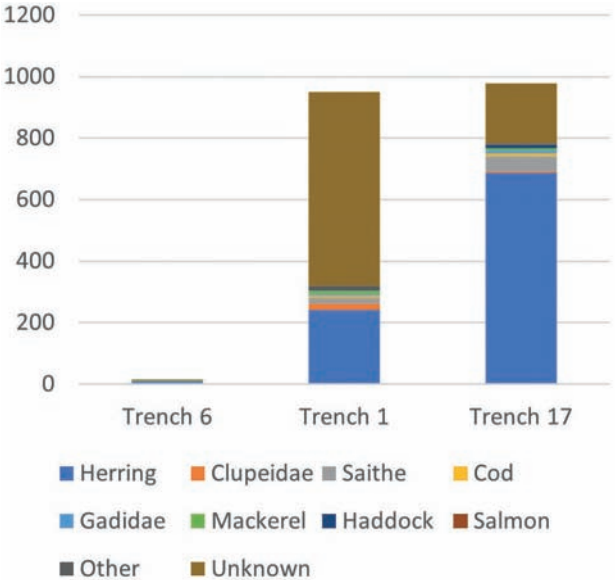


Figure 13.26. Distribution of fish remains within the cave by area (Trench) & species

using trap-nets (*e.g.* stake-nets, herring baulks) or weirs; close inshore, one boat with net would have been sufficient to ensure a good catch. Herring appears rare during prehistory when compared to the large cod family (Gadidae) assemblages found throughout Scotland. Only small quantities are present in fish bone assemblages in northern Scotland (Barrett *et al.* 1999) while in western Scotland only one other later Iron Age site has produced a minimal amount of herring vertebra – Dun Vulan in South Uist (Ceron-Carrasco 1999). Unlike the Northern Isles and Caithness, herring in the Western Isles becomes increasingly important, occurring in large quantities in assemblages from the Norse period (Ceron-Carrasco 2005). The presence of herring at the High Pasture Cave complex therefore represents a significant pre-Norse assemblage for the region.

13.5 Amphibians

Chris Gleed-Owen

13.5.1 Introduction and method

A series of bulk samples notably rich in small vertebrate remains was recovered from Trench 1, the central trench in Bone Passage. A full herpetological assessment was undertaken on this material. Only common toad (*Bufo bufo*) and common frog (*Rana temporaria*) were present. Although several bones were burnt, it appears that the remains were accumulated by avian or mammalian predators. In addition, a small group of amphibian remains were identified within the faunal assemblage, some also burnt. These were not assessed in detail but are tabulated here to illustrate frequency of amphibian remains in the High Pasture deposits.

The Trench 1 material was examined under ×7–×40 magnification and all herpetofaunal remains removed and identified to the highest taxonomic level possible. Total number of identifiable specimens (NISP), and minimum

number of individuals (MNI) were established generally using those elements most commonly recovered from archaeological contexts (*e.g.* scapulae, humeri).

13.5.2 Results and discussion

A condensed catalogue of the collated amphibian assemblage is presented in Table 13.9 and the more detailed NISP/MNI for identified species in the Trench 1 assessment at Table 13.10. Bones from Trench 1 were in a peaty/dirty condition. Amphibian remains were recovered from 26 contexts in total. The Trench 1 assemblage is notably species-poor, with only common toad and frog present and non-specific remains almost certainly representing the same.

Collation of the two datasets (Table 13.9) shows that 198 of the 208 fragments recorded are located within the cave, either in central Trench 1 (148 frags), front Trench 6 (21 frags), or rear Trench 17 (29 frags). Of the remainder, eight are associated with the cave entrance and stairwell, while two are associated with hearth deposits in the precinct (SB5; Phase 7a). Although there seems a clear bias towards identification of amphibian remains for Trench 1, there appears a genuine bias towards the cave. Chronological distribution is heavily skewed towards Phase 6, with only 68 fragments dating to earlier phases, and especially towards Phase 6b cave deposits SB 29c (115 frags), though this is likely to be at least partly due to Trench 1 identification bias.

Burning is identified on material from 13 of the 26 contexts containing amphibiae, including the material from both of the hearth deposit contexts (C2.34; C2.32) as well as every context located outside the cave. The presence of these few burnt/calcined bones raises the intriguing possibility that amphibians were deliberately prepared as food by humans; however, they could have been burnt accidentally.

All Trench 1 samples show signs of digestion. Despite previous research on amphibian taphonomy and possible predator species (Pinto Llona and Andrews 1999), these are difficult to identify. Likely candidates are mustelids and raptors, and possibly canids. Predation as an accumulative agent would mean that prey species could originate several kilometres away – a key consideration for environmental reconstruction.

There is no obvious overall difference in bone condition (and taphonomic clues) between layers. Both species are present in every Trench 1 context, with no apparent relationship between the assemblage and sedimentology/stratigraphy. Toads have slightly higher MNI values but as the greatest for either species is four it is impossible to discuss relative abundance meaningfully. There is some variation in NISP between samples/species but aggregated values are almost identical for both species. There is an apparent vertical increase in NISP values but this too is probably not significant.

Table 13.9 The High Pasture Cave amphibian assemblage

Ph	*SB*	*C*	*No.*	*Burning?*
2a	25a	C6.08	1	b
2a	5	C2.34	1	b
2a	18	C2.71a	1	b
2b	25b	C17.07	6	
2b	25b	C17.06b	1	
2b	25c	C6.07	4	b
2b	25c	C1.07	11 (12?)	
3	19	C2.70	1	b
3a	7a	C2.32	1	b
4c	27b	C1.06b	5	
4c	27b	C6.06	1	b
4c	27b	C17.05	4	
5b	27c	C1.05	6	b
5b	27c	C6.05	10	
5b	27c	C17.04	15	
6	22a	C2.51	3	b
6a	29a	C1.04	15	
6a	29a	C6.04	1	
6a	29a	C17.03	3	
6b	29c	C1.01	38	b
6b	29b	C1.02	18	
6b	29b	C1.03	55	b
6b	29b	C6.01	1	
6b	29b	C6.02	3	
6b	10	C2.61	1	b
7	22b	C2.44	2	b

b = burnt

13.5.3 Conclusions

The assemblage contains a very sparse herpetofauna of only two amphibian species: common frog and common toad. Both may be present in Skye today. There are no newts or reptiles. This may be due to the larger (1.5 mm) sieve mesh not retaining these remains, though snake vertebrae are normally >1.5 mm. It is possible that the assemblage contained only the two species. There are sparse modern or historical records for smooth newt, palmate newt, common lizard, slow-worm, and adder on Skye (Arnold, 1995) as well as modern records of common toad and common frog, which are widespread across the Scottish Highlands and some inner islands, with toad more patchily distributed. Common frog is an open country species, often spawning in the shallowest of temporary water bodies. Common toad is often associated with open woodlands and is more reliant on deeper ponds and lochans for spawning.

It is not unusual to find amphibian bones in large numbers in cave sequences, particularly those of Holocene

Table 13.10 The amphibian assemblage: NISP/MNI data

Ph	*SB*	*C*	*Toad NISP*	*Frog NISP*	*Frog/toad NISP*	*Toad MNI*	*Frog MNI*	*Burning?*
6b	29c	C1.01	23	9	6	4	2	1 (toad)
		C1.02	3	10	2	1	3	–
		C1.03	10	26	12	3	2	1 (frog)
		C1.04	1	5	2	1	1	–
		C1.05	3	1	1	1	1	?1 (frog)
		C1.06b	5	0	0	2	0	–
		C1.07	10	1?	1	2	1?	–
Totals			55	51	24	14	10	3

origin (Gleed-Owen 1999). Most probably they entered the cave via predators. It is possible that burnt bones indicate some human consumption but little anecdotal evidence exists for this anywhere in Europe, let alone Britain.

13.6 Marine molluscs

Ruby Cerón-Carrasco

13.6.1 Introduction and method

Marine molluscs were recovered by sieving and hand collection (Table 13.11). Shell apical fragments were identified to species using standard guides (Campbell and Nicholls 1989; Moreno-Nuño 1994a). Frequency was estimated by counting shell apices for gastropods and valve umbos for bivalves (Moreno-Nuño 1994b). Broken fragments were scanned and an approximate quantification given to estimate the potential significance of species recovered. Species were then quantified in terms of relative frequency within each sample, recorded as: very few (vf) = rare (< 5); present (f) = present in low numbers (<10); common (c) = present in large quantities.

13.6.2 Results and discussion

Results by context are given in Figure 13.28. The assemblage is dominated by periwinkle (*Littorina littorea*) (1509 adult, 1087 juvenile fragments) followed by limpet (*Patella vulgata*) (111 adult, 37 juvenile frags). In addition, 37 fragments from a further 14 species were also found, mainly flat periwinkle, oyster, and mussel (described below). A large number of fragmented and sometimes burnt shells were also recovered, generally within those contexts which also showed higher numbers of whole shells (*e.g.* cave midden deposits C6.05 and C17.05). Distribution showed a very strong bias towards the cave, with numbers increasing in later phases and a high 'spike' in P6b/SB29c. (Fig. 13.27). Within the cave, material appears preferentially distributed towards the front (Trench 6) and especially the rear (Trench 17) of the cave (Fig. 13.28) with notable concentrations of shell, mainly periwinkle, in Phase 6 cave midden dumps C6.05, C17.05, and C17.03.

13.6.3 Species overview

Edible periwinkles (*Littorina littorea*) are common on middle and lower shores and grow up to 2.5 cm high. Most recovered were whole specimens measuring 2–3.5 cm. Limpet (*Patella vulgata*) is common on all rocky Scottish shores and is of major quantitative importance on most littoral shores and shallow waters (Branch 1985). Common mussel (*Mytilus edulis*) is found on exposed rocky shores and estuaries, often in extensive beds. Shells may reach 10 cm but are fragile and usually fragmented, as seen in the High Pasture Cave assemblage. Common oyster (*Ostrea edulis*) is found mainly in shallow water. Its shell may grow to 10 cm, but its lamellar structure tends towards rapid fragmentation/disintegration. Material recovered at High Pasture Cave was very fragmentary. Fragments of scallop included those of the Great Scallop or St James' Shell (*Pencten maximus*). These are found on sand and gravel, usually in quite deep water. Also recovered were common whelk (*Buccinum undatum*), and the common otter shell (*Lutraria lutraria*).

Non-edible species consisted of mainly flat periwinkle (*Littorina littoralis*), usually found on bladder wrack (*Focus vesiculosus*) or knotted wrack (*Ascophyllum nodosum*), and rough periwinkle (*Littorina saxatilis*), found on rocks on the upper and middle shore. The whelk (*Nucella lapillus*) is found on rocks of the middle shore region. The grey topshell (*Gibbula cineraria*) is found under stones and seaweed on the lower shore.

13.6.4 Conclusions

There is considerable regional variation in the use of shellfish for nutrition throughout the Scottish islands. Early historical accounts indicate that coastal dwellers consumed shellfish out of necessity, particularly in times of hardship (Fenton 1984), probably during late winter and early spring when other food resources were scarce. However, High Pasture Cave is situated in an area with good access to both coastal and inland resources.

Mussel, limpets, periwinkles, cockles, and oysters have been recovered from sites dating as far back as the Mesolithic. It is difficult to establish the relative importance of shellfish in the archaeological record, including

Table 13.11 The High Pasture Cave marine mollusc assemblage

Ph	*SB*	*TR/C*	*Periwinkle*			*Limpet*			*Mussel*	*Crab claw*	*Rough peri-winkle*	*Flat peri-winkle*	*Oyster*	*Great scallop*	*Queen scallop*	*Whelk*	*Dog whelk*	*Clam*	*Razor shell*	*Otter shell*	*Gt top shell*	*Top shell*
			A	J	B	A	J	B														
1b	24	C17.10	4		f	1	2	f														1 (J)
2a	25a	C6.08	2		f	4	1	f						2; cbr			1	1				
2a	25a	C6.09	2					vf								1						
2a	25a	C17.08	20	30	c	2		vf				10; vfbr										
2b	25b	C17.06	81	48	f	42	21	f	fbr; fbr & b				1; fbr; fbr & b								fbr; fbr&b	
2b	25b	C17.07	2		vf	1							cbr									
2b	25c	C1.07	4				1		f br.													
2b	25c	C6.07	1	1	f	2		f					fbr		1; fbr							
3b	7b	C15.64				1		f					1									
3b	7b	C15.65	1		f	4	2	f					fbr						fbr			
3d	7d	C15.61	1																			
3e	7e	C15.56	1			2																
4b	8b	C15.42	2		f	1																
4c	27b	C1.06	2					f	f													
4c	27b	C6.06	34	21	f; fbr & b	7		f; fbr & b	cbr & b				2; cbr; fbr & b									
4c	27b	C17.05	160	98	c; fbr & b	4	1	c; fbr & b	fbr													
4c	8c	C15.38	60	40	c																	
5b	27c	C1.05	7		f	1		f														
5b	27c	C6.05	19	22	f; fbr & b	2	3	c; fbr & b	fbr; f br & b				6, cbr	1								
5b	27c	C17.04	147	82	c			f; fbr & b	cbr					1; fbr			1 (J)					

(Continued)

Table 13.11 The High Pasture Cave marine mollusc assemblage (Continued)

Ph	SB	TR/C	Periwinkle			Limpet			Mussel	Crab claw	Rough peri-winkle	Flat peri-winkle	Oyster	Great scallop	Queen scallop	Whelk	Dog whelk	Clam	Razor shell	Otter shell	Gt top shell	Top shell
6a	29a	C1.04	8	2	f			f														
6a	29a	C6.04			fbr & b			fbr & b														
6a	29a	C17.03	637	490	c	23	1	c					fbr; fbr & b	1; fbr							1	
6a	10	C15.07	15	6	f																	
6	22a	C2.47	1																			
6	22a	C2.49	3	1																		
6	22a	C2.50	1																			
6b	22a	C2.52	5	1		1		f	2p/b; f br & b													
6b	29c	C6.01	60	55	f	2	1	f	fbr; f br & b		f br & b											
6b	29c	C6.02	60	30				f			1											
6b	29c	C6.03	10	20	f; fbr & b	1		f; fbr & b														
g	29c	C6.01/4	8	2	f				fbr													
6a	29a	C17.03/04	70	70	f	3		f	1, fbr				1; fbr									

Key: A = adult; J = Juveile; B = broken; b = burnt; c = common/significant; f = few; vf = very few; vfbr = very few/broken; cbr = common/broken; fbr = few/broken; p/b = partially burnt

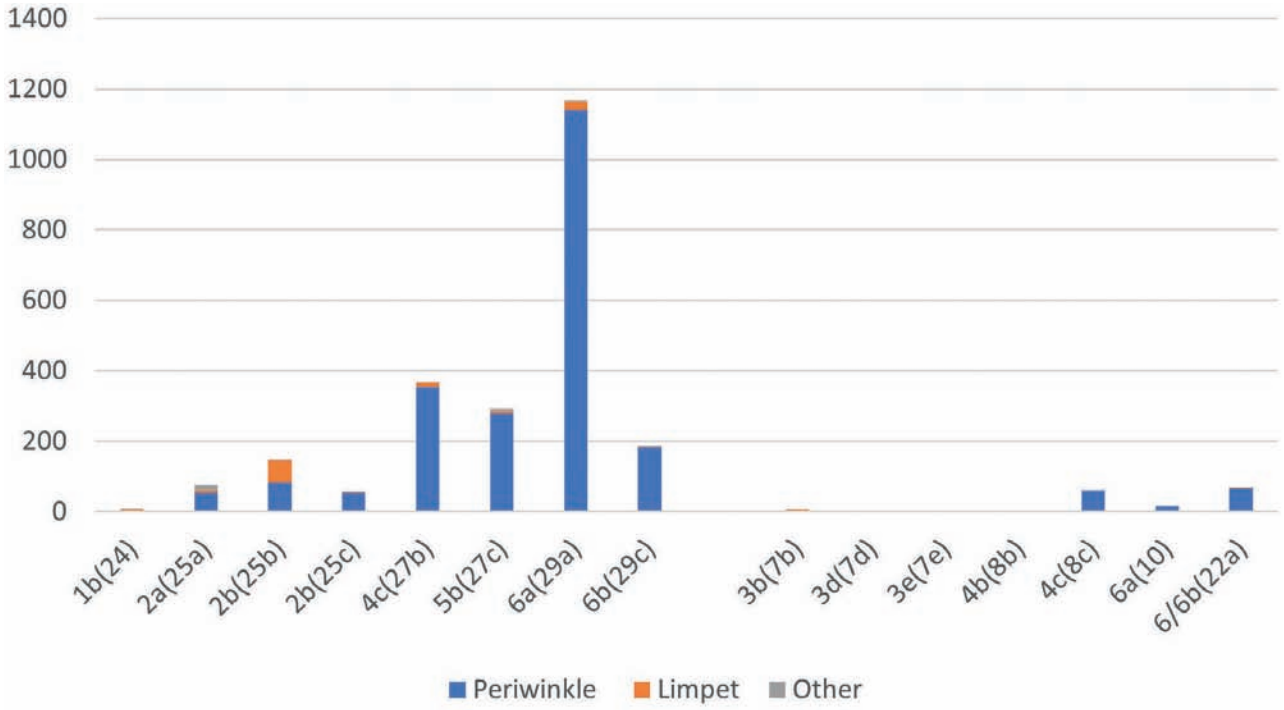


Figure 13.27. Marine mollusc distribution at High Pasture Cave

their use as food. Ethnographic and historical accounts may support the archaeological evidence however, suggesting more dependence was placed on shellfish in the past (Pollard 1994).

Shellfish such as periwinkles, limpets, and mussel have been traditionally used as fishing bait, with fishing also largely dependent on the seasonal variation of the bait (Fenton 1978; 1984; Ceron-Carrasco 2005). Considering the location of High Pasture Cave and the activities taking place there, it is likely that the shells were gathered for food. Furthermore, no marine shell remains that may have been used for ornamental purposes such as the cowrie (*Trivia monacha*) were found.

Non-edible molluscs recovered may have been introduced with seaweed into the cave. Two species which flourish around Scotland's coasts are the intertidal *Ascophyllum nosodum*, found mainly in sheltered areas, and *Laminaria hyperborea* which grows particularly in coasts with extensive shallow sub-tidal rocky areas. Burnt shell remains are considered to be the remains of domestic rubbish disposal.

13.7 Terrestrial molluscs

C. Pannell

13.7.1 Introduction and method

Terrestrial snails recovered by fine mesh sieving (min. 1.5 mm) were identified to species level by comparison to reference collections and standard guides (Beedham 1972; Cameron and Redfern 1976; Kerney and Cameron 1979).

13.7.2 Results and species overview

Results from deposits C1.01, C1.02, C1.03 and C1.14, all located in the central cave zone, are summarised in Table 13.12. 17 terrestrial snail species were identified, distributed through Phases 2a (C1.01) 3a (C1.02), 6a (C1.14) and 6b (C1.03).

Dominant species were *Discus rotundatus* (Muller, 1774), *Cochlicopa lubricella* (Poro, 1838) and *Oxychilus alliarius* (Miller, 1822). Discus rotundatus is one of the most common shelled molluscs in Scotland, ubiquitous in man-altered terrain, woodland, often at raised bog edges/lagg woodland, occasionally blanket bog, and usually in conjunction with human disturbance or cultivation. *Cochlicopa lubricella* is commonly found in meadows, is very widespread, often abundant but not in very wet or acid soils. Less common than but similar in shell to *C. lubrica* (Muller, 1774), they are often found together. *Oxychilus alliarius* (Miller, 1822) is very common, tolerant of acid conditions, and often the only shelled mollusc in acid grassland and wet heathland.

Other species present include:

Vertigo pygmaea (Draparnaud, 1801), a species less tolerant of base-deficient conditions, mainly coastal

Lauria cylindracea (Da Costa, 1778), which is ubiquitous on walls and rocks.

Vitrina pellucida (Müller, 1774), common in moderately humid woods, grassland, amongst rocks; often abundant in grassy coastal sand-dunes and stream banks.

Nesovitrea hammonis (Ström, 1765), inhabits wet woodland locations, unimproved pasture and

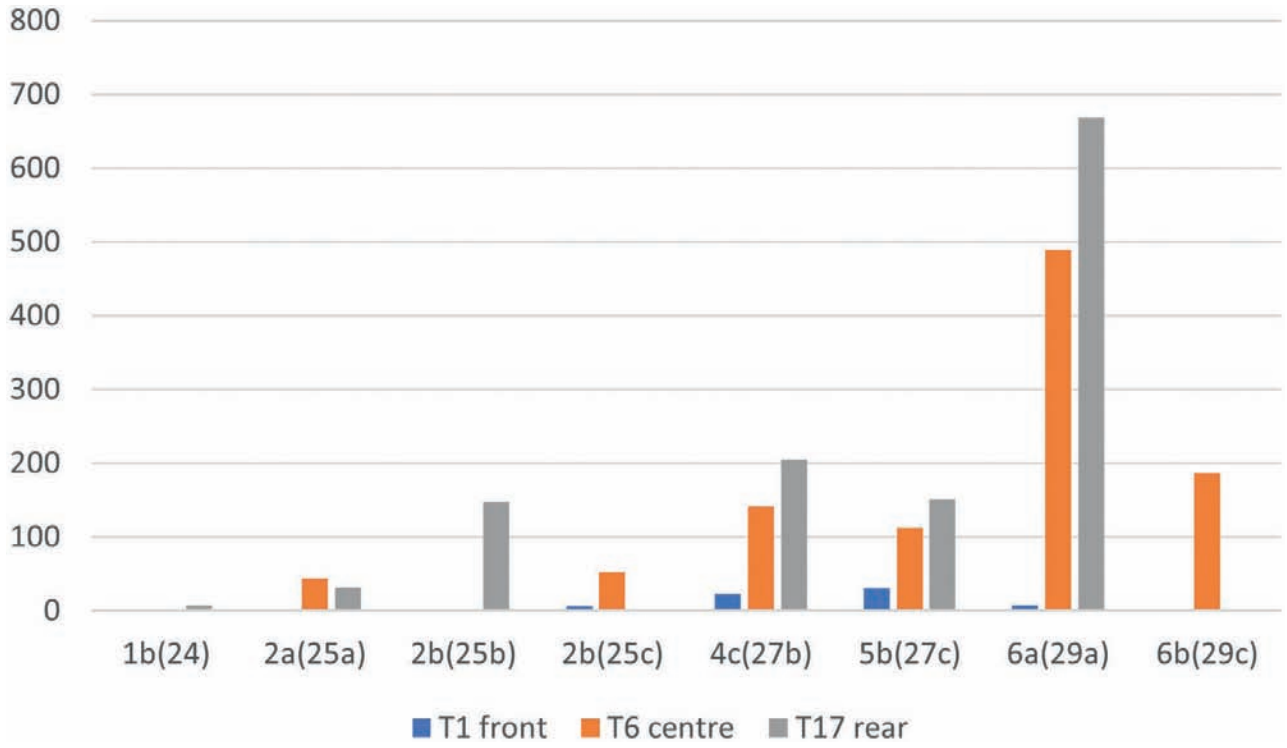


Figure 13.28. Marine mollusc distribution within the cave deposits

marshes, and occasionally moderately acid peatland peripheries.

Helicella itala (Linnaeus, 1758), found mainly in dry exposed sand dunes, screes, and calcareous grassland.

Cochlicella acuta (Müller, 1774), coastal, common on dunes and neglected sandy ground.

Cepaea hortensis (Müller, 1774), found on mortared walls or scrub woodland.

Clausilia bidentata (Ström, 1765), abundant on mortared walls, rocks, tree boles, fallen timber, broad-leaved woodland.

Aegopinella pura (Alder, 1830), widespread, common in woodland, particularly beech litter. Never common on acid soils.

Trichia hispida (Linnaeus, 1758), widespread but rarely abundant in wet, shaded habitats. Found often in synanthropic situations but also in other 'rich' or eutrophic places. Frequent in nettle beds. A hairless, flattened form is frequent in calcareous coastal districts.

Vitrea crystallina (Müller, 1774), found in damp habitats under stones and woodland litter. Some species are subterranean.

Arianta arbustorum (Linné, 1758), widespread in meadows, herbage, woods, hedgerows, but always in damp places.

Ashfordia granulata (Alder, 1830), found in woods, hedges, marshes and damp, shady places, and widespread in the British Isles.

Most molluscan species inhabit layers just below or on the surface and are therefore useful indicators of whether deposition occurred gradually or rapidly. Most of the above species inhabit sandy deposits (*Cochlicella acuta*, *Helicella itala*, *Vertigo pygmea*). *Trichia hispida*, *Cochlicopa lubrica* and *C. lubricella* are usually found in mixed populations, often in dry exposed habitats. *Lauria cylindracea*, *Oxychilus alliarus*, *Cepaea hortensis*, and *Clausilia bidentata* are found on stone or/and mortared walls or under rocks. Species associated with woodlands and indicative of moist, stable grassland conditions are *Nesovitrea* hammonis, *Aegopinella* pura, and *Oxychilus alliarius*, also tolerant of acidic soils.

13.7.3 Conclusions

Terrestrial molluscs are mainly studied in archaeology to investigate the contemporary local environment. They create an important record as often there are none in areas of archaeological recovery. This is true for many parts of the Scottish islands, where archaeology may provide the only means of surveying and recording their distribution.

The majority of the terrestrial snails recovered from High Pasture are found in mostly humid to wet habitats. Most of the species present are taxa typical of disturbed and shaded habitats associated with stone structures, rubble, and/or sand, and it is assumed these accumulated over a period of time. There is also indication of moist grassland and woodland conditions. Accumulation

Table 13.12 Land snails recovered from High Pasture Cave by context

Species	C1.101a	C1.01b	C1.02a	C1.02b	C1.03a	C1.03b	C1.14
*Discus rotundatus**	c	c	–	c	c	c	vf
*Cochlicopa lubricella**	vf	f	–	c	vf	c	–
*Oxychilus alliarus**	c	f	f	c	f	vf	vf
Vertigo pygmaea	–	vf	–	–	–	–	–
Lauria cylindracea	–	c	vf	vf	–	–	–
Vitrina pellucida	vf	–	–	–	–	–	–
Nesovitrea hammonis	–	–	–	vf	–	–	–
Helicella itala	–	–	–	vf	–	–	–
Cochlicella acuta	–	–	–	c	–	–	–
Cepaea hortensis	–	–	–	–	–	f	–
Clausilia bidentata	f	c	vf	vf	vf	–	vf
Cochlicopa lubrica	vf	vf	vf	–	–	–	–
Aegopinella pura	–	–	–	vf	–	–	–
Trichia hispida	–	–	–	–	–	vf	–
Vitrea crystalline	c	–	c	–	c	–	–
Arianta arbostorum	vf	–	vf	–	vf	–	vf
Ashfordia granulata	f	–	–	–	–	–	–

*= ?dominant; c = common; vf = very frequent; f = frequent

mechanisms can be considered natural, anthropogenic, and mixed.

13.8 Botanical remains

John Summers, Zoe Outram, Emma Horton, and Carrie Drew

13.8.1 Introduction

High Pasture Cave produced significant charred plant material, recovered predominantly from deposits of Middle Iron Age date (Phases 4–6) and almost entirely consisting of cereal grains, predominantly barley with a small number of wheat and oat. Hazelnut shell fragments, charred heather twigs, and relatively limited suites of weed seeds were also present (details in archive). The taxa are consistent with later prehistoric assemblages, with, typically for Scotland, hulled 6-row barley dominant. Material was concentrated in the cave and surrounding precinct, was extensively cleaned, and processed, and is notable for several, very large, discrete charred grain deposits. Given the lack of domestic settlement at High Pasture, these are unlikely to represent accidentally burned domestic waste.

13.8.2 Method

Several separate phases of processing and analysis (Horton 2005; Drew 2014; Summers and Outram 2016) examined bulk samples processed during excavation plus a number of additional controls subsequently processed under laboratory conditions. Samples were floated on site through a 1 mm mesh, and the flot dried and processed through a series of 8 mm, 3 mm, and 1.5 mm mesh sieves (Kenward *et al*. 1980). An extensive series of smaller control samples (generally under 2 litres) were flotted under laboratory conditions using a 0.5 mm mesh, to determine whether smaller macrofossils (cereal chaff fragments, smaller weed seeds) were lost during on-site processing. Materials recovered from these samples are incorporated into the overall results. Concentrations from the control samples containing charred plant material ranged from 0.32 to 74.81 items per litre of sediment.

Flots were examined at up to ×60 magnification for waterlogged and charred remains using a low powered stereomicroscope. Where particularly large, a subsample of the flot was counted using a riffle-box for division, with the entire flot scanned to ensure no further species were present. Tables have been adjusted in these instances to be comparable with other samples. The percentage of flots individually counted in comparison to the total scanned have been indicated. Charred plant macrofossil counts from all assessments are recorded in the site archive. Identification was undertaken using modern reference material, reference diagrams, and archaeobotanical texts (*e.g.* Cappers *et al*. 2006; Jacomet 2006). Plant nomenclature follows Stace (1997), and Birks and Williams (1983). Murray and Birks (1980) and Birks (1973) were consulted to consider the local environment. Habitat classifications follow Preston *et al.* (2002). The term seed is used herein as a general term for the fruiting bodies of plants. There is no evidence of waterlogged conditions at

High Pasture, meaning the few uncharred seeds and roots present are likely intrusive. Archaeological evidence for crop processing activities at the site include fragments of both rotary and saddle querns (see Section 12.3).

13.8.3 Assessment

Cereals

High Pasture shows large scale use and consumption of barley, with other cereal taxa probably representing incidental or accidental inclusions. Most grains were only identifiable as *Hordeum* sp. (barley family). Where more specific identification was possible, almost all barley was hulled (with hulls attached) or *cf*. hulled. A few naked barley grains may represent weeds within the main barley crop (as at Cyderhall, Sutherland; Pollock *et al.* 1993). The ratio of asymmetric (twisted) to symmetrical (straight) grains was *c*. 2:1 through all phases, indicating continued use of 6-row hulled barley (*Hordeum vulgare* (subsp.) *vulgare*). Where well preserved diagnostic rachis internodes were present, this was confirmed. A small number of oat and wheat grains were seen in both cave and surface deposits: not uncommon for prehistoric Scottish assemblages. These likely represent wild contaminants of the barley crop (Church 2002). Oat is seen from Phase 2 onwards, with a slight increase in later phases. Some larger grass seeds may potentially also be small oats. Unfortunately, High Pasture oat remains generally lacked the distinctive lemma or palaea fragments indicative of wild or domesticated type, although wild floret bases were observed in C2.65 (Phase 3). Elsewhere in Atlantic Scotland, cultivated oats have been encountered on Iron Age sites and may indicate limited cultivation from the Middle Iron Age (Summers 2015). It is therefore possible, though not likely, that some cultivation is indicated.

Wheat cultivation as far north as Shetland is evidenced during prehistory (Miller *et al.* 1998; Summers and Outram 2016). The small number of wheat grains at High Pasture were generally unidentifiable but are likely emmer, the only positively identified wheat species in the Atlantic Scottish Middle Iron Age (Summers 2015). It is unclear whether emmer was cultivated in this region during this period or whether this is an accidental inclusion. Probable emmer is identified as a minor contaminant to barley crops on Scottish sites ranging from Skara Brae (Ascough *et al.* 2007) to Balbridie, Aberdeenshire (Fairweather and Ralston 1993), and more locally, at Broadford on Skye (Hastie 2012). At High Pasture, seven grains in redeposited burnt spread C14.29 were identified as emmer-type (*Triticum dicoccum* type) based on their strongly 'hump-backed' appearance (Summers and Outram 2016) and sporadic examples of emmer/spelt wheat were observed in later phase deposits C2.44, C2.52, C6.03, and C15.25. The seven emmer wheat grains from C14.29, from a deposit devoid of the typically ubiquitous barley grains, may indicate emmer cultivation at High Pasture, although this is not identifiable in any further deposits. High Pasture cereals were probably grown in low lying, sheltered areas in the surrounding Elgol peninsula. The first prehistoric ard marks to be identified on Skye were found during excavations at High Pasture.

Both cave and surface assemblages were generally 'cleaned' with few non-cereal taxa or chaff fragments. Low contamination may indicate that High Pasture was a consumption site, rather than grain processing location (Van der Veen 1992), with grain brought in fully processed. However, the level of cleanliness is unusual for Iron Age sites where a proportion of weed seeds, straw, and chaff fragments is typically present even in 'cleaned' material. As contaminant remains are physically smaller and less resistant to taphonomic and carbonisation processes, this may reflect a preservation bias, despite generally good preservation of grain and charcoal (Boardman and Jones 1990). The control samples, sieved through a finer 500 µm mesh, generally recovered little further chaff than the main assemblage, although small numbers of additional weed seeds were noted.

High Pasture grain was generally burnt at a late stage of crop processing when almost all contaminants had been removed. Charred waste from earlier stages of processing would be typified by larger quantities of cereal chaff and straw, weed seeds, vegetative fragments of weed plants, and rhizomes from wild species (*e.g*. Hillman 1981; 1984; Jones 1984; 1987; Church 2002b). Chaff, produced during threshing, is rarely recovered in quantities from Scottish sites, perhaps due to its use as fodder or incorporation into manure. Other indicators for soil amendment at High Pasture (below) may also indicate that processing wastes were being used in this way. A small number of deposits contained notable charred and fused cereal/monocot vegetative material, including fused and vitrified cereal chaff and straw and/or numerous weed taxa, and may represent fine-sieving debris. This demonstrates both that the environment was conducive to cereal waste survival and also that some later grain processing was probably occurring. Stairwell deposit C2.65 (Phase 3) shows frequent monocotyledonous stems apparently from a different source, associated with some dense concentrations of carbonised plant material identified as a potential fibre mat structure, identified as possible processed plant fibres, or 'bast' (see Section 13.9).

Other economic taxa

This category is dominated by charred hazelnut shell – a common feature of later prehistoric assemblages, indicating the use of wild-gathered food sources alongside cultivated crops, with hazelnuts being rich in oil, protein, starch, and sugar. Unlike many wild food resources, they can be stored (Rowley-Conwy 2000). Hazel was probably an important fuel as well as food resource on Skye, and hazel charcoal is present (see Section 13.10). Contexts rich in hazelnut shell include Phase 2 deposits less rich in cereal remains. Hazelnut shells preserve well and produce

a relatively large amount of waste, and thus recovery is often likely greater than their relative importance (Legge 1989). A few charred fruit stones of crowberry may have been gathered for food, or accidently gathered in turves.

Weed seeds

The limited representation of processing by-products is similar to other sites identified as consumption locations, *e.g.* Dun Bharabat (Church 2000), and Broadford Medical Centre, Skye (Hastie 2012). The range of weed seeds were broadly similar across the site, with arable, ruderal, and species inhabiting a wide range of habitats such as grasses, sedges, and docks. These probably reflect the local environment, indicating nearby disturbed land and accidental gathering of weeds during cultivation. A small number of wet ground indicators such as blinks and sedges reflect damp ground, or weeds of cultivation. Taxa such as corn spurrey indicate lighter, sandy soils. Although comparative data is limited, this is similar to, for instance, Scord of Brouster, Shetland (Milles 1986), Tofts Ness, Sanday, and Callanais, Orkney (Church 2002b). Weed taxa and other remains are too limited to determine patterns of variation. Heath grass is largely limited to Phase 3 onwards. As grain concentrations increase in later phases, this may indicate that earlier assemblages are both less numerous, and of somewhat different composition. Evidence for ruderal and heathland taxa such as heath grass suggest marginal or nutrient depleted soils, or the unimproved heath and grassland habitats typical for Skye. Later deposits include common chickweed, goosefoot, and knotweed, which prefer more fertile soils (Hill *et al.* 2004), perhaps indicating soil amendment practices – likely a necessity for an arable economy capable of producing surpluses seen in the conspicuous consumption events of the High Pasture assemblages.

Burnt spread deposit C14.29 is unusual, with most identifiable carbonised remains sedge nutlets, along with crowberry and heath grass, taxa associated with wet heathland and rough grassland. More common arable weeds were also present (common nettle, common chickweed, corn spurrey) several emmer wheat grains, one identified oat grain, but no barley. C14.29 may therefore represent processing debris (fine sieving waste) from an oat crop grown on marginal land. Evidence from Atlantic Scotland indicates that oat was used as a way of extending cultivation into poor land during the late Iron Age (*e.g.* Bond *et al.* 2004; Smith and Mulville 2004) but also potentially earlier (*e.g.* Summers 2015). The precise species could not be determined to identify whether oats were present as domesticated or wild forms. Sedges have a range of potential sources, including gathered vegetation from heathland or rough grassland habitats, or turves cut for fuel.

Fuel use

Charred undifferentiated rhizomes/tubers were recorded in all phases in both cave and surface deposits. While most were indeterminate, a charred tuber in precinct deposit C15.28 had the characteristic ribbed surface pattern of a false oat-grass tuber (*Arrhenatherum elatius* ssp *bulbosum*), albeit distorted, potentially through charring. Low concentrations and small sizes are unlikely to indicate consumption (Rowley-Conwy 1986). Tuber/rhizomes including false oat-grass are frequently recorded charred on prehistoric sites and have been associated with the burning of turves (Hall 2003). A number of charred remains reflect wet acid heath and moorland, such as heather, heath grass, sedges, common spike-rush, lesser spearwort, sheep's sorrel, and a few crowberry fruit stones. As well as C14.29, several samples from Phase 4 on contained significant sedge nutlets, indicative of vegetation gathered from heathland/rough grassland. Charred heather, monocot stems, grass/sedge seeds or nutlets alongside tubers/rhizomes may reflect exploitation of heathland turves. Charred heather (Ericaceae undiff.), present as charcoal and small-diameter charred twigs, is seen in low numbers in all phases, from cave and surface. This indicates heather exploitation for fodder, fuel, bedding, or thatch (Fenton 1978; Gale and Cutler 2000). However, the presence of carbonised peat and further platy amorphous lumps of 'peat like' carbonised material, alongside charred rhizomes/tubers and the macrofossil taxa discussed above, may particularly suggest heather twig gathering through via heathy turves as a fuel resource alongside charcoal. This is supported by micromorphology (Section 13.15). Turves were important for construction and fuel (Hall 2003), particularly in more treeless areas (Dickson and Dickson 2000). Peat was locally available, cut from wet heathland and mires rich in heather, bracken, and long grasses. Some deposits also indicate gathering and burning of vegetative material and crop processing waste as fuel, *e.g.* C15.20's unusual concentration of sedge nutlets, abundant plant stems, and small diameter heather twigs. Significant charred vegetative plant material including stems is seen at C2.65, mostly monocotyledonous stems and leaves including grasses (Poaceae) and sedges (Cyperaceae), as well as possible rushes (Juncaceae), with little or no remains of cereal culm size. Such material may represent fuel, thatch, floor covering, fodder, or bedding. Here, seed concentration was far less than the volume of vegetative material, containing Yorkshire-fog, not commonly recorded as an arable weed, perhaps derived from a stand of wild grass. The absence of charred weed taxa may indicate gathering before most plants set seed, perhaps late spring, or early summer, after plants had grown to some height. The interval between collection, carbonisation, and deposition, is unclear. Material could have been stored, maybe for fodder, or used as a floor covering. At Oakbank Crannog, waterlogged rushes were interpreted as flooring (Miller 2002). Phase 4 deposit C2.43 contained an unusual concentration of brome grass caryopses, which occur elsewhere only sporadically. Brome grass is a common arable weed that often remains within crops after processing. Brome may be difficult to

remove during winnowing or sieving due to their similar size to the grains. It has been suggested that this large grass seed was deliberately included to bulk up harvests (Jones 1984). Although rare at High Pasture Cave, brome is not unusual for later prehistoric deposits. It may have been gathered deliberately as fuel, thatch, floor covering, or bedding, or accidentally included in the cereal crop.

Spatial patterns

Several contexts included a number of cereal grains showing deformation such as pitting and puffing, maybe due to intense heat (Boardman and Jones 1990) or exposure to heat on more than one occasion. However, grains were generally well preserved, suggesting that charred grain had undergone little disturbance post-deposition. Although the assemblage was broadly similar across site, and processing methodologies make direct comparison difficult, clear spatial differences in macrofossil distribution can be seen, with cave and precinct areas containing far more material than other locations.

13.8.4 Distribution

The cave (Trenches 6, 1, and 17)

These samples comprised mostly charred botanical remains (site archive), with small quantities of unburnt bone, charcoal including heather and shell. Charcoal and charred heather are generally more limited than at the surface, and few tuber/rhizomes or charred peat fragments are noted, suggesting limited, or selective, deposition of fuel residues and similar – although differing preservation may also be a factor. Thousands of grains (88% of cave macrofossils identified) were recovered from the cave, plus numerous hazelnut shell fragments and smaller numbers of weed seeds. The majority was recovered from later contexts, particularly Phases 4–6. Similar quantities of material were recovered from all trenches. Trench 6 was more variable in macrofossil concentration, with C6.04 (Phase 6) containing little material, and deposits from Phase 3 and earlier containing notably less grain overall, suggesting some change to cave use, with extremely large quantities of burnt grain deposited into the later Iron Age. Assemblage composition throughout the cave trenches is also similar: dominated by barley, with hazelnut shell with a small number of other constituents, and arable, ruderal, and general weed components present in all three. The chronological distribution of botanical materials within the cave by both phase and stratigraphic block is seen at Figure 13.29.

Small differences between trenches suggest discrete depositional events. While all trenches contained limited charcoal, Trench 17 (cave rear) contained more, particularly C17.03, C17.05, and C17.06. Only front Trench 6 contained charred/fused cereal/monocot matter, although heather twigs were present in all three trenches. Several cave deposits contained significant amounts of cleaned 6-row hulled barley with few contaminants or cereals. These concentrated in Phase 6, and all dated from Phase 4 onwards, consistent with faunal patterning in the cave (see Section 13.2). The quantity of grain in these deposits (notably C1.01, C1.02, C1.03, C6.01, C6.03, C6.05, C6.06, C17.03, and C17.04) is such that small scale domestic waste disposal is unlikely and these are interpreted as deliberate depositions, either of waste from a series of catastrophic burning events during large scale processing or as a more significant symbolic deposit. Phases 1–3 do not show such unusual or ritual deposition, with much less charred macrofossils, although quantities of hazelnut shell remain significant. Material in earlier contexts is typical of late prehistoric Scottish assemblages, comprising hulled barley with few wheat and oat grains, typical of processing or cooking waste, and possibly represents domestic waste disposal. While this may represent smaller-scale ritual deposition, there is no clear evidence for this. Figure 13.30 details these changes in distribution patterning through the three cave trenches: front (6), central (1) and rear (17).

The precinct (Trenches 2 and 15)

Here, plant macrofossil assemblages differed markedly in concentration from the other surface assemblages at High Pasture, containing significant deposits of charred grain (site archive). Total grains recovered from Trench 2 were around half of those recovered from the cave, with Trench 15 containing approximately half of this again. An overview of botanical deposition within the precinct is seen simply by Phase at Figure 13.31, and in detail by phase and stratigraphic block in Figure 13.32.

Most recovery was from Late Iron Age hearth midden contexts within these trenches, through Phases 3–7, with several discrete contexts providing extremely rich assemblages (Phase 3 contexts C2.26, C2.65, and C15.56; Phase 4 contexts C2.15, C2.61, C15.20, and C15.25; Phase 5 context C2.05, Phase 6 context C2.52 and Phase 7 context C2.03; with contexts C2.16, C2.05, C2.61, and C15.25 particularly significant). Around 30% of total charred macrofossils recovered from Trenches 2 and 15 were from hearth feature F15.20, an apparent focus for structured deposition, containing significant finds and large quantities of animal bone (see Chapter 6.4.4 and Section 13.2). Hulled barley dominated the assemblage (87%) with hazelnut shell forming 9% and weed seeds 4%: a typical Iron Age cleaned crop assemblage, with a close to 2:1 asymmetric:symmetric grain ratio indicating hulled 6-row barley. These extremely large concentrations are associated with hearths. The barley grains present, especially at F15.20, are too numerous to reflect either residual or domestic waste. Vitrified and fused charred vegetative material was noted in several hearth deposits, particularly C2.15, C15.48, C15.25, appearing to be formed predominantly by accumulation of cereal chaff and straw rather than the smaller monocotyledonous stems noted in stairwell deposit C2.65. This may reflect crop processing activity or waste deposition from the same, with waste perhaps used as kindling, or burning

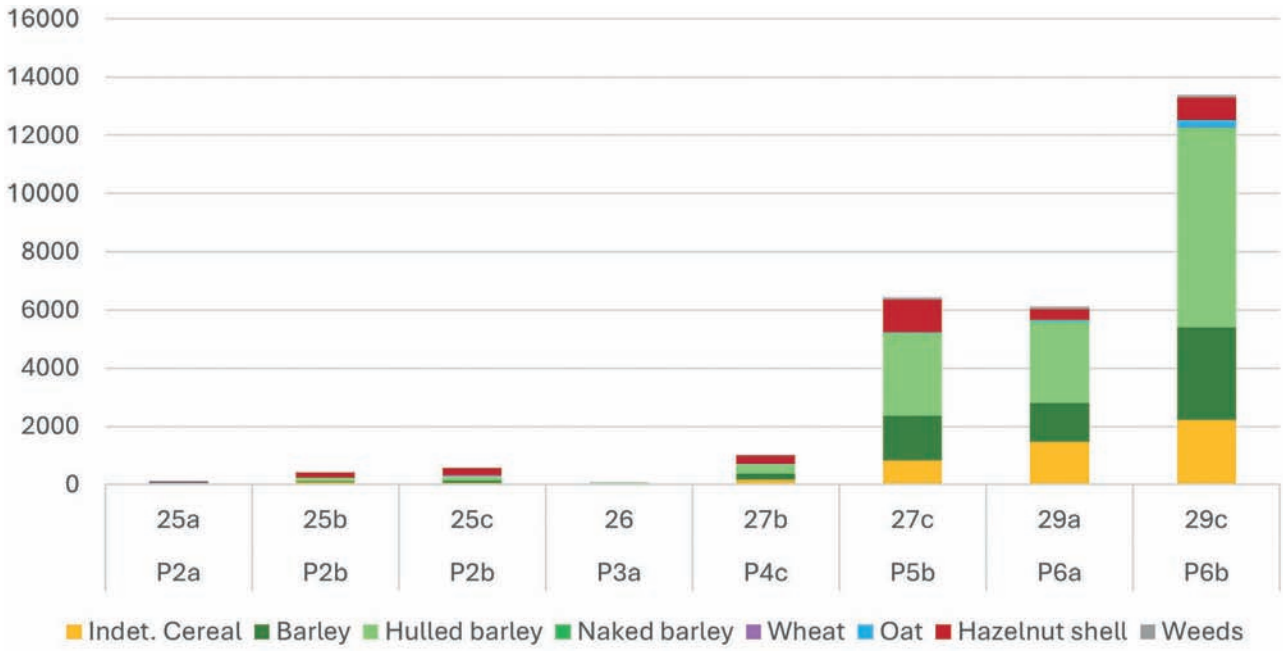


Figure 13.29. In-cave grain, hazelnut shell, & weeds, by phase & stratigraphic block

of flooring or fodder material. Typical crop processing waste such as individual rachis fragments or significant weed seeds are largely absent, and so interpretation is tentative. More moderate, although still numerous, grain was recovered from deposits associated with other hearths, such as F2.02 (Phase 6), F2.07 (Phase 5), and F2.10 (Phase 3). Redeposited residues from F15.25 (Phase 5) contained the majority of the charred plant macrofossils recovered from Trench 15, including significant barley grain, hazelnut shell fragments, and weed seeds, with some charcoal and charred vegetative material. Hearth midden deposit C15.56 (Phase 3) contained a further sizeable assemblage representing 5% of total Trench 2 and 15 charred plant remains. Grain rich precinct assemblages were clearly focussed in discrete areas associated with particular hearths, rather than spread around, with most other deposits demonstrating low, probably background, grain. Pits, for example F2.19 (Phase 4), F2.21 (Phase 5), F2.22 (Phase 4) contained very small quantities of likely residual grain and show no evidence of grain storage, although they may have been cleaned of such remains. The grain rich precinct features are largely contemporaneous with the large deposits of grain within the cave. Figure 13.33 details the chronological distribution by type of the main botanical groups in the precinct, through these key stratigraphic blocks.

The stairwell

There is no clear evidence of deliberate deposition of grain within the stairwell during closure. Seed assemblages from the three consecutive staircases were small and potentially residual (site archive), brought in during movement of grain into the cave. Contexts at the stairwell base, *e.g.* C2.52 (Phase 6), contained relatively frequent grain and likely reflect movement into the cave, associated with the rich upper cave deposits. The Phase 7 grave deposits contained very limited plant macrofossils, probably reflecting residual background waste rather than deliberate incorporation of material. Weed seeds were slightly more numerous in deposits directly above the stairwell closure deposits, although still extremely low. Of particular note is stairwell deposit C2.65 (Phase 3), composed largely of fragmented plant stems, with this and adjacent C2.66 showing more cereal grains than other stairwell deposits. C2.65 was dominated by barley with rare oat – unusually with no hazel nutshell present. Two 6-row barley rachis nodes were identified, indicating hulled, 6-row barley, and two floret bases of wild oat. It is unclear whether this represents a deliberate albeit relatively small deposit within the stairwell or accidental deposition during transport to the cave. The significant quantity of charred monocotyledonous stems may reflect material used as a floor covering either in the stairwell or elsewhere. Phase 3 sample C2.66 did not show such concentrations of vegetative material. Figure 13.34 shows the distribution of botanical materials in the stairwell, by phase.

Surface trenches

These contained small amounts of bone, both charred and uncharred, charcoal and charred heather charcoal and small diameter twigs, and occasional inclusion of charred peat-like or peat material (site archive). Modern roots and uncharred seeds and vegetative material are likely modern intrusive material, with no evidence of waterlogged deposits. Cereal grains dominate the assemblages (over 87% of total plant macrofossils), similar to the cave, with few chaff fragments or non-cereal taxa (weed seeds forming *c.* 3–4% of the overall assemblage). A number of grains from C3.03 showed protruding

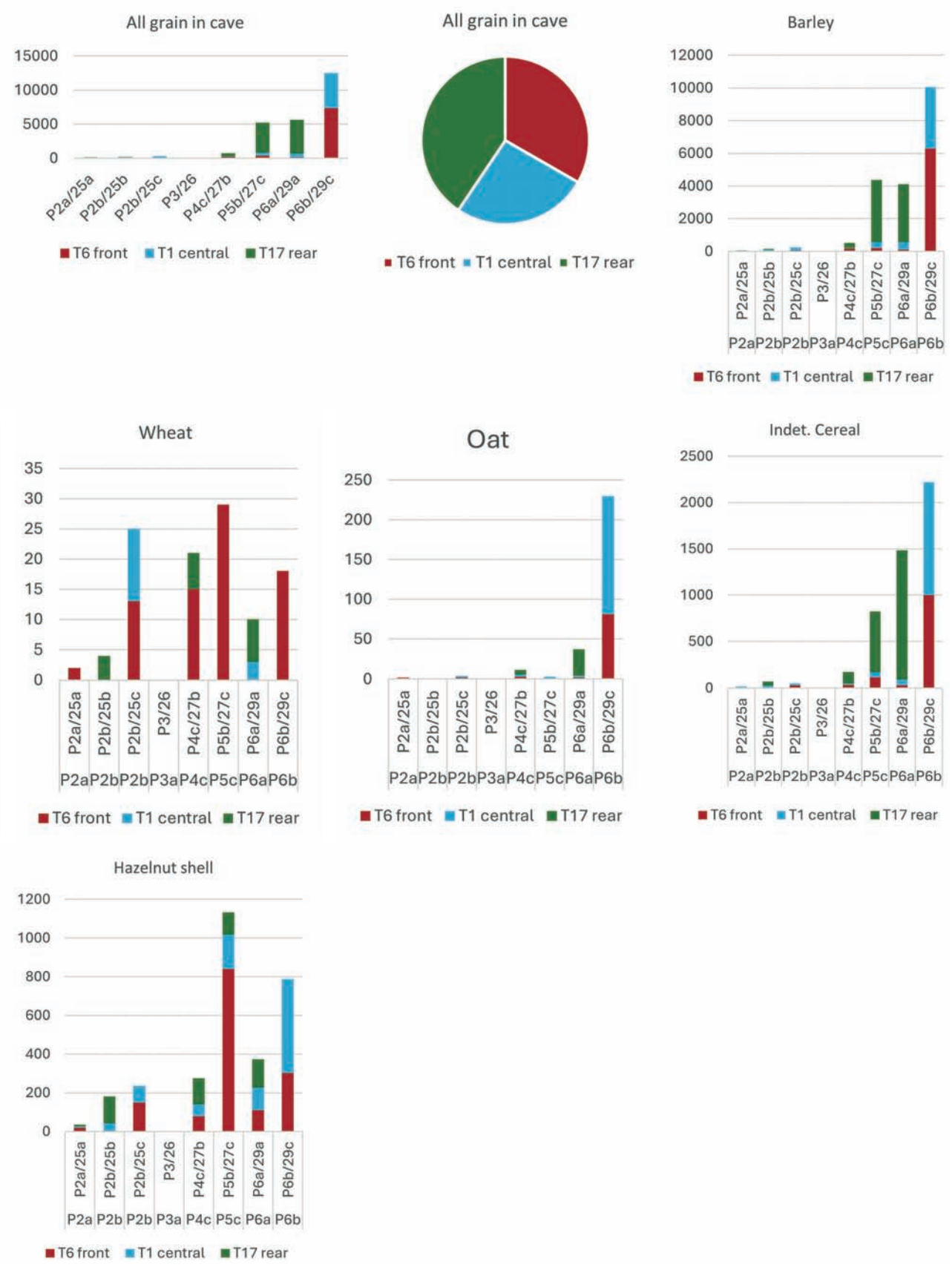


Figure 13.30. In-cave botanical distributions, by trench

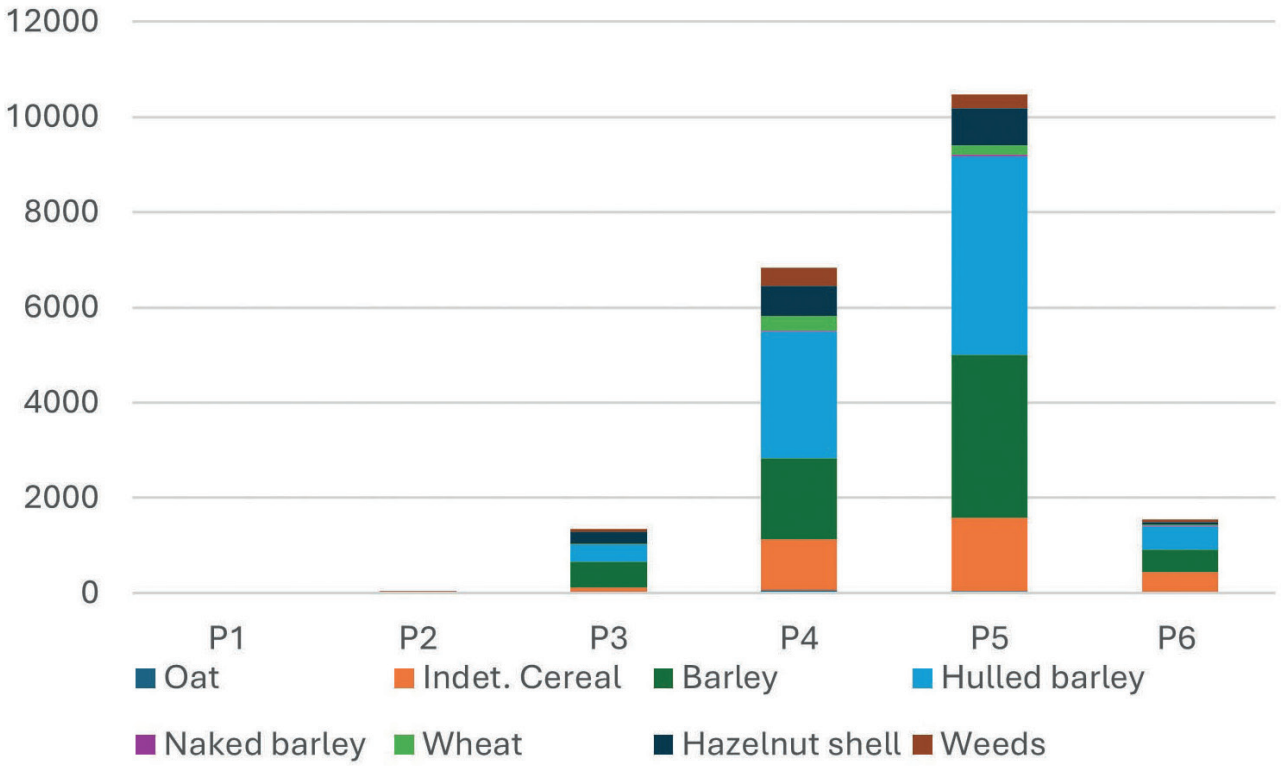


Figure 13.31. Precinct botanical material (grain, hazelnut shell, & weeds) by phase

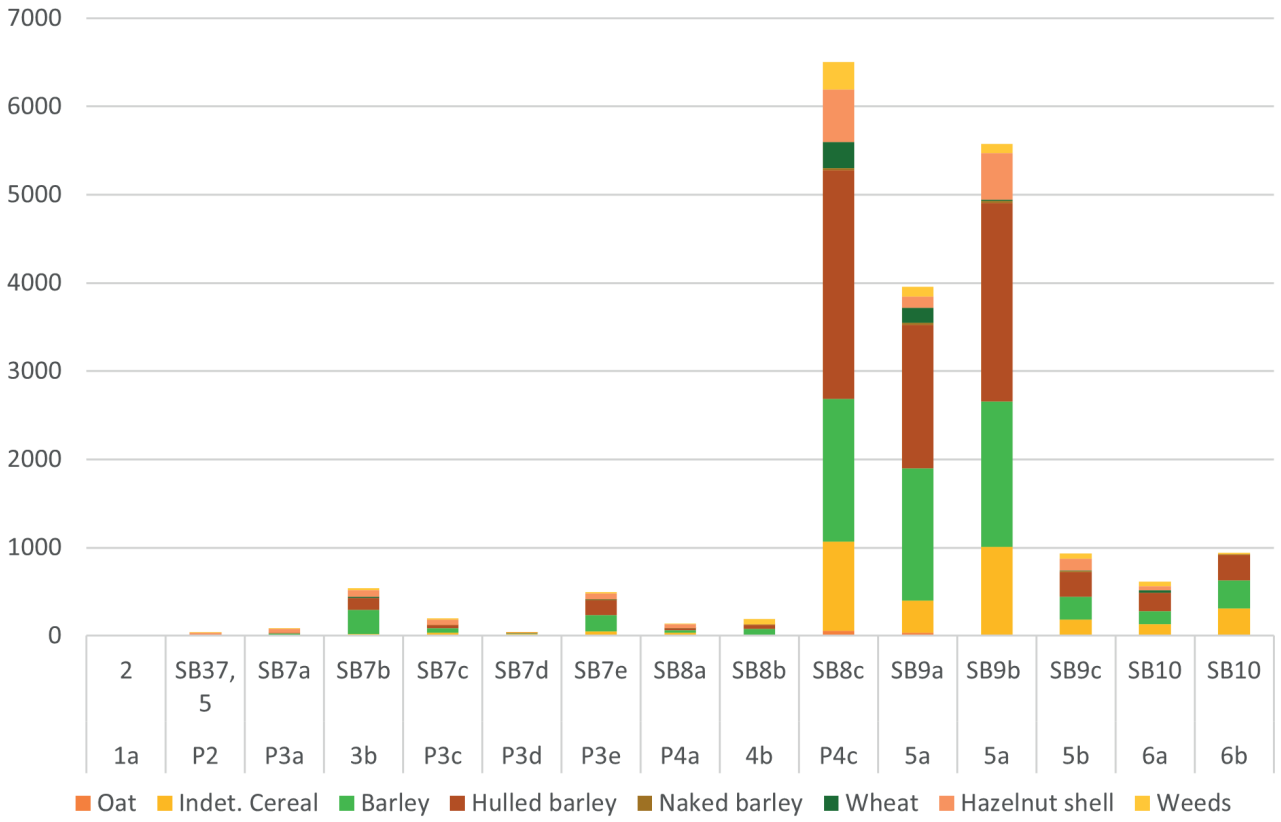


Figure 13.32. Precinct botanical material (grain, hazelnut shell, & weeds) by phase & stratigraphic block



Figure 13.33. Distribution of individual botanical groups in the precinct, by phase, & stratigraphic block

lemmas, which may suggest deliberate burning of spoilt damp grain, or accidental burning during drying of a domestic assemblage. C3.03 also contained a number of ruderal weeds and a small number of barley rachis fragments, although no arable weeds were present. As such, Trench 3 provides some further tentative evidence for crop processing on-site. Figure 13.35 gives an overview of botanical materials through the individual surface trenches.

Burnt mound spreads

Generally limited plant macrofossil evidence was present from these features at High Pasture, with hulled barley, wheat, and hazelnut shell and limited weed seeds

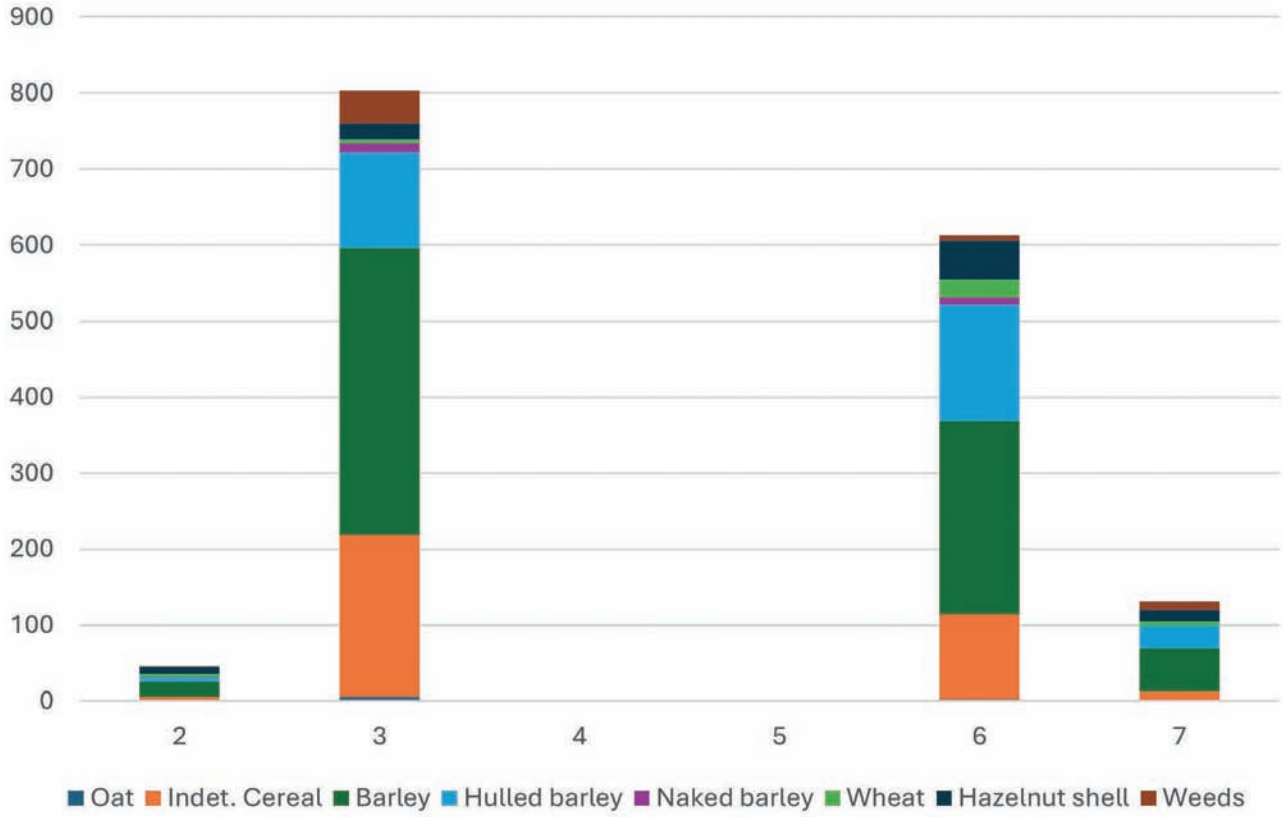


Figure 13.34. Distribution of individual botanical groups in the stairwell, by phase

present (site archive). Grain amounts were on a par with other trenches not directly associated with the cave or entrance area. This paucity of evidence is typical of such features, with burnt mounds generally containing little food debris. It is suggested that such features may have been used for non-domestic beer brewing (Peterkin 2007) or cooking food by boiling in water (Titlington Mount, Northumberland: Hodder and Barfield 1991; see also O'Kelly 1954), or even as saunas (Barfield and Hodder 1987), all of which may explain a lack of charred macrofossils despite evidence for burning. The assemblage could potentially be residual waste from grain rich assemblages deposited within nearby Trenches 2 and 15. An unusually large number of barley grains (for this location) were however recovered from spread C9.03, over 25% of total barley from the area, and 19 grains were also noted from C11.12. Two deposits were unusual in reflecting apparent cleaned grain, with one C9.03 sample (C9.03b), comprising 34 barley and an indeterminate seed. Other material from C9.03 appeared more diverse, potentially indicating a discrete deposit. A deposit of seven emmer wheat grains and an unusual concentration of sedge nutlets was observed in C14.29, with no barley identified from this deposit. This deposit may represent a small amount of processing debris (fine sieving waste) from a wheat crop however, sedges could have a range of other sources (above). Figure 13.36 shows the distribution of botanical materials through the burnt mound deposits, by phase and stratigraphic block.

13.8.5 Discussion

Overall trends by phase

Plant macrofossils suggest that an earlier, more utilitarian phase where broadly typical late prehistoric domestic consumption waste was deposited in small quantities within the cave and surface features was succeeded by more large-scale structured events during Phases 4–6, comprising burning of very large quantities of cleaned barley at hearths surrounding the cave entrance, with much of this material being deposited into the cave. There is some suggestion of the use of turves and peat as a fuel throughout the use of the site. While barley dominated throughout all phases, oat had a consistent low level presence from Phase 3 onwards, being more common in Phases 4/5 and 6. Some of this may be from wild oat, a contaminant in the barley crop. Wheat was present at low level concentrations from Phase 4 onwards. The status of wheat as a crop is uncertain, although seven emmer wheat grains from C14.29 in a sample devoid of barley may suggest a deliberately gathered wheat crop.

Phases 1–3 saw generally limited carbonised remains, with samples deriving predominantly from burnt mound deposits and within/surrounding the cave. Charcoal

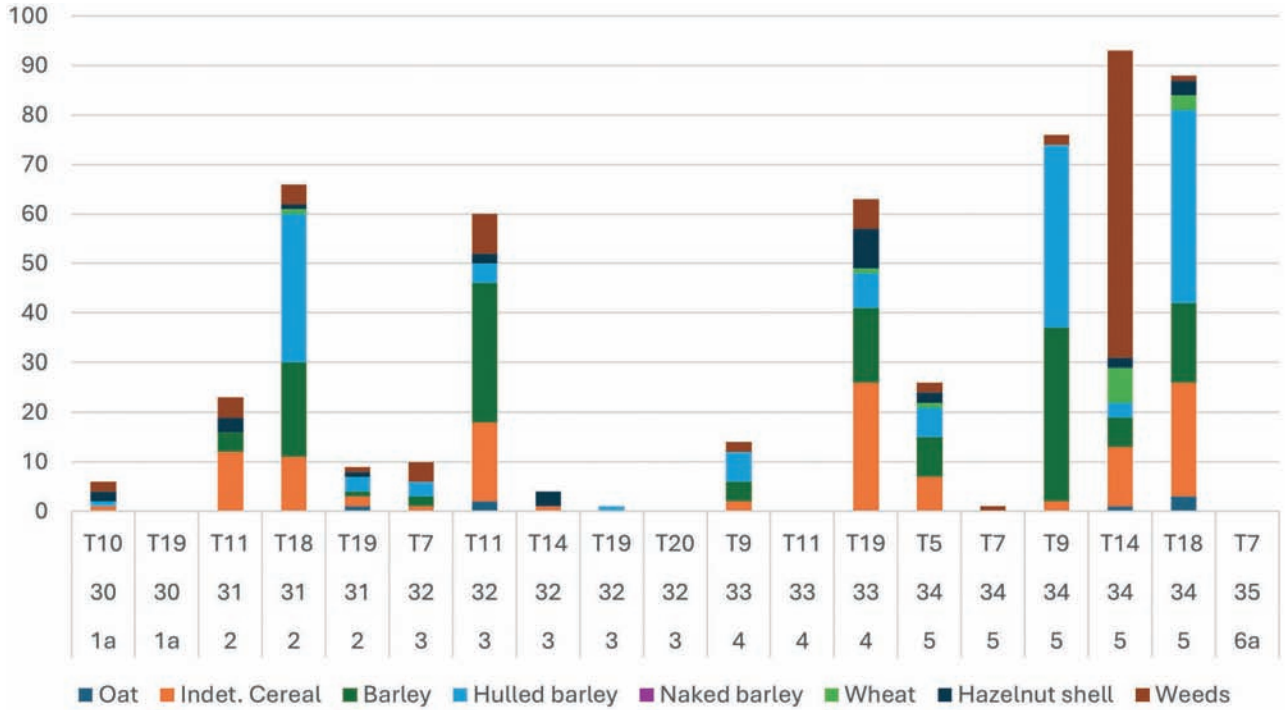


Figure 13.35. Distribution of botanical materials through the individual surface trenches, by phase & stratigraphic block

included heather (*Calluna vulgaris*), which persisted throughout the use of the site. Phase 3 samples were generally somewhat richer than in preceding Phases, although no extremely rich deposits were noted. Barley (*Hordeum* sp.), including hulled grains, predominated, accompanied by limited probable wild oat grains (*Avena* sp) and grasses, some of which may be small oat grains. Unusually, stairwell deposit C2.65 was composed predominantly of fragmented plant stems, with little or no remains of cereal culm size. The low weed seed concentration in comparison to number of stems may indicate late spring or early summer collection, although it is possible that material could have been stored.

Phase 4 contains several samples showing significant numbers of charred plant remains, with some of the richest deposits overall (*e.g.* C2.15, C2.61). These concentrated around the entrance to or within the cave. A control sample from burnt mound spread C9.02 consisted of largely unaccompanied barley grains, potentially a discrete deposit of clean barley. Weed seeds from Phase 4 likely reflect site environs, with heath grass and sedges indicating marginal conditions or natural heathland and rough grassland, and goosefoot/knotweed species more fertile soils which may indicate arable land management. Unusual deposits include C2.43, containing numerous brome grass caryopses, and C15.20 which contained over 20 sedge nutlets and some heath grass caryopses, potentially indicating fuel, thatch, fodder, floor covering, or bedding or cut turves.

Phase 5 indicates continued intensive use of cereals, with hulled barley predominating, and small numbers of oat and glume wheat. Some of the richest deposits derive from this period, including C2.05, C15.25, and C3.03. Charred plant remains are again concentrated around the cave entrance in large midden deposits associated with hearth features, and within the cave. Many deposits indicate cleaned cereal crops, with little carbonised chaff indicating intensive deposition of processing by-products, although some hearth deposits may incorporate crop processing waste. C3.03 is unusual, as not directly associated with the cave entrance, and with some of its barley grains having protruding lemmas, suggesting deliberate burning of spoilt damp grain, or accidental burning during drying of a domestic assemblage. Phase 5 samples contained a wider range of non-cereal taxa, including potential arable weeds, maybe reflecting varied growing conditions in this relatively marginal environment. Knotweed and common chickweed may indicate soils amendment, while blinks, sedges, and heath grass may reflect wetter, more depleted cultivated areas.

Phase 6 was again dominated by hulled barley. Seven wheat grains in C14.29 were identified as emmer-type (*T. dicoccum* type), and with no associated barley, this could be evidence for an emmer wheat crop. Several rich grain deposits were present, although fewer extremely large deposits in the precinct (C2.52 being the exception). This is interesting, as within the cave, extremely grain-rich deposits (C1.01, C6.01–C6.03) continue into this period, which may suggest a shift in disposal practices to a movement of carbonised grain exclusively into the cave. An unusually large collection of sedges in C14.29 could indicate gathered vegetation from heathland or rough grassland or cut turves.

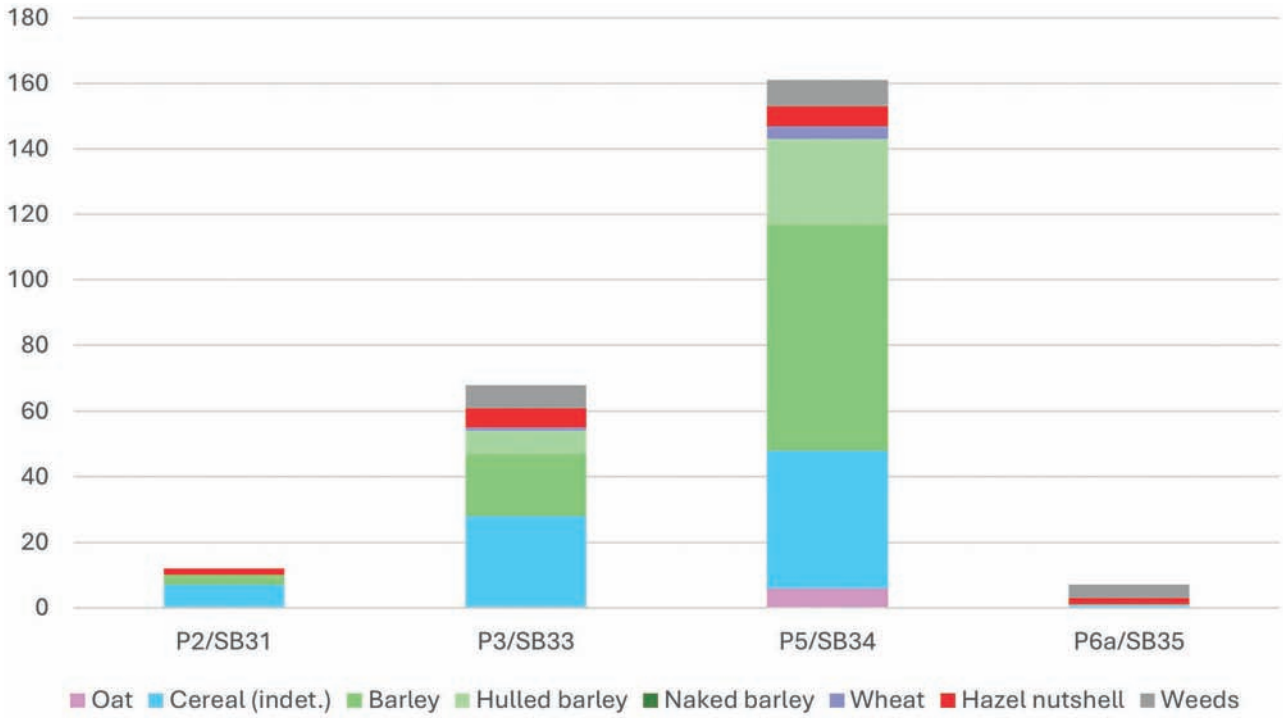


Figure 13.36. Distribution of botanical materials through the burnt mound deposits, by phase & stratigraphic block

Few clear trends were apparent from the limited Phase 7 contexts, with material largely appearing similar to Phase 6. Few rich grain deposits were noted, with hearth midden deposit C2.52 providing the only large assemblage.

The barley rich deposits

British prehistory shows relatively few massive cereal finds (Rowley-Conwy 2000), but several Scottish Iron Age domestic sites show large, charred barley caches, identified as products of accidental or deliberate conflagration from the burning of stored grain. Large pits or features dug into the ground close to or within Iron Age settlements have been interpreted as potential grain storage features (Hill 1995; Bond 2002). At grain rich domestic sites, burnt clean grain deposits are often present in non-domestic features such as pits or souterrains (Legge 1989; Miket 2002; Cunliffe 2004), reflecting a need for spacious, protected storage facilities (Ritchie and Ritchie 1999; Miket 2002; Bond *et al.* 2004). Scottish examples of such grain storage include Dalmore Farm, Ross & Cromarty (Wordsworth 1993); Upper Scalloway, Shetland (McCullagh 1990); Upper Suisgill, Sutherland (Van der Veen 1985), Wardend, Aberdeenshire (Boardman 1995a), Carn Dubh, Perthshire (Boardman 1995b), and Dun Mor Vaul (Mackie 1974), Dun Bharabat (Church 2002a), and Old Scatness, all on Shetland (Bond *et al.* 2005), all of which show evidence of features being used for grain storage, with significant quantities of burnt grain in discrete locations. The lack of chaff in sites such as Broadford, Skye indicates that grain was not always stored on the ear in such situations (Hastie 2012). It is possible that the cave at High Pasture was being used similarly but this is unlikely, with no associated domestic structure or settlement. A damp cave setting is also unsuitable for grain storage if a reasonable alternative was available (Miket 2002). Damp has been highlighted as a problem for cereal storage even at ground level (Rowley-Conwy 2000) and there is no evidence for use of air-tight features within the cave, such as pits. Oxygen would have quickly encouraged germination and thus rot (Van der Veen 1992), and there was little indication on grains from the cave of germination or mould. Rodent bones from cave contexts (see Section 13.2) also indicates a problem for in-cave storage.

A storage hypothesis also does not clarify how the in-cave assemblage became carbonised, with stored grain being unburnt. Burnt grain at large-scale storage sites indicates accidental burning (*e.g.* Newmill (Watkins 1980); or Scord of Bruster, Shetland (Milles 1986). There are no obvious burning horizons in the cave, and artefacts and ecofacts associated with burnt grain show no evidence of burning, indicating that cave assemblages were not burnt *in situ*. The large burnt assemblages from the cave in Phases 4/5 and 6 could be considered as the disposal of a large scale accident, with the cave a convenient location for disposal of the wasted material. However, barley and glume wheat grain is likely to have been stored in its hulls for added protection from spoilage. Accidental charring of these cleaned assemblages must

therefore have occurred during late stage processing, such as when graddening/parching (Fenton 1978; Church 2002b). However, while these final stages of processing could well have been undertaken at the site on a relatively large scale in the context of feasting and conspicuous consumption, the quantities of grain involved indicate an accident on a hugely catastrophic scale. Such assemblages elsewhere have been considered too large for a single cooking event (Rowley-Conwy 2000). The grain-rich assemblages at High Pasture span several hundred years, representing continuing disposal of large amounts of grain over a period of time, making accidental charring even more unlikely.

The most probable explanation is of structured deposition of large assemblages of burnt grain deliberately created at the surface. The 'domain of practices' of ritual deposition (Dietler and Hayden 2001) includes deposition of mundane items in specific locations and/or in specific fashions (Muir and Driver 2004). Large grain deposits in pits in southern Britain and northern France have been interpreted as a method of placing the seed in the 'realm of the chthonic deities' (Cunliffe 2005). Large dumps of burnt grain at An Dunan and Calanais kerb cairn indicate deliberate burning as part of funerary ceremonies (Church 2002b). Deposits interpreted as ritual in nature often feature a site of deposition which is naturally striking or difficult to get to, such as rivers, shafts, or pits, and location has often been used as an argument for ritual nature (*e.g.* Dun Ailinne, Ireland; Crabtree 2003) and at Durrington Walls (Albarella and Serjeantson 2002). Ritual deposition at High Pasture is also observed with a number of other artefactual and environmental assemblages.

13.8.6 Conclusion

Carbonised material throughout all phases of activity at High Pasture suggests that at least some small burning events were occurring across the use of the site, but there is a general lack of evidence for domestic activity. Burnt material is focused on the entrance to the cave and the cave itself, with the small assemblages from elsewhere most likely reflecting background levels and movement of this waste. The cereal remains reflect the typical Scottish prehistoric dominance of hulled barley as a staple, with little clear evidence of cultivation of other cereals. Hazelnuts were also clearly utilised for consumption. The use of peat and/or turves as fuel as well as charcoal is suggested throughout the occupation of the site. Both the local environs and the arable fields are reflected in the non-cereal taxa, with some deliberate improvement of the land during the Iron Age suggested by the weed seeds present. Generally low quantities of charred tuber/rhizomes, heather twigs, and heather charcoal suggests turves were used as fuel.

Large scale burning events producing significant quantities of burnt grain are concentrated in the later Iron Age Phases 4–6 where the cave itself was a focus of increased amounts of activity. The grain deposited in the cave and present in the several hearths was at a late stage of processing, though small deposits of charred vegetative waste tentatively indicate some grain processing on site. The archaeobotanical remains from the cave appear to reflect a move in later site phases to ritual activity, with deliberate deposition of very large amounts of cleaned charred barley grain having no obvious mundane explanation. While it is uncertain whether the charred remains reflect waste from consumption at large scale communal 'feasts' or symbolic deposition of burnt grain, deliberate deposition of a large assemblage of processed grain within the cave is clearly evident, with similar assemblages of unusual quantities of food in unusual locations used elsewhere to demonstrate feasting or ritual activities (Albarella and Serjeantson 2002). There is no indication of any votive deposition of plant macrofossils with the Phase 7 human and animal burials in the stairwell.

13.9 Fibre matting

Mhairi Hastie

13.9.1 Introduction and method

Three distinctive samples, consisting of concentrations of carbonised plant material, were recovered from two locations at High Pasture Cave. Described on collection as 'damp, fibrous organic residue', the remains were tentatively identified as possibly representing a fibrous 'matting' structure and passed to CFA Archaeology for specialist assessment.

Two samples were recovered from Phase 4 contexts C2.15b and C2.15c – dark, fire-cracked stone filled accumulations of hearth residues deriving from large granite-slabbed hearth F15.20 (SB 8c; see Chapter 6; Fig. 13.37). Both were rich in processed bone, grain, carbonised worked wood fragments and a richly varied artefact assemblage. A second, and more apparently complete sample was recovered from Phase 3 context C2.65 – a silty deposit lying between paving slabs and the top limestone step of the stairwell into the cave (SB20). This contained well-preserved animal bone and large quantities of charcoal and would appear to be a highly logical location for the recovery of matting/flooring material (Fig. 13.38).

Each sample was scanned under a high-powered microscope (×10–×100 magnification) and the characteristics/composition of the plant material was recorded and where possible the plant remains identified.

13.9.2 Results and discussion

All the samples appear to consist of the same carbonised material, principally comprising layers of long flat linear fibres (Figs 13.39 and 13.40). There is no sign of any weaving to suggest that the material formed a textile or rope, *etc.* Examination of the fibres under a microscope revealed that the fibres were made up of many fine strands.

What appeared to be fragments of woody core were also visible on some of the fibres. A brief scan through some of the fibres revealed that occasional weed seeds were attached to them; these were generally poorly preserved, but a possible seed of sedge (*cf. Carex* sp.) and one small-grained grass seed (Gramineae indet.) were identified. There was no charcoal or other charred material incorporated with the fibres.

The characteristics of the material could suggest that it may be bast fibres – cellulous fibres obtained from the phloem or outer bark of certain dicotyledonous plants, such as flax, hemp or nettle. If this is the case, then the material appears to be the final processed plant fibres. Unfortunately, other available research on such plant remains reveals that it is generally difficult to distinguish between flax, hemp, and nettle fibres, so it may not be possible to narrow down this identification. However, related online material shows the process of making fibres from nettles (http://www.jonsbushcraft.com/Nettle%20cordage.htm) and the strands of fibres shown in Stage 4/5 of this processing example look very similar to the carbonised material recovered from High Pasture Cave.

There is evidence from prehistoric Europe (*e.g.* Denmark and Switzerland) that plant fibres were used for production of textiles from the Neolithic onwards. During the Neolithic, textiles tended to be produced from either fibre from tree or shrub bark, or from plants with bast, with the evidence suggesting that both lime and flax were extensively used during this period (Medard 2012). Evidence from Bronze Age sites, including burial mounds at Lusehoj in Denmark (Bergfjord *et al.* 2012) and the Must Farm settlement, Cambridgeshire (Knight *et al.* 2024), also indicates that nettles were used for making textiles during this period. Ethnohistorical evidence indicates that fibres can be made from a variety of plants including nettle, sedge, reed, flax, hemp, *etc*. (cited by Medard 2012). If the High Pasture Cave material is processed plant fibres, it would not be out of place for this period.

The material may have been placed at the entrance to dry once it had been split into the finer strands. If the carbonised material from High Pasture Cave is indeed the remains of unspun processed plant fibres this may suggest that the inhabitants were producing textiles.

13.10 Charcoal

Mike Cressey

13.10.1 Introduction and objectives

Analysis of charcoal recovered from High Pasture Cave resulted in the identification of over 3000 individual fragments. The species index attained is dominated by *Corylus avellana* (hazel). The significance of the abundance of hazel is discussed in the light of its wide distribution on Skye during prehistory. The so-called Atlantic hazel provides a modern analogue to help understand what the local woodland may have looked like when High Pasture Cave was in use. Other identified species are discussed within the limitations of lower frequency and the taphonomic and sampling biases inherent in the assemblage.

Wood charcoal is probably the most common prehistoric ecofact, and its study (anthracology) a well-established environmental archaeological process that relies on a uniformitarianistic approach to the ecological requirements of woodland types and their historical and present day distribution within the study area. Prehistoric and historical woodland distribution patterns are largely based on pollen records for which there are several on Skye (Selby 2004).

Although a suite of factors affects pollen interpretation, such as differential production and preservation (Berglund and Ralska-Jasiewiczowa 1986; Tipping 1987), pollen distribution through the landscape tends to reflect largely natural rather than human factors. Where pollen travels minimal distances from source, pollen from a site will reflect something of its surrounding vegetation, except for crop or insect pollinated plants which tend to be absent from the record (Moore *et al*. 1991). However, charcoal is only on site because of people, with all of the accompanying issues relating to social, ritual, or practical choice of available material (Huntley 2010).

Of critical importance are taphonomic processes that influence formation of the charcoal assemblage and its subsequent alteration within the buried environment (Ascough *et al*. 2011). The High Pasture charcoal samples are the result of many interlinked human activities and natural processes that are difficult to separate based on overall effect (trampling/fracturing/secondary burning *etc*.).

The main objectives of the High Pasture charcoal analysis were:

- to determine species composition and assess the diversity of woodland within the High Pasture locality
- to identify worked wood and assess its preservation quality and significance
- to establish types of wood used for domestic fuel and other purposes
- to identify suitable samples for AMS radiocarbon dating

13.10.2 Methods and condition

Identifications were undertaken on both flot and hand picked samples of between 4–6 mm. Where possible these were identified to species to provide a relative index of wood types growing at or near the site. Charcoal was retrieved from bulk samples using a flotation tank with flots captured in 4–1 mm sieves (Kenward *et al*. 1980). Samples were air dried before sieving into 2 mm and 4 mm fractions. Charcoal identifications were normally carried out on only the >4 mm sized charcoal fragments owing to the time, cost, and constraint of obtaining

cross-sections on <2 mm fragments. Identification was via bifocal microscopy at ×50 and ×400 magnifications, using anatomical keys listed in Schweingruber (1992) and in-house reference charcoal. Asymmetry and morphological characteristics were recorded using standard in-house methodology.

Identification was to the highest taxonomic level possible, usually that of genus, while nomenclature follows Stace (1997). Where several species are possible the genus is given. When anatomical differences between related genera are too slight to enable positive identification to genus level a group name is given, for example with members of the Pomoidae group (*Crataegus*, *Malus*, *Pyrus*, and *Sorbus*) and aspen/willow (*Populus* and *Salix*) which are indistinguishable. Where a genus is represented by a single species in the native British flora this is named.

Charcoal condition varied, with a large proportion of fragments amorphous (manifesting in deviation from a natural cylindrical shape to a sub-rounded shape). Charcoal derived from large diameter branch wood is well represented. Vitrified charcoal was present but low in frequency. Vitrification occurs in temperatures over 800°C and reduces the wood cell structure to a glass-like appearance which, owing to the loss of vascular structure, cannot be reliably identified (Ascough *et al.* 2010; McParland *et al*. 2010). Some charcoal maintained a block-like shape which is a result of the stature of the wood and pyrolosis (*i.e.* possibly larger branch wood). Some charcoal had clear evidence of woodworm showing that dead wood had been collected for fuel.



Figure 13.37. In situ *fibre matting within stairwell deposit C2.65*

13.10.3 Results

A total of 3162 identifications were made providing a combined weight of 30.4 kg (Table 13.13). Nine species are represented: *Corylus avellana* (hazel); *Betula* sp. (birch); *Quercus* sp. (oak) *Pinus sylvestris* (pine); *Alnus glutinosa* (alder); *Fraxinus* (ash); *Salix* (willow), *Ilex* (holly), and the shrub *Calluna vulgaris* (heather).

Hazel is the most abundant (78%) followed by birch (16%), pine (2.4%), and oak (0.4%). Alder is represented by two fragments and ash and willow by only a single fragment. Hazel and birch provided the largest volume of charcoal (23 kg and 5 kg respectively). Some hazel fragments were large, ranging between 40–6mm diameter, showing that mature branch wood was exploited.



Figure 13.38. Fibre 'matting' samples from left: precinct hearth deposits C2.15b; right: stairwell context C2.65



Figure 13.39. Example of possible plant fibres from C2.65



Figure 13.40. Example of possible plant fibres from C2.65

Charcoal is most abundant in the precinct, with notably less material recovered from the cave, and less again from both stairwell and surface deposits (Fig. 13.41). Fragment number versus weight per area shows that charcoal from surface trenches and to a lesser extent the cave may be more fragmented than that seen in the stairwell and especially precinct. Hazel dominates in all areas of the site, with birch a more variable second, with fairly low birch recovery in both stairwell and surface. It is notable that both stairwell and surface show far less species variation, with only hazel and birch present in the latter and hazel, birch, and pine in the former. The precinct shows the greatest number of species, with the single fragments of holly and ash recovered from redeposited midden and hearth residues in this area, and the majority of ash, oak, and willow fragments. The only species missing from the precinct is heather, which is only present in the cave.

Distribution of charcoal by phase and stratigraphic block (Fig.13.42; Table 13.14) shows that charcoal recovery peaks in Phase 4, is present in lower yet still significant quantities in Phases 5–6, is lower again in Phase 3 and very low in other phases. Distribution is heavily skewed towards the precinct, with only Phase 6 showing significant charcoal recovery from elsewhere (the cave). This is not surprising given the focus on episodes of burning within the precinct and the survival of large quantities of fuel residue material in this area. Looking at this area in more detail (Fig. 13.43), it can be seen that charcoal recovery peaks very strongly in Phase 4c/SB8c. Eighty-three per cent of this P4c assemblage was recovered from C2.15, the context which produced the lyre bridge fragment and group of associated worked wooden objects (see Sections 12.10; 12.11). The Ph4c/SB8c assemblage is predominantly hazel with some birch, with all examples of 'rarer' species present (alder, pine, oak, willow) also coming from C2.15. In the cave, a bias to distribution is also noted, with roughly 75% of fragments located within the (smaller) central Trench 1 as well as almost all 'rarer' species including the only heather recovered from the site. Practically no charcoal is present in rear Trench 17 (Fig. 13.44).

13.10.4 Discussion

Accepting the taphonomic problems and bias in the sampled population size, we see that hazel is the dominant wood species recorded throughout the assemblage, indicating that hazel was always a major component of the local woodland.

All identified species are native to western Scotland and would have been present local to High Pasture Cave during prehistory. Hazel and birch are well represented within Scottish charcoal assemblages and thrive on acidic soils. Alder and willow would have been exploited from stream edges and other semi-waterlogged ground. Earlier charcoal studies (Cressey 2005; 2006) note that pine would have been used as tinder, as it burns vigorously when dry due to its high resin content and makes an excellent starter fuel. Although pine would have been widespread on local base-poor acidic soils, its presence within the High Pasture assemblage is generally low (2.4%). It is probably underrepresented owing to the fact that it does not carbonise as readily due to the factors already stated. Heather may have also been exploited as a starter fuel (Table 13.15).

The presence of a single fragment of ash can only be explained by the fact that this species only tolerates neutral or calciferous soils and would have grown close to High Pasture Cave given its requirement for calcareous limestone. Ash was used to turn the wooden bowl (SF 15.342, C15.32) described in Section 12.10.

The single fragment of holly charcoal (*Ilex aquifolium*) is intriguing. It is interesting to note that holly pollen is also recorded within a preliminary pollen record carried out in 2005, a single degraded grain recorded from central upper cave midden C1.03. It seems fairly certain that holly was growing close to the site, probably on the outcropping limestone near the cave entrance. The presence of holly

Table 13.13 Total charcoal assemblage from High Pasture Cave

Species	*No. IDs*	*Weight (g)*	*% frequency*
Corylus avellana	2481	2347.8	78.4
Betula sp.	518	577	16.3
Pinus sylvestris	76	71.5	2.4
Calluna vulgaris	50	5	1.5
Quercus sp.	14	14.5	0.4
Salix sp.	9	4.9	0.2
Rosaceae	9	5.3	0.2
Fraxinus/ Sorbus	1	0.9	0.03
Alnus glutinosa	3	2.9	0.09
Ilex aquifolium	1	0.7	0.03
Total	3162	3029.5	100

Table 13.14 Charcoal fragment number & weight by phase

Ph	*Species*	*No. IDs*	*Weight (g)*
1	Hazel	27	4.3
2	Hazel	108	50.7
	Birch	3	1.65
3	Hazel	261	210
	Birch	48	42.3
	Pine	3	2.1
	Oak	2	1.2
4	Hazel	1048	1206.2
	Birch	129	194.5
	Pine	1	4.1
	Oak	4	2.9
	Alder	2	2.5
	Willow	1	0.1
5	Hazel	368	297.5
	Birch	135	189.7
	Pine	45	37.5
	Oak	2	2.5
	Ash	1	0.9
	Willow	4	3.5
	Heather	25	0.7
	Holly	1	0.7
6	Hazel	580	468.9
	Birch	185	115.2
	Pine	21	24.2
	Oak	6	7.9
	Alder	1	0.4
	Willow	4	1.3
	Heather	25	4.3
7	Hazel	75	56.9
	Birch	2	0.7
	Pine	6	3.6
8	Birch	5	0.7

in Scottish charcoal assemblages is very rare indeed. This species has only ever been recorded once by the author, at Kaimes Hill, Edinburgh (Simpson *et al*. 2003). Holly is insect pollinated and is therefore not represented in pollen diagrams. It requires damp, frost-free environments and would be well suited to sheltered valleys on prehistoric Skye. It is also a species which has often been associated with settings near holy wells (Jones 1992; Shepherd 1994).

The significance of hazel

The dominance of hazel in the High Pasture assemblage invites further discussion. Coppins and Coppins (2012) have carried out a detailed study on the so-called Atlantic Hazel – hazel woodland located in the oceanic areas of the western British Isles. Here, hazel has been found to be the dominant form of 'ancient' woodland, often forming dense stands extremely diverse in other plants such as mosses and lichens, and as such this type of woodland is home to the richest assemblages of oceanic mosses, liverworts, and lichens in the whole of Europe.

Coppins and Coppins (2012) highlight the myths and misconceptions about hazel. It is commonly held that hazel is an understorey shrub and multi-stemmed hazel the result of coppicing, and that hazel will develop into a single-trunked tree if left uncoppiced. However, hazel grows 'naturally' as a multi-stemmed shrub independent of any intervention and certainly coppicing. Trees forming a large single trunk may develop when hazel is subjected to extended periods of intensive grazing; however, when this ceases trees quickly revert back to multi-stemmed shrubs. This study points to hazel's ability to produce multiple stems of all ages and variable diameter as the most contributing factor in the profusion of hazel in the High Pasture charcoal assemblage.

Hazel was one of the first woody species to establish along the western edge of Scotland as the ice retreated *c.* 11,000 years ago. Pollen studies show that pure hazel scrub dominated vast areas of western Scotland throughout prehistory, the spread of hazel throughout the western seaboard attributed to the fact that hazel nuts float. Pollen evidence suggests that after the ice retreated, hazel moved into the British Isles from sothwest Ireland and across the western seaboard of north Wales, Anglesey, the northwest of England, Isle of Man, up to Antrim in northeast Ireland, across to Dumfries and Galloway, up to Kintyre, the Inner Hebrides, then up the western edge of Argyll, including Skye, Wester Ross, and Caithness.

Selby (2004) notes that over 20 pollen diagrams existed for the Isle of Skye although none is adjacent to High Pasture Cave. By *c.* 4000 BP Selby noted that, based on rising values of heather (*Calluna vulgaris*)

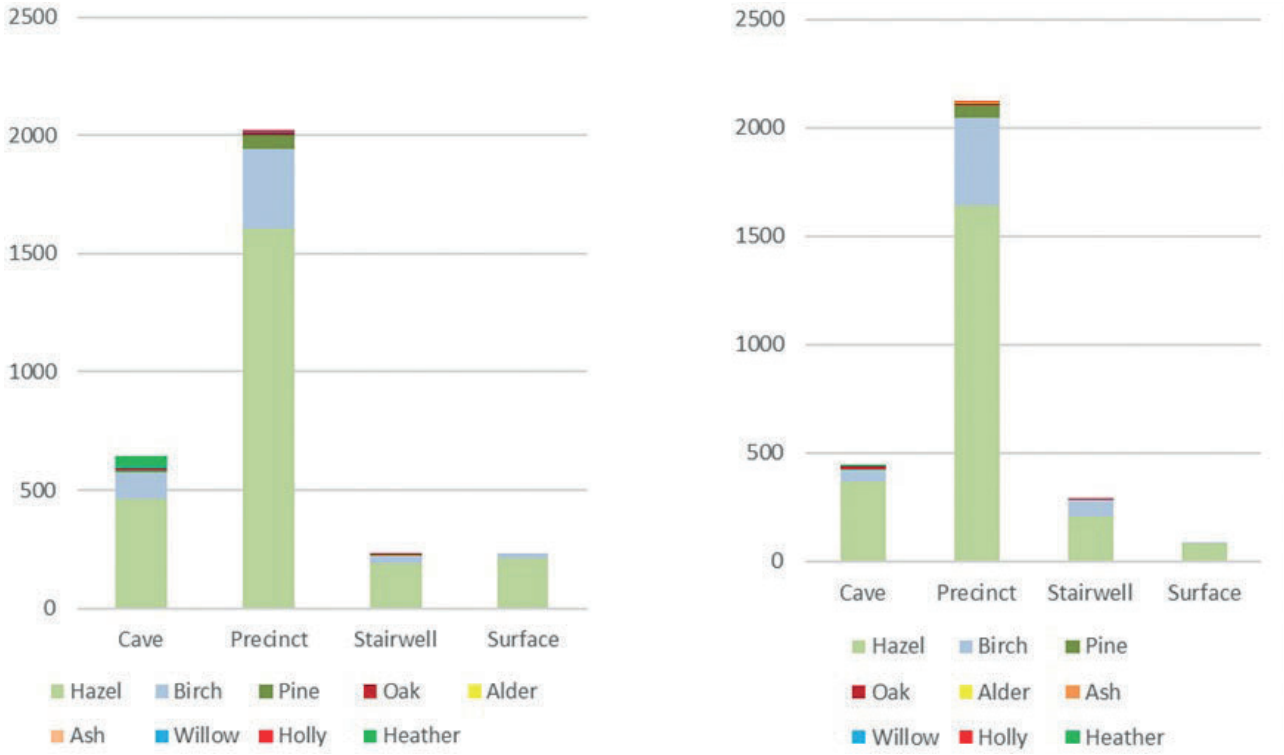


Figure 13.41. Charcoal distribution by area: left: by fragment count; right. by weight (g)

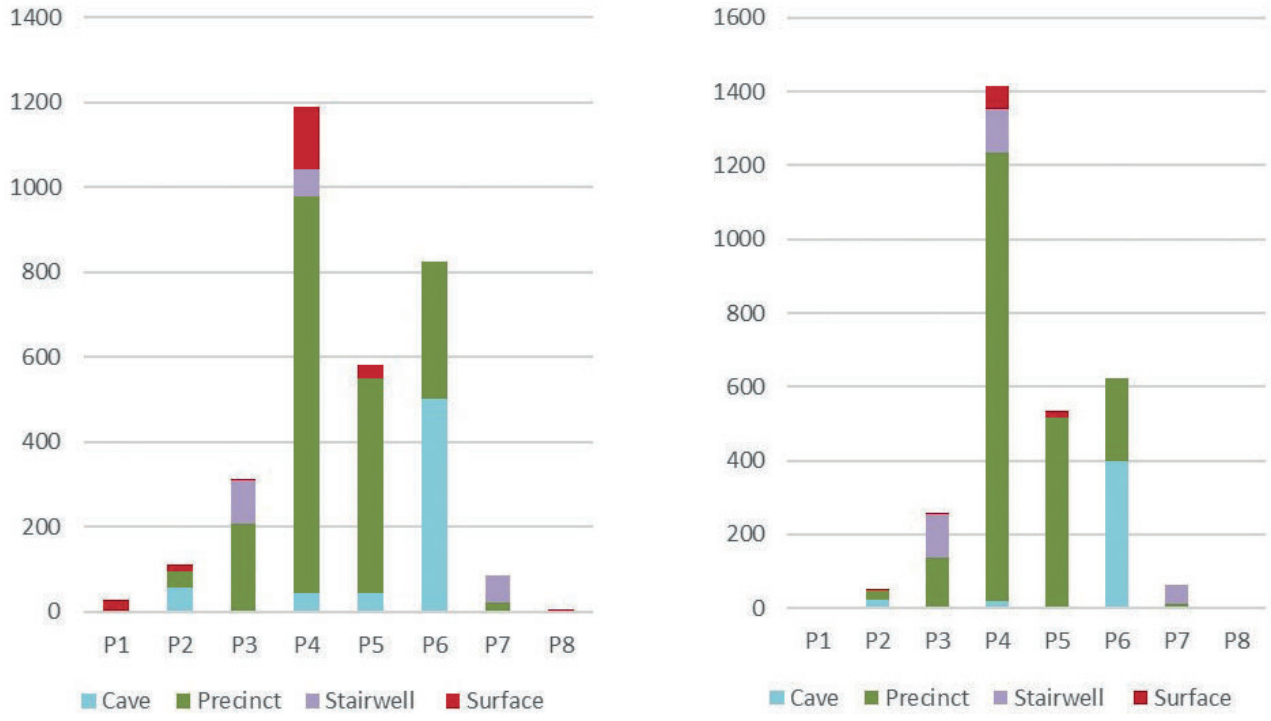


Figure 13.42. Charcoal recovery by site area by phase: left: by fragment count; right: by weight (g)

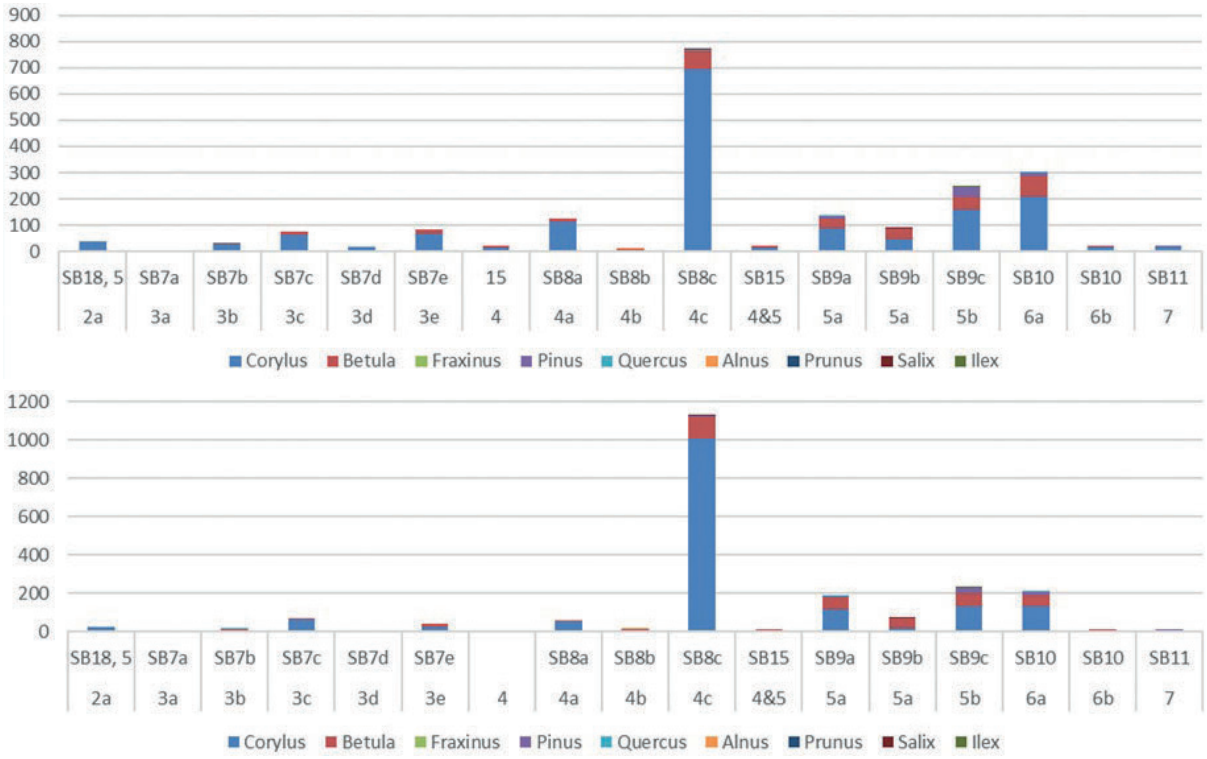


Figure 13.43. Charcoal distribution in the precinct: top. by phase/stratigraphic block; bottom. to species

pollen at her three coastal sites, this trend is reflected inland according to the other pollen sites (Lochs Ashik and Meodal). Acidification and the tendency for heather scrub and sphagnum bog formation is suggested to have been climatically driven due to increasing precipitation and stronger winds. By later prehistory, arboreal pollen declines rapidly with falling values of birch and alder noted at Loch Ashik at the expense of hazel which is recorded until the present. Selby recognised that the variability in arboreal pollen records obtained from sites across the south of Skye was probably the result of their position in relation to the Cuillin mountain range. Greater woodland and scrub development occurred at sites in the lee of the mountains compared to those without protection from exposure. Mixed hazel and birch woodland existed throughout the last millennia and the pollen records are in accord, demonstrating the decline of mixed woodland and replacement by acid heath indicators such as heather and ling.

On Skye today, native woodland is very restricted and a significant proportion of the island naturally treeless due to climatic conditions and extensive peatlands. Important fragments remain as remnants of the original tree cover. Some of the most widespread are the western oak woodland where sessile oak is variously mixed with birch or, on more fertile sites, ash, and hazel. On Durness limestone or other base-rich substrates, ash or hazel dominate, such as at Torrin and Coille Thogabhaig on Skye.

13.10.5 Conclusion

At High Pasture Cave, hazel is the most dominant charcoal species followed by birch. The former is a natural multi-stemmed shrub that would have supplied communities with sufficient fuel wood for a multitude of domestic uses. Abundance values for all identified species represent only a fraction of the wood that was consumed during the lifetime of the site. This study has shown conclusively that the local hazel woodland was certainly mature enough to provide not only large diameter branch wood but also hazelnuts for food as attested by the plant macrofossil evidence from the site (Cressey 2006; Section 13.8).

13.11 Pollen

S. Pratt

13.11.1 Introduction

A preliminary assessment of pollen composition, concentration and preservation was undertaken for 36 spot samples from a range of High Pasture contexts. Thirty samples were taken from the precinct, three samples from the cave, one from the cave stream passage deposits, and two samples from two separate surface trenches.

13.11.2 Methods

Samples were prepared at the University of Hull palynology laboratory using standard methods for pollen concentration as described in Moore *et al.* (1991) and

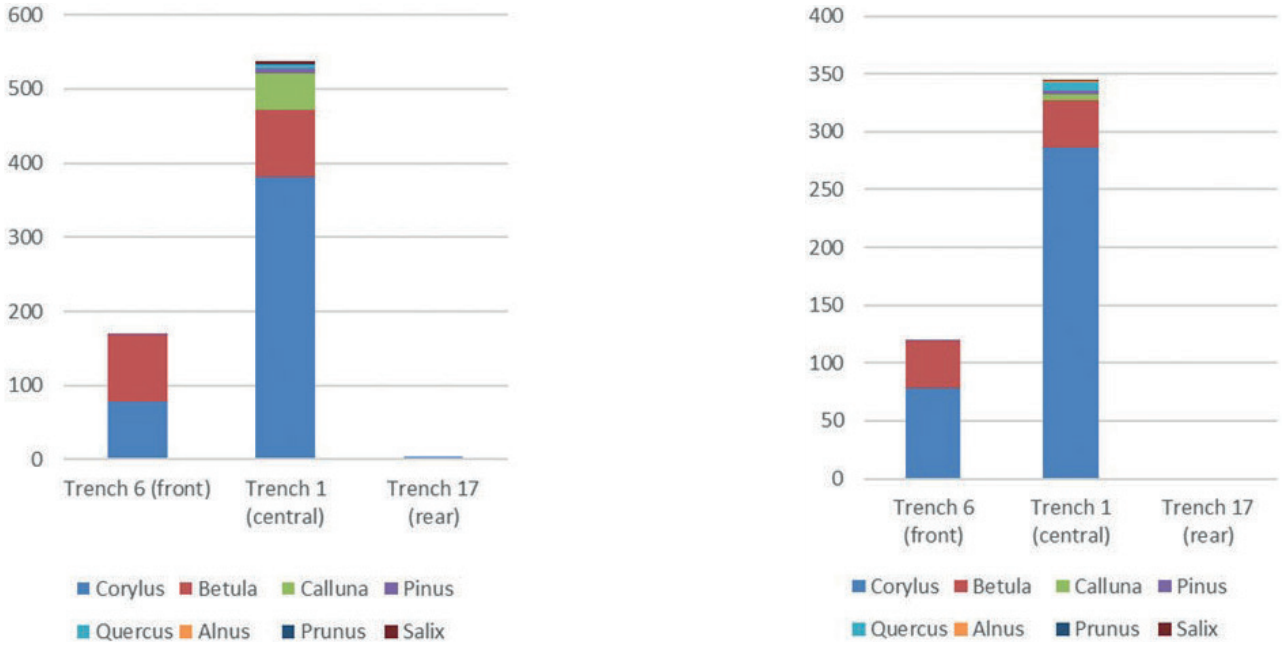


Figure 13.44. Charcoal distribution in the cave by species & trench area: left. by fragment count; right. by weight (g)

Table 13.15 General requirements of the woodland species identified at High Pasture Cave

Species	*General requirements*
Alder	Stream sides & flooded areas. Submerged roots.
Ash	Calcareous base-rich substrates & sheltered valleys alongside oak woodland.
Birch	Light demanding pioneer, acidic to base-poor soils.
Cherry/blackthorn type	Found alongside streams, tolerant to Scottish climate.
Hazel	Understory shrub tolerant of base-poor soils. Will self-coppice & form large trees if left uncut.
Heather	Acid heath & shallow free-draining soils; stony outcrops.
Holly	Damp frost-free environments, usually found alongside oak woodland.
Oak	All upland areas & tolerates most soil conditions.
Pine	Upland acid heath, shallow base-poor soils.
Willow	Damp to flooded areas & seasonally saturated soils/stream sides.

detailed in the site archive. Each sample was counted at 400× (1000× for critical identifications) until a minimum of 50 control spores had been recovered, with a further 50 recovered for those samples containing >5 pollen grains at the first count. This ensured that a similar volume of sediment was scanned for each sample. A general estimate of charcoal abundance was made (A=abundant, F=frequent, O=occasional, R= rare or absent), and spore types counted and identified by type. Identifiable pollen grains were recorded as normal, crumpled, corroded, broken, or degraded, and the same categories plus 'concealed' and 'unknown' for indeterminate grains.

13.11.3 Results

Contexts from which pollen was recovered are recorded at Table 13.16.

Charcoal

Twenty-eight of 35 samples contained at least some charcoal under magnification, with six showing frequent charcoal and the remainder occasional charcoal. Fragments in C2.05, C2.21, and C1.03 had a rounded, nodular appearance. Other fragments were more typically angular.

Pollen and spores

Twenty-four pollen and four spore taxa were identified, and 20 unknown grains (ten taxa) observed. Pollen preservation was generally good, with most grains normal or occasionally degraded, broken, or crumpled. *Calluna* (heather) and Poaceae (grass) pollen dominate, followed by Asteraceae Lactuceae (dandelion type), *Corylus* (hazel), *Alnus* (alder) and *Betula* (birch). Most grass pollen appeared to be of wild type but occasional grains

Table 13.16 The pollen assemblage from High Pasture Cave

Ph	*SB*	*C*	*Description*
2	1a	C2.39	Pollen conc. quite high: *c*. 23,000 gr. cm^{-3}. Preservation poor, implying mechanical damage/chemical &/or biological oxidation, though identification still possible. Occasional charcoal & frequent, slightly degraded trilete spores, prob. *Pteridium* (bracken). Dominant pollen: *Calluna* (heather).
3c	7c	C2.23	Abundant organic detritus, quite well-preserved pollen (*c*. 11,000 gr. cm^{-3}), frequent charcoal. *Calluna* dominant (25%), with *Corylus* (hazel), Asteraceae Lactuceae (dandelion type) & an intact *Pinus* (pine).
3d	7d	C2.21	*c*. 20% of identifiable pollen broken, degraded or crumpled. Further 35% indeterminate due to degradation, suggesting mechanical damage & oxidation. Poaceae (grasses) dominant pollen type. Other taxa included *Corylus*, degraded *Alnus* (alder) & *Conopodiaceae* (pignut). Abundant fine organic detritus with occasional nodular charcoal frags.
4c	27b	C1.06	Abundant organic matter with occasional charcoal; high pollen conc. (*c*. 30,800 gr. cm^{-3}), most pollen grains degraded/crumpled reflecting mechanical damage & oxidation, still identifiable. *Calluna* predominates, with Asteraceae Lactuceae, Poaceae (wild type) & *Alnus*.
4c	8c	C2.31	Pollen conc. *c*. 7400 gr. cm-3: 4 Asteraceae Lactuceae, 5 Poaceae (inc. 2 cereal type), 3 Caryophyllaceae (campion). Also *Rumex acetosella* type (sorrel), *Corylus,* further 4 unid. types (degraded or crumpled).
4c	8c	C2.40	Highest pollen conc. (*c.* 55,000 gr. cm^{-3}). Most grains identifiable, occasionally degraded, 31% too degraded to identify, implying oxidation by chemical/biological agents. Abundant organic & limestone detritus, occasional charcoal. Most frequent type Poaceae, 36 wild type, 7 undifferentiated cereal type. *Corylus*, *Alnus* & *Salix* (willow) & bracken spores also quite frequent.
5a	9a	C2.05	Sample HPC2 shows diverse assemblage: *Alnus*, *Corylus*, *Salix*, probable *Quercus* (oak), *Calluna*, Poaceae, degraded *Plantago lanceolata* (ribwort plantain), *Rumex* & Asteraceae Lactuceae (dandelion type). *Pteridium* (bracken), bryophyte (moss) spores, frequent nodular charcoal frags also observed.
5b	9c	C2.41	Pollen conc. *c.* 18,500 gr. cm^{-3}, Poaceae by far dominant pollen type (21 grains). Other taxa inc. *Corylus*, Asteraceae Lactuceae & *Calluna*. Abundant bracken spores & occasional charcoal.
6b	29c	C1.03	Context comprised mainly fine organic detritus with occasional nodular charcoal frags *c.* 30–50 µm diam. A fairly good pollen conc. (*c*.8500 gr. cm-3) with 7 *Calluna*, 5 Asteraceae Lactuceae, inc 1 *Anthemis* (mayweed) type, degraded cf. *Ilex* (holly) & 2 degraded *Pinus* air sacs.
7	22b	C2.44	A diverse assemblage, dominated by Asteraceae Lactuceae type (24%) & Poaceae (wild type, 17%). Ericaceae (bell heather or bilberry type), *Ilex*, *Salix*, *Corylus*, Caryophyllaceae & *Betula* (birch) also present. 3 unid., partially degraded grains may be Brassicaceae (cabbage family). 2 trilete spores (1 bracken type) & abundant other undifferentiated moss & fungal spores.
7	22b	C2.45	Pollen conc. *c*. 22 000 gr. cm^{-3}. 44% cf to *Salix*. *Salix* not observed in such abundance in any other sample (typically, *c*. 4–5%, but <11% in C2.16 & 12% in C2.34 (not listed)). Also 6 Poaceae, inc. 1 *Hordeum* (barley) type, 6 Asteraceae Lactuceae, 5 *Calluna*, 1 Apiaceae (carrot family).

of cereal type with larger pore annuli (diameter *c*. 5–7 µm) were seen in contexts C2.21, C2.26, C2.31, C2.38, C2.40, C2.41, and C2.45.

Nineteen samples had a concentration >3000 grains cm^{-3} with fewer than 45% indeterminable grains. Of these, C2.45, C2.39, C1.06, and C2.40 had the highest concentrations, from *c.* 21,000 to *c*.55,000 grains cm^{-3}. There were six contexts with pollen >7000 grains cm^{-3}: C1.03, C2.21, C2.23, C2.41, C2.31, and C2.44. Variation was seen within contexts, with two samples from C2.05, containing pollen at a concentration of *c.* 11,000 grains cm^{-3} in one (HPC 2), whilst. HPC 21 contained only *c.* 1500 grains cm^{-3}. Samples from contexts 1.03, C1.06, C2.05, C2.21, C2.23, C2.31, C2.39, C2.40, C2.41, C2.44, and C2.45 had particularly good concentrations of pollen and a sufficiently diverse range of taxa, described at (Table 13.16).

13.11.4 Discussion and conclusions

As expected, the assemblages are dominated by taxa typical of the upland landscape together with grasses and 'weedy' species associated with grazing and human activity. In contexts with >45% indeterminable degraded/crumpled grains, it is likely that certain taxa are over- or under-represented, making ecological interpretation difficult. C2.28, for example, is dominated by Asteraceae Lactuceae (30%). This is resistant to decay in palaeosols, so tends towards over-representation and has a distinctive morphology likely to be identified even when very degraded. Smaller grains may also be under-represented, *e.g. Filipendula* (meadowsweet), as these may be lost during fine sieving. There are other difficulties with interpreting these assemblages in any ecologically meaningful way, as both natural and anthropogenic reworking and disturbance of material during and after deposition will contribute to complex origins for pollen. However, when considered with other context characteristics, including charcoal and plant macro-fossils, useful archaeological interpretations are possible, *e.g.* relating to importation of material onto site.

The level of concentration of Poaceae grain types in samples C2.21, C2.26, C2.31, C2.38, C2.45, C2.40, and C2.41 supports the existing macrofossil evidence that processed, or partly processed, cereal was handled or deposited in and around the site. As it is unlikely that extensive arable cultivation took place around the site itself, this would explain the relatively high concentrations of cereal pollen seen.

Interestingly, the cave deposits all have at least some pollen including 30–50% *Calluna* and frequent Poaceae. If these passages were last active during pre-Glacial times, pollen could originate from pre-Glacial vegetation, but the high proportion of *Calluna* and Poaceae indicates that material containing pollen was instead brought in by humans, *e.g.* as bedding or fuel.

The predominance of *cf. Salix* pollen in the sample taken from burial fill C2.45 is interesting. As *Salix* is usually under-represented, the high concentration observed suggests that male catkins were locally present within this context.

It is also observed that the assessment of the coprolites recovered from the site (see Section 13.13) showed a notably low incidence of pollen.

13.12 Resin

Carl Heron

13.12.1 Introduction

A small fragment of putative resin (Fig. 13.45) was recovered by wet sieving from C6.05, a Phase 5b redeposited midden in the front cave trench (SB27c). Analysis was carried out to determine whether the sample is indeed a resin, and to identify its botanical origin. The clayey surrounding deposit was rich in ash and charcoal and contained significant finds including a cache of bone pins, a soapstone pendant, and other worked bone (see Chapter 7) and appear to represent a closing event in the cave at the end of Phase 5.

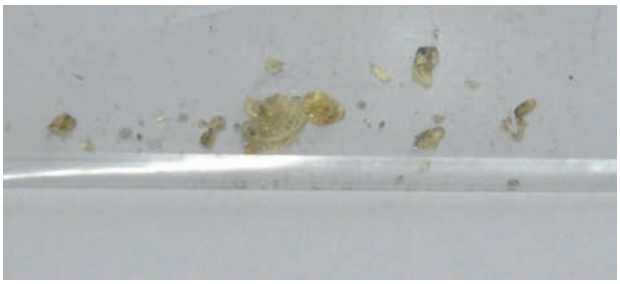


Figure 13.45. 'Resin' fragments seen at base of sample bag. Image width: c. 2 cm

13.12.2 Method

The sample was suspended in a 1 ml mixture of dichloromethane/methanol (DCM/MeOH, 2:1 v/v) and ultrasonicated for 2 × 15 minutes. The solvent solubilised much of the sample as evidenced by the discolouration of the solvent to orange-yellow. The solvent-soluble fraction was removed with a Pasteur pipette and blown to dryness under nitrogen. To promote chromatographic separation, silyl derivatives were produced through trimethylsilylation of the dried residue using 0.05 ml of N,O-bis(trimethylsilyl) trifluoroacetamide (BSTFA) with 1% TMCS (60°C, 1 hour). Excess reagent was removed by evaporation under nitrogen and the derivatized sample re-diluted in DCM (0.1 ml) and transferred to a sample vial for analysis by gas chromatography-mass spectrometry (GC-MS).

GC-MS analysis was carried out by combined gas chromatography-mass spectrometry using an Agilent 7890A GC system, fitted with a 30 × 0.25 mm, 0.25 μm DB-5MS UI 5% phenyl methyl siloxane phase fused silica column (Agilent), connected to a 5975C inert XL triple axis mass selective detector. The splitless injector and interface were maintained at 300°C and 280°C respectively and the carrier gas, helium, at constant flow. The temperature of the oven was programmed to rise from 50°C (isothermal for 2 min) to 350°C (isothermal for 10 min) at a gradient of 10°C per minute. The column was directly inserted into the ion source where electron impact (EI) spectra were obtained at 70 eV with full scan from m/z 50 to 800 amu.

13.12.3 Results

The total ion chromatograph of the derivatised solvent-soluble portion of the sample, with the nine most abundant peaks, are all identified as diterpenoids. These data confirm that the sample is a resin from Pinaceae sp. Table 13.17 provides mass spectrometric data on which the identification of the major constituents was based. The

Table 13.17 Characteristics of the major peaks found in the resin sample

Peak	*Identity*	*Molecular ion (M^+)*	*Characteristic fragment ions, m/z (abundance)*
1	Epimanool	290(2)	272 (20), 137(100), 81(90), 95 (85), 257(80), 189(25), 244 (25)
2	?	?	270(5), 143(100), 73(50), 257(20), 244(10)
3	Pimaric acid, TMS	374(15)	73(100), 121(60), 359(20), 257(20), 241(15), 143(15)
4	Isopimaric acid, TMS	374(5)	241(100), 73(95), 256(60), 257(30), 359(25), 143(20)
5	Dehydroabietic acid, TMS	374(15)	239(100), 73(25), 240(35), 357(20), 173(15), 255(15),
6	7β-hydroxydehydroabietic acid, TMS ether, TMS ester	460(15)	191(100), 73(75), 234(30), 237(30), 282(20), 417(15), 445(15)
7	7α-hydroxydehydroabietic acid, TMS ether, TMS ester	460(10)	237(100), 73(80), 191(60), 445(55), 252(25), 417(25), 155(20)
8	15-hydroxydehydroabietic acid, TMS ether, TMS ester	460(5)	445(100), 73(80), 446(35), 253(20), 327(15), 268(15), 187(10)
9	7-oxodehydroabietic acid, TMS	386(20)	253(100), 268(65), 73(50), 187(30), 269(25), 327(25), 371(15)



Figure 13.46. One of the coprolite samples from Phase 3b redeposited hearth residue C15.64

conifer subfamily Pinaceae includes pine (*Pinus*), larch (*Larix*), spruce (*Picea*) and fir (*Abies*). The resins of these trees comprise abundant diterpenoid acids, especially those with abietane and pimarane structures. Abietane acids are oxidised to form dehydroabietic acid (DHA), which in turn may be oxidised further.

Peak 1 is epimanool, a constituent of larch, spruce, and fir resin but not reported commonly in pine. The fragment ions compare well to those reported in by Helwig *et al*. (2017, 286, table 1). The identification of Peak 2 is uncertain. The mass spectrum does not correspond to the spectra for larixol and larixyl acetate, found in larch resins, presented in van den Berg (2003, A12–A13). Peaks 3 and 4 are pimarane diterpenoids. Peak 5, dehydroabietic acid, is commonly the major oxidation product of abietane dipeterpenoids. Peaks 6–9 are common oxidation products of dehydroabietic acid (Azémard *et al.* 2016). Low levels of monoterpenoid compounds were also detected (not shown in Fig. 13.47). No original abietane-type diterpenoids *(e.g*., abietic acid) were detected in the sample. The oxidation product of abienol, norambreinolide, is not present and this suggests that the resin is not from a fir species (Mills and White 1994). Larch resin is distinguished from other Pinaceae sp. resins by its marker molecules, larixol and larixyl acetate as well as the relatively high amount of isopimaric acid and the small fraction of abietic acids.

13.12.4 Conclusion

The results confirm that the sample is a Pinaceae sp. resin, possibly spruce. There is no evidence that the sample has been heated and this is consistent with its orange-yellow colour. Natural resins will have served multiple functions in prehistory, as adhesives, sealants, waterproofing agents, incense, decorative materials, medicinal products, and so on (Pollard *et al.* 2016). There is little evidence of the use of resinous substances in Iron Age Britain. One notable exception is a mixture of birch bark tar and pine tar used to fix coral studs to harness fittings used in a chariot from Wetwang, Yorkshire (Stacey 2004). Investigation of samples from France provides a wider context for the production and use of tars and pitches (Regert 2004; Rageot *et al.* 2016).

13.13 Coprolites

Rob Batchelor

13.13.1 Introduction

Eleven coprolite samples were recovered from High Pasture Cave, principally from middens or redeposited midden material (Fig. 13.46). The samples separate into two clear groups: concentrations from three different Phase 2 middens in the cave (S17.010, C17.07, Phase 2a (SB25b) in the cave rear; HPC0309, C1.07, Phase 2b (SB25c) in the central zone, and F6495, C6.07, also Phase 2b (SB25c). A second group date to Phase 3b (SB7b), both from C15.64, trampled redeposited ash and hearth residues in the precinct (Chapter 6).

The aim of the investigation was to establish evidence of the following from each coprolite: species of origin, diet, and health. A multi-proxy approach was employed

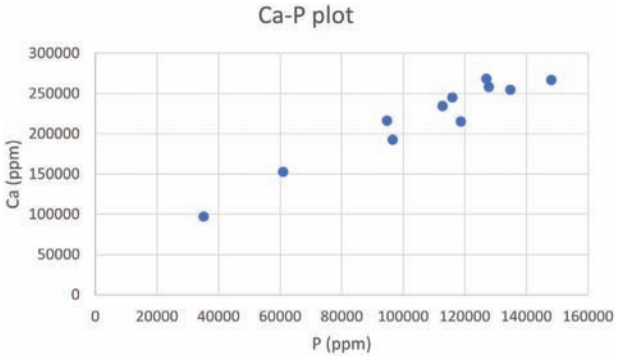


Figure 13.47. Calcium-phosphorus plot

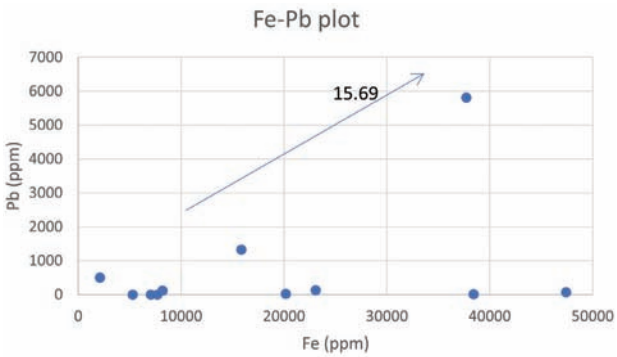


Figure 13.48. Iron-lead plot

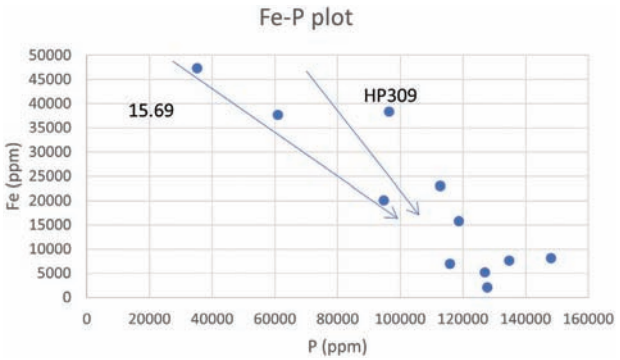


Figure 13.49. Iron-phosphorous plot

including: 1. inorganic (pXRF) and organic (GCMS) chemistry; 2. analysis of any contained microscopic plant remains (pollen and phytoliths); 3. analysis of any contained faunal remains (bones).

13.13.2 Methods

Inorganic chemistry (portable X-Ray Fluorescence Spectroscopy – pXRF)

XRF determines the elemental composition of a soil, sediment, or archaeological material. In addition to composition, this technique can provide valuable information on the original source of a deposit, and the former function of archaeological features in the absence of artefact/ecofact remains. Samples were placed into a lead sheet to protect the operator from radiation, then analysed for a range of major and trace elements using a portable-XRF Niton XL3T GOLDD. The portable spectrometer contains a small window through which measurements are taken. The reported values are in parts per million and are displayed in Tables 13.18 and 13.20 and Figures 13.47–13.49.

Organic chemistry (GCMS)

Samples (0.5 g) were treated with 1M NaOH (2 cm^3) in an ultrasonic bath for 2 hours and then kept at room temperature for 16 hours. 1M HCl (1 cm^3) was added followed by hexane containing 20-methylcholanthrene as internal standard (29.5ug cm^{-3}, 1 cm^3). The mixture was vortex mixed and then centrifuged. The hexane layer was removed and the process repeated twice with two more aliquots of hexane. The combined hexane solutions were concentrated to dryness under nitrogen and kept in a desiccator (sterol fraction). The dried extracts were derivatised with N-methyl-N-(trimethylsilyl) trifluoroacetamide (50 ul) at 55°C for 45 min. The solutions were transferred to GC vials with conical inserts with toluene (100 ul). GCMS analysis was carried out using a Hewlett-Packard 5890 Series II Plus gas chromatograph, fitted with a 30 × 0.25 mm × 0.25 µm DB5 column, coupled to a Hewlett-Packard 5972MSD mass spectrometer. Injections (2 ul) were in the splitless mode with a delay of 1.5 min. The injector temperature was 290°C and transfer line temperature 325°C. The helium carrier was set at constant flow of 30 cm^{-1}. The column temperature programme was initial 100°C for 2 min then ramped at 5.1°/min to 350°. Mass spectra were collected after 5 min from m/z 33-500 at 1.6 scans/s. Mass spectra of chromatogram peaks were searched in the literature cited and the NIST 08 library for possible compound identification. The results are presented in Tables 13.20 and 13.21 and Figures 13.50 and 13.51. The peak integration data transformed to ug/g of compound are presented in the site archive.

Pollen assessment

Coprolites were sampled as follows for pollen:

1. sampling a standard volume of sediment (up to 6 g);
2. adding two tablets of exotic clubmoss Lycopodium clavatum to provide a measure of pollen concentration in each sample;
3. deflocculation of sample in 1% Sodium pyrophosphate;
4. sieving of sample to remove coarse mineral and organic fractions (>125 µ);
5. acetolysis;
6. removal of finer minerogenic fraction using sodium polytungstate (specific gravity 2.0 g/cm^3);
7. mounting of sample in glycerol jelly.

Each stage was preceded and followed by thorough sample cleaning in filtered distilled water. Quality

Table 13.18 Results of the portable x-ray fluorescence analysis

ID	*Ph (SB) C*	*P*	*Fe*	*Zn*	*Pb*	*Cu*	*Rb*	*Sb*	*Sn*	*Cd*	*Pd*	*Ag*	*Mo*	*Nb*	*Ba*	*Zr*	*Sr*	*Bi*	*As*	*Se*	*Au*
17.010	2a(25b) C6.07 (C)	126885	5256	228	0	0	10	0	0	0	0	0	0	2	161	10	236	0	0	0	0
HP 0309-1	2b(25c) C1.07 (C)	147933	8167	637	119	38	19	0	0	0	0	0	16	12	259	5	327	0	0	0	21
HP 0309-2	2b(25c) C1.07 (C)	134708	7670	683	0	45	14	0	0	0	0	0	9	8	152	5	291	6	0	0	0
HP 0309-3	2b(25c) C1.07 (C)	115788	7039	458	0	36	8	0	0	0	0	0	0	2	194	4	281	6	0	0	0
6495	2b(25c) C6.07 (C)	127719	2098	286	508	26	9	0	0	0	0	0	4	0	203	7	279	0	0	0	0
15.69 1/5	3b(7b) C15.64 (P)	96410	38409	651	21	82	10	0	0	0	0	0	3	5	616	3	342	0	0	0	0
15.69 2/5	3b(7b) C15.64 (P)	35118	47389	542	76	99	15	0	0	0	0	0	4	3	761	27	317	5	0	0	0
15.69 3/5	3b(7b) C15.64 (P)	60864	37713	405	5814	57	9	0	0	0	0	0	4	3	394	8	337	0	0	0	0
15.69 4/5	3b(7b) C15.64 (P)	94605	20128	289	25	32	5	0	0	0	0	0	4	2	697	4	285	0	0	0	0
15.69 5/5	3b(7b) C15.64 (P)	118551	15848	693	1330	82	10	0	0	0	0	0	3	3	359	9	324	0	0	0	0
15.70	3b(7b) C15.64 (P)	112669	23037	476	131	0	9	0	0	0	0	0	0	3	287	0	293	0	0	0	0

ID = Sample Number

Table 13.19 Results of the portable x-ray fluorescence analysis

ID	*Ph (SB) C*	*W*	*Ni*	*Co*	*Mn*	*Cr*	*V*	*Ti*	*Ca*	*K*	*Al*	*Si*	*Cl*	*S*	*Mg*	*Total*
17.010	2a(25b) C6.07 (C)	0	0	0	942	0	58	483	268757	1927	7855	30602	0	248	0	443659
HP0309-1	2b(25c) C1.07 (C)	0	0	0	2378	0	105	759	267280	729	14919	30733	122	261	0	474839
HP0309-2	2b(25c) C1.07 (C)	0	0	0	2526	45	108	816	254869	642	9535	24672	0	435	0	437239
HP0309-3	2b(25c) C1.07 (C)	0	0	0	1646	43	86	735	245492	920	10252	37565	0	525	0	421081
6495	2b(25c) C6.07 (C)	0	0	0	1411	0	32	249	258690	318	4431	19149	0	579	0	415999
17.010	3b(7b) C15.64 (P)	0	0	0	942	0	58	483	268757	1927	7855	30602	0	248	0	443659
15.69 1/5	3b(7b) C15.64 (P)	0	0	0	14404	99	437	1273	192775	891	12710	36870	0	737	0	396749
15.69 2/5	3b(7b) C15.64 (P)	0	0	0	33659	100	665	2937	97698	8652	26946	125749	0	403	0	381165
15.69 3/5	3b(7b) C15.64 (P)	0	0	0	28608	0	442	1296	153168	1766	5719	31822	0	623	0	329049
15.69 4/5	3b(7b) C15.64 (P)	0	0	0	26469	0	389	1210	216796	1640	8561	31995	0	351	0	403486
15.69 5/5	3b(7b) C15.64 (P)	0	0	0	6162	58	132	725	215415	1202	8702	31798	0	653	0	402059
15.70	2a(25b) C6.07 (C)	0	0	0	6363	68	118	326	234743	221	0	11775	0	336	0	390856

ID = Sample Number

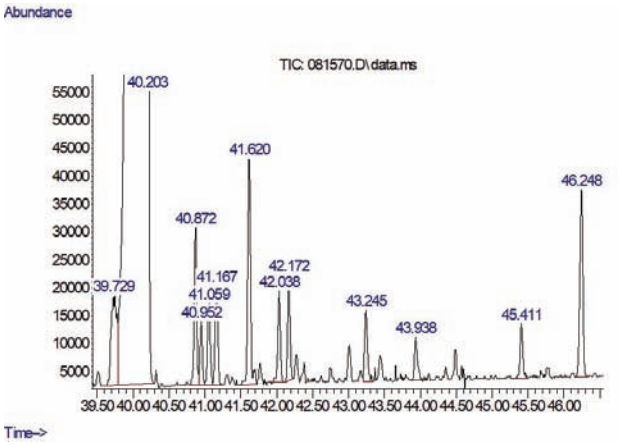


Figure 13.50 TIC chromatogram of derivatised extract of coprolite sample 15.70 from Phase 3 precinct deposit C15.64. The off-scale peak at 40.203 min is that of the internal standard (IS) 20-methylcholanthrene

control is maintained by periodic checking of residues and assembling sample batches from various depths to test for systematic laboratory effects. Pollen grains and spores were identified using the University of Reading pollen type collection and the following sources of keys and photographs: Moore *et al.* (1991); Reille (1992). The assessment procedure consisted of scanning the prepared slides and recording concentration and preservation of pollen grains and spores, and principal taxa on four transects (10% of slide) (Table 13.22).

Phytolith assessment

Coprolites were sampled as follows for phytoliths:

1. each sample was screened through a 0.5 mm mesh to remove coarse sized particles;
2. approximately 1 g of dried raw sediment was weighed out;
3. calcium carbonates were dissolved using a dilution of 10% hydrochloric acid and then washed in distilled water three times;
4. clay was removed using a settling procedure and sodium hexametaphosphate (Calgon) as a dispersant. Distilled water was added, and the samples left for 75 min before pouring off the suspense. This was repeated at hourly intervals until samples were clear. Samples were then transferred into crucibles and left to dry at a temperature of less than 50°C
5. after drying, samples were placed in a muffle furnace for 2 hours at 500°C to remove organic matter
6. phytoliths were then separated from the remaining material using a heavy liquid calibrated to a specific gravity of 2.3. Phytoliths were transferred to centrifuge tubes and washed three times in distilled water. They were then placed in small Pyrex beakers and left to dry
7. approximately 2 µm of phytoliths per sample were mounted onto microscope slides, using the mounting agent Entellan. Microscope slides were assessed using a Leica DMLP polarising microscope using ×100 and ×400 magnifications. Slides were assessed to ascertain if there were a sufficient number of single cells phytoliths present to take the slide to a full count.

Bone assessment

All extracted bone fragments from the coprolites were recorded:

1. all bone fragments from each sample were weighed on an electronic balance (to 0.1 g);
2. fragments were separated into size classes (<10 mm, 10–<20 mm, *etc*.) and counted
3. remains were described, focusing on material that can be identified to taxon or skeletal element, where possible, with the aid of a modern osteological reference collection supported by published protocols (here, Zeder and Lapham 2010). Some fragments could be assigned to animal-size categories (*e.g.* 'sheep-sized').

The results are presented in Tables 13.23 and 13.24.

ZooMS collagen fingerprinting analysis

Collagen fingerprint analysis of 30 fragments unidentifiable by eye was carried out following modified protocols of Buckley *et al.* (2016) in a manner that left the bone specimens morphologically intact. In brief this involved submersion of intact bone shards for 4 hours prior to collection and ultrafiltration of the acid-soluble proteins into ammonium bicarbonate using a 10 kDa molecular weight cut-off filter. The buffer-exchanged proteins were then digested into peptides using the enzyme trypsin overnight (~18 hours) at 37°C. A subsample of the digests was then prepared and co-crystalised for fingerprint analysis by matrix assisted laser desorption ionization time of flight mass spectrometry and the resulting spectra manually interpreted for species biomarkers published previously (*e.g.* Buckley *et al.* 2009). The results are displayed in Table 13.25.

Parasite assessment

Subsamples were extracted from the coprolites and examined for the eggs of intestinal parasites and other microfossils using the 'squash' technique of Dainton (1992), although primarily for the detection of parasite eggs the 'squash' technique routinely reveals other microfossil remains, *e.g.* diatoms and pollen grains/spores, and, if present, these were also noted. Slides were scanned at ×150 magnification, with ×600 employed where necessary.

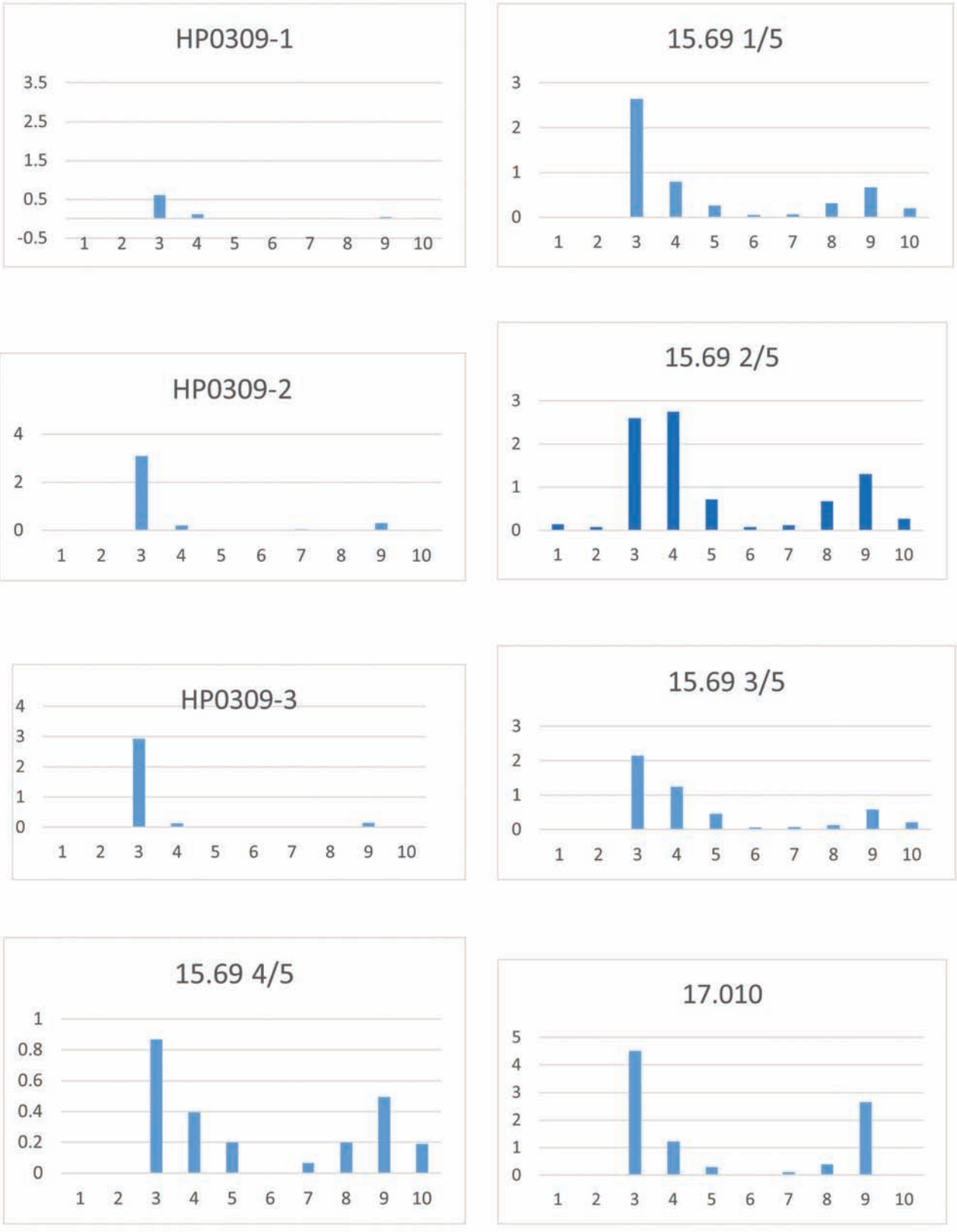


Figure 13.51. Amounts of sterols & stanols (listed in Table 5) measured as internal standard equivalents in ug/g of samples (Continued)

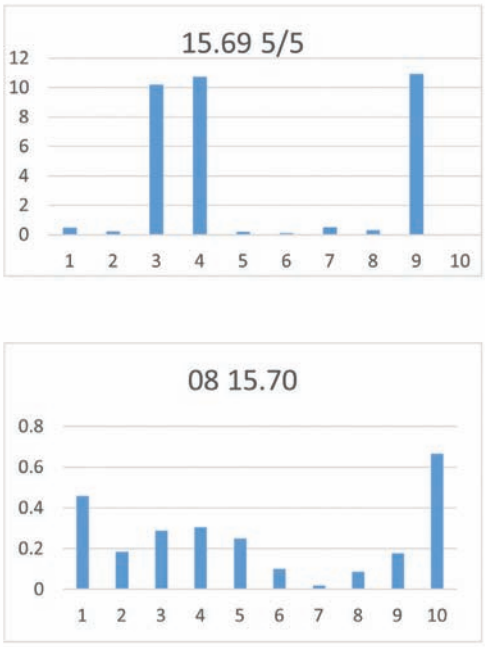


Figure 13.51. (Continued)

Table 13.20 Sterols detected in chromatograms of coprolite extracts

RT/min		*Assignment*	*Notes*
40.21		IS	
40.87	1	Coprostanol	Formed from cholesterol in gut, major component of human & porcine faeces, NOT a component of dog or bird faeces
40.95	2	Epicoprostanol	Formed from coprostanol
42.03	3	Cholesterol	Diet of carnivores & omnivores
42.18	4	5α-cholestanol	Formed by soil microbes from cholesterol or coprostanol
43.25	5	5β-stigmastanol	Formed by ruminant microbes from stigmasterol or sitosterol
43.46	6	stanol	
44.35	7	Sitosterol	Plant sterol, herbivore diet
44.5	8	5α-stigmastanol	Formed from 5β-stigmastanol
45.42	9	cholesterol-7-one	Microbial, metabolic, or artefactual oxidation product of cholesterol
46.24	10	sterol?	

RT/min = Retention Time per Minute

Table 13.21 Organic chemistry analysis

Sample ID	*Phase (SB) C; location*	*Faecal Index 1*	*Faecal Index 2*	*Faecal Index 3*
17.010	2a (25b) C.17.07; cave rear	0.000	0.000	0.000
HP0309-1	2b (25c) C.1.07; cave central	0.000	0.000	0.000
HP0309-2	2b (25c) C.1.07; cave central	0.000	0.000	0.000
HP0309-3	2b (25c) C.1.07; cave central	0.000	0.000	0.000
6495	2b (25c) C.6.07; cave front	0.940	0.991	115.068
15.69 1/5	3b (SB7b) C15.64; rrecinct hearth deposit	0.000	0.000	0.000
15.69 2/5	3b (SB7b) C15.64; precinct hearth deposit	0.078	0.168	0.053
15.69 3/5	3b (SB7b) C15.64; precinct hearth deposit	0.000	0.000	0.000
15.69 4/5	3b (SB7b) C15.64; precinct hearth deposit	0.000	0.000	0.000
15.69 5/5	3b (SB7b) C15.64; precinct hearth deposit	0.062	0.697	0.044
15.70	3b (SB7b) C15.64; precinct hearth deposit	0.653	0.647	1.500

13.13.3 Results and discussion: inorganic chemistry (pXRF)

Results are outlined in Tables 13.18–13.19 and Figures 13.47–13.49. Totals for the elements largely range between 40% and 47%, indicating the absence of many elements. These could possibly include sodium (Na), carbon (C), oxygen (O), and others, and suggests that oxides are likely to represent the remaining constituent parts.

Recalculation of the calcium (Ca), phosphorous (P) and silica (Si) to apatite (Ca10(PO4)6(OH)2) and silicon dioxide (SiO^2) indicates that most of the coprolites are made up of bone with silicate material and organic fragments. Since most of the samples are dominated by bone and bone fragments (see sections below), this is unsurprising. There is a good correlation between calcium and phosphorous indicating that the bone content of the coprolites does vary, but as the correlation is so strong (> 0.95 r2), this indicates the coprolites are almost entirely dominated by bone fragments (Fig. 13.47). There

Table 13.22 Pollen assessment

Sample ID	*Ph (SB) C; location*	*Concentration*	*Preservation*	*Main taxa*
15.69 1/5	3b (SB7b) C15.64; precinct	1	2	*Corylus*

Key: 1 =1–75 grains, 2 = 76–150 grains

Table 13.23 Coprolites: bone weight per sample & distribution of bone fragments by length

Sample ID	*Ph (SB) C; location*	*Present/ absent*	*Wt (g)*	*<10mm*	*10– <20mm*	*20– <30mm*	*30–<40 mm*	*Total N*
17.010	2a (25b) C.17.07; cave rear	present	0.3	24	–	–	–	24
HP0309-1	2b (25c) C.1.07; cave central	present	0.5	12	1	–	–	13
HP0309-2	2b (25c) C.1.07; cave central	present	2.2	35	8	1	–	44
HP0309-3	2b (25c) C.1.07; cave central	present	2.7	39	6	1	–	46
6495	2b (25c) C.6.07; cave front	present	0.2	14	3	–	–	17
15.69 1/5	3b (SB7b) C15.64. precinct	present	2.1	21	10	–	–	31
15.69 2/5	3b (SB7b) C15.64; precinct	present	0.9	13	4	–	–	17
15.69 3/5	3b (SB7b) C15.64; precinct	present	1.6	19	7	–	–	26
15.69 4/5	3b (SB7b) C15.64; precinct	absent	–	–	–	–	–	–
15.69 5/5	3b (SB7b) C15.64; precinct	present	0.2	10	1	–	–	11
15.70	3b (SB7b) C15.64; precinct	present	1.3	–	1	–	1	2

Table 13.24 Description of identified material in coprolites

ID	*Ph (SB) C; location*	*Description of bone fragments identified to taxon/skeletal part*
HP0309-1	2b (25c) C.1.07; cave central	sheep-sized bone frag. (poss. vertebral arch frag.)
HP0309-2	2b (25c) C.1.07; cave central	sheep-sized unfused vertebral centrum (*cf.* pig, *Sus*)
HP0309-3	2b (25c) C.1.07; cave central	sheep-sized vertebra (prob. cervical)
15.69 2/5	3b (SB7b) C15.64; precinct	possible sheep-sized rib frag.; long bone diaphyseal frag. (could be rabbit/ bird-sized animal, or young individual of larger taxon)
15.69 3/5	3b (SB7b) C15.64; precinct	Poss. sheep-sized rib frag.
15.69 5/5	3b (SB7b) C15.64; precinct	sheep/goat left calcaneum (*cf.* sheep, *Ovis*)

is also a good correlation between lead (Pb) and iron (Fe) (Fig. 13.48) with coprolite C15.69, from the precinct samples, showing a good correlation of increasing lead with increasing iron content. Lead readily absorbs to iron when in solution and could show that the deposition of both iron and lead is from solution. This could suggest that both are from a secondary (younger) context. The lead could be associated with bone directly (*i.e.* the animal ate lead contaminated bone, but this scenario is less likely).

The strong divergence of coprolite groups S15.69 (Phase 3b, precinct) and HP309 (Phase 2b, cave centre) on the iron-phosphorous plot (Fig. 13.49) indicates however that these two sets of samples are suitably different and show some geochemical variations.

Finally, coprolite HP309-2 contains gold, molybdenum, niobium, and chlorine enrichment (Table 13.18; 13.19) indicating that the animal had consumed something with a precious metal content (as these elements do not tend to migrate in solution).

Table 13.25 Collagen fingerprint results

ZooMS code	*Sample ID*	*More – more what?*	*Spot*	*Species*
Phase 2a (25b) C.17.07; cave rear				
2A	17.0/01		B5	Cattle
2B	17.0/01		B7	Cattle
2C	17.0/01		B6	Cattle
2D	17.0/01		B8	Cattle
2E	17.0/01		B9	Cattle
2F	17.0/01		B11	Cattle
2G	17.0/01		B10	Cattle
Phase 2b (25c) C.1.07; cave central				
10D	HP309-1		C13	Pig
9B	HP309-2		A10	Pig
9E	HP309-2		A12	Pig
8D	HP309-3		C1	Pig
Phase 2b (25c) C.6.07; cave front				
3A	6495		B12	Cattle
3B	6495		B1	Cattle
3C	6495		B2	Cattle
Phase 3b (SB7b) C15.64; precinct				
1A	15.69		B3	Deer
1B	15.69		B4	Deer
5A	15.69		C11	Cattle
5B	15.69		C12	Cattle
5C	15.69		D13	Cattle
5D	15.69		D14	Cattle
6A	15.69	Sheep-sized rib frag.?	C14	Cattle
6B	15.69	Long bone diaphyseal frag.	B13	Pig
6C	15.69		B14	Cattle
6D	15.69		A7	Cattle
6E	15.69		A5	Cattle
7A	15.69	Sheep-sized rib frag.?	A13	Cattle
7B	15.69		A14	Cattle
7C	15.69		A6	Cattle
7D	15.69		A9	Cattle
4B	15.70		C10	Sheep*

**sheep specimen is not the one identified by morphology as caprine, also note that all specimens retain appropriate labels to allow association with other information.*

13.13.4 Results and discussion: organic chemistry (GCMS)

Previous GC analyses of coprolite sterol biomarkers as their trimethylsilyl derivatives (*e.g.* Bull *et al.* 2003; Tyagi *et al.* 2008; Baeten *et al*. 2012) have shown that they occur as four sets of peaks at increasing retention times corresponding to [1] C27 stanols, [2] C27 sterols C27 5α-stanols and C28 stanols, [3] C28 sterols C27 5α-stanols and C29 stanols, and [4] C29 sterols and C28 5α-stanols. These groups of peaks were present, to varying extents, in the High Pasture samples. Two additional peaks corresponding to sterol derivatives according to their mass spectra, in a later group, were apparent in many of the samples; one (peak 9) gave a good match for cholesterol-7-one. Keto-sterols, but not this one,

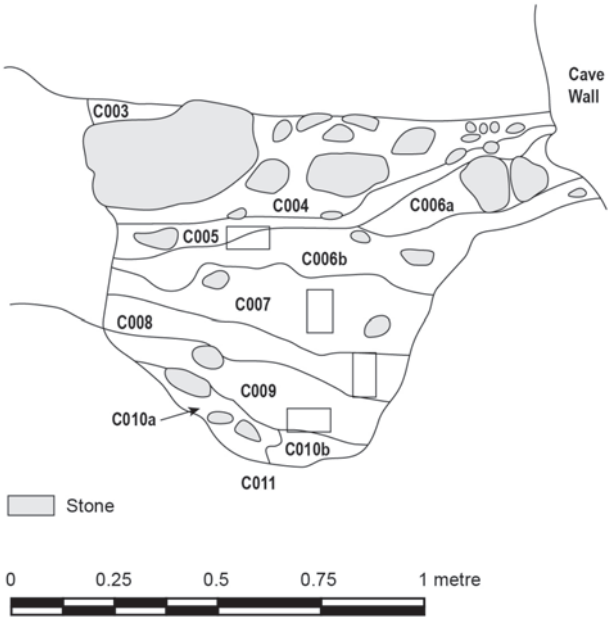


Figure 13.52. location of thin-section samples through the in-cave section, at Trench 1

are reported as intermediates in microbial reduction of sterols to coprostanol. Cholesterol-7-one is a known oxidation product of cholesterol (Guardiola *et al.* 2002). The presence of this compound is taken as evidence of cholesterol input in the present context. The other (peak 10) gave a spectrum possibly of a sterol derivative but was unidentified. An example chromatogram is shown in Figure 13.50. The peaks assigned and integrated from the chromatograms are listed in Table 13.21 together with notes on their possible significance. The profiles of the ten sterols measured in the different samples are shown in Figure 13.51.

In the simplest evaluation a high content of coprostanol is taken as an indicator of human or porcine faecal input. Coprostanol and its 3-α-epi isomer are major components of human faeces, significant in pig, horse, cow, sheep, cat, and chicken faeces but minor in horse, birds, and not in dog (Leeming *et al.* 1996; Bull *et al.* 2002, Gilpin and Devane 2003; Tyagi *et al.* 2008). Cholesterol is a minor component (5%) of human faeces but predominant (72%) in dog and seagull faeces (Gilpin and Devane 2003). In the absence of stanols, cholesterol, along with sitosterol, has been interpreted as arising from soil fauna and vegetation respectively (Bull *et al*. 2003). More elaborately, a number of indices calculated from ratios of particular peaks/compounds have been proposed, principally to score for the presence or otherwise of human/animal contributions to faecal products (Bull *et al*. 2002).

Faecal Index 1 = coprostanol+epi-coprostanol/coprostanol+epicoprostanol+5α-cholestanol a value of index 1 >0.7 is considered to be indicative of animal faecal input

Faecal Index 2 = coprostanol/coprostanol+5β-stigmastanol a value >0.73 indicates human faecal input, <0.38 indicates herbivore input

Faecal index 3 = coprostanol/cholestanol a value of >0.5 indicates faecal input, <0.3 soil bacterial action

Of the 11 samples, only two (Phase 2b cave front coprolite 6495, and Phase 3b precinct coprolite S15.70) contain significant amounts of coprostanols. All other samples contain minor or undetectable amounts of these sterols but significant amounts of cholesterol and its "environmental" reduction product cholestanol. The following assessments can be made, taking all samples to be morphologically identified coprolites (rather than soil/sediment which can give rise to sterols from soil fauna and flora).

Coprolite group HP309 (Phase 2b, cave centre) This profile is dominated by cholesterol, some cholestanol environmental reduction product. No significant plant sterols. Clear animal input but not human, ruminant, or other possessing gut microbial reducing activity; dog or possibly bird faeces input.

Coprolite 6495 (Phase 2b, cave front) This profile dominated by coprostanol and cholesterol, some phytosterols, likely human faecal input.

Coprolite 17.010 (Phase 2a, cave rear) This profile has major cholesterol, cholestenol and cholesterol oxidation product, minor stigmastanols, no coprostanols; dog or possibly bird faecal input.

Coprolite group 15.69 (Phase 3b, precinct) This profile has zero or minor cholestanols so no human faecal contribution, major cholesterol and its 'environmental' reduction and oxidation products (especially coprolite 15.69 1–5; some 5β-sigmastanol which indicates a sitosterol input and its enteric reduction; if the cholesterol and its environmental metabolite cholestanol are animal derived then dog or bird faecal input is indicated.

Coprolite 15.70 (Phase 3b, precinct) This is a unique profile in the sample set, with major coprostanols in addition to cholesterol, its reduction and oxidation products, together with phytosterols; human faecal input together with plant sterol contribution.

13.13.5 Results and discussion: pollen assessment

Results indicated either the absence or very limited concentration of pollen in each sample (Table 13.22). The only grains preserved were *Corylus* (hazel) in coprolite S15.69. The concentration and preservation are insufficient to reveal any information on the economy and diet of the site inhabitants or general vegetation.

13.13.6 Results and discussion: phytolith assessment

Phytolith assessment counts for the samples produced insufficient numbers to undertake analysis; not a single remain was recorded.

13.13.7 Results and discussion: bone analysis

The material is relatively friable, which in several samples appears to have resulted in bones becoming highly fragmented, although how much of this occurred pre- and post-depositional processes is not clear. Table 13.23 lists the samples submitted for analysis, weight of bone fragments from each, and the distribution of fragment lengths. These are consistent in size with known patterns from dog coprolites (Payne and Munson 1985), which tend to be relatively large compared to those of humans, due to the feeding behaviour of dogs. Taxa identified in the material – probable sheep and pig (Tables 13.23 and 13.24) – are both commonly found in the wider zooarchaeological assemblage excavated from High Pasture (Section 13.2), and the bones of these animals and others would have been available around the settlement for scavengers. Dog bones are also present in the zooarchaeological assemblage, as is rare evidence for bone gnawing by scavengers.

13.13.8 Results and discussion: parasite egg assessment

The samples gave no records of eggs of intestinal parasites or other indicators of the presence of faecal material (*e.g.* cereal 'bran').

13.13.9 Results and discussion: ZooMS analysis

Several subsamples were prepared and analysed, with the best 30 spectra reported (Table 13.25). The majority (22) were identified as cattle through its relatively unique marker at m/z 1208 amongst other peptides. It should be noted that these fingerprints cannot differentiate between *Bos* and *Bison* but given the known contemporary fauna it should be possible to rule out *Bison*. The next most abundant taxon identified was pig (5), identified through the presence of markers at m/z 1453.7 amongst others. Two specimens were identified as 'deer' (*e.g.*, markers at m/z 1427.7, m/z 1550.8, and m/z 2131.1) but noting that it is not possible to readily distinguish red deer from fallow deer. One specimen was specifically identified as sheep, distinguished from goat due to the presence of the peptide markers at m/z 3033.4 (in addition to other typical caprine markers).

13.13.10 Conclusions

The aim of the investigation was to establish evidence from each coprolite of species of origin, diet, and health using a multi-proxy approach.

Coprolite 17.010 – C17.07, Phase 2a (25b), cave rear This earliest coprolite contains a low-moderate bone content, including fragments identified as cattle. GCMS analysis indicates major cholesterol, cholestenol, and cholesterol oxidation product, minor stigmastanols, and no coprostanols. This together with the size/shape of the coprolite is consistent with the coprolite originating from a dog.

Coprolite group HP309 – C1.07, Phase 2b (SB25c), cave central These coprolites contain a high bone content, almost all dominated by pig. GCMS analysis shows high levels of cholesterol; this together with the size/shape of the coprolite is consistent with it originating from a dog. Also of interest is the presence of gold, molybdenum, niobium, and chlorine enrichment in coprolite HP309-2, indicating that either the pig(s) or dog had consumed something with a precious metal content.

Coprolite 6495 – C6.07, Phase 2b (SB25c) cave front This coprolite contains a low bone content, including fragments identified as cattle. GCMS analysis indicates the presence of cholestonals which are indicators of animal faeces, especially human, but not dog. The sample also contained cholesterol, but only small amounts of plant sterols which would be derived from herbivores or omnivores.

Coprolite group 15.69–C15.64, Phase 3b (SB7c), precinct These coprolites contain a moderate to high bone content, including fragments identified as cattle, deer, pig, and possibly sheep. GCMS analysis indicates similar profiles but with greater amounts of non-enteric metabolites and some plant sterols, again with the presence of cholesterol and absence of cholestanols. Once again, these results, together with the size/shape of the coprolite are consistent with it originating from a dog.

Coprolite 15.70–C15.64, Phase 3b (SB7c), precinct This coprolite contained a small quantity of bone identified as sheep. GCMS analysis indicates the presence of cholestonals which are indicators of animal faeces, especially human, but not dog. The sample also demonstrates a unique profile by comparison to the other samples with major coprostanols in addition to cholesterol, its reduction and oxidation products, phytosterols and plant sterols, all suggesting it is omnivore derived.

Whilst the coprolites from HP309 and 15.69 all appear to originate from dog, there are clear differences in both the XRF and GCMS signatures. These differences are consistent with the apparently different diets of the dogs: pigs (HP309) and cattle (15.69). All 11 coprolites contain a near absence of microfossils (parasites, pollen or phytoliths) largely enhancing a non-herbivore origin.

Finally, there is also a good correlation between lead (Pb) and iron (Fe) (Fig. 13.48) with coprolite 15.69 showing a good correlation of increasing lead with increasing

Table 13.26 Samples for bulk analysis, taken through a centrally located precinct section

Ct	*Ph*	*SB*	*Description*
C2.03a	7	11	Redeposited midden material
C2.03b	6z	10	Redeposited midden material
C2.05a	5b	9c	Redeposited midden & hearth rake-outs
C2.05b	5a	9b	Redeposited midden & hearth rake-outs
C2.05c	5a	9b	Redeposited midden & hearth rake-outs
C2.05d	5a	9a	Redeposited midden & hearth rake-outs
C2.06a	5a	9a	Redeposited material, used as levelling in precinct
C2.06c	5a	9a	Redeposited material, used as levelling in precinct
C2.15a	4c	8c	Hearth residue accumulation (hearth F15.20)
C2.15b	4c	8c	Hearth residue accumulation (hearth F15.20)
C2.15c	4c	8c	Hearth residue accumulation (hearth F15.20)
C2.16	4a	8a	Accumulated residues from precinct hearths
C2.20	3d	7d	Hearth residue accumulation (hearth F15.27)
C2.18	3e	7e	Accumulated residues from precinct hearths
C2.23	3c	7c	Hearth residue accumulation (hearth F2.10)
C2.26a	3b	7b	Accumulated residues from precinct hearths
C2.26b	3a	7a	Accumulated residues from precinct hearths
C2.33	2a	5	Hearth residue accumulation (hearths F2.18/F15.36)
C2.34	2a	5	Hearth residue accumulation (hearths F2.18/F15.36)
C2.35	2a	2	Likely silting in forecourt area outside the cave

iron content. Lead readily absorbs to iron when in solution and could show that the deposition of both iron and lead is from solution. This could suggest that both are from a secondary (younger) context. The lead could be associated with bone directly (*i.e.* the animal ate lead contaminated bone, but this is less likely).

13.14 Geoarchaeological deposit analysis

Jo McKenzie

13.14.1 Introduction

Twenty samples for geoarchaeological bulk soil analysis – via pH, organic matter content, magnetic susceptibility, particle size analysis, and total phosphate content – were taken from a key section sequence at High Pasture. The main Trench 2 section was located within the precinct immediately outside the cave entrance, where a deposit sequence was preserved spanning Phases 2a (SB2) to 7 (SB11) (Table 13.26) (see Fig. 13.53, below). The study aimed to examine key chemical and physical properties which might inform on human activity within the precinct, as well as general environmental conditions on site. Organic matter and particularly soil phosphate levels are valuable indicators of the presence and relative intensity of human occupation activities. Magnetic susceptibility and soil particle size can inform upon the origin and nature of redeposited material and the relationship of archaeological deposits to the natural soil sequence. Soil pH can aid understanding of soil and taphonomic processes and the effect of these upon other soil indicators as well as archaeological material. All five techniques selected are well established in geoarchaeological study, providing a solid basis for archaeological interpretation. Several of these techniques are especially relevant to understanding and interpreting actions involving heating and burning of materials, an especially important aspect of activity at High Pasture, with the majority of sampled deposits relating to hearth residue material.

13.14.2 Methods

Twenty small bulk samples of approximately 100 g each were obtained from the section face (Fig. 13.53), located to complement the 16 Kubiëna samples taken for micromorphological analysis (Section 13.15) (Table 13.26). Prior to analysis, soils were air-dried for two weeks and then sieved to 2 mm.

Soil pH: This followed a standard method (Bascomb 1974); 25 ml distilled water was added to 10 g of the <2 mm sample, which was stirred and left to stand for 30 mins. Determination of solution pH was made using a glass electrode pH meter calibrated to pH 4, 7, and 10 1 hour prior to measurement. 2 ml of 0.01M calcium chloride was then added to each solution and the pH measured again. The addition of calcium chloride simulates the salts normally present in soil, thus making the solution more buffered against variability between samples, and it is this second measurement that is quoted in the text. Soils were measured twice to ensure that a stable measurement had been reached.

Organic matter: This was carried out using the Loss on Ignition method. A portion of the <2 mm fraction was further oven-dried at 105°C to ensure complete dryness; 10 g of each sample was then accurately weighed into a crucible, placed into a muffle furnace, and left overnight at 375°C. After cooling in a dessicator, samples were

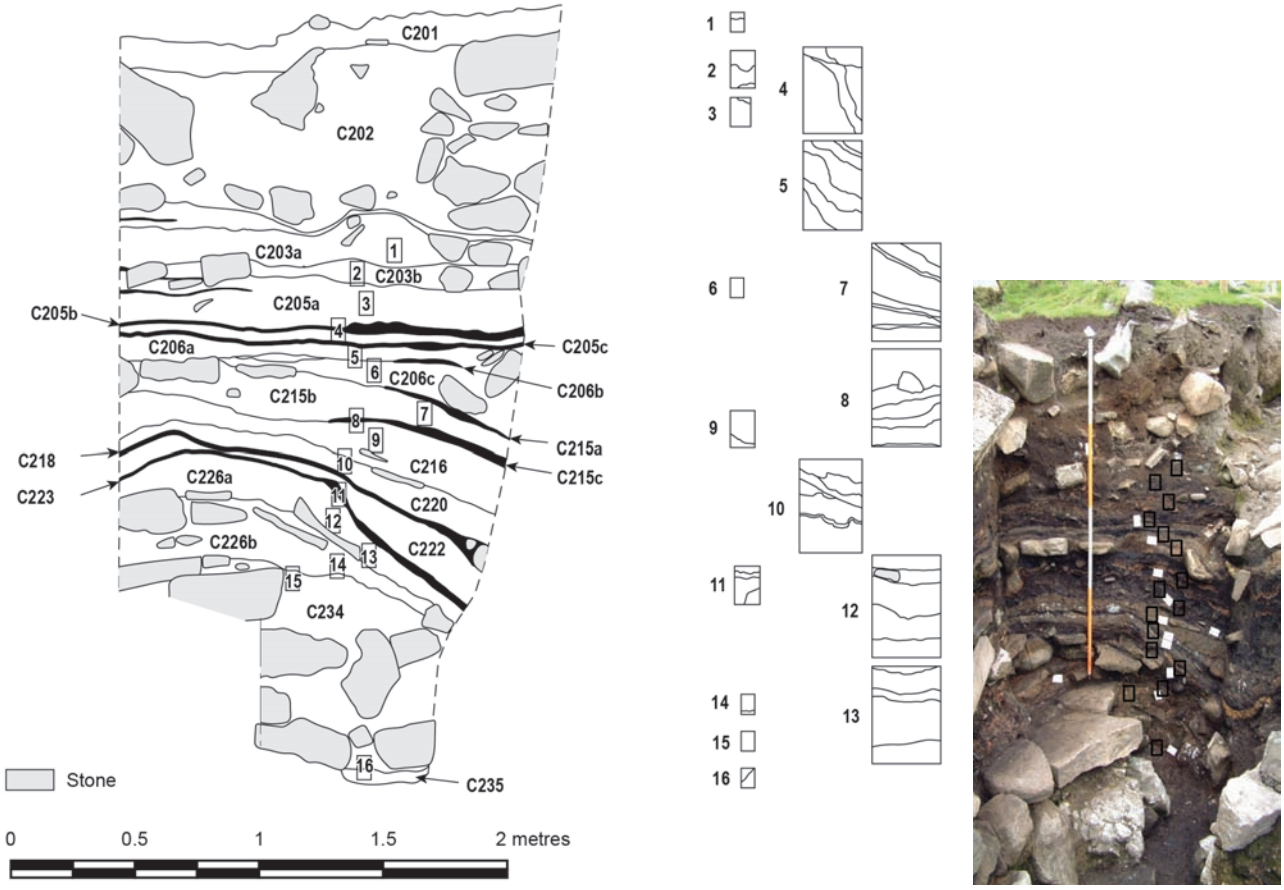


Figure 13.53. The precinct section: left: position of Kubiena samples & schematic of identified microhorizons – Kubiena tin sketches vary in size according to the relative complexity of each sample, from Samples 6 & 15 (single horizon) to Sample 7 (9 horizons); right. position of Kubiena samples in each context against the section itself

reweighed to determine the percentage loss of mass resulting from the ignition of the organic fraction.

Particle size: This was measured using a Beckman Coulter Counter LS 230 Particle Size Analyser with three volume analyses recorded and the results averaged. Samples underwent loss-on-ignition prior to analysis to remove organics and were agitated for 1 hour with 2 ml 0.25% Calgon (sodium hexametaphosphate) in distilled water to break up soil aggregates. Results show the % volume of size classes as follows: clay (<3.9 µm), very fine silt (<7.7 µm), fine silt (<15.6 µm), medium silt (<31 µm), coarse silt (<63 µm), very fine sand (<125 µm), fine sand (<250 µm), medium sand (<500 µm), coarse sand (<1 mm), and very coarse sand (<2 mm).

Magnetic susceptibility: This was measured using a Bartington MS2B desk-top meter (Dearing 1994), using standard 10 g sample pots. Samples were measured at both low and high frequency, enabling frequency dependant as well as mass specific magnetic susceptibility to be measured.

Total phosphate: This followed the sodium hydroxide fusion method given in Smith and Bain (1982). Colorimetric determination of the treated sample was then undertaken using an ammonium molybdate/ascorbic acid reagent, allowing 2 hours for colour development. Standard solutions were made ranging from 0–10 mg P and used to plot a graph of absorbance against relative concentration (mg P), from which the total phosphorus (mg/100 g) was calculated for each sample and then converted to total phosphate (P2O5/P2 = 9141.96/61.96 = × 2.29).

13.14.3 Soil pH

The results of the pH analysis indicate ranges from a minimum of 6.4 to a maximum of 7.2 (details in archive). This starts high at the top of the profile at 6.8/6.9 (Phase 6–7) before dropping steadily to a low of 6.4 at C205b (Phase 5a). pH then stays relatively steady at 6.4–6.6 before starting to climb into C2.23 in Phase 3. A maximum of 7.2 is reached at C2.23, after which pH drops back to 6.8.

This is relatively alkaline for deposits in a Scottish context and is probably partly due to the local limestone geology. While it is possible that anthropogenic inclusions,

such as wood ash, may act to raise soil pH, there is no correlation between more ash rich contexts (as identified via soil micromorphology, Section 13.15) and pH levels.

Soil organic matter

Soil organic matter relating to organic material lost during the loss-on-ignition procedure is shown as a percentage. Over 5% is a relatively high loss-on-ignition, and the majority of the 20 samples processed from precinct contexts (13 samples) are high. and in some cases extremely high. Generally, this relates to fuel residue content. Highest are C2.05d at 16.54% followed by C2.26b at 14.38%. Close behind are C2.15b (13.53%), C2.16 (12.65%) and C2.18 (11.38%). All of these are, unsurprisingly, contexts relating to hearth residue accumulation or redeposition (Table 13.26). In thin section, all show high levels of fuel residue content, although the correlation is not perfect – micromorphologically, C2.16 shows perhaps the highest fuel residue content overall, with 2.05d far lower in fuel inclusions. The exception is C2.18, which is a slightly laminated context with fairly low fuel residues. Other organic inclusions, such as plant cell residue, are present but not frequent and the high organic matter content of this context is therefore very unexpected. It is possible that this context is changeable along its length, with a more organic-rich area sampled in thin section (Section 13.15).

13.14.4 Magnetic susceptibility

The geology of the High Pasture Cave area is so varied that the notion of a 'background' level of magnetic susceptibility would be of little value to interpretation of the precinct sequence. No external reference being available, this is a dataset showing relative change within the profile only. As well as reflecting local geological conditions, the magnetic susceptibility of a sample chiefly indicates heating and disturbance of a deposit, and herein lies its value to archaeology.

Samples were measured in both 'low' and 'high' frequency magnetic fields. Both readings give an overall measure of magnetic susceptibility. The difference between these two readings gives the frequency dependant susceptibility, which reflects the amount of ultrafine ferrimagnetic minerals present in the deposit. Such particles are often formed through high intensity burning (Dearing 1994) and thus both a high magnetic and frequency dependant susceptibility can be a good indicator of the presence and intensity of burning activity.

It can be seen that there are two, possibly three notable 'peaks' in the dataset. The most significant of these is seen through C2.15, with the apex at highest reading (C2.15b). Interestingly, this peak corresponds with the only two significantly high frequency dependant susceptibility readings for the sequence – not at C2.15b, but either side at C2.15a and C2.15c. This is clearly a focus of intensive burning within which some change in method may be inferred at C2.15b – fuel type? Duration of burn? Looking at Figure 13.53, below, we see that while both C2.15a and C2.15c are single-episode contexts, C2.15b is made up of seven subhorizons. Charcoal is the dominant fuel residue in all three, though more prevalent in some of the C2.15b subhorizons than elsewhere. It seems that the difference in susceptibility may relate to the repeated events making up C2.15b. One interpretation would be that these layers represent rake-out material from a series of lower-intensity fires, whereas C2.15a and C2.15c show hotter burns – perhaps located nearer to the sample point. It is notable that the lowest subhorizon of C2.15b and the C2.16 deposit show the largest assemblage of burnt bones in the sequence. Also interesting is the presence of the distinctive assemblage of carbonised wooden objects, including the lyre bridge fragment, in this intensive C2.15 sequence (see Sections 12.10; 12.11): it appears that complex burning activities, perhaps deliberately managed and featuring fires of specifically higher and lower intensities, took place at this point in the sequence. The group of carbonised objects come from C2.15b: from this record, the likely 'hotter' part of the burn, but we can also assume that each burn would have seen not only variation between sequential fires but also across the single hearth area during each burn. The point is that this location saw not only repeated and intensive, but complex and managed burning activity.

The next 'peak' is seen at C2.03b. This is also the uppermost context in the sequence to show high fuel residues and burnt bone. These results therefore support the real significance of this context as the last in the sampled sequence to show significant activity. C2.03 relates to the final blocking of the stairwell and the deposition of human remains (see Section 8.4). A third, less intense peak is seen through C2.26a-C2.26b-C2.33, also corresponding to a peak in fuel residue content and at C2.26a (as in C2.15b), a concentration of multiple subhorizons.

A final point of interest is the very low magnetic and especially frequency dependant susceptibility seen for C2.06a – the location of the fine silt layer. This appears to indicate that the heating noted in thin-section for this unusual deposit is unlikely to have been intense. However, this bulk sample takes in not only this subhorizon but of course all three in C2.06c.

13.14.5 Particle size

The notable feature of the basic particle size analysis is the significant homogeneity seen between almost all samples, with fine to medium sand dominant, and the percentage of size classes very similar through each context. Only C2.35 at the base of the sequence shows some variation, with a noticeable lack of sub-sand sized particles. Overall, this is reflected in the micromorphological analysis and confirms that there is no noticeable 'alien' input of material to the site.

Unfortunately, the textural character of individual subhorizons is not reflected by the dataset. Of particular

interest here would be the fine silt seen at C2.06c – but as this is mixed in with other subhorizons, the nature of this interesting deposit cannot be explored further via this method: individual sampling of subhorizons only visible at the thin-section scale is not possible.

13.14.6 Total phosphate

The results of the total phosphate (total P) analysis reveal that although a range of both higher and lower values are seen, it should be noted that the entire sequence shows extremely high levels of phosphate. The lowest value is C2.20 with 287.26 mg/100 g P: a value of over 100 mg is considered high, indicating for example a manured soil (Pape 1970). The highest value is 3351.83 mg/100 g P at C2.33 – a massive amount. Clearly, these soils are phosphate saturated: a property indicated by several features in thin-section and explored more fully in the discussion below.

Within the sequence, two contexts stand out as having significantly higher total P levels than the rest: C2.33 (3,351.83 mg/100 g P) and C2.26b above (3057.40 mg/100 g P). These are located towards the base of the sequence (see Fig. 13.63) with C2.33 unfortunately being the only bulk sampled context not to be represented in thin-section. However, C2.26b, located immediately above, shows a high fuel residue content (though not uniquely so – some subhorizons of C2.16, for example, show more).

Neither context is bone rich. No anthropogenic clue as to the reason for this huge P content can therefore be identified, and it is suggested that these particularly high values to the profile base may relate at least in part to some down-profile movement of phosphate via intense illuviation. Although no strong down-profile pattern emerges, with fluctuations in total phosphate throughout the profile, there is an overall tendency for the larger values to increase towards the base of the sequence. There is a possible correlation here with the occurrence of calcium-iron-phosphate pedofeatures (see Section 13.15) – the latter are seen more frequently in lower horizons.

The other contexts which stand out as having higher total P show a mixture of high and low fuel residue contents – C2.15b and C2.16 showing very frequent residues, and C2.18 far less. Similarly poor correlations with bone inclusions are also seen. This is discussed in more detail both in the discussion and, in conjunction with the evidence from micromorphology, in Section 13.15 – clearly, this huge phosphate enhancement does not have a simple relationship with the levels of other anthropogenic indicators visible in the sequence.

13.14.7 Discussion

Geoarchaeological sampling through the deep section selected within the precinct area has produced a large and detailed dataset which contributes significantly to the corpus of information we have for activity in the key zone around the cave entrance, as well as informing on the effects of subsequent environmental and soil processes on the survival of evidence for that activity. Baseline assessments such as pH and particle size analysis provide key context for deposit characterisation. High organic matter content throughout the profile reflects the huge input of fuel related residues entering the precinct deposits, and provides us with a useful dataset which, for example in the case of C2.05d, highlights that those materials identified as redeposited midden mixtures may show organic matter content on a par with the 'purer' hearth residue deposits. Magnetic susceptibility readings through the profile provide a useful identifier for degrees of burning, a particularly interesting contribution to the understanding of the use of fire within the precinct area. Finally, and most significantly, the extremely high total phosphate recorded via this analysis, for a majority of the deposits sampled through multiple phases of precinct activity, flags up a very unusual and interesting depositional feature. The reasons for such high phosphate are explored further via the micromorphological assessment of the sequence and are discussed at Section 13.15.

13.15 Micromorphology

Jo McKenzie

13.15.1 Introduction

Samples for micromorphological analysis were taken from two key deposit sequences at High Pasture Cave: the main Trench 2 section, located in the precinct near the entrance to the cave, and a section running across the central part of the cave, at the interface between Trench 6 (cave front) and Trench 1 (cave centre). The aims of the study were twofold:

- To examine the nature and frequency of microscopic anthropogenic inclusions in the deposits, and thus the nature and intensity of human activity at these locations and on the site as a whole. The degree of artefact and particularly ecofact retrieval from High Pasture is high, and it is assumed that these particularly rich deposits will produce significant micro-archaeological information. Of particular interest is microscopic evidence for fuel residues and what these may reveal about the use of fire at High Pasture Cave.
- To investigate context stratigraphy at the microscopic level. The complexity of the depositional sequence, particularly in the deep deposits surviving in the precinct, is such that a full understanding of activity at the site may only be revealed through micromorphological analysis.

13.15.2 Method

Sixteen (from the precinct) and four (from the cave) Kubiëna samples for micromorphological analysis were obtained, alongside 20 accompanying bulk samples

taken from the Trench 2 section (see Section 13.14). Kubiëna samples were stored in airtight wrapping prior to processing.

All water was removed from the undisturbed Kubiëna samples by acetone exchange and confirmed by specific gravity measurement. The samples were then impregnated using polyester 'crystic resin type 17449' and the catalyst Q17447 (methyl ketone peroxide, 50% solution in phthalate). The mixture was thinned with acetone and a standard composition of 180 ml resin, 1.8 ml catalyst, and 25 ml acetone used for each Kubiëna tin. No accelerator was used but the samples were impregnated under vacuum to ensure complete outgassing of the soil. The impregnated soils were cured for 3–4 weeks, culminating with 4 days in a 40°C oven. Resin impregnated soils were sliced, bonded to a glass slide and precision lapped to 30 mm thickness, then cover-slipped to complete the manufacture of the thin-section. These were analysed using an Olympus BX-50 petrological microscope, following the procedures of Bullock *et al.* (1985) and the most recent procedures of Stoops (2003) and Stoops *et al.* (2010). Additional mineralogical investigation was undertaken using the atlases of MacKenzie and Guilford (1980) and Adams *et al*. (1984). A range of magnifications (×10–×400) and light sources (plane polarised, crossed polars, and oblique incident) were used to obtain detailed descriptions and these were recorded on standard tables (see archive). These provide a detailed breakdown of the presence and frequency of mineral, organic and anthropogenic components in each identified micro-horizon.

13.15.3 Analysis

The in-cave sequence

Due to excavation constraints, the four samples from the cave are quite closely grouped, with the uppermost Bone Passage deposits unavailable for sampling. Upper sample CAVE 2 spans the boundary of redeposited middens C6.06 (Phase 3b, SB27a) and C6.07 (Phase 2b, SB25c) providing a section through the charcoal rich lens associated with Phase 3a floor layer F6.02. Beneath this, samples CAVE4 and CAVE3 are within redeposited midden deposits C6.07 and C6.08 (Phase 2a, SB25a) respectively, and sample CAVE1 spans the boundary of Phase 2a/SB25a redeposited midden C6.09 and natural silting C6.10 (Phase 1a, SB24) overlying the limestone bedrock C6.11 at the base of the section (Fig. 13.52).

Sequence microstratigraphy and deposit character: this generally reflects the stratigraphy and deposit types noted during excavation, with additional complexity only seen in upper sample CAVE2. Here, all three contexts (C6.06, F6.02 spread material, C6.07) are clearly defined, with sharp, clear boundaries between contexts indicating clearly separated deposition events rather than ongoing activity (however, in the absence of soil forming processes within the cave, definitive hiatus points in deposition – *e.g.* a leached horizon – cannot be defined). Both C6.06 and C6.07 are poorly sorted and appear to be typical dump deposits (though only a small sample area is available from both). F6.02, however, shows clear internal lamination and a visible separation into two micro-horizons: a lower lens with more frequent charcoal and a slightly darker groundmass, and an upper lens with less charcoal and a lighter brown groundmass similar to that seen in C6.06 and C6.07. This darker groundmass appears due to the presence of occasional discrete, rounded lumps of darker silty material, full of cracks. These are typical of a trampled layer and here probably represent external material trodden into the deposit. Both lenses of F6.02 are clearly trampled, with charcoal and other inclusions appearing horizontally aligned and multiple fine laminations visible throughout (Fig. 13.53).

No further micro-lamination is seen, with C6.07, C6.08, C6.09, and C6.10 all poorly sorted 'dump'- type material, to the extent that no boundary is identifiable between C6.09 and C6.10 in slide CAVE2, and the slide is recorded as one. However, groundmass variation between these contexts is dramatic, with C6.08 (CAVE3) almost entirely composed of large rock fragments and C6.07 above (CAVE4) generally made up of fine sand. It is possible that this illustrates the variability within rather than between contexts. The lack of lamination in lowest sample CAVE1 (C609/C610) indicates that at this point the sequence is still derived from anthropogenic activity rather than representing the water-lain material noted during excavation (Birch and Wildgoose 2007, 48).

Mineral makeup: unsurprisingly, the dominant mineral feature in all five sampled Bone Passage contexts is limestone and fragmented calcitic material. However, a great variation in mineral type is seen which mirrors that seen in the precinct deposits. Quartz dominates the fine material groundmass, with minor feldspar, micas, and hornblende content. Olivine is a key component of both larger rock fragments and groundmass. Larger inclusions include chert, sandstone, and igneous and metamorphic fragments. All appear notably rounded and weathered. The position of the only completely limestone-dominated sample (CAVE3) in the middle of the deposit sequence indicates that significant amounts of likely in-cave material is also included in these deposits, perhaps indicating at least a degree of modification to the cave interior.

Anthropogenic material: varying in type and frequency throughout the sequence, human-derived inclusions largely reflect the excavation findings. *Fuel residue material* is most frequent in floor layer F6.02, and is also fairly frequent in C6.07, but drops sharply in C6.08 – C6.10. Although this concentration in the floor layer is to be expected, the difference in the intensity of fuel residue (and other anthropogenic) material between C6.07 and the other 'non-floor' deposits should be noted. Some variation in fuel type may also be represented. While

carbonised material in both F6.02 and C6.07 is almost entirely wood charcoal (with an additional range of unidentifiable amorphous carbonised fragments), evidence for peat use is seen in C6.07 (CAVE4), with inclusions of stringy, fibrous carbonised material identified as burnt peat. All contexts apart from C6.09/C6.10 also show spreads of fine, crystallitic, highly birefringent (having a characteristic, bright, 'sparkling' appearance in crossed polarised light) material. This is identified as wood ash – the calcitic material which remains when wood undergoes complete combustion. Unsurprisingly, this alkaline material survives well in the cave environment. Throughout all contexts, smaller 'punctuations' of carbonised material are fairly infrequent. These are signs of 'background' burning activity whose absence may indicate that burning activities within the cave were intense but infrequent, or possibly well-controlled. Heated minerals are relatively infrequent, concentrated in C6.06 and F6.02.

The second key anthropogenic feature of the in-cave samples is, unsurprisingly, *bone*. This is frequent in all samples apart from C6.09/C6.10 (CAVE1), and is seen both burnt and unburnt, though burnt is more frequent in all contexts. The ubiquity of burnt bone throughout even charcoal-poor contexts may also support the suggestion of peat fuel use. The most significant feature of the microscopic bone assemblage is the extremely good preservation of both burnt and unburnt fragments. Little or no degradation of this material is seen, and while within these samples this may be attributed to the typically alkaline conditions prevailing within the cave, such preservation is also a feature of the exterior Trench 2 samples. A second notable feature is the great variation seen in bone colour which does not always correspond to signs of burning/scorching. This is an interesting feature which is explored with reference to the larger Trench 2 sample set (see discussion).

Other indicators of human activity are seen throughout, and most frequently in C6.07. Here, fragments of lignified tissue, cell residue, plant tissues and fungal spores indicate transportation of probable fuel material into the cave prior to burning. There is a large shell fragment in C6.06, and small patches of heated silt in F6.02 are possibly related to a hearth construction (these are very small and rounded and cannot be characterised further). Small amounts of phytoliths are seen throughout the sequence indicate the constant transport of materials from outside the cave.

Pedofeatures: additional features indicative of soil processes are limited. Iron movement is the only strongly expressed feature and is seen most frequently in the upper cave samples, with iron rich nodules seen at intervals throughout C6.06, F6.02, and especially in C6.07. These indicate water movement and iron precipitation throughout the sequence. At the base of sample CAVE 3 (C6.08), a large patch of groundmass is an iron-rich red and may indicate waterlogging at this point. Small, infrequent organic and silt coatings on mineral grains indicate movement of fine material down-profile, indicating some degree of stronger illuviation process. There is no sign of biological activity or any other disturbance feature.

The precinct sequence

The sixteen samples taken from Trench 2 span almost the entire exposed sequence at the time of sampling in 2006, running from C2.03a at the top of the section to C2.35 at the base. This is a large sample set through a complex and intensive deposition sequence, with the result that from the 21 contexts and subcontexts sampled, 61 individual micro-horizons, well defined enough to be separately recorded, have been identified (Tables 13.27 and 13.28, below). The stratigraphy of these micro-horizons and their location within Trench 2 are shown in Figure 13.53.

Sequence microstratigraphy and deposit character: the micro-stratigraphic complexity of the Trench 2 samples (Fig. 13.53) is such that the following is a relatively concise overview of the sequence. Starting at the top of the sequence, C2.03a and C2.03b (Samples 2-1 and 2-2) appear to be typical dumped deposits, both of which can be separated into two clear subhorizons on the basis of groundmass colour and (in C2.03b) fuel residue content. C2.05a separates into three subhorizons, the uppermost of which also appears to be a dump (seen in the base of Sample 2-2). However, the lower two subhorizons (Sample 2-3) show clear repeated micro-lamination throughout. While the upper of these is only seen in a small area at the top of Sample 2-3, the lower is extensive, taking up the rest of the sample, and indicates a slow accumulation of material during this 'phase' of C2.05a. However, this sub-horizon is relatively sterile, with little anthropogenic material (see Table 13.27).

Sample 2-4 is the first of the more complex samples. The upper quarter shows two further C2.05a micro-horizons, the lower of which again appears finely laminated (and indicative of slightly more intensive anthropogenic activity). The lower three-quarters shows two lenses representing sub-contexts C2.05b and C2.05c, and a thick deposit identified as an uppermost subhorizon to context C2.05d. There is a very definite boundary between these upper two and lower three horizons (*i.e.* between C2.05a and C2.05b: while the two C2.05a micro-horizons slope gently towards a horizontal base, the three lower horizons all slope sharply from this horizontal and appear to have been partially truncated. This is not surprising for this part of the sequence: C2.05, from which a date of 400–200 cal BC was obtained (SUERC 122778; Birch and Wildgoose 2007, 115) is a key context in the sequence of activity outside the cave, associated with a hearth setting and areas of paving relating to the stairwell entrance (*ibid*., 120). This context appears to represent intensive activity and possibly removal as well as addition of material in front of the stairwell. All remaining C2.05 subhorizons

Table 13.27 Fuel residue types in the Trench 2 precinct sequence

Sample	*C*	*Sub-horizon*	*Wood charcoal*	*'Peaty' material*	*Amorphous material*	*Fuels low/ absent*	
2-1	C203a	a				*	
		b				*	
2-2	C203b	a	**		*		
		b				*	
	C205a	a				*	
2-3		b	**		*		
		c				*	
2-4		d				*	
		e	**				
	C205b		**		*		
	C205c		**		*		
	C205d	a	**				
2-5		b			*		
		c	*	*			
	C206a	a				*	
		b	**		*		
	C206b		***	*	*		
	C206c	a	*		*		
		b	**		*		
2-6		c	*				
2-7	C215a				**		
	C215b	a	*	*	*		
		b				*	
		c	***	*	**		
		d	***		*		
		e				*	
		f	**	*	*		
		g				*	
	C215c	a	**				
2-8	C215b	h	**	*	*		
	C215c	b	**	**			
	C216	a	*	*	*		
		b	*	***			
		c	*		**		
		d	*		*		
2-9			e	***	**	*	
			f	**	*		
2-10			g				*
			h				*
		C220	a				*
			b				*
			c				*
			d				*
		C218					*

(Continued)

Table 13.27 (Continued)

Sample	*C*	*Sub-horizon*	*Wood charcoal*	*'Peaty' material*	*Amorphous material*	*Fuels low/ absent*	
2-11		C222		*	*		
		C223		**	**		
		C226a	a				*
2-12			b	*	*		
			c		*		
			d		*		
			e	*	*		
			f		***		
2-13			g	*		*	
			h		*		
			i	**	**		
			j	*	*		
		C226b	a	**	**		
2-14			b	**	**		
		C234	a	**	*		
2-15			b	*			
2-16			c				*
		C235					*

below this line of truncation are rich in anthropogenic material (C2.05b, C2.05c, and C2.05d-a in Sample 2-4, and C2.05d-b and C2.05d-c in Sample 2-5).

Sample 2-5 is also complex, separating into seven lenses of which the upper two represent subhorizons of C2.05d and the lower 5, C2.06 a, b, and c. Described as a 'buff-coloured clay lens' during excavation (Birch and Wildgoose 2006, 113), in this section, C2.06 is recorded as three subcontexts: a mid-brown deposit C2.06a, a thick charcoal rich lens C2.06b, and the 'buff-coloured clay' C2.06c. Micromorphological analysis subdivides this further: C2.06a is made up of two clearly defined deposits, the lower of which shows fine lamination and more frequent anthropogenic materials, and C2.06c divides into three recorded sub-horizons (the lower two of which are seen in different samples and may be stratigraphically equivalent). The 'buff-coloured clay' seen in excavation is only present in the upper of these sub-horizons (*i.e.*, the penultimate lens in Sample 2-5). In thin section, this 'clay' is seen to be in fact a very fine, fairly sterile silt which forms a very definite lens (see following section, and discussion). The notable point, then, for this section of the sequence is the intensive series of anthropogenically-rich individual depositions which lie between the 'clay lens' seen at the top of C2.06c (the last but one lens in Sample 2-5 in Fig. 13.53) and the point of truncation through C2.05. If this truncation relates to activity around the hearth/paving at this level, it seems that there was significant activity between the deposition of the C2.06 clay and the hearth, an unknown amount of which may have been truncated away.

The lower subhorizon of C2.06c is extensive, taking in all of Sample 2-6, and appears dumped, with no visible lamination and only limited anthropogenic material. Intensive deposition returns in Sample 7, however – the most complex slide, showing nine subdivisions, the uppermost of which represents C2.15a, the middle seven the subhorizons of C2.15b, and the lowest C2.15c (Table 13.27). Although rich in anthropogenic inclusions, both C2.15a and C2.15c (also sampled in the top of Sample 2–8) appear dumped. By contrast, the seven episodes identified in C2.15b indicate an intensive series of events, with four thicker subhorizons showing repeated fine laminations alternating with three thinner lenses of pale fine silty material Fig. 13.54A). Although superficially similar to the pale C2.06c material, these thinner lenses are coarser and show far more anthropogenic inclusions, including frequent spreads of phosphatic material, and are therefore unlikely to represent any hiatus in human activity. C2.15b is therefore a focus of intensive activity.

Moving into Sample 2-8, the lower, dumped lens of C2.15c seals a second intensive series of events: C2.16. Eight separate subhorizons are identified within this context, four in Sample 2-8, two in 2-9, and two in 2-10. A slight overlap between 2-8 and 2-9 means that upper and lower sub-horizons within these samples may be stratigraphically equivalent. C2.16 represents perhaps the most anthropogenically active context of the sequence, with large amounts of fuel residue material, and two highly heated lenses (Fig. 13.54B). Unlike C2.15b, however, fine lamination is less apparent: these subhorizons appear as larger, coarser dumps of mainly fuel residue material.

Table 13.28 Burnt versus unburnt bone in the precinct sequence

Sample	*C*	*Sub-horizon*	*Burnt bone*	*Unburnt bone*	*Very low in bone/no bone*
2-1	C203a	a			*
		b			*
2-2	C203b	a	*	**	
		b			*
	C205a	a			*
2-3		b			*
		c			*
2-4		d			*
		e		*	
	C205b		*	*	
	C205c			*	
	C205d	a	*	*	
2-5		b			*
		c			*
	C206a	a			*
		b	*	**	
	C206b			**	
	C206c	a			*
		b			*
2-6		c			*
2-7	C215a				*
	C215b	a	*	*	
		b			*
		c	*	**	
		d			*
		e			*
		f	**		
		g	**	**	
	C215c	a		*	
2-8	C215b	h	***	*	
	C215c	b	**	*	
	C216	a			*
		b			*
		c			*
		d			*
2-9		e			*
		f			*
2-10		g			*
		h			*
	C220	a			*
		b			*
		c			*
		d			*
	C218				*

(Continued)

Table 13.28 (Continued)

Sample	*C*	*Sub-horizon*	*Burnt bone*	*Unburnt bone*	*Very low in bone/no bone*
2-11	C222			**	
	C223				*
	C226a	a			*
2-12		b			*
		c			*
		d		*	
		e			*
		f			*
2-13		g			*
		h			*
		i			*
		j			*
	C226b	a			
2-14		b	*		
	C234	a			*
2-15		b		*	
2-16		c			*
	C235				*

There is an undulating, fairly diffuse boundary in Slide 2-9 between C2.16 subhorizons E and F (the second highly heated subhorizon).

The two subhorizons at the base of C2.16, into Sample 2-10, are quite different to the rest– pale and relatively sterile. Considering the very iron rich character of C2.20 below, it is suggested that there is some misplacement of the sampling position and that these two sub-horizons more properly belong to C2.20 and represent the leached upper horizons of a context indicating a hiatus in the sequence and the development of a *ground surface*. This is very clear – C2.20 stands apart from the rest of the sequence which shows few indicators for significant iron movement. Of its four lenses, all are iron rich and two can be classed as iron pan.

It is also notable that although C2.20 lacks significant fuel residues, fungal spores, cell residue and plant decomposition products are fairly well represented. It would appear that Sample 2-10 indicates a point at which there is a very definite break in human activity. This context appears between two dated points which give a broad spread to the sequence: Early Iron Age context C2.34 (SUERC 12280; 750–400 BC) and Early–Middle Iron Age context C2.08 (SUERC 12279; 370–100 BC).

Potentially at odds with the character of C2.20 is the presence of frequent calcium-iron-phosphate concentrations in the second (and least iron-dominated) sub-horizon of C2.20. A strong feature of this sequence, these pedofeatures indicate extensive phosphate accumulation and are linked to bone degradation (Simpson *et al*. 2000). Their appearance in this relatively sterile context and the question of phosphate mobility through the sequence is discussed further.

Below C2.20 is a series of three contexts showing no micro-horizons. C2.18 appears as a slightly laminated layer in which anthropogenic activity increases slightly and frequent iron nodules show the continued effect of the slight podsolisation seen at C2.20. Moving into Sample 2-11, C2.22 is similar, though lacking iron enrichment. A sharp clear boundary separates C2.22 from a very different deposit. C2.23 is packed with fuel residues and shows a slight but uneven lamination, giving the lens a trampled look. Below this, the remainder of Sample 2-11 is taken up by relatively sterile sub-horizon Context C2.26a-a. The sharp contrast between the light, sterile C2.22 and C2.26a-a and the densely packed C2.23 between them indicates a short, intense, and very well-defined episode at this otherwise quite inactive point in the sequence (Fig. 13.54C).

Moving into Sample 2-12, more intensive activity returns in the remainder of C2.26a. This is the context with the most subhorizons, with a further nine lenses identified through samples 2-12 and 2-13. Their character varies greatly, with fuel residue materials in particular ranging from high to low (discussed further below), and boundaries generally clear, sharp, and horizontal. Most contexts appear dumped rather than laminated. C2.26a appears to represent a complex series of distinct events within which, however, bone deposition is almost uniformly low.

Below this, C2.26b probably represents one episode, present at the base of Sample 2-13 and through the majority of 2-14. This is a thick dumped deposit with fairly

frequent fuel residue. The lower quarter of Sample 2-14, the whole of 2-15 and the upper part of 2-16 are taken up by a second dump (C2.34) which shows far fewer anthropogenic inclusions. C2.34 is a thick context, and there is a gap of *c.* 40 cm between the base of 2-15 and the top of 2-16. C2.34 appears to show some iron accumulation down-profile, with the groundmass noticeably redder in the 2-16 sample. Final sampled C2.35, seen in the lower half of Sample 2-16, is a similarly sterile dump, distinguished from C2.34 above by a slightly paler groundmass.

Mineral makeup: although lacking the calcitic material seen in the Bone Passage samples, the Trench 2 sequence is mineralogically quite similar in other respects, again reflecting the very varied local geology. Larger rock fragments include limestone, sandstone, compound quartz, chert, and igneous and metamorphic fragments, with general coarse mineral makeup similar to that seen in the cave samples. There is no noticeable concentration of one or more mineral types in any part of the sequence.

The vast majority of samples appear to be composed of a uniformly fine to medium sand, and larger 'pebbles' are relatively rare. These are commonest at the top of the profile, with generally quite rounded and weathered limestone and compound quartz fragments seen at intervals through Samples 2-1 to 2-3. Beyond this, rock fragments bigger than 2 cm in any direction are only present in dumped layer C2.15c in Sample 2-8, sub-horizon C2.20-d (just above the thick iron pan shown in Fig. 13.54C), and subhorizons C2.26a-c (Sample 2-12), and C2.34-b (Sample 2-15).

Concentrations of much finer mineral material are however a feature of several deposits. Fine micro-horizons composed almost entirely of pale silt are seen at C2.15b-a, C2.15b-c, and C2.15b-f. Several other subhorizons contain fine silt laminations (*e.g.* C2.05a-e). The most distinctive silt deposit is seen at C2.06c-a. This is the 'buff-coloured clay' which is an important precinct deposit – seen as only a narrow lens in the sampled section but fairly thick across the trench as a whole. In thin-section, this is a very uniform pale yellow silt which appears heated in oblique incident light and in crossed polars shows small patches of birefringence. Although fairly sterile, small amounts of fuel residue material are seen – some small charcoals, but also the first incidence of small peaty looking fragments (Fig. 13.54D). It is suggested that this material could be completely combusted peat with charcoal, with the small birefringent areas calcitic wood ash, and the heated silt the mineral remnant of combusted peat/peaty turves. However, it would be unusual for this kind of fuel residue to form such a 'pure' deposit, especially in large amounts. This is explored further in the discussion. However, this ash interpretation is supported by the fine material appearance of both of the most highly heated sub-horizons (C2.16-a and C2.16-f), both of which have a high silt content which is probably partly formed from completely combusted fuels.

Anthropogenic material: fuel residues: the range and relative concentration of fuel residues identified in the Trench 2 sequence is a large, complex dataset providing an important insight into human activity at High Pastures. Micromorphological analysis is an ideal tool for investigating the use of different fuel sources in thin section, as even very small fragments of carbonised material can be identified to basic source – the most significant potential differentiation being wood charcoal (which shows a characteristically cellular structure) versus 'peaty' material (which has a distinctive fibrous, 'stringy' appearance; Fig. 13.54E–F). In the tables (Table 13.27), only charcoal is differentiated, with the remainder of the carbonised material classed as 'amorphous black organic'.

A full breakdown of fuel residues identified in the sequence can be found in the site archive, showing wood charcoal, and material with a 'peaty' structure, and that for which no internal structure can be confirmed. The results, however, are discussed in context with other anthropogenic features in the Discussion. Briefly, it can be seen that fuel residues are frequent in the majority of horizons, with only 20 out of 62 deposits classed as low in fuel residues. In many instances, subhorizons are identified on fuel residue intensity, indicating that in many contexts, intense and often multiple discrete burning episodes occurred. Wood charcoal dominates, particularly at the top of the profile, where peaty materials are absent. Charcoal is most prevalent in C2.16 and especially C2.15. However, the majority of horizons showing high charcoal also show some peaty input, with C2.15b-d the only intensive fuel residue deposit almost completely composed of charcoal.

'Peaty' materials only become common from C2.15 onwards, and only dominate in four deposits – C2.16-b, and C2.26a-c, -d and -f (where charcoal is absent). However, peat is relatively common from this point in the profile. It is notable that 'amorphous' carbonised material becomes less prevalent as peat is increasingly identified towards the base of the profile. This could mean that some amorphous material is in fact peat, perhaps less well preserved in certain contexts. This is supported by the general appearance of charcoal versus peat when seen in the same deposit, for example C2.26b-b. Both are fairly equally represented, but it is noticeable that charcoal fragments tend to be larger, with more well-defined edges. Although charcoal and peat preservation are good overall, this may illustrate the relative frailty of peaty materials and the potential underrepresentation of this fuel source.

Very small amounts of carbonised material showing small mineral inclusions are seen in a few horizons, such as C2.06a-a and C2.06a-c. These are most probably burnt turf fragments. Although this potentially represents a third fuel source, it is most likely not one regularly utilised at High Pastures. More frequent are ash inclusions, which appear to be derived from both fuel sources. Wood ash, present inside the cave, is only rarely seen in open-air

contexts, as the relative acidity of wetter soils washes this material away. However, this is seen in several Trench 2 contexts, notably in areas where pH is higher at the top of the profile. The likely presence of peat ash, which is seen as a fine heated silt, is discussed above.

Heating episodes can also be recognised by the colour of the fine material groundmass. Experimental work has shown that heating temperatures are broadly reflected in changes in the groundmass colour of a sample (Simpson *et al.* 2003). Groundmass heating, as opposed to the presence of merely fuel residues, indicates proximity of the soil material to the heat source. It is not uncommon for deposits with a heated groundmass to show few fuel residues, which may indicate the location of the hearth fabric itself (or, conversely, may indicate completely combusted fuel residues, as above). Trench 2 shows groundmass heating in five of the six subhorizons of C2.16, three of the lower subhorizons of C2.26a, and the upper horizon of C2.34. Groundmass colour ranges from a dark to a bright red, indicating lower, 'domestic' heating temperatures. The brightest of these is C2.16-a (Fig. 13.54G) which shows few fuel resides compared with subhorizons immediately below and above.

Anthropogenic material: bone This is the second most frequent anthropogenic indicator seen in the precinct sequence. Excavation findings indicate that activities connected with the treatment and deposition of the extensive faunal remains assemblage recovered mainly from the cave are central to understanding the High Pasture site. The relationship of both burnt and unburnt bone fragments to other soil features provides an exciting insight into how these activities may have been undertaken. Figure 13.54 gives an overview of this.

Despite the high bone content of the sequence as a whole, Figure 13.54 shows that the majority of Trench 2 deposits have low or absent bone (43 of 62). Bone rich deposits are present only in the top half of the profile, with bone almost absent below C2.15c.

There is slightly more unburnt than burnt bone. This is a significant finding for the thin-section analysis, as during excavation, unburnt bone had a low recovery rate and was generally soft and friable when encountered, leaving open the question of unburnt bone survival and the true relative frequency of burnt versus unburnt bone in the area (Birch pers. comm.). However, contexts rich in bone generally show a mixture of both burnt and unburnt. Burnt bone is only clearly in the majority in one section of the profile (the lower part of the C2.15 sequence; Fig. 13.54F).

In most bone rich layers, burnt bone fragments are much smaller than unburnt (*e.g.* C2.03b-a, C2.05d-a, C2.06a-b). Only in the contexts where burnt bone predominates are larger fragments of burnt bone seen. This may indicate some difference in activity – proximity to areas of butchery versus burning/cooking, for instance (see Section 13.15.4). Different bone types are also clearly indicated with some fragments showing more open, vesicular structures (Fig. 13.54I).

The most notable feature of the bone inclusions is their excellent preservation (Fig. 13.55A). This is also noted for the cave sequence, but is far more unexpected for this open-air profile, within which microbial activity, water movement and physical disturbances such as freeze-thaw action typically mean that features such as bone are usually quite degraded. Such preservation also appears at odds with the on-site description of unburnt bone as being soft and degraded. The likely explanation for this unusual preservation is explored in the discussion (Section 13.15.4).

A final and possibly very interesting feature of the bone seen in thin section is the range of colours it shows. Bone colour ranges from pale brown, to yellow, brown, and even rich dark red (Fig. 13.54I). Colours do not accord with any particular bone typology or micromorphological sign of burning. However, recent experimental work in this area (Hanson and Cain 2007) has shown that differences in bone colour can indicate burning activity even when bone appears outwardly unburned, and also that differences in bone condition during burning (*i.e.* fleshed versus 'greasy' versus degreased) can affect the extent that a bone appears burned and also may determine colour under the microscope.

Anthropogenic material: other indicators: additional inclusions in the Trench 2 samples are frequent, though not particularly diagnostic of any specific human activity. Phytoliths and diatoms appear throughout the sequence, as do cell residue, fungal spores, and small inclusions and patches of amorphous anthropogenic material. Fungal spores and fruiting bodies are frequent in many contexts, and often show some lamination, suggesting the presence of rotted wood (*e.g.* C2.06a-b). Larger patches of brown amorphous material increase towards the base of the sequence and may be linked with increasing peat use. Brown amorphous organic material in particular often forms part of the micro-lamination of some subhorizons (Fig. 13.55B).

Pedofeatures: additional soil features indicative of human activity are far more frequent in this exterior sequence than in the cave. Features indicative of low level movement and disturbance, such as organic, silty, and dusty clay infills, and coatings are seen at intervals throughout. These are fairly frequent in some deposits (especially organic coatings) but concentrate in no particular area. Limpid clay pedofeatures, indicative of water movement and illuvial processes, are far rarer, only really seen in Context C2.05d-b. However, small iron nodules are fairly frequent in the majority of deposits, indicating that water movement is a process active throughout the sequence. With the exception of the leached horizon and subsequent iron pan and iron rich sequence seen at C2.20, however, this movement seems small and localised, with no overall increase in iron accumulation down-profile.

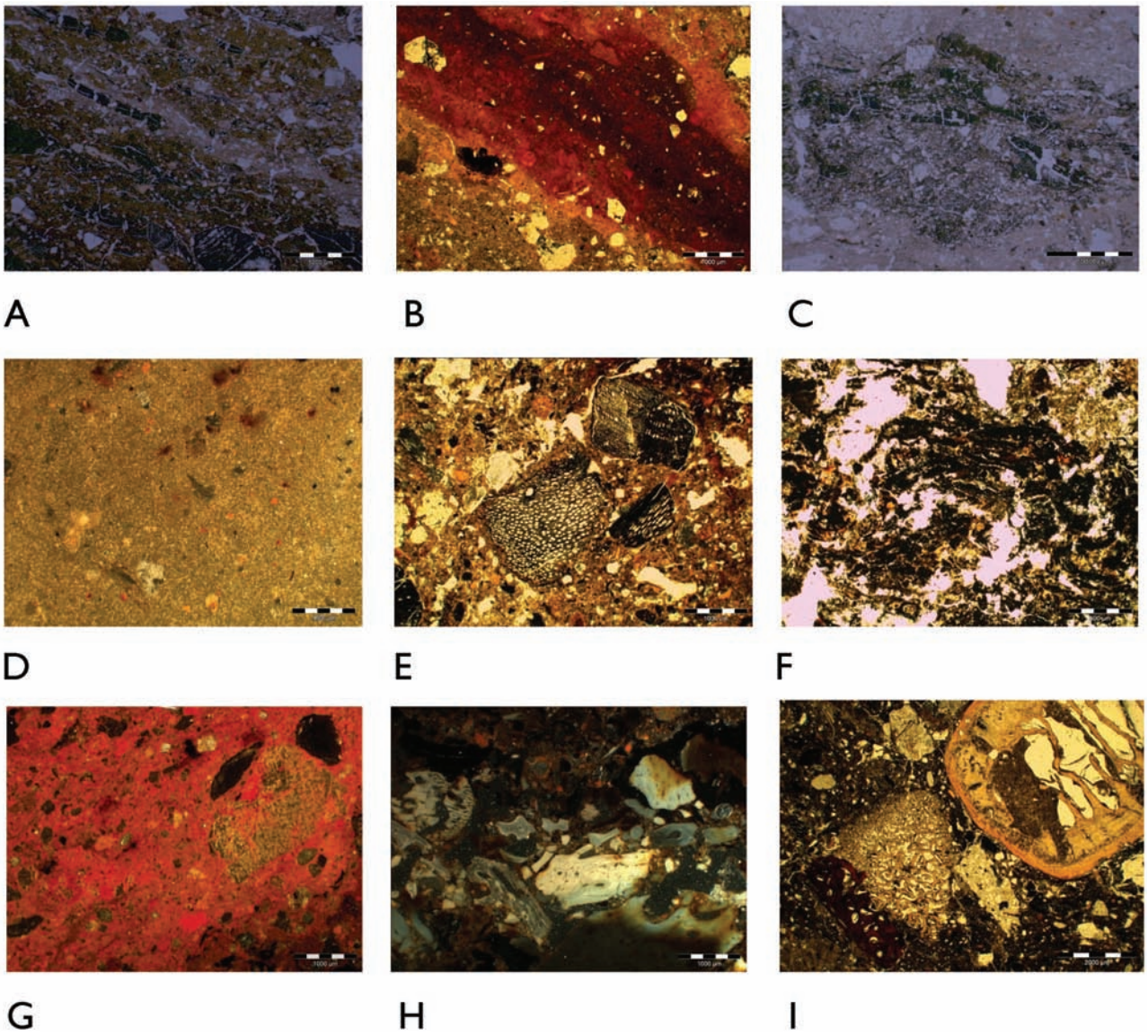


Figure 13.54. A. Subhorizons in C2.15b (Sample 2–7), upper & lower lenses are finely laminated & charcoal rich, between the two, a thinner lens of pale silt can be seen (plane polarised light = PPL); B. C2.20, subhorizon D, thick, continuous iron pan lens PPL); C. trampled fuel residues: C2.23, sharp boundaries separate this lens from C222 above & C2.26a, subhorizon A, below (PPL); D. C2.06c–a, oblique incident light view of 'buff-clay' deposit; this is a fine, very pure silt, with small fuel residue inclusions (& occasional Fe nodules, the deposit appears heated, with a strong reflection & small heated inclusions visible; E. charcoal fragments display a range of cellular structures, C2.34–b (PPL); F. burnt peaty material, C2.26a–f (PPL); G. Groundmass heating: the completely reddened groundmass contrasts with the dark charcoal fragments, context C2.16, subhorizon A (oblique incident light); H. fragments of burnt bone in C2.15b-h (oblique incident light); I. bone in C2.06a, note differences in bone morphology & colour (PPL)

By far the most significant group of soil pedofeatures are those relating to phosphate movement and accumulation. Two types of phosphatic feature are seen in the sequence. Amorphous phosphate appears in thin-section as a fine, featureless yellow material which infills soil void space and is isotropic (does not reflect) in crossed polarised light. Significant accumulation of this material is rare in wet, usually acidic Scottish soils, where water movement usually washes out phosphate that has passed into the soil from degrading organic materials (such as plants or, more usually, bone). However, amorphous phosphatic features are frequent throughout the sequence, present in most contexts and significant in 29 out of 62 subhorizons. All but one of those contexts high in bone are also high in phosphatic features, and though the majority of phosphate rich sub-horizons are also high in fuel residues, this is a less clear correlation. Amorphous phosphatic infills are distinctive, often forming part of the micro-lamination of some sub horizons (Fig. 13.55C). Others are more amorphous and often reminiscent of partially decayed organic materials, especially bone (Fig. 13.55D).

The second phosphatic pedofeature seen in Trench 2 is one more directly linked to bone decomposition.

Calcium-iron-phosphate (Ca-Fe-P) pedofeatures are distinctive soil features which are formed during the release of Ca and P from bone hydroxyapatite during decomposition. They appear as small radial crystallisations (Fig. 13.77) and have been identified in several geoarchaeological investigations into bone rich contexts (*e.g.* Simpson *et al.* 2000). These features are associated with very phosphate rich environments. Ca-Fe-P pedofeatures are seen in seven Trench 2 subhorizons, almost all clustered in the lower half of the profile between contexts C2.20 and C2.26a. One lone Ca-Fe-P rich lens is seen at the top of the profile in Context C2.05a-b. None of these contexts shows good bone preservation.

13.15.4 Discussion

Micromorphological analysis of deposits at High Pasture has produced a varied dataset which provides a large amount of information on human activity both inside the Cave and at a key focal point within the precinct outside. In particular sampling through the extensive Trench 2 section has produced a valuable dataset spanning all key phases of activity in the precinct through time.

Excavation showed that the area of the precinct represented by the sample section to consist of layer upon layer of organic rich material with dumps of fire-cracked stone and charcoal, interspersed with several hearth features (Birch pers. comm). Unsurprisingly, fuel residues and other features of burning were a major element of the precinct thin sections. Charcoal predominates with wood ash (a rare sight in a wet, open air profile) also seen. However, it seems that those at High Pasture utilised both peat and wood for their fires. Carbonised peat residues are seen fairly regularly throughout the precinct sequence, and heated fine silt patches may indicate completely combusted peat. Peat residues are more frequent in earlier contexts, but it is possible that some of this may be a bias of preservation, and there is no clear 'switch' from one fuel residue type to another. Turf, another potential source, seems little utilised. Inside the cave, charcoal is very much the dominant residue type, particularly within the C2.06 floor layer.

The micro-horizonation of individual residues within the precinct sequence is interesting. In thin section, the stratigraphy of the samples is incredibly complex, with many contexts showing a number of subhorizons equating to individual events. Several of these show a distinct change in the relative frequency of charcoal to peaty inclusions, for example contexts C2.16-a to C2.16-b, and C2.26a-f to C2.26a-g. Clearly these thin, often very distinct lenses represent the waste from very differently composed fires, their clear boundaries indicating a rapid series of depositions. Micromorphology supports the on-site interpretation that material was dumped into the precinct in quick succession from a variety of discrete burning sites in the immediate vicinity.

Groundmass heating, a second identifier for burning activity, is also seen in the precinct sequence. This is however relatively rare overall, and also indicates that the major source of input into these deposits is fuel residue waste burned elsewhere – perhaps not far away, but not burned *in situ*. Only a few lenses show the bright red colour representative of *in situ* burning, most of them located within C2.16 towards the middle of the sequence. This sporadic evidence for actual burning within the immediate cave entrance area is supported by the only occasional evidence for hearths in the trench (Birch and Wildgoose 2005, 23) and also by the magnetic susceptibility results, where peaks and troughs point to highs and lows in enhancement despite the universally high levels of fuel residue material.

Bone, both burnt and unburnt, is also very frequent in both the cave and exterior sample sets. Burnt bone dominates the cave set, though both are present, and outside, unburnt bone is in the majority (and seen in more deposits). Two features of both the burnt and unburnt bone stand out. The first is the excellent level of preservation, particularly outside the cave. Bone survives well in alkaline environments and in those where soil processes, such as illuviation, are inhibited. Thus, while good preservation might be expected of the bone inside the limestone cave, outside is a different matter. pH levels in the Trench 2 precinct samples, while fairly high, are not excessively alkaline (Section 13.14) and the presence of iron nodules and a leached/iron pan sequence (at C2.20) show that soil processes are not inhibited in the area outside the cave. Why then do we see such excellent bone preservation? It is suggested that the answer lies in the unusually large amount of phosphate present in the Trench 2 sequence.

Phosphate enhancement in human-modified soils is the result of organic additions – such as bone, flesh, manure, high levels of plant material. The levels of total phosphate recorded for the Trench 2 sequence (Fig. 13.55C, D, E, and F) are extremely high, providing an unusual a record as that for bone preservation. In thin section, we see that the level of phosphate enhancement is such that many of the deposits are rich in not only phosphate rich inclusions such as bone, but even show patches and lenses of amorphous phosphate from previously degraded organic materials – another rarity in exterior soils subject to through-flow of water. Trench 2 is clearly a completely phosphate-saturated environment, and it is suggested that, although much of the rich bone assemblage clearly has degraded away (as evidenced by the calcium-iron-phosphate features seen in several contexts, even relatively sterile contexts such as C2.20), a large proportion of bone has been protected from such dissolution, phosphate cycling presumably having reached some level of equilibrium in some areas. This is supported by excavation evidence – unburnt bone was present but was 'soft' and difficult to excavate (S. Birch, pers. comm.) and less well preserved than the in-cave bone (Birch *et al.* 2006, 88). In thin-section, we can see that the internal structure of these 'soft' bone fragments are in fact perfectly preserved. In micromorphological terms, this is a very significant assemblage preserved in unusual conditions, providing insight into processes of bone decomposition that are rarely seen in non-cave archaeological deposits (Fig. 13.55F).

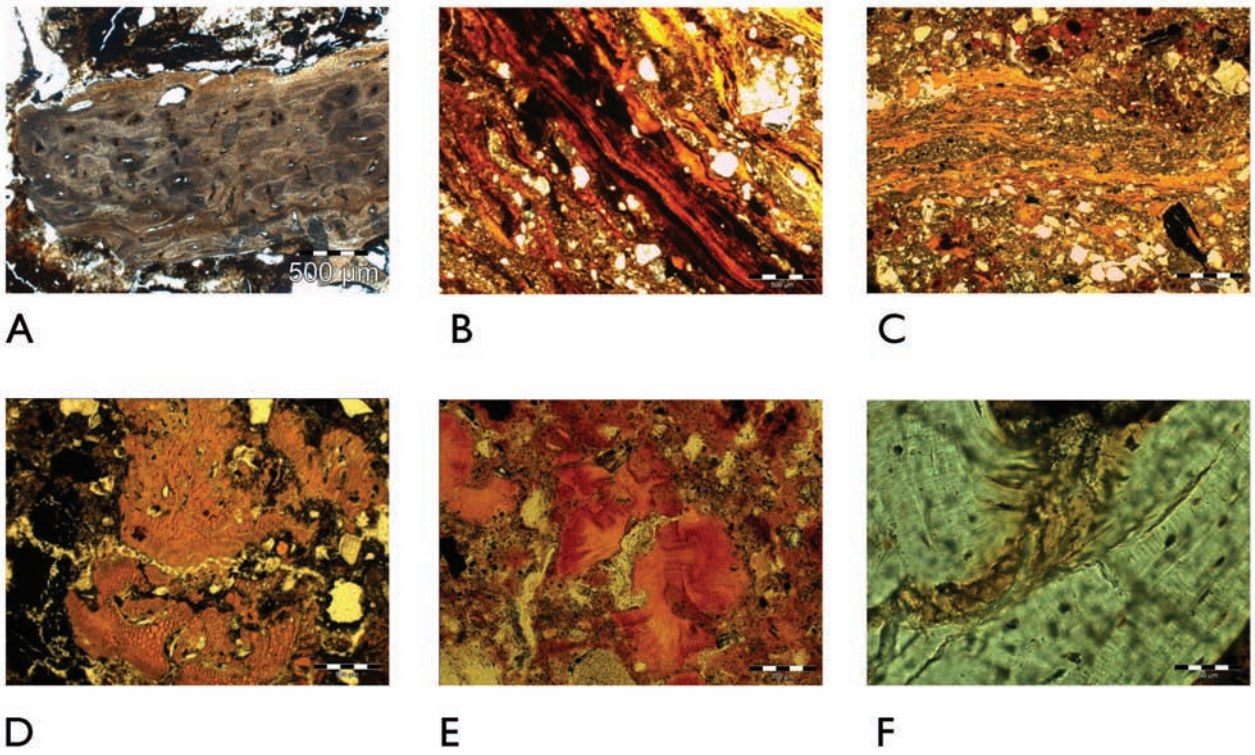


Figure 13.55. A. bone in C2.06a, note excellent preservation of internal structure (PPL), B. brown amorphous material, possibly unburnt peat, forming micro-laminations within C2.05d–c (PPL); C. phosphatic micro-laminations in C2.26a–b (PPL); D. amorphous phosphatic accumulation with internal structure, probably degrading bone, possibly a plant fragment in C206-b (PPL) E. clump of calcium-iron-phosphate pedofeatures in C2.20-b; note the distinctive radial crystalisation pattern (PPL); F. bone degrading in C2.03b, amorphous phosphatic material fills the cracked spaces within the bone; such processes are rarely preserved in thin-sections (PPL)

Where does this enormous phosphate enhancement come from? The thin-section samples show that inside the cave amorphous phosphate is rare, despite the extensive bone assemblage recovered during excavation (and seen in thin-section). What difference in human activity could be responsible for this?

The evidence provided by the large and unusual bone assemblage seen particularly inside the cave may provide the answer. 'Ritual' aspects to the cave assemblage, such as deposition of whole animals and unusual butchery practices, are a key feature of the High Pasture Cave site. It is suggested that the Trench 2 area, immediately outside the cave, was a focus for butchery activity, particularly that of defleshing, including in some cases the breaking of bones and extraction of marrow, prior to bone/carcass deposition inside the cave, and that the concentration of evidence for this in this particular area may indicate that the cave entrance area is itself of ritual significance – as a slaughter/butchery area. Many comparative features of the micromorphological and geoarchaeological analyses (Section 13.14) support this. There is a poor correlation between particularly high phosphate levels and frequency of both bone and fuel residue inclusions, indicating that other phosphate sources are significant. High concentrations of blood, flesh, and marrow are an obvious source. Phosphate features at this level of intensity are very rare but have been noted at sites where fleshy wastes are significant, such as fish processing middens (I. Simpson, pers. comm.). In Trench 2, burnt bone fragments, though frequent, tend to be very small, indicating that the focus of cooking/feasting activity was a little further away (the fuel residue evidence suggests the same, as does the magnetic susceptibility data). Unburnt bone is more frequent and the fragments larger. Moreover, the range of bone colour seen in especially the Trench 2 samples suggests that bone in a variety of conditions – partially fleshed as well as degreased – is entering the Trench 2 deposits (Hanson and Cain 2007). Comparison of faunal and thin-section evidence for bone use on a context-by-context basis could be an exciting avenue for future work, as could more detailed investigation of the link between bone colour and bone condition – a relatively unexplored avenue of archaeological research.

Other points of interest raised by the thin-section analysis in particular concern the detailed stratigraphy of especially Trench 2. The extensive lamination and sub-horizonation of this sequence support, and enhance, the interpretation of this area as a place of intensive, complex, and repeated activity.

13.16 The environmental assemblages in context

Jo McKenzie

13.16.1 Introduction

High Pasture Cave is by any estimate a highly unusual site, and this is particularly true for its environmental assemblages. While we can indeed consider the datasets assessed above within the more familiar arenas of subsistence, of resource use, of local environmental conditions – ultimately, this is neither what they represent nor – in possibly more instances than we can establish – from where they derive. The environmental material from High Pasture is a rare example of a dataset that, in the absence of local evidence for domestic habitation, appears to represent not only an apparent primarily ritually deposited sequence, but also one unparalleled in Iron Age Scotland in bulk and diversity.

This section first brings together the diverse range of environmental assemblages recovered at High Pasture and provides a chronological overview of the organisation of this through the different areas of the site, providing a baseline picture of the shape, size, and organisation of the environmental record as a complete entity. The nature of the record is such that consideration of the relationship between individual environmental assemblages (and to other datasets such as the artefact assemblages) is a key aspect of our interpretation of the site overall, as well as that of key inputs such as faunal and botanical remains.

Secondly, this section outlines and summarises the key themes of that interpretation: the placement of environmental material within different site areas, the deposition of 'out of the ordinary' materials and groups of materials, and the question of structuring, both in terms of shaping individual deposits and their patterning within the site stratigraphy as part of the High Pasture cycle of foundation, ceremony, and closure.

13.16.2 Pulses of activity: the environmental assemblages through time

Pre-Iron Age (*Phase 1*) evidence for deposition of environmental remains at High Pasture is limited, with only a scattering of bone (Section 13.2) charcoal (Section 13.10), and botanical remains (Section 13.8) recovered from within and around the cave. This only emphasises the huge change in activity into the early Iron Age in Phase 2.

The evidence for *Phase 2* as a time when High Pasture starts to become established as a place of significance in the Iron Age comes largely from its environmental assemblages. Here, the cave itself is the overwhelming focus for deposition. *Phase 2a* saw the accumulation within the external precinct of small amounts of animal bone, charcoal, and botanics, associated with the use of the first hearths established adjacent to the first cave walkway, and a similarly small *Phase 2b* assemblage associated with its closing. Notably, very little precinct bone is burned, in contrast with contemporaneous material from the cave – the source of almost all Phase 2 bone (Section 13.3). Compared to other phases, there is also a slightly larger proportion of charred, as opposed to more comprehensively burned, bone in Phase 2, perhaps indicating that during these early, pre-stairwell events, burning of material took place both on the precinct hearths and inside the cave, during a time when the area was more 'open' and linked, and it would be more possible for smoke to escape safely. In thin section, Phase 2a deposits in the cave do show surviving wood ash, a fairly fragile indictor which may support an interpretation of *in situ* burning events (Section 13.15).

It is also possible that (more than for later phases, where copious quantities of environmental residues fill the precinct), not all activity taking place in the Phase 2 precinct area is evident. Context C2.33, representing material relating to main Phase 2a hearth F2.18/F15.36, shows the highest total phosphate in the entire sample sequence, higher even than the intensive activity recorded in the hearth deposits of Phase 4 (Section 13.14). It may be that at least some activity involving organic processing, such as butchery, or events involving live animals, was present in this phase which is not recorded in the physical record. Putting these two elements together may suggest at least some pattern – despite the presence of the precinct hearths – of slaughter and/or butchery within the precinct followed by burning inside the cave, or a very careful collection of burnt bone from the precinct hearths for deposition inside the cave.

These events were clearly structured with regard to placement of environmental material inside the cave. Compared to later phases, the focus is heavily on bone deposition, rather than grain (Section 13.8). *Phase 2a* sees bone, much of it heavily burned, deposited preferentially to the front of the cave, with a tendency for bone further in to be smaller and more fragmented – perhaps suggesting that a proportion of the bone recovered from further inside was trampled through (Section 13.2). A compacted floor at the start of *Phase 2b* appears to facilitate a movement to use of all areas of the cave, with more specific concentrations of structured material seen and some focus on the central cave area – a concentration of cattle bone behind a central side slab, and a concentration of dumped herring bone in the same context. This apparently more specifically structured approach to cave deposition continues into the very end of Phase 2b, with the deposition of a significant deposit of char, burnt grain and bone at the very entrance to the cave (C2.71) possibly marking the closure of the walkway through the precinct, and the end of this phase of activity at the site.

Prior to the build-up of precinct deposits and the construction of the stairwell, the movement of environmental material may therefore indicate more of a unified space, in which activity within the precinct is a direct precursor to that within the cave. A small spike in coprolite recovery may reflect this overall greater accessibility of the cave prior to the construction of the stairwell. Nine coprolites, all likely dog, span the front to rear of the cave, through

Phases 2a–2b. It is notable that apart from this, only one other (and non-Phase 2) context produced coprolites – perhaps suggesting that such wastes were, beyond Phase 2, not routinely allowed to remain within either cave or precinct.

A complete reversal in the focus of activity is seen through *Phase 3*. No environmental material is deposited in the cave during this time, with all activity concentrated within the precinct. Five distinct subphases of deposition consisting of huge amounts of hearth refuse and organic wastes are identified via their associated hearth settings, around and on top of which huge accumulations of material raise the precinct surface level significantly by the end of this phase. Patterns of discard and/or placement of the environmental material through these subphases help characterise this activity. Relative to Phase 2, bone throughout *Phase 3* shows proportionally less burning overall, with the exception of final *Phase 3e* (Section 13.3) suggesting that the bone deposited through this phase derived more from processing and butchery than cooking/burning (Section 13.2), and the presence of both cranial and post-cranial elements throughout these assemblages supports this. Deposition of charred plant remains, almost entirely consisting of clean, processed 6-row hulled barley, increases considerably during Phase 3 compared to Phase 2 (Section 13.8), but is still fairly patchy, with only final Phase 3e context C15.56 showing a single significant deposition of grain. Variation in the composition of individual deposits such as this is common for the Phase 3 environmental material, and suggestive of an element of structuring to many of the hearth focused events. *Phase 3a* deposit C2.26a was not only particularly pig rich but elevated in pig compared to the general assemblage. The deposits associated with *Phase 3b* hearth F15.30 were high in bone with practically no grain present – one of these, C15.64, produced the only two coprolites found outwith Phase 2– that one of these is likely human in origin is interesting (Section 13.13). *Phase 3c* deposit C2.28 produced limited bone, but the material present was mostly pig or dog. *Phase 3d* context C15.61 showed evidence of the incorporation of wild animal resources, producing two boar tusks. *Phase 3e* produced particularly rich deposits of both bone (again pig rich) and grain which included young pig and calf – like in the stairwell (below) an early indication of the particular significance of young animal remains seen in later phases. Micromorphological analysis of the numerous individual burning events making up many of these context's hint at an even greater level of variability and individual character, with individual burnt lenses potentially showing some switching between the use of charcoal and peat as fuel (Section 13.15).

The build-up of deposits in the precinct through Phase 3 necessitated the construction of the first stairwell into the cave (Section 6.3.2). Environmental assemblages provide key data illustrating the likely ritual significance of both construction and use of this feature, with potential *Phase 3a* foundation deposit C2.67 containing numerous young pig and dog bones – the latter implying deposition of feet (Section 13.2). Environmental material associated with its use also emphasise the significance, and maintenance of the stairwell feature. Stairwell packing silt C2.65 contained fragments of fibrous 'matting', probably constructed from flax, hemp, or nettle (Section 13.9) probably represent part of an in-situ area of mat across the top limestone step of the stairwell. Possibly forming a 'sink' for botanical survival, this context produced a rich mixture of fairly unusual remains including increased charred vegetative material, possibly representing thatch, bedding, or fodder, and wild floret bases, indicative of potential oat cultivation (Section 13.8). This last potentially complements the increase, from Phase 3 on, of the presence of weeds which prefer more fertile soils – indicative of potential soil amendment and/or land management around High Pasture.

It is possible that more Phase 3 activity involved the use of the cave than its large material assemblages suggest. The single in-cave feature dating to Phase 3 is a walkway through the cave, and micromorphological analysis of this thin sequence (F6.02) shows a distinct input of trampled char (Section 13.15). It is possible that at least some of the environmental material generated within the precinct in Phase 3 was, in fact, deposited underground, not within the excavated region of the cave, but into the active streamway beyond. This is discussed further in Chapter 14.

In *Phase 4*, the focus of environmental deposition within the precinct continues, with this phase representing the peak of activity within the increasingly monumentalised out-of-cave area. Three subphases, again characterised by the use of individual hearth settings, define the event sequence, and this phase contains the largest single deposits of both key environmental assemblages of bone (in *Phase 4a* context C2.16) and cleaned, burned grain (in *Phase 4c* context C2.15), and the largest assemblage of charcoal recovered from the site (Section 13.10). Cereal remains associated with *Phase 4b* hearth F15.20 account for over 30% of all botanical remains recovered from the entire precinct sequence (Section 13.8). Some global changes in species ratios for animal bone, notably an overall rise in pig compared to cattle, may complement this dramatic increase in grain deposition, and it is perhaps in Phase 4 that we first begin to detect the sense of 'richer' ceremonial processes, with an air of surplus creation and perhaps the advent of feasting events, taking place at High Pasture. The undoubted peak of this is seen at Phase 4c, where the succession of deposits at C2.15a, b, and c clearly represent a significant event sequence featuring important artefact assemblages, human remains, incorporation of less usual materials such as a second example of fibre 'matting', the creation of huge amounts of fuel residue (with a particularly high magnetic susceptibility reading for this group of contexts (Section 13.15), and heavily

butchered bone (Section 6.4.4). As with previous phases, deposit patterning within the environmental assemblages suggests localised structuring of individual deposits – such as the foundation deposits associated with stairwell modification seen at C21.10 and C2.62/C2.53 (Section 6.4.3) and the gathered antler and periwinkle incorporated into the new precinct enclosure wall.. This is perhaps less evident than in the preceding phase, however, particularly for the faunal assemblage, and particularly for the very large precinct deposits. Again, a sense of larger, perhaps coarser series of depositions, associated with larger gatherings, is implied. Geoarchaeological and thin-section evidence from deposits relating to this phase also show a peak in total phosphate and corresponding phosphate rich pedofeatures, particularly in C2.15b (Sections 13.14; 13.15) suggestive of intensive organic material input such as blood or viscera.

It is only towards the end of Phase 4 that deposition of environmental material into the cave is resumed and, with it, the bias towards deposition underground. The huge amounts of environmental material recovered from the precinct in *Phase 4c* are dwarfed by that entering the cave. Some patterning to faunal deposition is seen, implying some structuring on both large and smaller scales: a bias to cattle is seen in the cave deposits overall, although likely Phase 4 cave closing deposit C1.06 was particularly rich in pig (Section 13.2). The largest assemblage of fish bone for all phases is still preferentially, almost exclusively, deposited in the cave, but now the focus shifts from the centre to the cave rear (Section 13.4), where a periwinkle concentration is also seen (Section 13.6). Deposition of grain within the cave is also focused toward its rear (Section 13.8). One interesting observation within Phase 4 is that its precinct charcoal may be less fragmented than that seen in the cave – possibly indicating that the latter is more likely to have travelled in, redeposited alongside bone and grain placed into the cave, while stratigraphic evidence suggests that the huge input of precinct char from the repeated burning events is, in general, left entirely *in situ*. Phase 4 charcoal recovery is concentrated strongly in just one context – C2.15, which produced the lyre bridge fragment and associated wooden worked objects. This potential focus on wood burning extends into the presence of charcoal from rarer species within this context, such as alder, pine, oak, and willow.

Patterns of environmental deposition within *Phase 5* show strong parallels with the latter part of Phase 4. Environmental material is deposited into both cave and precinct, where three subphases characterise activity in the precinct, once more focused on activity relating to sequential hearths. A similarly 'generalised' feel to both key botanical and bone assemblages may, however, be more a function of high levels of bone fragmentation, making species assessment difficult (Section 13.2) and a tendency to 'spreading' of key material, such as burnt grain, across a wider area (Section 7.2.2). This last is an interesting characteristic of the Phase 5 precinct deposits. With deposit accumulation in Phase 4 building up to the extent that the enclosing wall is breached, the Phase 5 arena for activity outside the cave is larger, and intensive on-hearth accumulation of fuel residues, bone, and grain no longer a key feature. It may be that this 'masks' the significance of some Phase 5 events within the sequence, with the near-richest single burnt grain sample coming from this period of activity, from Context C15.25 in *Phase 5a* (Section 13.8). Parallels with earlier Phase 4 activity are also seen in the composition of environmental material, with identifiable bone showing a similar pattern of increased pig in the cave deposits, and cattle within the precinct (Section 13.2). While accumulation in the precinct is gradual, most in-cave material appears to relate to a single closing deposit in the later stage of *Phase 5b*, made up of several redeposited dumps of midden and hearth residues originating in the precinct, focused on the front and rear of the cave (Section 7.2.4).

Some structuring is noted: a concentration of juvenile pig bones (Section 13.2), fish concentrated almost exclusively to the rear, and a discrete deposit of periwinkle to the cave centre (Section 13.6). A hint at ceremonial activity within the cave is seen in *Phase 5b* context C6.05 (SB27c), which produced the only fragment of resin recovered from the site. Identified as probably spruce, and unburnt, this could have had a range of uses, some of which would correspond with ritualised activities, such as burning to release a smell (Section 13.12). Interestingly, there is also a small 'spike' in rarer examples of species charcoal in *Phase 5b*, with the only holly charcoal fragment associated with the use of hearth F2.07 (C2.05a), and ash charcoal from context C15.18. Could this represent a uniquely Phase 5 element of 'structuring' – the deliberate use of woods not typically used in ritual deposition? Both holly and ash would likely have grown locally in the calcareous soils around High Pasture (Section 13.10), with the latter used to turn the wooden bowl found on site (Section 12.10). Heather charcoal, notably, is only present from Phase 5 on, and only in the cave (Section 13.10) – where multiple fragments of heather charcoal were recovered from the central cave area (C1.05).

Outwith these two foci for ritual activity, a particularly interesting deposit is seen at the surface, with a concentration of emmer wheat, oat, and a range of weed taxa in burnt spread deposit C14.29 stands out as unusual and may possibly indicate opportunistic cultivation of oats on marginal land, presumably near to the site (Section 13.8).

Phase 6 represents the final, and includes the most unusual, sequence of ritualised deposition at High Pasture. This is entirely focused on the cave, with far less deposition of environmental material within the now less coherent precinct area (Section 8.2.3). The

assumption is that almost all material generated via the far less intensively used precinct hearths within *Phase 6a* was deposited in the cave, with only small amounts of highly fragmented bone, burned grain, shellfish, and charcoal remaining.

Within the cave, *Phase 6a* is comprised of extensive bone and grain-rich deposits extending throughout the cave length, featuring above average levels of pig, heavily processed skeletal material, and extremely rich deposits of burnt barley (Sections 13.2; 13.8). Fish bone and shellfish are, once again, concentrated to the rear of the cave (Section 13.4). Above this, a highly structured series of deposits represents the later *Phase 6a* activity – three discrete caches of cattle bone placed along the cave length, each representing one individual, with evidence for articulated placement of at least some carcass elements but also showing clear butchery for meat removal (Section 13.2). The last deposition of environmental material into the cave, and at High Pasture, was the *Phase 6b* deposition of a huge, bone, grain, and char rich midden into the front half of the cave, similar in composition to the deposits preceding it. Some interesting features include only the second example of heather charcoal from the site (Section 13.10), and neonate dog and pig (Section 13.2). Above this, a unique deposit of at least 23, semi-articulated, complete pig carcasses showing elements of ritual butchery represented the final High Pasture depositional event. The 'special' nature of these animals went further than their deposition – raised on a diet significantly higher in animal protein than others deposited at the site (Section 11.4), and killed prior to 'peak' meat age, these pigs represented a characteristic large scale 'feasting' deposit and signify a high-profile deposition event (Section 13.18).

After this, *Phase 7* sees the backfilling of the stairwell, a process associated with a number of significant environmental deposits. Most significant of these are the human remains interred into the upper stairwell, which were accompanied by the skeleton of a perinate piglet and some part of a puppy, including the head. The presence of *Salix* pollen (Section 13.11) indicated that catkins had been placed within the cist-like burial area.

13.16.3 Selection and patterning of environmental material

What makes a ritual deposit? Environmental remains are a key contributor to understanding the context of ritual deposition at High Pasture. Seeing 'everyday' resource materials curated, deposited, and maintained in a way which makes it clear that they have been imbued with a special identity, separate and additional to their practical characteristics, has long been a key part of understanding the complex wider context of ritual deposition in prehistory, and a window into unknowable ceremonial events such as feasting. The environmental assemblages provide much of this, and also illustrate themes running through patterns of deposition which help 'colour in' the rich picture of ritual life at High Pasture.

Material type: especially *species* is clearly an important component to individual ritual events. At High Pasture, the importance of pig in this context is seen from Phase 3 onwards, culminating in the 'special' pig deposit of Phase 6b, and indicates the concept of one particular species representing conspicuous consumption, with selection, preparation, and curation an important part of the ritual process. The concept of the collection, preparation and building up of foodstuffs to provide a 'sumptuous' experience is less easy to see in the botanical assemblage, where barley is the only real crop option, but the particularly careful cleaning of the deposits at High Pasture indicates a similar focus on the preparation of material to enable a particularly special, enjoyable event. That much of this – notably the burnt grain caches – is not eaten, is also significant.

This leads on to *association*. At High Pasture, we repeatedly see a pattern of interplay between materials, with, for example, deposits which are very high in bone being correspondingly low in grain, and vice versa. An essential element of structuring of deposits is that the components making up a deposit are key, and patterns of environmental deposition at High Pasture may indicate that this might be not only for what they contain, but perhaps also for what they do not contain. Location also has a clear significance beyond individual events, with strong, enduring associations between certain materials and the locus of deposition, such as fish into the rear of the cave, indicating a powerful continuum of ritual practice at the site.

Treatment or *modification* is another key element to ritual expression within the environmental assemblages. It is notable that the three cached cow carcases deposited within the cave in Phase 6a saw their bones gathered together, and carefully placed in specific locations within the cave – perhaps requiring additional 'special' treatment and placement to satisfy the ritual process, whereas the already very 'special' pig carcases deposited subsequently required no such treatment. Such treatments, both before (grain cleaning, pig feeding) and after deposition (placement, association with artefacts, association with or separation from other environmental materials) help turn these materials from simple resources to significant entities. Finally, the use of *young animals* in a range of specific depositions, particularly structuring events linked with closure or foundation, is a frequent theme at High Pasture.

13.16.4 Scales of deposition

Although the environmental assemblages at High Pasture represent an enormous input of material compared to any other Iron Age site of similar size, the scale of

this deposition varies hugely from phase to phase, and between areas. Crudely, the amounts of bone and grain gradually rise through the Iron Age to a high at Phase 4, see a slight drop back during Phase 5, and raise within the cave in Phase 6 and the site's closure. This is particularly clearly seen in the deposition of grain, with limited input before the huge deposits seen in Phase 4 and then Phase 6. It is notable that within some of these later, more intensive event sequences in both precinct and cave, more heavily 'structured' individual deposits appear less evident. While this is difficult to quantify – with more nuanced material patterning perhaps easily lost in, especially, the huge deposits in Phase 4 and 6 – it may be the case that as the significance of High Pasture as a ritual location increased, the ritual significance of the site itself may have superseded that of the materials used. A negative interpretation of such patterning might be that as the site increased in regional significance, its ability to provide religious or cosmological expression for its local community was watered down. A more positive interpretation might be that over time, High Pasture provided an increasingly powerful hub for communication, exchange, and the development of wider social networks. Perhaps both scales operated at once. There is a contrast between, for example, the larger, more 'mundane' assemblages of bone and grain, their frequent focus on burning, but not eating, and structured deposits connected with more constrained foundation or closing events, made outside of what could be seen as 'public' displays, where 'special' characteristics such as the inclusion of young animals are common.

13.16.5 Structuring space: from precinct to cave

Against the background of 'pulses' of large scale depositions discussed above, more detailed and/or specific episodes of structured deposition, then, are skewed towards events which reconfigure any element of the site itself and impact the way in which the space is/can be used. It is arguable that it is only the particular physical configuration of High Pasture, and especially the stairwell access, that allows us to see this in action, so well. Evidence from the environmental assemblages seems to suggest that it is likely, however, that this concept of 'reconfiguration' was also a key factor in the choreography of larger scale, public ritual events, alongside the concerns of celebration or ceremony. We can interpret some of the main deposits associated with the successions of hearths in the precinct as having similar links to the reconfiguration of space – of the 'closing' of one hearth, and likewise one series or season of events at the site. Here, a likely very complex suite of meaning associated with the refuse produced through these large-scale events unfolds. A key part of the ritual process connected with larger scale events at High Pasture is the movement of large amounts of environmental material from precinct to cave, and its ritualised deposition alongside selected artefacts. Not necessarily 'structured' in terms of material composition or specific treatment, such 'ritually charged rubbish' nevertheless is used as a means of developing and 'structuring' the entire ritual arena. We see this in the non-linear relationship between cave and precinct in terms of this movement – in Phase 3, the focus of ritual activity is entirely within the precinct, and thus it is there that the environmental residues remain, deliberately not moved, inaugurating the theme of constant build-up of the 'ritually charged' surface with every event, perhaps providing, outside the cave, a boundary of 'exclosure' – an area outside which the ritual events cannot happen, beyond which it is inappropriate to deal with material which relates to the cave. When deposition into the cave resumes in Phase 4, this element of the ritual process is retained. Between these two key locations, the stairwell provides a liminal, pivotal location, one whose importance to the site's geography is clear from the care with which reconfigurations of this small space are commemorated.

13.16.6 Subsistence and economy: the data from High Pasture

The undoubtedly 'special' nature of the High Pasture site makes it difficult to use the environmental assemblages as any sort of proxy for wider considerations of patterns of subsistence, husbandry, cultivation, and general resource use in Iron Age Skye. The likelihood is that the organic remains deposited at High Pasture represent a specifically chosen, often perhaps curated subset of the resources available locally. However, the nature of environmental assemblages is such that even such a 'skewed' dataset cannot help but still reflect elements of the setting – both natural and human influenced – from which it originates. For example, we see no freshwater fish within the assemblage and little non-domestic animal input, which may reflect a set of choices at least partly dictated by local geography and conditions. At a broader scale, a small weed input within the grain assemblages provides a small window into likely local ground cover conditions, and thus possibly prehistoric land management. Against a background of wet acid heath, moorland, and rough grassland typical of the region, we see from Phase 3 an input of weeds indicative of potential soil improvement, and thus land management, extending to possibly some cultivation of oats on marginal land in Phase 5 (Section 13.8).

One particular question is the extent to which the High Pasture environmental assemblages, in the light of their heavily 'curated' character, can address the question of local domestic activity. In the absence of any domestic structures identified on or near the site, where were these special pigs kept, these large grain assemblages cleaned? We have no clear answers but may look to elements of the exotic within the artefact assemblages to conclude that it is likely that visitors to High Pasture may have come

significant distances, and that elements of preparation and organisation on a larger scale may have involved individuals from a wide catchment area.

Beyond this, the significance of the environmental assemblages to understanding the Iron Age beyond Skye is important. Like other large 'feasting' assemblages, it attests to a society the potential for creating a surplus, for wealth creation. High Pasture likely operated as part of a wider pattern of connection, celebration, and relationships between areas with a shared understanding of social references – ritual – as perhaps most clearly evidenced by the highly ritualised deposition of bone seen at C001 (Sections 13.2; 13.18).

13.16.7 Offerings from the land: the environmental assemblages in context

The environmental assemblages recovered from High Pasture may be 'ritualised', but they are also representative of the structure of the society behind it – the resources available to High Pasture's Iron Age visitors, fed through the prism of the economic strategies familiar to them. Choices for ritual activity involving food provides a window into attitudes to resource use, recognitions of the rare, special, and important, and idea into the social and economic systems supporting ritual and community activities. Part 5 discusses the contribution of the environmental assemblages to understanding High Pasture in context.

Part VI

Ritual, memory, and identity: High Pasture through time

14

Ritual, memory, and identity: High Pasture through time

14.1 Introduction

> Caves seem to be places where people went in order to gain a sense of the order of their world and their place within it, to mark important transitions in their lives and to connect with other worlds. Identity and status, belonging and affiliation, fertility, and livelihood, the ancestral past and the place of people within it, all may be glimpsed in the material record of caves. (Peter Tomkins 2015)

Just over 12 years ago, excavations at the High Pasture complex finished, completing the most extensive investigation of a cave in Scotland. The time that has passed between then and this publication has witnessed a resurgence of academic interest in the prehistoric and later use of subterranean environments, including caves (*e.g.* Bergsvik and Skeates 2012; Moyes 2012; Dowd and Hensey 2016). These explore previously overlooked theoretical and methodological approaches to cave study on a global scale and new frameworks examining the agency of these enduring 'natural' places: a complex interplay between environment, taphonomy, and human activity, drawing too on anthropology and psychology to consider the all important 'experiential' aspect of cave use (*e.g.* Wilford 2016; Büster *et al.* 2019).

In her seminal publication on Irish caves, Dowd (2015) investigates regional narratives, acknowledging them as integral to the ways in which past societies conceptualised and utilised underground spaces through time. Other publications include Leach's (2015) analysis of human remains from caves and rock shelters in Yorkshire, and Wilford's (2016) comprehensive study of cave use in Britain from *c*. 800 BC to AD 800. From a Scottish perspective, of major interest is the recent synthesis of excavations at the Sculptor's Cave, Moray (Armit and Büster 2020) – like High Pasture, a remote, inaccessible setting with evidence for a *longue durée* of use, including mortuary activity and votive deposition.

Although elements of High Pasture's apparent use history can be paralleled elsewhere in the Atlantic Iron Age, this place is so far unique within a Scottish context. Our work indicates long term periodic activity, with clearly some element of generational continuity, seen via specific activities and deposits which we suggest strongly advocate a ritual focus. As such, the extent and quality of High Pasture's archaeology makes it central to understanding of Iron Age ritual practice in Scotland and provides a unique opportunity to investigate the role of caves in the cosmology of later prehistoric communities, both in the British Isles and Europe. Here, we set High Pasture within this wider Iron Age context, a world where caves and the activities taking place in and around them could clearly represent powerful symbols of legitimacy, central to establishing and maintaining social identities, within the wider prehistoric landscapes of Scotland and beyond.

14.2 A theatre of life and death: the story of High Pasture

The High Pasture excavation record creates a detailed picture of the activities that took place here. From the visitations of the Early Bronze Age through to the more continuous periods of Early to Middle Iron Age activity, at least 2000 years of human interaction saw the development of High Pasture Cave from a hidden, isolated natural feature into a monumental complex, defined by the interactions and experiences of the people who came to this enigmatic place.

14.2.1 Early interactions

Although just one of many cave entrances on the limestone of southern Skye, High Pasture, with its extensive passages, and mysterious stream disappearing invitingly underground, was certainly visited during earliest prehistory, as early finds and a cup marked boulder confirm.

Mesolithic and Neolithic interactions must have been brief and episodic, with no visible trace of use by these earliest visitors. Maybe the dynamism of the location itself – where water stops its cascade to abruptly enter the earth – was enough to mark this as a special place. Alternatively, High Pasture may have served as a good overnight location in the landscape: while foraging, or droving livestock between settlements and upland pastures. Interactions with the cave and its surrounds, for all purposes, would have created experiences, stories to embed within local knowledge and folklore.

Repeated visits through the Early Bronze Age suggest that the cave was already established as a location, with visible activity including ploughing to the northeast of the main entrance, and the erection of a small, squat standing stone. This may have marked the location of the cave and perhaps had some ritual significance. Surrounding posts and stake-holes, accompanied by ceramics and flint, may indicate a first structure, at the same time as the first artefacts were placed in the darkest recesses of Bone Passage: a cache of ceramic sherds, lithics, and two bone tools. We do not know whether more material from this period may have been lost from either the cave or surrounding natural amphitheatre: the cave of the Early Bronze Age was a wild, unmodified feature – prone to flooding during heavy rain, its access limited to people willing to negotiate its darker recesses. Flood re-activation of the usually dry cave entrance may have removed much more material relating to this earliest use.

The materials placed in Bone Passage during the Bronze Age provide the first evidence for structured deposition at the site and, like Bronze Age cave deposits identified elsewhere in Britain and Europe, these have a ritual, votive quality. Other materials relating to these early interactions may also have been incorporated within later, Iron Age deposits, although post-depositional taphonomic processes may also be responsible for this. Stone tools, ceramic sherds, and fragments of animal bone may indicate redeposition of curated materials, such as the rough-out for a polished stone axe, placed in the upper Iron Age fill of a ditch or pit east of the cave entrance: clearly a curated, valuable object.

Strath Suardal and the shores around Broadford Bay to the north of High Pasture contain a significant number of Neolithic funerary monuments, including chambered tombs, many of which became the focus of Early Bronze Age cist burials (Section 1.4). The standing stone at *Clach na Annait* and stone circle at Kilmarie, on the Strathaird peninsula to the southwest, hint at a wider ritual landscape in the south of Skye, and a growing core of settlement sites can be dated to the Bronze Age.

14.2.2 The Early Iron Age

The transformation of the High Pasture complex through the Iron Age is set out in detail in Chapters 6 and 7. Major structural changes through time influenced the use of space and movement through the site, along with a likely growth in both activity and the scale of material movement, suggesting increasing numbers of people visiting High Pasture through this period.

The first visible modifications to the cave and natural amphitheatre during the Early Iron Age (*c.* 800 BC) demonstrate initial work to transform a natural feature: remodelling the cave entrance, setting threshold stones, building a wall. The resulting cave access will have resembled a rectangular doorway. The flanks of the doline outside the cave were quarried and its stone used to construct a walkway flanked by narrow terraces, which led to a simple stone stairwell, guiding people down to the cave's darkness, past a simple hearth – the focal point within a still largely natural exterior space. Inside Bone Passage, a compacted surface indicates that people must have moved through the cave, probably to access the underground stream to its rear. During this early period, the cave interior was clearly the focus for activity and material deposition (Sections 12.12; 13.16). A second hearth, clearly constructed to reference the cave entrance itself, likely generated much of the material deposited in the cave at this time, with ash deposits concentrated at the base of the steps and cave entrance. A natural collapse of the cliff above the entrance sometime during this period left a large boulder partially blocking the walkway, which became incorporated into the entrance design via a new section of walling connecting the boulder to the cave entrance. This may have been a significant moment in the early history of the site. The walkway was backfilled with boulders and midden, into which were incorporated saddle querns and quern rubbers, and a group of objects placed in the 'liminal' cave entrance zone: perhaps a closing deposit marking the end of this first major period of activity.

These rhythms of activity continued through the Early Iron Age to *c.* 450 BC: structural change and site modification, and deposition of midden, burnt deposits, and objects mainly relating to daily life. The 'precinct' area became defined by low, possibly composite, walls of stone and turf with an approach from the northeast which guided visitors between two arcs of wooden posts, entering the precinct space at its southeast corner. A stack of five consecutive hearth settings was constructed, forming, along with associated ash and burnt residues, a conspicuous, steep-sided fuel and midden mound in the west side of the precinct. To the east of this mound, a simple paved walkway led from the precinct entrance to the stairwell and cave; the entrance of which was by now likely covered by a roof, with access to the stairwell through a wooden door or screen. Descending the steps and entering the cave, a paved walkway flanked by irregular shaped stones guided access through the centre of Bone Passage, utilising the route of highest head clearance, to the ramp overlooking the underground stream.

From around 650 BC, deposition of material all but ceased in the cave and the focus switched to the precinct. Quantities of hearth refuse and organic waste, identified with successive hearths, created huge accumulations of material which were not cleared from the precinct but retained, curated along with their associated structural features – hearths, walls, paving – necessitating the construction of three different phases of stairwell to ensure continued access into the cave. By the final phase of Early–Middle Iron Age activity, the western hearth sequence and its ash mound were only a memory, completely inundated by midden accumulation. Finally (Section 14.2.3), a fairly flat precinct interior would be landscaped, completely enclosed by a monumental wall, with a new walkway and stairwell access flanked by two new hearths – one at the stairwell, one to the southwest – creating a new internal geography which necessitated movement between the fires in order to access the cave.

By this point, the continued deposition of huge amounts of midden, ash, and fire-cracked stone through the peak of Early–Middle Iron Age activity had clearly created a practical problem. For a time, large quantities of material were deposited outside the precinct perimeter, creating extensive spreads of 'burnt mound' type material, up to a metre deep, extending in a horseshoe around the precinct, and forming a third locus for extensive deposits to sit alongside those of both precinct and cave (Sections 12.12 and 13.16). It appears that High Pasture's significance as a location steadily increased during the Early Iron Age. Architectural developments and 'richer' deposits give an impression of surplus creation: perhaps the start of more populous gatherings, more significant feasting events. It is possible that a once modest shrine and gathering place for local people had become a more central locale, associated with, or perhaps appropriated by, an elite. It is notable that structural developments all suggest the control, as well as the maintenance, of access to the site – in particular the cave – as well as enhancing and defining what must have been perceived as a liminal, powerful, potentially dangerous place. The paved walkway through Bone Passage, providing access to the stream, was kept clear of overburden for at least 200 years: it is only towards the end of the Early Iron Age that artefacts and environmental materials are placed here again on resumption of underground deposition.

Walkover survey has identified large numbers of later prehistoric round-houses across Skye. In the north of the island these are often found in groups, alongside numerous more complex forms of Atlantic Round-house: brochs and duns, and small forts. Some of these are associated with field systems, and the north also boasts numerous souterrains. In the south, complex Atlantic Round-houses are usually coastal, with simpler round-house forms well distributed along the Strathaird and Sleat peninsulas, usually on the better drained soils. The rarity of more monumental Iron Age structures including forts and souterrains is in stark contrast to their distribution in the north. It is difficult to estimate population densities for Skye based on these distributions, especially as only a small proportion of sites possess excavation and dating evidence, and we can only speculate as to which sites may have been contemporary with phases of activity at High Pasture. However, Skye probably hosted a sizeable and increasing Iron Age population, and it is in this context that we should view the development of the High Pasture complex.

14.2.3 Continuity: Early to Middle Iron Age

From about 400 BC, modifications at High Pasture included raising the final stairwell walls by a few courses of stone, creating a corbelled roof, and redefining the precinct enclosure wall. Both efforts seem largely to have been responses to the gradual inundation of these structures by midden and stone accumulation to maintain access to the cave. But through Phases 4 and 5, more global action became necessary. Earlier structures, especially the stairwells, became unstable. Deposits slumped *en masse* into air-filled voids, creating a hollow almost a metre deep inside the enclosure. This deformation of the precinct's curated sequences of ash and midden destabilised the enclosure wall, and only the build-up of similar deposits against the inside of the wall face prevented its total collapse. To rectify this problem and create a level precinct surface, a large deposit of sterile fine ashy silt was spread across the interior. The precinct was reconfigured, reduced in size by the construction of a new enclosure wall, and new hearths, paving, and work areas set out for what would be the final phases of the site's use. Phase 5 saw the southeast entrance to the precinct blocked, and a new northwest entrance point created, its steps leading down over the partially buried enclosure wall to the stairwell and cave. Now, two contemporary in-precinct hearths meant that progression through the precinct space necessitated movement between them, and their associated flames and smoke, to access stairwell and cave.

These later phases representing Middle Iron Age activity witnessed some of the largest depositional events: midden, large quantities of fuel residues, and fire-cracked stone were deposited into Bone Passage and outside the precinct boundary wall, featuring increased numbers of artefacts and spreads of metalworking residues. With the reduction in available space inside the precinct, along with potentially larger gatherings taking place, these liminal areas outside the precinct boundary seem to have become a part of a wider arena of activity. Meanwhile, continuing, and increased deposition of midden and other materials into the cave reduced its available space considerably, resulting in more restricted movement underground too. It is possible that by this stage in High Pasture's long history, a visit to the underground stream had either become an activity restricted to the few, or that the significance of visiting the cave, with its flowing stream, was reduced.

14.2.4 Site closure

The final events at High Pasture are notable for unusual sequences of clearly ritualised deposition. This is focused on the cave, with little environmental material placed in the precinct. Within the cave, extensive midden deposits extended through Bone Passage, particularly rich in pig remains and burnt barley and containing a wide range of artefacts. Some of this midden was harvested from the curated material in the precinct and possibly from the spreads of fire-cracked stone beyond its boundary. A structured series of deposits was then placed in the cave. Bone Passage received two discrete caches of cattle bone, each representing an individual animal, with another two deposited further underground – one on a ledge above the stream passage, and one within boulders beyond a still-water pool further inside the cave system. The very last input into the cave – a substantial, bone, grain, charcoal, and artefact rich midden transported into the cave's southern chamber – featured the remains of a very young dog and pig and was finalised with a unique deposit of at least 23 semi-articulated, complete pig carcasses subjected to unusual butchery, along with a group of artefacts on the bottom two steps of the stairwell. After this event, the stairwell was backfilled with boulders and midden, much of the stone deriving from the corbelled roof and upper side walls of the structure. The precinct access was similarly backfilled, and a series of midden-rich deposits spread through it.

The site was closed, but this was not its final event. While it is likely that people continued to visit this place – undoubtedly embedded in folklore and personal memory, an ancestral link to the past – it is also possible that High Pasture remained a potent, dangerous locale. We will never know the reasons for the cave closure, but perhaps the objects and deposits placed there – representative of complex affiliations, likely used in significant ritual activities – were now perceived as dangerous, removed from the world of the living, and residing in the realm of the dead. Some 150–260 years after access to the cave had been sealed, a final act of remembrance, or possibly closure, demonstrates that knowledge of High Pasture Cave was deeply embedded in social memory. Human remains were interred into the top of the closed stairwell structure: an adult woman, her unborn foetus, and a perinate displaying a different DNA signature, although isotope analysis suggested they shared a similar environment. These cadavers were accompanied by the remains of a foetal piglet and some parts from a very young dog. *Salix* pollen indicates that catkins had been placed within the cist-like grave, suggesting an early Spring burial. After the placement of a rich assemblage of objects including fragmented rotary querns, a fine bronze double link chain, a large iron spear, half of a decorative glass bead, and a Roman coin, the grave area and the surrounding top of the stairwell were sealed with stones, boulders, and midden, capping these potentially powerful and hazardous internments, and finally erasing the High Pasture entrance from view.

These events came at a time of significant upheaval in Iron Age society, with new religious beliefs, introduced by Roman incursions into the British Isles and later by Christians into western Scotland, coming into play. Through the British Isles, caves seem to have become the focus of richer, more diverse assemblages. Wilford (2016, 127) has suggested that such assemblages of the late 1st and early 2nd centuries AD likely reflect the continuation of Late Iron Age practices but that intensification of in-cave deposition may be a response to social pressure created by the introduction of new types of material culture. Depositional practices at Sculptor's Cave, Moray mirror those elsewhere across Britain, practices which continued into the 3rd and 4th centuries (Armit and Büster 2020, 257). Excavations at the settlements of Birnie and Clarkly Hill in Moray have both produced Roman coin hoards, suggesting that their inhabitants had access to the types of material found at Sculptor's Cave (Armit and Büster 2020, 258).

High Pasture, Sculptor's Cave, and the settlements of Birnie and Clarkly Hill are located at the periphery of Roman influence in Scotland – although the last three share a common setting on the fertile Moray Firth coast. The abrupt closure of the complex at High Pasture is intriguing. Other cave and rockshelter sites across the western seaboard display continued activity, *e.g.* at Fiskavaig, Skye, and the increasing use of artificial subterranean structures such as souterrains and 'wells' (Section 14.5.2) also indicate that access to the subterranean world remained important in Iron Age cosmology. It is thus a mystery why High Pasture was closed.

The development of an Early Christian foundation at *Cille Bhride* (Kilbride), on the valley floor just 0.5 km away from High Pasture, is testimony to the wider cultural changes taking place during the early centuries AD. Despite this, beliefs deeply rooted in pre-Christian society were acknowledged and assimilated. At Cille Bhride, this included the well of *Tobar na Annait*, today still covered by a complete upper rotary quern stone, said to be the home of an immortal fish, and to which newlywed brides were brought to ensure fertility (Lamont 1913).

14.3 Experiencing High Pasture

During the Early Iron Age (Phases 4–5), the monumental development of High Pasture had reached its zenith, and being a participant in activity at the complex would have been an incredible sensory experience. Excavation, particularly within the cave, affords some understanding of the unique character of High Pasture and its likely significance for the Iron Age people of Skye and beyond.

14.3.1 Physical space and movement

Structural and architectural features ensured that access to the cave was maintained, managed, and controlled. Entering the complex would have meant following the walkway, flanked by wooden posts, along its arc to the southwest before passing through the monumental wall of the precinct enclosure. Once inside, movement would only have been possible along the same paved path, flanked as it was by intensive activity areas – some perhaps covered by small, roofed shelters, slab-built hearths within and atop red, orange, and black hillocks of ash and fire-cracked stone. This internal area only measured 8–10 m in diameter, similar in area to a prehistoric round-house. Space within the precinct would therefore have been limited to small, select groups or individuals. The slopes of the natural amphitheatre extended above the enclosing wall to create an intense, private place, partially hidden from view. At the end of the walkway, the stairwell opening with its corbelled roof would come into view, perhaps through a thick, moving cloud of acrid smoke. A wooden door or organic screen would reveal a steep, narrow flight of uneven steps, leading down into the vague outline of the natural cave entrance. Descending the steps, one would enter a restricted, claustrophobic space, narrowing as the descent continued, until access to Bone Passage itself required a stooping movement below the modified cave roof. The transportation of midden, stone, and butchered remains into this space would have been difficult. Once inside, at first it would be possible to stand and walk forward a few paces, but then a short, sideways movement would be required to negotiate the narrow central section before entering the slightly higher north chamber. Passing a second constriction below a jammed boulder at the start of the Ramp, one would enter a tall, narrow rift with views over the underground stream. Artificial light, especially once into the ramp, would have been necessary, not least to avoid the hazards of flowing water, hidden crevices, and pot-holes below its surface (Fig. 14.1).

14.3.2 Fire, smoke, sound, and smell: the precinct

The use of fire was clearly central to activities in the precinct. The construction of multiple hearths, set precisely within the space (Chapters 6 and 7), denotes a significant part of the ceremonial experience. Although certainly used to prepare food and likely facilitate a range of potentially prosaic tasks, the hearths also formed an integral part of the precinct's 'sacred' space. In particular, passing between two fires may suggest purification or cleansing activity for those entering and/or leaving the cave – we



Figure 14.1. Reconstruction drawing depicting activities taking place in the precinct during Phase 2

are reminded of the Beltane driving of cattle between two bonfires while leaving for the summer shieling grounds, a process carried out until recent times in the crofting townships of the Western Isles of Scotland and Ireland (Green 1986, 72). Fires within the precinct would also have created dramatic effects and backdrops, especially during twilight or darkness, radically shaping the experiential qualities of this part of the complex. Flames and smoke, especially from hearths located close to the stairwell, would partially obscure the cave entrance and those entering and leaving it, creating a theatrical, mystical, and memorable experience (Fig. 14.2).

Other sensual impacts would also have shaped the precinct experience. The natural amphitheatre housing the whole would facilitate sound reverberation, an echo back from the hillside itself: an amplification of human interactions, animal sounds, and potential music adding to the atmosphere. These combined sounds from the high slopes may even have been audible to people in the valley below, watching the glow from the fires during hours of darkness.

Entering the precinct would have had a dramatic impact on the senses: a relatively small, enclosed, restricted space featuring slaughter, butchery, noisy, pungent food preparation, craft activity – the smell of burning wood and peat mingling with that of meat, drink and perhaps more obnoxious odours from decaying remains. Crackling fires alongside the noise of activity and performance would have permeated the restricted space and we can only speculate as to whether music supplemented this assault on the senses. The discovery of the musical instrument bridge suggests that the people visiting High Pasture were familiar with and had some access to music (Section 12.11). These sensual experiences were major elements of daily life in prehistory; within the intense space of the precinct, and in the context of its ceremonies, they would have been elevated to new heights.

14.3.3 Entering the underworld

Descending the narrow stairwell steps, light and sound would quickly fade, and those entering the cave passed into a different world – dark, damp, and likely a place where events followed particular, potentially structured patterns in a restricted space: movement, separation, and passage into the ground. Moving through the south chamber and its twilight zone, the darkness would have intensified, and (perhaps most significantly) available light would have depended on the evolving modifications focused on the cave entrance and stairwell, as well as the time of day and the season, and the presence of artificial light. The twilight zone marks the transition between light and darkness, and this area of the cave seems to have received special attention in the form of structured deposits and offerings throughout the Iron Age.

Moving through the central narrowed area of the cave, artificial light would have been necessary. This in itself may have had its own significance. With each movement of the body and source of light, shapes would appear from the shadows, creating a sense of movement and a play of extravagant and bizarre motion across the cave walls. The passage would appear to close and open on progression through the space, the natural cave architecture imposing an order to the cave experience: flowstone and erosion features suddenly illuminated, each step bringing into view materials and objects left by previous visitors, direct contact with unknowable elements of 'the past'. The longer the immersion below ground, the more would have been revealed as the eye accustomed, with manipulation of light sources a major factor in what could be seen at any given moment.

The penetrating darkness of the underground world, the so-called Dark Zone, is the most powerful element of a cave in terms of its effect on human behaviour, with particular implications for human physiological responses (Barnatt and Edmonds 2002, 125–6; Dowd 2015, 4). These are the places often described as unsettling in their unfamiliarity, fear-inducing, thrilling – a place of heightened senses. Such conditions would have been well-suited to inducement of altered states of consciousness and its concomitant implication of deeper levels of knowledge and spiritual awareness. The impenetrable darkness encountered in the rear of the cave is profound, unparalleled in the natural world. The flickering light of a burning torch or lamp would be the sole link to the outside world. The transition between light and dark also creates virtual and liminal barriers – passages disappearing into the darkness, creating a sense of mystery, the Otherworld.

Restricted vision stimulates the enhancement of other senses such as hearing and smell. The cave void would also create an echo, with the simple drip of water amplified by the cave architecture, human imagination, and the surrounding silence. The damp, humid cave environment creates a smell similar to decay, but people moving through Bone Passage would anyway have been exposed to pungent aromas: decaying animals, fish, and other organic materials – a particularly vivid, even overwhelming visual and olfactory experience within such a dark, enclosed space (Fig. 14.3).

Although dulled within the north chamber of Bone Passage, the stream is clearly audible: a muted rumbling gurgle. Access to the rear cave ramp, leading to the mainstream passage, required forcing the body below a large boulder, after which it is possible to stand upright in a tall, narrow rift coated in white calcite encrustations. Movement is only possible for the next few metres using a sideways shuffle, but then the space opens, looking out over the remarkable mainstream passage with its clean-washed walls and rush of water hurtling downstream into complete blackness. Suddenly, the sound of flowing water is almost deafening, the crashing flow just a short step away. The natural architecture in this section of the cave is spectacular; the walls sculpted by the passage of



Figure 14.2. Reconstruction drawing showing overhead view of the precinct during Phase 4



Figure 14.3. Reconstruction drawing showing activities in Bone Passage in Phase 3

water over thousands of years. Without light, however, this place would be transformed: mortally dangerous, a place of anxiety and claustrophobia, the rushing water creating disorientation, the fear of difficulty finding the way back to the surface.

Moving back to the base of the stairwell, this experience would roll back. Surface activities would gradually become more audible, the light increasing, even dazzling. Climbing the stairwell steps and re-entering the precinct may have been akin to a symbolic rebirth or rejuvenation, a physical and symbolic departure from the subterranean world of the dead to that of the living. Prolonged excursions into caves can stimulate hallucinations and out-of-body experiences (Dowd 2015, 8) – transformative practices which would be most apparent and symbolic when emerging into the outside world of life, light, colour, smell, movement, and sound.

14.3.4 The significance of water

Water was an important feature at High Pasture, embodied by the surface stream mysteriously disappearing underground to pinpoint the cave location. Heavy rain would have created a dynamic, dramatic situation at the complex, with rising water potentially spilling into the main cave entrance and into Bone Passage. However, such 'reactivation' would only have been possible during the Bronze and Early Iron Age before major modifications to the precinct. During heavy rain, the dull roar of the mainstream passage is clearly audible at the cave entrance, and entry into Bone Passage would have only emphasised this. That the cave could be transformed temporarily into a wet, noisy place would likely have enhanced its sense of otherness and liminality: its potential to change. Caves are often acknowledged in anthropological and ethnographic literature as sources of life giving water; particularly in karst landscapes where many of the water courses flow underground, creating a scarcity of water during summer months.

Various interpretations have been put forward for the significance of watery contexts in the past – links to the domain of the gods and the dead, perhaps portals to 'other worlds' – both in Britain and continental Europe (Brunaux 1987; Waterhouse 1992; Derks 1998, 135; Rey 2014). Water-filled places in the landscape can be conceived as boundaries, in both a horizontal and vertical sense: the water's surface creating a threshold between different worlds (Bradley 2017, 187). Rivers connect with the natural geographical borders which often reflect political power and/or religious belief, allowing both living and dead to connect with the spiritual world. Other watery places – pools, bogs, swamps, and man-made structures including wells – may also have formed liminal boundaries between earth and underworld, the living, and the dead. Such places may have provided points in the landscape where people could communicate with otherworldly entities and make offerings to appease them. Water cults

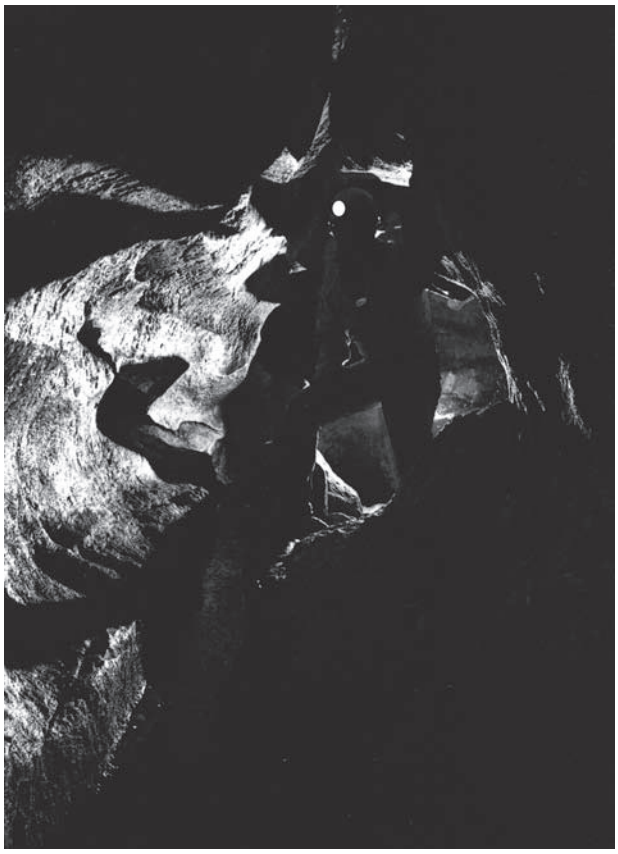


Figure 14.4. The underground stream, High Pasture Cave

and associated votive offerings are well-researched among prehistoric traditions in Northwest Europe during the Bronze Age and through the Iron Age and preceded the introduction of Roman aquatic deities by many centuries (Rey 2014, 39–43). Numerous examples of structured ritual deposits in association with watery contexts during the Iron Age are known across Europe (Hubert *et al.* 1934; Brunaux 1987; Bradley 2005). In Britain, important sites include Duddingston Loch (Callander 1922, 351–65), Flag Fen (Bradley 2000, 51; Pryor 2001), Fiskerton (Parker Pearson and Field 2003), Lynn Cerrig Bach (Green 1993, 52; 1994, 1–13), the River Thames (York 2002; Green 2004, 128), and in Ireland, the River Shannon (Cooney and Grogan 1994, 143; O'Sullivan 2007).

The access arrangements at High Pasture, both into the cave and especially the walkway leading through Bone Passage during Phases 3 and 4, highlight the potential importance of the underground stream during the Early Iron Age (Fig. 14.4): access through the cave at this time necessitated keeping the walkway open and clear of accumulating deposits. However, with the exception of the cattle placed on the ledge above the main streamway and within boulders at the end of Lake Passage, no artefacts or deposits were recovered from other areas of the underground stream. It seems likely that offerings were made into the flowing water; if so, they have long since disappeared, washed through the cave system, possibly

redeposited in small, flooded, inaccessible passages beyond the terminal chamber.

14.4 Cave use and function: reconsidering a domestic context

Caves are chosen by people, rather than constructed, and while they may be altered or modified, they are selected for specific natural qualities required or desired for carrying out a specific range of tasks. Traditionally, interpretation of cave use in prehistory has been structured by the belief that domesticity represents a more plausible, self-evident form of cave use than ritual (Manem 2012, 138; Tomkins 2012, 73). This is extrapolated via several factors: the range of artefacts and associated deposits recovered from cave sites, interior features including hearths and paving, topography, access, and to a lesser extent, cave morphology. Recent research, however, has taken a different tack, with the view that specific selection of caves for ritual reasons, for religious and/or cultic use, was widespread (Moyes 2012; Skeates 2012a; 2012b; Tomkins 2012; Dowd 2015).

14.4.1 Cave and context: location and morphology

Cave morphology is of particular importance to function (Wilford 2016). The geographical setting and physical characteristics of a cave would have been crucial to its selection for use: for domestic occupation, as workshops, or for ritual activity. A wide range of criteria would have featured in these choices – entrance orientation, light penetration, distance to a good water source, the natural properties of the cave (dry or wet), internal dimensions, and its topographical setting, especially with regards to contemporary settlement. How does High Pasture fit into existing models relating to cave use and function?

It has been stated (Moyes 2012, 5) that human–cave interaction is central to their very definition – that caves are partially defined by human perceptions of them and cannot be understood in terms of their geology alone, and that archaeological typology must encompass human perception in conjunction with geomorphology. This is especially true with regards to the presence, absence, or quality of light. Natural light has a major impact on human cave use, understood as three definable zones: light, twilight, and complete darkness. A speleologist's description of a 'cave' refers to a space containing a dark zone, while rockshelters, which are more open, possess light or twilight areas. There are of course many combinations of the two, and cave geomorphology plays a major role in creating a dark zone. Other natural features within caves influencing selection include speleothems and watery contexts, whether static pools or flowing water.

Two fundamental elements that influenced initial interpretation at High Pasture was its location in the landscape and the morphology of the cave itself. A significant factor in the perception, and thus selection, of the cave may have been the 'liminal' quality of its spatial and temporal distance from the everyday. The cave entrance is relatively remote, its setting possessing commanding views over the surrounding mountain landscape, hidden from view, on marginal land on the periphery of the settlement zone. Approached via a steady climb from the valley floor, High Pasture may well have been a secret place, where local knowledge was necessary for access. This may have been a significant part of the experience: the physical exertion of the climb, the stress and apprehension of entering the potentially dangerous interior. In their discussion of the Bronze Age use of caves in the Derbyshire Peak District, Barnatt *et al*. (2002) suggested that knowledge of a cave's location and how to access it was socially significant, with a restricted few able to find these features. Caves located near route ways, rivers, or specific land parcels or field systems may have acted as natural mnemonics in the landscape (Wilford 2016, 188, 227).

The morphology of High Pasture Cave may have been even more instrumental in its choice, and this has contributed significantly to our interpretation of site function. The section of cave accessed in prehistory (Bone Passage) comprises a relatively narrow length of passage with a damp and humid atmosphere. Its physical shape – two small chambers separated by a narrower constriction; a ramp exit defined by a further constriction – provides a range of defined activity areas. Traversing the passage to access the underground stream beyond would have required specific movements. Access to the streamway would have depended on water levels, with even dry conditions requiring some wading through shallow pools and stooping through lower passage sections. Darker, less accessible sections of the cave were also prone to sudden, dramatic flooding during heavy rain. Beyond the immediate entrance, the limited natural light would have lessened with each successive construction or modification of the stairwell abutting the cave entrance, especially during final phases of activity when it was covered with a corbelled roof: interestingly, no stone lamps were recovered among the plethora of artefacts deposited at the site. Bone Passage, the Ramp and sections of the mainstream passage are also adorned with calcite formations of varying hues and colours. Even today, with knowledge of how they are formed, these natural encrustations covering the walls of the cave are remarkable to behold and we can only speculate on their effect on its prehistoric visitors.

All these factors suggest that the cave would not have been suitable for normal domestic occupation, even temporarily. This is confirmed to some degree by the absence of direct evidence for fire-setting in the cave. But these same characteristics, in this remote location, did render High Pasture suitable for more esoteric activities, offering an exotic range of sensory experiences many times more varied than those of a simple rockshelter or less complex

single chamber cave. Wilford (2016, 349–50) demonstrates that cave environments significantly influenced the mode of human use, with human remains predominantly recorded in vertical shafts and multi-chambered caves, and rich assemblages indicating extended periods of deposition concentrated in more extensive multi-chambered karst caves … especially those containing an underground stream.

14.4.2 Identifying and defining ritual activity

Talking about ritual is fraught with difficulties: of identification, of definition, of contextualising an experience far removed from our modern worldview. Understanding ritual as a separate domain of activity, in opposition to the domestic or everyday, is problematic: certainly for the Iron Age, the potential for ritual significance to have permeated every aspect of everyday life is acknowledged, complicating further any attempt to identify ritual activity via signifiers which defy explanation in domestic terms. While interpretation of the function of prehistoric structures might assume that they primarily formed a 'domestic' task-space (Brück 2007, 24–38), unusual forms of deposition, such as structured pit deposits below house floors, or incorporation of human remains into the fabric of buildings at key moments in their history (Pappa *et al.* 2004; Bradley 2005, 13–15, 170–80; Armit 2006; Tucker 2010; Waddington 2014) show that prehistoric spaces saw the 'everyday and repeated' inextricably linked with the 'unusual and unique'. Houses were locations where ceremonies, gatherings and political events unfolded as well as domestic spaces, and the performative nature of 'household' architectures demonstrate that their creation, maintenance, and destruction were a vehicle for people to articulate relations, values, and worldviews (Waddington 2014, 66–7).

Past work on caves has generally recognised two circumstances where ritual has been inferred without question: cave art and mortuary contexts. But for other situations, the traditional separation of 'ritual' and 'domestic' into discrete spheres of experience has served cave study badly. Discussing the caves of Neolithic Crete, Tomkins (2012, 59–74) highlights this as a key issue in cave interpretation, with its corresponding expectancy that ritual assemblages should contain specialised equipment and votive objects. In-cave assemblages have thus commonly been interpreted as domestic simply because they often consisted of domestic type objects, along with materials such as butchered bone and fuel residues.

The artefact and environmental assemblages from High Pasture broadly fit with what would normally be found in a domestic Iron Age context in Scotland, but the excavation suggests that the site was unlikely to have seen domestic occupation, and investigation of both the immediate cave environs and surrounding landscape confirms the absence of typical later prehistoric domestic structures. Although features identified at the surface did include structural, monumental architecture, this was overwhelmingly focused on maintaining access to the cave throughout its Iron Age use, rather than facilitating development of more complex spaces in the precinct enclosure – which is defined as much by its central traversing walkway leading to the cave as by its internal hearths and surrounding wall.

As Skeates (1997, 80), Tomkins (2015, 63–5), and Manem (2012, 140) comment, archaeologists have not always been successful in defining ritual assemblages. A challenging aspect at High Pasture was the large assemblages deposited, especially within Bone Passage. This low, restricted, damp space housed the 'evidence' of a disproportionally wide range of crafts and economic activities: weaving, leatherworking, metalworking, object manufacture from a wide range of raw materials including antler, bone, and stone (Section 12.12); and the remains of resources indicative of pastoral, arable, and wild harvesting activity (Section 13.16). These were unlikely to be indicators for activity potentially taking place within the cave itself. A small assemblage of iron and antler weapons, and the presence of disarticulated human remains, presented further evidence for a 'special' series of deposits: all the craft and economic activities that one cultural group could practice, along with funerary rites, were represented in this narrow cave and its precinct – activities that could or would take place elsewhere within the settlement zone. In many respects, these represent a symbolic mirror of real or maximised activities, sublimated in a ritual context.

The deposits and artefacts recovered from some caves, including High Pasture, are often both quantitatively and qualitatively rich – a paradoxical concentration – while those traces that exist on contemporary surface settlements are often much less significant. The contradictions between the functions of the artefacts found together in these caves, along with their associated environmental remains, has not previously been considered in detail. In the case of High Pasture, how can the confined space of Bone Passage be both a locus for food storage or even precious objects, and a space for rubbish dispersal, or a locale where a plethora of craft activities took place which was also used for funerary activities? Why, for example, would food waste not be removed from such a restricted space? Most Iron Age domestic space appears to have been kept clear of accumulating waste during use, with rotting remains (a process perhaps accelerated by a humid underground environment), attracting pests.

The use of both cave and precinct for the deposition of human remains (Section 11.2; 11.6) is a particular expression of ritual activity, reflecting a perception of caves as liminal places, natural conduits between the world of the living and an underworld of spirits, gods, or ancestors (Dowd 2015; Leach 2015; Armit and Büster 2020). Some of the human bone and teeth recovered at High Pasture, including the burials at the top of the backfilled stairwell, were accompanied by animal remains. These were often

from very young individuals, including foetal elements: pig, cattle, sheep/goat, horse, and dog, and also non-domesticates such as red and roe deer, wild boar, and wolf. Their bones were also incorporated within the fabric of site structures, such as the stairwell's wall cores, below paved surfaces, and in the precinct enclosure wall.

More common deposits of mature animal remains most likely relate to consumption, including feasting activities (Section 13.2.6), but even here, 'special' activity can be postulated. The final pig deposit placed in Bone Passage (C001, Phase 7) was not just 'normal' refuse, fundamentally different in nature to the caches of cattle remains from the same depositional phase (Section 13.2). Likewise, potential structuring is seen in the deposition of fish, shellfish, and the significant quantities of burnt grain, including the large placements of clean and processed barley, burnt before deposition, and left uneaten. If recovered from a domestic settlement, such deposits would be classed as everyday 'refuse' – but in the context of their deposition alongside artefact groups and human remains, it may be preferable to label this material as 'ritually charged garbage': the result of specific activities taking place perhaps solely at High Pasture, perhaps also at contemporary settlements in the wider landscape.

14.4.3 Complex biographies: generation, deposition, and curation

In addition to the deposits themselves, a range of what might be termed 'ritualisation techniques' can be identified at High Pasture which further identify these materials, in the absence of evidence for local habitation, as a rare example of a potentially entirely ritually deposited sequence: structured deposition, fragmentation, transformation.

Generation: where did the material and objects come from?

High Pasture's location and the absence of adjacent contemporary structures indicates that animals, fish, shellfish, and grain were transported to site. Butchered crania and lower limbs imply that most animals arrived alive and were slaughtered and dismembered on site. The only potential domestic variant to this is horse, for which only individual teeth and fragment of mandible were recovered. Joints of meat may of course have also been transported. The nearest location where shellfish could be gathered, and saltwater fish caught, is Camas Malag, *c.* 1.5 km from the cave. That people were prepared to transport materials over some distance to High Pasture is evidenced by the presence of cobble pot-boilers: we know from their lithologies that many derived from the raised beach and shoreline of Camas Malag. Wood and peat could have been gathered relatively close to the cave, but it is noted that through the Iron Age, species representation in the charcoal assemblage increases and diversifies, and includes non-local species such as Scots Pine (Section 13.10).

Excepting the semi-articulated remains deposited in the top of the backfilled stairwell during its final closure (Section 8.4), disarticulated human bone and teeth recovered from High Pasture were incorporated into midden. Is it possible that this small assemblage, mostly bones from limb extremities, represent remaining elements from individuals placed inside the cave for excarnation? This has been suggested at other sites, *e.g.* MacArthur's Cave, near Oban, where the remains of at least four Early Iron Age individuals were identified (Saville and Hallén 1994). Alternatively, the High Pasture fragments may represent elements from selected individuals, interred and/or deposited with specific purpose. In-cave depositions of human teeth and bones, often into caves with difficult access, have been interpreted as potential votive offerings elsewhere (Dowd 2015, 164–6).

Isotope analysis suggests that the adult female in the top of the stairwell may have lived locally to High Pasture, but that her later adolescence and early adulthood may have been spent outside Skye, or on a different part of it (Section 11.6). Analysis of one young adult (Individual K) indicates high, prolonged consumption of marine resources unusual for British Iron Age individuals. These results echo those of the 'Elder' female, deposited outside the broch at The Cairns, Orkney, in *c.* AD 200, who appears to have consumed marine resources at consistently high levels throughout her life (Carruthers pers. comm.). An alternative interpretation is that Young Adult K's (and also, the Elder's) ^{13}C and ^{15}N enrichment relate to movement, not diet, reflecting an environmental baseline with higher oxygen and nitrogen values, likely indicating a warmer environment than found in most of Britain (Section 11.6.3).

High Pasture's artefact assemblage includes almost all the materials present in later prehistoric Scotland, including rarely preserved organic objects such as the wooden lyre bridge, decorated La Tène metalwork, an intricate spiral glass bead, decorated bone comb fragments, a Roman bronze coin, and an important group of socketed iron tools. Although High Pasture had no associated recognisable domestic architecture, it seems likely that some events taking place at the site, especially given its location, lasted for more than a single day. We may envisage temporary encampments surrounding the complex, the evidence for large scale feasting and food preparation implying that many recovered items such as querns, pottery vessels, and some everyday tools would have been associated with these activities. Episodes of crafting may have been undertaken, pots broken, and materials casually lost.

With around half of the individual finds categorised as tools or craft debris (including evidence for non-ferrous metalworking such as crucibles and copper alloy offcuts, and antler waste) was craft production a major part of the

High Pasture complex 'identity'? – taking place either at the site, or in the surrounding landscape? Such questions need to consider both site morphology and the abundant evidence for structured deposition. In the absence of *in situ* related structural evidence, can the presence of iron slag alone, or partially finished whorls or combs directly imply on-site crafting or industry?

The complete ironworking process, from ore to artefact, is seen within the High Pasture assemblage (Section 12.8), and examining its context is essential to understand whether every stage of this complex activity took place on site or whether material was brought for deposition. While on-site blacksmithing seems likely, with hammerscale retrieved from some of the precinct hearths, evidence for smelting is less clear. The large furnace lining fragment from the Early Iron Age (Phase 3/4) is one of the earliest Scottish examples, indicating that those visiting High Pasture Cave had access to a new, possibly exotic craft. However, with no evidence for an *in situ* furnace on site, it is possible that this single chunk of furnace wall was deliberately deposited. If so, it is also possible that other materials representing ferrous and non-ferrous metalworking may have been introduced from elsewhere.

Both flake and spheroidal hammerscale were recovered during sample processing at High Pasture, the small flakes dislodged as hot iron is hammered, while slag spheres form when molten droplets are expelled from hot iron during the same. In large quantities, hammerscale is a good indicator of *in situ* blacksmithing as these tiny flakes and spheres are generally too small to be easily removed elsewhere. Hammerscale was recovered from the precinct outside the cave, where smithing may have taken place in association with the numerous hearths but was also recovered from Bone Passage. There was no indication of an iron smithing hearth in the cave and so, unusually, in this instance the material seems to have been introduced. It is or course possible that this was unintentional, perhaps within redeposited midden from the precinct. However, the inclusion of hammerscale in specific contexts at High Pasture may be seen in the same light as the large quantities of burnt grain (Section 13.8; 13.16), also incorporated into midden in the cave, but also present in other targeted areas of the site such as stairwell backfill deposits and landings (see Section 13.8.4).

Over 10 kg of bog iron ore was also collected from High Pasture, most deposited during Phase 3 (91%). There was no evidence of heating (*e.g.* vitrification or charcoal impressions), indicating it is in its raw, unmodified state, while its context, the fill of the first phase stairwell, suggests it could have been a deliberate deposit (Section 12.8.4). Apart from small quantities of hammerscale there is no other significant ironworking debris present before Phase 4, which also suggests that the bog iron ore was not necessarily used for ironworking.

The assemblage of vitrified material from High Pasture Cave is a challenging one to interpret: centuries of deposition and movement of material have created a complex stratigraphic sequence. But, in conclusion, we must consider that much of the ironworking assemblage may have been deliberately deposited, despite the difficulty in interpreting a waste product in this way. At the time of High Pasture, when ironworking was relatively new, the significance and impact of this visually dramatic and transformative craft must have been great. The act of ironworking, its resulting products and debris, and the ironworkers themselves, were perhaps viewed as symbolically charged and their presence at this site is in keeping with this (Section 12.8.5).

If this important assemblage of material was not generated at High Pasture, then where might it have come from? A possible source is site LS06 (Section 1.4), a structure excavated as a part of the High Pasture Environs project (Birch and Wildgoose 2015). Located within a prominent oxbow in the stream issuing from the High Pasture Cave resurgence, *c.* 0.3 km from the cave, these excavations produced an extensive assemblage of iron slag, plano-convex hearth bases, and half of a large steatite tuyère, whose size suggests association with a large, potentially smelting, furnace.

The content and depositional context of the antler working assemblage also questions its material source. This included at least 75 fragments of working debris – both shed and gathered material, prepared beam segments and strips, and tine offcuts – suggesting that much of the material was yet to be used. A large concentration of this debris was recovered from a small and focused area in the north chamber of Bone Passage, suggesting a token/votive deposit or cache. In addition, there are few primary offcuts, suggesting that some antlers may have been part-processed elsewhere. This may indicate that antler material arrived at the site intended for deposition, rather than for use in on-site craft activity (Section 12.5).

Of crucial importance is understanding the degree to which artefacts and materials were locally derived or were transported to High Pasture from further afield. This informs on not only the potential and relative significance of the assemblages, but also where visitors lived, how far they travelled, and thus how important High Pasture was in Iron Age Skye and beyond. While the artefact assemblage is almost all made from locally available materials and displays manufacturing traditions current in Iron Age Skye (Section 12.12.8), there are a few interesting exceptions. The Roman coin and the La Tène sheetwork are both visibly exotic, as is the double-linked chain incorporating recycled Roman metal. However, most copper alloy finds fit local traditions and, along with objects such as the glass beads (all most likely imports) are known from elsewhere on Skye, indicating that these were in common circulation. The stone assemblage is predominantly local, from Skye or the immediate mainland (Section 12.4) but provides a few intriguing non-local items. The steatite (talc-schist) used to manufacture many of the spindle whorls and a

bangle is plausibly from the Glenelg peninsula on the adjacent mainland, but equally, may have derived from sources further afield, including Shetland. Sources of oil shale, from which some of the bangle fragments are manufactured, have also been tentatively identified in north Skye and south Raasay, where Emeleus and Bell (2005, 175) reported Jurassic oil shales, although these have not been assessed for workability. Visual characteristics suggest three different sources were used for the bangles from High Pasture, although there can be considerable variability within one source. Other sources are markedly further afield, with oil shales occurring widely in the Central Belt, Brora in Sutherland, and south of the border. One shale bangle fragment is an unusual grey colour, rarely known in Scotland (Section 12.3), and the precise source of this material has still to be ascertained.

The stone items manufactured from rocks of Dalradian geology, most likely sourced in Argyll, provide additional clues to trade and movement. These include a pair of rotary quern fragments and a decorated palette of garnet mica schist, an actinolite schist spindle whorl and two greenstone rubbers. Most Scottish querns seem to use local stone types, as good stone was widely abundant, so the two quern fragments here provide valuable evidence of longer distance movement. The use of ornate stone for the decorative palette is unsurprising: like other objects manufactured from decorative materials such as glass or shale, it is plausible that regional supply networks were in place. Our best evidence for the presence of visitors to High Pasture with links to Dalradian geology are the greenstone hide rubbers and actinolite schist whorl: there is no obvious reason for these everyday items to be acquired at a distance. Future scientific provenancing may reveal new detail for this line of enquiry; for now, we can only speculate on the true breadth of origin of the wider assemblage.

Some interesting comparisons relating to 'exotic' raw materials used for stone tools can be drawn from other cave site assemblages: Wookey Hole, Somerset, contained exotic stone imports such as a pair of beehive querns of Old Red Sandstone from either Pen Hill (Mendip) or of North Hill (Cornwall) type (Balch 1914, 573, 581), a Kimmeridge shale spindle whorl and two fragments of a shale cup (Balch 1914, 581), and whetstones made of micaceous schist, likely from Cornwall (Wilford 2016, 416). In re-interpreting the function of caves located in the karst of the Rochefoucauld, Charente, France and used by the Duffaits Culture during the Bronze Age, Manem (2012) took a very different approach to provenancing their deposited pottery. Basing his study on technical behaviour and the *chaîne opératoire* relating to pottery manufacture, he found that some of the material had travelled significant distances from settlement sites for deposition. Ceramics displaying the same *chaîne opératoire* had also been deposited together, in one limited area of a particular cave. In certain cases, he even found pots deposited in pairs in one limited space (Manem 2012, 144–5). The ceramic petrology undertaken so far for the ceramics recovered from High Pasture (Section 12.2.10) has revealed a wide range of tempers used in their manufacture. These temper materials strongly indicate that the assemblage may represents pots (or indeed, individual sherds) brought to the site from a range of localities, groups, or traditions. Broader approaches such as that employed by Manem may add further detail to these results, but it is worth considering the pottery sherd deposition at High Pasture as shown in Table 12.1 (sherds versus vessels by phase).

Structured deposition, fragmentation, and curation

Structured deposition is a concept that has been discussed in depth (Hill 1995) and along with this, the definition of terms such as 'unusual', 'symbolic', 'non-domestic', 'placed', 'intentional', and 'ceremonial' has been particularly useful in understanding this broad, interchangeable concept (*ibid.*, 95; Garrow 2012, 93). Garrow's view of structured deposition as a 'sliding scale' with 'material culture patterning' at one end versus uniquely symbolic 'odd deposits' at the other is particularly interesting in thinking through High Pasture, where the sheer volume of material threatens to overwhelm the potential for useful interpretation. His suggestion that material culture patterning does not have to always represent intentional acts resulting from underlying symbolic schemes but can 'just happen' – and might simply constitute subtle differences in occupation spreads across a site (Garrow 2012, 109) – is useful.

There is also more to an object's life than deposition (Garrow 2012, 121). Deposition at High Pasture was the last of a long series of actions in which these objects were involved, one or more of which may constitute the reason for their deposition as much as the object itself. Identifying structured deposits at High Pasture thus considered the frequency with which particular deposits occur, their location, combinations of artefacts and other associated materials, and whether artefacts are whole or fragmentary (Bradley 1987, 352; Schiffer 1987, 302; Brück 1995, 255; Hill 1995, 3, 95–6; Needham and Spence 1997, 86–7; Thomas 1999, 62; Brudenell and Cooper 2008). Fundamentally unusual in internal design, containing numerous events which would qualify as 'odd deposits' in Garrow's terminology (2012, 194), and with evidence for 'special' forms of treatment for some materials, the nature and context of deposition is not really in doubt at High Pasture – although with activity spanning over 800 years, the passage of time has blurred elements of material patterning. The caches – cobble tools, antler points, spindle whorls, arguably antler working debris – comprise some of the more visual forms of structured deposition, mostly associated with Early Iron Age activity (although as the number of artefacts increased, caches may have become less common or more difficult to identify). Although less typical cache forms, concentrations of bog

iron ore and other metalworking residues, and the charred wooden objects in Phase 4, would also have represented valuable material.

The recovery of many intact items is also significant. Usually seen within bigger groups, or placed in structural elements, objects such as a fine bone pin, a decorated spindle whorl, or an iron spearhead were still useable, and unlikely to be casually discarded or lost. The iron assemblage is a particularly good example, suggesting specific depositional habit. Half of the 42 objects were deposited intact and included large tools, such as the socketed axe, and weapons. Several had evidence for mineralised wooden hafts, indicating that they formed *complete* objects when deposited. Other mineralised organic traces indicate that one of the daggers was in a leather scabbard, and a ring-headed pin had been placed in a leather pouch. Rare evidence of decoration on one of the iron spearhead sockets, and traces of sharpening and repair on two of the daggers, adds to a picture of selection of cared for, valued objects. The intact saddle querns recovered from the site were all deposited working face down, including the large quern SF15.408 recovered from Early Iron Age Phase 2. This quern had been heavily used and curated at the time of deposition, possibly transported into the site during some of the earliest phases of activity.

By contrast, several intentionally broken objects were also recovered. Smashed saddle and rotary querns, some deposited in caches, display evidence of 'overkill' in the form of cut marks and defacing of the grinding surface. Rotary quern fragments seem to resemble deliberately halved/quartered segments rather than fractures resulting from accidental or *in situ* damage. The iron spearhead, with its tip bent over, echoes the treatment of weapons in hoards across Europe in later prehistory (Section 12.8). More delicate, personal items were also subjected to deliberate breakage, after which their fragments had been kept together, such as an iron ring-headed pin and copper alloy bundle including bangle fragments. Many other fragmentary items were recovered: bone and antler tools and fittings, bronze mounts, glass beads, spindle whorls. While it is possible that some of this reflects post-depositional processes and/or trampling, the condition and association of many objects implies that burial was relatively quick and localised disturbance minimal. The placing of fragmented objects into caves is seen elsewhere: such as at Franchthi Cave, Greece (Talalay 1993, 45–6; Vitelli 1993, 60; Stroulia 2003, 24). Ethno-historically, among the Maya, year renewal offerings placed in caves consisted of old, worn out, or broken objects (Moyes 2012).

Fragmentation has been interpreted as the ritual killing or sacrifice of objects prior to deposition and also as signalling creation and expenditure of social wealth (Jonuks 2009, 252). The 'fragmentation premise' postulates that objects were first regularly and deliberately fragmented; and that the resulting fragments were then often re-used in an extended use-life (Chapman and Gaydarska 2006). The re-integration of object parts with different life histories forms a supercharged structured deposition of all stages of an object's biography: the birth of a complete object, fragmentation, re-use of different parts in different contexts, and re-integration as a part of its final deposition (Chapman 2012, 131). It is possible that, along with complete objects, the deposition of fragments of the same types of material would have enhanced a deliberate deposition. The cache of steatite spindle whorls deposited in Bone Passage contains complete (newly made and well used whorls), part finished examples, and one whorl that had been halved. Fragmentation practices may also relate to the human body (Gamble 2007, 87–110), with its processing and the funerary rite, perhaps featuring deliberate fragmentation, dispersal, and deposition of body parts. After excarnation and disarticulation, it is possible that human bone fragments were circulated amongst the living as expressions of relationships with the dead, before final deposition (Triantaphyllou 1999). The marked contrast in the deposition of intact versus fragmented objects at High Pasture may thus intimately relate to votive or sacrificial processes.

The environmental assemblages from High Pasture included animal, fish, shellfish, and burnt plant remains, mixed with fuel residues, and were recovered from all three major areas of the complex. Besides the general residue accumulations associated with the hearths, specific, concentrated deposits of organic materials stand out: within structural contexts, incorporated under and between paving, in the stairwell and precinct enclosure walls, and particularly at 'liminal' locations such as the cave entrance and at defined locations within the two main 'chambers' of Bone Passage, especially the constricted central zone. It is clear that locations had significance not linked to individual events, with strong, enduring associations between certain types of organic materials and where they were deposited. For example, with the exception of two small periwinkle caches in the blocked precinct entrances, all fish and shellfish were placed in the cave, and the majority into the northern half of the passage. The fish bone assemblage shows that individual species saw zoned deposition: mixed in the north chamber (haddock, cod, saithe) but almost exclusively herring within the narrow central zone. Association between material types is also seen, such as the placing of burnt grain with fish bone and shellfish in the north chamber. The use of young animals, particularly in deposits linked with closure or foundation, is a frequent theme, with an association with disarticulated human remains, including the burials located within the top of the backfilled stairwell (Section 8.4). Species patterning can also be seen in some larger midden spreads associated with foundation and closure events: increased red deer, dog, horse, and pig. In closing deposits in particular, unburnt bone dominates, and displays less butchery, perhaps suggesting the deposition of carcases, or elements thereof. These patterns

indicate symbolic activity not limited to individual events but expressed over longer timescales – a powerful continuum of ritual practice. The 'special deposits' of cached cattle and pig bone, relating to the final closure of the cave, display evidence for special treatment and ritualised placement which goes far beyond the usual in structured deposition of animal remains. Pig was an important species at High Pasture, especially from Phase 3 onwards, but its significance may go beyond a representation of conspicuous consumption: selection, preparation, and curation of pig remains appears to be an important part of the ritual process (Section 13.2.6).

The more discrete deposits associated with specific events (foundation, closure) and those focused on the precinct hearths were overshadowed by the much larger midden spreads which filled Bone Passage and the precinct, especially their huge inputs of burnt and unburnt stone. Beyond the precinct wall, dumps of fire-cracked pebbles, ash, boulders, and unburnt stone formed a horseshoe shaped spread of material that almost surrounded the site. These outsize deposits may have represented not merely debris but a material entity connected with past events and, as such, also a curated object. The inclusion of larger unburnt stones, especially into Bone Passage where transport down the steep stairwell and into the cave would have been a difficult, dangerous task, is interesting. Did these stones represent elements from unknown and previously dismantled structures, or were they used to 'bulk out' the midden deposits, making them more prominent, more remarkable?

In the cave, artefact concentrations close to the entrance and stairwell base, adjacent to the ramp exit to the stream, and, in particular, in the passage's narrow central zone, suggests a series of sequential, specific loci for deposition, often of the same type of objects through time. These points may represent specific thresholds, with broader artefact distribution across the passage representing material entering the cave as part of midden redeposited from the precinct, but overall, there seems little evidence of changing preferences for where certain artefact types were deposited over time (Section 12.1.6). Comparing precinct to cave shows that a broader range of artefact types is found in the former, and a striking difference in the number of stone finds from cave compared to surface. While it is possible that the size of some of the querns prohibited their transport into Bone Passage, the deposition of a large saddle quern at the base of the stairwell shows this was possible, and this therefore seems to reflect a deliberate choice. Calcite deposits on their surfaces indicate that at least some stone objects spent time in the cave but later moved into the precinct. By contrast, bone and antler finds were markedly more common in Bone Passage. It seems likely that rule, tradition, or superstition may have dictated the selection of appropriate materials for deposition both over and underground.

The burnt spreads see artefact numbers diminish significantly, but potentially structured deposits include burnt and fragmentary saddle querns – one placed working face down in a shallow pit surrounded by stones – and a possible small cache featuring metal, tools, and a bangle fragment. This area also seems to have been a focus for metalworking residues from Phase 4 to the final site closure.

The midden context of a significant proportion of the material from both cave and precinct adds a layer of complexity to understanding depositional pathways. Ceramic sherds, for example, were generally small and heavily abraded – but larger, refitting sherds of pottery recovered from the same deposits, displaying fresh breaks, indicate that these integral, original midden components had been joined by specific objects introduced as part of the final (re)deposition event – the midden itself providing a ready-brewed medium into which artefacts, and sometimes human remains, could be appropriately incorporated. The perception of midden as a valuable symbolic as well as practical creation, with many potential uses, is well referenced (Brück 1995, 255; Needham and Spence 1997, 84–5; Pryor 1998, 64) with strong associations with fertility and the cycles of life, death, decay, and renewal (McOmish 1996; Needham and Spence 1997; Brück 2006; Pollard 2008; Waddington and Sharples 2011). The specific curation of midden is seen even on a monumental scale (*e.g.* McOmish 1996), with potential connotations of affluence and social success, even becoming markers of territorial dominance (Needham and Spence 1997, 85; Church *et al.* 2014).

Middens and their associated materials were curated throughout High Pasture, remaining visible between periodic visits and longer periods of hiatus, thus forming meaningful structured events in themselves. Their placement often marked significant changes to site infrastructure, such as the closure of old structures and events connected with them (*e.g.* the stairwells). They may also have marked significant events or gatherings. Midden curated at High Pasture over a period of at least 700 years was moved and redistributed around the complex (Sections 13.16.2 and 12.12.7) – acts of large-scale reconfiguration which were clearly a key part of the choreography of bigger, likely public events. These actions were not necessarily 'structured' in terms of material composition or treatmen, but used 'ritually charged rubbish' as a medium for developing and 'structuring' the entire ritual arena. Such reconfigurations, while dictating the use of the available space, clearly also had a long range viewpoint, such as the maintenance of access through Bone Passage. Could midden also have been imported into the site from surrounding settlements? At the non-domestic site of An Dunan, on the island of Lewis, it has been implied (Church *et al.* 2014) that the ashy fuel residues forming a conspicuous mound in the structure had been



Figure 14.5. Reconstruction drawing showing activities in the precinct during Phase 3, with the curated ash mound & hearths

sourced elsewhere. At East Chisenbury in Wiltshire, it has also been suggested that the substantial midden mound represented the curation of secondary deposits, where animal waste and other materials were gathered together, transported from their origin point and deposited at the site (McOmish 1996). Such a scenario is difficult to prove for High Pasture (Fig. 14.5), but we know that people were certainly used to carrying bulky, heavy resources into the site.

The movement and redistribution of material within the complex would also have revealed objects embedded into the site during earlier activities. While it seems that many objects were retained *in situ*, some were certainly removed for redeposition – either at High Pasture, or possibly in the wider landscape. A few stone tools recovered from the precinct have a calcite 'cave skin' adhering to their surfaces. These must have lain exposed in the cave for a significant time before deliberate removal, illustrating a complex and rarely glimpsed post-depositional biography (Section 12.12.7). A number of objects recovered from the site relate to much earlier Neolithic and Early Bronze Age activity, including lithics, Beaker and Food Vessel ceramics, and a pig bone dated to the Late Bronze Age recovered from Iron Age deposits. Are these residual incorporations, or curated objects 'rediscovered' by Iron Age activity? Likely to represent the latter category is a rough-out for a Neolithic axe manufactured from Langdale Tuff (SF13.001) deposited in an Iron Age ditch fill.

Depositional patterning at High Pasture mirrors, to some extent, contemporary settlement sites, such as the deliberate incorporation of midden within house architectures in the Scottish Atlantic Iron Age, or the setting of Bronze Age round-houses in Shetland and the Western Isles into pre-existing middens (Downes and Lamb 2000; Williams 2003, 231). The significance of midden locations to round-house geographies as places of transformation and ritual focus has been repeatedly established (Parker Pearson and Richards 1994, 52; Richards and Thomas 1984). Roman settlements in central Britain show a link between 'midden' locations and specially 'placed' deposits (Chadwick *et al.* 2013) with the concepts of fertility and regeneration associated with midden deposits during the Iron Age apparently continuing into the Romano-British period. In Atlantic Scotland, structured deposition of midden has been identified in settlement sites, and even in individual structures (Fairhurst 1971, 74; Armit 1996, 145–8; Waddington 2014), most likely

representing material transported into a building to mark its abandonment or 'death' – a final 'closure' of the structure (Waddington 2014, 241). Similar deposits have been recognised at sites displaying monumental architecture, including Howe, Orkney (Ballin Smith 1994), which also contained human remains and artefacts incorporated within house structural elements, potentially inferring foundation rites (Waddington 2014). Large deposits of pottery and animal bone, often containing red deer, were associated with abandonment contexts along with disarticulated human bones and skeletons relating to final closure of buildings (*ibid.*, 82–3). Important events seem to have been marked by breakage, material deposition, consumption, and feasting deposits (Hill 1995, 27), suggesting ritualised consumption was intimately linked to settlement change.

A building's abandonment did not necessarily mark the end of deposition. A growing core of evidence highlights the continued placement of human remains, sometimes with artefacts, into abandoned structures or settlements. These are perhaps best interpreted as offerings to past generations, an attempt to connect with the ancestors (Alcock 2003, 272), or as evidence for specific attitudes to the remains of monumental structures. It is perhaps partly due to poor recording of such contexts that few direct associations between human remains, artefacts and other materials are so far known (Waddington 2014).

14.5 High Pasture: a Scottish to European context

Caves and rockshelters are enduring natural features in the Scottish landscape. In excess of 3900 recorded entries exist in the Scottish Cave and Mine Database (http://registry.gsg.org.uk, accessed October 2022), and at least 420 caves and shelters are recorded as containing archaeology, scattered across the limestone regions and especially the coastline, where a wide range of basement rocks permeate the landmass. With many of these sites not subject to detailed survey or excavation, it is likely that many more contain evidence of past human activity.

As discussed briefly in Section 1.5, Scottish caves and rockshelters have seen varying levels of excavation and interpretation, much of it during the 19th to early 20th centuries. Data varies in quality and although some sites have been re-assessed in recent times, there has been minimal synthesis of the data, and defining activity and function at these sites remains problematic. However, renewed research interest, scientific techniques, and growing awareness of the research potential of caves and rockshelters has seen the number of sites of archaeological significance in Scotland grow. This synthesis focuses on the Bronze Age to Iron Age, setting High Pasture Cave within a wider Scottish and European context.

14.5.1 High Pasture Cave: a Scottish and European Perspective

Following the Mesolithic, where the majority of caves and rockshelters seem to have been used for temporary occupation and economic activities, there appears to be a major shift in the Scottish Neolithic to funerary/mortuary use, with the use of caves and rockshelters for deposition of human remains seen in other areas of Britain (Chamberlain 2012; Leach 2015; Wilford 2016) and Europe (Waterhouse 1992; Skeates 2012; Dowd 2015; Tomkins 2015). In Scotland, human bone assemblages are identified at a number of sites including MacArthur Cave (Hallen 1994), Raschoille and Distillery Caves (Connock 1985), Carding Mill Bay Cave (Connock *et al.* 1992), Creag nan Uamh Caves (Saville 2005, 358), and An Corran Rockshelter (Saville *et al.* 2012). The use of caves for the deposition of the dead continues into the Early Bronze Age, with dated sites including the An Corran Rockshelter, Carding Mill Bay Cave, Covesea Cave 2, and Covesea Cave 1 (Buster and Armit 2014; 2016b), Glennan Cave (MacGregor 2003), Sand Rockshelter (Hardy and Wickham-Jones 2007), and Uamh Caillich (Dunbar and Lynchehaun 2007). Human remains include inhumations and cremation deposits, occasionally in association with disturbed cists, Food Vessels, and Beaker ceramics. Covesea Cave 2 also possessed timber structures possibly associated with excarnation (Buster and Armit 2016; Armit and Buster 2020, 251). Several other caves have produced undated material probably relating to this period, based on typology. A significant number of sites containing Early Bronze Age funerary remains are concentrated in Argyll, especially former sea caves around Oban. Evidence for Early Bronze Age activity at High Pasture was limited to the surface (Section 5.3), with no *in situ* material identified in the cave.

Most Bronze Age cave activity seems focused in the darker, sometimes less accessible areas. A similar pattern is seen both in Ireland (Dowd 2015, 125–60) and England (Greenwell 1894; Britton 1971; Britton and Longworth 1986; Leach 2015, 103). In Scotland, dated sites include Croig Cave, a former sea cave on Mull containing a cache of objects including a penannular copper bracelet and an amber bead, placed in a small Late Bronze Age pit (Mithen and Wicks 2012). A group of former sea caves and rockshelters at Coire Sgamhadail on the Applecross Peninsula (Hardy and Wickham-Jones 2007), produced deep midden deposits containing shellfish, animal bone, lithics, and cobble tools dating to the Bronze Age, as did a pig bone recovered from An Corran Rockshelter (Saville *et al.* 2012), indicating continuation of activity from the Neolithic.

Elsewhere, a small number of former sea caves have produced human remains. At Sculptor's Cave (Benton 1931; Shepherd 2007; Armit *et al.* 2011; Armit and Büster 2020) and especially the nearby Covesea Cave 2 (Armit



Figure 14.6. Image showing the Covesea Caves, Moray, Scotland (© Ian Ralston, courtesy of © Historic Environment Scotland, Canmore cat. no. SC01012387)



Figure 14.7. Location of Borness Cave on the Galloway coast of southwest Scotland (© Historic Environment Scotland, Canmore cat. no. DP241606)

and Büster 2016a; 2020; Fig. 14.6), a re-emergence of mortuary practices was revealed, dating to the Late Bronze Age. The human remains from Sculptor's Cave, some displaying evidence for post-mortem modification, were accompanied by a rich array of metalwork comprising personal ornaments: penannular bracelets, pins, and gold-covered hair rings. Parallels are seen at Borness Cave on the Galloway coast (Corrie *et al.* 1872–4; Clark 1874; 1878; Corrie *et al.* 1874; Fig. 14.7), excavated during the later 19th century, where two infant crania were recovered dating to the Late Bronze Age (Sheridan *et al.* 2015).

Caves featuring human remains dating to the Late Bronze Age in England include Raven Scar in the Yorkshire Dales (Leach 2006, 103), and Heathery Burn, Co. Durham, where at least one articulated individual was recovered alongside a rich assemblage of Late Bronze Age metalwork (Greenwell 1894, 96; Britton and Longworth 1968; Britton 1971). Re-analysis and dating of human remains from early Irish cave excavations provides further evidence for Bronze Age activity. Dowd (2015, 127; 2016) notes that despite the importance of cremation to Bronze Age funerary practice, cave remains of this period are almost always unburnt, suggesting differing funerary rites for the underground realm. Dowd's own excavations at Glencurran Cave (Dowd 2015, 148–54) recovered a wide range of Bronze Age material, much apparently votive deposits, with activity concentrated in the cave's 'dark zone'. Structural modification at Glencurran contained and defined this part of the cave; blocking off passages and creating a walled zone which received quantities of votive offerings. Caves in Ireland seem to figure prominently in Bronze Age ritual life (Dowd 2015, 160), building on established Neolithic funerary traditions. Growing evidence for especially Late Bronze Age structured deposition into caves includes human and animal remains, but also artefact groups that in any other context might appear 'domestic'. Our limited evidence for Bronze Age activity at High Pasture cave also appears focused within its darker recesses (Section 5.4).

A wider context for funerary activity and votive offering during the Neolithic and Bronze Age is also demonstrated across other European regions (Waterhouse 1992; Warmenbol 1996; Harding and Gilmour 2000; Skeates 2012; Tomkins 2012; Jasinski and Warmenbol 2017), including Manem's (2012) work on the caves of the Rochefoucauld karst, Charente, France, used by the Duffaits Culture (Section 14.4.3). Original investigations tended to classify these as 'refuge'/'annexe dwelling places', or 'temporary' permanent dwelling places. Many of these caves produced large artefact assemblages dominated by ceramics, bronze objects, spindle whorls, loom weights, evidence of bone working, and metalworking waste. The caves also contain animal remains, mainly pig and sheep, and included young animals, along with horse and some wild fauna. Interestingly, these caves also produced large quantities of burnt grain (Manem 2012, 140). Manem's work has provided valuable evidence to suggest that many of the Charente caves were used exclusively for ritual activities including votive deposition, along with their use for funerary rites, attracting people over considerable distances.

The use of caves as mortuary loci continued into the Early and Middle Iron Age in Scotland, including at MacArthur Cave (Saville and Hallén 1994), where four individuals placed over earlier Mesolithic occupation deposits may represent a small cemetery, or an excarnation location. A few disarticulated human bones and teeth recovered from High Pasture date to the Early Iron Age (Section 11.4) and into the Middle Iron Age. Other Scottish cave and rockshelter sites containing Middle Iron Age human remains include Distillery Cave and MacArthur Cave in Oban, and Fiskavaig Rockshelter, Skye where a perforated human skull fragment was recovered.

Curiously, the large human bone assemblage from Sculptor's Cave produced no material dating to the Early or Middle Iron Age, with identifiable votive offerings also absent, save possibly a dog deposited within the west cave passage (Armit and Büster 2020, 255, 259). Dog remains were also identified at High Pasture, within both precinct and cave, sometimes accompanying human remains.

In addition to mortuary and ritual practices, caves and rockshelters in Scotland were used for a wide range of activities in the Iron Age: temporary occupation (mainly former sea caves and rockshelters), and as craft workshops, especially for metalworking. Substantive evidence for this sometimes survives as *in situ* hearth features and associated residues from both smelting and blacksmithing, including at Rubh an' Dunain Cave (Scott 1933–4), Leitir Fura Cave (Ritchie and Cruickshanks in prep), Fiskavaig Rockshelter (Wildgoose and Birch 2009a; 2009b); Coire Sgamhadail, Applecross (Hardy and Wickham-Jones 2007), Constantine's Cave, Fife (Wace and Jehu 1915), Croig Cave, Mull (Mithen and Wicks 2012), Keil Cave (Ritchie 1966–7), Ellary Boulder Cave (Tolan-Smith 2001, 96) in Argyll, and at Learnie 1A, 1B and 2B caves, near Rosemarkie (Birch and Peteranna 2017). Most of these sites comprise rockshelters and former sea caves.

Elsewhere, evidence for cave and rockshelter use across Scotland is generally limited to artefact scatters, often associated with midden, recovered during antiquarian excavations or later landscape projects (*e.g.* Hardy and Wickham-Jones 2007). Despite evidence for extended periods of Iron Age in-cave deposition, interpretation is hampered, especially in the absence of dates. A focus on coastal sites, including former sea caves (Wilford 2016) may however suggest an association of caves with seaway movement and the use of these natural shelters for temporary occupation or transhumance.

No Scottish caves featuring Iron Age deposits have so far been identified displaying the range of artefacts and environmental remains, as large scale deposition events, as at High Pasture. This may in part reflect differences in methodology and recording, and the preponderance of antiquarian data as well as the bias of (especially) targeted excavations focusing on earliest cave use. However, the limited evidence for votive deposition along with securely dated Iron Age human remains from caves may be real.

One well dated Scottish site featuring deposits and artefacts of comparable age to High Pasture is Fiskavaig Rockshelter, also on Skye (Wildgoose and Birch 2009b). This rescue excavation produced a diverse, extensive artefact assemblage including evidence for ferrous and non-ferrous metalworking and antler and bone working. Many objects at Fiskavaig appeared unfinished, suggesting a potential workshop, where repairs were carried out on a range of materials. A cache of 24 long, slender antler points, apparently associated with weaving, were found alongside a perforated human cranial fragment and a complete upper rotary quern. Slab-built hearths, extensive midden rich in animal bone dominated by mature, adult cattle displaying butchery indicative of feasting echoes deposits at High Pasture and, like both High Pasture and Sculptor's Cave, Fiskavaig displays unusual morphological characteristics and is very difficult to access. Radiocarbon dates suggest activity between 50 cal BC and cal AD 240, contemporary with the closure of High Pasture cave and its final deposition of human remains.

Armit and Büster (2020, 258) suggest that the apparent absence of clear evidence for votive deposition and funerary activity in caves during the Iron Age reflects a wider pattern across Britain and Ireland. Branigan and Dearne (1992, 36) concluded that a lack of evidence for ritual cave use in England and Wales during the Roman Iron Age, other than for funerary purposes, might reflect a continuation of Iron Age attitudes. However, there are exceptions. A particularly unusual and inaccessible form of 'cave space' are the vertical shafts or fissures found in northern England and the Mendips, Somerset. Totally unsuitable for occupation, these appear to have been used for ritual activity in the Iron Age and Romano-British periods, including Ryedale Windypits and North End Pot in the Yorkshire Dales; Dog Hole, Cumbria; and Fishmonger's Swallet, Gloucestershire (Leach 2015; Hardwick 2022). Some of these sites also display evidence for use from the Late Neolithic and Bronze Age. Although artefact recovery is limited, a significant corpus of human remains includes evidence for whole corpse deposition, severe disability and disease, and perimortem trauma including decapitation, blunt-force injuries, and processing of fresh bone for marrow (Leach 2015, 323–5, 334–5). Human remains are often found mingled with animals, especially dog and horse, apparently cast into the fissures before closure. These blocking/backfilling events provide interesting parallels for the closure of the stairwell at High Pasture. Several Iron Age dates from English fissure caves suggest activity contemporary with High Pasture (Leach 2015, 329, 311–13; Wilford 2016, 85–8).

In Ireland, the challenge of understanding Iron Age life is mirrored in the cave record, with diagnostic pottery and assemblages lacking, limited radiocarbon dates, and a meagre artefact assemblage (Dowd 2015, 160). One site provides some parallels with High Pasture: the Cave of Cruachan, or Oweynagat, in the heart of the ritual complex of Rathcroghan, Co. Roscommon. This cave may have served as a catalyst for the construction of funerary and ritual monuments, comprising a natural limestone passage with an artificial rock-cut section extending from the cave mouth including sections of drystone walling, and the construction of an early medieval souterrain (Condit and Moore 2003; Waddell *et al*. 2009, 79–83; Dowd 2015, 172). An 1864 illustration shows a circular enclosing bank *c*. 17 m diameter, containing the entrance to the cave, slightly raised in the centre. Recent investigations suggest that activities involving fire took place inside the monument (Fenwick and Parkes, 1997; Waddell *et al.*

2009, 83–9) and that the enclosure may pre-date the souterrain, created to contain and control access to the cave (Dowd 2015, 172).

Roman Iron Age artefacts have been recovered from at least eight caves in south to southwest Scotland including Borness Cave, Torr's Cave, and Hanging Rocks Caves 1 and 2, Dumfries and Galloway, and The Yellow Man Cave, Constantine's Cave, Kinkell Cave, Fife, St Columba's Cave, mid-Argyll, and at Keil Cave, Kintyre (Wilford 2016, 96). A fragment of Roman glass was found at Fiskavaig, and Sculptor's Cave has produced dated Roman Iron Age artefacts in abundance. Here, mortuary activity resumed, probably centred on the second and third centuries AD, after a hiatus of around a millennium. Human remains divide into two groups: those likely representing renewed use of the cave for complex post-mortem funerary rites, and a second group representing a specific decapitation 'event' (Armit and Büster 2020, 253–7). Some inhumations appear to have been interred shortly after death, with numerous items of personal jewellery and dress fasteners indicating that the dead were laid out clothed (*ibid*., 256). Toileting and grooming equipment echo finds from a number of English caves with Roman Iron Age presence (Wilford 2016). Single arms from two sets of tweezers were recovered from High Pasture within pre-Roman Iron Age contexts (Section 12.7). Evidence for votive deposition of Late Roman material at Sculptor's Cave includes a hoard of 240 coins, some pierced, possibly worn as charms or marks of status (Armit and Büster 2020, 257).

Borness Cave, Galloway is another sea cave in a liminal, inaccessible location (Fig. 14.7). At the base of steep cliffs, it was excavated during the later 19th century: metalwork including a Dragonesque brooch, a harness mount and a glass armlet suggest activity during the 1st and 2nd centuries AD. A number of worked bone spoons are similar in style to those from caves in the Settle area, Yorkshire, and a bone toggle paralleled at Victoria Cave, also in Yorkshire (Wilford 2016, 497–8). While it is unclear whether activity at Borness was contemporaneous with cave use further south, these deposits hint at a shared cosmology. Many British caves containing Roman Iron Age finds also contain Iron Age material, suggesting some continuity (Wilford 2016, 131), but the assemblages in general suffer from a lack of detailed analysis.

Structured deposition of jewellery and personal objects in caves in England and Wales, along with use for funerary and mortuary practices, provides clear evidence for a range of ritual activities during the Roman Iron Age. Several caves featuring more visible deposition events contain extensive passages and underground streams, with objects often placed in areas displaying calcite formations and pools: Poole's Cavern, Derbyshire, Wookey Hole, Mendip, and Ogof-Yr-Esgryn, South Wales. White (1997) highlights the unusual assemblages in Yorkshire caves at this period, and the unsuitability of many of these sites for domestic occupation or craft activity. Victoria Cave, Settle (Fig. 14.8), produced over 80 bronze items, recovered from a dark location accessed by a long crawl, featuring impressive calcite formations and natural pools, with Roman tile and glass fragments pressed deep into crevices and fissures in the bedrock (Dearne and Lord 1998). Romano-British assemblages from caves and more 'formal' shrines (Woodward 1992, 67–72) display many similarities, with coins, jewellery, ceramics, antler pins, spoons, toilet artefacts and weapons recovered from both.

In continental Europe, several remarkable sites dominate the literature. In the Moravian karst of the Czech Republic, the unique Býčí Skála Cave (Bull Rock Cave; Golek 2017) produced a substantial Hallstatt and La Tène assemblage from the entrance hall and large main chamber: animal and material offerings, textiles, ceramic and sheet metal vessels, jewellery, weapons, tools, moulds, and parts from wagons or carts. A possible workshop within the entrance hall featured a forge and associated metalworking material. At least 40 burials, disarticulated human remains, and cremations comprised two age groups: young children, and adults aged 35–60. Some individuals had been beheaded, while others were missing legs or hands. Deeper inside the cave, the remains of a chariot or wagon contained a male skeleton, with complete or partially butchered horses, dogs, and pigs. In Belgium, the Trou de Han produced a significant assemblage associated with an underground watercourse, especially in a 200m section of passage (Jasinski and Warmenbol 2017). Weaponry, metalworking, jewellery, coins, glass and amber objects, and the lower mandibles of decapitated young people date to the Late Bronze Age, Iron Age and Roman periods. Many items were deliberately damaged before deposition, others burnt. Several vertical shaft or fissure caves of central Europe have produced Iron Age material, similar to those of England. Here, ritual activities seem to have taken place adjacent to the fissure entrances at specific times of the year, featuring fire, sacrifices of meat and other foods, human sacrifices, and object deposition. Combined materials were deposited into the shafts and sealed by a layer of stones, echoing the major backfilling of the stairwell access at High Pasture (Section 8.3).

Durezza Cave, Carinthia, Austria (Galik 2004, 54–61) provides a particularly interesting example for ritual activity of the Late Hallstatt to Early La Tène (700–450 BC). Artefacts included ceramics, bronze, glass beads, and weaving weights, mixed with ash and charcoal. However, it is the remains of humans and animals that stand out. The animal assemblage, much of which entered site as complete corpses, was dominated by at least 55 individual dogs, and horse including numerous foetal bones. *c.* 138 human interments were also present. The use of vertical shafts and fissure caves such as Durezza is seen in karst areas across Europe including Slovakia, Austria, Italy, Slovenia, and Germany (Galik 2004), but little synthesis has taken place.



Figure 14.8. Hard hats fitted, Steven Birch & Martin Wildgoose prepare to negotiate the chaotic shoreline to the Fiskavaig rockshelter, Skye

Iron Age cave use in Scotland continued into the early historic period, with evidence for early Christian and Pictish usage seen in rock carvings and associated iconography, mostly around the coast especially Fife, Ayrshire, Galloway, Argyll, and the islands of Bute and Arran (Wilson 1882; MacLagan 1875; Maxwell 1885; 1885; Trotter and Maxwell 1886; Patrick 1905; Wace and Jehu 1915; Mackie 1986; Ritchie and Stevenson 1993; Fisher 2001), and at Sculptor's Cave and Clashack Cove Cave (Benton 1931; Shepherd 2007; Armit *et al.* 2011; Armit and Büster 2020). Although function during this period appears to comprise mainly temporary occupation, excavations at several former sea caves near Rosemarkie, Black Isle have recovered well preserved evidence for craft activities and metalworking: Learnie (Birch and Peteranna 2017) and Caird's Cave (Anderson-Whymark 2011). Excavations at Learnie 2B unearthed an adult male, brutally killed, with substantial peri-mortem cranial trauma suggesting deliberate 'overkill', buried in sterile sand deposits in a dark alcove (Birch and Peteranna 2017).

In Ireland, the early medieval period is the most visible for caves and rockshelters, with artefacts reflecting contemporary activity in ringforts, crannogs, and monastic settlements (Dowd 2015, 177). It is possible that caves may have lost some of the potency of earlier periods, and became spaces for more general, varied use (*ibid*., 174). Some of these contain a wide range of artefacts, similar to High Pasture, and some unusual geomorphology including vertical entrances and collapsed roofs, into which materials were deposited. It is possible that these assemblages may have derived from adjacent settlements, the caves forming convenient cavities for waste (Dowd pers. comm.). It is tempting to seek alternative interpretations for larger scale deposition events at these sites, with their broad range of artefacts and associated materials. Notwithstanding recent work in Ireland (Dowd 2015) and across continental Europe (Whitehouse 1992; Tomkins 2009; Bergsvik and Skeates 2012; Manem 2012; Moyes 2012; Skeates 2012; Mavridis and Jensen 2013; Dowd and Hensey 2016), finding close comparanda for High Pasture has proved challenging.

Wilford's overview of British caves from the Iron Age to the early medieval period discusses morphology and landscape position in influencing cave selection and use (Wilford 2016). Despite chronological and regional diversity, caves were important sites in many coastal and upland regions, intrinsically linked to wider concepts of natural places, landscapes and the underground. Of particular relevance to High Pasture is Wilford's suggestion that cave environment and morphology were of prime importance, with most large artefact assemblages recovered from extensive multi-chamber karst caves, especially those with water, suggestive of extended periods of votive deposition (Wilford 2016, 349–50). High Pasture is one of a relatively small number of limestone karst caves in Scotland associated with an active underground stream and with an accommodating entrance. Outwith Scotland, Wookey Hole in Mendip, Poole's Cavern in Derbyshire; Victoria Cave in Yorkshire; and Ogof-Yr-Esgryn, south Wales, may provide parallels, albeit mostly outside High Pasture's Iron Age context. A small number of larger, single-chamber caves received extensive assemblages of material during the Roman Iron Age, such as Thirst House Cave, Derbyshire, and Minchin Hole, South Wales. Minchin Hole's entrance is flooded during high tide. Like Sculptor's, Borness, Culver Hole, and Fiskavaig (Fig. 14.10), Minchin Hole is a liminal location, a sometimes-inaccessible interface between land and sea.

If the small number of caves containing large, varied deposits are a true representation of the distribution of major deposition sites during the long Iron Age and Roman Iron Age periods, can we infer that these sites would have been major hubs for ritual and ceremonial activities at this time? If so, High Pasture may have functioned as an important centre, visited from far and wide – as potentially evidenced by some key artefacts. A major difference between High Pasture and such potentially comparable sites is that High Pasture was closed and sealed before the Roman occupation of Britain, with only the last phase of burial and its assemblage dating to this time.

14.5.2 High Pasture in the Scottish Atlantic Iron Age

During the 1st millennium BC a dramatic change in architectural style is seen in the Atlantic Iron Age of Scotland, with the construction of monumental houses rather than tombs and ritual monuments. Skye and surrounding islands are rich in complex round-house structures – galleried duns, enclosures, promontory enclosures, brochs, and crannogs – along with more simple structures and souterrains. These monumental buildings, most of which are distributed along the coastal strip, may reflect the

development of a clientship system, differentiation of social position, tenure of land and control of an economic base (Armit 1996).

Complex Atlantic Round-houses reached their zenith during the closing centuries of the 1st millennium BC, as displayed at the brochs of Dun Telve and Dun Troddan, Glenelg; at Dun Carloway in Lewis, and at Mousa and Gurness in the Northern Isles (Armit 2003). These form some of the best preserved Iron Age monuments in Europe and would remain a focus for re-use and occupation well into the early historic period. Broch and round-house settlement is seen through the Western Isles, Caithness, and into Orkney and Shetland, where there is a relatively extensive record of excavation: of brochs, duns, wheel-houses, and cellular buildings, covering the 'long Iron Age', from *c.* 600 BC to the beginning of the Viking Age (*c.* AD 800).

Wheelhouses, unique to the Western Isles with the exception of Shetland, were largely hidden below ground, revetted into deposits of wind-blown sand and midden. Although this practice may have been as a means of withstanding the severe winds of the Outer Hebrides, it has been suggested (Parker-Pearson and Sharples 1999, 17) that their architecture may be drawing on metaphors of 'fixity of place, regeneration and fertility'. Elaborate foundation deposits within round-houses of the Western and Northern Isles include human and animal remains placed in pits below house floors.

Landscape survey on Skye has recorded a wealth of Iron Age settlement remains, mainly round-houses and their contemporary field systems (Wildgoose 1999a). A round-house at Coille nan Groben, Sleat produced dates between 850 and 700 cal BC; while a round-house at Coille a' Ghasgain, also Sleat, was in use around 400 cal BC (Armit 1996, 103–5). Round-houses investigated by the High Pasture Cave & Environs Project have also produced dating indicative of Iron Age use (653 cal BC–cal AD 429). This suggests the use of circular structures over an extensive period, mostly contemporary with activities at High Pasture (Birch and Wildgoose 2010). A single alternative to the use of circular buildings is seen at the farmstead at Tungadale, on Skye's west coast. This monumental, rectilinear stone built structure contained a souterrain within its massive southeast wall and an interior dominated by a central hearth, dating to 535–222 cal BC (Wildgoose pers. comm.). By the time of its abandonment, the accumulation of occupation deposits, including a sequence of hearths, had reached the wall-heads of the structure, suggesting curation of associated features and materials, at least during the final stages of its use.

Fieldwork and excavation on Skye during the last 20 years has substantially increased the number of known souterrains (Miket 2002), with distribution closely following more fertile land. Excavation at Broadford Medical Centre, south Skye, recovered a wide range of Iron Age features including a souterrain, three grain storage pits, and a grain-drying kiln. Activity was focused on grain processing, drying, and storage, with burnt barley likely resulting from fires set in the pits for cleansing, and with conflagration events associated with the kiln. Radiocarbon dated the use of the structures to 374 cal BC–cal AD 25 (Birch 2012). Souterrains have been interpreted as places of refuge, as storage facilities, as having served ritual functions, and their varied morphology across Scotland makes a common universal function unlikely. Storage of agricultural produce seems overwhelmingly likely for many, but the souterrain at Tungadale, and several others in Skye such as Kilvaxter, collect water after prolonged rain (Fig. 14.9). In Skye, souterrains concentrate in the north of the island, with few in the south, and none currently known in natural cave-bearing areas. Resembling an artificial cave, with sometimes complex morphologies, a ritual dimension for souterrains has long been posited. However, there can be little doubt as to their social significance: their construction would have been a labour intensive undertaking (Armit 1999, 583). Many souterrain were backfilled at the time of their closure and in the northeast of Scotland it has been suggested there is an 'abandonment horizon' in the mid to late 2nd Century AD (Armit 1999). Radiocarbon dates relating to the souterrain at the Broadford Medical Centre (Birch 2012) indicate it was backfilled *c.* 171 BC–AD 25, at a similar time to the stairwell at High Pasture.



Figure 14.9 The souterrain at Kilvaxter, in north Skye: the interior after a period of heavy rain – a man-made cave!

Another subterranean monumental structure characteristic of the Atlantic Iron Age is the so-called 'wells' typically associated with brochs. The well at Gurness, Orkney (Armit 2003, 108–11) is an elaborate drystone construction incorporating 18 stairs, hollow chambers, and corbelled cells; one hidden below its steps, ending in a vertical metre drop to a small pool in a stone-lined cistern. Impractical as a water source, this structure defies purely functional explanation. A similar structure is seen

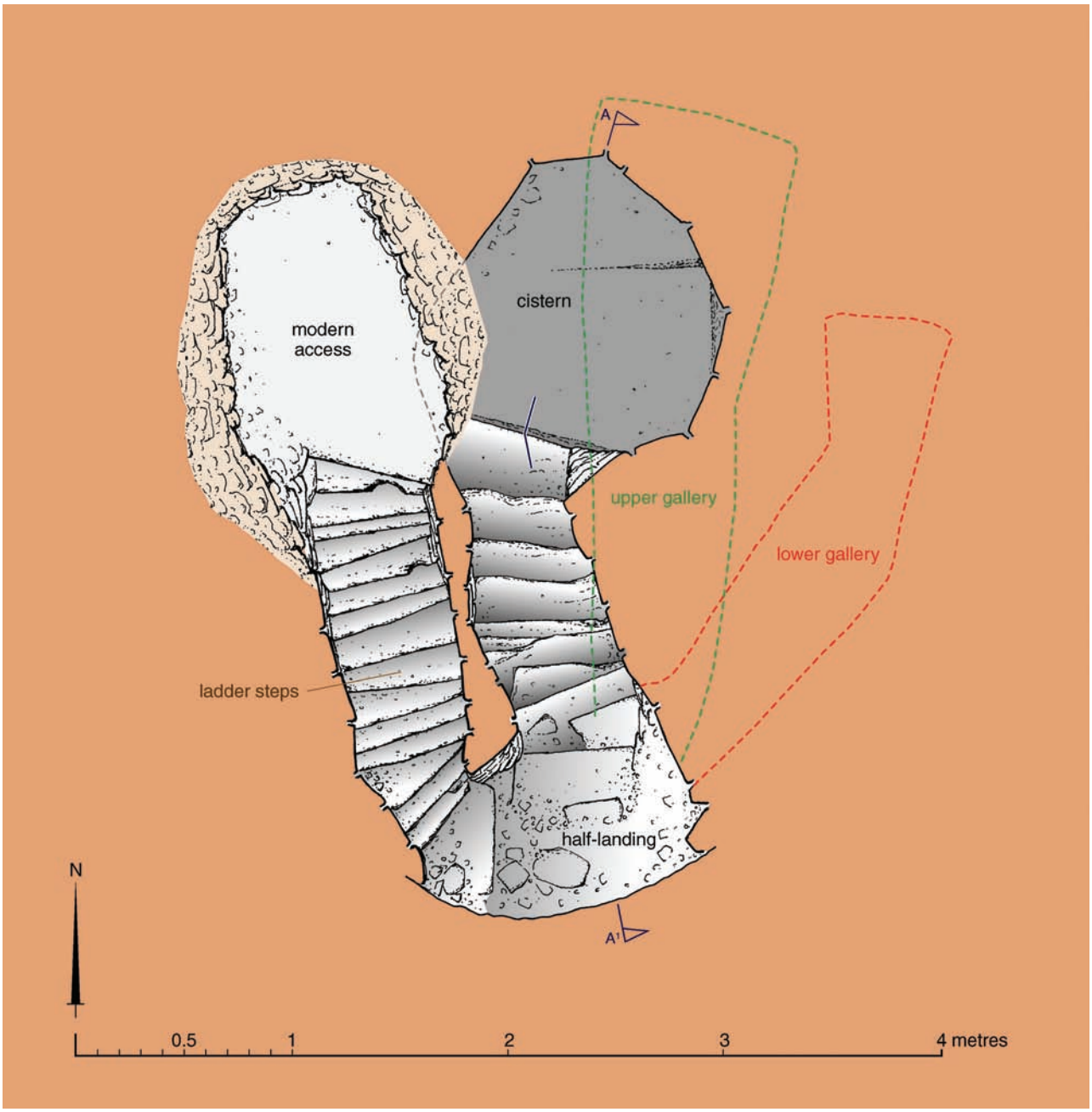


Figure 14.10. Plan showing the underground structure of Mine Howe on Mainland Orkney (© Crown Copyright, Historic Environment Scotland, Canmore cat. no. SC01594486)

at Mine Howe, also Orkney (Fig. 14.10 and 14.11), here cut into a natural mound surrounded by a substantial ditch. Twenty-nine steep steps access side galleries before ending in a vertical drop into a water holding cistern or tank. Mine Howe's underground chamber is the hub of a much wider complex, featuring a metalworking-focused workshop containing evidence for a wide range of other crafts (Card *et al.* 2006). Human remains at Mine Howe include the inhumation of an adult woman below the floor of the workshop and an adult male displaying evidence of trauma outside it. Iron Age, Roman, and Pictish objects were recovered from the site, but no evidence for settlement structures.

Other enigmatic structures in the west of Scotland include the unexcavated site of Sron na h-Iolaire (the eagle's ridge or beak), at Struidh on the Inner Hebridean island of Eigg. This dramatic, hard to access location on the east coast sits below a prominent basalt rib and comprises a grassy platform defined by a roughly circular stone enclosure. A narrow northeast entrance is flanked by two large stones in the outer wall, and the southwest quadrant contains the entrance to an underground chamber. There

are no signs of a stone stairway, but an entrance lined with drystone masonry provides access to a large, low space roofed almost entirely by a single huge boulder. When recorded in 2001, the underground space contained a thick midden covering the floor including animal bones, shells and broken hammerstones (RCAHMS 2003). The site has counterparts at Usinish on the east coast of South Uist, with round-houses constructed around the entrances to boulder caves, but Sron na h-Iolaire stands out for its dramatic natural backdrop: vertical basalt columns soaring to the clifftop, framed by two enormous boulders. The Fiskavaig rockshelter, Skye, shares a similarly dramatic coastal location, also framed by huge basalt cliffs displaying remarkable horizontal banding. Less impressive when viewed from the rockshelter and shore, these would have provided an approaching boat with a clear marker identifying the site from some distance.

Another site with no known structural parallel is Crowlista, Lewis (Church *et al.* 2014). This stone-built structure on the tidal islet at An Dunan occupies a significant position, where the division between land and sea is blurred. The structure is contemporary with the main period of broch occupation in Scotland, but its function is unclear, its structural configuration not resembling contemporary domestic dwellings. There is no hearth setting, but instead an uncharacteristically large ash deposit featuring monolithic marker stones and formal approach steps – a mound that could be described as monumental. The mound was obviously curated throughout the use of the structure, but it appears that burning did not take place on site, the ash generated elsewhere and brought here for deposition (Church *et al.* 2014, 214). A ritual site, where votive deposits of ash and ceramics were made, possibly linked with feasting or celebration is suggested: An Dunan, like High Pasture, forms part of a growing core of non-domestic sites in the Iron Age Scottish landscape. An Dunan's curated ash mound shares many similarities with the curated stack of hearths and their deposits seen in the High Pasture precinct.

Assemblages from these different site types vary significantly, and survival of organics and environmental material can be poor, especially on acidic soils. Most artefacts derive from early excavations where recording was often limited (Armit 1996, 127), and surviving evidence is thus usually mixed assemblages representing accumulation in buildings which would have seen ongoing activity centuries after their primary use had ended.

A major contrast between High Pasture and contemporary excavations in Skye is the number of artefacts recovered. The prehistoric round-houses of Sleat and Strath Suardal produced very few artefacts, even considering the potential for differential preservation and excavation strategies. While there seems less of an imbalance between High Pasture and assemblages of larger monumental structures of the time, the number and range of objects and materials from High Pasture is only replicated at major excavations, *e.g.* at Howe, Orkney (Ballin Smith 1994) and Broxmouth, East Lothian (Armit and McKenzie 2013).



Figure 14.11. One section of the underground stairwell at Mine Howe (© Crown Copyright, Historic Environment Scotland, Canmore cat. no. SC01392343)

The Atlantic Scottish Iron Age saw continued deposition of material into bogs and watery contexts, continuing from the Late Bronze Age and mirroring depositional practices seen elsewhere across the British Isles and Europe. However, the Iron Age emphasises domestic items and foodstuffs, rather than the bronze weapons and tools of earlier contexts. In Skye, these include a handled wooden bowl recovered from peat at Talisker, Bracadale (cal AD 4–377), a wooden bowl from peat at Loch a' Ghlinne, Sleat (96 cal BC–cal AD 188), and several wooden kegs containing bog butter (cal AD 225–401) from Kyleakin (deposited with a bronze cauldron). Other bog butter containers from Skye include a now lost example from Kilmaluag, a possible keg wrapped in skin from the Point of Sleat, and several possible kegs from Plockton, in Lochalsh (Anderson 1884–5, 309–15; Earwood 1991).

14.6 Human interactions with caves

Natural places in the landscape – mountains, springs, rivers, caves, and rockshelters – are often closely linked with folklore, myth, and tradition. Throughout the world, those associated with caves and rockshelters indicate the

deep significance such sites had to local communities and their beliefs. Caves were places where one could communicate with ancestors and the dead, places of origin, birthplaces of gods and heroes, connected with fertility, death, and rebirth, entrances to the underworld, fearful places outside the realm of everyday life (Bradley 2000; Tolan-Smith 2001, 10; McCafferty 2012, 297; Moyes 2012, 6–10; Dowd 2015, 248–51). Such cosmological fascination is present from our earliest history (*e.g*. Bergsvik and Skeates 2012; Moyes 2012).

To the prehistoric worldview, a cave's natural, unchanging form may have represented a constant in a sometimes rapidly changing social world. But perceptions of, and activities connected with, specific caves are likely to have altered over time, creating a palimpsest of evidence which complicates archaeological efforts to interpret the relationship of past peoples with caves. Caves like High Pasture were also subject to modification, blurring the boundaries between 'natural place', and built environment:

> We may live in a house built by ancestors, or in a cave, where ancestors have dwelt or visited; and just like houses caves can be seen as the works of ancestors. Their successors may have felt a responsibility to look after these natural places, to harness their power or even to transform them into something else. (Bradley 1998, 21)

14.6.1 Cave cosmologies

There is a strong association between cave use and the perception of water as cosmologically significant in prehistory. The ultimate life giver, and yet capable of destruction, ritual constructs surrounding water seem often to be attempts to define its unpredictability: the source of life but also death, imbued with animist qualities (Masani 1918, 87; Strang 2004, 129). A long tradition of depositing objects and materials into rivers and pools appears to extend very much to specifically underground watery contexts. It is possible that the idea of underground and underwater were strongly connected in prehistory, their cosmological distinction even blurred. Depositing material into caves and rivers may thus have served a similar purpose, representing the same symbolic act. Links between mortuary practice, metalworking, water and caves all hint at a broader linked cosmology. Special power, then, might reside in a complex cave featuring an active watercourse, such as High Pasture, and we see these locations serve as a focus for the deposition of human remains, as well as extensive artefact assemblages during the Iron Age and Roman Iron Age (Wilford 2016).

High Pasture, along with many other British caves used in prehistory, shows a focus on deposition of the young. Stillborn and infant remains, and young animals, are a repeated motif in cave assemblages. It is possible that young children (and young animals) may have lacked individual identity and, as such, were suitable for internment in – or perhaps relegation to – the underground realm (Giles 2012, 19–24). It is possible that young animals associated with the remains of young children may have been selected to accompany them on their journey to the underworld (Chládek 2011, 35). Dogs are well represented in the High Pasture faunal record, as at other caves displaying Iron Age/Roman Iron Age activity. These animals would have had key community roles – herding, hunting, but also guardianship. Dogs may have guarded communal thresholds such as entranceways and boundaries and the structured deposition of dogs is found within settlement entrances and boundary ditches (Morris 2011; Score 2011). Dog remains in caves, including High Pasture, may also then represent guardianship, protection of thresholds, and accompanying the dead to the underworld (Wilford 2016, 322–4). The deposition of stillborn and infant remains may also be symbolic of renewal and fertility (Giles 2009, 89).

Transformative craftworking and weaving in caves during the 1st millennia BC/AD are also linked with concepts of agriculture and fertility (Wilford 2016, 268–9). Symbolic deposition of objects associated with spinning and weaving is seen at a number of British cave and rock-shelter sites, including High Pasture. Certainly in Bone Passage, the deposition of such objects is very unlikely to indicate that textile working was taking place inside. Ethnographic studies into textile working by indigenous communities suggest that weaving is often considered part of the creation and maintenance of the cosmos (Prechtel and Carlsen 1988; Cowen 1995; Kehoe 2000). A link between weaving and the astronomical order is seen in a range of Amerindian cave using cultures, such as the Maya, for whom weaving also represented processes of renewal, death, and the underworld (Prechtel and Carlsen 1988, 131). For the Romans, weaving was intimately connected to the *Parcae* (or the Three Fates), the spinners of the thread of life (Eckardt 2014, 314) and weaving combs, spindle whorls, and other debitage within Roman Iron Age temples suggest that textile tools were used as votive offerings.

The objects associated with textile crafts at High Pasture are generally associated with Early Iron Age activities. The large assemblage of 25 bone and stone whorls and 15 bone or antler needles were essential tools, commonly employed on settlement sites, while many of the 22 antler points, some with circumferential tip wear, may be a local equivalent to long-handled combs. Several of the needles were extensively used and some repaired, while two whorls are decorated, which is notably rare in Early–Middle Iron Age examples. Four of the High Pasture object caches comprise textile tools: two of whorls and two of antler points. Both whorls and needles are represented at all stages of their life cycle, from roughouts through pristine examples to the heavily used and reworked. The finer context of these seemingly basic tools therefore suggests they were of great significance to

their owners, and even to the wider community (12.11). A similarly large assemblage of spindle whorls (also displaying various stages of manufacture), bone pins and needles, were recovered from Wookey Hole (Wilford 2016, 416). Given the cosmological significance of weaving, it is possible that the production of pattern braids was seen as a magical process, similar to metalworking (*ibid.*, 270).

Crafts and craftworkers associated with metals are strongly associated with ritual and superstition, and there is ample evidence for metalworking at a number of Scottish cave and rockshelter sites, including High Pasture. Interestingly, the material from High Pasture appears to represent the full metalworking process: raw material, by-products, crucibles, and moulds, and even furnace fragments; alongside material relating to smelting, blacksmithing, and non-ferrous metalworking (Section 12.8). While this may be indicative of active craft within this landscape, it is reasonable to suggest a further symbolic link with concepts of rejuvenation, transformation, and fertility, likely also reflected in the preponderance of querns and burnt grain deposited at High Pasture.

Processed and non-processed wild animal remains at High Pasture include red and roe deer, wild boar, and wolf, potentially referencing cosmologies relating to the natural world. The site location on the edge of the settlement zone may be significant, linking human use of the cave with access to, and harnessing the power of, the natural world. Those using the cave – perhaps especially the representatives of crafts – may have been perceived as able to become intertwined with the symbolic perceptions attached to animals (Wilford 2016, 280).

In cultures lacking natural subterranean features, we often see the construction of underground spaces – metaphorical caves. As discussed in Section 14.5.2, the construction of artificial subterranean spaces demonstrates the wider importance of caves to Atlantic Iron Age Scotland, and the concept of a powerful, cosmologically important underground and/or underworld. Similar forms of subterranean architecture can also be seen in monumental buildings in intra-mural passages and chambers. The use of storage pits and ditches in association with settlement contexts may reflect similar cosmological beliefs.

14.6.2 Theatres of experience

It is impossible to comprehend the detail of the events and activities that took place at High Pasture. We can however imagine that the management of light, acoustics, colour, and the materials on display would have created a physically immersive experience. Accessing different areas of the site, especially the restricted space of Bone Passage, would have been a profound experience in both a public, communal, and also a private sense, incorporating a sense of the past, of links with ancestors, of duty, community, hierarchy, and power.

As well as undoubtedly being a place of performance and theatre, of large gatherings of people, High Pasture may also have been a place of veneration, of quiet contemplation - of both collective and personal ceremonies and rituals on a smaller or more exclusive scale. We can imagine many of the deposited objects relating to daily life and craft activities – heirlooms, tokens, even fragments of people themselves – representing individual, personal acts. At both ends of the scale, those who came to High Pasture would become part of a constant reaffirmation and conservation of a sacred space.

14.6.2 A sense of place

High Pasture would have provided an environment with a number of qualities able to 'super-charge' the ritual experience: its complex morphology, its underground stream, an isolated location. The whole would have offered a unique experience within a location which may have been transitional in other ways: perhaps on the edge of specific land parcels, and thus linked with boundaries, rights, and ancestral connections. This likely influenced development of the site through time, as what was a completely natural construct was transformed into a human modified space, largely designed in order to control access to the underground, and (perhaps) the deliberate limiting of available space therein. Similar developments are identified in Bronze Age Crete where Tomkins (2012, 74) suggests that caves were appropriated by emerging elites as useful power spaces, important to the construction of identity and territory. The intensification of material deposition through time at High Pasture might reflect territorial expansion, tension, or more active negotiation of relationships within and perhaps between communities. Perhaps control of the flow of material into the complex reflected the strength of a community's claim on their local landscape, the creation of a legitimate history via material deposition. The generation and accumulation of these cultural signifiers and their curation and manipulation may have bolstered the position of those who undertook it: the High Pasture deposits as a 'bank' of cultural capital that could be stored, curated, reworked, and recycled through time (Needham and Spence 1997, 84), reinforcing community identities, and creating shared memories.

The varied processes of curation of materials and deposits at High Pasture, including the incorporation of old into the new, may therefore relate directly to the transference of status. This may also have been referenced in the built architecture. Although structural modifications to the complex were concerned with maintaining access to the cave and underground realm, the physical evidence of earlier structures were retained *in situ*, curated through time: the superimposed hearth settings and associated ash deposits, and especially the enclosure walls and stairwells. The incremental construction of the stairwell in particular display a necessity to retain earlier structures which then

became embedded in the site (Figs 14.12 and 14.13). There is no obvious practical benefit to such actions and it has to be recognised that such 'old' may have effectively constituted the 'new', creating symbolic links across generations, the work of the ancestors remaining part of life in a very material and permanent sense. By occupying the same space and incorporating elements of earlier structures, any new construction was perhaps physically and metaphorically bonded to those who came before, extending the biography of that line, enhancing kinship links, rights, and inheritance.

Artefacts and materials may also have formed important sources of information connecting people with places through time. Acts of deliberate breakage, fragmentation, and the distribution of material parts can be seen as a reflection of the construction of such relationships between people and objects (Chapman and Gaydarska 2006; Gamble 2007, 132–52), even a form of inheritance (Smith 2011, 137). Fragmentation of an object may have signified endings and/or beginnings, breakage both symbolising and empowering the transition from one state to another (Brück 1999b, 155; 2006, 297–9; Moore 2007, 94). Thomas (1999, 66) has also suggested that actions associated with fragmentation could symbolise the decommissioning of objects thought to contain a particular potency or social significance which had become 'polluted' in some way and thus could no longer be used in daily life. Such items may have had to be carefully disposed of, with appropriate rituals, including their fragmentation, to render them safe. Items belonging to the deceased, or objects used within funerary rituals may have fallen into this category (Grinsell 1961, 476–7). Artefacts for use in the afterlife may also have been broken: breaking an object effectively removed it from the earthly realm (*ibid.*; Chapman 2000, 23–6). A fundamental difference between the concepts of offering and sacrifice may also be expressed via breakage: Hubert and Mauss (1964, 12) emphasise that sacrifice should include, if not destruction of, then at least considerable physical transformation, changes making the object or being acceptable to the supernatural world. By contrast, the physical state of an 'offering' is not altered. The religious or supernatural energy of the sacrifice is higher, its ceremonial destruction requiring particular effort and recognition.

The presence of certain foods and specific artefacts – some deposited at High Pasture over several generations – implies the centralised organisation of these practices, of shared belief and purpose. However, important questions remain relating to how such practice was organised. Taking into consideration the significant number of people involved in the production of materials deposited at High Pasture, either as offerings or as tools involved in practices taking place at the site or elsewhere, what was the relationship between the individual and the site? Were the events taking place at High Pasture wholly community-based, or do individual agents emerge at the heart of this common space?

High Pasture was, then, replete with highly ritually charged materials and objects, a place familiar with performative acts, modified and curated to ensure that these powerful features and deposits were visible and monumentalised: the cave as mnemonic for regional identity. Thus, a local ritual landscape at High Pasture was passed from generation to generation, demonstrated in its successive occupations and associated events throughout the Iron Age and back into earlier periods of prehistory. The maintenance of technical traditions, the repeated deposition of a recognised suite of offerings through the Iron Age indicates that the people who frequented this place passed on not only the memory of the landscape, but also of the operation of High Pasture itself – from generation to generation, a shared heritage, and territorial anchorage.

The intensification of activity at High Pasture during its later phases begs the question – why, after such an extended period of use, was the cave finally sealed? The final insight that High Pasture may give us into the social fabric of Iron Age society on Skye is that at some point, it either may have seen significant upheaval – perhaps due to wider geopolitical changes, including the appearance of new religions – or that it finally came to see High Pasture Cave as too dangerous, too potent a place.

14.7 Beyond High Pasture

Most research into European cave use has focused on particular time periods, individual site assemblages, or specific regions, but more recent studies have explored the crucial, basic elements – cave morphology, location, and the wider social, environmental, and landscape context of cave-use (*e.g.* Waterhouse 1992; Skeates 2012; Tomkins 2012). Our attempt to contextualise High Pasture within a current archaeological framework indicates that similar cave types seem to have been used in similar ways: particularly karst caves displaying complex morphology, multiple chambers and especially an underground stream. Rich assemblages and human remains at High Pasture Cave echo those at Wookey Hole, Victoria Cave, and Ogof-Yr-Esgryn, and we can interpret their selection as special places based on a range of shared characteristics. Similar choices seem to have been made at coastal caves such as Sculptor's Cave, Borness Cave, Fiskavaig Rockshelter, Culver Hole, and Minchin Hole, where difficulty of access and a liminal location between land and sea seems to have attracted similar practices. Such selections and patterns of activity may illustrate shared cosmological beliefs extending across Britain and – to judge from sites such as the Trou de Han, Býčí Skála Cave and Durezza Cave – into continental Europe. There is a need to contextualise cave use in Europe-wide frameworks (Wilford 2016, 351), especially across Northern Europe.

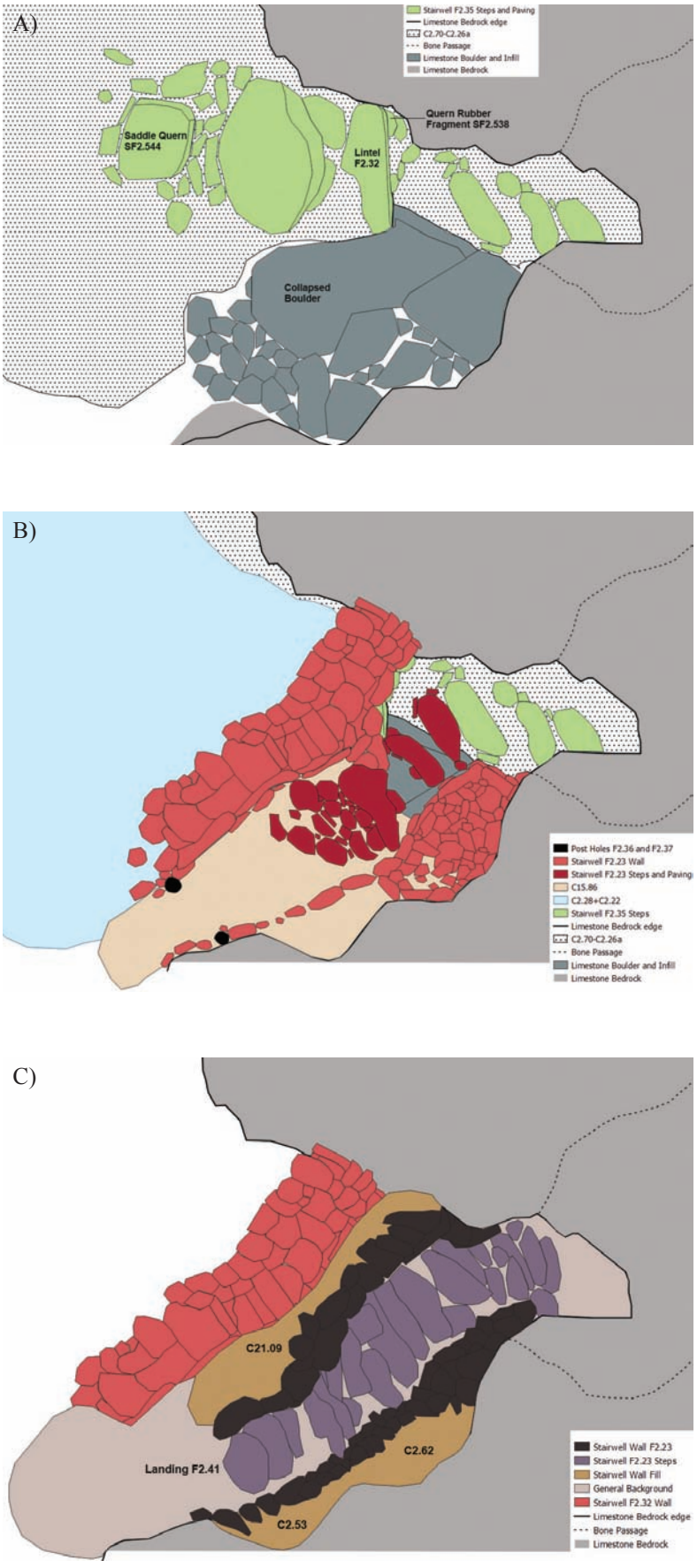


Figure 14.12. Schematic plans showing relationship between stairwells F2.35, F2.32, & F2.23

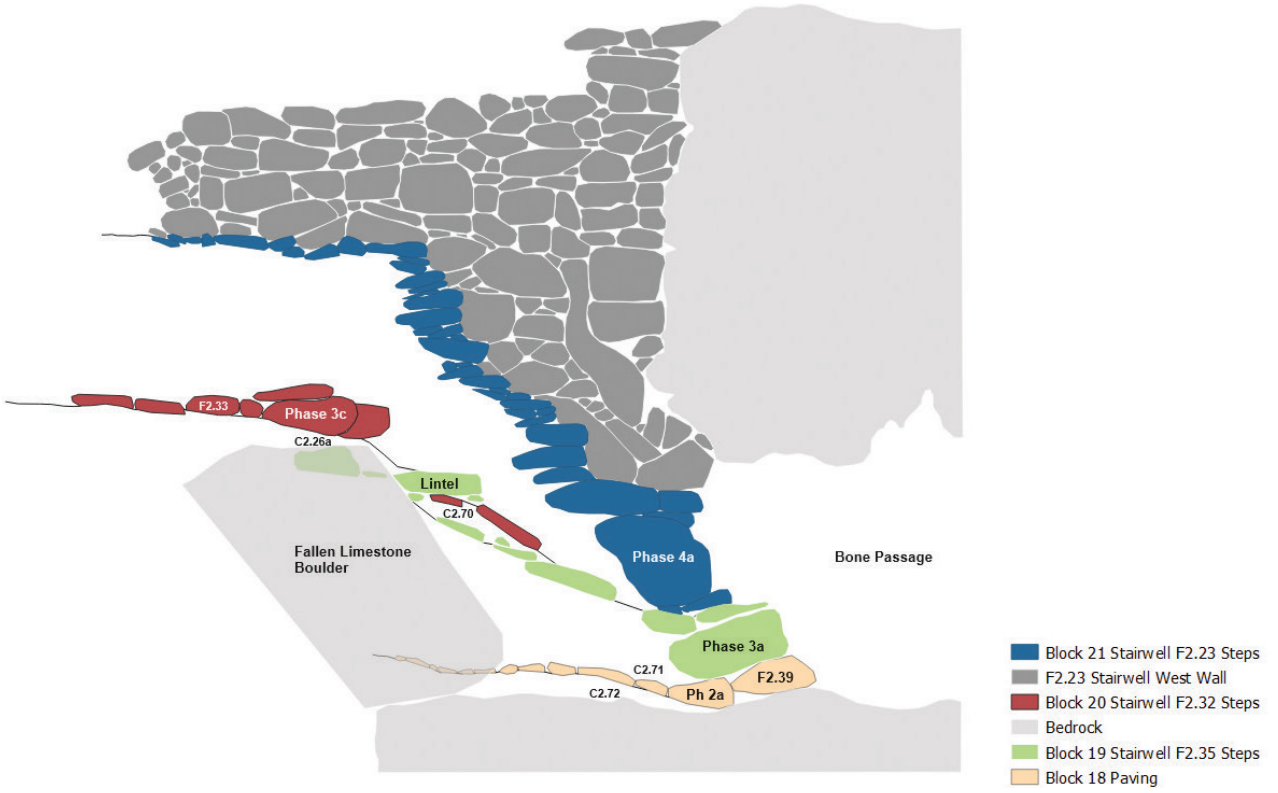


Figure 14.13. Schematic showing section through stairwell structures F2.35, F2.32, & F2.23

In Scotland, the wealth of data from cave and rockshelter excavations of the past 200 years is limited by a lack of both detailed synthesis and radiocarbon dates. More generally, a lack of diagnostic artefact typologies has limited the visibility of cave-use during the 1st millennium BC. Consequently, the significant increase in Roman activity seen in caves across England and Wales, along with more visible forms of in-cave deposition in southern and eastern Scotland during the Late Iron Age and Roman Iron Age may partly be because of the introduction of more robust material culture. This reinforces the need to integrate caves within regional chronologies and highlights the potential of systematic radiocarbon dating programmes. Dates obtained during the Scotland's First Settlers Project (Hardy and Wickham-Jones 2007) shows that a significant number of coastal caves and rockshelters were utilised during the Iron Age.

Several Scottish cave and rockshelter excavations have produced human remains in association with midden deposits and Iron Age to Roman Iron Age artefacts, but often lack stratigraphic detail. The potential for these datasets to unlock the context of later prehistoric cave use is seen in Leach's (2015) programme of AMS dating and osteological analysis on human remains from Yorkshire caves, and by Fibiger (Dowd 2016, 3–50) on Irish cave deposits.

Available data indicates regional variation in the chronology of cave use across Britain and Ireland. Whilst the advent of Roman influence has implications for interpreting earlier Iron Age use of sites, it also demonstrates that cave use was part of broader social processes. Similar interpretations can be proposed for regional variations in cave use in the early medieval period. While cave activity appears to decline in England, it increases across Scotland and Ireland in the second half of the 1st millennium AD – a rise explained by the use of caves as hermitages by Celtic Christian communities. In England, changing worldviews may have led to a fear of the supernatural properties of natural places (Wilford 2016), while Dowd (2015, 174) suggests that the adoption of Christianity may have led to a general 'demystification' of caves in Ireland.

Scottish, indeed British, cave archaeology is still in many ways in its infancy. We can identify shortfalls in accounting for certain aspects of the cave record, such as the presence of human remains, high value objects, unusual or seemingly ritualised forms of deposition, and especially when such materials within caves and rockshelters display a domestic signature. The absence of an alternative interpretative framework challenging the 'domestic model' still prevents such situations being fully explored, with Iron Age ritual practices facing problems of definition and a lack of appreciation of its intricate relationship with the domestic. High Pasture Cave offers a unique window into the complexity of such activity during the Iron Age, with few cave sites in Europe producing such



Figure 14.14. Backfilling a big hole in the ground: the precinct area with Steph Glover

a rich, diverse record represented in both the depositional and monumental record.

Excavations at High Pasture have shown how the cave and its environs became a place for significant events spanning at least 800 years through the Iron Age, with a legacy extending back to at least the Early Bronze Age. Food and feasting, the transformation and deposition of materials, the shaping through communal acts of a natural place into a monumental complex representative of generations: High Pasture has much to contribute to our understanding of the use of caves and the role of natural places within prehistoric worldviews, both in Skye and the wider landscape of Atlantic Iron Age Scotland and beyond. The High Pasture archive is a resource with great future potential, and this publication should be viewed as a first step towards a better understanding of activity in caves and underground spaces in later prehistory.

Appendix

Bayesian modelled dates by phase

Appendix Table 1. Bayesian modelled dates Phase 2

Phase/Event	*95% Probability*	*68% Probability*
EIA Activity (Start)	*820–775 cal BC*	*800–770 cal BC*
Phase 2 (Start)	*800–745 cal BC*	*790–760 cal BC*
Phase 2 (End)	*750–660 cal BC*	*753–690 cal BC*
Phase 2/3 Transition	*730–640 cal BC*	*715–660 cal BC*

Appendix Table 2. Bayesian modelled dates Phase 3

Phase/Event	*95% Probability*	*68% Probability*
Phase 2/3 Transition	*730–640 cal BC*	*715–660 cal BC*
Phase 3 (Start)	*715–575 cal BC*	*700–625 cal BC*
Phase 3 (End)	*650–570 cal BC*	*640–590 cal BC*

Appendix Table 3. Bayesian modelled dates Phase 4

Phase/Event	*95% Probability*	*68% Probability*
Phase 4 (Start)	*670–505 cal BC*	*625–535 cal BC*
Phase 4 (End)	*530–405 cal BC*	*495–415 cal BC*

Appendix Table 4. Bayesian modelled dates Phase 5

Phase/Event	*95% Probability*	*68% Probability*
Phase 5 (Start)	*520–415 cal BC*	*490–430 cal BC*
Phase 5 (End)	*315–225 cal BC*	*290–245 cal BC*

Appendix Table 5. Bayesian modelled dates Phases 6 and 7

Phase/Event	*95% Probability*	*68% Probability*
Phase 6 (Start)	*295–215 cal BC*	*275–230 cal BC*
Phase 6b (Stairwell backfill)	*310–75 cal BC*	*185–100 cal BC*
Phase 6 (End)	*180–40 cal BC*	*145–85 cal BC*
Phase 7 (Stairwell burials)	*cal AD 5–120*	*cal AD 25–90*
Phase 7 (End of Iron Age activity)	*cal AD 75–145*	*cal AD 85–125*

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