# Cliffs End Farm
# Isle of Thanet, Kent

**A mortuary and ritual site of the Bronze Age, Iron Age and Anglo-Saxon period**

*By Jacqueline I. McKinley, Matt Leivers, Jörn Schuster
Peter Marshall, Alistair J. Barclay and Nick Stoodley*

# Cliffs End Farm, Isle of Thanet, Kent

## A mortuary and ritual site of the Bronze Age, Iron Age and Anglo-Saxon period with evidence for long-distance maritime mobility

by

Jacqueline I. McKinley, Matt Leivers, Jörn Schuster, Peter Marshall
Alistair J. Barclay and Nick Stoodley

# Cliffs End Farm, Isle of Thanet, Kent

## A mortuary and ritual site of the Bronze Age, Iron Age and Anglo-Saxon period with evidence for long-distance maritime mobility

by

Jacqueline I. McKinley, Matt Leivers, Jörn Schuster, Peter Marshall
Alistair J. Barclay and Nick Stoodley

with contributions by
Phil Andrews, Catherine Barnett, Alex Bayliss, Christopher Bronk Ramsey, Gordon Cook
Jessica M. Grimm, Pieter M. Grootes, Phil A. Harding, Kevin M. Hayward, Lorrain Higbee
Talla Hopper, Richard I. Macphail, John Meadows, Lorraine Mepham, Andrew Millard
Stuart Needham, J. Peter Northover, Sharon Penton, Johannes van der Plicht, Rob Scaife
Chris J. Stevens, Jacqui Watson and Sarah F. Wyles

and illustrations by S.E. James

**Wessex Archaeology Report 31**

Wessex Archaeology 2014

Published 2014 by Wessex Archaeology Ltd
Portway House, Old Sarum Park, Salisbury, SP4 6EB
http://www.wessexarch.co.uk/



**British Library Cataloguing in Publication Data**
A catalogue record for this book is available from the British Library

Edited by Philippa Bradley
Typeset by Karen Nichols

ISBN 978-1-874350-70-5

Printed by Berforts Information Press

*Cover photographs*

*Front*: Burial 3675 showing overlying burial 3674, note chalk fragment 'held' in hand
*Back*: Amber beads from Anglo-Saxon grave 2756

Wessex Archaeology Ltd is a company limited by guarantee registered in England, company number 1712772. It is also a Charity registered in England and Wales, number 287786; and in Scotland, Scottish Charity number SC042630. Our registered office is at Portway House, Old Sarum Park, Salisbury, Wiltshire SP4 6EB.

# Contents

# List of Figures

**Chapter 4**



**Chapter 5**



**Chapter 6**



**Chapter 7**

# List of Plates

# List of Tables

# Contributors

**Phil Andrews**, Wessex Archaeology
**Alistair J. Barclay**, Wessex Archaeology
**Catherine Barnett**, Wessex Archaeology
**Alex Bayliss**, English Heritage, 1 Waterhouse Square, 138–142 Holborn, London EC1N 2ST
**Christopher Bronk Ramsey**, Oxford University Research Laboratory for Archaeology and the History of Art, Dyson Perrins Building, South Parks Road Oxford OX1 2QY
**Gordon Cook**, Scottish Universities Environmental Research Centre. Rankine Avenue, Scottish Enterprise Technology Park, East Kilbride G75 0QF
**Jessica M. Grimm**, formerly Wessex Archaeology
**Pieter M. Grootes**, Leibniz-Labor für Altersbestimmung und Isotopenforschung, Christian-Albrechts-Universität zu Kiel, Max-Eyth-Str. 11–13, 24118 Kiel, Germany
**Phil A. Harding**, Wessex Archaeology
**Kevin M. Hayward**, Birch Vale, Plantation Close, Curridge, Thatcham, Berkshire RG18 9DJ
**Lorrain Higbee**, Wessex Archaeology
**Talla Hopper**, 25 West Street, Warminster, Wiltshire BA12 8JY
**Elizabeth James**, Wessex Archaeology
**Matt Leivers**, Wessex Archaeology
**Richard I. Macphail,** Institute of Archaeology, University College London, 31–34, Gordon Square, London, WC1H 0PY
**Peter Marshall**, English Heritage, 1 Waterhouse Square, 138–142 Holborn, London EC1N 2ST
**Jacqueline I. McKinley**, Wessex Archaeology
**John Meadows**, Leibniz-Labor für Altersbestimmung und Isotopenforschung, Christian-Albrechts-Universität zu Kiel, Max-Eyth-Str. 11–13, 24118 Kiel, Germany
**Lorraine Mepham**, Wessex Archaeology
**Andrew Millard**, Department of Archaeology, Durham University, South Road, Durham DH1 3LE
**Stuart Needham**, Langton Fold, North Lane, South Harting, West Sussex GU31 5NW
**J. Peter Northover**, Department of Materials, Oxford University Begbroke Science Park, Sandy Lane, Yarnton, Oxford OX5 1PF
**Sharon Penton**, formerly English Heritage, Fort Cumberland, Portsmouth
**Johannes van der Plicht**, Centrum voor Isotopen Onderzoek, Rijkuniversiteit Groningen, Nijenborgh 4, 9747 AG Groningen, The Netherlands
**Rob Scaife**, School of Geography, University of Southampton, Highfield, Southampton S017 1BJ
**Nick Stoodley**, Department of Archaeology, University of Winchester, West Hill, Winchester, Hampshire SO51 0QL
**Jörn Schuster**, formerly Wessex Archaeology
**Chris J. Stevens**, formerly Wessex Archaeology
**Sarah F. Wyles**, Wessex Archaeology
**Jacqui Watson**, formerly English Heritage, Fort Cumberland, Portsmouth

# Acknowledgments

The archaeological excavation and most of the analysis was commissioned and funded by Millwood Designer Homes Ltd, and Wessex Archaeology gratefully acknowledges the cooperation and support of John and Jeff Elliot, Managing Director and Deputy Managing Director respectively, as well as Peter Bland and Chris Wills. The cooperation of the former landowners, Mr and Mrs J Chapman, is also acknowledged. Simon Mason, Principal Archaeological Officer for Kent County Council, monitored the investigations; a special debt of gratitude is owed to him for assistance and advice throughout the project, and especially his crucial input to the successful application for PPG16-support to English Heritage. Acknowledgements are also due to Adam Single of Kent County Council for advice during the course of the fieldwork. On numerous occasions Emma Boast and Ges Moody of the Trust for Thanet Archaeology have kindly provided advice and information from their ongoing projects and the Thanet Sites and Monument Record.

The radiocarbon dating programme, stable isotope, human bone and metallurgical analyses were generously funded by English Heritage. Thanks are owed to Peter Kendall, Inspector of Ancient Monuments for advice during the later stages of fieldwork, and especially to the Project Assurance Officer (PRO) Sarah Jennings, who sadly did not live to see the successful conclusion of the project. Helen Keeley subsequently took up the PRO role and we are grateful for her help and advice during the project. Alex Bayliss and John Meadows are thanked for their enthusiastic help and support during the earlier stages of the radiocarbon dating programme. During its later stages the programme was coordinated by Peter Marshall, and the project team greatly benefited from his knowledge and experience. Thanks are also due for the help in kind provided by Sharon Penton and Jacqui Watson formerly of the Archaeological Conservation Laboratory at Fort Cumberland for the analysis of the mineral-replaced organic remains found on some of the Anglo-Saxon grave goods.

The fieldwork was managed by Rob Armour-Chelu and Richard Greatorex. The post-excavation work was managed by Jörn Schuster; the volume was edited by Philippa Bradley. The fieldwork was carried out by David Godden, Jon Martin, Kirsten Egging Dinwiddy, Simon McCann, Ruth Panes, Dave Murdie, Chris Reece, Stuart Whatley, Carrie Mason, Nigel Ward, Claire Gannon, Francesco Trifilo, Gary Wickenden, Naomi Hall, Kelly Davies, Ken Lyden, Lee Newton, Andy Mayfield, Pete Smith, Rob De'Athe, Tim Murphy, Gemma Ingason, Graciella Hernandez, Steve Legg, Jonathon Smith, Simon Reames, Dave Brown, Claire Davis, Paul Morrison, Mark Stewart and John Russell. The dedication of the field staff is acknowledged, especially during the bitterly cold winter of 2004/5. Many thanks are due to Michael J. Allen for his advice on environmental matters during fieldwork and the early stages of the analysis programme as well as his input into the proposal for the radiocarbon dating programme. The illustrations were drawn by Elizabeth James and photographs by David Godden, Elaine Wakefield, Jacqueline McKinley and Karen Nichols. Linda Coleman and Karen Nichols are thanked for preparing the photographs and diagrams for publication. Base map for Figure 1.1 supplied by Roman-Germanic Commission of the German Archaeological Institute, J. Köhler.

Jacqueline I. McKinley would like to thank Anthea Boylston for access to the unpublished human bone report for Runnymede, and Sheila Hamilton-Dyer and Adrienne Powell for their advice on avian scavenging. Margaret Clegg (Natuaral History Museum) kindly undertook the SEM analysis of the skull trauma.

Lorraine Mepham would like to thank Stuart Needham for his invaluable comments on the Bronze Age metalwork; any errors in identification or interpretation remain the author's own.

Jörn Schuster would like to thank Karen Walker for support and advice throughout the post-excavation programme, and Andrew Fitzpatrick and Anthony Firth for information and helpful discussions. Many thanks for discussing the initial excavation results are also extended to Anthony F. Harding, Wolf Kubach, Germaine Leman-Delerive, Jes Martens, Seàn McGrail, Wolf-Rüdiger Teegen, Liesbeth Theunissen and Karl-Heinz Willroth.

Chris J. Stevens would like to thank Sarah F. Wyles for the assessment and extraction of the charred plant remains.

The archive is currently stored at the offices of Wessex Archaeology under the project codes 56330, 56950–52, but will be deposited with Kent County Council upon provision of a suitable museum repository. Selected artefact categories have been retained by the former landowner (glass, amber, apatite/gypsum and copper objects, and silver).

# Foreword

The Roman geographer Tacitus is rather dismissive about the inhabitants of Britain in the 1st millennium BC. He reminds us loftily that we are dealing with barbarians whose origins – whether natives or immigrants – remain obscure. Archaeological research has shown us that southern Britain at that time was densely populated by communities with similar lifestyles but distinctive identities. Raw materials and goods were traded within these islands and also with communities overseas. Some have survived in the archaeological record, others for which these islands were famous such as slaves, hunting dogs and hides have not. That Britain was in contact with continental Europe throughout the Iron Age is evident from many aspects of the surviving material culture. Exotic material found its way into Britain but whether by immigration or trade is uncertain. Archaeological evidence has its limits and can seldom distinguish precisely how objects found in the soil arrived on these shores more than 2000 years ago. We can, however, perceive influences from two directions – from central and northern Europe across the North Sea and from the Mediterranean and Iberia to south-west Britain and the Irish Sea. We can go further and suggest that movements along the western sea-ways were motivated by trading networks in copper, tin and gold but the impact of this in human terms has been obscured by the limitations of the data.

That veil has now been raised by the application of scientific techniques to the human remains. Fortunately for archaeologists, teeth survive in extremely good condition in the ground and isotopic analyses are providing us with new tools. We can now ascertain what the individual was eating, in what season the food was being consumed and most importantly where the meals were consumed. A mortuary site on the Isle of Thanet overlooking Pegwell Bay with burials at intervals throughout the 1st millennium BC is of interest in its own right for what it tells us about burial rites. What makes it special is that isotope analysis of teeth from 26 individuals gives us the startling information that they include the remains of two groups of immigrants from 'Scandinavia' and the west Mediterranean/Iberian area respectively.

These discoveries make old debates about immigration versus trade redundant, ensures that archaeological studies have sufficient leverage to contribute to the integration process in Europe and provide a perspective on debates regarding national identity. Congratulations are due to all those who have made this advance in understanding possible – Millwood Designer Homes for funding the excavation, analysis and publication and English Heritage for funding the more expensive analyses and publication. In every way this is a project of the 21st century which has contributed greatly to the understanding of our past and origins.

*Geoffrey Wainwright*
formerly Chairman, Wessex Archaeology

# Summary


The site of Cliffs End Farm is located at the southern edge of the Isle of Thanet overlooking Pegwell Bay, now approximately 300 m to the south-west, and about 2 km north of the eastern entrance to the Wantsum Channel, which ceased to function as a navigable waterway into the Thames Estuary by the late medieval period.

The development covered an area of *c.* 1.2 ha, and prior to evaluation and excavation in 2004–5 no archaeological features were known from the site. However, due to the density of archaeological sites in the immediate vicinity, the archaeological work was part of planning consent, as a consequence of which nearly 500 features and 1000 contexts were recorded.

Apart from a few finds of residual Mesolithic and Early and Middle Neolithic date, the earliest datable features are six Beaker Period/Early Bronze Age barrows. There then appears to be a hiatus of occupation until the Late Bronze Age, as Middle Bronze Age activity is only indicated by three radiocarbon dates from residue on flint-tempered pottery.

An extensive programme of radiocarbon dating of 104 samples on human and animal bone, charred residues on pottery and charred plant remains was targeted at the clarification of the chronological development of specific features and to establish the currency of individual pottery fabrics.

Towards the end of the 11th century cal BC a number of enclosures and other features were created for mortuary and ceremonial purposes. The chronological development starts with the Northern Enclosure, followed by the Central Enclosure. The remodelling of both enclosures and the first activity in Mortuary Feature 2018 occurs in the early 10th century. The activity within the Mortuary Feature spans the period between the 10th and 3rd/4th centuries cal BC and is characterised by the deposition of 13 articulated bodies but includes redeposited partial articulated remains, dispersed semi-articulated remains, and disarticulated bones and bone fragments. These depositions belong to three distinguishable phases of mortuary activity in the 11th–9th, 5th and 4th–3rd centuries cal BC. The Mortuary Feature is the only area of the site where the soils were conducive to bone preservation, although individual bones were also recovered from the Midden Pit in the Northern Enclosure and some other features in the northern part of the site.

Analyses of C/N and Sr/O isotopes were carried out on teeth from 26 human individuals, three sheep/goat teeth and one brickearth sample. Apart from the predominance of terrestrial diets, the results show that individuals from three broadly distinguishable origins were buried at Cliffs End Farm, including groups termed cold climate ('Scandinavian'), local and southern (western Mediterranean/?Iberian), whose ratios vary in the three chronological periods of human deposition in the Mortuary Feature.

A group of ditches and pits belong to the Late Iron Age, and the only early Roman feature is a ditch in the north-western corner of the site. There then appears to be no occupation until the Early Anglo-Saxon period when a cemetery is established, focusing around the barrows in the western part of the site. Overlapping with the use of the cemetery, but continuing into, at least, the 11th century, are 74 pits confined to the southern part of the site, many of which contained large quantities of marine shell, probably consumed locally at communal gatherings.

The volume includes analyses of pottery, small finds, animal bone and environmental assemblages.

# Zusammenfassung

Das ca. 1.2 ha große Neubaugebiet Cliffs End Farm liegt am südlichen Rand der Isle of Thanet, oberhalb der heutzutage ungefähr 300 m süd-westlich gelegenen Pegwell Bay. In südlicher Richtung sind es etwa 2 km bis zur östlichen Mündung des Wantsum Channel, der spätestens seit dem späten Mittelalter nicht mehr als schiffbare Verbindung in die Themsemündung nutzbar war.

Vor den 2004–5 durchgeführten archäologischen Untersuchungen waren von dem Areal des Baugebiets keine archäologischen Befunde bekannt. Aufgrund der Dichte archäologischer Fundstellen in der unmittelbaren Umgebung waren diese Untersuchungen, in deren Verlauf fast 500 Befunde und nahezu 1000 Einzelkontexte dokumentiert wurden, jedoch Teil der Auflagen für die Erteilung der Baugenehmigung.

Abgesehen von einigen wenigen Streufunden mesolithischer sowie früh- und mittelneolithischer Zeitstellung, handelt es sich bei den frühsten datierbaren Befunden um sechs becher- oder frühbronzezeitliche Grabhügel. Im Anschluß daran ist eine Besiedlungslücke bis zur späten Bronzezeit zu verzeichenen, denn abgesehen von drei Radiokarbondaten, die von verkohlten Resten an flintgemargerter Keramik stammen, gab es keine Hinweise auf mittelbronzezeitliche Aktivität.

Im Rahmen umfangreicher Analysen wurden insgesamt 104 Radiokarbondatierungen an Proben von menschlichen und tierischen Knochen, verkohlten Resten an Keramik und verkohlten Pflanzenresten untersucht, mit deren Hilfe die chronologische Abfolge bestimmter Befunde sowie die Laufzeiten einzelner keramischer Warenarten ermittelt wurden.

Gegen Ende des 11. Jhs. cal BC wurden mehrere Einfriedungen und andere Anlagen für Bestattungs- und zeremonielle Aktivitäten errichtet. Die chronologische Abfolge beginnt mit der Northern Enclosure, gefolgt von der Central Enclosure. Änderungen an diesen beiden Einfriedungen sowie erste Aktivitäten in Mortuary Feature 2018 datieren in das frühe 10. Jh. cal BC. Bei den Aktivitäten innerhalb der Mortuary Feature, die insgesamt den Zeitraum zwischen dem 10. und 4./3. Jh. cal BC umfassen, handelt es sich um die in situ Deponierung von 13 noch komplett im anatomischen Verband befindlichen menschlichen Individuen, aber es fanden sich auch sowohl umgebettete als auch verstreute, noch teilweise im anatomischen Verband zusammenhängende Skelettelemente, sowie vereinzelte Knochen und Knochenfragmente. Diese Deponierungen lassen sich drei klar unterscheidbaren Bestattungsphasen im 11.–9., 5. und 4.–3. Jh. cal BC zuordnen. Die Mortuary Feature ist der einzige Bereich des Fundplatzes mit entsprechender Knochenerhaltung; es fanden sich jedoch auch vereinzelte Knochen in der Abfallgrube (Midden Pit) in der Northern Enclosure und einigen weiteren Befunden im nördlichen Teil der Grabungsfläche.

Analysen von C/N- und Sr/O-Isotopen wurden an den Zähnen von 26 menschlichen Individuen, drei Schaf/Ziege Zähnen und einer Bodenprobe (brickearth) durchgeführt. Abgesehen von einer überwiegend terrestrisch geprägten Ernährung zeigen die Ergebnisse auch, dass in Cliffs End Individuen aus deutlich unterscheidbaren Herkunftsgebieten bestattet wurden. Es wurden die drei Gruppen „kaltes Klima“ („skandinavisch“), „lokal“ und „südlich“ („westliches Mediterraneum/?Iberisch“) unterschieden, deren jeweilige Anteile in den drei Bestattungsphasen in der Mortuary Feature variieren.

Eine Gruppe von Gräben und Gruben datiert in die späte Vorrömische Eisenzeit, und der einzige frühkaiserzeitliche Befund ist ein Graben in der Nordwest-Ecke der Grabungsfläche. Es folgt ein Hiatus bis zum Beginn der früh-angelsächsischen Periode, in der ein Gräberfeld angelegt wird, das sich auf den Bereich um die Grabhügel im westlichen Bereich der Grabungsfläche konzentriert. Die Nutzung von 74 auf den südlichen Teil der Fläche beschränkte Gruben ist mit der des Gräberfelds teilweise zeitgleich, sie reicht aber mindestens bis ins 11. Jh. n. Chr. Zahlreiche Gruben enthielten große Mengen von Muscheln, die wahrscheinlich im Rahmen gemeinschaftlicher Zusammenkünfte vor Ort verspeist wurden.

Der Band enthält Untersuchungen zu Keramik, Kleinfunden, Tierknochen und paläobotanischen Resten.

*Übersetzung: Jörn Schuster*

# Résumé

Le site de Cliffs End Farm se trouve en bordure sud de l'île de Thanet dominant la baie de Pegwell, maintenant à environ 300 m au sud-ouest, et environ 2 km au nord de l'entrée est du chenal de Wantsum, qui a cessé de servir de voie navigable donnant accès à l'estuaire de la Tamise venue la période médiévale tardive.

Le site couvre une superficie d'environ 1,2 ha, et, avant le diagnostic et les fouilles de 2004-5, on ne connaissait aucun vestige archéologique à ce site. Cependant, en raison de la densité de sites archéologiques dans le voisinage immédiat, un diagnostic archéologique était attaché à l'obtention d'u permis de construire, ce qui a eu comme conséquence le répertoriage de presque 500 vestiges et 1000 contextes.

A part quelques trouvailles avec des dates résiduelles du Mésolithique et du Néolithique ancien et moyen, les vestiges datables les plus anciens sont six tertres de la période Beaker ou de l'Age du Bronze ancien. Il semble ensuite y avoir eu un hiatus dans l'occupation jusqu'à l'Age du Bronze final, car l'industrie de l'Age du Bronze moyen n'est présente que sous la forme de trois datations au radiocarbone provenant de résidus sur de la poterie dégraissée au silex.

Un ample programme de datation au radiocarbone de 104 échantillons prélevés sur des ossements humains et animaux, des résidus carbonisés sur de la poterie et des restes de plantes carbonisés visaient à clarifier le développement chronologique de certains vestiges particuliers et à établir la circulation de pâtes de.céramique individuelles.

Vers la fin du XIe siècle av.J.-C.cal un certain nombre d'enclos et autres monuments furent créés à des fins mortuaires et cérémonielles. Le développement chronologique commence avec l'Enclos Nord, suivi par l'Enclos Central. Le remodelage de ces deux enclos et la première activité dans le Vestige Mortuaire 2018 ont lieu au début du Xe siècle. L'activité à l'intérieur du Vestige Mortuaire s'étale sur la période entre le Xe et le IIIe ou IVe siècle av. J.-C. cal et se caractérise par le dépôt de 13 corps articulés, mais comprend aussi des restes articulés partiels redéposés, des restes semi-articulés dispersés, et des os et fragments d'os désarticulés. Ces dépôts se rangent en trois phases distinctes d'activité mortuaire aux XIe-IXe, Ve et IVe-IIIe siècles av. J.-C. cal. Le Vestige Mortuaire est la seule zone du site où les sols favorisent la préservation d'ossements, bien que des os individuels aient aussi été recouvrés de la fosse à déchets de l'Enclos Nord et de certains autres vestiges de la partie nord du site.

On a effectué des analyses d'isotopes de C ou N et de Sr ou O sur les dents de 26 individus humains, trois dents de moutons ou chèvres et un échantillon de terre à briques. Mis à part la prédominance d'une alimentation terrestre, les résultats montrent que des individus d'en gros trois origines distinctes furent ensevelis à Cliffs End Farm, y compris des groupes appelés climat froid (`Scandinave'), locaux et méridionaux (Méditerranéen occidental ou?ibérique) dont les proportitions varient au cours des trois périodes chronologiques de déposition humaine dans le Vestige Mortuaire.

Un groupe de fossés et de fosses appartient à l'Age du Fer final, et le seul vestige du début de la période romaine est un fossé dans le coin nord-ouest du site. Il semble qu'ensuite il n'a pas été occupé avant le début de la période anglo-saxonne, date à laquelle fut établi un cimetière se concentrant autour des tertres de la partie ouest du site. Empiétant sur l'utilisation du cimetière, mais se prolongeant au moins jusque dans le XIe siècle, on trouve 74 fosses confinées à la partie sud du site, dont beaucoup contenaient de grandes quantités de coquillages marins, probablement consommés sur place à des rassemblements communautaires.

Ce volume comprend des analyses de poterie, de petites trouvailles, d' os d'animaux et d'assemblages environnementaux.

*Annie Pritchard*

# Chapter 1

# Introduction

*by Jörn Schuster*

This volume presents the results of archaeological investigations at Cliffs End Farm (hereafter Cliffs End) in the parish of Cliffs End near Ramsgate on the Isle of Thanet, Kent (Fig. 1.1, Pl. 1.1). Despite the lack of finds from the site prior to the excavations, in an area of such dense archaeology some remains were to be expected. However, what was unexpected was the sheer complexity of some of the prehistoric features and associated remains. The careful excavation of these remains was crucial to the recovery of important information on site formation processes and through painstaking post-excavation analysis a remarkable sequence has been established. Scientific techniques, radiocarbon dating and isotope analysis, made possible by the support of English Heritage, have produced important results, which shed new light on occupation, burial rituals and the movement of people between this part of Thanet and continental Europe during the Bronze Age and Iron Age. After the end of the Iron Age the site seems to have been

*Plate 1.1 Mortuary Feature 2018 during excavation, from the north-east*

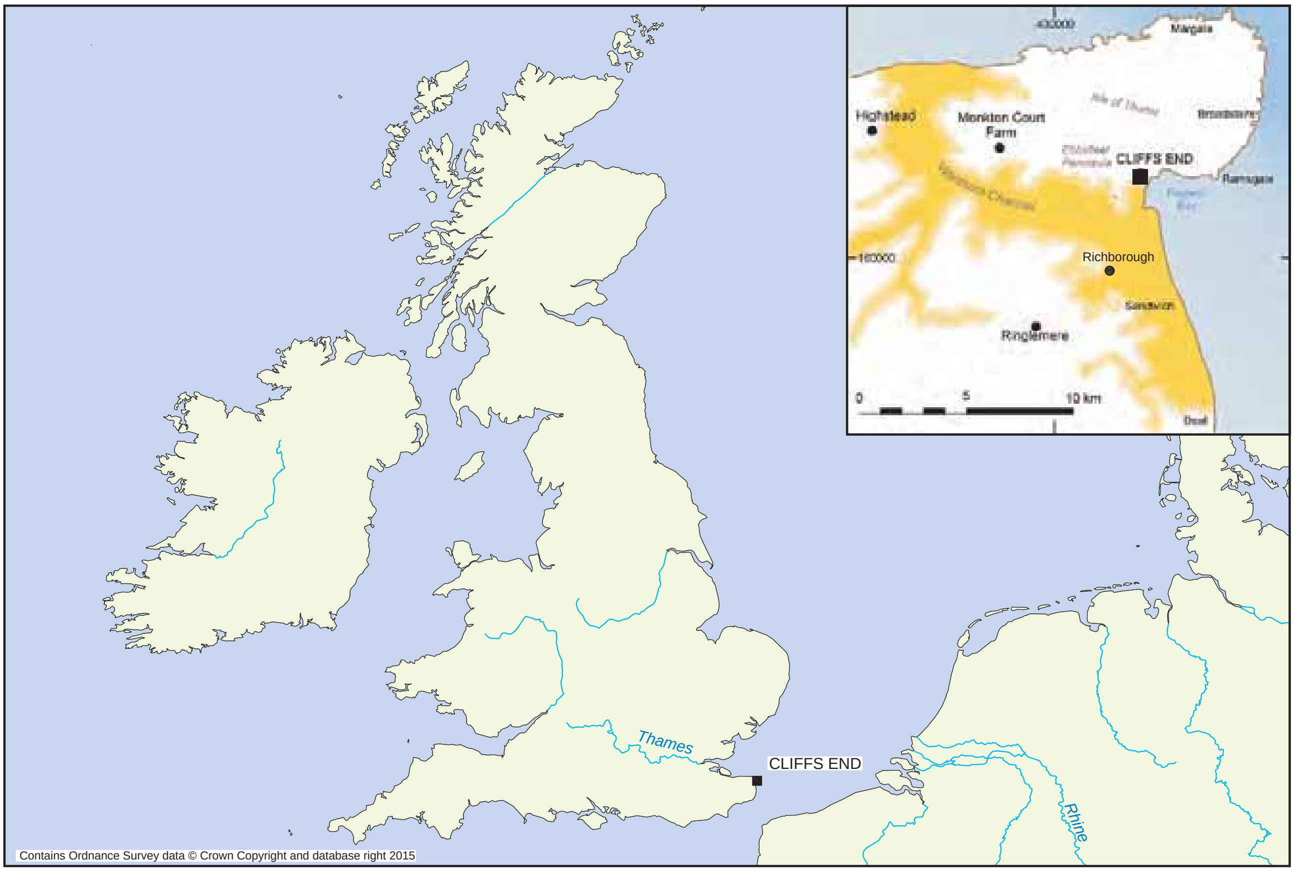



*Figure 1.1 Site location showing the isle of Thanet and the Wantsum Channel and selected sites mentioned in the text*

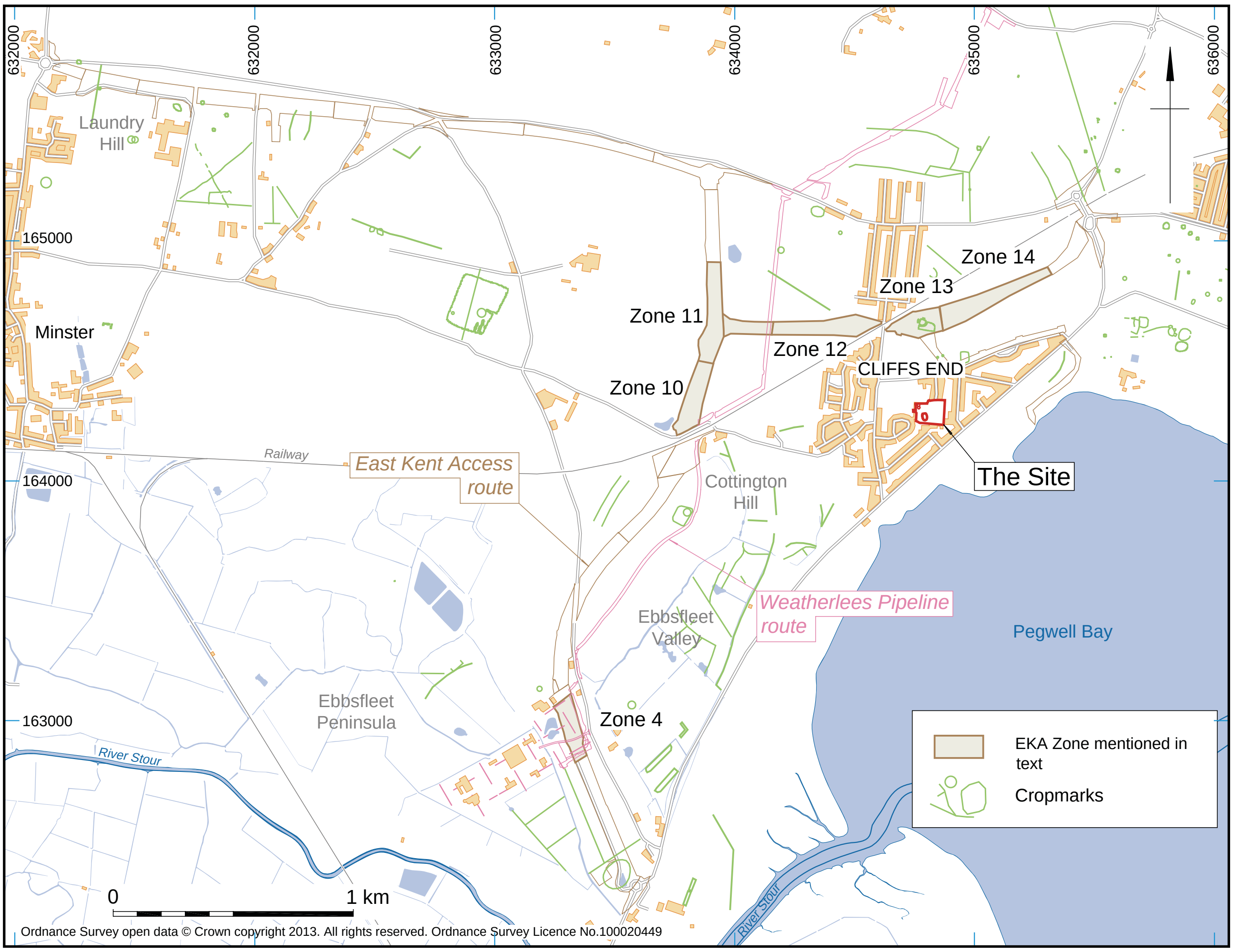



*Figure 1.2 The location of Cliffs End showing the route of the East Kent Access Road (EKAR)*

largely abandoned until the Early Anglo-Saxon period when a cemetery was established. Occupation continued into the 11th century. There was limited evidence for post-11th century activity with only a little 12th–14th century pottery and a very worn silver 'Long Cross' penny being recovered.

## Location and Geology

The site is located on the southern edge of the Isle of Thanet, 300 m from the shoreline at the top of land sloping up from the north-west corner of Pegwell Bay and to the south of Cliffs End Road (NGR 634820 164290; Fig. 1.2). The site was situated on a low ridge at 22.5 m above Ordnance Datum (aOD), aligned north to south, which crossed the western half of the site. East of the ridge the site sloped gently down to 18.5 m (aOD) at the eastern edge of the excavated area. An area of 1.2 hectares was investigated during the excavations (Fig. 1.2). The site was farmland before the excavation. Throughout the periods of the site's use Thanet was an island, separated from the North Kentish Plain by the Wantsum Channel, Pegwell Bay marking its eastern mouth (Fig. 1.1). Around 2000 years ago this waterway began to silt up naturally. This process was accelerated by human agency, particularly in the medieval period and later. The final draining of the area occurred in the 17th century, by which time the channel had ceased to function as a passable short-cut into the Thames estuary (Perkins 2007).

The underlying solid geology of Thanet is Cretaceous Upper Chalk, exposed in the high cliffs which stretch along the North Sea coast from Margate past Broadstairs to Ramsgate and dip into a syncline on the north side of Pegwell Bay at Cliffs End, where they are overlain by Tertiary–Palaeocene Thanet Beds and localised patches of drift deposits of Head Brickearth (British Geological Survey (BGS) 1980; Kerney 1965; Weir *et al.* 1971; Sheppard-Thorn 1988). The resulting flat plain, containing the later Thanet Beds, extends inland from Pegwell Bay towards the west, past Minster and Monkton.

The general sequence observed on site consisted of Thanet Sands overlain by Head Brickearth. The Brickearth lay beneath 0.15–0.60 m of mid-greyish brown clayey silt subsoil. This subsoil was deepest on the south-eastern side of the site, where it appeared to be a colluvial deposit which had begun to form in the Late Bronze Age or Early Iron Age. The sequence was capped by *c.* 0.15 m of ploughsoil.

## Archaeological Background

The following section provides a brief summary of the local archaeology and history of Thanet, focusing on periods for which archaeological evidence was discovered during the excavations at Cliffs End. A good overview with a comprehensive bibliography for the archaeology of the entire Isle of Thanet up to the Norman Conquest is provided by Moody (2008). Additionally, a couple of large-scale linear projects have been published in recent years: the account of the archaeological investigations prior to the widening of the A253 road between the Monkton and Mount Pleasant roundabouts by Bennett *et al.* (2008), and the results of the excavations along the *c.* 13 km-long route of the Weatherlees–Margate–Broadstairs Wastewater Pipeline, which passes within less than 1 km to the west of the site, by Egging Dinwiddy and Schuster (2009). More extensive syntheses of the archaeological and historical background of the eastern part of the Thanet landscape have also been produced in previous desk-based assessments, evaluation and assessment reports for various projects by Wessex Archaeology (1992; 1998; 2004d; 2006b), and a very comprehensive and detailed archaeological model has been prepared for the archaeological investigations undertaken along the easement of the East Kent Access Road (EKAR) which passes within 300 m to the north of the site (Kent Highway Services (KHS) 2008; Oxford Wessex Archaeology 2011; Andrews *et al.* forthcoming).

### *Mesolithic and Neolithic*

Mesolithic findspots are known at Cliffs End and Ramsgate where two Thames picks – Late Mesolithic flaked flint axes – have been found in the upper reaches of several valleys intersecting on the north coast of Pegwell Bay (Moody 2008, 58–9, fig. 23; KHS 2008, 105).

Compared to later periods, sites of Neolithic date remain less numerous on Thanet (Perkins 2004, 80; Moody 2008, 65, fig. 24; Parfitt 2006, fig. 26). Early Neolithic sites include the first causewayed enclosure to be identified in Kent at Chalk Hill, Ramsgate, on the western slope of one of the valleys opening out to Pegwell Bay (Dyson *et al.* 2000); a short stretch of another curvilinear causewayed enclosure was subsequently recorded on the eastern side of the same valley near Court Stairs (Moody 2008, 64–7, figs, 25–6). Only 1 km to the west of Cliffs End, four small pits containing fragments of Middle Neolithic Mortlake style bowls were recorded at Cottington Road (Leivers 2009, 67). Further Impressed Ware sherds have been recovered from slightly west at Oaklands Nursery in Cottington Road (Perkins 1998), at Laundry Road, Minster (Boast and Gibson 2000) and on the route of the Monkton Gas Pipeline (Perkins 1985). At Ringlemere extensive Neolithic pits, postholes and other features associated with Grooved Ware pottery were found under a mound of the second phase of the henge monument M1 (Parfitt 2006, 8–9).

Sites of Late Neolithic/Early Bronze Age date are known from Lord of the Manor, Ramsgate, where a henge monument and later burial were recorded (Moody 2008, 73–5, figs 30–1; 80, fig. 34; 84), and Fengate material was recovered from the causewayed enclosure at Chalk Hill, Ramsgate (Gibson 2006). A monument complex at Ringlemere includes a Late Neolithic henge monument (Parfitt 2006, 4, fig. 3; 47) numerous ring-ditches, as well as the famous gold cup, which is thought to be Bronze Age, dating to around 1950–1750 BC (Needham 2006, 61, fig. 30).

### *Bronze Age*

Sites from this period are very common on Thanet, and additionally it is likely that many unidentified cropmarks date to this period. While there is less evidence for settlement, the sites appear to be mainly associated with mortuary activity with barrows and ring-ditches dominating the evidence. Parfitt (2006, 49) has estimated the density of Bronze Age barrows for Thanet at almost four sites per $km^2$ (see also Perkins 2004, 76). Groups of Beaker/Early/Middle Bronze Age ring-ditches/round barrows have been excavated at Margate, Lord of the Manor and Manston Airport. At the latter site, *c.* 1 km north of Cliffs End, a grave slightly off-centre within an ovate ring-ditch was found containing the remains of a crouched burial with a long-necked Beaker, jet button and a flint knife (Perkins and Gibson 1990). In 1968 a Beaker was found during the cutting of a drainage trench in Cliff View Road in Cliffs End, *c.* 600 m NNW of the site (Fig. 1.3; Macpherson-Grant 1968). Individual monuments were also recorded at St Peter's, Broadstairs and the Ebbsfleet Peninsula with many more unexcavated examples identified from aerial photographs (Moody 2008, figs 34, 45). A particularly large ring-ditch, *c.* 45 m in diameter, has been found on aerial photos superimposed on a substantial sub-rectangular enclosure only 400 m to the north of the site (KHS 2008, 104). Individual burials apparently not associated with ring-ditches (flat graves) were recorded at Nethercourt, Ramsgate, and Ebbsfleet. Hengiform monuments, which are unusual in south-east England, have been found at Northdown, Margate, and Lord of the Manor, Ramsgate (*ibid*., 73–6).

Early Bronze Age remains (mainly ring-ditches) are known to cluster above the former south coast of the island, from Ramsgate westwards broadly along the line of the A253 at least as far as Monkton (Bennett *et al.* 2008). At Laundry Road, Minster (Boast and Gibson 2000) and Oaklands Nursery, Cliffsend (Fig. 1.3; Perkins 1998), evidence for Early Bronze Age settlements has been found, and at Monkton Road, Minster charred cereal grains from a field system have produced Early Bronze Age dates (Martin *et al.* 2012). It is possible to envisage a dispersed linear barrow cemetery on the higher ground behind a zone nearer the coast within which more sites of domestic character remain to be discovered. However, it has been shown that not all ring-ditches warrant identification as round barrows. From the many excavated examples it is apparent that there is considerable variation in the components of these features, and their functions are not yet fully understood. While some round barrows are clearly monuments to individuals, many do not contain a primary burial and may thus have served some other purpose (Moody 2008, 96).

An intensification of the agricultural use of the landscape appears to have occurred during the Middle Bronze Age, with the division of land into field systems and enclosures which may have persisted into the Late Bronze Age and Early Iron Age (*ibid*., 98–9). Two finds of Middle Bronze Age material made near Ramsgate indicate links with the Continent: a Deverel-Rimbury vessel containing a series of Picardy pins (Hawkes 1942), and, between Holicondane and Dumpton, 'a skeleton accompanied by four bronze armlets; three are very massive and ornamented with alternated incised spiral and oval-shaped markings, the other is a coil of ten coils' (Payne 1897, li) which have been claimed to be associated with North German metalworking tradition (Moody 2008, 108). Late Bronze Age settlements are known from Foreness Point; St Peter's, Broadstairs; Northdown, Margate and Ebbsfleet/Weatherlees Hill (Egging Dinwiddy and Schuster 2009, 71–81). Approximately 1.8 km north-east of the site a number of pits at Manston Road, Ramsgate, contained Middle Bronze Age pottery and a Late Bronze Age settlement included a square post-built structure, as well as several ditches and gullies (Hutcheson and Andrews 2009, 202–7). Other contemporary enclosures and associated field systems are known from Westwood and Chalk Hill, the latter *c.* 1.5 km to the east north-east of Cliffs End (Moody 2008, 99). A Late Bronze Age-Early Iron Age D-shaped enclosure has recently been excavated in the easement of the East Kent Access Road at Zone 14, *c.* 600 m north-east of the site (Figs 1.2–1.3; Andrews *et al.* forthcoming). Late Bronze Age burials were also found along the East Kent Access Road (Andrews *et al.* forthcoming).

Bronze Age metalwork hoards are a common feature of the period in Thanet (Perkins 1991, 259–61, fig. 4; Perkins 1992, 278; Yates 2004, 14; Andrews *et al.* 2009, 76, fig. 2.8B), and most recently in Zone 4 of the EKAR (Andrews *et al.* forthcoming). Two gold bracelets of 1st millennium BC date, from disturbed subsoil in Zone 4, may also represent a hoard (Andrews *et al.* forthcoming). The distribution and types of site reflects the geographical importance of Thanet as a gateway to the Thames Estuary and inland waterways of southern England.

### *Iron Age*

The transition from Bronze to Iron Age appears to have been a gradual development with probable continuity of sites. It is likely that many of the undated enclosures identified from aerial photographs date to this period. Evidence for Iron Age settlement sites and features is mainly distributed around the North and East coast of Thanet, with enclosures for example, at Hartsdown, Fort Hill and North Foreland, Manston, South Dumpton Down, and Dumpton Gap (Moody 2008, 117–38, figs 66–83). On the southern slopes of Thanet along the marshes of the deepening Wantsum Channel there are enclosures at Minster and substantial Middle/Late Iron Age boundary/enclosure ditches on the Ebbsfleet Peninsula, near Weatherlees and Cottington Hills (Egging Dinwiddy and Schuster 2009, 93, fig. 2.12; cf. Parfitt 2004a, 17–8). Iron Age activity identified prior to the construction of the East Kent Access Road includes a palisade, field systems and enclosures and settlements as well as burial remains (singletons, small grave groups including a Middle Iron Age linear cemetery) (Oxford Wessex Archaeology 2011; Andrews *et al.* forthcoming; McKinley forthcoming).

As with the rest of Kent (Parfitt 2004a, 16), evidence for Iron Age burial is scant in the vicinity of Cliffs End. However, six inhumation graves and Middle or Late Iron Age pottery were found in Mount Green Avenue, Cliffs End in 1959 (Kent HER TR 36 SW 2, Fig. 1.3; Egging Dinwiddy and Schuster 2009, 93, fig. 2.12, 28). An undated grave was found *c.* 400 m north of the site during the construction of a gas mains pipe trench in 1974, together with a number of ditches containing Early/Middle Iron Age pottery (Fig. 1.3; Willson 1984). Several singleton Late Iron Age/early Romano-British graves as well as a small assemblage of redeposited Middle/Late Iron Age bone were found in ditches along the route of the wastewater pipeline at Weatherlees and Ebbsfleet Lane, *c.* 1.8 km south-west of the site (Egging Dinwiddy and Schuster 2009, 93, fig. 2.12; 105–13).

### *Romano-British*

Cliffs End is located only 4.7 km north-east of the important Roman port and supply base at Richborough (Fig. 1.1). Located opposite the Isle of Thanet and the Wantsum Channel, it afforded a strategic vantage point as a gateway to the Thames along long established trade routes (Millett 2007, 141–6). However, whether it was here that the Claudian

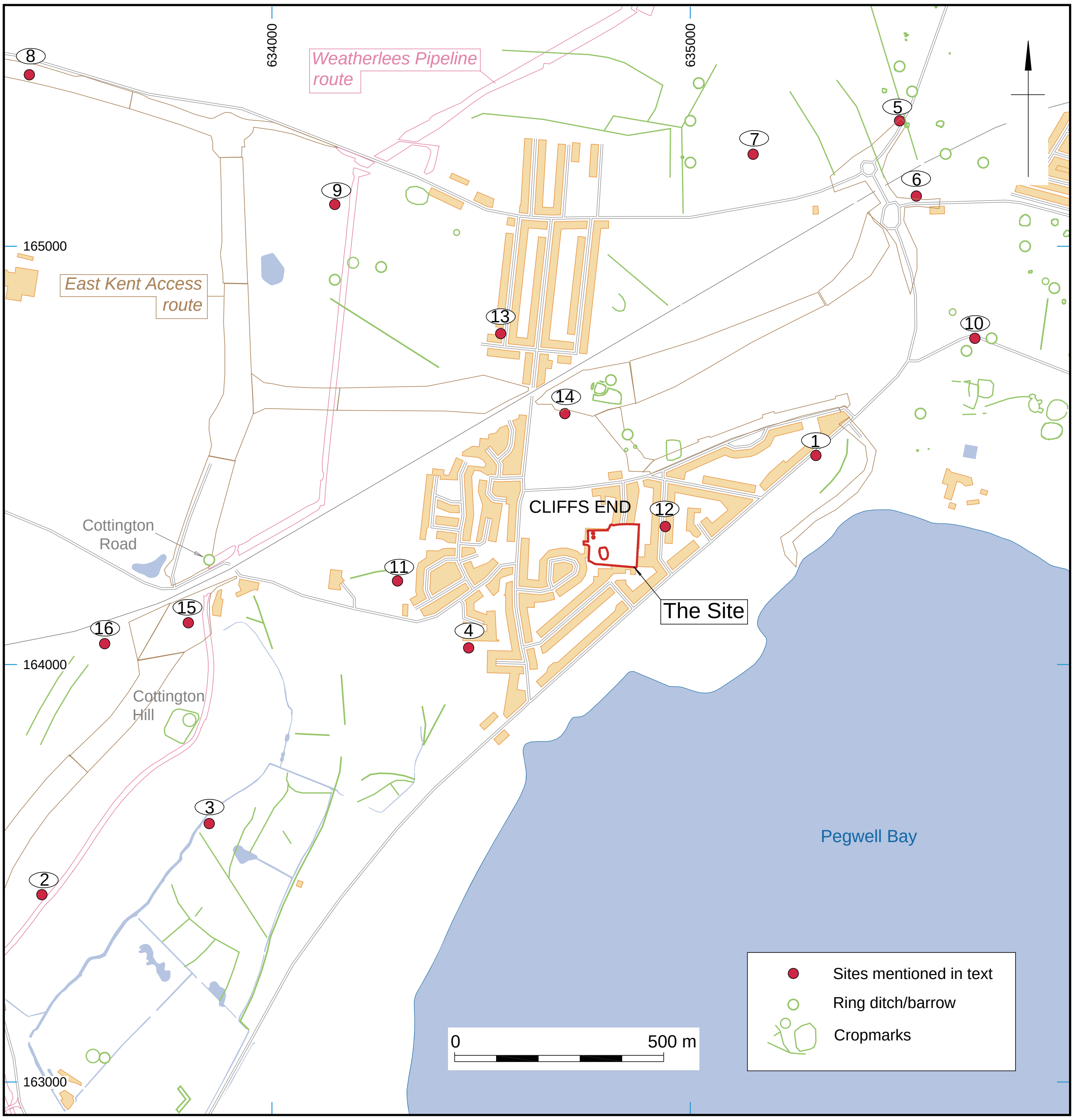



*Figure 1.3 Location of Cliffs End Farm and selected sites mentioned in the text: 1) Romano-British inhumation burials (KE15421); 2) Late Bronze Age hoard; 3) Prehistoric midden material, Cottington Hill (SMR 603); 4) Oaklands Nursery; 5) Lord of the Manor henge and round barrows; 6) Ozengell cemetery; 7) Manston Airport Beaker burial; 8) Romano-British inhumation and cremation burials (Perkins 1985); 9) Iron Age pits (Perkins 1985); 10) Probable Anglo-Saxon inhumation burial (Kent HER no. TR 36 SE 686); 11) Romano-British cremation burial in amphora (Thanet SMR 376); 12) Six Late Iron Age burials found by workmen in 1959 (Thanet SMR 172); (13) Crouched Beaker burial (Thanet SMR 170); 14) Iron Age pits and grave (Thanet SMR 171); 15) Probable Roman villa site (Thanet SMR 255); 16) Bronze Age hoard (Perkins 1992)*

invasion fleet of AD 43 landed remains the focus of much scholarly debate (see for example, Salway 1981, 75; Frere and Fulford 2001; Sauer 2002; Bird 2002; Hind 2007), but it might well be from Richborough that the last Roman military presence was withdrawn to Gaul in AD 406 (Millett 2007, 143).

A gazetteer of the Roman archaeology of Thanet was published by David Perkins in 2001. More recently Moody published a map of Roman sites on Thanet (Moody 2008, 140, fig. 84), and a map of Iron Age and Romano-British sites along the route of the wastewater pipeline from Weatherlees to Margate was included in Egging Dinwiddy and Schuster (2009, 93, fig. 2.12). Evidence for burials in the vicinity of Cliffs End includes a mixed-rite cemetery at Cottington Road, *c.* 800 m to the west (Fig. 1.3; *ibid.*, 98–104). Additionally, cremation burials are known from Cliffs End and Ramsgate, and inhumation burials from Manston, Ramsgate, Cottington Hill and Lord of the Manor, Ramsgate. Cremation and inhumation burials were identified on the Monkton Gas Pipeline (Perkins 1985). Unidentified structural remains, some possibly of substantial masonry buildings or villas, were for instance recorded at Cottington Hill, Weatherlees Hill and Ebbsfleet Farm, and the most extensively investigated Roman building in Thanet is Abbey Farm villa at Minster (Moody 2008, 143–5, figs 85–6).

### *Anglo-Saxon*

East Kent, and Thanet in particular, is remarkably rich in Early Anglo-Saxon cemeteries, both in terms of the number of examples and the assemblages of grave goods (Richardson 2005, vol. 2, maps 8–9; Riddler 2004a, 27; Welch 2007, 196, fig. 6.5). The important cemetery of Ozengell is located under the Lord of the Manor roundabout, *c.* 1 km to the north-east of Cliffs End (Fig. 1.3; Moody 2008, 161–2, figs 95–6), an Anglo-Saxon inhumation was uncovered at Chalk Hill (Kent HER no. TR 36 SE 686), while the remains of a Middle Anglo-Saxon (cal AD 860–670; NZA-28977; 1263±30 BP, 95% confidence) singleton burial were found in a ditch at Cottington Hill 1 km to the west (Egging Dinwiddy and Schuster 2009, 131–2). A cemetery of mostly unaccompanied burials of probable Middle Anglo-Saxon date has been uncovered in Zone 14 of the East Kent Access Road, half way between the site and Lord of the Manor (Figs 1.2–1.3; Oxford Wessex Archaeology 2011, 129).

Evidence for Anglo-Saxon settlement has proved more elusive, with only ten sites on Thanet revealing sunken-featured buildings, although aerial photographs indicate some further structural evidence (Welch 2007, 197, fig. 6.6; Moody 2008, 161, fig. 95). In the vicinity of Cliffs End, excavations in Manston Road, 2 km to the north-east, uncovered evidence for an Anglo-Saxon settlement including five sunken-featured buildings (SFBs) of 6th–7th century date (Hutcheson and Andrews 2009), and a single SFB was found just south of the Romano-British mixed-rite cemetery on Cottington Road (Fig. 1.3; Egging Dinwiddy and Schuster 2009, 129–31). A cluster of shell-filled pits was found close to the cemetery in Zone 14 (Andrews *et al.* forthcoming). There are no Late Anglo-Saxon sites in the vicinity, but many of Thanet's modern towns and villages have Anglo-Saxon origins; some churchyards in use today contain the remains of very early burials, and some of the churches have Anglo-Saxon predecessors. This continuity of place is likely to have masked or removed more Anglo-Saxon settlement evidence.

Traditionally, the Isle of Thanet, and more specifically Ebbsfleet on the northern shore of the south-western entrance to the Wantsum Channel, has been identified as the landing place of the legendary Saxon leaders Hengest and Horsa as well as the Christian missionary St Augustine, sent by Pope Gregory in AD 597 (Stenton 1971, 16, 105).

## Project Background and Research Aims

In view of the extraordinary and – more importantly – unexpected archaeological findings at Cliffs End, it is considered necessary to describe in some detail the circumstances of the project's planning condition and excavation strategy as it evolved during the progress of fieldwork.

No archaeological finds or features were known from the development area prior to the commencement of archaeological investigations in 2004. However, based on the density of archaeological sites in the vicinity (see above) an archaeological condition, stipulating an evaluation and – if necessary – further archaeological work, was part of planning consent (Wessex Archaeology 2004a).

The programme of archaeological works began in May 2004 with an evaluation of 15 trenches (Fig. 1.4), which identified at least five ditches and one sub-circular pit, with pottery of post-Deverel-Rimbury tradition roughly dated as Late Bronze Age/Early Iron Age recovered from these features. Two pits and one ditch, all containing remains of marine shellfish, were dated to the Middle Anglo-Saxon period. While prehistoric material was found more widely spread, Anglo-Saxon material appeared to be confined to the southern part of the site. Additionally, two sherds of glazed medieval pottery were recovered, but there were no associated features. Two concrete slabs were identified as remains of

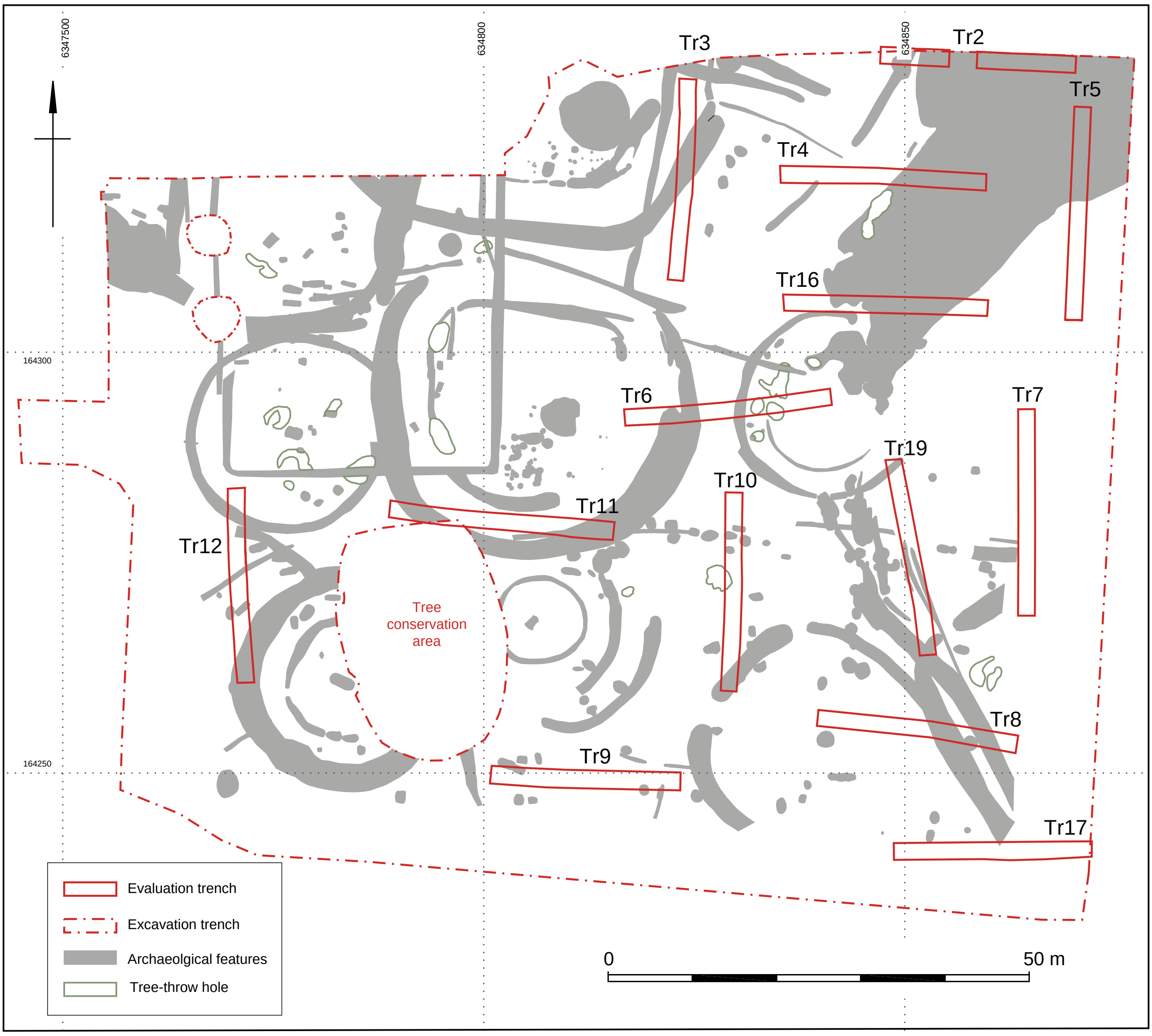



*Figure 1.4 Location of evaluation and excavation trenches*

World War II anti-aircraft gun emplacements (Wessex Archaeology 2004a).

Based on the evaluation results the aim of the excavation was to establish the presence, location, date, character and condition of any surviving archaeological remains (Wessex Archaeology 2004b). The excavation took place between July 2004 and February 2005 (Wessex Archaeology 2006a). Following the initial stripping, a large number of features were discovered, among them six ring-ditches (some with multiple ditches), three sub-square enclosures, the northern containing a large midden pit, and an Early Anglo-Saxon cemetery (Fig. 1.5). A large feature (2018) was identified in the north-east portion of the site (maximum width of 29 m at its northern end and a minimum length of 52 m) which continued north-eastwards beyond the northern limit of the excavation. The nature and colour of its redeposited/reworked 'brickearth' fill and its diffuse boundary with the surrounding colluvial 'brickearth' topsoil and subsoil meant that the feature was almost indistinguishable in plan (see McKinley, Chapter 2, Mortuary Feature 2018). More significantly for future archaeological evaluations of similar sites with comparable geological conditions, it was impossible to discern the feature in the evaluation trenches.

In order to ascertain the nature of the feature, a sondage trench was hand excavated in the northern part of 2018 and an additional machine slot dug near the south-west end, revealing a series of slowly accumulated layers and, most importantly for the further excavation strategy, substantial quantities of redeposited, disarticulated human bone and evidence for *in situ* articulated human remains; a radiocarbon date on a femur recovered from the sondage returned an 11th/10th-century BC cal date. From these initial results it was concluded that 2018 presented an extensive Late Bronze

Age mortuary feature which would need to be excavated largely by hand to ensure full recovery of all archaeological components. Due to the location of site access close to the area of the sondage it was agreed that all other features revealed during stripping would have to be excavated before excavation of the mortuary feature could commence. Investigation of Mortuary Feature 2018 was eventually carried out between November 2004 and February 2005, following a specifically adapted excavation strategy agreed with the curator (Wessex Archaeology 2004c).

Based on the assessment of the excavation results (Wessex Archaeology 2006a) a strategy for analysis was agreed specifying the following updated research aims (Wessex Archaeology 2007):

1. Improve the chronological resolution of the various features recorded and assemblages retrieved;
2. What relationships exist between the Late Bronze Age features and the mortuary feature? Were they contemporary, or were they chronologically distinct events?
3. Analyse the nature of the deposition and formation processes influencing deposits throughout the 'mortuary feature';
4. Compare the nature of deposition and treatment of human remains from the 'mortuary feature' with that of midden pits and other features;
5. Use suitable analysis to identify the diet and origin of the human remains from the 'mortuary feature';
6. The condition of the human bone will be examined to identify what taphonomic factors (ancient and modern) may have affected it;
7. Further analysis of the sex and age of individuals will enable deductions to be reached with regard to the nature of the population, variations in mortuary treatment and temporal/spatial variations;
8. Analysis of spatial distribution of finds (inclusive of human bone) and deposits will be examined to determine whether actions/placement follow deliberate or random patterns.

In order to address aims 1 to 3, an extensive radiocarbon dating programme of human remains and pottery residues was devised; questions pertaining to aim 5 were to be answered by C/N- and Sr/O-isotope analyses. Contrary to an initial aim included in the method statement for the excavation of the mortuary feature (Wessex Archaeology 2004c, 3.2.6), it was decided on the basis of the assessment that no ancient DNA (aDNA) analysis be carried out. Some aDNA sequences are very common, and generally the results tend to give broad based information on assemblage homogeneity rather than indicate direct blood relationships. Since some of this type of information may be derived from normal metric and non-metric skeletal data, it was considered that the required expenditure would not be justified by the potentially limited results which could be obtained. However, future developments in the field of aDNA analysis will undoubtedly lead to improvements in the technique, at which time analysis of the material from Cliffs End could more productively be included as part of a wider research programme covering broader regional, national and potentially international research questions.

## Methods of Excavation and Recording

A 10 m-wide area was stripped by machine along the eastern and southern edges of the site. The features encountered were recorded and then this area was used for stockpiling material stripped from the main area. Two more spoil heaps were made beyond the northern edge of the excavation. An area around a large tree to the south-west and two smaller areas around smaller trees to the north-west were left unexcavated as the trees were to be retained.

Experience gained during the evaluation has shown that archaeological features and deposits cut into the natural brickearth tended to take a few days to 'weather out'. A ten day strip, map and record was therefore proposed as Phase I of the mitigation to allow for the full extent of archaeological remains to be identified and recorded (Wessex Archaeology 2004b).

In the south-eastern part of the site there was an area of hillwash with Anglo-Saxon features cut into its surface; it was at the same time covering Bronze Age features. After the later features had been recorded the hillwash was removed by tracked excavator and the features beneath were investigated.

All excavation and recording utilised Wessex Archaeology's systems both in the field and during post-excavation analysis. All relevant guidelines, codes of practice and legislative procedures were followed during all stages of the investigations, assessment and analysis. All archaeological features were hand-excavated, suitably sampled, and those of particular interest were excavated fully. All graves were wholly excavated and sampled in the appropriate manner.

The large Mortuary Feature (2018) revealed in the north-eastern corner was totally excavated. By hand-digging a sondage trench at the northern end it was ascertained that the lower parts of this feature contained articulated *in situ* human remains and most of the disarticulated human bone, whereas the upper 0.5 m was less rich in finds and had

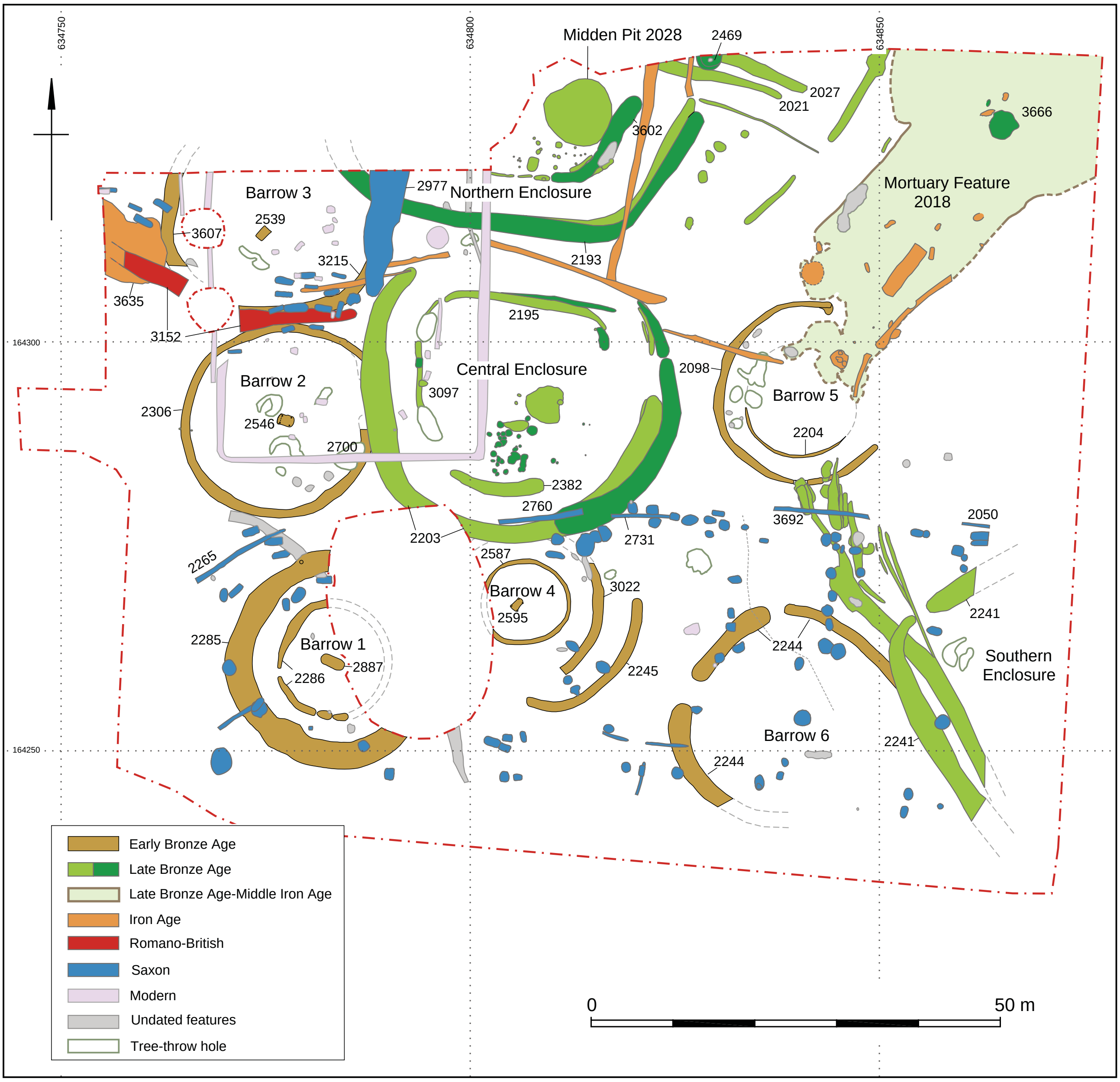



*Figure 1.5 Phased plan of all features*

probably been brought in as hillwash and natural silting. It was therefore decided during excavation to remove the upper part of spit 3 by machine (see McKinley, Chapt 3). Finds recovered during the machining of the mortuary feature were given the coordinates of the south-west corner of the larger area being machined (typically 8 m by 6 m), followed by spit number 00. The remaining investigation was then carried out by hand excavation of 0.2 m deep spits. For this purpose, Mortuary Feature 2018 was divided into a grid of 2 m squares. Each square was given a six figure context number formed by the easting and northing of its south-west corner followed by its spit number. The spits were numbered from 01 at the top. A random 10% sample of all spits was sieved as a control to judge if smaller objects were being missed.

Within 2018 all burial remains, articulated, disarticulated and dispersed human remains, animal bones and other special finds were digitally surveyed. Following the feature's complete excavation, its base was 3-D recorded to allow generation of a digital terrain model (Fig. 2.11).

Bulk environmental samples of up to 40 litres were taken from sealed archaeological features. In addition four undisturbed soil monoliths and two smaller undisturbed soil kubiena samples were taken. In the Late Bronze Age Midden Pit 2028 a soil monolith and two soil kubiena samples were taken through a dark layer of soil formation. In Mortuary Feature 2018 two soil monoliths were taken through the whole sequence of deposits and in addition a small soil monolith was taken through burnt deposits in the base of pit 3666.

# Chapter 2
# Prehistoric Evidence

*by Matt Leivers and Jacqueline I. McKinley*

## Evidence for Early Prehistoric Activity

*by Matt Leivers*

Human activity in the vicinity of the site prior to the Neolithic is attested only by a limited quantity of struck flint likely to date to the Mesolithic period, all redeposited in later contexts. The identified component consists of blades struck with soft hammers, blade and bladelet cores exhibiting a similar technology, and a small number of retouched tools.

This material indicates a generally low level of (probably intermittent) activity in the vicinity of the site. It is likely that these early lithics are evidence of short-term transient activities in the area.

### *Neolithic Features*

The site lies on the former northern shore of the Wantsum Channel, in a zone which has produced a significant group of Neolithic features and sites, including at least one causewayed enclosure and a scatter of small pits containing Peterborough Ware ceramics. Although no definitely contemporary features were identified on the site, a small group of 10 Early Neolithic and Peterborough Ware sherds (Fig. 5.1) was recovered from the fills of the inner and outer ditches respectively of Early Bronze Age Barrow 1 (below). Four Peterborough Ware sherds from section 3444 of the outer ditch are clearly redeposited in that location. Six sherds from feature 3455 (Fig. 2.2) of the inner ditch included one dated to 3960–3700 cal BC (GrA-37690, 5035±35 BP). Feature 3455 was one of a pair of pit-like segments of the interrupted ditch and, given that no later material was present in that feature, it is possible (if not necessarily likely) that it is in fact an Early Neolithic pit fortuitously incorporated into – or cut by – the barrow ditch.

The sherds derive from at least three vessels: one a bowl of uncertain form and two either Mortlake or Fengate Peterborough Ware vessels, and their occurrence only in the ditches of this single barrow suggests that they have not moved a great distance from their original location, even if 3455 was not a pit that was subsequently cut through. Other Middle Neolithic pits are known in the immediate locality, on Chalk Hill (Cleal 1995), 1.25 km to the east, and at Cottington Road less than 1 km to the west (Leivers 2009).

## Beaker and Early Bronze Age Features

The earliest archaeological features encountered which can be dated with any degree of certainty are six round barrows of varying size, three (Barrows 1–3) situated on a north-south aligned ridge on the western side of the excavated area, and three (Barrows 4–6) on the eastern slope (Fig. 2.1, Table 2.1).

Although there are no absolute dates or stratigraphic relationships to demonstrate a sequence for the individual barrows (any physical relationships which may have existed between Barrows 1 and 4 inaccessible below – and very probably destroyed by – a retained tree), there are indications that Barrow 1 may have been the primary focus around which the small cemetery grew, followed by Barrows 2 and 4, and ultimately 3, 5 and 6.

Each barrow survived only as a ring-ditch or group of ring-ditches, with (in four of the six instances) a central feature, probably a grave. No traces of a mound survived in any instance, and neither a central mound nor internal or external banks can be inferred from any of the excavated ditch sections.

### *Barrow 1*

Barrow 1 was located on a false crest at the southern end of the low ridge, slightly to the south of the highest point in the local topography, and overlooking the break of slope above the shore immediately to the south. The barrow was demarcated by a pair of approximately circular concentric ditches.

The outer ditch (2285) had a maximum width at the top of 3.90 m, a maximum surviving depth of 1.35 m, and a surviving external diameter of 25 m (Fig. 2.2). The broad tops of the ditch sections are largely the result of weathering back of the original edges, and when dug the feature would probably have been a much narrower, steep-sided slot perhaps not much more than a metre wide. Nine sections were excavated across the line of the ditch (not all of which reached the base of the feature) that demonstrated a general similarity of fills and sequence throughout, suggesting a continuous circular ditch (unless an east-facing causeway lay in the area beneath the retained tree) which had been left to fill gradually over millennia.

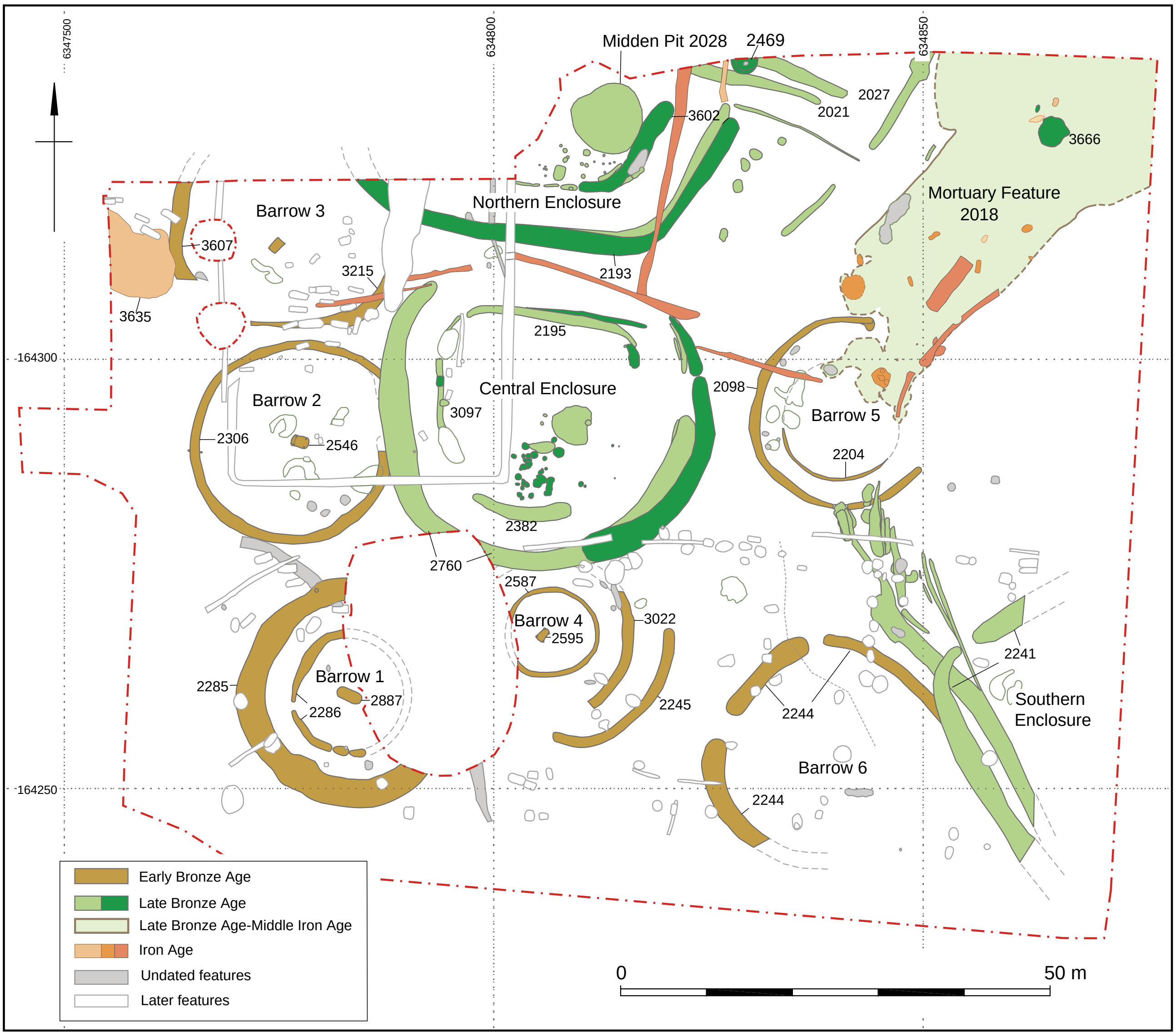



*Figure 2.1 Plan of prehistoric features*

Very little material was recovered from the fills: the only ceramics were four sherds of Peterborough Ware from section 3444 (see above), and a single gram of Late Bronze Age pottery from the uppermost fill of section 2644. Quantities of lithics were scattered throughout the excavated sections, and these are discussed below.

The inner ditch (2286) was of a very different character to the outer. Whereas 2285 was a continuous deep slot, 2286 consisted of a series of longer and shorter ditch segments and pits, separated by causeways which may have been the unintentional result of the ditch having been dug as a series of (sometimes intersecting) pits. Assuming a generally circular shape, the maximum surviving external diameter would have been 15 m. Depths vary quite markedly, with the ends of ditch segments sloping up to shallow terminals under 0.40 m deep. At their deepest, the ditch segments survive to 0.55–0.60 m below the machined surface. Widths vary similarly, with the terminals varying between 0.35 m and 0.58 m wide. Given the shallowness of these sections and the profiles of some of the deeper excavated portions, it seems likely that the original width of the south-western ditch segment would have been upwards of 0.5 m, and that of the north-western segment considerably more, at perhaps 1.00 m (Fig. 2.3).

On the southern side, the boundary consisted of a pair of pits (3484 and 3455, Fig. 2.2). The westernmost (3484) was 0.86 m wide, 1.68 m long and 0.42 m deep. The easternmost (3455) was 0.88 m wide, 1.77 m long and 0.47 m deep. The longer ditch segments on the western side were for the most part without finds: small quantities of struck flint were recovered; only two sherds of Late Bronze Age pottery came from the uppermost fill of 3449. The two pits were rather different: 3484 contained flint in its upper two fills; 3455 contained six sherds of Early Neolithic pottery. Although not demonstrable, it is possible (if not especially

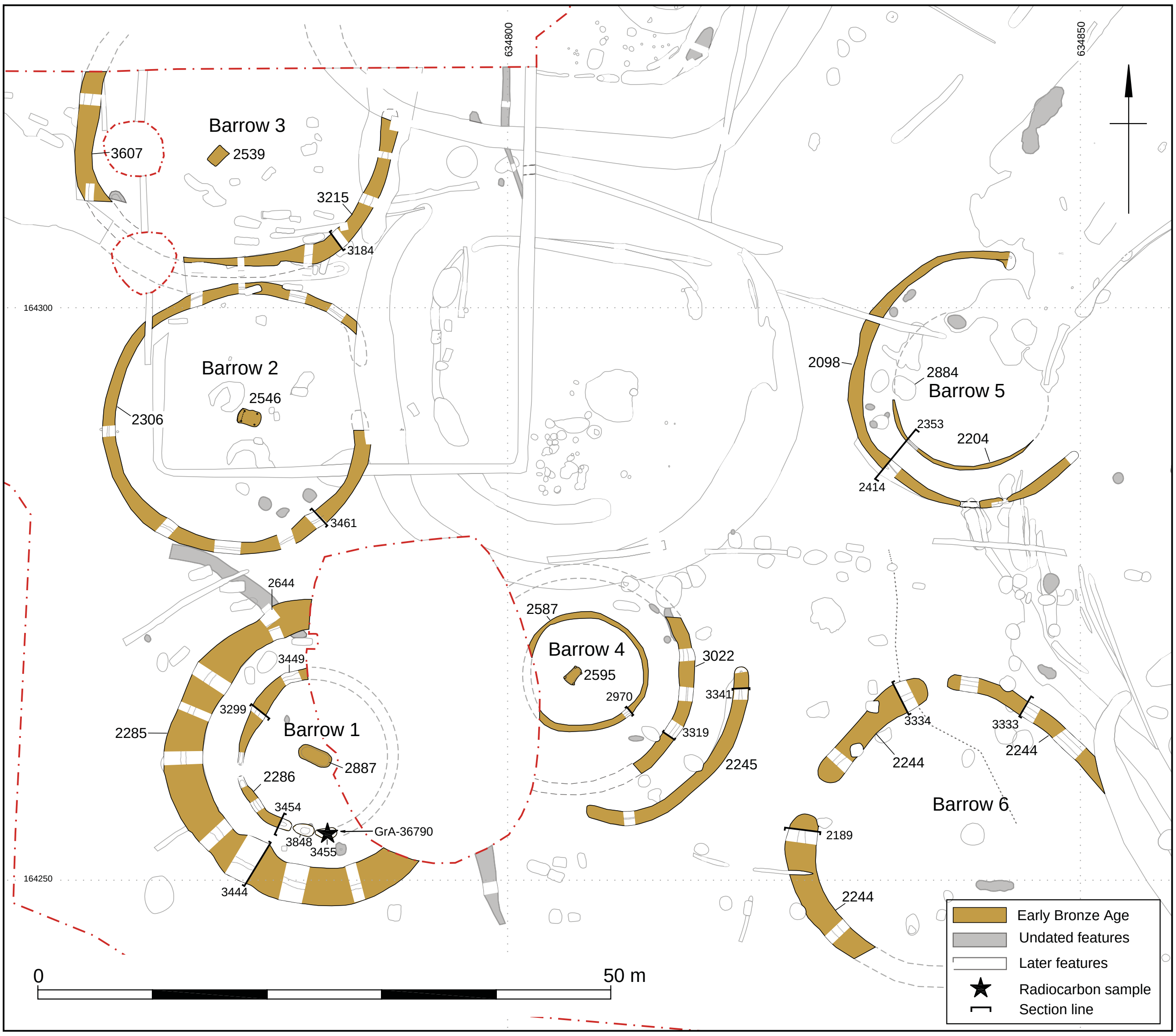



*Figure 2.2 The barrow cemetery*

likely) that this feature is in fact contemporary with the ceramics it contained, rather than being a part of Barrow 1 (see above).

An assemblage of 154 pieces of flint were scattered throughout the excavated sections of both ditches, none of which was especially diagnostic. The raw material and technology identified in the group from the central feature of this barrow (see below) is repeated amongst the broader range from the ditches, indicating that some of this material at least could be broadly contemporary with the period of the barrow's creation and use, probably during the currency of Beaker ceramics in the Early Bronze Age.

The difficulty in confidently assigning the debitage and cores from the ditches to either the Beaker or Early Bronze Age period lies in the uncertainty regarding the mechanisms by which the material entered the ditches. Some at least may have been deposited deliberately when the ditches were newly open or beginning to silt, but it seems more likely that the majority of the flint entered the ditches subsequently, either deliberately during later silting episodes or (perhaps more likely) during episodes of erosion from surface scatters or deposits. This latter possibility is perhaps supported by the condition of many of the technologically-similar pieces: still relatively fresh, but on the whole noticeably more abraded or damaged than the material from the central pit.

The central pit (2887) was aligned WNW to ESE, and was 2.98 m long, 1.40 m wide and survived to a depth of 0.67 m below the modern surface. Ostensibly a grave, the feature contained no human remains. A heavily corroded rectangular copper alloy object, measuring 80 x 40 x 5 mm, which cannot be identified to type was found on the base of the cut, 0.9 m from the western end, and two groups of struck flint lay on the base at the eastern end.

In total 118 pieces of worked flint were found clustered at the northern edge of the grave, in an elongated 'figure-of-eight' spread (group 215, context 2888) approximately 0.40 m long and 0.20 m wide, perhaps representing two groups, seemingly placed in organic containers or bags, remains of which have not survived (see Harding, Chapter 5). The two groups contained 75 unretouched pieces, including ten chips and 19 broken pieces. The retouched tools included 23 knives (five triangular bifacial, eight edge-flaked, five plano-convex, five other); a single barbed and tanged arrowhead of Green's Sutton C type (Green 1984); seven scrapers (three end scrapers, two end/side scrapers and two other probable examples); and nine pieces with miscellaneous retouch. Although there were no cores, the pattern of scars on the dorsal surfaces of flakes is consistent with Late Neolithic and Early Bronze Age technologies.

This material has a number of unusual qualities. One is the quality of the raw material, which is almost without exception of the finest quality pure black flint which must have derived from one, or at the most two or three, large nodules which were flaked specifically for inclusion in this feature. A second unusual aspect of the assemblage is its dissimilarity to both other groups of material from graves, which frequently contain a higher proportion of barbed and tanged arrowheads (of which this assemblage includes one); and to domestic assemblages, which tend to be typified by large numbers of scrapers. In this sense, it is intriguing that four different types of retouched tool – none of them particularly diagnostic and with similar cortex suggesting that they were removed from the same nodule – should be included in such a well furnished assemblage.

Apart from the lithics and copper alloy object, feature 2887 contained 14 sherds of pottery. Seven very small highly abraded thin-walled sherds in fabric O1 included two decorated with incised herringbone or chevron motifs. Context, thickness, fabric and decoration combine to suggest that these sherds derive from a single Beaker vessel. While it is tempting to identify these as deriving from a vessel accompanying an inhumation burial, the complete absence of bone and the condition of the sherds make such an assertion speculative at best. The other seven sherds from the main fill of 2887 consist of four grog-tempered crumbs, which may or may not be Early Bronze Age, and three sherds of flint-tempered Late Bronze Age pottery. Late Bronze Age pottery is also present in the uppermost fill of 2887, which seems to represent later material accumulating in the hollow left by settling of the earlier fills.

Given the absence of any bank or mound material, and the small portions of the ditches which were available for excavation, it is not possible to determine whether or not the ditches were contemporary with each other. The most likely scenario is that the inner ditch (2886) is the earlier of the two, contemporary with the central feature and any burial or other activity within it. The size and morphology of the inner ditch is not unlike other segmented ditched barrows of Early Bronze Age date which were subsequently enlarged by the addition of a wider outer ditch (eg, Barrow 12 at Radley, Oxfordshire, Barclay and Halpin 1999, 97–111).

### *Barrow 2*

Barrow 2 was located immediately to the north of Barrow 1, with only 4 m separating the outer edges of the ditches (Fig. 2.2). Unlike Barrow 1, Barrow 2 had a single ditch, with a maximum width at the surface of 1.20 m, a maximum depth of 0.80 m and an external diameter of 23.65 m (Fig. 2.3). The ditch was approximately circular, and irregularities of the plan on the eastern side are due to difficulties in distinguishing its outline in this area during excavation, where the ditches had largely been destroyed by Late Bronze Age and Anglo-Saxon features. There are, however, indications of a break in the circuit on this side. Nine sections were excavated through the ditch, which was largely devoid of finds, with only a few struck flints and some Late Bronze Age pottery in its upper fills.

A central sub-rectangular pit 2546 was probably a grave; it was aligned WNW to ESE, and measured 1.98 m by 1.30 m by 0.31 m deep. Within the pit, four small postholes of approximately 0.10 m diameter and at least 0.30 m depth (none was completely excavated) were arranged in a rectangle measuring approximately 1.10 m by 0.90 m. To the west of the postholes was a slight sub-rectangular depression measuring 1.20 x 0.36 x 0.02 m.

There were three fills, the lowest of which (2547) was only present around the edges of the feature and which probably resulted from weathering of the edges or was backfilled natural material between the sides of the cut and whatever structure may be inferred from the postholes (probably some sort of timber mortuary structure). The subsequent layer (2548) filled both the postholes and the pit, the implication being that the fill had formed once any timber structure had rotted or been removed. Within this fill were two sherds in fabric O1 (as in the central feature in Barrow 1, see above). Although featureless, these sherds may be from another Beaker, potentially associated with a burial in this feature, although no human bone was recovered. A further grog-tempered sherd in fabric G5 came from the same fill, and on fabric grounds also appears to date to the Late Neolithic or Early Bronze Age. The uppermost fill (2549) contained only a few struck flints.

### *Barrow 3*

Barrow 3 lay north of and almost adjacent to Barrow 2, the edges of the ditches of the two barrows being separated by no more than 1.50 m (Fig. 2.2). Only the southern half of the barrow lay within the limits of excavation, and this portion had been much disturbed by later features, so the form and dimensions are uncertain, although the barrow seems to have been similar to Barrow 2 with a single ditch (3215) open on the eastern side.

The longest portion of the ditch (the south-eastern arc) was investigated in five places. This ditch was flat-bottomed (between 0.60 and 0.80 m wide at the base), approximating to 1.30 m wide at the top, and between 0.72 and 0.82 m deep below the machined surface (Fig. 2.3). No ceramics were recovered from the fills, and only a small quantity of struck flint.

Towards the western limits of excavation, a series of intercutting ditches, pits and other features lay where the ditch of Barrow 3 would be expected. Amongst the features in this area (many of which shared relationships which were particularly unclear) the most likely to belong to Barrow 3 (in terms of morphology and stratigraphic position) was 3607, which had a flat base 0.70 m wide and survived to 0.60 m below the machined surface. No material was recovered from its fill.

If ditch 3607 does represent the western side, then Barrow 3 would have had an external diameter of 27.5 m. At the approximate centre was a sub-rectangular pit (2539), probably a grave, aligned south-west to north-east. The cut measured 1.65 by 1.10 m, with a maximum surviving depth of 0.15 m. An irregularity in the eastern corner may have been the remains of a posthole similar to those in the central feature of Barrow 2 (see above). The only find from the single fill of pit 2539 was a chisel arrowhead of type E (Green 1984; Fig. 5.7, 20). The piece is worn, suggesting that it may have been of some age when it was deposited.

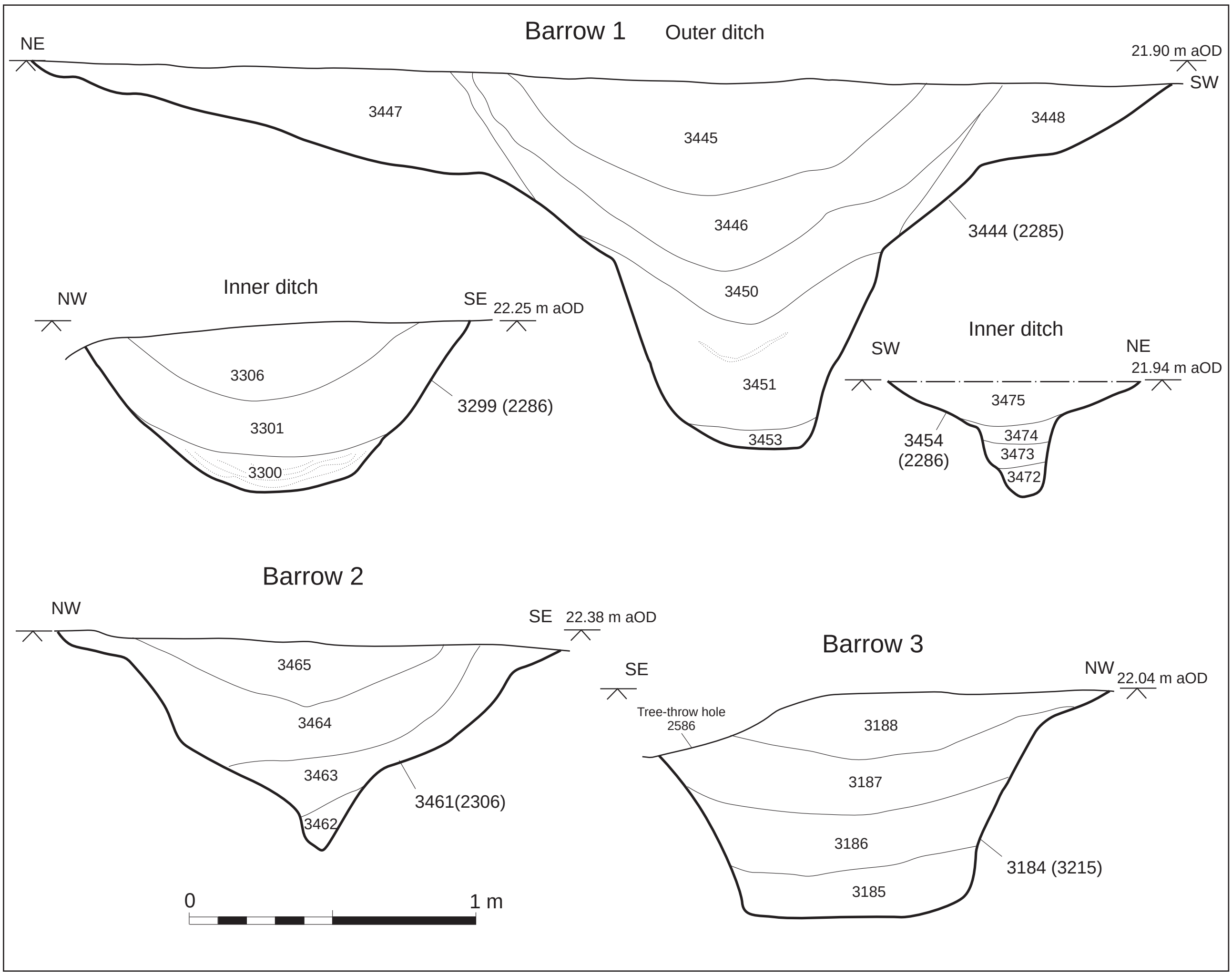



*Figure 2.3 Selected sections of barrows 1–3*

### *Barrow 4*

Barrow 4 was sited to the east of Barrow 1 (Fig. 2.2). The retained tree stood between the two barrows, obscuring any relationships that may have existed between the two.

Barrow 4 had three ditches. While the inner and middle ditches could have formed complete arcs without intersecting with the outer ditch of Barrow 1, the outer ditches of both could not have formed complete circuits at the same time, since they would have intersected. There are indications that the outer ditch of Barrow 4 did not form a complete circuit, suggesting a chronological primacy for Barrow 1.

Only one section (2970) was excavated through the inner ditch (2587: Fig. 2.4). Here, the ditch was 0.60 m wide at the top, 0.25 m wide at the base, and 0.15 m deep. The single fill contained no finds. The complete circuit seems to have described a slightly flattened circle, 10.42 m across from north to south and approximately 10.90 m from east to west.

Three sections were excavated across the middle ditch (3022) which was 1.15 m wide at the top, with relatively steep sides and a flat base between 0.25 and 0.40 m wide (Fig. 2.4). The maximum surviving depth was 0.60 m. No material was recovered from the fills. Only a portion of the south-eastern arc could be traced on the ground, but if originally complete then the ditch would have had an external diameter of 17.86 m.

The outer ditch (2245) was also investigated in three places. On the eastern side, a terminal formed the southern side of an entrance similar to Barrows 2 and 3. At this point the ditch was a broad, shallow V-shape, 1.82 m wide and surviving to 0.62 m below the machined surface; 1.30 m to the south, the ditch had broadened slightly to 2.00 m, and changed in profile to become a flat-bottomed, almost vertical sided feature, 0.82 m deep and 0.70 m wide at the base (Fig. 2.4). Towards the western end, the profile had reverted to a shallow V-shape, 1.10 m wide and only 0.44 m deep, suggesting that another terminal may have lain immediately to the west. However, it is not certain that the ditch continued to the west. At the point where it could no longer be traced on the surface it deviated from circular, turning slightly to the north, and it is probable that Barrow 4 was encircled by this third ditch circuit only on the eastern side, since Barrow 1 was probably already standing to the west, leaving insufficient space for a complete third circuit of ditch on that side.

Off-centre within the inner ditch was a sub-rectangular pit (2595), probably a grave, aligned south-west to north-east. The pit was 1.66 m long by 1.00 m wide and survived to only 0.17 m below the machined surface. There were indications that a post had stood at each corner, possibly supporting a timber mortuary structure as in the centre of Barrow 2 and – perhaps – 3 (see above). The single fill contained only a small amount of struck flint.

### *Barrow 5*

Further to the east, another set of ring-ditches and other features form a fifth barrow. The outer ditch (2098) describes not quite three quarters of a circuit 22 m in external diameter. The circuit is not complete, and consists of at least three segments of interrupted ditch. The south-eastern-most segment was 7.92 m long, and – where excavated at the eastern terminal – 0.82 m wide with a surviving depth of only 0.17 m. The western end of this segment appeared to cut the next, although the relationships were not altogether clear and cannot be certain, possibly being nothing more than the effects of weathering back of the edges.

Regardless of sequence, the next segment west was 0.70 m wide and extremely shallow (surviving to only 0.09 m below the machined surface). The western end of this segment was not observed (Late Bronze Age feature 3141 cut the ditch here) and it may be that the ditch is in fact continuous from this point. However, since only two sections were excavated it is not possible to be certain. One excavated section (across the body of the ditch) shows the feature at this point to be 1.67 m wide at the top, with an undulating base and a maximum depth of 0.58 m (Fig. 2.4). As elsewhere, there was only one fill. The only other excavated section was through an apparent bulbous terminal on the northern side. Excavation showed the terminal to be real, but the shape to result from the intersection of the ditch with a second feature and the machining away of the eastern portions.

The inner ditch (2204) survived only on the southern side. Only one section was excavated, revealing the highly truncated remains of a feature just 0.25 m wide and 0.08 m deep (Fig. 2.4). Should this ditch have continued beyond the points at which it could no longer be traced on the eastern side and beyond which its line was lost below a series of amorphous features to the west and north, it would have described a circle with an external diameter of 13.82 m. The arrangement of the supposed tree-throw holes, pits and spreads that interrupt the arc are in fact such as to suggest that they may instead be the highly disturbed remains of the inner ditch, some cut through by later features and very much disturbed by bioturbation and machining.

The lithic assemblage from Barrow 5 is rather limited, but includes scrapers of later Neolithic or Early Bronze Age type, and an unfinished barbed and tanged arrowhead from tree-throw hole 2894.

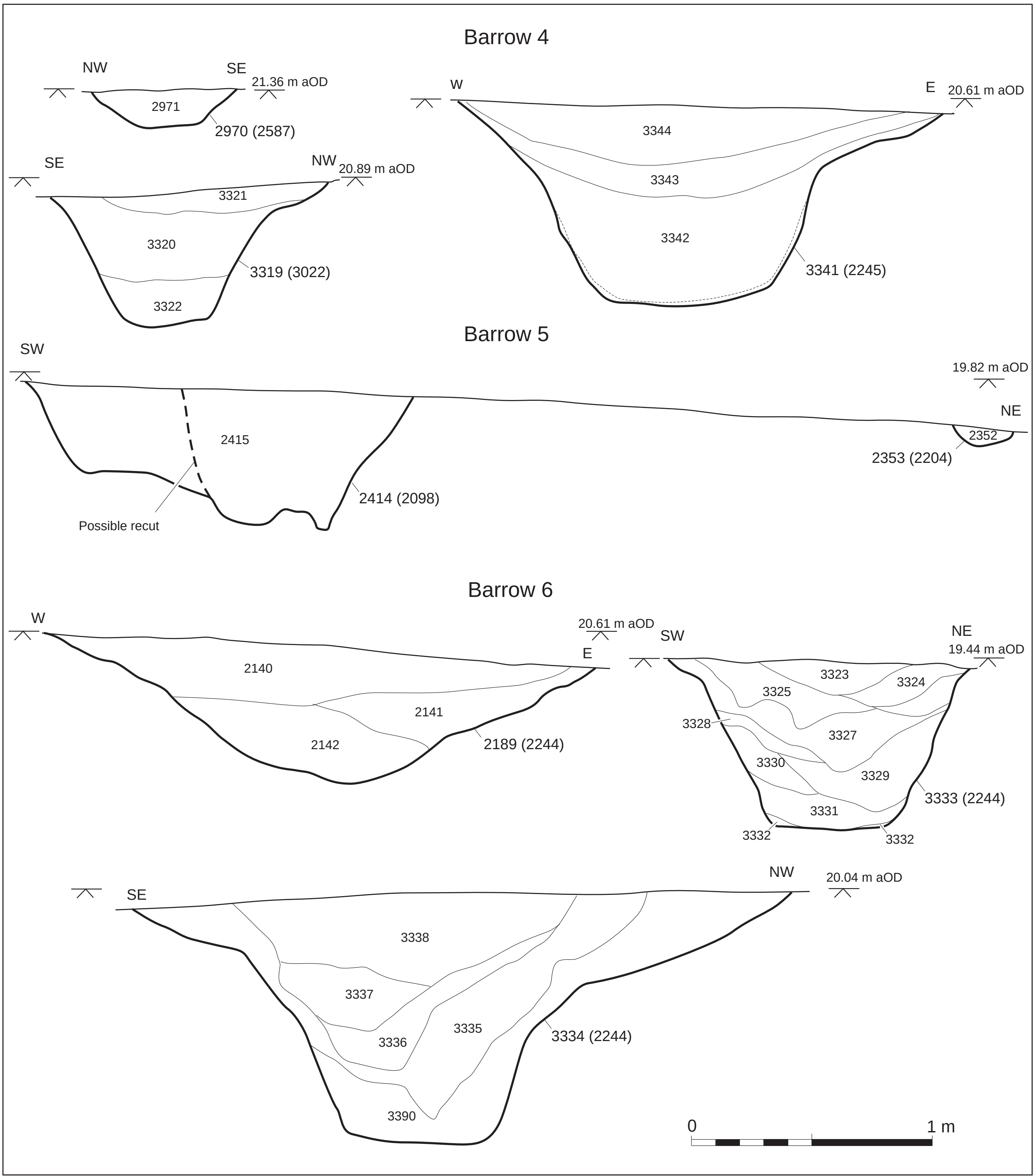



*Figure 2.4 Selected sections of barrows 4–6*

## *Barrow 6*

In the south-east corner of the site a segmented ditch (2244) probably represents the remains of a sixth barrow, which was cut by a series of Late Bronze Age features (Fig. 2.2). Consideration of the seven excavated sections suggests that – although no terminals were excavated – this ditch consists of three segments separated by causeways, as with Barrows 1, 4 and possibly 5. In total, the segments describe half of a circuit approximately 27 m in external diameter.

The depths and profiles of the excavated ditch sections are strongly suggestive of discrete units (Fig. 2.4). The south-western-most was 2.30 m wide at the surface with a surviving depth of 0.55 m and a shallow profile. The north-western segment was 2.50–2.70 m wide and survived to a depth of 1.00 m below the machined surface. This segment had a narrow flat base and a V-shaped profile. The north-eastern segment was 1.00–1.40 m wide at the surface, with a maximum depth of 0.69 m and a steep-sided U-shaped profile.

## Discussion

Given the 315 ring-ditch cropmarks known on Thanet (Perkins 2004), it is not surprising that the Cliffs End examples do not stand in isolation. The Lord of the Manor barrow group at Ozengell (Macpherson-Grant 1980; Perkins 1980a; 1980b; Grinsell 1992), for instance, is only a kilometre to the north-east. The Cliffs End barrow cemetery has much in common with the Lord of the Manor group, not least a considerable degree of uncertainty over date, function and sequence.

The six barrows at Cliffs End have little which unites them as a coherent group. Three have more than one ditch; three do not (Table 2.1). Four have central or near-central features which were probably graves; two do not. Of these features, three have indications of an associated timber structure; one does not. Some have evidence for ditches constructed in segments; others do not, and others differ from circuit to circuit. Four have indications of having had east-facing breaks in the ditches; in two instances the evidence does not survive. None has any indication of a central mound or surrounding bank, although such features can be assumed for some or all, since something must have survived in the early Anglo-Saxon period to form the focus of a cemetery (see McKinley, Chapter 7). It is perhaps also no coincidence that the later Bronze Age and Iron Age activity was located in the area.

No more certainty can be claimed for the dating of these structures. While at first glance they need be nothing more (or less) than usually elaborate Early Bronze Age barrows, further consideration suggests otherwise. The Middle Neolithic ceramics in the ditches of Barrow 1 have already been mentioned, and while there is no reason to suppose that that structure is contemporary with those ceramics, the coincidence may be pointing to a continuation of use of a place over a much longer period than is already the case at Cliffs End.

There are several examples known on Thanet of Late Neolithic enclosures which were transformed into barrows (what David Perkins has called 'henge barrows' (2004, 76) – at Lord of the Manor (Site 1), for instance (Macpherson-Grant 1980) – as well as off the island, at Ringlemere (Needham *et al.* 2006) and elsewhere. Parfitt notes that excavation of some of the double and triple ditched sites in east Kent and Thanet known from aerial photographs have revealed 'complex monuments of multi-phased developments' (2006, 47) and it is tempting to include at least Barrow 1 at Cliffs End among these.

| | Ditch 1 | Ditch 2 | Ditch 3 |
|---|---|---|---|
| Barrow 1 | 25 m | 15 m | - |
| Barrow 2 | 24 m | - | - |
| Barrow 3 | 27 m | - | - |
| Barrow 4 | 26 m | 18 m | 11 m |
| Barrow 5 | 22 m | 14 m | - |
| Barrow 6 | 27 m | - | - |
| Central Enclosure | 39 m | 25 m | - |
| Northern Enclosure | 45 m | 25 m | - |

*Table 2.1 Comparative sizes of barrows and enclosures*

The sequence of use and reuse in the Lord of the Manor group may well provide the best parallel for the Cliffs End barrow group, despite the very much more elaborate earlier phases at some of the Lord of the Manor sites. In the absence of full publication, and the uncertainties of the rather sparse evidence from Cliffs End, all that can be suggested with any degree of certainty is that these two groups of sites appear to have undergone similar trajectories of use.

With the exception of the Early and Middle Neolithic ceramics, the earliest datable material associated with the Cliffs End barrows are some very small scraps of Beaker ceramics in the fills of the central features of Barrows 1 and 2. It would be unwise to claim contemporaneity between the features and ceramics, or to insist that the barrows were of Beaker date, on the basis of such limited evidence. Nevertheless, no Beaker pottery was recognised anywhere else in the Cliffs End assemblage (a sherd with charred residues dated to *2470–2275 (90% probability) cal BC* (*OxA-18519*; Table 3.2) in Mortuary Feature 2018 is in an undiagnostic flint-tempered fabric, PRN 1242), and the presence of it solely in these two features gives some cause to postulate a Beaker phase to Barrows 1 and 2 at least. Other Beaker activity was occurring nearby: a burial 600 m to the north in Cliffview Road (Macpherson-Grant 1968) was apparently a flat grave, although the circumstances of its discovery would not have revealed any surrounding barrow ditch; one of the Lord of the Manor barrows (Grinsell 1992 Ramsgate 8/THAN) had an off-centre grave with a crouched inhumation and long-necked Beaker.

Also noteworthy are the traces of timber structures in three of the four central features (in Barrows 2, 3 and 4). Such features are not common amongst Kentish barrows – Grinsell (1992, 359) lists only a single example (Wouldham 1/Tonbridge and Malling), associated with a Biconical Urn, noting parallels in the Netherlands. Other sorts of structures or post settings are more common, however: at Lord of the Manor Site IID, for instance, as well as at Ringlemere (Needham *et al.* 2006). These and other examples tend to consist of slots as well as postholes, and this may shed some light on the otherwise enigmatic linear hollow at the western end of the grave in Barrow 2 at Cliffs End. It is possible to envisage the remnants of a timber structure akin to that at Gray Hill, Llanfair Discoed, for instance (Chadwick and Pollard 2005).

The lack of any burials – either inhumation or cremation – at Cliffs End makes understanding the use and chronology of the barrows more complicated. The absence of human remains could simply be the result of soil conditions, which also explains the near-absence of skeletal remains in the Anglo-Saxon graves (see McKinley, Chapter 7). It is worth considering, however, that many sites in north-east Kent which ended their lives as barrows had no original mortuary function, and this may have been the case for some, if not all, of the Cliffs End examples. Neither Barrow 5 nor Barrow 6 have any trace of a grave within the area defined by the ditches, and while this could be the result of truncation, or of a funerary rite involving the placing of remains directly on the ground surface (as at St Margaret's-at-Cliffe, Dover: see Parfitt 2006, 49–50), it could be the case that the ditches did not demarcate a funerary enclosure. Examples of 'barrows' without any associated (initial) burial are common enough – both in Kent and further afield (Grinsell 1992).

One piece of evidence which may more strongly suggest a burial was originally placed in Barrow 1 is the collection of 118 flint tools and flakes (Pl. 2.1, see Harding, Chapter 5). The assemblage is dominated by flakes, but there were a variety of retouched forms including knives, scrapers, retouched flakes, and a barbed and tanged arrowhead. Three possible unfinished arrowheads were also recovered. Used edges were common, even amongst the unretouched flakes, and analysis suggested that many of the flakes would have been suitable blanks for secondary working. Flint artefacts are amongst the most common grave goods found in Beaker burials (eg, Clarke 1970, appendix 3, 448), but only a few very rich graves contain more than three or four flint artefacts. An extraordinary example of a rich grave comes from Boscombe Down, Wiltshire which included 122 flints as well as a range of other grave goods (Fitzpatrick 2011, fig. 29, table 13), and is clearly a high status burial. The dominance of arrowheads within such grave assemblages is notable, although the recovery from the Amesbury Archer's grave of more 'artisan' items indicates that the situation is perhaps more complex than a simple indication of warfare or hunting. Harding notes that the Cliffs End assemblage 'is dissimilar to burial groups, which frequently contain a higher proportion of barbed and tanged arrowheads in 'warrior' 'archer' or 'hunter' burials or scrapers, which are more usual in domestic assemblages'.

*Plate 2.1 Flint deposit in the central pit (2887) of Barrow 1 laid in 'figure-of-eight'*

Clearly, the surviving evidence from the Cliffs End barrow cemetery is equivocal. Little can be claimed with certainty. What is clear, however, is that the place in which these structures were built was of considerable importance, and is likely to have had been so for some time when the barrows were constructed. What the group seems to be marking is another significant location in a landscape of considerable importance to the inhabitants of Thanet in the Neolithic and Early Bronze Age: within 2 km of the site are two causewayed enclosures, a possible cursus, and the Lord of the Manor henges and barrows.

Viewed as a part of a broader landscape already of some antiquity, the presence of the Cliffs End barrows is not surprising. What is more difficult to account for is the apparent absence of any human activity around them for the next half millennium.

## Middle Bronze Age

There are no features, structures or layers on the site which can be dated to the Middle Bronze Age, and it would appear that in the period between the end of the use of the barrow cemetery and the creation of the Late Bronze Age enclosures some five centuries later there was no human activity on the site of any significant nature. There would indeed be no reason to suppose any Middle Bronze Age activity in the vicinity at all, were it not for three radiocarbon dates from carbonised residues on sherds of flint-tempered pottery. Two of these came from Midden Pit 2028 inside the Late Bronze Age Northern Enclosure and the third came from Late Bronze Age Mortuary Feature 2018 (Fig. 2.1, Table 3.2, see McKinley, below).

The significance of the absence of any real evidence for Middle Bronze Age activity lies perhaps in the implications of that absence for the resurgence of the importance of the site in the Late Bronze Age. There can be no doubt at all that by the beginning of the 1st millennium the site was (or was in the process of becoming) a very significant place indeed, and the question inevitably arises of why here? While the location above Pegwell Bay was undoubtedly important in terms of sea traffic, it remains open to question whether any added significance adhered due to the history of the place, or whether it had been forgotten. The barrows must have survived in some form (since they formed the focus of the Early Anglo-Saxon inhumation cemetery), and whether the Late Bronze Age enclosures respect or slight them is a matter of debate.

Elsewhere on Thanet, Middle Bronze Age activity takes the form of cremation graves dug into earlier barrows, and the laying out of trackways, field systems and enclosures. It may be that the barrows at Cliffs End were so treated – given that no traces of any mounds survive, the lack of later burials is easily explicable. On the other hand, it could be that the apparent absence of activity is real, and that nothing happened which left an archaeological trace for 500 years.

## Late Bronze Age and Early Iron Age Features

Whatever the nature of any Middle Bronze Age activity on the site – or the reasons for its absence – at some point towards the end of the 11th century cal BC a new period of very much more intense occupation began, with the creation and use of a number of enclosures and other features with apparent domestic, mortuary and ceremonial activities attested. Although very few of the features lay completely within the excavated area, taken together they appear to mark a centre of some considerable importance.

The main elements of this complex as revealed within the excavated area comprised a pair of sub-circular or sub-square enclosures (with a small part of what may have been a third similar structure) and a large mortuary feature (2018), with a scatter of other pits, ditches, layers and features (Fig. 2.5). A chronological development can be suggested (based on radiocarbon dating, morphology, ceramic typologies and limited stratigraphic relationships) which places the Northern Enclosure earliest; followed by the Central Enclosure; the remodelling of both enclosures and the first activity in Mortuary Feature 2018; then on-going activity in 2018 and the final filling of Midden Pit 2028 within the Northern Enclosure. Where the Southern Enclosure fits into this sequence remains uncertain.

### *Northern Enclosure*

Ditches 2193/2469 and 3602 probably formed the southern side of an enclosure, most of which lay beyond the northern limit of excavation (Fig. 2.6). Although no traces were detected beyond the site, extrapolation from the excavated portion and reference to possible comparanda (eg, Highstead Period 2 Enclosure B70: Bennett *et al.* 2007, 16, fig. 16) may suggest an enclosure of approximately 45 m by 45 m. Too little of the interior lay within the excavated area to allow any structures to be detected, although a consideration of evidence from this period as a whole suggests that the enclosure was not given over to settlement, but rather served some ceremonial purpose associated with feasting and – at a later stage – the disposal of the dead. The sequence of recutting of the ditches suggests that there were two phases.

#### Phase 1

This phase consists of the original cut of (outer) ditch 2193 (2463, 2420/2422, 2289); arguably a series of slots (3270, 3269, 3494, 3493, 3534/3536) and postholes (3468, unnumbered) on the line of what became (inner) ditch 3602; a series of linear features (2021, 2027, 2197, 2216) and postholes (2085, 2198, 2199, 2200, 2201) within and outside the entrance; a large pit in the interior (Midden Pit 2028); and a scatter of smaller features (not all of which need belong to this phase).

#### ***Ditches***

The original cut of the outer ditch 2193 survived only where the line of the subsequent recut deviates from it, and consequently its dimensions are unknown. As far as can be ascertained, it seems to have been a steep-sided V-shaped cut, surviving to between 0.90 m and 1.30 m below the stripped surface, with the greatest depth closest to the entrance terminal (Fig. 2.6). The fills comprised an initial layer of collapse from the interior sealed by a thin stabilisation layer, in turn beneath a gradual accumulation of eroded material.

Three sections were excavated. Only at the southern terminal were any quantities of material recovered (other excavated sections contained only a few small sherds of flint-tempered and quartz-tempered pottery), suggesting that the entrance to the enclosure may have been a favoured location for acts of deposition (and other indications of this are discussed below). At the entrance, the basal fill (2464 within ditch 2463) contained small quantities of animal bone and fired clay, along with a smoothed, pointed implement made on a bovine rib and 28 sherds of flint-, quartz- and grog-tempered pottery, exclusively plain body sherds. The uppermost fill (2466) contained similar materials, including

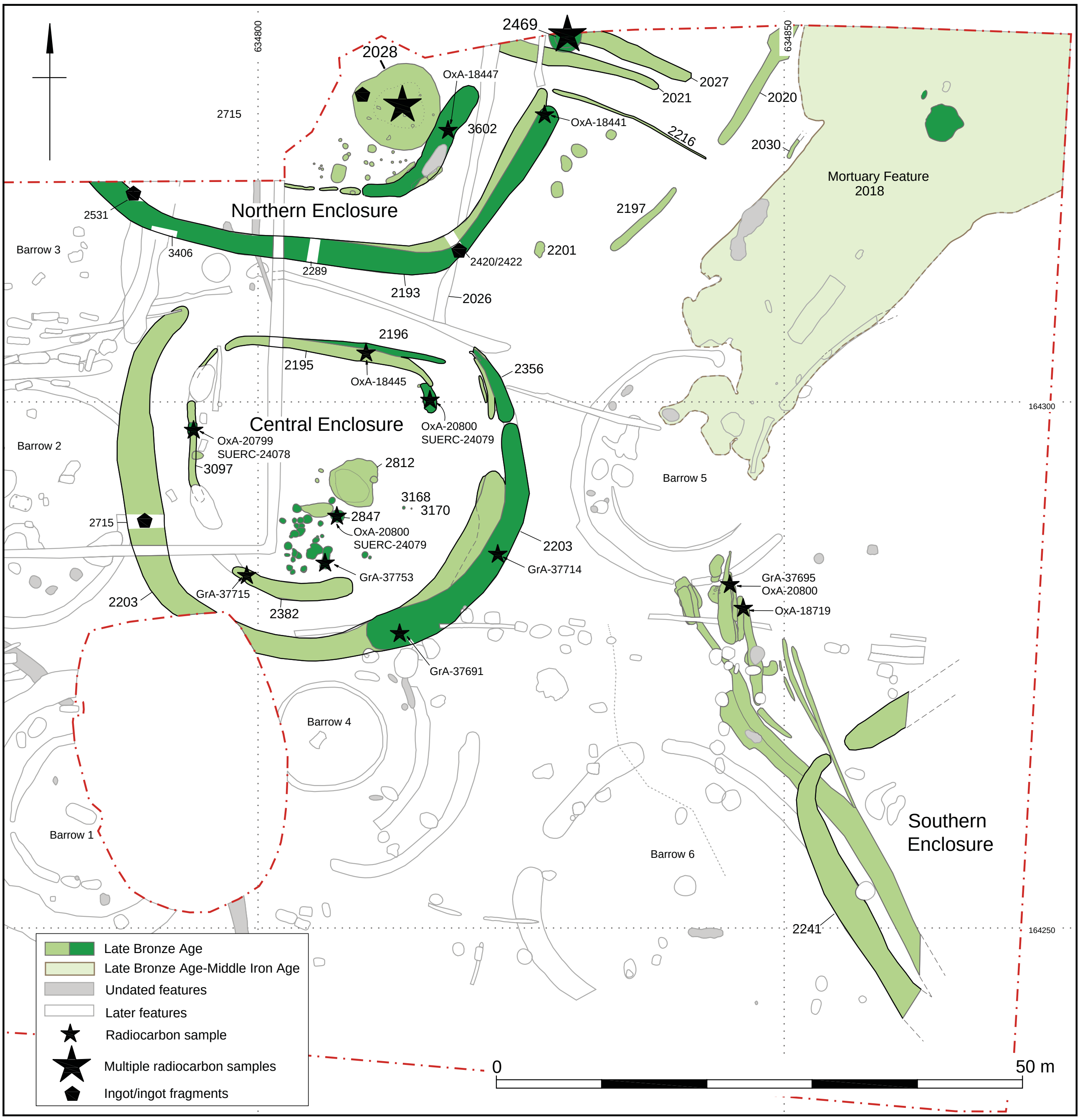



*Figure 2.5 Late Bronze Age enclosures, Mortuary Feature and other features*

four worked bone implements (two highly polished gouges (one fragmentary, one complete), and the distal part of a grooved and faceted sheep/goat metacarpus) (Pl. 5.10, 9), and a pottery assemblage including portions of a jar with a flaring rim and a horizontal applied cordon in the neck, decorated with fingertip impressions (PRN 445, Fig. 5.3, 18). Typologically, this vessel should belong in the first half of the 10th century cal BC.

It may be the case that this first phase of the outer ditch was contemporary with a series of slots and pits or postholes which were parallel with it, some 4.5 m inside the enclosure. Typifying this series of features is difficult, given that some of them were unexcavated (3270, 3269) and some truncated by (or invisible within unexcavated assumed portions of) ditch 3602, but the visible morphology is strongly suggestive of a timber palisade.

Where excavated, the slots proved to be 0.70 m wide and 0.20–0.40 m deep. A depression in the base of segment 3534 may have been the base of a posthole, and segment 3494 contained two others – one (3468) at the western end, the other (un-numbered but recorded on plan and section) 0.34 m further east. Both features were deeper than the slot, but the fills of all three features were identical and it was not possible to distinguish any stratigraphic relationships. If these features did hold posts then it seems likely that they were removed at some point, and this would most probably have been at the

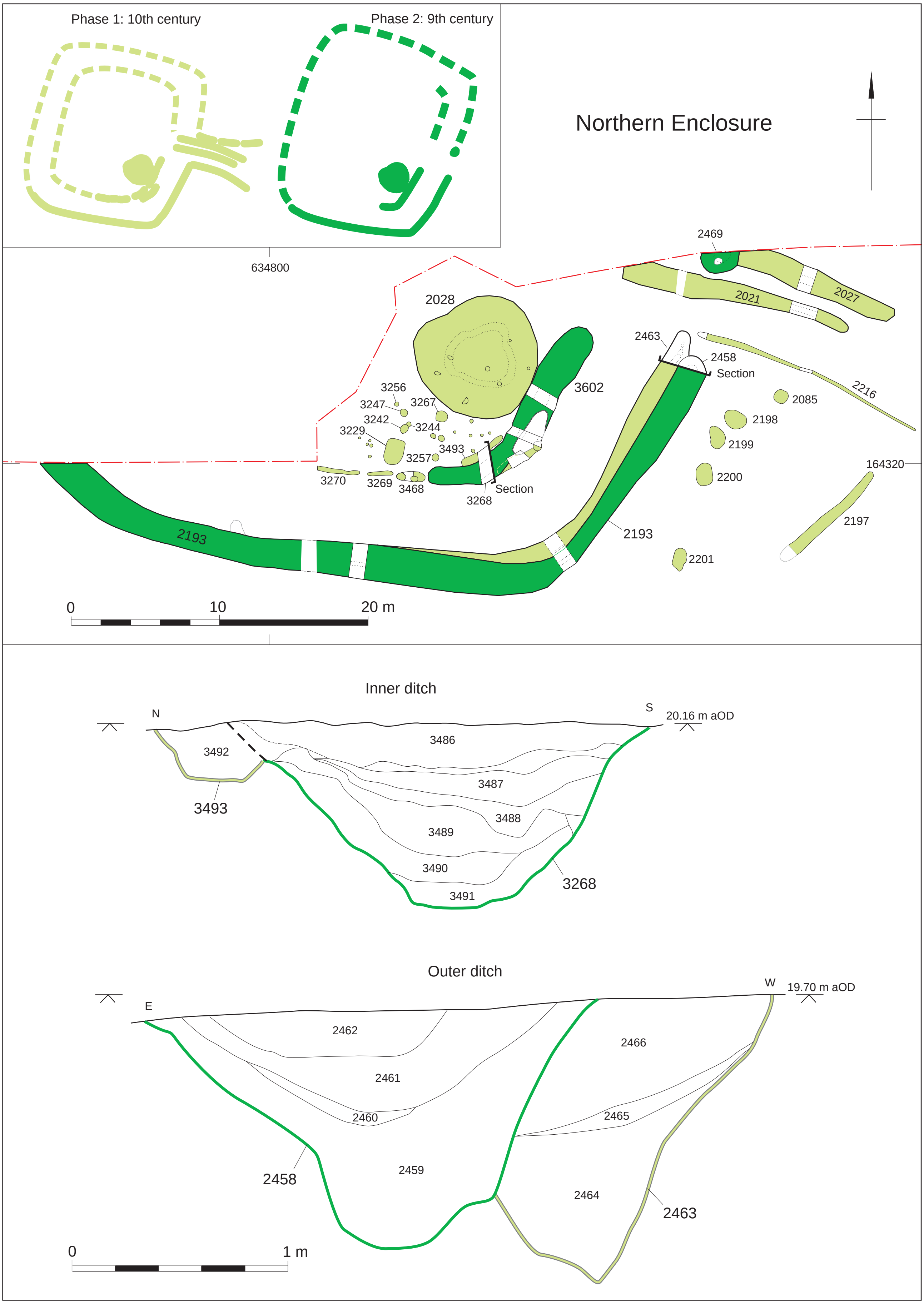



*Figure 2.6 Plan and selected sections of the Northern Enclosure showing projected plan for both phases*

time of the remodelling of the enclosure which also involved the re-establishment of the outer ditch.

Pottery from the slots consisted of flint-tempered sherds from typical Late Bronze Age jars; the fill of 3468 contained 12 teeth crowns from a juvenile/subadult of between 10 and 14 years old who – on the basis of isotope data – had come from 'Scandinavia' (see Millard, Chapter 4). No other bone was present, but it can perhaps be suggested that the crowns are the sole surviving part of a buried skull. It is difficult to avoid ascribing a ceremonial intent to such a deposit.

***Entrance features***

North of the terminal of the outer ditch were three roughly parallel linear features. The southernmost (2216: approximately 16 m long, 0.40–0.20 m wide, 0.19 m deep) began only 0.50 m east of the terminal of the outer ditch and appeared to define one side of the entrance into the enclosure. Its single fill contained a few crumbs of flint-tempered Late Bronze Age pottery.

Two further ditches lay within the entrance, approximately 1 m apart, both of which continued below the limits of excavation to the west. The southernmost (2021) was 15.5 m long, 1.70 m wide, and 0.26 m deep; the northernmost (2027) was 11.3 m long, 1.70 m wide, and 0.40 m deep. Each had a single fill; that of 2021 contained only crumbs of flint-tempered pottery, while 2027 had animal bone and considerably more flint- and quartz-tempered sherds.

It is difficult to assign a function to these features. One possibility is that they formed parts of structures controlling movement into and out of the enclosure. Four metres south of the eastern end of 2216 was ditch 2197 (8.5 m long, 0.85 m wide, 0.40 m deep), which was roughly parallel to the outer enclosure ditch. Ditch 2020 (1.0 m wide, 0.20 m deep) continued this same line for over 12 m, beyond the northern limit of excavation (Fig. 2.5). A smaller length of ditch (2030) lay immediately south-west of ditch 2020, and parallel with Mortuary Feature 2018; it may have been associated with the ditches. If they formed part of a structure, then the combined effects of these lengths of ditch would have been to screen the enclosure from Mortuary Feature 2018, and to prevent access to the entrance from the south.

***Internal features***

Pit 2028 lay immediately inside the entrance to the enclosure, and although its weathering cone intersected with that of the phase 2 inner ditch, the original form of these features suggests that there was originally no relationship between them. The pit was oval in plan and its central, deeper part measured 8 m by 6 m. It had moderately-sloping, somewhat irregular sides and was 1.3 m deep (Fig. 2.7). Although there is no indication of its original purpose, it may have been dug as a quarry. Alternatively, it may have been dug specifically for the disposal of domestic waste, of which it contained a considerable quantity. The creation and first phase of use of the feature belongs – on the basis of dated ceramics from its lower fills (see Table 3.8) – in the earliest phase of Late Bronze Age activity on the site, predating both the Central Enclosure and the earliest burials in Mortuary Feature 2018 to the east, in the 10th century cal BC.

Once the feature was given over to the disposal of waste (primarily pottery, animal bone, cereal processing waste and other organics), it began to be filled by a sequence of alternating layers of naturally-accruing material (collapsing sides; colluvial inwash; etc.) and deliberately dumped 'midden' material. The deliberately-deposited layers seem to have formed relatively quickly, as the result of discrete episodes of activity (perhaps over weeks) rather than as accumulations over time (perhaps years); this is suggested by the condition of both the pottery (freshly broken, unabraded) and animal bone (not gnawed or with other traits of prolonged exposure). Given this, the dates obtained on charred residues on the insides of sherds from these layers can be taken to date the formation of those layers very closely. The durations of the intervals between the formation of these layers are less clear, but are most likely to be measured in decades. The infilling of the pit could be divided into five broad stages, within which nine separate episodes could be discerned. For descriptive convenience these layers have been numbered from 1 to 9, with 1 the latest, 9 the earliest (Fig. 2.7).

No samples were dated from layer 9, but it is estimated that layers 8–4 accumulated over *65–505 years* (*95% probability*; Fig 3.11) and probably *100–260 years* (*68% probability*), most likely in the 10th century. These layers contained a substantial ceramic assemblage and provided 15 radiocarbon determinations on charred residues (see Table 3.8; layers 8, 6, 5 and 4 in Table 5.5).

The lowest (undated) fill (9) was a thin layer of initial weathering of the feature's edges, containing a piece of part-worked glauconitic sandstone, almost 0.5 kg of animal bone, and only two small pot sherds. It was followed after an unknown period of time by layer 8, which contained a very much more substantial assemblage of animal bone and pottery (charred residues from which provided three dates suggesting formation in the first half of the 10th cal century BC), and a smoothed and polished small spatula-like worked bone object.

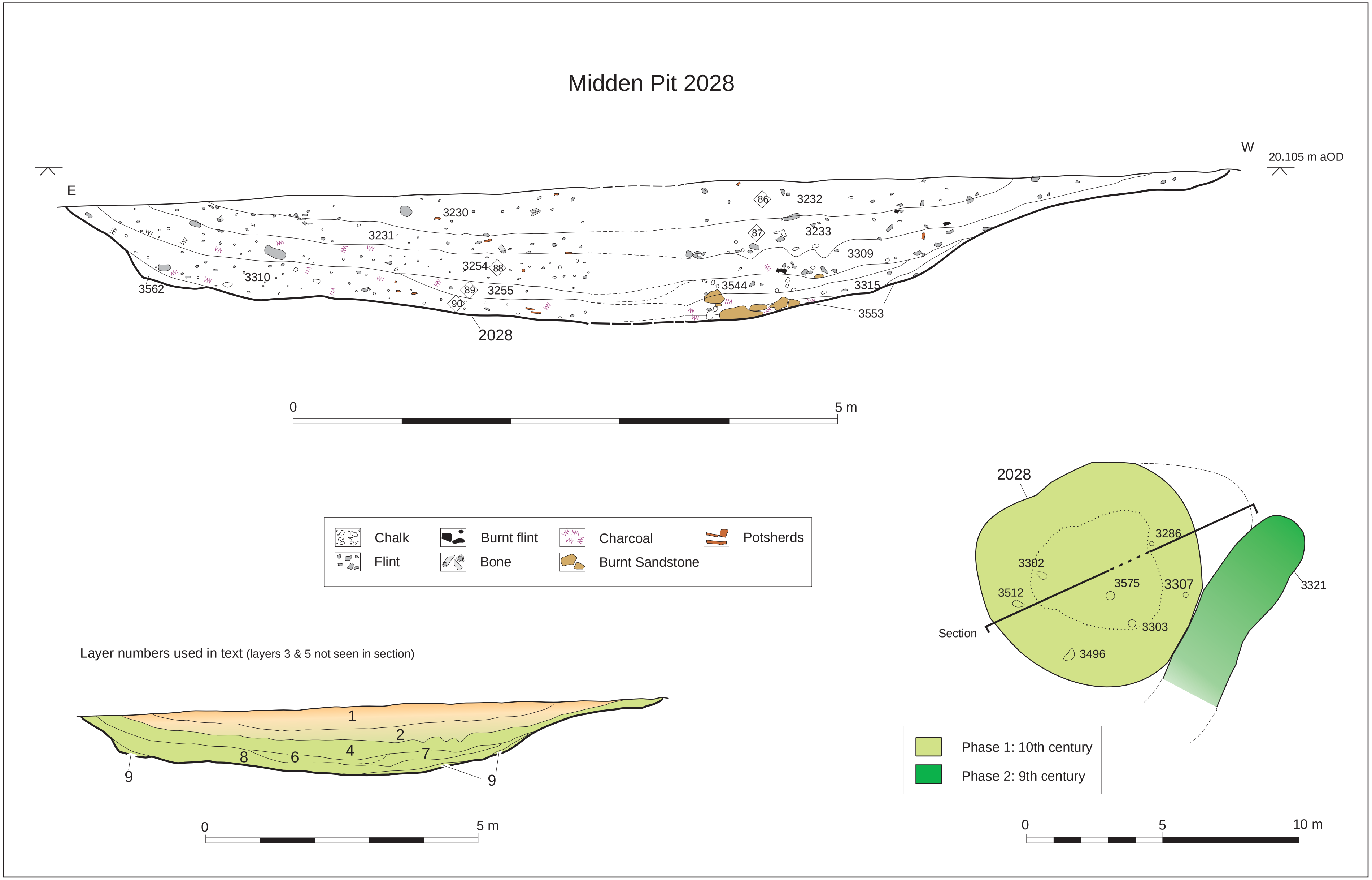



*Figure 2.7 Plan and section of Midden Pit 2028 with schematic section showing layer numbers used in text*

Layer 7 contained no ceramics or other datable evidence, but appeared to be a rapidly-formed colluvial or erosion deposit. Above it, layer 6 was a second deposit of ceramic-rich rubbish, on the basis of the two associated radiocarbon dates formed at some point in the 10th cal century BC. Sherds from a number of vessels in this layer had been burnt prior to deposition. Approximately 1 kg of animal bone was present, along with part of a coarse glauconitic sandstone saddle quern and a highly polished worked bone gouge.

Layer 5 (not illustrated on Fig. 2.7) was another layer of colluvial inwash or erosion, but again contained fragments of pottery (PRN 828) dated to between 1015–900 cal BC (OxA-18443, GrA-37697, combined date at 95% confidence), some animal bone, and a grooved and polished bone fragment.

Layer 4 contained a very substantial quantity of ceramics (dated residues from which suggest formation between the second half of the 10th and first half of the 9th centuries BC), almost 2 kg of animal bone, parts of three coarse quartz sandstone saddle querns, two smoothed and polished worked bone implements (one perforated), a copper alloy object, possibly a pin shaft, and human skull and lower limb fragments from one or more adults.

Layer 3 (not illustrated on Fig. 2.7) was relatively shallow, at 0.10 m, but contained substantial quantities of flint, 0.5 kg of animal bone, and a small number of pot sherds with residues which date to between *1210 and 970 cal BC* (PRN 153, OxA-17875, at 95% probability). Some postholes were cut from this level, and it appears to represent an originally level stabilisation horizon within the fills.

There is no real distinction to be drawn between the ceramics from these layers, with only the presence of small bowls or cups with omphalos bases and jars with neck cordons in layer 4 indicating any change in the ceramic repertoire. Above layer 3, however, there seems to have been a very marked change in the use of the feature, as the two uppermost layers all seem to be naturally (and probably quite gradually) accumulated deposits, which demonstrate a significant degree of mixing and redeposition of ceramics. These layers belong in phase 2 of the enclosure's use, and are described there.

## Phase 2

The outer ditch (2193) of the enclosure was recut (2458, 2427, 2287, 3408), the inner ditch 3602 was added (3581, 3564, 3554, 3552, 3268), and the entrance was altered during phase 2 (Fig. 2.6). Some of the internal features also silted up at this time.

### *Ditches*

The outer ditch (2193) was investigated in five places. The terminal forming the entrance was 2.10 m wide at the surface and 1.10 m deep, slightly shallower than the original cut and offset slightly to the east (Fig. 2.6). The excavated section indicates that the original ditch had filled completely by the time the line was re-established, although there is no absolute indication of how much time elapsed between the silting of the first ditch and the cutting of the second (phasing from elsewhere in the enclosure suggests perhaps a gap of centuries). The other completely excavated section revealed a ditch of comparable dimensions, here (in the approximate centre of the southern side) coinciding more exactly with the line of the original ditch.

The fill pattern in the ditch resembles that of the first, with a quantity of slump or collapse, followed by a stabilisation layer with later weathering and settling above. Less material came from the basal fill in the terminal (a little animal bone and pottery, some flint); more from the fills above the stabilisation layer (itself sterile): the lower of these layers (2461) contained very little animal bone, quantities of burnt flint, fired clay and slag, a little struck flint, over 0.5 kg of pottery, and part of a polished worked bone implement; the upper layer (2462) contained similar finds (a little animal bone, flint and pottery) including part of a perforated grooved bone implement.

With the exception of the worked bone implements, this signature (of a little animal bone, struck flint and pottery) typifies the fills of the second outer ditch. Only in sections 3408 and 2531 was any additional material found, consisting in the first instance of a small group of tiny undiagnostic copper alloy fragments and in the latter of a group of four copper alloy ingots (see Northover, Mepham, Chapter 5, Fig. 2.5).

Ditch 3602 only exists on the eastern side, and represents the enhancement of the entrance to the enclosure. Although there are no physical relationships to prove it, it seems likely that the palisade of phase 1 was remodelled at this time to form the very much more substantial inner ditch. The inner and outer ditches had an approximately 4.5 m-wide strip between them, devoid of features and probably marking the line of the bank suggested by the silting patterns in both ditches.

The maximum surviving dimensions of this feature were 1.96 m wide at the surface and 0.85 m deep, with a flat base, 0.50 m wide (Fig. 2.6). Four sections were excavated, each with minor variations on a basic shape and fill pattern. The lower fills contained small quantities of animal bone, flint and pottery, with only the highest two fills containing substantial quantities of material, including a worked and polished bone implement.

***Entrance features***

The entrance appears to have been substantially remodelled. The fact that the limits of excavation lay in the area of the entrance means that the reconstruction of its form is beset with difficulties. For phase 2, this means that it is not clear whether the large feature (2469) which cuts the earlier ditches in the entrance represents the terminal of the phase 2 outer ditch on the northern side of a narrower entrance (which would be not more then 4 m wide), or a pit dug in its centre.

Feature 2469 was not completely excavated, but it was more than 1.62 m deep, over 3.70 m broad at the surface, and narrowing to 0.80 m at the maximum excavated depth. This makes it markedly larger than the outer ditch south of the entrance, and consequently it may be that 2469 was a very large pit. The reasons for digging such a large feature in the entrance remain obscure, but one possibility is that it held a substantial post (although there is nothing about the fills to suggest this).

Whatever the reasons for its creation, feature 2469 was a focus for deposition as it filled. The lowest excavated fill contained almost 2 kg of pottery, for example, (Figs 5.2–5.3, 4, 6, 19), including substantial portions of a rusticated jar with vertical wiping, a burnished bowl, and a slip-coated large shouldered bowl with an applied cordon at the shoulder and fingertip decoration on the cordon and rim, estimated to date to *1015–920 cal BC* (*PRN 784, OxA-18447*; Table 3.3). Above this was a layer containing 0.5 kg of pottery, and two worked bone objects (a polished object with cut and smoothed edges and ground rounded tips, and a highly polished pin or needle (ONs 1214, 518, Pls 5.9, 2, 5.10, 10). The next layer contained a very substantial assemblage of material: approximately 2 kg of animal bone, among which was an articulated *Equus* lower limb (see Table 3.3: SUERC-24077); 1.5 kg of pottery, including (amongst the masses of flint-tempered body sherds) large parts of a jar with incised diagonal slashes on the rim and applied neck cordon, and a small bowl with an omphalos base and horizontal lines above the shoulder (Fig 5.2, 6); part of a bone gouge (ON 1207); and human bone from a minimum of six individuals, one with sharp weapon trauma on a rib (Pl. 4.8).

A second much smaller, but still substantial feature (3699: 2 m across; 0.77 m deep), appears to have been cut into the top of the pit at this point. Its single fill contained a similar suite of material, including pottery and human bone which may have been redeposited from the layer below, but also a copper alloy pin (Fig. 5.9, 8, ON 436; see Mepham, Chapter 5).

***Internal features***

Although there are again no stratigraphic relationships to demonstrate it, it seems probable that the alteration of the enclosure coincided with the second phase of activity within Midden Pit 2028. Above the stabilisation horizon which marked the cessation of phase 1 activity were two layers (layers 2 and 1) of dark greyish silt. The dating of these layers is not straightforward. Sherds from layer 2 provided a date of *785–640 cal BC* (PRN 128, OxA-17872, at 95% probability). Soil micromorphology reveals a very disturbed horizon of colluvial inwash and domestic waste, with the material deposited wet, then trampled, bioworked, and strongly contaminated by the disposal/drainage of cess between periods of waterlogging (see Macphail, Chapter 5). The nature of the finds assemblage suggests a mass of domestic refuse, including almost 10 kg of animal bone (see Grimm and Higbee, Chapter 5), 8 kg of burnt flint, two ceramic spindlewhorls amongst several kilograms of fired clay (see Leivers, Chapter 5) and a worked bone gouge. Fragments of human bone were also present.

Layer 1 has a wider date range of *1005–840 cal BC* (PRN 705, OxA-17915), *900–790 cal BC* (PRN 706, OxA-17877) and *790–720(52%) cal BC* or *695–555 (43%) cal BC* (OxA-17914, GrA-36004, combined date at 95% probability), the last of which does not seem at odds with the ceramics at this level. These include grog-tempered and shell-tempered fabrics amongst the mass of flint-tempered and quartz-tempered, and also some forms which could be considered as more properly earliest Iron Age, including a round-shouldered jar with herringbone incision and a light burnish (Fig. 5.3, 23) and joining sherds from a tripartite red-finished bowl with horizontal bands of impressed decoration (Fig. 5.3, 22). These ceramics occur alongside an abundant finds assemblage similar to that in layer 2: animal bone and burnt flint was very common; fragments of two worked bone implements included one with staining suggesting it had been attached to a copper alloy implement; copper alloy objects from the layer included a pair of tweezers (Fig. 5.9, 7, ON 238), an ingot, and some unidentifiable fragments. Again, fragments of human bone were present.

On the basis of the ceramics from these two fills, it seems likely that the final infilling of this feature happened gradually over more than a century.

***Undated internal features***

In the space between Midden Pit 2028 and the line of the palisade and later inner ditch was a group of 19 possible postholes and a shallow pit (3229). No pattern could be detected amongst these features which might suggest a building or other structure. Pit 3229 contained a small assemblage of flint-, quartz- and grog-tempered pottery (only 19 sherds weighing 88 g), which hints at a date later in the sequence. Of the postholes, only seven were excavated and none contained any material beyond a few small sherds of flint-tempered pottery. All are effectively undated, and need not be contemporary.

### *Central Enclosure*

This enclosure was sub-circular, some 38 m in external diameter with a horseshoe-shaped ditch (2203) enclosing a second smaller discontinuous arc 25 m across and open to the east (Fig. 2.8). In plan, the enclosure appears to respect (and therefore post-date) the Northern Enclosure, having no outer ditch on the northern side. The original entrance appears to have been east-facing, but was closed off at some point (Fig. 2.8).

#### Outer ditch

The stratigraphy and sequence of ditch 2203 is difficult to reconstruct with certainty, as only small parts of it were excavated and – especially on the western side – the many intersecting brickearth-filled linear features which comprised (as well as pre- and post-dated) it were very difficult to untangle. On the western side, the excavated sections seem to represent a simple single phase ditch, shallow and with a broad U-shaped flattened profile, approximately 2 m wide at the surface and up to 0.80 m deep. No complete section was excavated across the width of the ditch on the western side (although not apparent from the available plans, the western edge of the ditch had been destroyed by an amorphous feature or features, possibly a continuation of ditch 2977, dated to the Anglo-Saxon period).

At the point on the southern side adjacent to the end of the inner ditch (see below), the outer ditch appeared to undergo a marked change in width and orientation. From this point eastwards, a number of recuts were visible in the excavated sections, and it is most likely that the sections on the west already described represent what on the east are the earlier cuts in the sequence. Here again, the stratigraphy (although far from clear) appears to show an initial phase of ditch approximately 2.00 m wide and up to 0.90 m deep (Fig. 2.8).

This original ditch ended at a terminal forming the southern side of an east-facing entrance. The terminal appears to have undergone some alteration over the course of its history, as does the corresponding opposite terminal, which lay 5 m to the north, formed by three or perhaps four phases of intersecting slots and ditches. None of the excavated sections of the phase 1 ditch contained much material (a little animal bone, some burnt and/or struck flint, fragments of fired clay, pottery). A part-finished, handmade shale armlet came from the Central Enclosure ditch (found in evaluation Trench 11), associated with Late Bronze Age pottery. The pottery is exclusively flint-tempered, which may be an indication of a date early in the sequence, but the quantities and weights are small. The only exception to this general pattern was a group of nine copper alloy ingots and fragments, perhaps the remains of a dispersed hoard, in the upper fill of section 2715 (Fig. 2.8, see Mepham, Northover, Chapter 5). A radiocarbon determination of *1030–895 cal BC* (GrA-37714, 2810±30, at 95% probability) was obtained on a sherd from the Phase 1 ditch. On the basis of this evidence, it seems most likely that this ditch belongs in the 10th cal century BC.

Whatever the precise sequence of the creation and maintenance of the entrance, at some point, both terminals were replaced by a very much more substantial ditch. Beginning at the point of changed alignment noted above, this second phase of ditch was a maximum of 3.40 m wide at the surface and 1.05 m deep, with a broad, steep-sided U-shaped profile. The ditch narrowed and rose progressively towards the north, being only 1.00 m wide and 0.50 m deep at its end. This later section of ditch altered the form of the enclosure considerably, as it ran continuously across the area of the east-facing entrance, effectively closing off access. Again, chronologically diagnostic materials were not common in the excavated sections, although the pottery assemblage did include some sandy fabrics, as well as a limited number of forms indicative of a later point in the ceramic sequence (including a fine flint-tempered bowl with incised horizontal lines above the shoulder (Fig. 5.3, 11). A date towards the end of the 9th century cal BC might not be out of place.

#### Inner ditch

Approximately 3.5 m separated the outer ditch from a discontinuous line of slots forming a second horseshoe-shaped arrangement open to the east (Fig. 2.8). These features appeared to consist of perhaps three irregularly-shaped segments, the investigated sections of which were each of a single phase (although some may have been replacements for others). The southern side was formed by ditch 2382 (between 1.34 and 1.56 m wide and 0.23 to 0.38 m deep), the western end of which was not observed. The western side was formed by slot 3097, only 0.74 m wide and 0.12 m deep

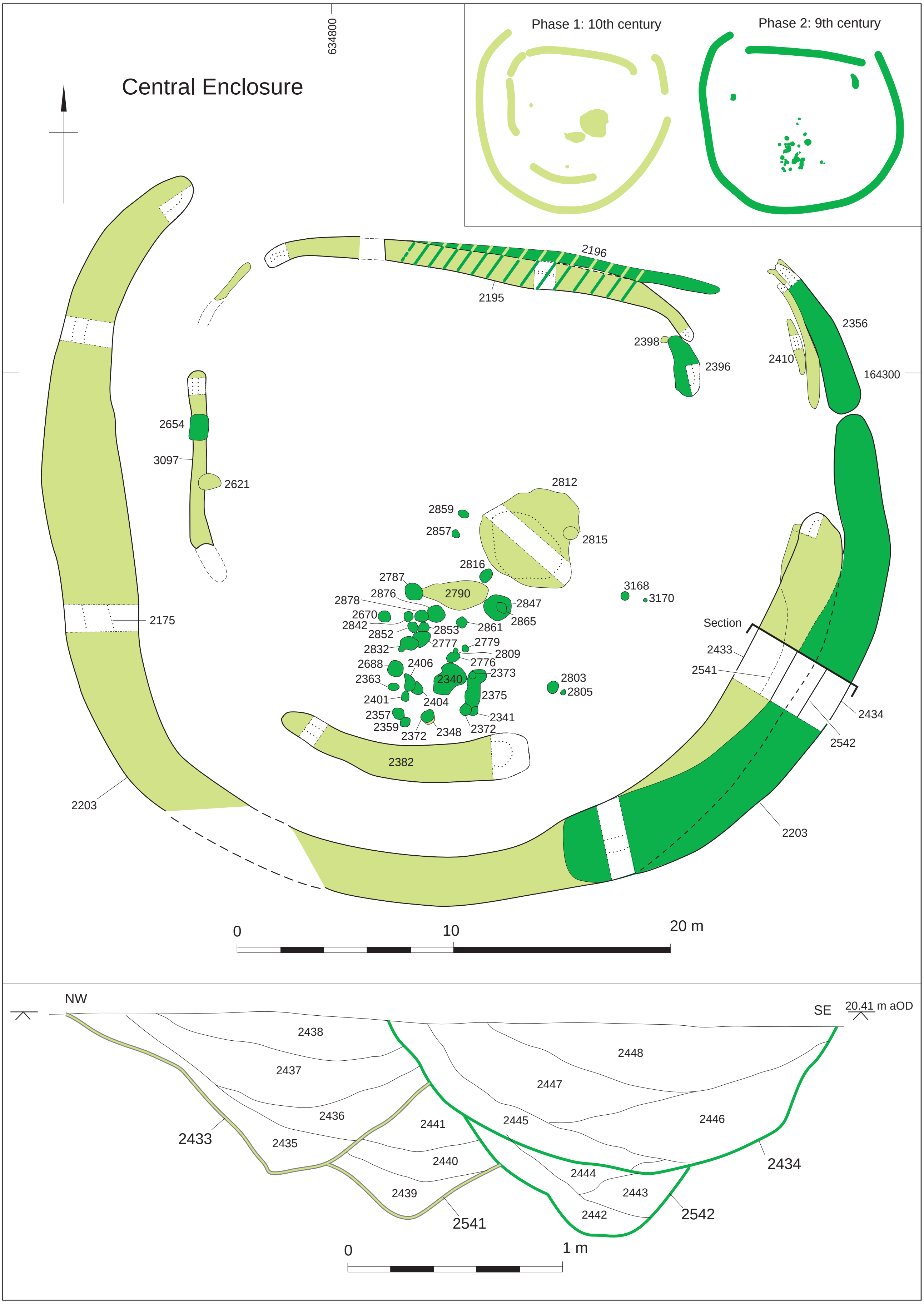



*Figure 2.8 Plan and selected sections of the Central Enclosure*

in the single excavated section. The southern end of this slot had been destroyed by a tree-throw hole, and it had been cut through by pit 2654 (see below). The northern side consisted of ditch 2195, 1.20 m wide in the centre, narrowing to 0.80 m and 0.46 m at the terminals, with corresponding depths of 0.35 m, 0.20 m and 0.12 m, respectively. The eastern end of this ditch appeared to cut pit 2396 (although their edges only intersected by centimetres and originally may have been discrete features); the eastern half was doubled by a second narrow ditch (2196: 11 m long; maximum width 0.53 m maximum depth 0.22 m). No stratigraphic priority could be established between the two.

Finds were relatively sparse, limited to a little struck flint and fired clay, and small quantities of exclusively flint-tempered pottery, entirely consistent with a date in the 10th century cal BC. Carbonised residues on a sherd from the northern side dated to *1030–900 cal BC* (PRN 379, *OxA-18446*); from a sherd (PRN 318) in the southern side to *940–825 (91% probability) cal BC (GrA-37714).* The only exception to this pattern was the upper fill of the western end of the ditch forming the southern side, which contained over 1 kg of pottery, including sand- and grog-tempered fabrics. However, in this location the ditch was overlain by a layer of refuse which also sealed many of the features within the enclosure (layer 2311, described below) and which had settled into the top of the ditch at this point.

**Internal features**

A number of features lay within the area defined by the inner ditch (or – in two cases – intersected with that ditch) (Fig. 2.8). One (pit 2396, situated at the eastern end of the northern side of the inner ditch) is of a very different character to the others, which are likely to form a group (or at least be broadly contemporary).

Towards the centre of the enclosure, a large irregular hollow (2812) had a maximum dimensions of 4.97 m by 4.76 m and a maximum depth of 0.20 m. The lower of the two fills was sterile, while the upper contained typical flint-tempered pot sherds, some flint, and an unidentifiable lump of copper alloy. No reliable dating evidence was recovered, but the absence of pottery with any temper other than flint may indicate a feature belonging to the first phase of activity in the 10th century cal BC. The eastern edge of the feature was cut by a small pit (2815), the uppermost fill of which contained pottery including small fragments of a flint-tempered bowl, and larger portions of a flint-tempered jar with an incised applied cordon in the neck. Elsewhere on the site, these forms might be expected to date to the 9th century cal BC.

Pit 2396 was 2.88 m long, 1.25 m wide and survived to a maximum depth of 0.78 m. A sequence of seven fills was identified, alternating between broad deposits of silty sands and thin layers of silty clay. The uppermost layer itself consisted of a series of seven identifiable lenses. Pottery was recovered intermittently throughout the fills, and the fabrics and identifiable forms indicate a date in the 9th century for the feature. This is at odds with the estimated date for the context of *1035–910 cal BC (95% probability; Last pit_2391*; Fig. 3.6) obtained from two carbonised emmer/spelt grains which are likely to be redeposited.

In the area between hollow 2812 and the southern inner ditch were 34 small pits, postholes or probable postholes. Although no overall pattern could be identified which would indicate a structure or structures, some of the postholes did seem to be in pairs, for instance, 2372/2341, 3168/3170, 2803/2805 and 2357/2359.

Most of these features contained small quantities of pottery and struck flint, but some had rather different assemblages in their fills. Feature 2787 contained a small quantity of cremated human bone, and 2348 had a recut that may have been made during or after the removal of a post. The subsequent backfill contained fragments of at least seven vessels, including a substantially complete small grog-tempered bowl (Fig. 5.3, 27). Feature 2359 (possibly paired with 2357) contained sherds of at least five vessels, including substantial portions of a jar with fingertip impressions, a smoothed sandy bowl, a fine shouldered bowl with external smoothing and incised lines on the shoulder (Fig. 5.3, 12), and a complete wiped jar (Fig. 5.3, 26). The pottery had been placed around the outer edge of the feature, apparently in the post-packing, which also included two flint hammers. Its pair (2357) contained only 14 small sherds of similar vessels. Pit 2688 contained an unusual deposit of over 0.5 kg of burnt clay, into which were mixed sherds of a flint-tempered jar. Posthole 2776 contained sherds from three vessels (a fine bowl with a line of fingertip impressions on the rim; rim sherds from a second smoothed bowl; and plain body sherds from a third vessel); a lump of fired clay; and smooth quartzite pebble, all in the packing around the post.

One unusual feature of the finds assemblage from this area was the number of flint 'hammerstones' recovered (three from posthole 2341, three from posthole 2359, one from posthole 2776, one from posthole 2777 and one from the overlying spread). These (and another group from Midden Pit 2028 in the Northern Enclosure) appear to be graded in size, and each has a distinctive wear pattern. Although referred to as hammerstones, these cannot have been used in


*Plate 2.2 Oblong flint 'hammerstone'*

flint knapping: one unusual oblong example had two patches of discrete use wear showing repeated and particular targeted striking (Pl. 2.2). Posthole 2341 also contained pottery, carbonised residue from a single sherd (PRN 294) dated to *1025–890 (94% probability) cal BC*.

Around and above this group of pits, postholes and associated features was a 0.20 m deep spread of dark soil (2311) which contained abundant charcoal and an assemblage of material including 1.5 kg of burnt flint, 0.5 kg of worked flint, 0.5 kg of animal bone, 0.5 kg of fired clay and 1.5 kg of pottery. The pottery consisted of sherds from at least 12 (but probably many more) vessels, including finger-pressed jars, bowls with incised horizontal lines, and sherds from one vessel (Fig. 5.3, 14) which joined sherds in posthole 2341. The layer seems likely to have formed as a result of whatever activities were occurring within the enclosure, and particularly within the area of the postholes.

One further feature belongs to this broad horizon of activity in the 9th century cal BC: 2654 was a rectangular pit (1.20 m by 0.83 m; 0.22 m deep) cutting through the western portion of the inner enclosure. Five stakeholes were cut through its base; at some stage these had been removed or decayed, and the lower fill formed. The pit contained a substantial quantity of pottery: at least nine vessels in the lower fill, including a flint-tempered jar with a gritted base and a thumb-pressed base/wall angle; a smoothed and burnished bowl with incised lines on the shoulder; and a circular lid with a small loop handle and cruciform combed decoration, which is without known parallel (Fig. 5.2, 7). The upper fill contained portions of at least four vessels, including a burnished and smoothed bowl and a second bowl with incised lines at the shoulder (Fig. 5.2, 9). Two carbonised emmer/spelt grains were dated from context 2656 (pit 2654). The best estimate for the date of infilling of the pit is provided by *Last pit_2654* (Fig. 3.6) *905–810 cal BC (95% probability)*.

**Features in the south-east**

In the south-eastern corner of the excavated area a number of intersecting linear and other features were situated between Early Bronze Age Barrows 5 and 6 (Figs 2.5, 2.9). Ditch 2242 was a broad linear feature (2242) aligned north-west to south-east. At its south-eastern end it was 1.90 m wide and 0.84 m deep, with a steep-sided U-shaped profile. Further to the north-west, it consisted of two intersecting parallel ditches: an original broad shallow cut replaced by a narrower, deeper feature which probably corresponds to the south-eastern portion. Both phases of ditch contained Late Bronze Age ceramics. The north-western end terminated in a group of features cutting the ditch of Barrow 5. Feature 2242 (which has by this point become a narrow straight-sided slot, 0.5 m wide and 0.45 m deep) cut an earlier rectangular pit (3141/3148) which itself cut Barrow 5. A later rectilinear slot (3143) cut 2242. Struck flint was recovered from throughout the sequence, but none was chronologically distinctive.

Immediately to the east of ditch 2242 was a second series of intercutting ditches and features. Most (3004, 3006, 3086, 3153) were narrow and shallow, with single fills. The latest in the sequence (3011) was rather different, up to 1.40 m wide and 1 m deep, with a series of seven fills containing flint, animal bone and pottery, including a fine burnished bowl from the lowest layer. None of these short lengths of ditch resolve into meaningful patterns, and it is difficult to ascribe a purpose beyond the general definition of a boundary. Some of the more amorphous members of these groups are probably the result of bioturbation, but the more regular examples appear to be anthropogenic, and to show some concern with the maintenance of some form of demarcation in this spot. The continued importance of this boundary is suggested by its maintenance in the Middle Iron Age or later, when lengths of similar slots were dug in and along the edge of Mortuary Feature 2018 (see below). It may then be that these features formed part of some sort of structure separating the mortuary feature from activity to the east, beyond the excavated area.

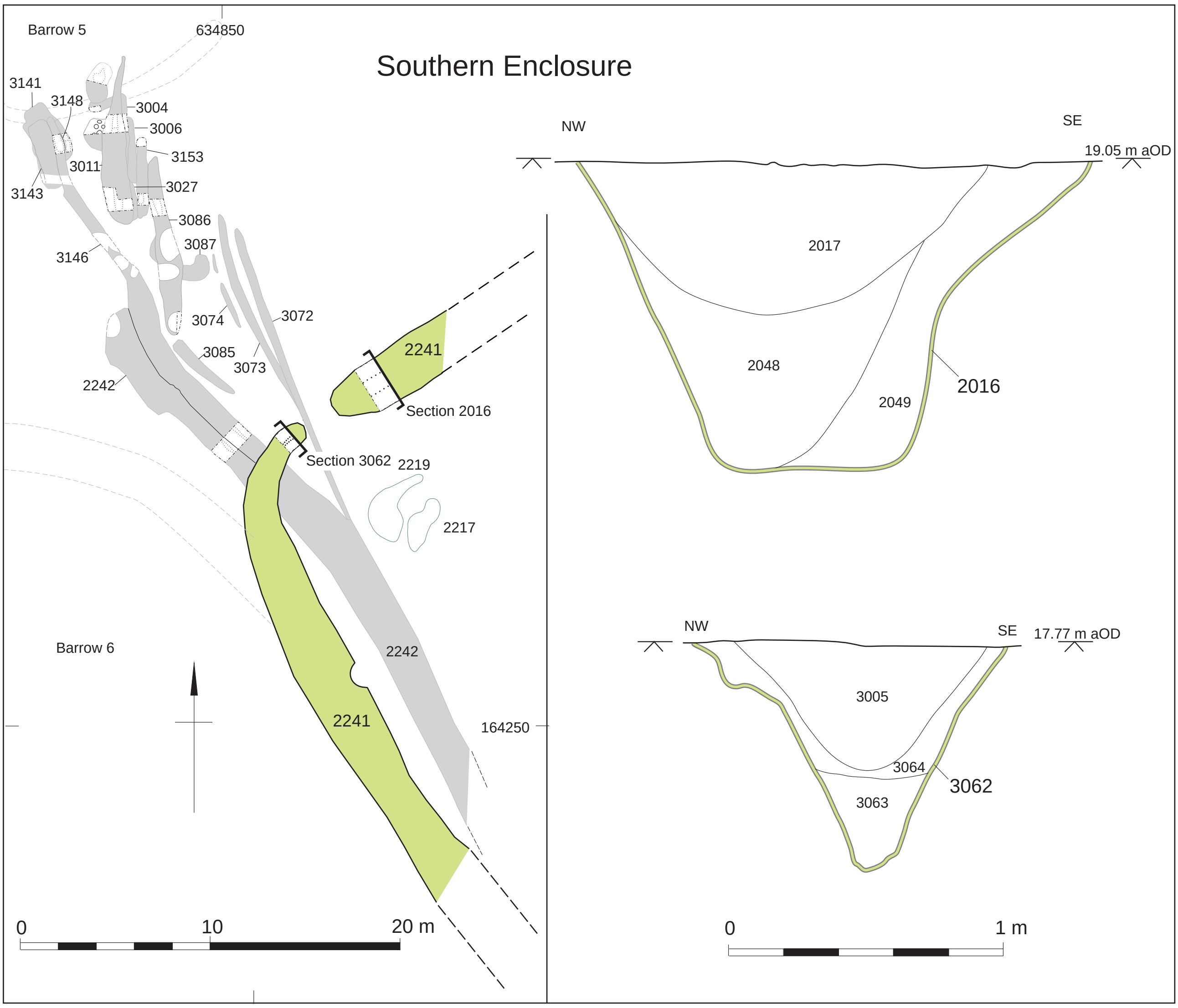



*Figure 2.9 Plan and schematic sections of the Southern Enclosure*

## *Southern Enclosure*

The Southern Enclosure comprised two sections of ditch (group 2241, Fig 2.9). One section was excavated through these features, and the only dating evidence was 15 g of flint-tempered, apparently Late Bronze Age pottery from the latest fill of the most recent cut. If this is any sort of dating evidence, then it is possible that the earliest of these V-shaped cuts belongs to Barrow 6.

Prior to excavation, group 2241 appeared to turn north-eastwards through a right angle, cutting across ditch (2242) and continuing beyond the limits of excavation. The apparent intersection between ditches 2241 and 2242 was not excavated, but immediately north-east of it ditch 2241 was revealed as a single V-shaped cut, 1.15 m wide and 0.80 m deep (Fig. 2.9), very similar in profile and dimensions to the latest of the intersecting features already described. A further 4.5 m to the north-east, however, the ditch (2016) was of very different form: 1.86 m wide and 1.10 m deep, with a steep U-shaped profile and a flat base. It is therefore likely that this is not a continuous ditch, but two sections forming terminals either side of an entrance to another Late Bronze Age enclosure similar to the Northern and Central Enclosures. The likelihood of this is perhaps strengthened by the very much greater quantity of material recovered from section 2016: as well as substantial amounts of animal bone, a portion of a human ulna was present, in addition to well over 1 kg of pottery in the upper two fills, including most of a flint-tempered jar, fragments of at least three other jars (one with an applied cordon and gritted base), and portions of two burnished bowls. This assemblage (human bone, animal bone, pottery) is very similar to that recovered from the entrance to the Northern Enclosure, pointing to a repeated depositional grammar in these locations.

**Mortuary Feature 2018** *by Jacqueline I. McKinley*

The north-east portion of the site was dominated by a large feature (2018), which on initial exposure appeared to form a single entity with a maximum width of *c.* 29 m at its north end and a minimum length of *c.* 52 m; the feature extended for an unknown distance to the north-east of the area of investigation (Fig. 2.1). The upper-most fill, comprising a redeposited/reworked dark yellowish brown clay loam 'brickearth' (3700) of variable depth (0.12–0.30 m, increasing to the north-east), appeared ubiquitous across almost the entire feature. Heavier machine-stripping at the southern end of 2018 had removed this layer to reveal the similarly coloured redeposited silty loam 'brickearth' (3701) with which it had a diffuse boundary and from which it was largely indistinguishable in plan.

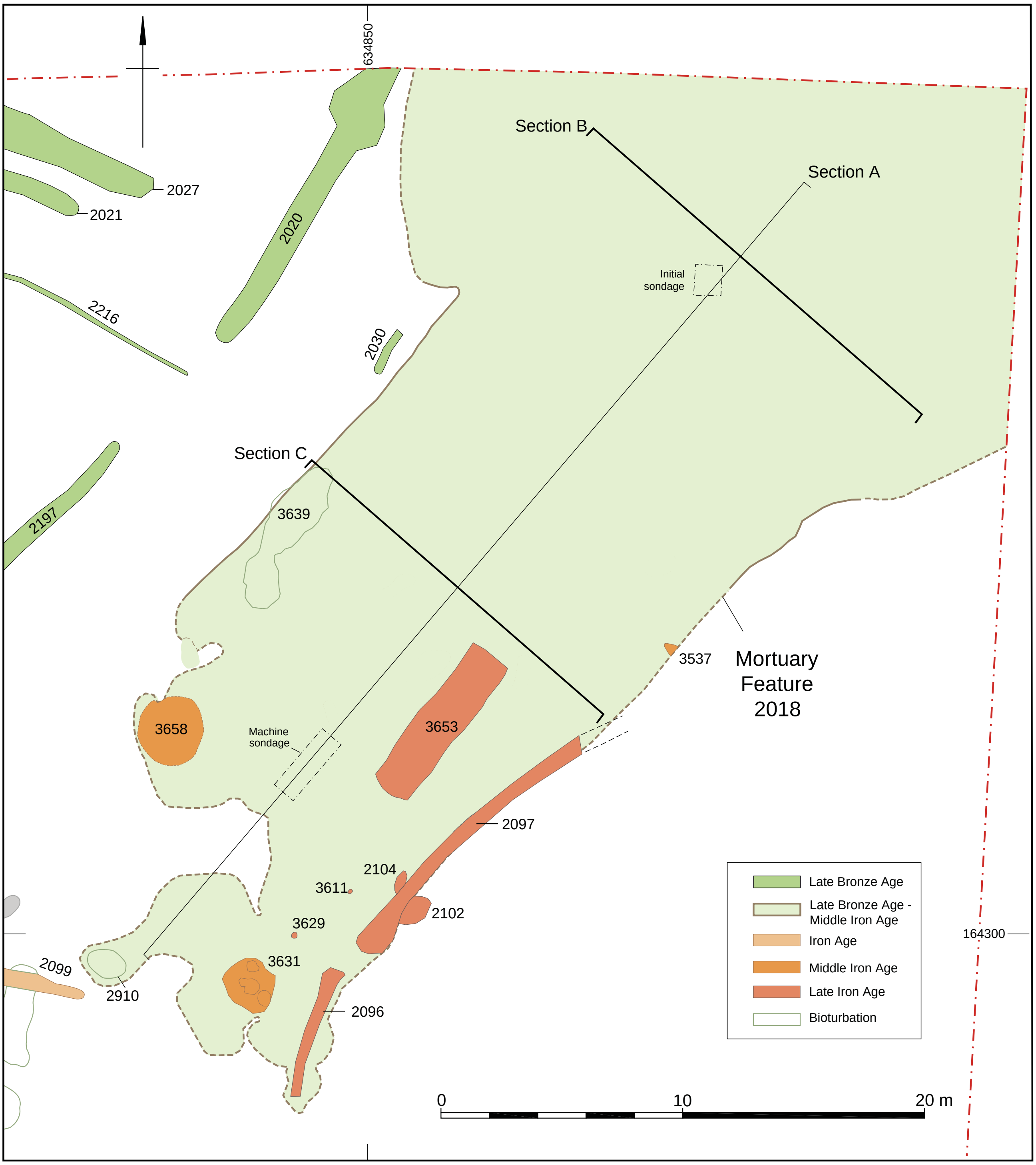



*Figure 2.10 Mortuary Feature 2018 showing all features visible at surface level, initial sondage and location of sections*

The feature lay towards the base of a gentle north-eastern slope falling from a low north-south ridge (*c.* 22.75 m aOD) which marked the western margins of the area of investigation. The ridge overlooks Pegwell Bay to the south-east and three of the six Early Bronze Age barrows recorded from the site were aligned along it (Barrows 1–3; Fig. 2.1). The ground level above feature 2018 ranged from 18.53 m to 19.07 m aOD, the lowest point falling in the north-east corner of the site. A variable depth (up to 0.77 m) of topsoil (dark brownish grey silty loam) and subsoil (mid-greyish brown clayey loam) was removed by machine to reveal the upper levels of the feature at 18.78 m aOD at its south-west end and 18.01 m aOD at the north-east, the greatest depth of machine stripping being towards the latter. The colluvial nature of both topsoil and subsoil is illustrated by the increased depth of deposits removed towards the lower end of the slope and the average depths of material removed across the site overall (depth range: topsoil 0.19–0.30 m, average 0.25 m; subsoil 0.12–0.24 m, average 0.18 m).

Although essentially linear in plan and set on a north-east to south-west alignment, there was an observable difference between the shorter (length *c.* 18 m), more 'bulbous' northern third and the longer (*c.* 34 m), narrower (*c.* 16.20 m) southern part of the feature. This difference in form at surface level was later seen to reflect two foci of activity, which demonstrated a broad temporal shift from north to south. Six Early Bronze Age barrows were revealed to the south and west of 2018, the shallow southern end of the latter extending, possibly deliberately, through the 'entrance' and into the interior of Barrow 5 (Fig. 2.1). There were no other direct stratigraphic relationships between 2018 and either the barrows or the three other major prehistoric features on the site, two Late Bronze Age enclosures to the west and one to the south (see Leivers, above).

The location of the spoil heap, along the entire eastern boundary of the site, and the site entrance, which lay across the north-western segment of 2018, meant that the margins of the feature in these areas could not be confidently ascertained by excavation. It is not known how far to the north the feature extended or how the profile may have continued from that seen in the longitudinal section (Figs 2.10–2.12). The true edges were located at only two points, all in the southern portion of the feature close to the boundary with the 'bulbous' northern third (Fig. 2.10, denoted by a solid line). The western margins of the feature were confirmed in two places and closely followed the pre-excavation outline (the line shifting inwards by *c.* 0.20–0.30 m). The true edge was only evident in one location, being masked by later bioturbation in the only other place where it was mapped (Figs 2.10, 2.13, Section C); here, although shallow (*c.* 0.20–0.50 m), the edge was relatively acute. It is probable, however, that in general the western margins were characterised by a gently shelving profile with little evidence for a deliberate cut as such. The impression is of 'puddled' edges akin to those seen on the margins of a pond rather than a made-edge. As a consequence of the positioning of the spoil heap, the eastern margins of 2018 were ascertained in only one location, at the junction between the northern and the southern portions of the feature (Figs 2.10–2.11). Here, the broad shallow margins extended over *c.* 4.5 m. On the basis of the evidence recovered from the west side, the margins of the feature on the east are likely to be relatively close to those mapped pre-excavation; if so the edges were probably relatively deep (*c.* 0.60 m) and acute (Fig. 2.13, Section C ). Alternatively, given the 0.80 m outward variation between the pre-excavation mapping and the actual edge in the one fully investigated location on the east side, the margins may have been further out than shown, allowing room for a profile more akin to that seen on the west side. The southern *c.* 10 m length of the feature was gradually shelving (*c.* 0.20 m deep), an effect possibly exaggerated by the natural rise in ground level in this area of the feature. The latter may also have resulted in greater truncation and reworking of the fills due to later activity since they will have had a shallower covering of the colluvial subsoil removed by machine.

Few features were evident within the upper fill of 2018 at stripped-surface level (Fig. 2.10), one of which (3639) is likely to represent the remains of animal burrowing and the others of human activity (2102, 2104, 2096, 2097, 3653; see below). The undifferentiated nature of the upper fill led to the initial insertion of a sondage in the northern portion of the feature to investigate the depth, form and nature of the cut and the deposits within it (Fig. 2.10). This revealed 2018 to contain a series of what appeared to comprise slowly accumulated layers, that were difficult if not impossible to distinguish in plan, the lower levels of which had been cut by a large pit (3666, Fig. 2.11). Both 2018 and 3666 extended to a considerable depth below the level of the stripped surface (up to 1.35 m) and, most significantly for the excavation procedure which followed, both contained substantial quantities of redeposited, disarticulated human bone together with evidence for *in situ* articulated remains. As a consequence, it was concluded that 2018 would need to be fully excavated (at least as far as was feasible within other constraints imposed by the site; see above) and, to ensure full recovery of the archaeological components within what appeared to form an extensive mortuary feature, that excavation would need to be largely undertaken by hand.

The overall excavation strategy is presented in Chapter 1 but the elements pertaining to the mortuary feature are briefly summarised here. The entire fill of 2018 was excavated in blocks of 2 m² and spits of 0.20 m depth. Since the interfaces between layers within 2018 were extremely difficult to distinguish in plan and generally only evident in section, most of the archaeological components from these layers – including those from many of the cut features later revealed in section – were collected under their block/spit number rather than as stratigraphically distinguished context numbers. The spits extended from *c.* 18.48 m aOD to 16.28 m aOD, with a maximum depth of 2.20 m (spit 11) recovered from the central area of 2018 (ie, the base of one of the pits; Fig. 2.12). Excavation by spit was later modified for half the blocks, spits 1–2 and the upper half of spit 3 being removed as one by machine (spit 0). All the human bone was also subject to 3D recording. The latter provided a check for the depth of individual spits, a few of which within the central area of the site proved to be over the stipulated 0.20 m (by up to 0.20 m in several places, unfortunately). Whilst this had little effect on the human bone distribution, the vertical location of some other archaeological components not

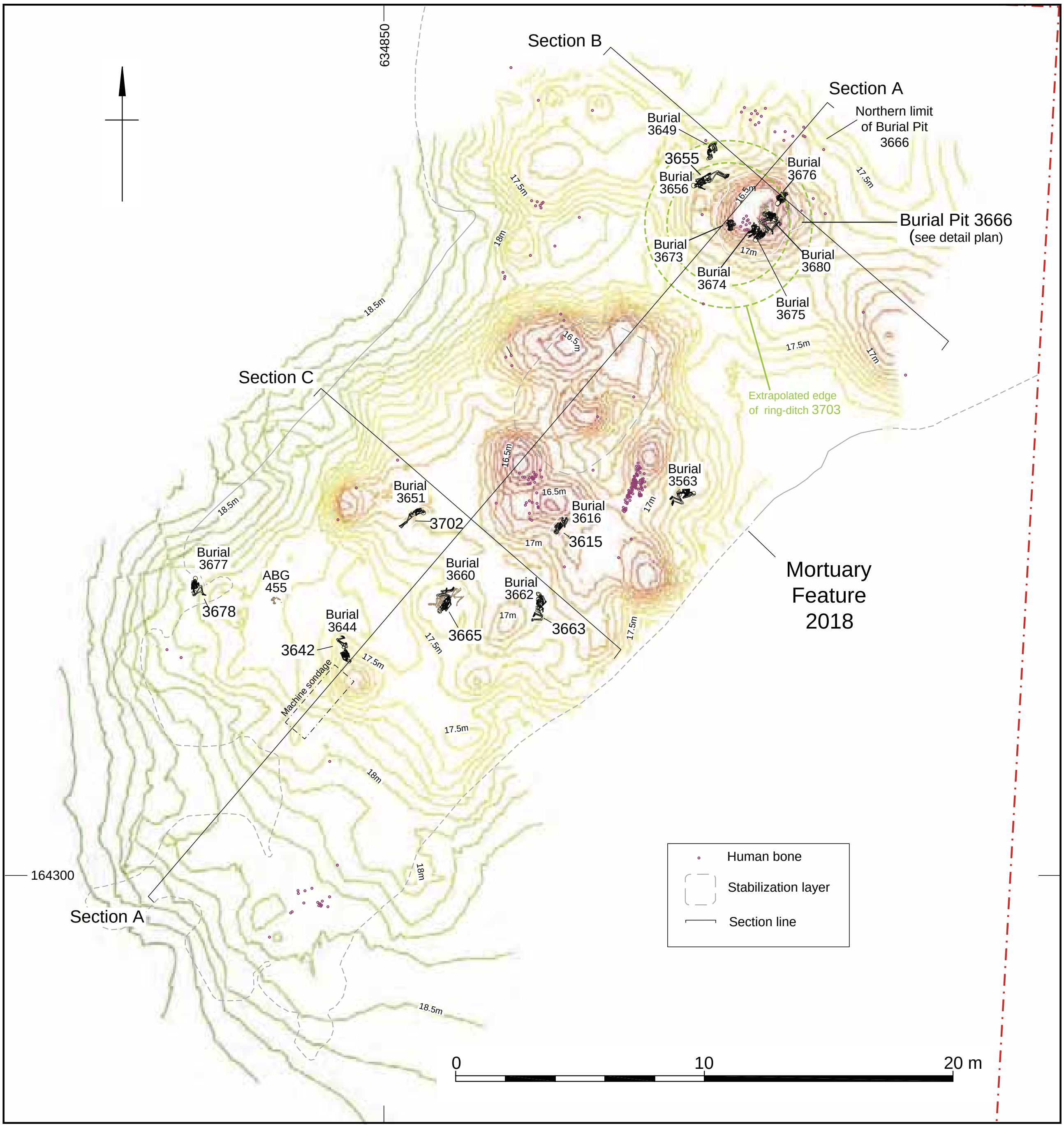



*Figure 2.11 Topographic plan of Mortuary Feature 2018 showing location of mortuary deposits*

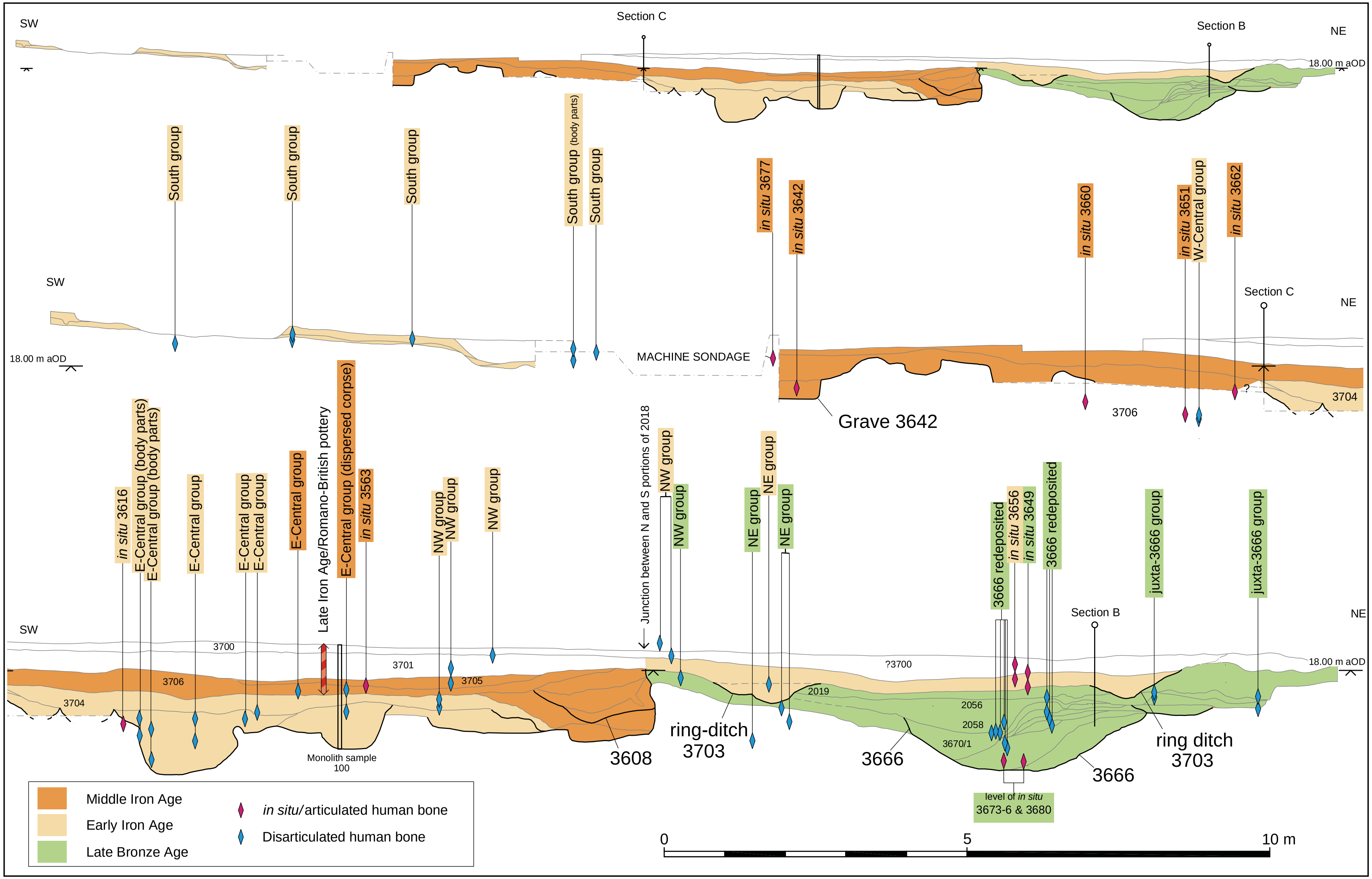



*Figure 2.12 North–South section (A) through Mortuary Feature 2018 with schematic positioning of the articulated and disarticulated human bone recovered from the feature projected into the section (NB x and y co-ordinates closest approximation, x co-ordinate positioned at correct m aOD with no adjustment for slight natural E–W slope across feature)*

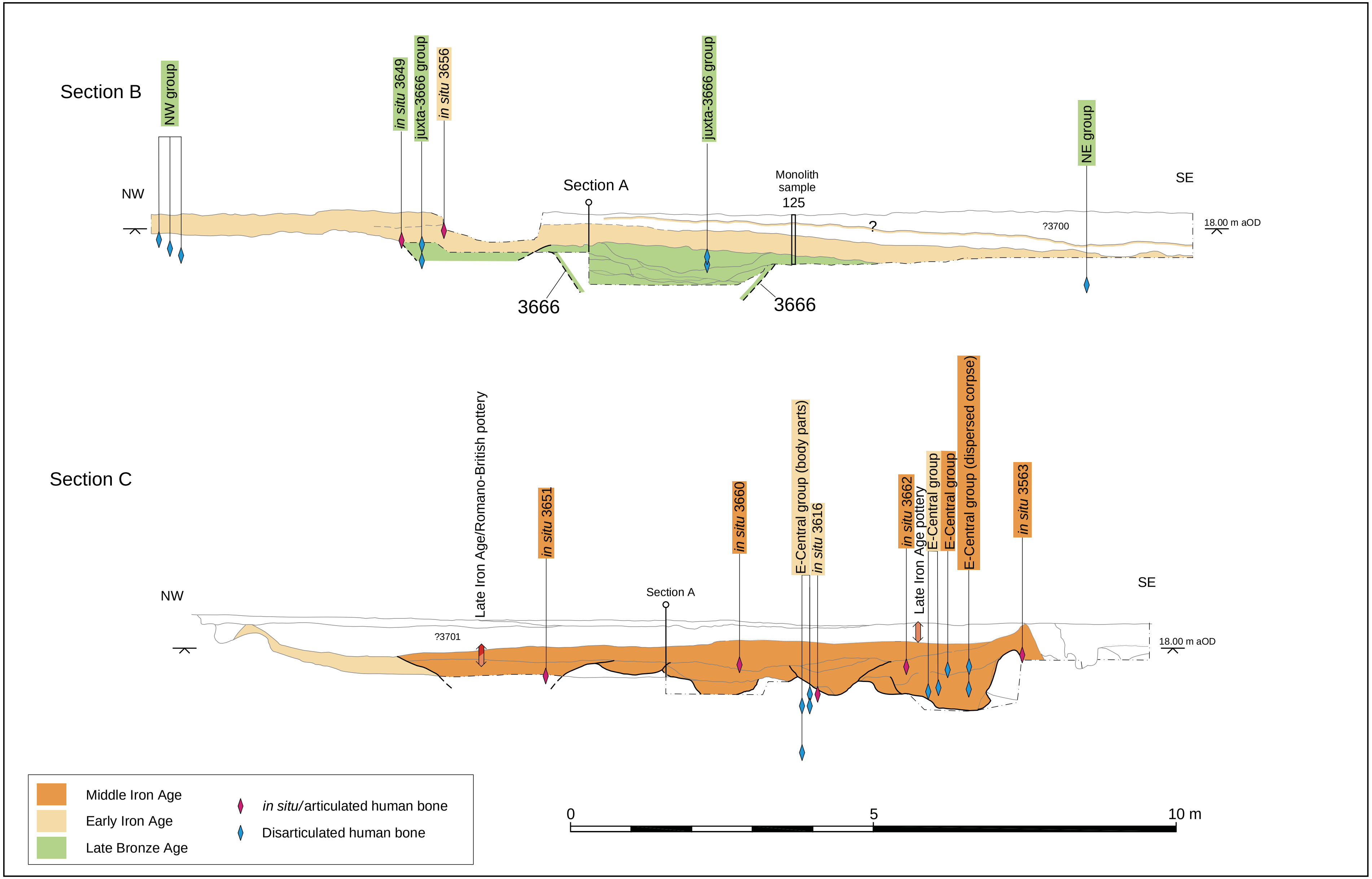



*Figure 2.13 East–West sections (B and C) through Mortuary Feature 2018 with schematic positioning of the articulated and disarticulated human bone recovered from the feature projected into the section (see Fig. 2.12)*

subject to 3D location had to be treated with caution. In all, 366 grid/spit numbers were allocated, and 44 independent context numbers, most deriving from pit 3666.

As outlined above, the size of the feature together with the form and nature of the fills (most comprising redeposited/reworked silty loam 'brickearth') rendered excavation by individual stratigraphic entities extremely difficult. Stratigraphic data were largely recorded in the form of a series of linked sections extending over the accessible length of the feature and at five intervals (0.18–0.22 m apart) across its width (Figs 2.10–2.11). Dating evidence in the form of residual pottery and flint was refined by an extensive programme of radiocarbon analysis of the redeposited and *in situ* human remains and some animal bone (see Marshall *et al.*, Chapter 3). The latter, tied into the vertical stratigraphy recorded in the sections, assisted with the absolute and relative dating of activity within the feature. Inevitably, layers could not always be readily linked between adjacent sections or had their continuity – or lack of it – masked by cut features. The projection of levels from dated *in situ* deposits onto the nearest section could not always provide a precise location within the stratigraphic layers recorded due to natural variations in the ground level. There were particular problems with pit 3666 where sections on different alignments had been drawn at different levels due to the fortuitous placing of the initial sondage (the original sections of which collapsed due to several weeks of exposure in poor weather prior to the main phase of excavation of 2018 and had to be recut resulting in inevitable slight enlargement) and the main north-south section, both of which only clipped the western segment of the feature. Despite these limitations, resulting in imprecise phasing of some elements of the overall fill, it was

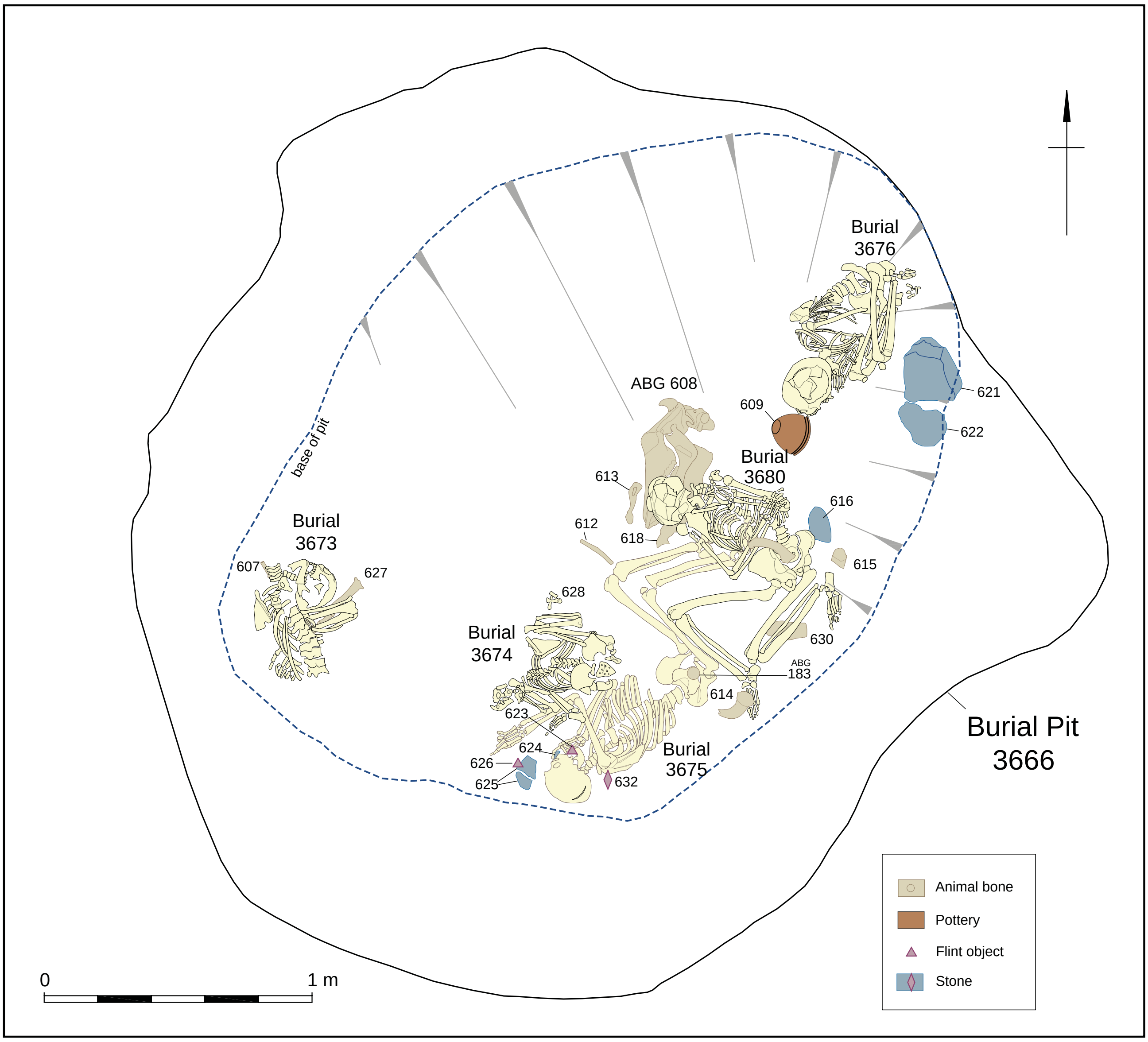



*Figure 2.14 Burial Pit 3666 in Mortuary Feature 2018 showing* in situ *human remains and associated finds (see Fig. 2.16 for detailed plan)*

possible to discern the general temporal sequence, the validity of which was independently supported by the radiocarbon results (see Marshall *et al.*, Chapter 3). Three main phases of mortuary activity were demonstrated; Late Bronze Age (11th–9th century cal BC), late Early Iron Age (5th century BC) and Middle Iron Age (4th–3rd century cal BC).

### *Late Bronze Age: 11th–9th Century cal BC*

The primary purpose and period of use of feature 2018 cannot be stated with absolute confidence. The distinction in the horizontal outline between the northern and southern portions of the feature was further highlighted in excavation and is well illustrated by the topographic mapping of the base (Fig. 2.11). Although the overall form was similar in both areas, with an uneven base frequently cut by pits of varying size (a minimum of 33 cuts were seen in the base and a minimum of 36 overall including the recuts), there was a distinct break between the two portions which corresponded with the change in shape in plan. This junction was cut by one of the later pits (3608) in section partly masking the primary stratigraphic relationship (Fig. 2.12), but on the basis of the attributed dating it also appears to coincide with a temporal break. Although residual Late Bronze Age pottery was recovered from several concentrations within the southern portion of 2018, predominantly from the upper levels (spits 1–3) and to the west of pit 3608 (Leivers, Chapter 5), the overall evidence indicates that Late Bronze Age activity was limited to the northern part of the feature, focused specifically on pit 3666, and that it took the form of a complex sequence of mortuary rituals. It is possible that some of the earliest pits in the southern portion of the site were cut contemporaneously, particularly the deeper ones in

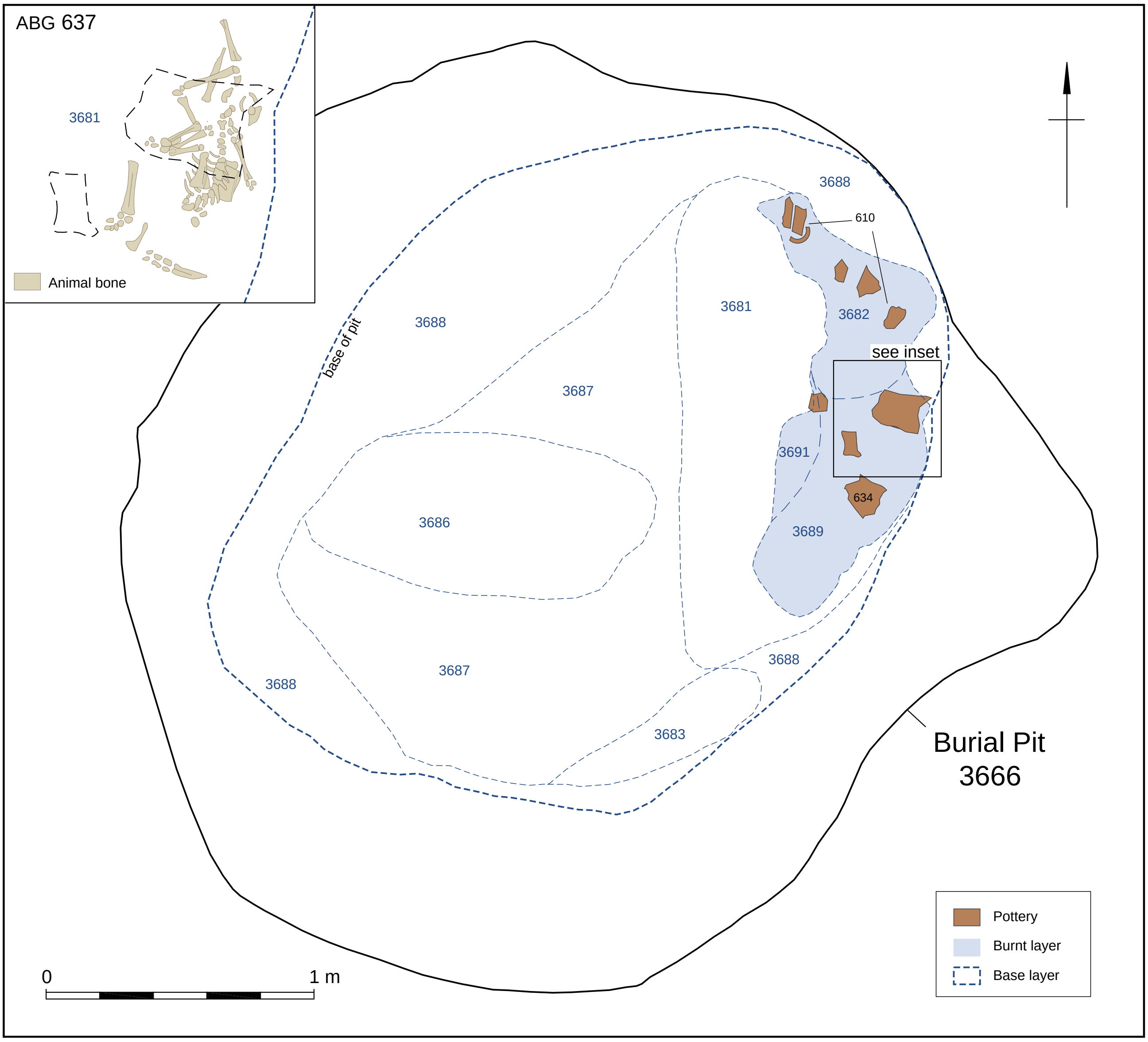



*Figure 2.15 Burial Pit 3666 showing deposits below the* in situ *human remains including pottery, burnt layers and two foetal lambs (ABG 637)*

*Plate 2.3 Burial Pit 3666 with burials 3673–3676 and 3680 and associated finds (see Fig. 2.14)*

the northern concentration, but there is no direct stratigraphic link between the areas, and no Late Bronze Age material was recovered from the lower fills of these features.

A minimum of eight pits, some recuts of earlier features, appear to have been present in the northern portion of 2018, the largest and deepest of which was pit 3666 (Pl. 2.3), which appears to have formed the focus of the Late Bronze Age mortuary activity.

**Burial Pit 3666**

The upper edges of pit 3666 were distinguished at *c.* 17.03–17.33 m aOD, *c.* 1.0 m below the machined-surface level. The ovoid cut (*c.* 4.09 x 3.56 m), set on a north–south alignment, had acute sloping sides, the lower parts of which were almost vertical in places. The base was generally flat but had a curved sloping step (*c.* 0.17 m high) in its northern half, particularly on the west side (Fig. 2.14). The pit as excavated appears to have formed a recut, possibly more than one, of an earlier feature which may have extended over a much broader area, possibly as much as 4 m to the south and 2.50 m to the north, but to no greater depth (Figs 2.11–2.12). To the south 3666 appears to have cut a layer from which no archaeological components were recovered, but the situation to the north is somewhat unclear. Here, it appears that layers may have been reworked, including the edges of the pit itself, the cut for which only became apparent at a level *c.* 0.30 m lower than to the south, and that material had slumped or been deposited into the pit from that side. The implied larger pit may have been shallower overall or have had a deeper central area with shallow stepped sides as suggested by the profile in the main north–south section (Fig. 2.12).

The initial deposits in the base of the pit are indicative of short periods of silting; the primary deposit 3688 probably extended across the entire base to a maximum depth of *c.* 0.10 m whilst the subsequent episode (3687) was limited to the southern portion of the pit (maximum 0.03 m deep; Fig. 2.15). The relationship between these early stages of silting and up to 0.40 m thick accumulation of redeposited natural (3667) infilling from the north-side of the pit is unclear since the latter was recorded in the initial sondage (which itself was subject to a period of weathering with subsequent recutting; see above) and cannot be conclusively linked with the levels exposed in the later more detailed investigations. It appears likely to be equivalent to the initial silting 3688 or 3687, as all extended below the *in situ* burial deposits, but if so it indicates a more sustained period of silting, infilling from the north-west, with at least one associated episode of slumping of the pit sides (3672).

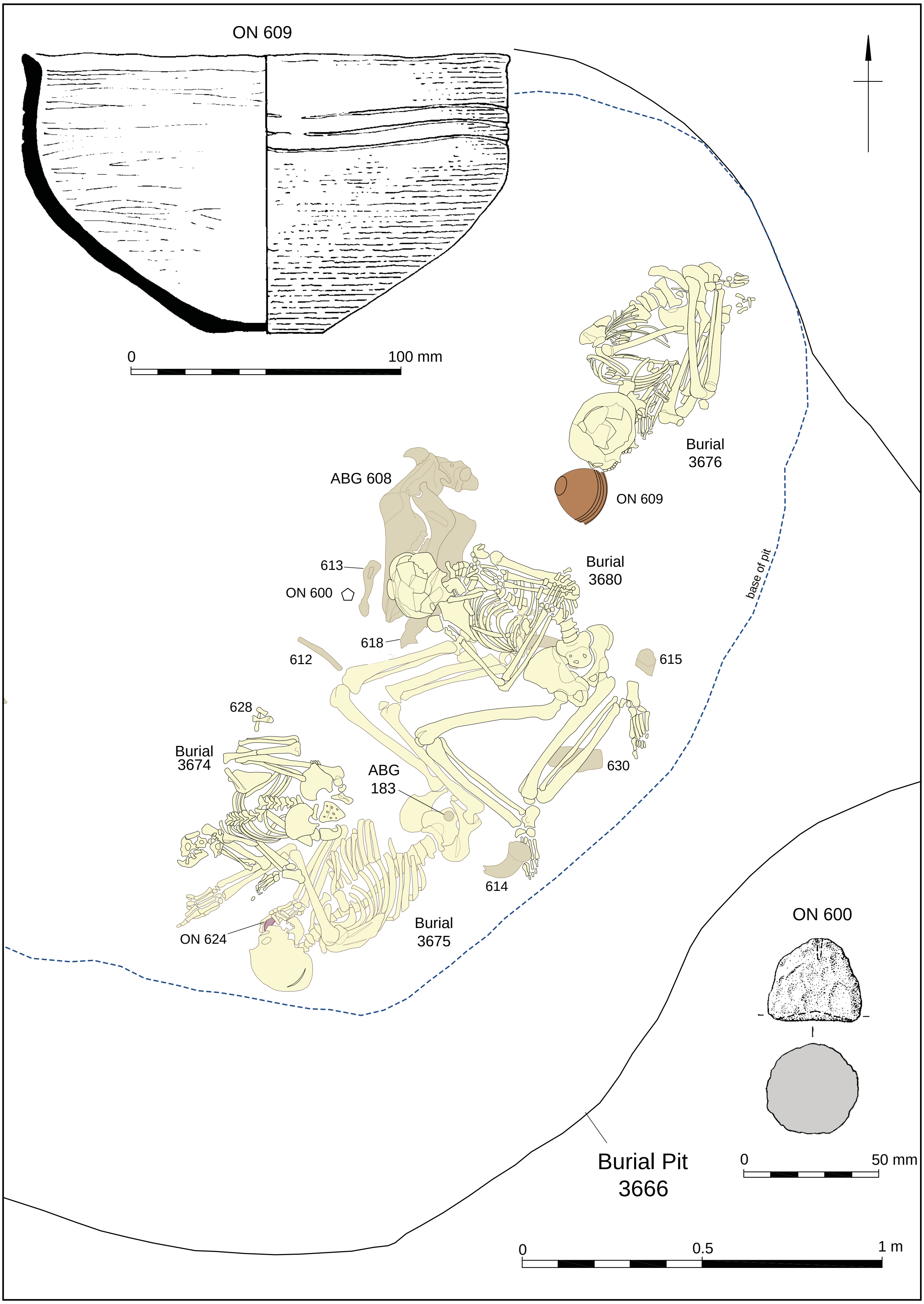



*Figure 2.16 Detailed plan of Late Bronze Age burials 3674–6 and 3680 with associated finds*

These initial episodes of natural silting were followed by a series of deposits limited to the north-eastern third of the pit which combined to give a maximum thickness of *c.* 0.16 m. An isolated area (1.30 x 0.60 m, 0.09 m deep) of apparently deliberately redeposited natural, 3686, was sealed by a thin lens (0.04 m) of material (3685) which is likely to represent natural silting from the sides of the pit. A second apparently deliberate dump of redeposited natural (3681) contained numerous archaeological components (worked and burnt flint; animal bone) including fragments of disarticulated human bone from two individuals (ON 628), although this may have been incorporated via bioturbation from overlaying *in situ* deposits (see below; Table 4.2). An isolated area of the sides of the pit then slumped in (3691) and two foetal lambs (ABG 637, Fig. 2.15) were placed over 3681 prior to a further deliberate dump of burnt material (3689) being made in a hollow (*c.* 0.70 x 0.50 m and 0.12 m deep) covering the animal remains, abutting the slumped material and apparently scorching the underlying deposit 3681. The burnt material (a mix of processing waste and charred dung; see Stevens, Chapter 5) incorporated archaeological components similar to those from 3681, including a fragment of redeposited human bone with evidence for canid gnawing (Table 4.2), and large fragments of pottery from two vessels. A second similar dump of burnt material slightly further north (3682; 1.2 x 0.5 m, 0.05–0.10 m deep) also included redeposited human bone which had been burnt/scorched, together with fragments of animal bone, fired clay and flint, and – again – large fragments of pottery from two vessels. Some of the pottery from these two layers of burnt material derived from the same vessel (ON 610 (PRN 861) from layer 3682 and ON 634 (PRN 862) from layer 3689; Fig. 5.4, 28) suggesting they represent different deposits of the same material made in rapid succession.

Modelling of the radiocarbon dates estimates an interval of *1–10 years (68% probability)* between deposition of the *in situ* remains of one of the lambs (ABG 637) and the use of 3666 as the place of burial for the first (3675) of four intact human corpses (3674, 3676 and 3680) and the placement of an incomplete, articulated but partially decomposed corpse (3673; Marshall *et al.*, Chapter 3). The absence of stratigraphic evidence for silting within that interval – which did, however, include several episodes of dumping of burnt material – suggests it was of relatively short duration, placing it at or towards the lower end of the suggested range.

The burial sequence could not be precisely ascertained from the excavation evidence due to the lack of a direct stratigraphic link between all of the deposits (Fig. 2.16, Pl. 2.3). Within the group formed by 3674, 3675 and 3680, the elderly adult female 3675 was deposited first. The remains of the subadult 3680 to the north-east and the juvenile 3674 to the north both partially overlay these earlier remains (see below), and the lack of displacement to the underlying bones suggested that they were at least articulated providing a relatively broad range of several hours to a decade between deposits (Fig. 2.16). There was no direct stratigraphic link between this group of three and the juvenile 3676, positioned close to the north-east side of the grave. The latter was placed directly over the latest of the dumps of burnt material (3682), but although stratigraphically later than the scorched and trampled redeposited natural 3681 (3683) over which the elderly female 3675 was laid and the earlier dump of burnt material 3689 overlain by the subadult 3680, layer 3682 itself did not extend far enough to the south-west to encroach or be encroached upon by any of the other burial deposits. The partial remains of 3673, situated close to the south-west corner of the grave, could have been deposited after the secondary silting (3687) in the base (Figs 2.14–15). The subsequent activity in the north-east portion of the pit did not encroach this far to the south-west, the lenses of redeposited natural (3686) ceasing just to the east of burial 3673. There was, however, nothing to indicate that 3673 preceded any of the other burial deposits since the same layer sealed them all. The latter, a thick and presumably slowly accumulated natural infill (3670), directly overlay all except the juvenile 3674 which was initially sealed by a thin (0.04 m deep) lenses of burnt material (3668; see Barnett, Chapter 5) isolated in extent and not evident elsewhere in the grave.

A burial sequence was deduced, however, by a combination of the results of the radiocarbon analysis with the stratigraphic evidence. This confirmed the elderly adult female 3675 as the earliest within the sequence (Table 2.2), followed by the juveniles 3674 and 3676 within a *1–15 year* interval *(68% probability)*. The death – though clearly not necessarily this final deposition of the partial remains – of the adult male 3673 falls next in the sequence, followed by the subadult 3680 within a *1–20 year* interval *(68% probability)*. Although a range of *1–45 years (68% probability)* is suggested by the radiocarbon analysis for the overall sequence of events, the archaeological evidence suggests they are likely to have occurred in relatively rapid succession rather than extending towards the upper end of the suggested range.

| | ON 110 KIA-24861 | ON 101 GrA-37751 | ON 536 OxA-18436 | ON 521 OxA-18435 | ON 100 GrA-37966 | 3675 OxA-17805 | 3676 GrA-36000 | 3674 OxA-18597 | ON 543 GrA-37912 | ON 541 GrA-37913 | ON 556 GrA-37713 | ON 542 184605 | ON 589 124205 | ON 545 OxA-18439 | 3673 OxA-17804 | 3680 GrA-36002 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ON 110 KIA- 24861** | - | 93% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| **ON 101 GrA-37751** | 7% | - | 82% | 90% | 92% | 94% | 96% | 96% | 96% | 96% | 96% | 97% | 97% | 97% | 98% | 99% |
| **ON 536 OxA-18436** | 1% | 18% | - | 61% | 65% | 71% | 81% | 81% | 81% | 81% | 81% | 82% | 85% | 85% | 87% | 95% |
| **ON 521 OxA-18435** | 0% | 10% | 39% | - | 54% | 61% | 73% | 74% | 74% | 74% | 74% | 76% | 79% | 80% | 82% | 92% |
| **ON 100 GrA-37966** | 0% | 8% | 35% | 46% | - | 57% | 70% | 70% | 71% | 71% | 71% | 73% | 77% | 77% | 80% | 90% |
| **3675 OxA-17805** | 0% | 6% | 29% | 39% | 43% | - | 100% | 100% | 72% | 72% | 72% | 75% | 78% | 78% | 89% | 100% |
| **3676 GrA-36000** | 0% | 4% | 19% | 26% | 30% | 0% | - | 50% | 51% | 51% | 52% | 55% | 61% | 62% | 71% | 100% |
| **3674 OxA-18597** | 0% | 4% | 19% | 26% | 30% | 0% | 50% | - | 51% | 51% | 52% | 55% | 61% | 62% | 71% | 100% |
| **ON 543 GrA-37912** | 0% | 4% | 19% | 26% | 29% | 28% | 49% | 49% | - | 50% | 51% | 53% | 59% | 59% | 63% | 80% |
| **ON 541 GrA-37913** | 0% | 4% | 19% | 26% | 29% | 28% | 49% | 49% | 50% | - | 51% | 53% | 59% | 59% | 63% | 80% |
| **ON 556 GrA-37713** | 0% | 4% | 19% | 26% | 29% | 28% | 48% | 48% | 49% | 49% | - | 53% | 58% | 59% | 62% | 79% |
| **ON 542 184605** | 0% | 3% | 18% | 24% | 27% | 25% | 45% | 45% | 47% | 47% | 47% | - | 56% | 56% | 59% | 76% |
| **ON 589 124205** | 0% | 3% | 15% | 21% | 23% | 22% | 39% | 39% | 41% | 41% | 42% | 44% | - | 51% | 52% | 67% |
| **ON 545 OxA-18439** | 0% | 3% | 15% | 20% | 23% | 22% | 38% | 38% | 41% | 41% | 41% | 44% | 49% | - | 51% | 66% |
| **3673 OxA-17804** | 0% | 2% | 13% | 18% | 20% | 11% | 29% | 29% | 37% | 37% | 38% | 41% | 48% | 49% | - | 73% |
| **3680 GrA-36002** | 0% | 1% | 5% | 7% | 9% | 0% | 0% | 0% | 20% | 20% | 21% | 24% | 33% | 34% | 27% | - |

The table should be read from the left hand column across each row. The stated value (%) is the probability that the radiocarbon date listed in the left column is older than each radiocarbon date in the row (eg, the % probability that left femur from bone group 2058 KIA-24861 is older than left parietal from bone group 2058 GrA-37751 is 93% = 0.93 probability).

**In situ *burial remains and associated materials***

**3673:** (Figs 2.14, 2.17) Partial articulated remains of an adult male (*c.* 30–35 yr.) arranged in a neat bundle (probably originally bagged or bound together) in the south-west of the pit and overlying an articulated cattle foot (ON 627; see Grimm and Higbee, Chapter 5). The remains comprised the skull, spine, left thorax and upper limb. The latter, including the shoulder, was articulated and formed the base of the bundle, laid semi-prone on the left side. The arm appears to have been flexed away from the 'body' at the shoulder, and bent back towards the body at the elbow. The lower half of the thoracic spine, together with the lumbar spine and left half of the rib cage were also articulated, possibly still partially attached to the upper limb. The skull, together with the articulated cervical and upper thoracic vertebrae, appears to have been perched on top of the bundle, the skull having slumped back into an awkward position with the top of head resting on the arm. Although articulated, the corpse must have been substantially decomposed to allow such arrangement of the remains.

A composite copper alloy and worked bone object (ON 607) comprising a highly polished and perforated bone tube (left tibia of a roe deer or sheep/goat, although the slenderness indicates the former as most probable; J. Grimm), drilled for suspension and found in association with a copper alloy ring, lay below the cervical/upper thoracic vertebrae. Length 102 mm; round distally gradually becoming triangular at the proximal end (following natural shape of the bone), width changes from 10 mm to 14 mm. Perforation 2.5 mm diameter, drilled transversally through the distal part of the bone. Green staining around this end of the bone suggests the copper alloy ring was attached here. The object was probably a pendant, but it cannot be stated with certainty that the individual had been 'wearing' it.

*Left: Table 2.2 Percentage probabilities of the relative order of the dates of the articulated and disarticulated human bone from Burial Pit 3666 and the juxta-3666 group (excluding remains of final Late Bronze Age deposition burial 3649; based on data by Marshall* et al.*, Chapter 3)*

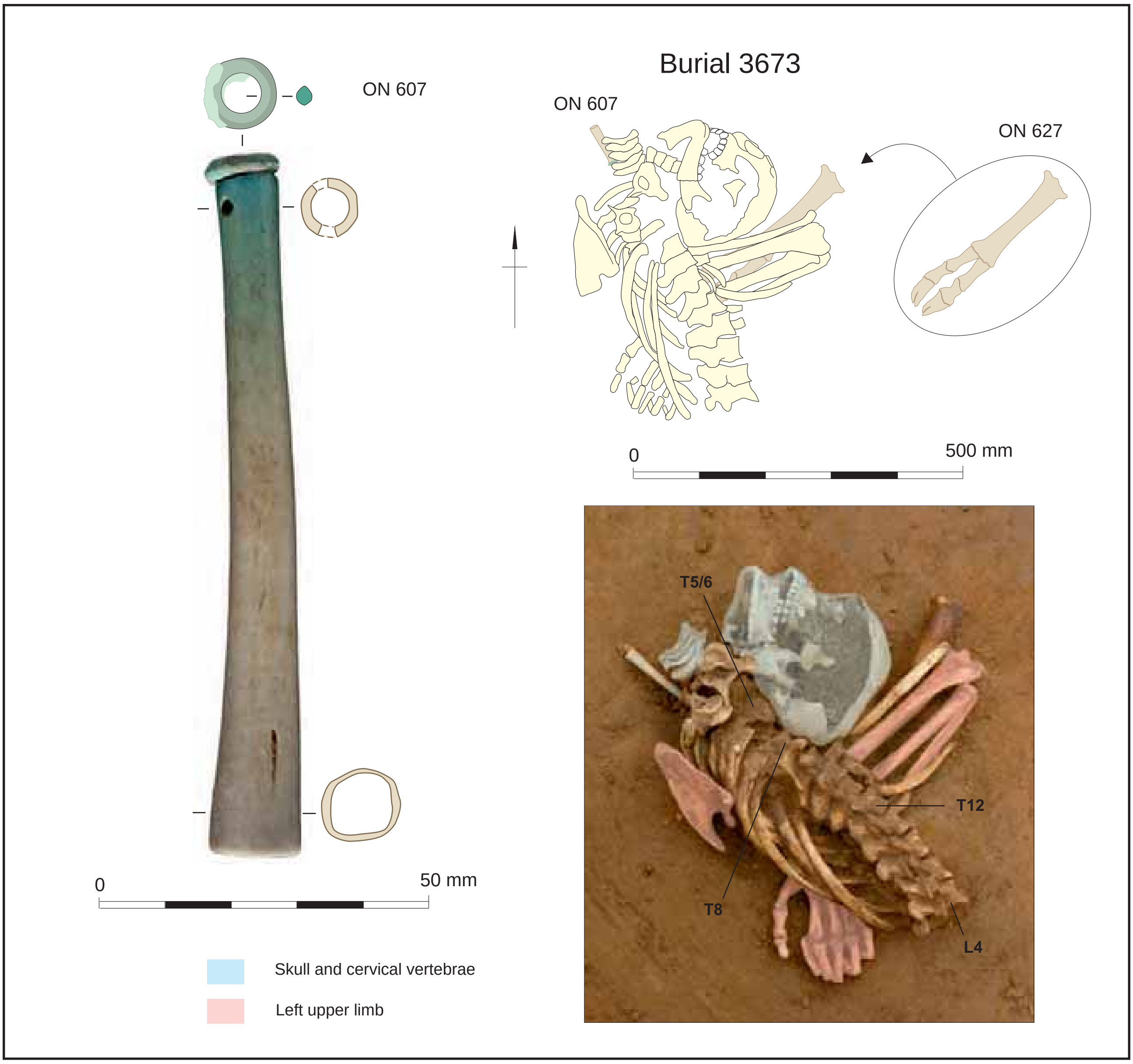



*Figure 2.17 Detailed plan of Late Bronze Age burial 3673 and associated finds*

**3674:** (Figs 2.14, 2.16, Pls 2.3–2.5) Crouched (possibly bound?) in a prone position and subsequently collapsed down; juvenile *c.* 10–11 yr. Most of the skull and the right hand were missing as excavated; some bone (the hand; see below) may have been disturbed during the recutting/cleaning of the initial investigative sondage (see above) prior to the recognition of the burial pit, but the skull was disturbed in antiquity and may, at least in part, have been redeposited in later fills of 3666 (?ONs 106, 521 or 535?: see McKinley, Chapter 4). The left foot and elbow overlay the left and part of the right arm of 3675, and part of the left pelvic bone (ischial centre) had collapsed over the left elbow of 3675. Disarticulated adult foot bones (ON 628) lay to the right of the right leg.

*Plate 2.4 Late Bronze Age burial 3675 showing relationship with burials 3674 (above) and 3680 (right)*

*Plate 2.5 Late Bronze Age burial 3674 partially overlying burial 3675 (bottom left)*

**3675:** (Figs 2.14, 2.16, Pls 2.3–2.6). Flexed on left side; elderly female >50 yr. Right arm extended above the head with 90° flexion at shoulder and elbow; hand just above head level with index finger extended 'pointing' to the south-west. Left arm flexed acutely at elbow bringing the hand up to the face; 'holding' a small lump of chalk (ON 624; weight 7 g) to maxilla. Arms partly overlaid by juvenile 3674 and feet under the spine of subadult 3680. The remains of at least two neonatal lambs were recovered from the sample (183) taken from the pelvic area; the excavator (an osteologist) believed the remains to have been at least partially articulated at the time of deposition but that they had 'dispersed' throughout the human pelvic remains in decomposition; ie, the lamb remains were placed over the human corpse.

Two fragments of burnt siltstone were recovered in close proximity to the human remains; ON 623 below the chin and ON 625 from between the head and the right hand where it was recovered together with a piece of burnt flint (ON 626). The position of these stone fragments is likely to have been fortuitous and associated with the underlying burnt deposit

*Plate 2.6 Late Bronze Age burial 3675 showing a detail of overlying burial 3674 (bottom left)*

3683, from which a fragment of partly worked siltstone (ON 632) was also recovered adjacent to the skeletal remains.

**3676:** (Figs 2.14, 2.16, Pls 2.3, 2.7). Crouched on right side; legs slumped further to right and thorax back towards supine position; juvenile *c.* 10–12 yr. Hands together (?tied) under chin. The skull was set on its base to 'face' one half of a ceramic bowl (ON 609; PRN 858; Leivers, Chapter 5), apparently set adjacent to the skull and the group of three individuals to south. It is unclear how this level of rotation could have occurred due to 'slumping' and its position may reflect post-decomposition manipulation, though clearly not when the remains were fully disarticulated since the cervical vertebrae and mandible were still articulated.

*Plate 2.7 Late Bronze Age burial 3676 with pottery vessel (ON 609)*

Two large fragments of burnt siltstone (ONs 621 and 622) lying between the human remains and the side of the grave pit are likely to relate to the underlying layer of burning 3682; it was clearly not considered necessary to remove them before making the burial.

**3680:** (Figs 2.14, 2.16, Pls 2.3, 2.8). Flexed on right side with post-depositional slumping; subadult *c.* 17–18 yr, ?female. Head resting on articulated cattle skull (with 1st cervical vertebra; ABG 608), slumped forwards towards chest and right shoulder. Right arm flexed across body at elbow, left flexed acutely at elbow bringing the hand to the shoulder. Both legs flexed at hip; left flexed acutely at knee bringing foot under pelvis and right flexed at knee to bring foot to level of left knee. The body appears to have slumped down from a more 'up-right' position; the shoulders/upper body may originally have lain further over the cattle head.

*Plate 2.8 Late Bronze Age burial 3680 with subadult's skull resting on cattle skull (ABG 608); note relationship with 3675 to left*

A fragment of burnt siltstone (ON 616) was recovered from below the human remains and probably, as elsewhere, relates to the preceding deposits of burnt material. Various fragments of disarticulated animal bone (ONs 612–5, 618 and 630; mostly cattle with some sheep/goat, see Grimm and Higbee, Chapter 5) were recovered from above and below the human remains.

The fully articulated *in situ* remains were confined to the south-eastern half of the burial pit. The redeposited semi-articulated remains were placed against the south-west edge of the pit slightly separated from the *in situ* deposits. The north-western area of the pit, with its slightly inward sloping profile, was noticeably devoid of *in situ* remains. The numerous fragments of burnt siltstone found in close proximity to several of the burial remains probably all relate to the earlier burnt deposits; it is possible that more such fragments could have been moved to accommodate the interments, and no conclusive statement can be made as to the deliberate retention or not of the stones recorded in excavation. Several large fragments of pottery recovered from spits 8 and 9 in the vicinity of burial 3676 were found to have derived from one of the three vessels represented by sherds lying amongst the deposits of burnt material 3682 and 3689.

Redeposited human bone from a minimum of two individuals was recovered from amongst and around burials 3673, 3674 and 3676, where they appear to have been randomly scattered; though the articulated foot bones ON 628, situated immediately north of the juvenile 3674, may have been deliberately placed (Table 4.2; Fig. 2.16). The redeposited bone denoted 3674b may also have been semi-articulated; it is possible some, but certainly not all, of this bone derived from 3673 and was displaced and dispersed during the final deposition of these remains. Some bone, again parts of two individuals, was recovered from the north-west area of the burial pit deposited on a level with, but probably subsequent to, the *in situ* remains: NB parts of a juvenile right hand may have derived from burial 3674, having been recovered in the cutting/recutting of the initial sondage (see above). Some of the juvenile bone from spit 9, within

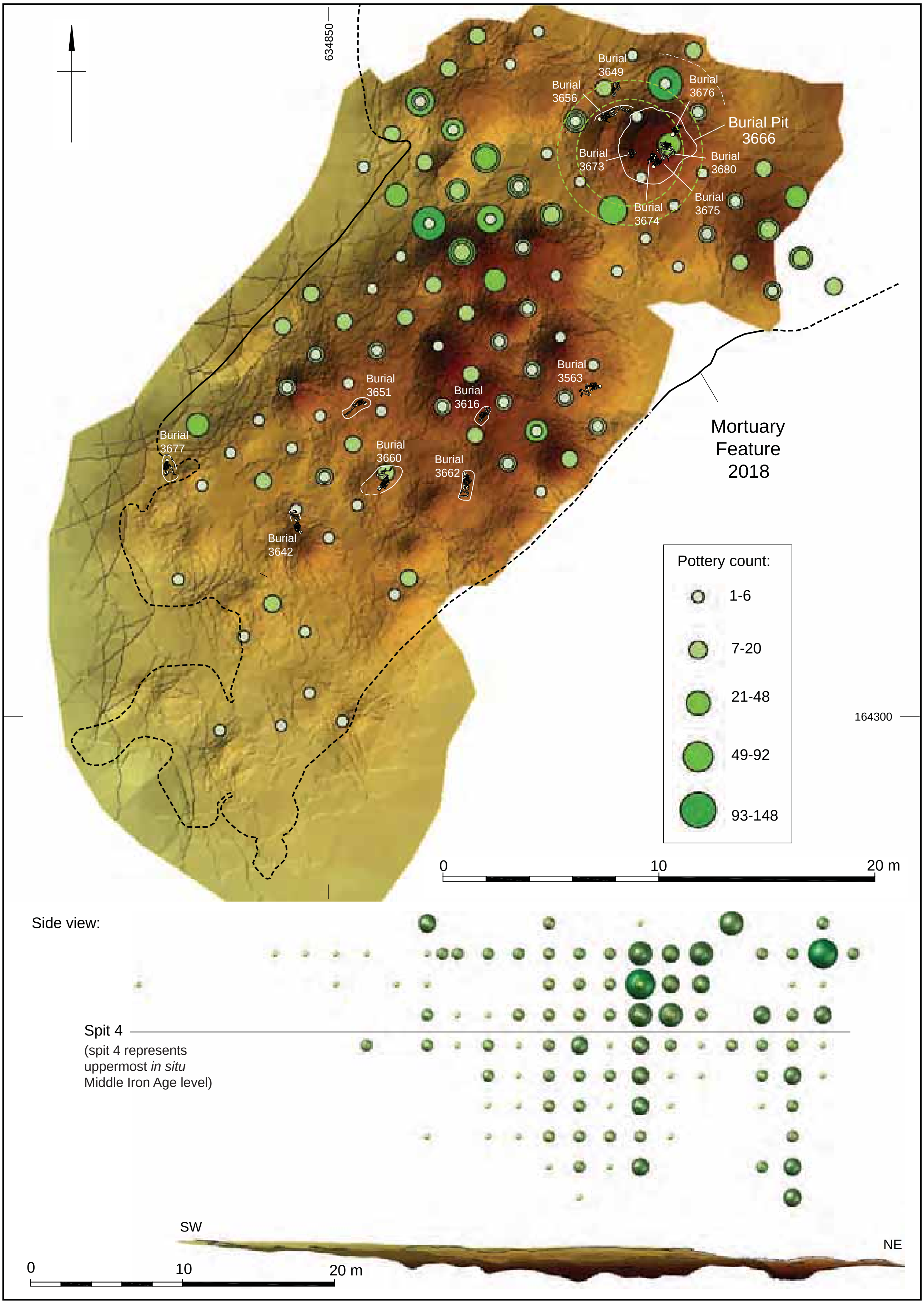



*Figure 2.18 3D distribution of prehistoric pottery shown against the underlying topography and mortuary deposits*

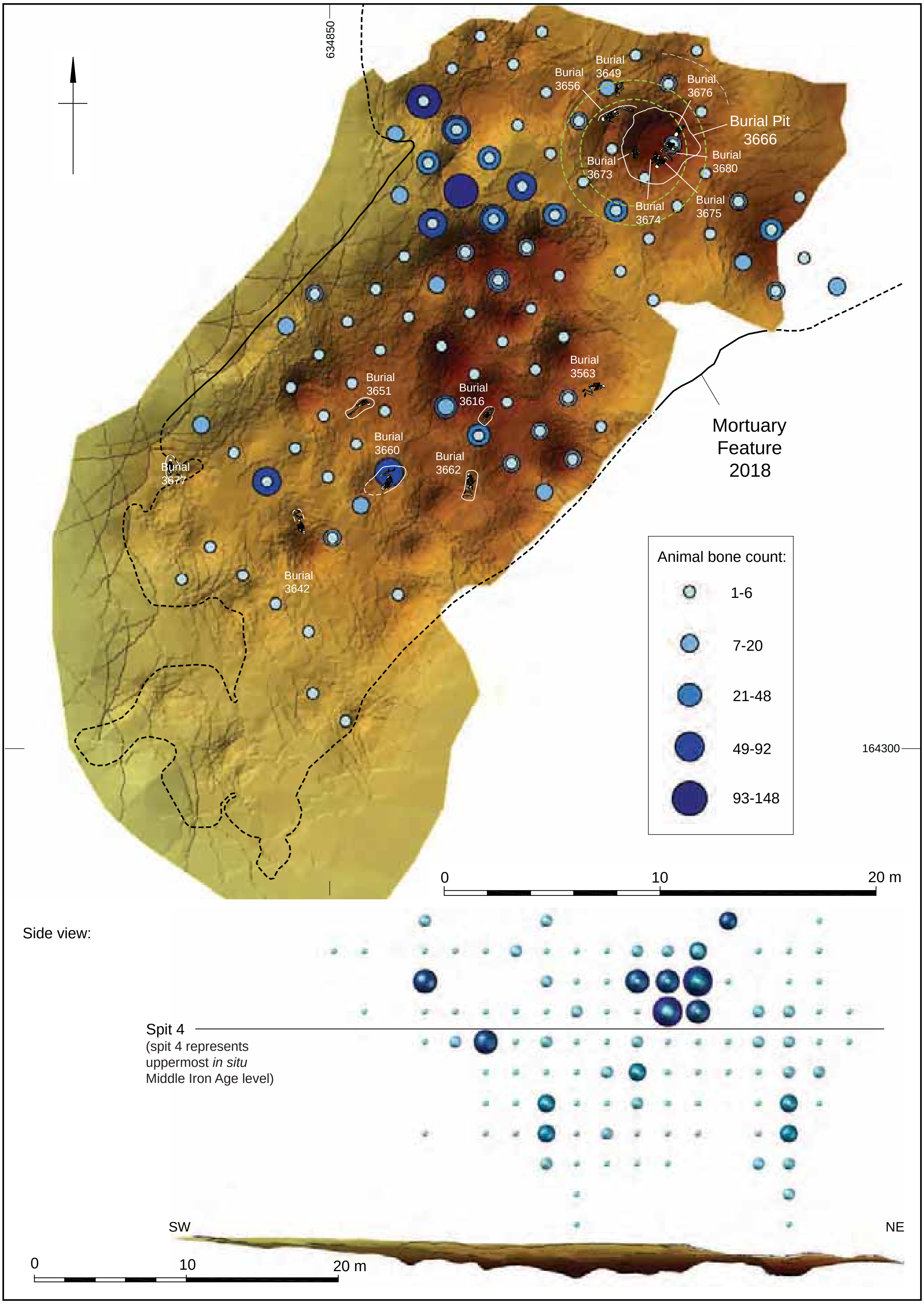



*Figure 2.19 3D distribution of animal bone shown against the underlying topography and mortuary deposits*

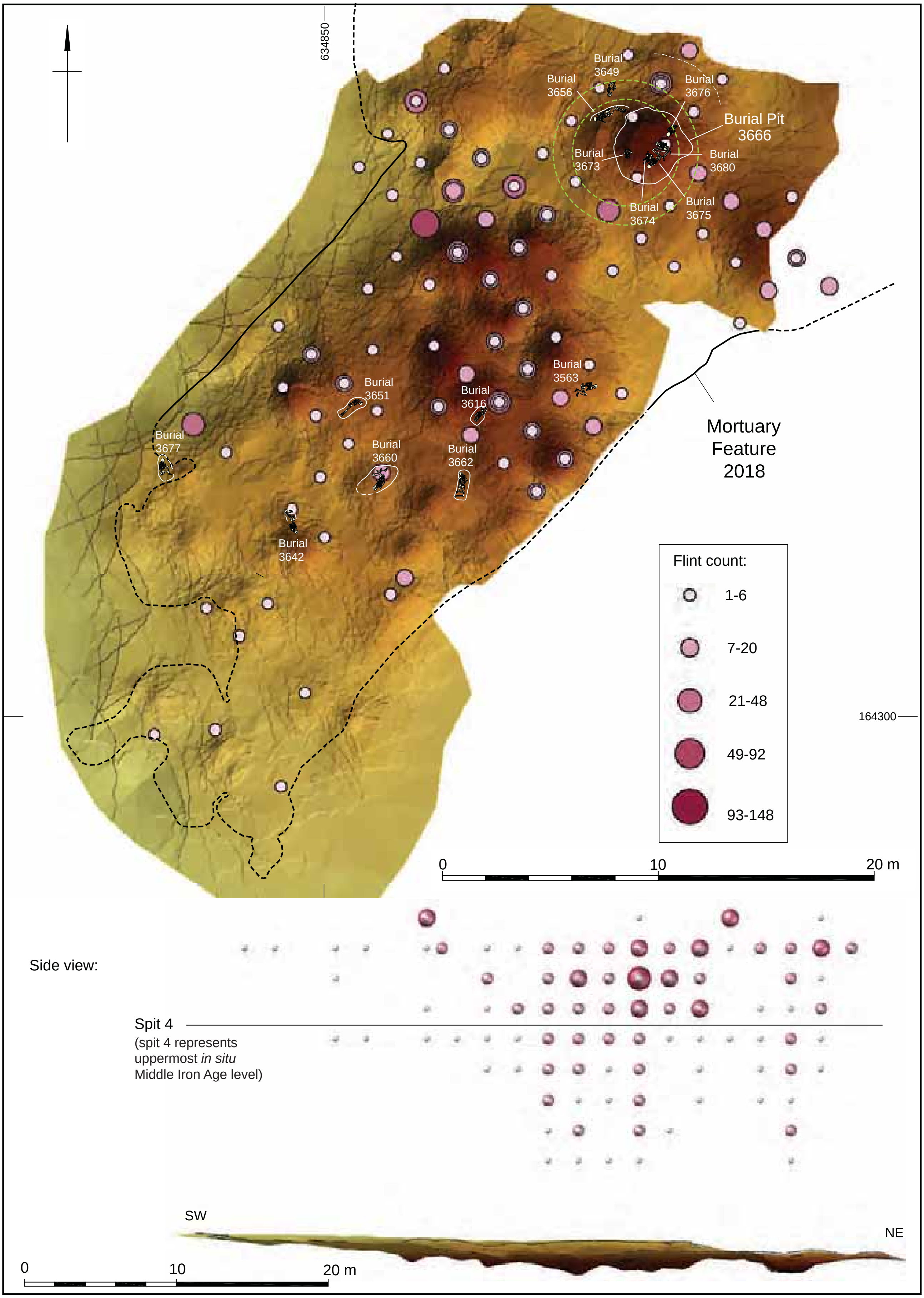



*Figure 2.20 3D distribution of worked flint shown against the underlying topography and mortuary deposits*

the fill (3670) immediately above the *in situ* remains, could have been relocated by process of bioturbation from one of the *in situ* individuals but may equally have derived from another individual (see McKinley, Chapter 4). A small lead weight (ON 600; Fig. 2.16) was also recovered from spit 9 (at 16.54 m OD) in the central area of the pit; immediately to the north-west of, but not necessarily associated with, burial 3680. Fairly substantial quantities of pottery from a variety of vessels, often surviving as large fragments, were also recovered from spit 9, mostly from the north-east quadrant (Figs 2.18–2.20).

These mortuary deposit, made close to the base of 3666, were covered by a textually undistinguished backfill, *c.* 0.40 m thick, which appeared to have accumulated largely from the north and west sides of the pit (contexts 3670/3671; Fig. 2.12). A small quantity of disarticulated human bone was recovered from these layers, together with fragments of pottery from the corresponding spits 7 and 8, the latter concentrated – as in spit 9 – in the north-east quadrant (Fig. 2.18). This period of relative inactivity was followed by the deposition of two 'groups' of human bone, including skulls and long bones (layer 2058, spits 6 and 7; Table 4.2), in the north-western and central-eastern parts of the pit fill, mostly above the area devoid of *in situ* remains. It is difficult to make a precise link between the groups due to one set of remains having been recovered from the initial sondage and the second set during the main investigations of the feature; however, they are likely to represent a single depositional episode (Figs 2.12, 2.21). The radiocarbon dates indicate that this material was not all closely commensurate (Marshall *et al.*, Chapter 3). Analysis of the dates indicates that at least three of the bones from the 2058 bone group (two skulls –

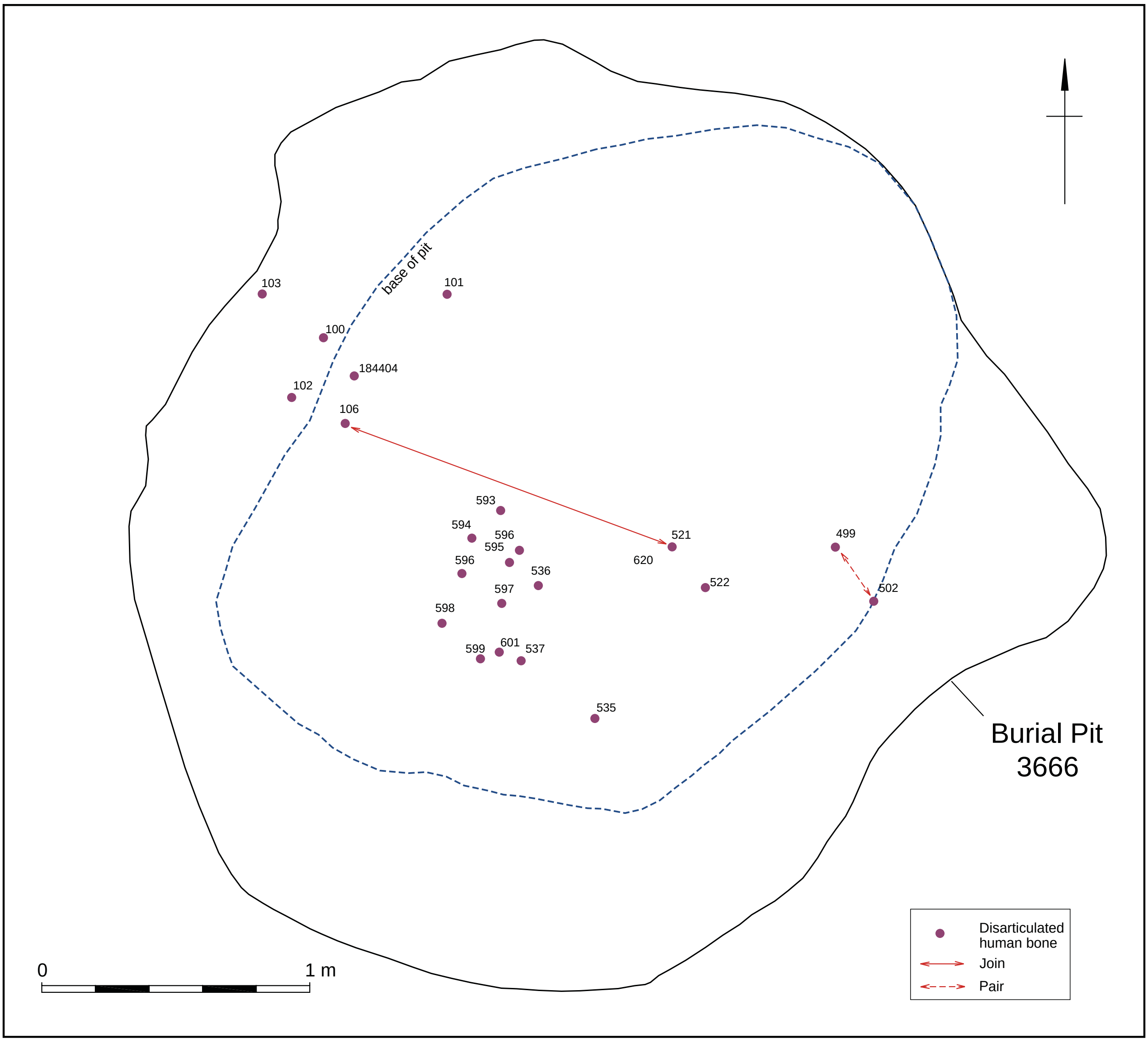



*Figure 2.21 Disarticulated human bone groups found above* in situ *remains in Burial Pit 3666*

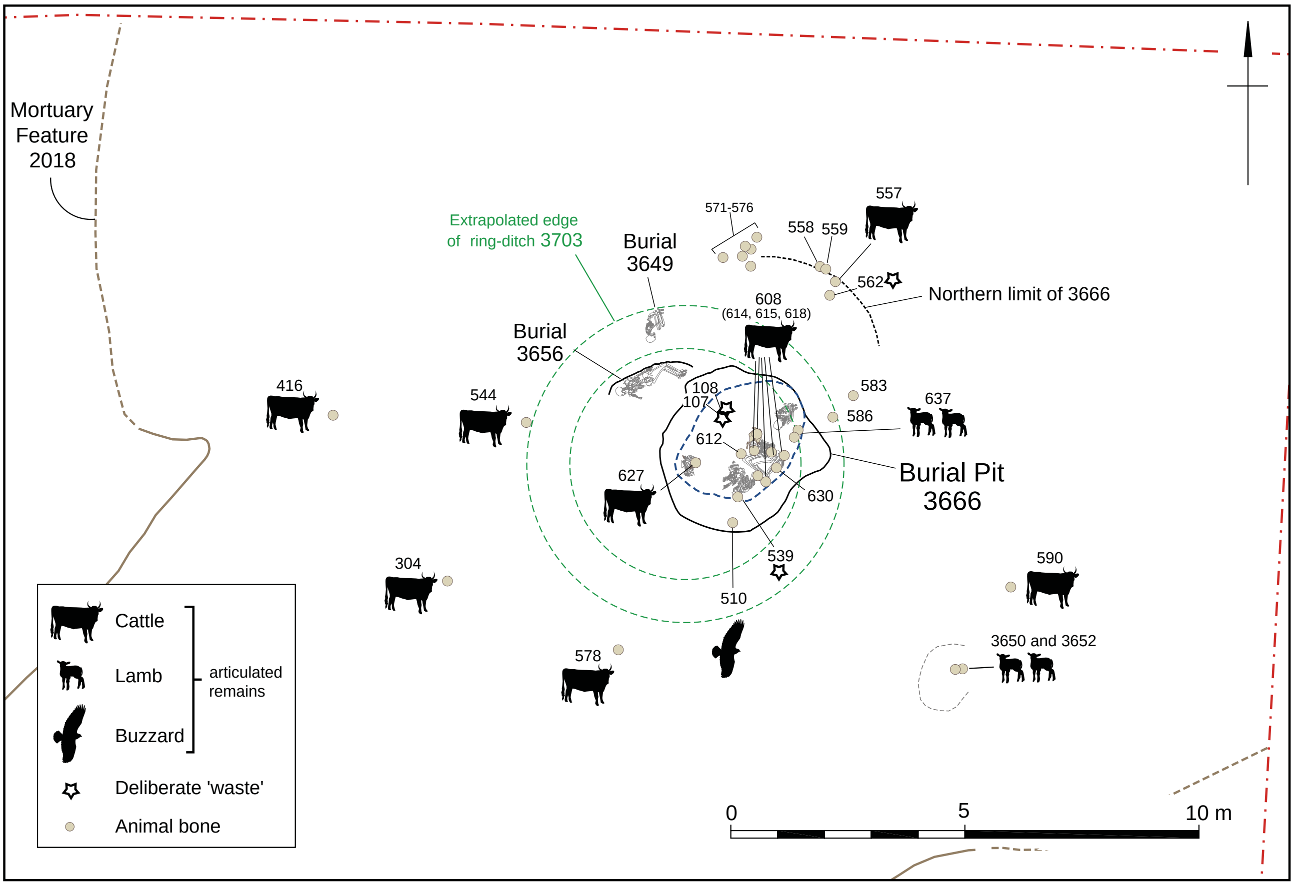



*Figure 2.22 Plan of Burial Pit 3666 showing extrapolated ring-ditch 3703 and animal bone including articulated remains and deliberate 'waste'*

ONs 101 and 536 – and one femur) derived from individuals whose deaths predated that of the elderly adult female 3675 buried at the base of the pit (Table 2.2). The other two dated bones (skull ON 100 and a juvenile femur) were statistically indistinguishable from 3675 but, as with the latter, appeared to predate all the other *in situ* remains. The pit had been further backfilled, again apparently from the north and to a lesser extent the west side, in a series of about five lenses of material, *c.* 0.15–0.25 m in depth, one of the upper-most of which included frequent charcoal flecks (Fig. 2.12). A few fragments of redeposited human bone were recovered from these levels (spits 4 and 5), mostly from the eastern half. Amongst the small amounts of animal bone were the remains of a buzzard recovered from the southern side of the pit fill (17.51 m aOD; Fig. 2.22; Grimm and Higbee, Chapter 5).

The relationship between these lenses and layer 2058, together with the almost indistinguishable 2056 and 2057 above it (all of which contained relatively substantial quantities of residual (small fragments) Late Bronze Age pottery, animal bone, burnt flint and fired clay, but only 2058 contained human bone), is not clear since they do not appear to have been contiguous across the pit, certainly not all at the same level or with the same number of lenses, and consequently do not appear on the same section (layers 2056–8 were recorded only in the initial sondage through the feature). The implication appears to be that 2058 overlay the main series of lenses which accumulated within the pit from the north side but also extended further north across the apparent edge of the feature suggesting it had originally extended a further *c.* 2.5 m to the north (Figs 2.11–2.12). The upper levels of pit 3666 may originally have lain at *c.* 17.57 m aOD, with shallow stepped edges around the deeper central section. The broad stepped margins on the north and south sides indicate a potential overall length of *c.* 10.50 m. The proposed extended east–west profile is not as clear in section, but considered together with the final contour survey of Mortuary Feature 2018, it appeared to form narrower stepped margins giving a potential overall width of *c.* 5.6 m.

The relationship between the upper fills within 3666 and the adjacent areas to the north and east from which disarticulated and articulated human bone was recovered (juxta-3666 group; Figs 2.23–2.25 and Table 4.3) is not conclusive since there is no discernable stratigraphic link in terms of layers. The location and levels from which the human bone was recovered do, however, provide a good indication (Figs 2.11–2.13). The bone from these areas was on a level with the upper lenses of the pit fill and appears to have lain on the margins of – some probably within – what

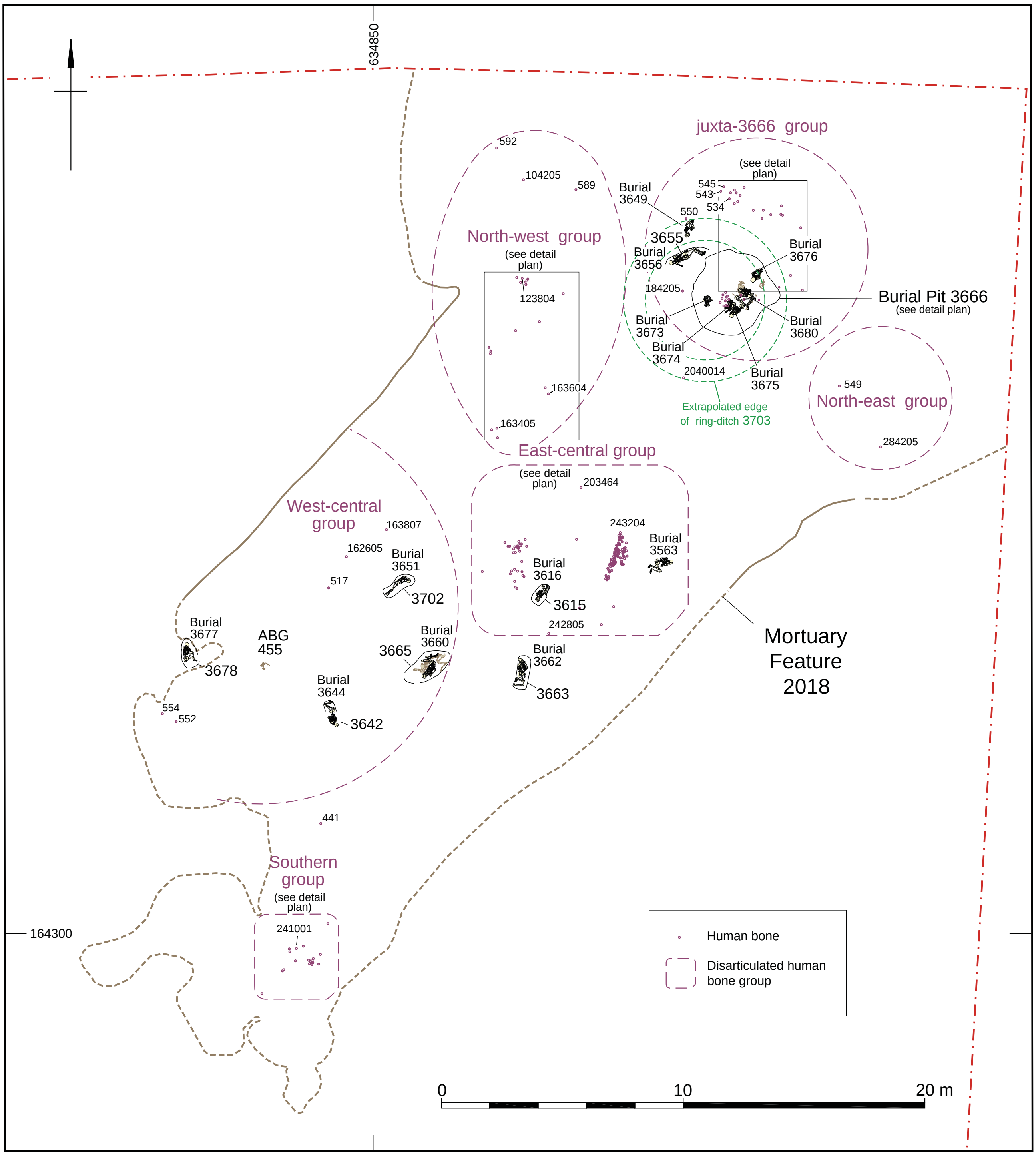



*Figure 2.23 Mortuary Feature 2018 showing location of human bone groups*

would have formed the extended pit. Radiocarbon dates on seven samples (one a duplicate) of human bone show a broad correlation with that from 3666 (Marshall *et al.* Chapter 3). The relative order of estimated dates shows no discernable distinction between this redeposited material, but that it derived from individuals whose deaths post-dated that of all the others represented within pit 3666 with the probable exception of the *in situ* subadult 3680 (Table 2.2). Redeposited animal bone, flint, Late Bronze Age pottery and two copper alloy objects – a small ring (ON 428, Fig. 5.9, 2) and a possible pin fragment (ON 527) were recovered at similar levels to the human bone. Cattle remains are a common feature (possibly reflecting preferential preservation), with a series of possibly placed deposits (mainly of skull elements) around all except the north-western margins of pit 3666 (Fig. 2.22).

The full extent of the pit appears to have subsequently been sealed by a fairly homogenous deposit (ie, at least two poorly distinguished levels were evident) of silting/colluvial

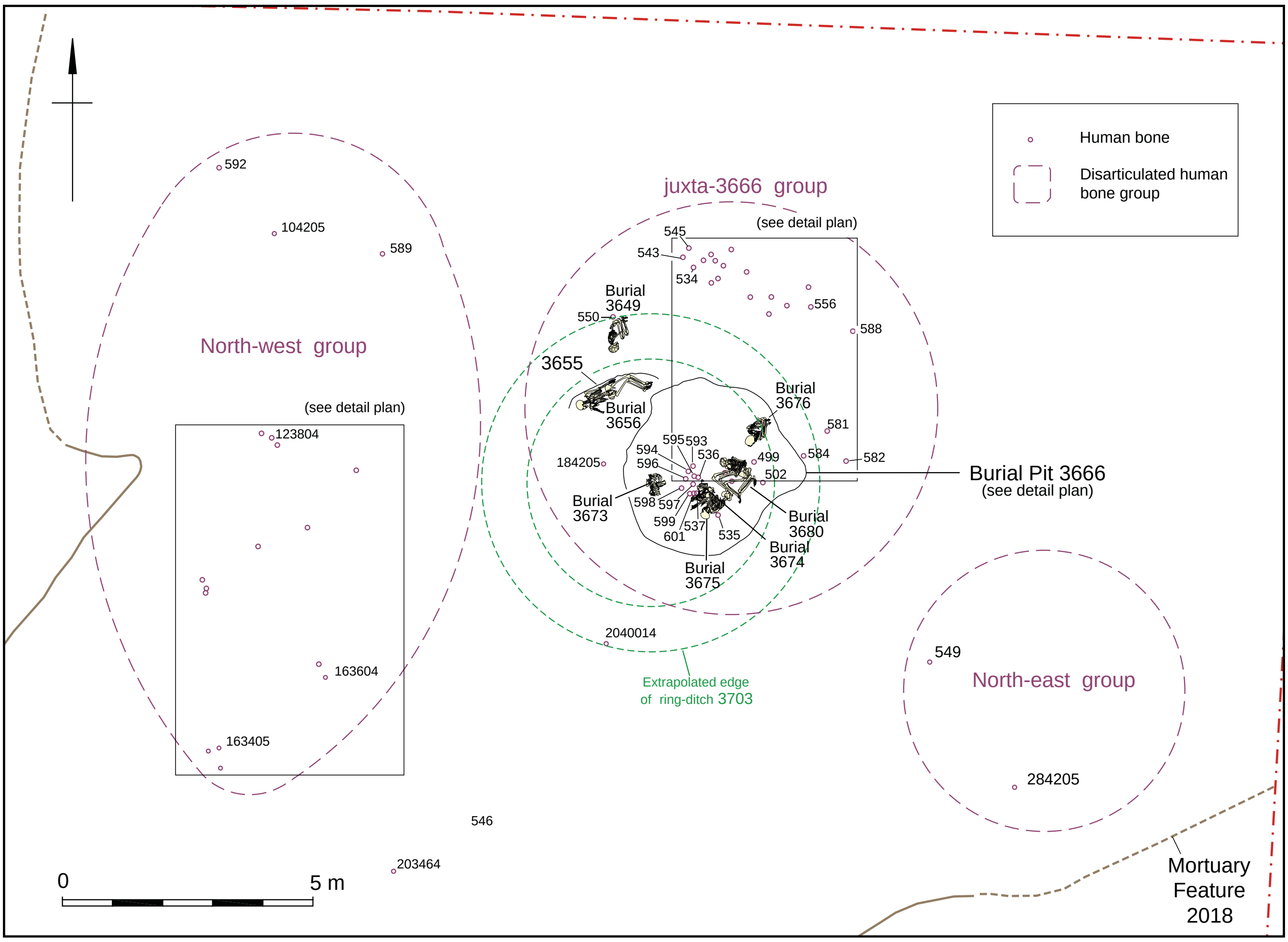



*Figure 2.24 Plan of North-west, juxta-3666 and North-east groups showing location of human remains*

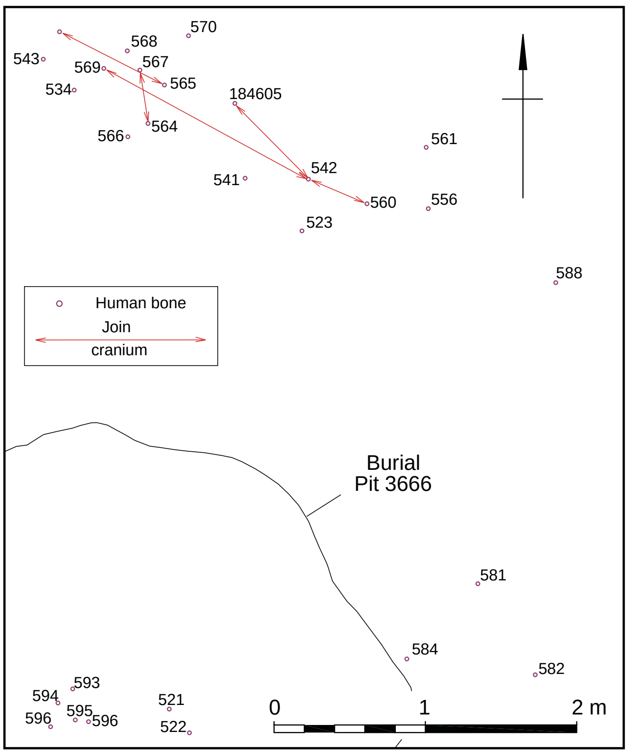



*Figure 2.25 Disarticulated human bone from juxta-3666*

material (2019) which, as with the two layers below it, contained a range of finds in some quantity (especially burnt flint and residual pottery) but no human bone. Although the deposit was recorded as 2019 (0.20 m deep) only where it crossed the central part of 3666, the upper level corresponded stratigraphically with the layer (maximum 0.43 m deep) sealing the lenses of material forming the upper fills of the extended cut to the north (Fig. 2.12). The two are separated by a shallow cut, *c.* 1.70 m wide and 0.30–0.50 m deep, which also cuts into the upper fill of 3666. A second cut, of similar size, shape and form, can be seen in the main section *c.* 2.50 m to the south, truncating the recorded southern extent of layer 2019. These two features, cut to the same depth from the same stratigraphic level, form a close outline to the deepest section of the underlying pit 3666, and appear to represent the remnants of a small ring-ditch cut for that purpose (3703; Figs 2.11, 2.23–2.24). Although not clearly represented in the east-west section and, therefore, inconclusive, the projected line of this small, shallow ring-ditch and its relationship to both earlier and later mortuary deposits (see below), is compelling. Unfortunately, the relevant part of the section to

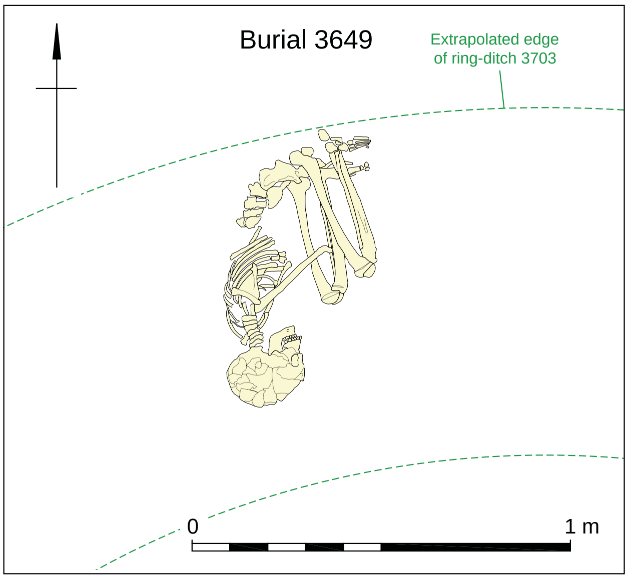



*Figure 2.26 Plan of last Late Bronze Age burial remains 3649 in relation to extrapolated ring-ditch 3703*

the west had been cut by the initial investigative sondage, and to the east the situation is confused by the incomplete record and the shallow angles at which both 3666 and the projected ring-ditch would have crossed the section line (Fig. 2.11)

The *in situ* burial remains 3649 lay on the north-west margins of the extended pit 3666 at a slightly higher level (physically and stratigraphically) than layer 2019. Its recorded level corresponds closely with that of the ring-ditch (3703), within the projected circuit of which it would have lain (Figs 2.12, 2.24, 2.26). No grave cut was observed in excavation but, as noted previously, such cuts were very difficult to detect in the largely homogeneous fills of Mortuary Feature 2018 and the absence of a cut cannot be taken as definite; there is also the possibility that the burial could have been made within the ditch itself. The subadult individual, possibly a female, had been laid crouched on the right side; the lack of apparent subsequent movement suggests the body was covered with soil fairly rapidly. The bone is in relatively poor condition in comparison with the other *in situ* remains from 2018 (possibly due to the shallow soil cover) and all or parts of many skeletal elements are missing (60% skeletal recovery, see McKinley, Chapter 4), mostly significantly the bones of the forearms and hands. The remains had been clipped by the machine during stripping of the site, which had crushed and resulted in the loss of some of the skull vault, but the bones of the forearms and hands were clearly missing in antiquity. There is no indication of trauma, ante- or post-mortem, which implies there was post-decompositional manipulation of the remains deliberately removing these skeletal elements.

The stratigraphic evidence demonstrates burial 3649 to have comprised the final mortuary act of the Late Bronze Age within Mortuary Feature 2018, made subsequent to the ‘closure’ of Burial Pit 3666 and possibly within the ring-ditch cut to mark its location. The radiocarbon results show the burial was made up to 10 years after those made towards the base of Burial Pit 3666 (Marshall *et al.*, Chapter 3). Burial 3649 was sealed by what appeared to comprise a homogenous deposit which probably accumulated over a relatively broad period of time extending from the Late Bronze Age to the Early Iron Age, the only firm dating evidence for which is that it was cut by a grave (3655) in the 5th century cal BC (see below).

**Mortuary and other deposits external to Burial Pit 3666**

There was no direct stratigraphic relationship between the human remains recovered from within and immediately around Burial Pit 3666 (juxta-3666 group) and the disarticulated human remains recovered from two smaller concentrations to the east (North-east group) and west (North-west group; Figs 2.12–2.13, 2.24, 2.27). A Late Bronze Age radiocarbon date commensurate with that obtained from the juxta-3666 group was returned for one sample from the North-west group (see Chapter 3). This bone derived from a level well below that of the layer sealing 3666, and whilst other human remains from this area were at a slightly higher level it is all commensurate with a Late Bronze Age date. The levels and location of material within the North-east group of human remains indicates it also belongs within this phase.

Two adjacent isolated spreads of charred remains (3650, Fig. 2.22): *c.* 0.70 m diameter, 0.10 m deep and 3652: *c.* 1.50 x 1.00 m, 0.06 m deep; including charred grains, cultivated and wild seeds; see Stevens, Chapter 5), recorded at a slightly higher level than the human bone in the north-east area of 2018, could have been deposited in the latter part of the Late Bronze Age phase or in the Early Iron Age since they appear to have lain in the layer sealing burial 3649. These two dumps of material, inclusive of a few fragments of animal bone (including part of an adult cattle skull, ON 590, and the remains of two neonatal lambs; Grimm and Higbee, Chapter 5), and some residual flint and pottery, are primarily of interest due to their location on the eastern side of the feature and the deliberate form of their deposition; unlike much of the material incorporated within 2018 at this level they had not arrived via colluvial action, and their location suggests they relate to activity undertaken to the east of the feature (see Stevens, Chapter 5).

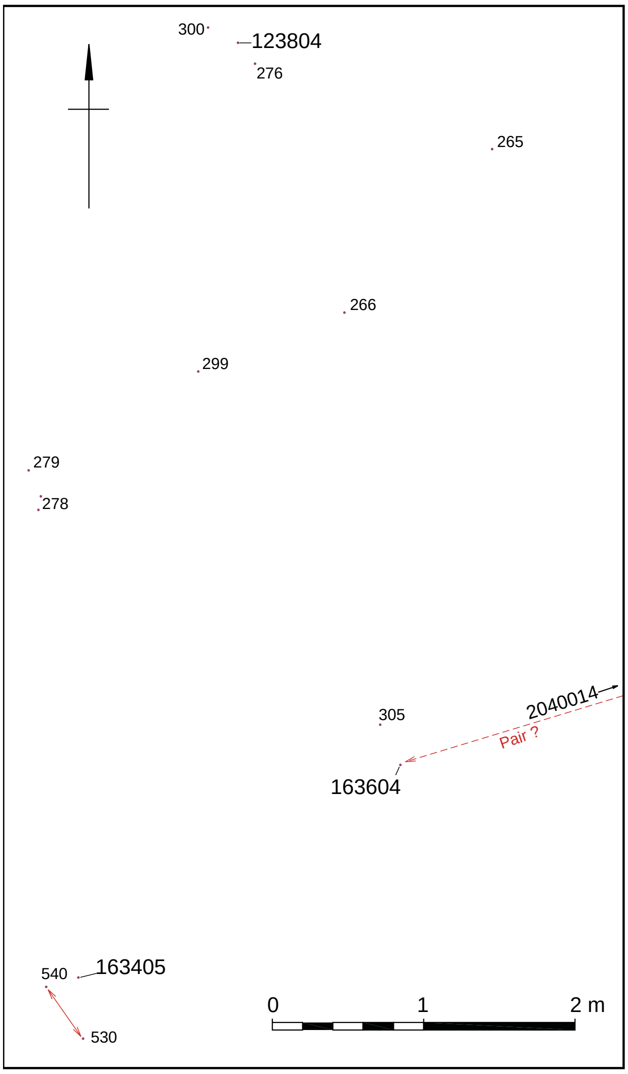



*Figure 2.27 Late Bronze Age disarticulated human bone from North-west group*

## *Late Early Iron Age: 5th Century cal BC*

Chronological modelling indicates a gap of 325–415 years (*68% probability*) between the Late Bronze Age and Early Iron Age mortuary activity within feature 2018. Whilst a temporal link is provided between the northern and southern portions of the feature by virtue of there being activity in both areas in the 5th century cal BC, a direct stratigraphic connection between the two is less forthcoming. The Late Bronze Age/Early Iron Age layer (2019) sealing the last of the Late Bronze Age burials and cut by the Early Iron Age grave 3655 in the northern part of the feature (Fig. 2.11), appears, in section, to form one with the layer in the southern portion of the site sealing the radiocarbon dated *in situ* Middle Iron Age deposits; clearly, they cannot represent the same layer.

As observed previously, it was notoriously difficult to distinguish individual layers within the fills of Mortuary Feature 2018. In several of the sections layers/lenses often petered out; a depth of fill recorded as one layer in the face of one section may appear as two or three in the adjoining segments of section, and boundaries were generally diffuse. There will undoubtedly have been interleaving between lenses of material across such a large feature and there is likely to have been occasional reworking of some of the fills within different locations. The latter is indicated by, for example, the incomplete definition of several of the grave cuts (see below). The layers within discrete features are likely to present a more visually accessible representation of the accumulated fills than are the broad deposits of seemingly homogenous material which appeared to cover the feature as a whole. The implied diffuse boundary in the upper fills of 2018 at the junction between the northern and the southern portions could be seen to emphasise the temporal variation in use, with a shift in the focus of activity from the former to the latter. The stratigraphic relationships, supported by the radiocarbon dating, within both areas show a clear sequence, but that sequence was broken or blurred between the two due to the form and intensity of activity in the south.

**Pits**

As mentioned above, the earliest activity in the southern part of 2018, as in the northern, comprised the cutting of numerous pits of uncertain function. At least 28 pits could be distinguished, the majority and deepest of which were concentrated in a *c.* 13 x 16 m area commencing at the junction with the northern portion of the feature (Fig. 2.11). They ranged in size from *c.* 0.60 m to 3.50 m in diameter, and from *c.* 0.22 to 1.06 m in depth, the lowest level lying at 16.28 m aOD (Figs 2.12–2.13). The two largest pits lay *c.* 4 m and 11 m to the south of Burial Pit 3666, all three appearing to form an alignment with the northern 'entrance' of the Early Bronze Age ring-ditch (Barrow 5) to the south-west.

Most pits (25) were cut into the natural but there was frequent intercutting in the area of greatest concentration. The fills were generally homogenous single deposits, with marginal differences between individual pits, but it was observed that these 'singular' fills usually comprised a series of barely distinguishable lenses. Coarse components were rare in most cases, with the occasional inclusion of chalk pieces and flint gravel which increased in frequency in the later pits (see below, *Middle Iron Age*). Small quantities of residual Late Bronze Age pottery, animal bone and flint were recovered from the fills of most of the pits within the area of greatest concentration (Figs 2.18–2.20).

The stratigraphic evidence coupled with the radiocarbon dating of *in situ* deposits indicates that the pitting activity in this part of 2018 was of long duration. Some pit cutting was probably being undertaken in the Early Iron Age and it certainly extended into the Middle Iron Age. The earliest pits could, as to the north, have been Late Bronze Age or earlier in date; the paucity of residual pottery in the lower levels suggests this may have been the case in some instances (Fig. 2.18). The *in situ* human remains dated to the 5th century cal BC were, however, common at a lower level than the pit cuts or commensurate with only the deepest of them which were sealed by Middle Iron Age deposits. This suggests that much of the pitting activity in this part of 2018 dated to the 5th century or later. Only one small pit (0.95 x 0.70 m, 0.30 m deep), possibly pertaining to this date, was found in the northern portion of the site (3618, not visible in plan), immediately to the north of Burial Pit 3666. In common with most other such features it contained some residual Late Bronze Age pottery, together with burnt and unburnt flint.

**Mortuary deposits**

A 5th-century cal BC date was attributed to samples of human bone from a variety of mortuary deposits comprising *in situ* articulated remains (two individuals), the dispersed remains of body parts (two bone concentrations) and disarticulated redeposited bone (three samples; see Marshall *et al.*, Chapter 3, Tables 4.1, 4.3). The majority of this material derived from the southern portion of 2018 with the exception of burial 3656 (grave 3655, Figs 2.11, 2.23, 2.28), and the overall sequence showed a relatively extended span of *15–80 years (68% probability)*.

Grave 3655 was cut through the *c.* 0.25 m depth of material which had accumulated across the northern portion of 2018 following the apparent cessation of activity in this area in the latter part of the 9th century cal BC. The layer had backfilled the shallow ring-ditch (3703, Fig. 2.11) apparently marking the position of Burial Pit 3666, but the location of the grave suggests it may still have been in evidence. The burial was made in the north-east of the area described by the projected line of the ring-ditch, the grave cut being set close against its inner edge (Figs 2.11, 2.24); the location undoubtedly could have been fortuitous but is highly suggestive of deliberate intent. The SSW–NNE oriented grave cut (1.80 m x *c.* 0.66 m) could be defined only along its northern length and at either end, and had a maximum surviving depth of 0.18 m (the north-west end of the grave may have been slightly damaged during the cutting of the initial investigative sondage). The individual (3656; an adult, probably female) had been laid supine and largely extended, with the legs flexed slightly to the left; the left arm was extended, and the right flexed slightly away from the body at the shoulder and acutely at the elbow, bringing the hand up to the shoulder; the head was laid on the right side (Fig. 2.28). The few residual finds from the grave fill are commensurate with those recovered from the general fills forming the upper spits within 2018 (Late Bronze Age pottery, animal bone, burnt and unburnt flint).

The making of this burial appears to have constituted the final deliberate act for which there is evidence from the

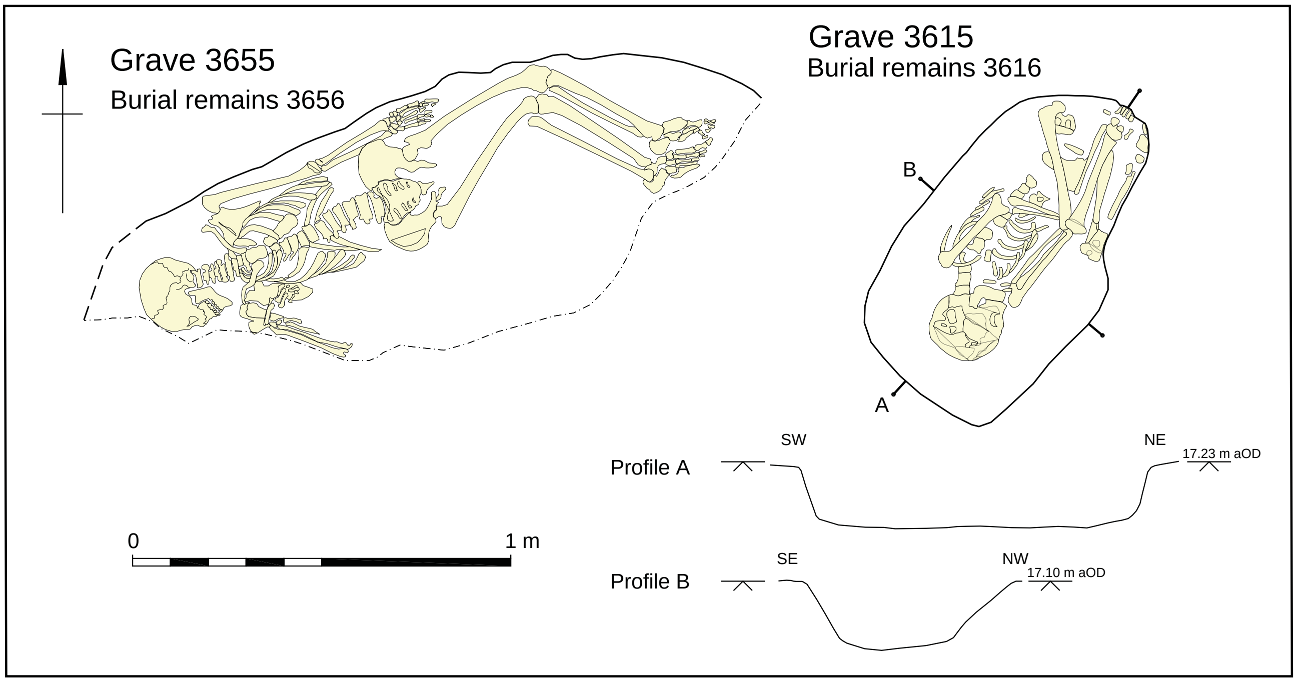



*Figure 2.28 Plan of Early Iron Age (5th century) burials 3655 (juxta-3666 group) and 3615 (East-central group)*

northern part of 2018. It was sealed by a further deep accumulation of material (3700; *c.* 0.44 m) from which no material of a later date than the burial was recovered. As with much of the fill within feature 2018, layer 3700 was indicative of a long, slow and probably intermittent process of colluvial infill which will have extended over a considerable period of time, possibly commencing in the 5th century cal BC and continuing into the Middle, or possibly even the Late Iron Age.

Despite the lack of a clear stratigraphic link (see above), the radiocarbon dates from the human remains demonstrate that mortuary rites were being practiced in the southern portion of the feature both prior and subsequent to the burial being made to the north. The main focus of activity lay in a confined area (*c.* 3 x 2.5 m) in the central part of the feature, coinciding with the location of the deepest (and probably earliest) pits (Figs 2.11, 2.12, 2.29). Here, two groups of human bone, which appear to have comprised the partially articulated but dispersed remains of body parts from an adult female and an adult male (see McKinley, Chapter 4; Fig. 2.30), represent the earliest deposits. There was no evidence for a

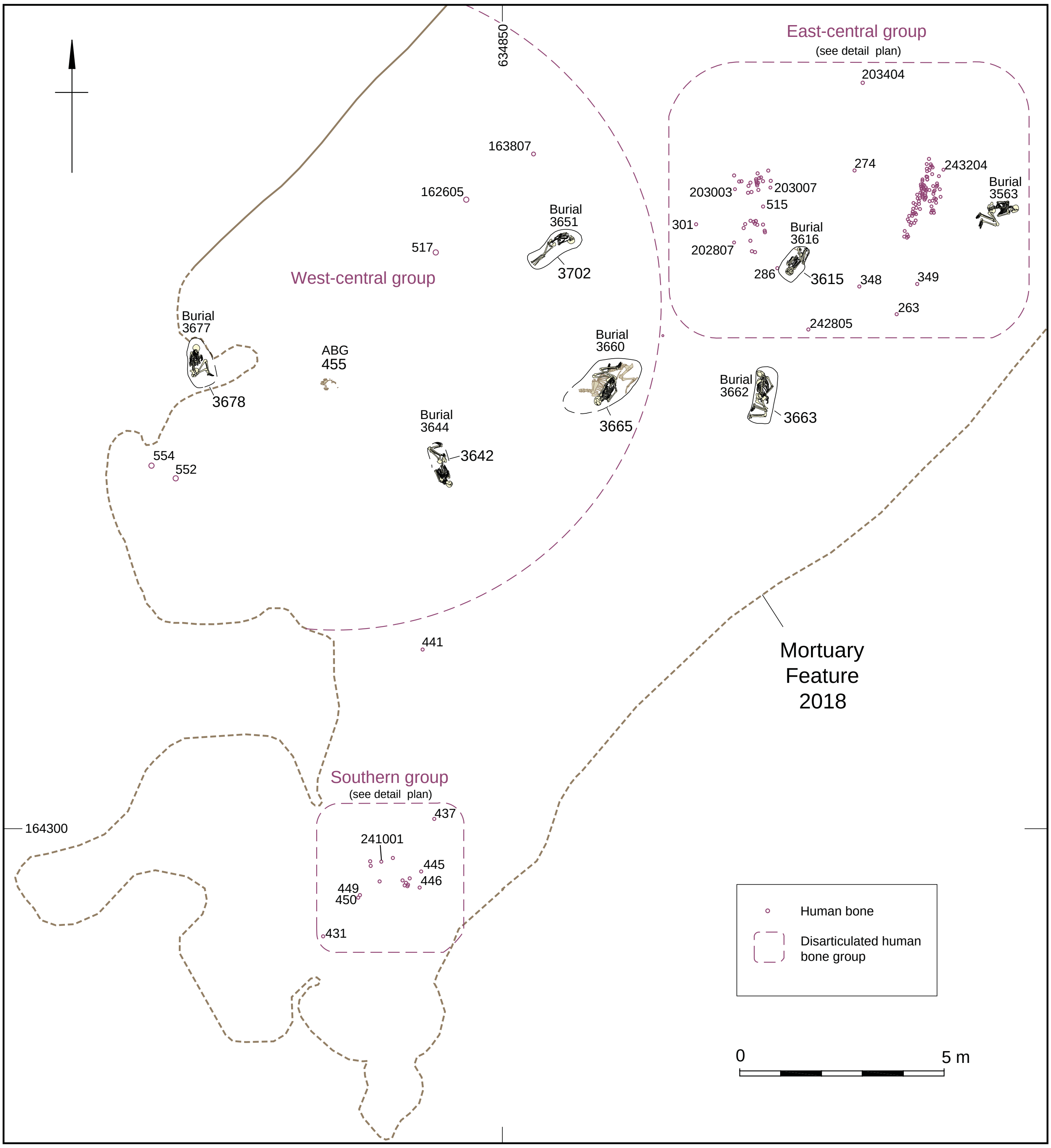



*Figure 2.29 Plan of West-central, Southern and East-central groups showing location of human bone*

cut directly associated with these remains, and they may have been laid (initially uncovered) within the partially backfilled large pits with which the location of each group of bones corresponds. There is likely to have been several years, possibly decades, between each deposit (that of the female remains predating that of the male; Marshall *et al.*, Chapter 3) during which time further natural silting occurred within the pits. Some of the few additional fragments of dispersed disarticulated human bone from the East-central group are also likely to have been of this 5th-century cal BC date, possibly, but not conclusively, derived from one of the two individuals identified, although other fragments probably relate to the Middle Iron Age activity in the same area (see Table 4.3).

The sub-rectangular grave 3615 (0.95 x 0.5 m, 0.16 m deep, Figs 2.28–2.30), appears to have been cut through the upper levels/margins of the easterly of the two pits with which the dispersed body parts were associated; up to 30 years after the last of the earlier mortuary deposits in this area and *1–110 years* after burial 3656 was made in the northern portion of the feature (Marshall *et al.*, Chapter 3). The levels and location of the two features suggest that the pit would have been fully backfilled by this time; the presence of a layer of sand forming the upper fill suggests the pit may have been deliberately 'sealed'. The subadult (3616), possibly female, was buried on an SSW–NNE orientation, laid on the right side with the legs tightly flexed at the hip and knee (Figs 2.28, 2.30). Residual finds of animal bone, burnt and unburnt flint, Late Bronze Age pottery and fired clay were recovered from the grave fill.

This central concentration of deep pitting appears to have formed a slight hollow *c.* 10 m$^2$ which subsequent to its mortuary use accumulated a *c.* 0.30 m deep colluvial material (context 3704, Fig. 2.12). This will have had some levelling effect across the area but probably would not have totally masked the presence of the underlying features.

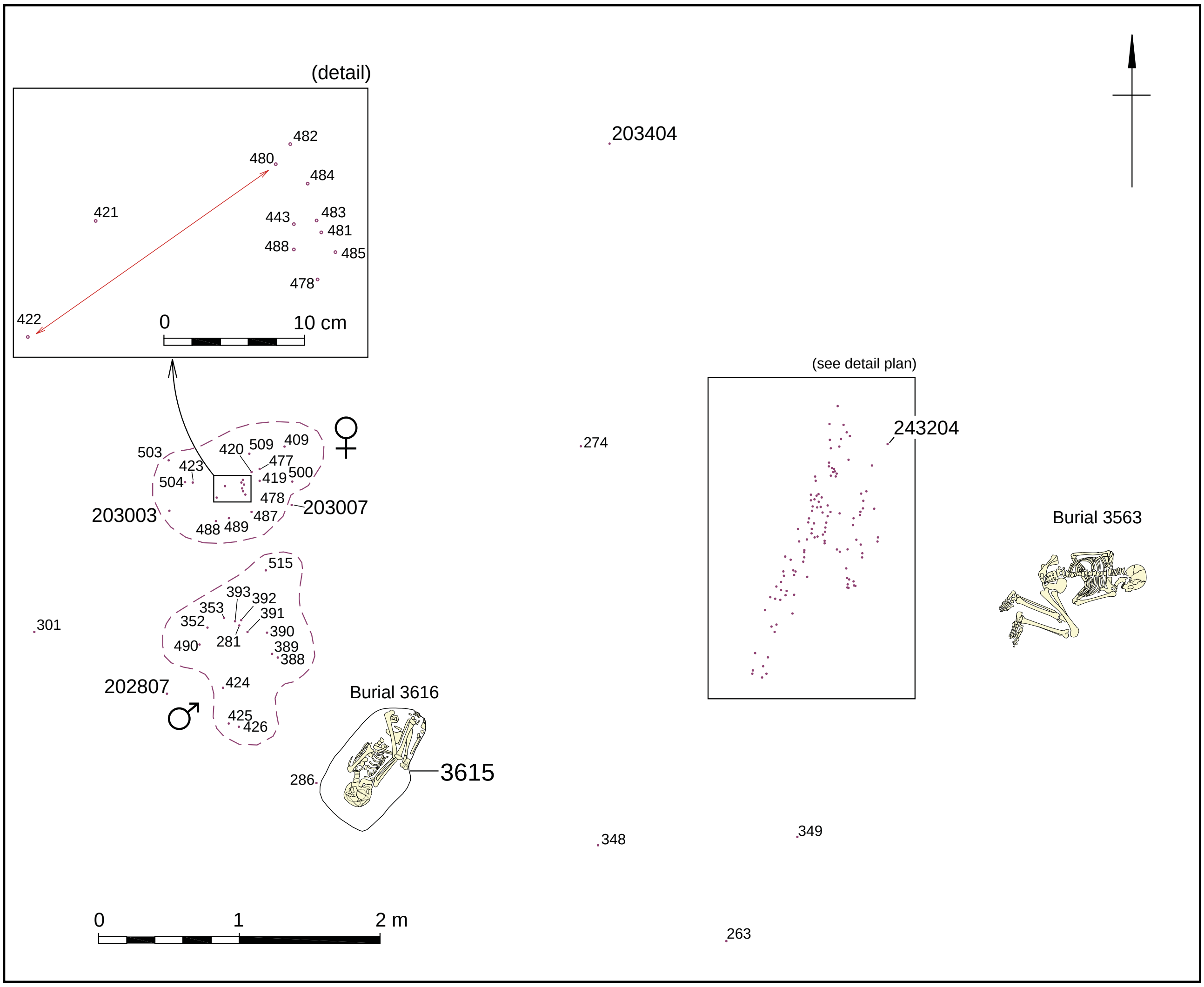



*Figure 2.30 Disarticulated human bone from East-central group and burials 3616 and 3563*

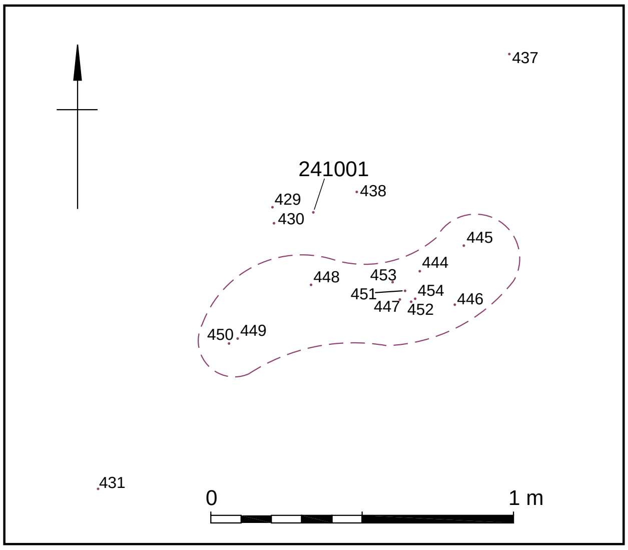



*Figure 2.31 Detail of disarticulated human bone from Southern group*

Outside this central area, samples of redeposited disarticulated human bone recovered from the Southern group (ONs 430 and 437, Figs 2.23, 2.31) and the southern part of the North-west group of human bone (163405) have also been dated to the 5th century cal BC; that from the former appears closest in date to the dispersed articulated remains from the central area and that from the latter to the *in situ* remains from above Burial Pit 3666 (Fig. 2.11). Stratigraphically, the sample from 163405 is, in keeping with its radiocarbon date, commensurate with the latter part of this phase. The remains from the Southern group are stratigraphically detached from the rest of the feature due to a combination of excavation strategy (an investigative machine sondage broke the continuity in the main section) and geography (the ground level rises to the south and west, rendering the use of levels to provide even a broad link untenable); consequently, it is not possible to confidently correlate it with the main part of the feature. The human remains from this Southern group do, however, all appear at one level suggesting they are of similar date, and there is, as in the central area, some indication that parts of this assemblage may have comprised dispersed body parts. The radiocarbon dates together with the apparent similarity in mortuary rite suggests the material from this area is probably all relatively contemporaneous with that from further north.

The disarticulated material from the southern part of the North-west group of human remains does not present as cohesive a picture as that from the Southern group. Whilst some or all of the bone may be of 5th-century cal BC date, much of it was recovered from what are likely to be later contexts.

## *Middle Iron Age: 4th–3rd Century cal BC*

Evidence for activity in this period was concentrated within the 20 x 15 m area of deepest pitting to the south of the junction between the northern and southern portions of 2018 (Figs. 2.11, 2.29), and took the form of further pit digging and deposition of articulated human remains followed, and possibly accompanied by, the accumulation of colluvial deposits and the development of a probable stabilisation layer (3705; Figs 2.12–2.13).

**Pits**

Pits continued to be cut and recut, particularly in the northern and eastern parts of the area of concentrated activity, but also, with less intensity and to a shallower depth, on the margins of the southern portion of 2018. Pit 3608 (*c.* 1.90 m diameter, 0.90 m deep), situated at the junction between the southern and northern parts of the feature, was a smaller recut of an earlier Middle Iron Age pit (*c.* 2.90 m diameter, 0.90 m deep) which itself may have followed the line of an earlier cut (Fig. 2.12). The three distinguishable fills of 3608 were all similar in texture (silty loam) and colour (greyish brown) with moderate inclusions of chalk pieces and flint gravel. Large quantities of burnt flint (8426 g) were recovered from the two lower fills, other finds including small quantities of animal bone and residual pottery of Late Bronze Age and Middle Iron Age date (Figs 2.18–2.20). Other pits in this central area appear to have been of similar size but with fewer fills and archaeological inclusions, any pottery being residual Late Bronze Age, which may suggest a slightly earlier date than that for pit 3608.

A possible small pit (3537; 0.50 m wide, 0.36 m deep), on the eastern margins of 2018, could represent a ditch terminal (Fig. 2.10). In common with most of the upper layers and pits within 2018, small quantities of animal bone, flint and residual pottery were recovered from the two fills, and some charcoal from the upper fill. The base of pit 3631 (*c.* 2.30 m diameter, maximum 0.45 m deep), situated at the southern extreme of 2018, had been cut by three smaller pits (*c.* 0.40–0.50 m diameter). The single fill included sparse archaeological components comprising burnt and unburnt flint including a fragment of blade (ON 492) and a fragment of redeposited human skull (ON 431). There is no direct dating evidence from the feature, and the stratigraphic sequence at this end of 2018 was difficult to establish, but the pit is likely to be of Middle Iron Age or possibly later date, though it is probable that the fragment of human bone is residual 5th-century cal BC material in keeping with the other material from the Southern group of human bone. On the western margins of 2018, *c.* 3 m to the south of the Middle Iron Age grave 3678, pit 3658 (2.65 x 1.50 m, 0.50 m deep, Fig. 2.10) also appeared slightly different in form to most of the other pits with an irregular outline and base. The single fill contained small quantities of the commonly observed flint and residual pottery and two small deposits of human bone (ONs 552 and 554) possibly parts of the same individual and exhibiting evidence of canid gnawing (Table 4.3; see McKinley, Chapter 4). No direct dating evidence or stratigraphic link could be ascertained, but the bone was recovered from the same level as grave cut 3678, suggesting a commensurate date for the feature; however, the human bone, as previously observed, could be residual 5th century cal BC.

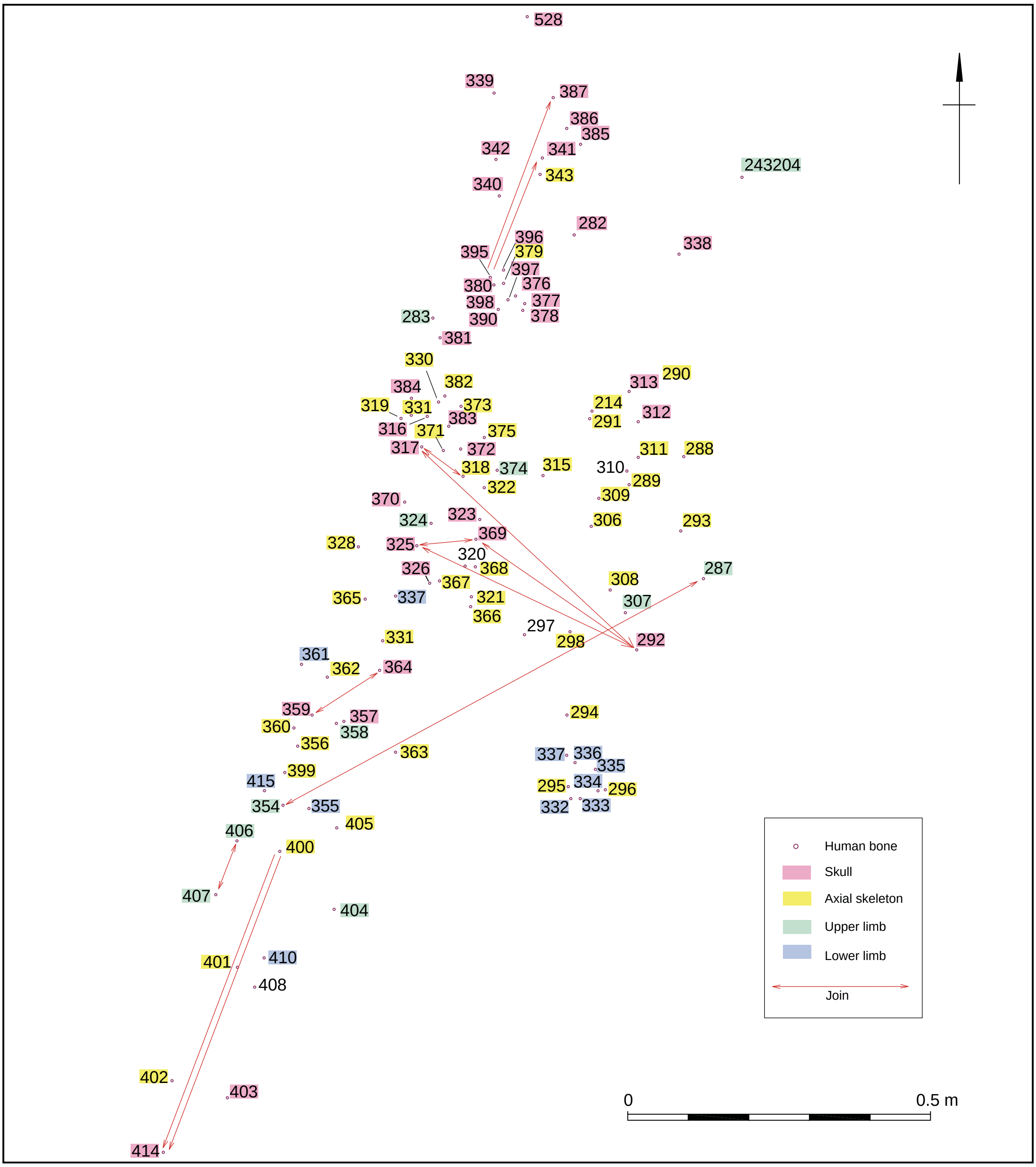



*Figure 2.32 Detailed plan of Middle Iron Age disarticulated human bone from East-central group (see Fig. 2.30)*

**Mortuary deposits**

The mortuary deposits, comprising the *in situ* articulated remains of six individuals and the dispersed remains of a seventh, formed a broad east–west band (21 m east–west; 7 m north–south) across the centre of the southern portion of 2018 (Figs 2.11, 2.29 Tables 4.1, 4.3). Most of the burial remains lay to the south of the earlier area of concentrated pitting, indicating a slight shift in focus from the 5th century cal BC; however, two deposits (one *in situ* articulated and the dispersed remains) lay on the eastern margins of this earlier focus of activity together with some redeposited disarticulated material (Fig. 2.30).

The mortuary activity covered an estimated *15–55 year period* (*57% probability*; Marshall *et al.*, Chapter 3), and the sequence deduced via the sparse stratigraphic evidence combined with recorded levels for the human bone is supported by the radiocarbon dates. The earliest deposits comprise the four central graves 3642, 3663, 3665 and 3702; all were sealed by the colluvial deposit 3706 and possibly also, in parts, by 3704 which may have commenced formation in the later 5th century cal BC but could have extended into the later period (Figs 2.12–2.13). The later mortuary deposits lay towards and, in the case of 3677, on the margins of 2018. The dense assemblage of skeletal elements recovered across a 2.01 x 0.56 m area in grid/spit 243204, towards the eastern margins of the feature, appear to represent the semi-articulated dispersed remains of a single individual (a subadult, possibly female; Figs 2.30, 2.32 see McKinley, Chapter 4). The remains were dated by a sample from ON 355, which placed the deposit chronologically later than the central graves but slightly earlier than the two burials at either end of the west–east line. The bones appear to have been spread through layer 3706 and were possibly partly sealed within it. The remains of burial 3563 lay *c.* 1.10 m to the east, stratigraphically higher and with a radiocarbon date indicating the individual was interred *c. 1–15 years* later (Table 4.1; Figs 2.13, 2.30). The burial was apparently made in the upper levels of 3706, below the 'stabilisation' layer 3705 which may not physically have extended this far to the east. The final mortuary deposit was made in grave 3678 and cut through the western margins of the feature; the stratigraphic relationship is probably similar to that of burial 3563 and the radiocarbon dates indicate they were temporally almost indistinguishable (Marshall *et al.*, Chapter 3). A small quantity of redeposited human bone fragments from the East-central group were recovered from the same range of levels as the dispersed subadult remains, suggesting a similar date. Most of this bone lay slightly to the west of the latter, however

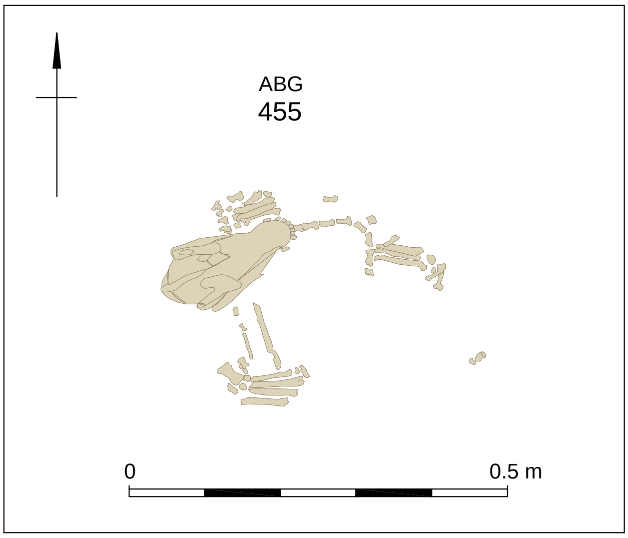



*Figure 2.33 Plan of remains from probable dog pelt (ABG 455)*

(max. 5.5 m distant, Fig. 2.30), in the vicinity of the Early Iron Age dispersed body part deposits (see above). Despite the often fairly substantial disparity in levels between the material from the two phases (*c.* 0.30–0.80 m), it is possible that this disarticulated material, from what appears to be Middle Iron Age levels, could have derived from the earlier deposits.

One other potentially contemporary deposit of note, which may have been associated with the mortuary rites being practiced in and around feature 2018, were the remains of an adult male dog situated *c.* 3 m to the east of grave 3678 (ABG 455; Figs 2.11, 2.29, 2.33). The bones recovered suggest they represent the remains of a dog pelt (Grimm and Higbee, Chapter 5). They were found within the same stratigraphic level as the latest human burial remains indicating a placed deposit of Middle Iron Age date. The recovery of fragments of pig (immature tibia ON 344) and horse (facial bones ON 264) bone from similar levels amongst and adjacent to the semi-articulated dispersed remains of the juvenile (243204) could simply be fortuitous rather than indicative of any role in the mortuary rite (Grimm and Higbee, Chapter 5).

*Plate 2.9 Middle Iron Age burial 3563*

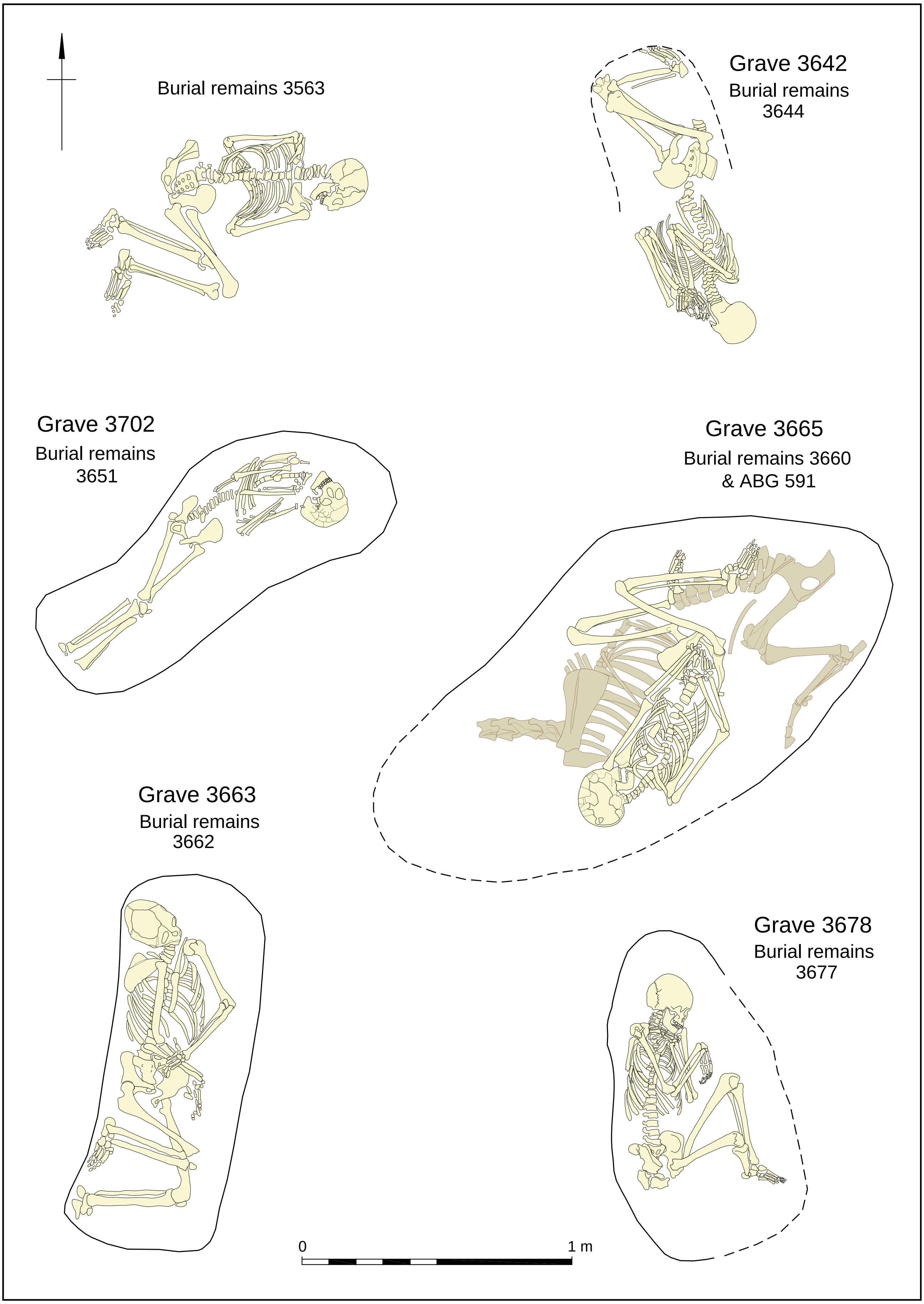



*Figure 2.34 Plans of Middle Iron Age burials*

***In situ* burial remains and associated materials (see Table 4.1 for levels)**

**3563:** (Figs 2.23, 2.30, 2.34, Pl. 2.9). No grave cut was observed in excavation. Adult female laid flexed on left side, upper body slumped forwards during decomposition; ENE–WSW orientation. Legs flexed at hip and knee; arms flexed at elbow and hands together at chest level, left hand cupped in right and thumbs linked; head slightly tucked down.

**3644:** (Figs 2.23, 2.29, 2.34, Pl. 2.10). Grave 3642: 1.20 x 0.60 m, maximum 0.42 m deep; elongated oval with steep straight sides and flat, but slightly sloping base; SSE–NNW orientation. Cut into upper levels of one of the pits on the southern margins of the pit concentration. Adult female, laid flexed on left side, body slumped forwards and angled down towards head which lay towards the centre of the underlying pit (at 7.38 m aOD). Knees placed against NNW end of grave, right leg flexed acutely at knee and foot level with coccyx (at 17.63 m aOD), and left leg flexed 90° at knee with foot resting up against side of grave (at 17.77 m aOD). Both arms flexed at elbow and hands together palmar-wise (?tied at wrist) at neck/chin level. Marked angle of body suggests the base of the grave may have slumped into the underlying pit (Fig. 2.11). Redeposited flint in grave fill.

*Plate 2.10 Middle Iron Age burial 3644*

*Plate 2.11 Middle Iron Age burial 3651*

**3651:** (Figs 2.23, 2.29, 2.34, Pl. 2.11). Grave 3702: *c.* 1.30 x 0.40 m, *c.* 0.18 m deep; edges uncertain in excavation, elongated oval with shallow sloping sides and uneven concave base (head and feet at higher level than hips – 0.10–0.15 m); NE–SW orientation. Subadult, probably male, laid supine and extended with axial skeleton resting in a slightly concave area. Legs together at knee; hands flexed at elbow, hands together (?tied) under chin/?resting on face; head flexed back and laid on right side. Most of foot bones removed ?in antiquity. Residual animal bone, flint and pottery recovered from grave fill.

**3660:** (Figs 2.23, 2.29, 2.34, Pl. 2.12) Grave 3665: *c.* 2.0 x 1.15 m, 0.15 m deep; southern edges not seen in excavation, northern edges indistinct but suggest irregular oval with steep side and flat base; SW–NE orientation. Subadult, probably male, laid on left side, legs flexed, arms extended, hand together over pelvis, head bent down, body slumped back slightly. Laid over the partial remains of a horse (ABG 591; axial body, right rear limb and part of right forelimb) laid on its right side on the same orientation. Body may originally have lain more directly over the torso of the horse, feet resting on lumbar vertebrae, and has slipped-off slightly during decomposition process. Residual pottery and struck flint from grave fill.

*Plate 2.12 Middle Iron Age burial 3660 male subadult laid over partial remains of a horse (ABG 591)*

*Plate 2.13 Middle Iron Age burial 3662*

**3662:** (Figs 2.23, 2.29, 2.34, Pl. 2.13). Grave 3663: *c.* 1.40 x 0.55 m, 0.20 m deep; sub-rectangular, steep concave sides and flat base; N–S orientation. Adult female, flexed on left side, body slumped back against west side of cut; legs flexed at hip and knee, feet 'braced' against western edge of grave; arms flexed at elbow, hands over pelvis. Residual flint in grave fill.

**3677:** (Figs 2.23, 2.29, 2.34, Pl. 2.14). Grave 3678: *c.* 1.21 x 0.70 m, 0.15 m deep; oval, steep concave sides and flat base; N–S orientation. East side of cut, including right leg, truncated by machine. Subadult, possibly male, flexed on left side; body slumped back slightly, arms flexed at elbow, left hand resting over neck, right hand flexed down at wrist.

Burial 3677 was the final mortuary deposit made within Mortuary Feature 2018. Thereafter, the feature continued to accumulate colluvial deposits incorporating small quantities of abraded pot sherds, animal bone and flint, predominantly across those areas formerly forming the focus of activity, though the location of this material is more likely to reflect landuse upslope of 2018 to the west rather than much directly associated with the feature itself (Figs 2.18–2.20). The extensive accumulation of redeposited brickearth 3706, with a maximum recorded depth of 0.42 m, probably extended across the entire length and breath of 2018 but appears to have been removed from the northern portion of the site in antiquity, possibly in the Late Iron Age (Fig. 2.12), and during the heavier machine stripping of the southern end of the feature (see above). The layer appeared both in plan and in section to form a homogenous deposit. It sealed the last of the Middle Iron Age pits and most of the mortuary deposits of that date, but also appears to have accumulated around and above the last few of the latter which lay in its upper levels on the east and west margins of the feature. Consequently, despite its homogenous appearance, obviously reflective of its deriving from the same product deposited via the same formation process, it had clearly formed over an extensive period of time and represented a series of indistinguishable colluvial episodes uninterrupted by any change in landuse, either associated with the feature itself or the adjacent up-slope area.

*Plate 2.14 Middle Iron Age burial 3677*

A change did come, however, represented by a discrete buried soil (3705) which was recorded within a slight hollow above the subsided pit fills in the centre of the area of most extensive pitting lying immediately to the north and west of the Middle Iron Age burial remains (Figs 2.11–2.12). Although the recorded extent of this layer was limited to *c.* 5.00 x 2.60 m with a maximum depth of 0.20 m, it is probable that it was originally much more extensive, possibly covering most of this downslope area, and that it was truncated by the same later reworking of the soils that removed all traces of the underlying colluvium 3706 from the northern portion of the site, the recorded remnant surviving due to being sealed within the hollow by relatively rapid colluvial deposition (D. Norcott pers. comm.). Slightly darker than the parent material (brickearth colluvium), 3705 also had a loose, medium-coarse granular structure with common chalk lumps; the latter possibly the result of marling. The apparent absence of worm sorting of these chalk lumps (recorded from monolith 100; Fig. 2.11) renders it possible that this layer could have comprised a redeposited topsoil; however, on balance it is more likely to represent the remnant of an *in situ* buried soil (D. Norcott pers. comm.). There is no record of an increase in the concentration of finds from this layer compared with the rest of the upper fills. The date of this deposit is not conclusive but in the absence of any evidence for later activity it seems most likely to have formed at the end of the Middle Iron Age, possibly into the early part of the Late Iron Age, implying a change in landuse.

### *Late Iron Age/Romano-British Period (including Features External to Mortuary Feature 2018)*

The recovery of small quantities of Late Iron Age/Romano-British pottery (211 g/33 fragments), amongst the other previously observed range of residual finds (spits 1–3; Figs 2.12–2.13, 2.18–2.20), from the deep (maximum 0.46 m) colluvial deposits above the stabilisation layer 3705 suggests a Late Iron Age date for the commencement of this accumulation and the implied truncation of the upper levels of the earlier Iron Age deposits. A possible earlier date for at least the lower levels of the deposit cannot be excluded, however, given the small amount of material recovered, its limited distribution within the central strip of the feature and the common root activity recorded in these levels. A second, chalk-rich, possible stabilisation layer, surviving in a similar horizontal location to its earlier counterpart, sealed this penultimate colluvial deposit (3701). It may also have formed in the Late Iron Age but equally may be Romano-British in date; there is no direct dating evidence.

As previously discussed, there is a lack of continuity between the southern and northern portions of the feature in the later phases. This is probably largely the product of truncation/reworking of fills in the later prehistoric period coupled with the great similarity between deposits and difficulty in distinguishing individual layers. The available evidence suggests that the redeposited brickearth 3701 did not extend across the northern portion of the site or that, if it did, it lay at a slightly higher level than to the south and that it was subsequently reworked/removed. This suggestion may be supported by the absence of evidence for the later stabilisation layer in this northern part of the feature and to it being overlain by the final colluvial deposit 3700.

Several features evident in the southern portion of 2018 at machine surface level appear likely, by virtue of their cutting the latest colluvial deposits, to be Late Iron Age in date. The curvilinear ditches 2096/7, situated on the eastern margins of 2018, followed the same alignment and were separated by a *c.* 1.13 m wide 'entrance' between their respective terminals (Fig. 2.10). The line of these relatively shallow, V-shaped ditches (*c.* 0.60–0.70 m wide, 0.22 m deep) could not be traced across a distance of more than *c.* 20 m, but they appear to follow the same course as projected by some of the Late Bronze Age ditch segments to the south of Barrow 5 (Fig. 2.1). Two postholes, 3611 and 3629 (0.25/0.20 x 0.17/0.15 m, 0.11 m deep), lying *c.* 1.40–1.80 m to the north-west, appear to be aligned with the gap between the ditches. The projected line of the outer ditch of Barrow 5 would have passed through the gap between the ditch terminals and the two postholes. Whilst this may represent a fortuitous location, it does suggest the barrow was extant and in part respected by the later feature. The function of the latter is not clear; the posthole fills were devoid of finds and the single ditch fill contained similar residual material to that recovered from the colluvial deposits within 2018. The line of the ditch could be seen as marking the edge of the Mortuary Feature and/or describing an area to the east; the latter was not investigated due to the positioning of the spoil heap (see above). Two small, shallow pits (2104 and 2102; maximum 1.30 x 0.80 m, 0.23 m deep) of unknown function, cut by ditch 2097, had similar (single) fills and inclusions to the latter.

Residual Late Bronze Age and Late Iron Age pottery was recovered from the single fill of the short surviving length of the V-shaped ditch (3653; 1.43 m wide, 0.39 m deep) cutting through the upper fill of, and on the same alignment as, Mortuary Feature 2018. Heavily truncated, the feature is probably Late Iron Age in date at the earliest and may be later.

The very small quantity of residual Late Iron Age material recovered from Mortuary Feature 2018 is commensurate with the very limited evidence for activity of this date from the site as a whole. The only other feature from which pottery of this date was recovered, fragments from at least two vessels, was 3635 which lay in the north-western corner of the site (Figs 2.1, 2.35). This area had been subject to modern disturbance via deep ploughing and the planting of an orchard resulting in extensive bioturbation of the fills of some features, and the retention of some trees had led to a loss in continuity between parts of what was probably the same feature. The large (7.30 x *c.* 10.00 m minimum), relatively shallow (*c.* 0.72 m), concave pit 3635 was one such example. Its eastern and western boundaries were not clearly defined (it continued beyond the limits of excavation to the west); its purpose is unclear and date uncertain. It appears, however, most likely to be Late Iron Age, representing the only feature of this date from the site which can be assigned with any confidence; it cut the ditch of Barrow 3, and was itself cut by a possible Romano-British ditch 3601, a continuation of ditch 3152. A few fragments of pottery were amongst the sparse inclusions within its apparently single fill of redeposited brickearth.

Pit 3635 was cut by a broad, shallow U-shaped ditch (3601; concave side and base), *c.* 2.60 m wide and a minimum 0.44 m in depth. The two, possibly three fills (the last covers the width of both ditch and pit and was probably a late deposit), represented slow accumulations of redeposited brickearth incorporating small quantities of struck and burnt flint, and residual Late Bronze Age and Romano-British pottery. This section of the feature appears to represent the western continuation of curvilinear ditch 3152, which cut through the ditches of Barrows 2 and 3 before terminating close to the Central Enclosure ditch. The ditch survived to a greater depth in parts of this eastern section (maximum 0.88 m),

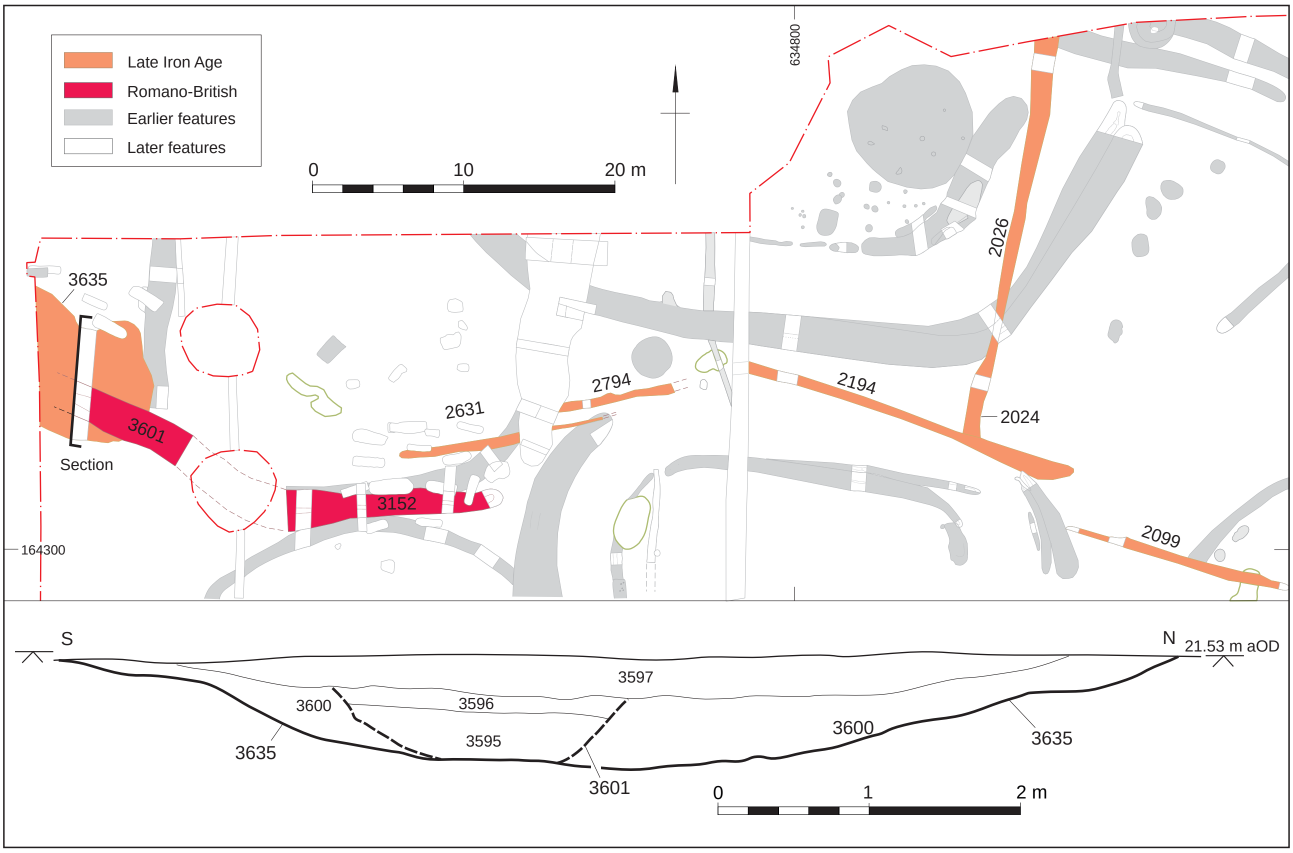



*Figure 2.35 Plan of Iron Age and Romano-British features with a section through 3635*

with a similar form and width but few finds (burnt and struck flint), and was cut by several Early Anglo-Saxon graves.

The date of features 3601 and 3152 is not conclusive, given the high degree of bioturbation in this area and possible incorporation of later pottery in their fills by worm or root action. However, given the limited distribution of material of this date (colluvial deposits in 2018 down slope and some residual Romano-British pottery in a few Anglo-Saxon features) the implication is that what little discernable activity was being undertaken within the immediate vicinity during this phase was in, or to the north-west.

A possibly associated group of roughly north-south and east-west ditches/gullies were recorded in the central northern portion of the site (Figs 2.1, 2.35). All had been substantially truncated (0.07–0.25 m deep), had shallow U-shaped profiles of variable width (majority 0.28–0.60 m) and similar single fills occasionally incorporating small quantities of abraded residual Late Bronze Age pottery, animal bone, struck and burnt flint. A copper alloy ingot (ON 111), also probably residual, was found in the northern-most excavated segment of ditch 2026 (Fig. 2.35). The four roughly east–west ditches (2099, 2194, 2794 and 2631) all comprised short sections, *c.* 8.0–22.50 m in length with, where investigated, shallow rounded terminals. Rather than forming a contiguous line the two eastern ditches were on the same WNE–ESE alignment and those to the west on a similarly angled but opposed WSW–ENE alignment, the central segment of each being set slightly north of its pair. The two roughly north–south ditches (2024 and 2026) were set perpendicular to ditch 2194; the latter appears to have cut 2026 but this relationship is unclear and the two may have functioned contemporaneously. The features have the appearance of boundary ditches, though if so the southern boundary was clearly flexible and easy access was retained; they appear most likely to relate to activities being largely undertaken to the north-west of the excavated area. The date of these ditches is unclear. Most of them, at some point, cut across parts of the Late Bronze Age enclosure ditches and those of Barrows 3 and 5, and those in the western part of the site were cut by several Early Anglo-Saxon features, which indicates a broad potential range of (probably Late) Iron Age–Romano-British.

## *Natural Features*

Two large irregular features on the western (3639) and eastern (2090, not illustrated) margins of feature 2018 (Fig. 2.10), although they contained small quantities of residual Late Bronze Age pottery, appear to represent animal burrows, possibly of a relatively recent date. The more regular feature 2910, situated at the very south-west end of 2018, is likely to be the base of a tree-throw hole.

# Chapter 3

# Chronology and the Radiocarbon Dating Programme

*by Peter Marshall, Alistair J. Barclay, Alex Bayliss, Christopher Bronk Ramsey, Gordon Cook, Pieter M. Grootes, John Meadows, and Johannes van der Plicht*

## Introduction

A single radiocarbon measurement (KIA-24861) was obtained at an early stage in the excavation to provide a date for the human remains recovered from the initial sondage cut through Mortuary Feature 2018. A further 104 measurements were obtained during the analysis phase: 40 on human bone (including the assessment date and five replicate determinations), eight on animal bone, 50 on charred residues adhering to the interior of ceramic sherds (including one failed date) and six on charred plant material (Tables 3.1–3.7).

### *Objectives*

The radiocarbon dating programme was not used to build a chronological framework for the whole site, which ranges in date from the Neolithic to medieval; instead the programme was targeted to address a number of project specific research questions:

- to determine the date of several groups of human burial remains recovered from various parts of Mortuary Feature 2018;
- to establish whether the burials made within Burial Pit 3666 belonged to the same phase as the individual inhumation burials made within discrete graves;
- to establish the date of groups of disarticulated bones found in Burial Pit 3666 and elsewhere within Mortuary Feature 2018;
- to determine the age and duration of a sequence of deposits in Midden Pit 2028;
- to determine the date of redeposited human bone within the upper midden deposits;
- to determine the date of the Northern, Southern, and Central Enclosures;
- to establish the date range of individual ceramic fabrics. Eleven of the 21 defined fabrics are associated with charred residues (F1–4, 6–9 and 11; Q1 and 3);
- to establish whether there is a broad shift in the use of principal inclusion/temper type from flint to quartz. To establish whether this shift was rapid or gradual;
- by contextual association establish whether other fabrics (grog, shell) can also be considered as later in date;
- to establish whether there exists a correlation between fabric and form, and if such a relationship is chronologically sensitive.

### *Sample Selection*

#### Human bone selection

The selection procedure for the human bone was devised by Jacqueline McKinley. The initial round of dating concentrated on the articulated skeletal remains from the Mortuary Feature 2018, including those from its apparently primary component Burial Pit 3666 (Fig. 4.1). With the exception of one partial articulated (manipulated) skeleton from 3666, all represented *in situ* remains of burials with high rates of skeletal recovery/survival. A sample of the right femur was selected from each burial context for dating.

Disarticulated bone was recovered from several locations within Mortuary Feature 2018 and from the fills of two midden pits (2028 and 2469) (Fig. 2.1) and one other (Anglo-Saxon) pit (2834) in the south-east area of the site (Fig. 7.1). The material from 2018 could be divided into six areas of more-or-less concentrated deposits including: a juxta-3666 group, North-west group, North-east group, West- and East-central groups and Southern group (Fig. 4.1).

In order to ensure the same individual from the disarticulated remains was not sampled more than once, selection of one specific skeletal element was undertaken. The most frequently occurring skeletal elements within the disarticulated bone assemblage included the right femur and left parietal (skull vault). The suitability of both of these elements was considered to assess which would enable the recovery of the maximum amount of data from the variety of locations to be considered.

The left parietal was selected as the most commonly occurring skeletal element, although this did limit the groups from 2018 from which material could be selected (juxta-3666, North-west and Southern groups) and excluded all the material from one of the midden pits.

Three exceptions from this element selection involved immature individuals, each of an age for which there was no possibility of duplication elsewhere within the assemblage (see Table 4.1).

**Animal bone selection**

Six animal bone samples (two were replicated) were selected from *in situ* articulated bone deposits that were directly associated with human remains within Burial Pit 3666, grave 3655 and a ditch terminal/pit (2469). As well as contributing to the construction of the overall chronology these samples also provide baseline dietary data with which to interpret the human stable isotope results.

**Pottery charred residue selection**

The selection of ceramic sherds for the dating programme was undertaken by Matt Leivers. The criteria for selection were as follows:

**1.** Charred residues from the interior were selected;

**2.** Care was taken to select material from freshly broken pottery that was considered to have not been redeposited (ie, primary rubbish within the Midden Pit 2028) and to identify single samples from individual vessels from sherd groups within discrete contexts;

**3.** Single sherds, or sherds from contexts with low numbers of the same fabric type were only selected in order to provide a direct date for the fabric/form of the individual sherd. These results have been interpreted as only providing *termini post quos* for their contexts.

**Charred plant remains selection**

Charred plant material was selected from deposits of material that were considered to be contemporary with a context to reduce the risk of dating redeposited/intrusive material. Only single identified grains/seeds were used for dating. Material was selected and identified by Chris J. Stevens. Six samples were selected from features associated with the Central Enclosure.

### *Radiocarbon Laboratory Methods*

At the Oxford Radiocarbon Accelerator Unit the charred plant remains and carbonised residues were prepared using the methods outlined in Brock *et al.* (2010); with the carbonised residues pre-treated using acid only as they were generally too fragile to withstand the alkali step. The human and animal bones were processed using the gelatinisation and ultrafiltration protocols described by Bronk Ramsey *et al.* (2004a). All the samples were combusted, graphitised and dated by Accelerator Mass Spectrometry (AMS) as described by Bronk Ramsey *et al.* (2004b).

Carbonised residues on pottery dated at the Rijksuniversiteit Groningen were processed using the AAA protocol (Mook and Waterbolk 1985) and bone was prepared as described by Longin (1971). The samples were then combusted to carbon dioxide and graphitised as described by Aerts-Bijma *et al.* (1997; 2001) and dated by AMS (van der Plicht *et al.* 2000).

Human bone submitted to the Scottish Universities Environmental Research Centre (SUERC), East Kilbride were pre-treated using a modified Longin method (Longin 1971) and charred plant remains by the acid-base-acid protocol (Stenhouse and Baxter 1983). $CO_2$ was obtained from the pre-treated samples by combustion in pre-cleaned sealed quartz tubes (Vandeputte *et al.* 1996), converted to graphite (Slota *et al.* 1987) and dated by AMS, as described by Xu *et al.* (2004).

The single human bone submitted to the Leibniz Labor für Altersbestimmung und Isotopenforschung, Christian-Albrechts-Universität, Kiel, Germany, was processed according to the methods outlined in Grootes *et al.* (2004) and measured by AMS (Nadeau *et al.* 1997).

All four laboratories maintain a continual programme of quality assurance procedures, in addition to participation in international inter-comparisons (Scott 2003), which indicates no laboratory offsets and demonstrates the validity of the precision quoted.

## Results

The radiocarbon results are given in Tables 3.1–3.7, and are quoted in accordance with the international standard known as the Trondheim convention (Stuiver and Kra 1986). They are conventional radiocarbon ages (Stuiver and Polach 1977).

### *Calibration*

The calibrated results, relating the radiocarbon measurements directly to calendar dates, are given in Tables 3.1–3.7 and in Figures 3.2–3.8. All have been calculated using the calibration curve of Reimer *et al.* (2009) and the computer program OxCal (v4.1) (Bronk Ramsey 1995; 1998; 2001; 2009). The calibrated date ranges cited in the text are those for 95% confidence. They are quoted in the form recommended by Mook (1986), with the end points rounded outwards to 10 years, or 5 years if the error is <25 years. The ranges in plain type in Tables 3.1–3.7 have been calculated according to the maximum intercept method (Stuiver and Reimer 1986). All other ranges are derived from the probability method (Stuiver and Reimer 1993).

### *Stable Isotopes*

Stable isotope measurements ($\delta^{13}C$ and $\delta^{15}N$) on human and animal bones (Tables 3.1, 3.5–3.6 and 4.17) indicate that the humans consumed a diet predominantly based upon temperate terrestrial $C_3$ foods (Schoeninger and DeNiro 1984; Katzenberg and Krouse 1989). The radiocarbon results are, therefore, unlikely to be affected by any significant reservoir effects (Bayliss *et al.* 2004) and the calibrated date ranges can be regarded as accurate estimates of the ages of their samples.

The C:N ratio of all bone samples indicates that preservation was sufficiently good and, therefore, the accuracy of the radiocarbon determinations can be accepted with confidence (Masters 1987; Tuross *et al.* 1988).

## Methodological Approach

A Bayesian approach has been adopted for the interpretation of the chronology from this site (Buck *et al.* 1996; Bayliss *et al.* 2007). Although the simple calibrated dates are accurate estimates of the dates of the samples, this is usually not what archaeologists really wish to know. It is the dates of the archaeological events, which are represented by these samples, which are of interest. In the case of Cliffs End, it is the chronology of the mortuary activities, midden and enclosures that is under consideration, not the dates of individual samples. The dates of this activity can be estimated not only using the absolute dating information from the radiocarbon measurements, but also by using the stratigraphic relationships between samples.

Fortunately, methodology is now available which allows the combination of these different types of information explicitly, to produce realistic estimates of the dates of 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 as other researchers choose to model the existing data from different perspectives.

The technique used is a form of Markov Chain Monte Carlo sampling, and has been applied using the program OxCal v4.1 (http://c14.arch.ox.ac.uk/). Details of the algorithms employed by this program are available from the on-line manual or in Bronk Ramsey (1995; 1998; 2001; 2009). The algorithm used in the models described below can be derived from the structures shown in Figures 3.1–3.6, and 3.13–3.18.

## Later Prehistoric Site Chronology

Samples of human bone for dating were taken from remains recovered within Burial Pit 3666, individual graves and several of the bone groups within Mortuary Feature 2018 and Midden Pit 2088, and Anglo-Saxon pit 2834 (Tables 3.1 and 3.6). Samples were also taken on charred residue that was adhering to pottery sherds from a series of well-stratified deposits within Midden Pit 2028. Additional samples were taken on pottery charred residues from various features across the site. Further samples, on human bone, animal bone and on two pottery sherds with residues were taken from pit/enclosure ditch terminal 2469. A series of samples (charred plant remains) were taken from deposits within the Central Enclosure that were associated with three key groups of Late Bronze Age pottery (see Leivers, Chapters 2 and 5).

### *Samples and sequence*

**Burial Pit 3666 and the 'satellite' deposits**

Burial Pit 3666 and its immediate surrounding area (juxta-3666) contained a complex sequence of groups of disarticulated bone and the articulated remains of human inhumation burials some with directly associated animal bone (some articulated) (Figs 2.14 and 2.23) (see McKinley, Chapter 2). The edges of this feature were difficult to define due to the nature of the re-worked brickearth fills (of both 3666 and 2018) and the excavation procedures adopted in this area of the site (see McKinley, Chapter 2). It appears, however, that several groups of disarticulated bone (within and above the burial pit), burials 3649 and 3656, and most (if not all) of the 'satellite' deposits within the juxta-3666 group (541, 543, 545, 556 and 567) fell within the boundary of this pit. Burial 3649 appeared to lie within the confines of the projected ring-ditch describing the main depth of the feature (see Fig. 2.23; see McKinley, Chapter 2), into the fill of which a grave may (or not) have been cut (no remains of a grave were found), and can therefore be considered to be the final burial in this sequence. Burial 3656 is stratigraphically later as the grave (3655) cut a layer that seals both pit 3666 and burial 3649.

***Articulated skeletal remains within Burial Pit 3666***

Eleven individual samples (including two replicated measurements) of human and animal bone were selected from the complex of articulated skeletal remains (Fig. 2.14) and associated deposits near the base of the pit.

The earliest radiocarbon sample was from the partial articulated remains of a lamb (ABG 637), one of a pair laid over a deliberate dump of redeposited natural (3681) (Fig. 2.15). The lamb bones were not directly associated with the

| Laboratory code | Sample ref | Material & context | $\delta^{13}C$ (‰) | $\delta^{15}C$ (‰) | C:N | Radiocarbon age (BP) | Weighted mean | Calibrated date, cal BC (95% confidence) | *Posterior density* estimate, *cal BC (95% probability)* |
|---|---|---|---|---|---|---|---|---|---|
| **Articulated, partial articulated burials, and animal bone deposits 3666** | | | | | | | | | |
| OxA-17805 | Burial 3675 | Right femur from articulated human burial 3675, ?female>55 yr., buried with remains of lamb/goat 3698 | -20.2 | | | 2677±30 | | 900–790 | *910–845* |
| OxA-18431 | Burial 3675 | Four phalanges from articulated lamb remains (ABG183) found in the pelvic area of human burial 3675 | -22.8 | 8.2 | 3.2 | 2767±29 | | 1010–830 | *895–830* |
| OxA-17807 | ABG 637 – burial 3689 | Left femur from articulated lamb foetus (3689A), bone group 637, at the same level or below burials 3676 and 3680 | -22.2 | | | 2780±28 | 2772±22 BP (T'=0.2; ν=1; T'(5%)=3.8) | 1000–840 | *930–845* |
| GrA-35982 | As OxA-17807 | As OxA-17807 | -22.5 | | | 2760±35 | | | |
| OxA-17806 | Burial 3680 | Left mandibula from articulated *Bos taurus*, skull (cranium & mandible) 3680 used as 'pillow' for human burial 3680 | -21.3 | | | 2766±28 | 2744±22 BP (T'=1.6; ν=1; T'(5%)=3.8) | 970–820 | *895–830* |
| GrA-36003 | As OxA-17806 | As OxA-17806 | -21.8 | | | 2710±35 | | | |
| GrA-36002 | Burial 3680 | Right femur from articulated human burial 3680, ?female *c.* 17–18 yr. buried with cattle skull 3680 | -20.6 | | | 2750±35 | | 1000–810 | *895–825* |
| GrA-36000 | Burial 3676 | Right femur from articulated human burial 3676, ??male *c.* 10–11 yr. associated with a large fragment of a decorated fineware bowl | -20.1 | | | 2745±35 | | 980–810 | *910–825* |
| GrA-35999 | ABG 627 – burial 3673 | Left metacarpus from articulated *Bos taurus* limb 3 ABG 627, with human burial 367 | -22.4 | | | 2730±35 | | 980–800 | *915–835* |
| OxA-17804 | Burial 3673 | Left humerus from partial semi-articulated human burial (legs missing) 3673, male 30–40 yr. associated with ABG 627 | -19.7 | | | 2713±29 | | 920–800 | *895–820* |
| OxA-18597 | Burial 3674 | Right femur from articulated human burial 3674, ?female *c.* 9–10 yr. | -19.7 | 9.1 | 3.1 | 2754±27 | | 980–820 | *895–830* |
| **Disarticulated bone groups 3666 (within and above)** | | | | | | | | | |
| GrA-37966 | Bone group 2058 (ON 100) | Left parietal from disarticulated human bone group 2058 (ON 100), ?female *c.* 15–18 yr. | -20.4 | | | 2710±30 | | 920–800 | *915–820* |
| GrA-37751 | Bone group 2058 (ON 101) | Left parietal from disarticulated human bone group 2058 (ON 101), ??female *c.* 35–45 yr. | -19.0 | | | 2790±30 | | 1020–840 | *1015–840* |
| OxA-18436 | Bone group 2058B (ON 106) + 521 join | Left femur from disarticulated human bone group 2058 (ON 101) + 521 join, *c.* 6–10 yr. | -20.0 | 11.9 | 3.2 | 2748±29 | | 980–820 | *975–825* |
| OxA-18435 | Bone group 204407 (ON 536) | Left parietal from disarticulated human bone group 204407 (ON 536), male *c.* 20–25 yr. | -19.2 | 11.0 | 3.2 | 2728±28 | | 930–810 | *925–825* |
| KIA-24861 | Bone group 2058 (ON 110) | Left femur from disarticulated human bone group 2058 (ON 110, from initial sondage), *c.* 6–10 yr. | -19.6 | | | 2865±29 | | 1130–930 | *1130–925* |

*Table 3.1 Radiocarbon measurements from Mortuary Feature 2018 (human and animal)*

| Laboratory code | Sample ref | Material & context | δ$^{13}$C (‰) | δ$^{15}$C (‰) | C:N | Radiocarbon age (BP) | Weighted mean | Calibrated date, cal BC (95% confidence) | *Posterior density* estimate, *cal BC (95% probability)* |
|---|---|---|---|---|---|---|---|---|---|
| **Juxta 3666 bone deposits, North-west group, single graves (3649 and 3656) and other bone groups** | | | | | | | | | |
| OxA-18433 | 184605 (ON 567) | Frontal/occipital, disarticulated human bone, 184605 (ON 567), ?female *c.* 11–14 yr. | -19.6 | 9.7 | 3.2 | 2748±27 | 2721±20 BP (T'=2.1; ν=1; T'(5%)=3.8) | 915–810 | *910–825* |
| OxA-18434 | As OxA-18433 | As OxA-18433 | -19.4 | 10.0 | 3.2 | 2693±27 | | | |
| OxA-18437 | Bone deposit 124205 (ON 589) | Right parietal, disarticulated human bone, 124205 (ON 589), *c.* 15–25 yr. | -20.0 | 10.6 | 3.2 | 2703±28 | 2702±21 BP (T'=0.0; ν=1; T'(5%)=3.8) | 905–805 | *905–815* |
| GrA-37709 | As OxA-18437 | As OxA-18437 | -20.2 | | | 2700±30 | | | |
| OxA-18439 | Bone deposit 164605 (ON 545) | Left parietal disarticulated human bone, 164605 (ON 545), female *c.* 15–25 yr. | -20.5 | 12.0 | 3.2 | 2692±28 | | 910–800 | *905–810* |
| GrA-37912 | Bone deposit 164605 (ON 543) | Left parietal, disarticulated human bone, 164605 (ON 543), *c.* 8–12 yr. | -19.9 | | | 2740±30 | | 980–810 | *975–955 (3%) or 940–820 (92%)* |
| GrA-37913 | Bone deposit 184604 (ON 541) | Left parietal, disarticulated human bone, 184604 (ON 541), *c.* 8–12 yr. | -20.4 | | | 2740±30 | | 980–810 | *975–955 (3%) or 940–820 (92%)* |
| GrA-37713 | Bone deposit 184804 (ON 556) | Left parietal, disarticulated human bone, 184804 (ON 556), ?female, >45 yr. | -20.0 | | | 2735±30 | | 970–810 | *970–960 (1%) or 935–820 (94%)* |
| OxA-18429 | Burial 3649 | Right femur from articulated human burial 3649, ?female *c.* 14–16 yr. | -20.1 | 9.5 | 3.2 | 2698±27 | | 910–800 | *850–805* |
| OxA-18430 | Burial 3656 | Right femur from articulated human burial 3656, ?female *c.* 30–35 yr. | -20.6 | 10.0 | 3.2 | 2405±27 | | 730–390 | *465–390* |
| OxA-20796 | Bone deposit 203007 (ON 419) | Right clavicle from disarticulated human bone group 203007 (ON 419), ?female *c.* 50–70 yr. | -19.3 | 9.5 | 3.2 | 2375±25 | 2365±20 BP (T'=0.4; ν=1; T'(5%)=3.8) | 415–390 | *480–390* |
| SUERC-24072 | As OxA-20796 | As OxA-20796 | -19.5 | 9.7 | 3.3 | 2350±30 | | | |
| OxA-20798 | 202806 (ON 352) | Left metatarsal from disarticulated human bone group 202806 (ON 352), >18 yr. Dispersed remnants of probable articulated body parts (left foot at least) apparently exposed | -19.5 | 9.5 | 3.2 | 2417±25 | | 740–400 | *470–395* |
| GrA-35980 | Burial 3616 | Right femur from articulated human burial 3616, ??female *c.* 14–18 yr. | -20.8 | | | 2365±35 | | 520–380 | *415–375* |
| GrA-37755 | Bone deposit 241601 (ON 430) | Left parietal from disarticulated human bone group 241601 (ON 430), *c.* 25–40 yr. | -20.2 | | | 2430±30 | | 760–400 | *750–640 (24%) or 595–400 (71%)* |
| OxA-18438 | Bone deposit 163405 | Left parietal from disarticulated human bone group 163405, *c.* 20–40 yr. | -19.3 | 10.2 | 3.2 | 2404±27 | | 730–390 | *730–650 (8%) or 545–395 (87%)* |
| OxA-18440 | Bone deposit 3610 (ON 437) | Left parietal from disarticulated human bone group 3610 (ON 437) >13 yr. | -19.8 | 13.2 | 3.1 | 2418±27 | | 750–400 | *745–645 (16%) or 550–400 (71%)* |
| **Various bone groups listed by phases 1–3 see Chapter 2 Central 'spread' of single graves** | | | | | | | | | |
| OxA-17802 | Burial 3651 [phase 1] | Right femur from articulated human burial 3651, male *c.* 14–16 yr. | -19.9 | | | 2237±28 | | 400–200 | *395–335 (83%) or 320–240 (12%)* |
| GrA-35998 | Burial 3660 [phase 1] | Left femur from articulated human burial 3660, ?male *c.* 15–17 yr. buried with horse 3664 | -20.6 | | | 2250±35 | | 400–200 | *400–340 (85%) or 320–245 (10%)* |

*Table 3.1 cont. Radiocarbon measurements from Mortuary Feature 2018 (human and animal)*

| Laboratory code | Sample ref | Material & context | $\delta^{13}C$ (‰) | $\delta^{15}C$ (‰) | C:N | Radiocarbon age (BP) | Weighted mean | Calibrated date, cal BC (95% confidence) | *Posterior density estimate, cal BC (95% probability)* |
|---|---|---|---|---|---|---|---|---|---|
| **Various bone groups listed by phases 1–3 see Chapter 2 Central 'spread' of single graves (cont.)** | | | | | | | | | |
| OxA-17803 | Burial 3660 [phase 1] | Right femur from articulated *Equus caballus* burial 3664 associated with human burial 3660 | -21.6 | | | 2283±28 | | 400–230 | *405–350 (92%) or 285–255 (3%)* |
| GrA-37707 | Burial 3644 [phase 1] | Right femur from articulated human burial 3644, female *c.* 30–40 yr. | -21.0 | | | 2265±30 | | 400–200 | *400–345 (88%) or 295–245 (7%)* |
| GrA-37686 | Burial 3662 [phase 1] | Right femur from articulated human burial 3662, female *c.* 29–34 yr. | -20.8 | | | 2225±30 | | 390–190 | *395–255* |
| OxA-20795 | Bone deposit 243204 (ON 355) [phase 2] | ?Fibula from disarticulated human bone group 243204 (ON 355), ??female *c.* 12–14 yr. Dispersed remnants of probably *in situ* corpse apparently exposed | -19.7 | 9.7 | 3.2 | 2244±27 | 2231±21 BP (T'=0.4; ν=1; T'(5%)=3.8) | 390–200 | *390–340 (82%) or 320–240 (13%)* |
| SUERC-24071 | As OxA-20795 | As OxA-20795 | -19.8 | 9.8 | 3.2 | 2215±30 | | | |
| OxA-18432 | Burial 3677 [phase 3] | Right femur from articulated human burial 3677, ??male *c.* 14–16 yr. | -19.4 | 9.7 | 3.2 | 2198±26 | 2201±20 BP (T'=0.0; ν=1; T'(5%)=3.8) | 370–195 | *385–250* |
| GrA-37687 | As OxA-18432 | As OxA-18432 | -19.7 | | | 2205±30 | | | |
| GrA-37911 | Burial 3563 [phase 3] | Right femur from articulated human burial 3563, female *c.* 30–40 yr. | -21.2 | | | 2275±30 | | 400–210 | *405–345 (90%) or 290–255 (5%)* |

*Table 3.1 cont. Radiocarbon measurements from Mortuary Feature 2018 (human and animal)*

human remains and were sealed by two deposits of burnt material over which the human bone was placed. Replicate measurements GrA-35982 (2760±35 BP) and OxA-17807 (2780±28 BP) on the left femur from ABG 637 are statistically consistent (T'=0.2; ν=1; T'(5%)=3.8; Ward and Wilson 1978) and so a weighted mean has been taken (ABG 637; 2772±22 BP).

The *in situ* remains (3675) of an elderly female were stratigraphically the earliest in a sequence of three burials (Fig. 2.16) and is dated by OxA-17805 (2677±30 BP). The articulated remains of at least two neonatal lambs (ABG 183) appear to have been placed across the woman's abdomen and were subsequently "dispersed" throughout her pelvic region (Fig. 2.14) during decomposition. A single phalange from a group of four derived from the latter was dated (OxA-18431; 2767±29 BP).

Stratigraphically later than burial 3675 are the remains of two further inhumation burials, 3674 and 3680 (Fig. 2.14) (the two deposits are stratigraphically mutually exclusive). The torso of the *in situ* remains of the subadult 3680 overlay the feet of the elderly female 3675 and the head was resting on an articulated cattle skull. Both bone deposits were dated; the human remains 3680 (GrA-36002; 2750±35 BP), while replicate measurements on the cattle skull OxA-17806 (2766±28 BP) and GrA-36003 (2710±35 BP) are statistically consistent (T'=1.6; ν=1; T'(5%)=3.8) and so a weighted mean has been taken (cattle skull; 2744±22 BP).

Parts (left foot, elbow and pelvic bone) of the tightly crouched burial remains 3674, dated by OxA-18597 (2754±27 BP), overlay the right and left arms of the elderly female 3675. At the same physical level as these remains were two further burial deposits, which could not be directly stratigraphically linked to the group of three though all were sealed by the same layer (see McKinley, Chapter 2). To the west of 3674 was the partial articulated remains of an adult male 3673 (Fig. 2.14), which overlay (ie stratigraphically above) an articulated cattle limb and a worked bone object with a copper alloy ring (ON 607; Fig. 2.17; see Mepham, Grimm, Chapter 5). Single measurements were obtained for both the human remains (3673; OxA-17804; 2713±29 BP) and a cattle bone (GrA-35999; 2730±35 BP).

The tightly crouched remains of the juvenile 3676, situated to the north-east of burial 3680, were dated by GrA-36000 (2745±35 BP). This burial had half a decorated fineware bowl (see Leivers, Chapter 5 and Figs 2.14 and 2.16) placed immediately beyond the head.

At least four other large vessel fragments were recovered from the deposits either above or below the various burials (spits 8 and 9 of square 2044 and layers 3682 and 3689; see Leivers, Chapter 5), which includes part of a local vessel with possible Urnfield affinities (Fig. 5.4, 28).

***Disarticulated human bones from Burial Pit 3666***

Redeposited disarticulated human bone was recovered from various levels of the pit fill, stratigraphically above the *in situ* articulated remains (see Table 3.1). A single date (KIA-24861) was obtained from a left femur recovered from the initial investigative sondage into 2018 and four further measurements were obtained on material collected during the main phase of excavation of the feature. These were from three left parietal fragments (GrA-37966, GrA-37751 and OxA-18435) and a single long bone (OxA-18436), all of which were considered to be from separate individuals (see McKinley, Chapter 4).

The five measurements from the disarticulated group are not statistically consistent (T'=18.1; ν=4; T'(5%)=9.5) and therefore represent people who died at different times. Although if the measurement obtained during the excavation is excluded (KIA-24861) the other four results are statistically consistent (T'=4.0; ν=3; T'(5%)=7.8) and could therefore be of the same actual age.

***Juxta-3666 and the North-west groups: disarticulated bones and single burials***

Five individuals were sampled for dating from the disarticulated human remains of the juxta-3666 group that spread north and east of Burial Pit 3666 (Table 3.1; Fig. 4.1) Replicate measurements on ON 567 (OxA-18433 and OxA-18434) are statistically consistent (T'=2.1; ν=1; T'(5%)=3.8) as are those on ON 589 (OxA-18437 and GrA-37709) T'=0.0; ν=1; T'(5%)=3.8). Hence in both cases a weighted mean has been calculated before calibration: ON 589 (2702±21 BP) and ON 567 (2721±20 BP). The other individuals sampled comprise ON 545 (OxA-18439), ON 543 (GrA-37912), ON 541 (GrA-37913) and ON 556 (GrA-37713).

The six results from the juxta-3666 and North-west groups are statistically consistent (T'=2.9; ν=5; T'(5%)=11.1) and the individuals could therefore have all died at the same time or more probably within a relatively short period of time of each other.

OxA-18438 (2404±27 BP) dates a fragment of disarticulated human bone (163405) from the southern part of the North-west group (Fig. 4.1).

The remains of two stratigraphically discrete inhumation burials, 3656 (extended) and 3649 (crouched) were situated immediately to the north-west of Burial Pit 3666 as seen in excavation but probably lay within the area described by the one-time extent of the pit and the extrapolated confines of the associated ring-ditch (see McKinley, Chapter 2 and Fig. 2.11) Burial 3649 (OxA-18429; 2698±27 BP) comprised the final mortuary act of Late Bronze Age date within 2018, made subsequent to the 'closure' of Burial Pit 3666. Following the deposition of a homogenous deposit, which accumulated over a considerable period of time, grave 3655 was cut for burial 3656 (see below).

**Single graves and human bone deposits**

Prior to the dating programme the actual age of the mortuary deposits was unknown, although it was suggested that they could all belong to the Late Bronze Age (*c.* 1150–800 cal BC). In fact given the nature of the site any date from Neolithic through to Saxon was possible. It was also clear that the burials need not belong to a single phase of activity. On spatial grounds the burials appeared to form two possible groups, one spreading north-east–south-west and roughly aligned with the long axis of Mortuary Feature 2018 (consisting of juxta-3666, North-west, East-central and Southern groups) and the other roughly east-west (West-central and East-central groups) (Fig. 4.1). The exact relationship between the two groups and Burial Pit 3666 is discussed below and elsewhere in this report. However, any simple distinction may hide a more complex situation as described by McKinley (Chapter 2).

***North-east–south-west spread of single graves and human bone deposits***

These deposits include burials and bone groups (3656, 3615, ON 419, ON 352, ON 430 and ON 437) from the North-west, West-central, East-central and Southern groups (Fig. 4.1).

Burial 3656 (Burial Pit 3666) was cut through the deposit that had accumulated across the northern part of 2018, sealing the last Bronze Age burial (3649). The right femur of this individual was dated (OxA-18430; 2405±27 BP). In the southern portion of the Mortuary Feature (2018, East-central group) the main focus of activity lay in a confined central area coinciding with the location of the deepest of the cluster of underlying pits (Fig. 2.13.) Two groups of human bone appear to have comprised the semi-articulated dispersed remains of body parts from an adult female (ON 419 203007) and adult male (ON 352 202806). Replicate measurements on the female remains (OxA-20796; 2375±25 BP and SUERC-24072; 2350±30 BP) are statistically consistent (T'=0.4; ν=1; T'(5%)=3.8) and so a weighted mean has been calculated (ON 419; 2365±20 BP). The male remains (ON 352)

| Laboratory code | Sample ref | Material & context | $\delta^{13}C$ (‰) | Radiocarbon age (BP) | Weighted mean | Calibrated date, cal BC (95% confidence) | *Posterior density estimate, cal BC (95% probability)* |
|---|---|---|---|---|---|---|---|
| OxA-17876 | PRN 634 [Fabric F9] – layer 8 | Carbonised food residue adhering to the interior of sherd PRN 634 [Fabric F9]. Four sherds of this vessel in midden layer 8 (3044) | -26.0 | 2775±30 | | 1010–830 | *1040–940* |
| OxA-17988 | PRN 633 [Fabric F3] – layer 8 | Carbonised food residue adhering to the interior of sherd PRN 633 [Fabric F3]. Two sherds of this vessel in midden layer 8 (3310/3044) | -25.9 | 2868±33 | | 1190–920 | *1125–950* |
| GrA-35997 | PRN 1518 [Fabric F9] – layer 8 | Carbonised food residue adhering to the interior of sherd PRN 1518 [Fabric F9]. Four sherds of this vessel, all with residue, in midden layer 8 (3310) | -25.9 | 2855±35 | | 1130–910 | *1115–950* |
| OxA-17948 | PRN 776 [Fabric F6] – layer 6 | Carbonised food residue adhering to the interior of sherd PRN 776 [Fabric F6]. Three sherds of this vessel, all with residue, in midden layer 6 (3544) | -25.3 | 2824±28 | | 1060–900 | *995–925* |
| GrA-37028 | PRN 1548 [Fabric F9] – layer 6 | Carbonised food residue adhering to the interior of sherd PRN 1548 [Fabric F9]. Three sherds of this vessel, all with residue, in midden layer 6 (3510) | -25.3 | 2825±40 | | 1120–890 | *985–920* |
| GrA-35994 | PRN 1550 [Fabric F9] – layer 5 | Carbonised food residue adhering to the interior of sherd PRN 1550 [Fabric F9]. A single sherd of this vessel in midden layer 5 (3255) | -26.5 | 2760±35 | | 1010–820 | *1010–915* |
| OxA-17874 | PRN 206 [Fabric F3] – layer 4 | Carbonised food residue adhering to the interior of sherd PRN 206 [Fabric F3]. Base of a coarseware jar in midden layer 4 (2118) | -26.4 | 2734±30 | | 970–810 | *945–885* |
| OxA-17873 | PRN 194 [Fabric F3] – layer 4 | Carbonised food residue adhering to the interior of sherd PRN 194 [Fabric F3]. Three sherds of this vessel in midden layer 4 (3254/2118) | -25.2 | 2773±30 | | 1010–830 | *945–895* |
| GrA-35987 | PRN 197 [Fabric F6] – layer 4 | Carbonised food residue adhering to the interior of sherd PRN 197 [Fabric F6]. Thirty-two sherds of this vessel, two with residue, in midden layer 4 (2118) | -25.5 | 2810±35 | | 1050–850 | *945–895* |
| GrA-35993 | PRN 1591 [Fabric F6] – layer 4 | Carbonised food residue adhering to the interior of sherd PRN 1591 [Fabric F6]. Four sherds from a thin-walled jar, with residues, in midden layer 4 (3254) | -26.1 | 2780±35 | | 1020–830 | *945–895* |
| GrA-35984 | PRN 193 [Fabric F3] – layer 4 | Carbonised food residue adhering to the interior of sherd PRN 193 [Fabric F3]. Four sherds from this vessel, all with residues, in midden layer 4 (2118/3234) | -24.7 | 2810±35 | | 1050–850 | *945–895* |
| GrA-35983 | PRN 204 [Fabric F7] – layer 4 | Carbonised food residue adhering to the interior of sherd PRN 204 [Fabric F7]. Five sherds from the base of a vessel, all with residue, in midden layer 4 (2118) | -23.4 | 2790±35 | | 1020–830 | *945–895* |
| GrA-35992 | PRN 1590 [Fabric F3] – layer 4 | Carbonised food residue adhering to the interior of sherd PRN 1590 [Fabric F3]. Two sherds from a necked vessel, both with residue, in midden layer 4 (3254) | -26.1 | 3025±45 | 3081±28 BP (T'=2.5; ν=1; T'(5%)=3.8) | 1430–1260 | – |
| OxA-17986 | As GrA-35992 | As GrA-35992 | -25.3 | 3115±35 | | | |
| OxA-17987 | As GrA-35992 | As GrA-35992 | -24.9 | 2860±32 | | 1130–920 | *950–900* |

*Table 3.2 Radiocarbon measurements from Midden Pit 2028 (ceramics)*

| Laboratory code | Sample ref | Material & context | δ$^{13}$C (‰) | Radiocarbon age (BP) | Weighted mean | Calibrated date, cal BC (95% confidence) | *Posterior density estimate, cal BC (95% probability)* |
|---|---|---|---|---|---|---|---|
| OxA-17875 | PRN 153 [Fabric F3] – layer 3 | Carbonised food residue adhering to the interior of sherd PRN 153 [Fabric F3]. Four sherds of this vessel in colluvial in wash layer 3 (2119) | -26.5 | 2886±32 | | 1210–940 | *1210–970* |
| GrA-35988 | PRN 154 [Fabric F3] – layer 3 | Carbonised food residue adhering to the interior of sherd PRN 154 [Fabric F3]. Two sherds of this vessel both with residue, from colluvial in wash layer 3 (2119) | -25.3 | 2830±35 | | 1120–900 | *1125–915* |
| GrA-35989 | PRN 699 [Fabric F6] – layer 2 | Carbonised food residue adhering to the interior of sherd PRN 699 [Fabric F6]. A single sherd from colluvial in wash layer 2 (3231) | -26.2 | 2850±35 | | 1130–910 | *1125–915* |
| OxA-17872 | PRN 128 [Fabric F2] – layer 2 | Carbonised food residue adhering to the interior of sherd PRN 128 [Fabric F2]. Six sherds of this vessel, including rim & shoulder with slashed decoration), four with residue, in midden layer 2 (2117) | -24.4 | 2459±29 | | 770–400 | *785–640* |
| OxA-17915 | PRN 705 [Fabric F6] – layer 1 | Carbonised food residue adhering to the interior of sherd PRN 705 [Fabric F6]. Two sherds, both with residue, from midden layer 1 (3232) | -24.8 | 2778±28 | | 1010–830 | *1005–840* |
| OxA-17877 | PRN 706 [Fabric F2] – layer 1 | Carbonised food residue adhering to the interior of sherd PRN 706 [Fabric F2]. Three sherds from a ?triparte vessel, two with residue, from midden layer 1 (3232) | -27.0 | 2669±33 | | 900–790 | *790–720 (52%) or 695–555 (43%)* |
| OxA-17914 | PRN 706 [Fabric F2] – layer 1 | Carbonised food residue adhering to the interior of sherd PRN 706 [Fabric F2]. A single sherd from midden layer 1 (3232) | -25.0 | 2531±27 | 2516±22 BP (T'=0.9; ν=1; T'(5%)=3.8) | 770–540 | - |
| GrA-36004 | As OxA-17914 | As OxA-17914 | -25.4 | 2490±35 | | | |
| GrA-37699 | PRN 32 [Fabric F3] | Carbonised food residue adhering to the interior of sherd PRN 32 [Fabric F3]. Twenty-nine sherds (365 g) of this vessel from the midden (layer not recorded) | -25.5 | 2820±30 | 2817±21 BP (T'=0.0; ν=1; T'(5%)=3.8) | 1020–905 | *1020–905* |
| OxA-18445 | As GrA-37699 | As GrA-37699 | -25.2 | 2815±28 | | | |
| P21539 | PRN 1039 [Fabric F1] – 163007 | Carbonised food residue adhering to the interior of sherd PRN 1039 [Fabric F1]. Single sherd (1 g). Failed due to low yield | - | - | - | - | - |

*Table 3.2 cont. Radiocarbon measurements from Midden Pit 2028 (ceramics)*

| Laboratory code | Sample ref | Material & context | δ$^{13}$C (‰) | δ$^{15}$C (‰) | C:N | Radiocarbon age (BP) | Calibrated date, cal BC (95% confidence) | *Posterior density* estimate, *cal BC (95% probability)* |
|---|---|---|---|---|---|---|---|---|
| OxA-20797 | Midden layer 2 | Radius, disarticulated human bone, *c.* 8–12yr, from context 3231, juvenile | -20.0 | 8.4 | 3.2 | 2724±26 | 930–810 | 920–810 |
| SUERC-24076 | Midden layer 4 (ON 244) | Parietal disarticulated human bone (ON 244), *c.* 15–30 yr. from context 244 | -19.8 | 9.0 | 3.3 | 2890±30 | 1210–970 | 1210–975 |

*Table 3.3 Radiocarbon measurements from Midden Pit 2028 (human)*

| Laboratory code | Sample ref | Material & context | $\delta^{13}C$ (‰) | $\delta^{15}C$ (‰) | C:N | Radiocarbon age (BP) | Weighted mean | Calibrated date, cal BC (95% confidence) | *Posterior density* estimate, *cal BC (95% probability)* |
|---|---|---|---|---|---|---|---|---|---|
| **Northern Enclosure** | | | | | | | | | |
| OxA-18442 | PRN 833 [Fabric F9] | Carbonised food residue adhering to the interior of sherd PRN 833 [Fabric F9]. Nineteen sherds (740 g) of the vessel (form vi) from layer (3646) below Northern Enclosure north terminal ditch | -25.3 | | | 2846±29 | | 1120–910 | *1030–925* |
| GrA-37689 | 2470–1 (ON 494) | Left parietal disarticulated human bone 2470–1 (ON 494), from Northern Enclosure north terminal ditch | -20.2 | | | 2835±30 | | 1120–900 | *1025–920* |
| SUERC-24077 | Animal Group 3646 | Left humerus from articulated *Equus* lower limb 3646 from Northern Enclosure north terminal ditch | -22.5 | 5.1 | 3.5 | 2835±30 | | 1120–900 | *1025–920* |
| OxA-18443 | PRN 828 [Fabric F9] (3645) | Carbonised food residue adhering to the interior of sherd PRN 828 [Fabric F9]. Five sherds (55 g) of this vessel from layer (3645) Northern Enclosure north terminal ditch | -25.9 | | | 2793±29 | 2804±21 BP (T'=0.3; ν=1; T'(5%)=3.8) | 1015–900 | *1010–920* |
| GrA-37697 | As OxA-18443 | As OxA-18443 | -26.0 | | | 2815±30 | | | |
| OxA-18441 | PRN 423 [Fabric F8] | Carbonised food residue adhering to the interior of sherd PRN 423 [Fabric F8]. Fifty-four sherds (356 g) of this vessel in south terminal ditch, layer (2461) | -25.2 | | | 2865±28 | | 1130–930 | *1040–925* |
| GrA-37696 | PRN 830 [Fabric F3] (3645) | Carbonised food residue adhering to the interior of sherd PRN 830 [Fabric F3]. Vessel 830 consists of eight sherds (46 g) from layer (3645) pit (2469) | -27.3 | | | 2775±30 | | 1010–930 | *1010–910* |
| OxA-18447 | PRN 784 [Fabric F3] (2365) | Carbonised food residue adhering to the interior of sherd PRN 784 [Fabric F3]. Forty-two sherds (138 g) of this vessel from layer (3565) within ditch 3602 | -25.0 | | | 2807±29 | | 1040–890 | *1015–920* |
| **Central Enclosure** | | | | | | | | | |
| OxA-20799 | 2656.20b | Single charred *Pisum sativum* from fill (2656) of pit (2654) a pit that cuts inner gully of enclosure | -23.4 | | | 2683±26 | | 900–800 | *905–810* |
| SUERC-24078 | 2656.20a | Single carbonised emmer/spelt grain as OxA-20799 | -23.2 | | | 2760±30 | | 1000–820 | *995–835* |
| OxA-20800 | 2844.37b | Single carbonised emmer/spelt grain from posthole/pit (2847) within enclosure interior | -21.60 | | | 2717±27 | | 920–800 | *925–820* |
| SUERC-24079 | 2844.37a | Single charred *Vicia fabia* bean as OxA-20800 | -22.8 | | | 2740±30 | | 980–810 | *975–955 (4%) or 940–825 (91%)* |
| OxA-20813 | 2391.63b | Single carbonised emmer/spelt grain from pit (2396) possibly cut by inner gully | -23.9 | | | 2876±30 | | 1190–930 | *1070–920* |
| SUERC-24080 | 2391.63a | Single carbonised emmer/spelt grain as OxA-20813 | -23.7 | | | 2845±30 | | 1120–910 | *1050–910* |
| GrA-37691 | PRN 615 [Fabric F3] (2203) | Carbonised food residue adhering to the interior of sherd PRN 615 [Fabric F3]. Eighty-nine sherds (515 g) of this vessel from layer (2988) ditch (2203) | -26.2 | | | 2870±30 | | 1130–930 | *1025–910* |
| OxA-18446 | PRN 379 [Fabric F8] (2378) | Carbonised food residue adhering to the interior of sherd PRN 379 [Fabric F8]. Thirteen sherds (133 g) from a single vessel from layer (2378) ditch 2195 | -25.7 | | | 2822±29 | | 1060–900 | *1030–900* |

*Table 3.4 Radiocarbon measurements from the Northern, Central and Southern enclosures*

| Laboratory code | Sample ref | Material & context | $\delta^{13}C$ (‰) | $\delta^{15}C$ (‰) | C:N | Radiocarbon age (BP) | Weighted mean | Calibrated date, cal BC (95% confidence) | *Posterior density* estimate, *cal BC (95% probability)* |
|---|---|---|---|---|---|---|---|---|---|
| **Central Enclosure (cont.)** | | | | | | | | | |
| GrA-37715 | PRN 318 [Fabric F6] (2343) | Carbonised food residue adhering to the interior of sherd PRN 318 [Fabric F6]. Five sherds (30 g) of this vessel from layer (2343) ditch (2382) | -26.0 | | | 2740±30 | | 980–810 | *975–955 (4%) or 940–825 (91%)* |
| GrA-37714 | PRN 412 [Fabric 8] (2541) | Carbonised food residue adhering to the interior of sherd PRN 412 [Fabric 8]. Eight sherds of this vessel (25 g) from layer (2440) ditch 2541 | -26.0 | | | 2810±30 | | 1050–890 | *1030–895* |
| GrA-37753 | PRN 294 [Fabric F9] 2342 | Carbonised food residue adhering to the interior of sherd PRN 294 [Fabric F9]. One hundred and sixteen sherds (405 g) of this vessel from layer (2342) within posthole 2341 | -25.5 | | | 2805±30 | | 1040–890 | *1025–890 (94%) or 875–855 (1%)* |
| **Southern Enclosure** | | | | | | | | | |
| OxA-18719 | PRN 628 [Fabric F3] (3009) | Carbonised food residue adhering to the interior of sherd PRN 628 [Fabric F3]. A single sherd (44 g) from layer (3009) ditch (3153) | -25.9 | | | 2842±28 | | 1120–910 | *1120–945* |
| GrA-37695 | PRN 625 [Fabric F3] (2996) | Carbonised food residue adhering to the interior of sherd PRN 625 [Fabric F3]. Thirty-five sherds (168 g) of this vessel from layer (2996) ditch (3011) | -25.9 | | | 2820±30 | 2841±22 BP (T'=0.9; ν=1; T'(5%)=3.8) | 1060–920 | *1040–920* |
| OxA-18444 | As GrA-37695 | As GrA-37695 | -26.0 | | | 2858±27 | | | |

*Table 3.4 cont. Radiocarbon measurements from the Northern, Central and Southern enclosures*

are dated by OxA-20798 (2417±25 BP). A sub-rectangular grave 3615 (burial 3616, Fig. 2.11), within the East-central group, appeared to cut through the upper levels of the easterly of the two pits with which the dispersed body parts (see above) were associated. The *in situ* remains are dated by GrA-35980 (2365±35 BP). In addition, samples of redeposited disarticulated bone from the Southern group (Fig. 2.29), ON 430 and ON 437, were dated GrA-37755 (2430±30 BP) and OxA-18440 (2418±27 BP) respectively.

***Central spread of single graves***

Seven burials (3677, 3644, 3660, 3651, 3662, 3563 and 243204) were spread east-west over an area of 20 m (Fig. 2.11) and stratigraphically could be grouped into three phases (1–3: see McKinley, Chapter 2; Table 3.1).

The four earliest deposits comprised: burial 3660, which includes the partial articulated remains of a horse. Two dates were obtained for this burial, one on horse bone (OxA-17803; 2283±28 BP) and the other on the human left femur (GrA-35998; 2250±35 BP). The two measurements are statistically consistent (T'=0.5; ν=1; T'(5%)=3.8) and could be of the same actual age. In addition single measurements were obtained on bone from burials 3644 (GrA-37707; 2265±30 BP), 3651 (OxA-17802; 2237±28 BP) and 3662 (GrA-37686; 2225±30 BP).

A spread of associated skeletal remains from a juvenile (context 243204), from one fragment of which (ON 355) replicate measurements were obtained – OxA-20795 (2244±27 BP) and SUERC-24071 (2215±30 BP). These are statistically consistent (T'=0.4; ν=1; T'(5%)=3.8) and so a weighted mean has been calculated, 243204 (ON 355); 2231±21 BP.

The final stratigraphic level included the remains of two burials, 3677 and 3563. Grave 3678 (burial 3677) just clipped the western margins of 2018 (Fig. 2.11). The measurements OxA-18432 (2198±26 BP) and GrA-37687 (2205±30 BP) are statistically consistent (T'=0.0; ν=1; T'(5%)=3.8) and so a weighted mean has been calculated, burial 3677 (2201±20 BP). Burial 3563 is dated by GrA-37911 (2275±30 BP).

**Midden Pit 2028**

The Midden Pit (2028) has been interpreted as a feature given over to the disposal of waste (primarily pottery, animal bone, cereal processing waste and other organics). It was filled by a sequence of alternating layers of naturally-accruing material (collapsing sides, colluvial inwash) and dumped 'midden' material. The 'midden' layers are interpreted as rapid episodes of depositional activity (perhaps over weeks) rather than slow accumulations (perhaps years); this is suggested by the condition of both the pottery (freshly broken, unabraded) and animal bone (most not gnawed or weathered).

In order to establish the age and duration of the midden (2028) a series of samples (Tables 3.2–3.3) were submitted from its stratified deposits. Layers 8 (bottom), 6, 5, 4 and 2 (top) are interpreted as consisting of midden-like material in which the pottery appears to be freshly broken prior to deposition (see Leivers, Chapters 2 and 5). Layer 3 is interpreted as colluvial inwash and the uppermost layers (2 and 1) as gradual accumulations, with much evidence for trampling and mixing. The majority of the samples from the midden were on charred pottery residues (Tables 3.4, 3.5) and these have been instrumental in dating the ceramic sequence (see below). The majority of sherds submitted from the midden came from groups of related and refitting sherds that represent single vessels, which can be interpreted as directly placed freshly broken material. In other words the time between breakage and disposal is likely to have been very short and, therefore the time between the last use as a cooking pot (formation of the charred residue) then breakage and collection, and eventual disposal within 2028 is likely to have been days or weeks at the most. The small number of sherds that were not demonstrably from single vessels or conjoining sherds have been interpreted as only providing *termini post quos* for the layers from which they were recovered, and primarily contribute to the dating of the ceramic sequence (see below).

In addition to the ceramic residues, two fragments of disarticulated human bone from different individuals were dated (Table 3.3) to determine whether they were contemporary with any of the other phases of mortuary activity identified on the site.

**Northern Enclosure**

Seven samples were submitted from the ditches/entrance pit of the Northern Enclosure (Table 3.4). On spatial grounds alone the larger Northern Enclosure appeared to be respected by the outer ditch of the central one (Fig. 2.5).

Three samples were dated from the lowest excavated fills (3645–6) of a deep feature that could be the Northern Enclosure ditch terminal (2469), although this is inconclusive as the feature could not be fully investigated due to the limits of the excavated area (see Leivers, Chapter 2). Alternatively it could be interpreted as a large pit. OxA-18442 (2846±29 BP) provides a date for a residue from one of 19 sherds from a single vessel deposited in 3646, while SUERC-24077 (2835±30 BP) dates the left humerus from an articulated lower limb from a horse from the same context. These two measurements are statistically consistent (T'=0.1; ν=1; T'(5%)=3.8) and could be of the same actual age. This result supports our argument that residue dates from sherd groups relating to single vessels can be treated in a similar way to *in situ* material.

Acknowledging the assumption that the charred residue belongs to the final use of the pot (the actual dated event) before it was discarded and that pots were possibly replaced on a frequent basis when they were no longer used for cooking (broken during cooking, sour from over-use, or required for other purposes). In this respect the dated event is always older than the context of deposition, although the time difference is most likely to be insignificant.

Replicate measurements (OxA-18443; 2793±29 BP and GrA-37697; 2815±30 BP) on a sherd from one of five from a single vessel in 3645, are statistically consistent (T'=0.3; ν=1; T'(5%)=3.8) and thus a weighted mean has been taken (PRN 828; 2804±21 BP).

A measurement (GrA-37689; 2835±30 BP) on a disarticulated human skull (2470/1<494>) fragment from a later recut of this ditch/pit provides a *terminus post quem* for the infilling of the ditch.

**Central Enclosure**

Samples from eight contexts of the Central Enclosure were dated (Table 3.4). The horseshoe-shaped enclosure ditch (2203) is dated by GrA-37691 (2870±30 BP) a residue on a sherd from a group of 89 related fragments from a single vessel from layer 2988 and GrA-37714 (2810±30 BP); residue on a sherd from eight fragments from a single vessel in layer 2440. The stratigraphy and sequence of 2203 is difficult to reconstruct with certainty as only small parts were excavated, therefore no direct relationship between these two layers of the outer ditch can be demonstrated.

The inner ditch consisted of three irregularly shaped sections two of which provided samples for radiocarbon dating. From the northern section (2195) residue adhering to one of the 13 sherds from a single vessel (OxA-18446; 2822±29 BP) provides a date for the deposition of layer 2378. The southern section (2382) is dated by residue (GrA-37715; 2740±30 BP) adhering to one of the five sherds from a vessel in layer 2343.

A number of features lay within the area defined by the inner ditch from which four provided samples for dating. One hundred and sixteen sherds from a single vessel were deposited in layer 2342 of posthole 2341. Residue from a single sherd of this vessel was dated (GrA-37753; 2805±30 BP).

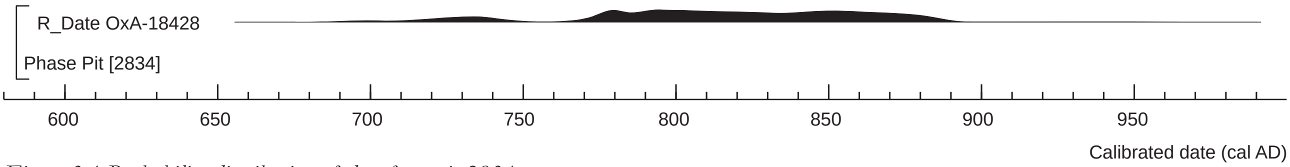



*Figure 3.1 Probability distribution of date from pit 2834*

| Laboratory code | Sample ref | Material & context | $\delta^{13}C$ (‰) | $\delta^{15}C$ (‰) | C:N | Radiocarbon age (BP) | Calibrated date, cal AD (95% confidence) |
|---|---|---|---|---|---|---|---|
| OxA-18428 | Burial deposit 2839 | Left parietal disarticulated human bone from burial deposit 2839, ??female *c.* 30–40 yr. | -19.1 | 11.0 | 3.2 | 1212±26 | 710–900 |

*Table 3.5 Radiocarbon measurement from pit 2834*

Duplicate measurements on charred plant material recovered from a further three internal features that are statistically consistent and could therefore be of the same actual age:

- OxA-20799 and SUERC-24078 from the fill (2656) of pit 2654 (T'=1.1; ν=1; T'(5%)=3.8);
- OxA-20800 and SUERC-24079 from posthole/pit 2847 (T'=0.3; ν=1; T'(5%)=3.8);
- OxA-20813 and SUERC-24080 from pit 2396 (T'=0.5; ν=1; T'(5%)=3.8).

### Southern Enclosure

Immediately to the east of ditch 2242 was a series of intercutting ditches and slots. OxA-18719 (2842±28 BP) on a residue adhering to a single sherd from ditch 3153 provides a t*erminus post quem* for layer 3009. Replicate measurements GrA-37695 (2820±30 BP) and OxA-18444 (2858±27 BP) on a residue from one of 35 sherds relating to a single vessel in layer 2996 are statistically consistent (T'=0.9; ν=1; T'(5%)=3.8) and thus a weighted mean has been calculated (PRN 625; 2841±22 BP). The result (PRN 625) therefore provides a date for the formation of layer 2996 and infilling of ditch 3011.

### Human skull from pit 2834

A human skull was recovered from Anglo-Saxon pit 2834 (Fig. 3.1, Table 3.5, see McKinley, Chapter 7). Although this feature was considered to be Anglo-Saxon in date, there was the possibility that the skull had been curated from an earlier burial deposit. The radiocarbon measurement (OxA-18428; 1212±26 BP) calibrates to cal AD 710–900 thus confirming the initial interpretation.

### Pit 3455

The inner ditch of barrow 1 was of very different character to the outer ditch and on the southern side consisted of a pair of pits. A carbonised residue from the fill of pit 3455 provides a *terminus post quem* for its infilling, it was one of four sherds identified as fabric F10, and returned a date of 3960–3700 cal BC (GrA-37690; Fig. 3.2, Table 3.6) indicating that the pottery belongs to the earliest Neolithic.

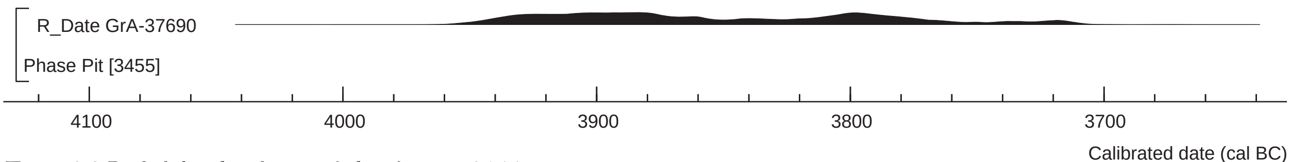



*Figure 3.2 Probability distribution of date from pit 3455*

| Laboratory code | Sample ref | Material & context | $\delta^{13}C$ (‰) | Radiocarbon age (BP) | Calibrated date, cal BC (95% confidence) |
|---|---|---|---|---|---|
| GrA-37690 | PRN 732 [Fabric F10] – (3455) | Carbonised food residue adhering to the interior of sherd PRN 732 [Fabric F10]. Four sherds (14 g) from pit (3455) associated with EBA ring-ditch 2286 | -27.1 | 5035±35 | 3960–3700 |

*Table 3.6 Radiocarbon measurement from pit 3455*

**Late Bronze Age pottery**

Fifty measurements on charred residues adhering to the interior ceramic sherds were obtained (see objectives above). The pottery assemblage is characterised as spanning the plain and decorated ware phases of the Late Bronze Age and Earliest Iron Age (see Leivers, Chapter 5 and Fig. 5.5) (Barrett 1980; Needham 1996a and 2005; Cunliffe 1991, 61). Twenty-seven measurements were obtained from a sequence through Midden Pit 2028 and a further 23 measurements were obtained on sherds from various features across the site (Tables 5.5, 5.6; see Leivers, Chapter 5).

## *Modelling and Interpretation*

**Mortuary Feature 2018**

A Bayesian model for the chronology of the Mortuary Feature 2018 is shown in Figures 3.3–3.5, 3.7. The model shows good agreement between the radiocarbon dates and stratigraphy (Amodel=121).

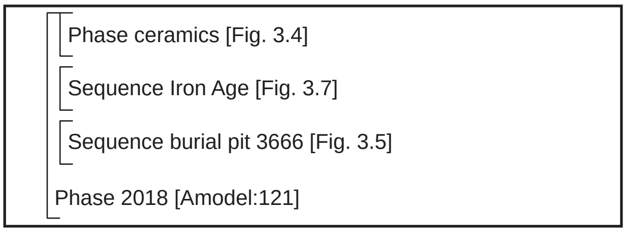



*Figure 3.3 Overall structure for the chronology of Mortuary Feature 2018*

| Laboratory code | Sample ref | Material & context | δ13C (‰) | Radiocarbon age (BP) | Weighted mean | Calibrated date, cal BC (95% confidence) | *Posterior density estimate, cal BC (95%probability unless otherwise stated)* |
|---|---|---|---|---|---|---|---|
| OxA-18519 | PRN 1242 [Fabric Q1] – (202007) | Carbonised food residue adhering to the interior of sherd PRN 1242 [Fabric Q1]. A single sherd (6 g) from layer (202007) mortuary feature 2018 | -24.7 | 3881±37 | | 2480–2200 | *2470–2275 (90%) or 2250–2210 (5%)* |
| GrA-37754 | PRN 1176 [Fabric F4] – (138407) | Carbonised food residue adhering to the interior of sherd PRN 1176 [Fabric F4]. A single sherd (7 g) from layer (138407) mortuary feature 2018 | -25.4 | 2455±30 | | 770–400 | *755–410* |
| OxA-18517 | PRN 1468 [Fabric F7] – (264208) | Carbonised food residue adhering to the interior of sherd PRN 1468 [Fabric F7]. Thirteen sherds (52 g) of this vessel from layer (264208) mortuary feature 2018 | -26.4 | 2886±29 | 2876±22 BP (T'=0.3; ν=1; T'(5%)=3.8 | 1130–980 | *1130–975* |
| GrA-37916 | As OxA-18517 | As OxA-18517 | -26.6 | 2865±30 | | | |
| OxA-18516 | PRN1501 [Fabric F9] – 284405 | Carbonised food residue adhering to the interior of sherd PRN 1501 [Fabric F9]. Ten sherds of this vessel, two conjoining, from layer (284405) mortuary feature 2018 | -25.6 | 3099±29 | | 1440–1300 | - |
| GrA-37702 | PRN 1302 [Fabric F9] – (204000) | Carbonised food residue adhering to the interior of sherd PRN 1302 [Fabric F9]. Five sherds (57 g) from layer (204000) mortuary feature 2018 | -27.4 | 2900±30 | | 1220–1000 | *1215–1000* |
| OxA-18518 | PRN 1465 [Fabric F11] – (264205) | Carbonised food residue adhering to the interior of sherd PRN 1465 [Fabric F11]. Two sherds (8 g) from layer (264205) mortuary feature 2018 | -25.6 | 2942±27 | | 1270–1040 | *1260–1050* |
| GrA-37704 | PRN 965 [Fabric Q1] – (142805) | Carbonised food residue adhering to the interior of sherd PRN 965 [Fabric Q1]. A single sherd (6 g) from layer (142805) mortuary feature 2018 | -25.9 | 2425±30 | | 750–400 | *750–640 (22%) or 595–400 (73%)* |
| GrA-37700 | PRN 1476 [Fabric Q3] – (264405) | Carbonised food residue adhering to the interior of sherd PRN 1476 [Fabric Q3]. A single sherd (18 g) from layer (264405) mortuary feature 2018 | -27.9 | 2920±30 | | 1260–1010 | *1255–1235 (3%) or 1215–1010 (92%)* |

*Table 3.7 Radiocarbon measurements from Mortuary Feature 2018 (ceramics)*

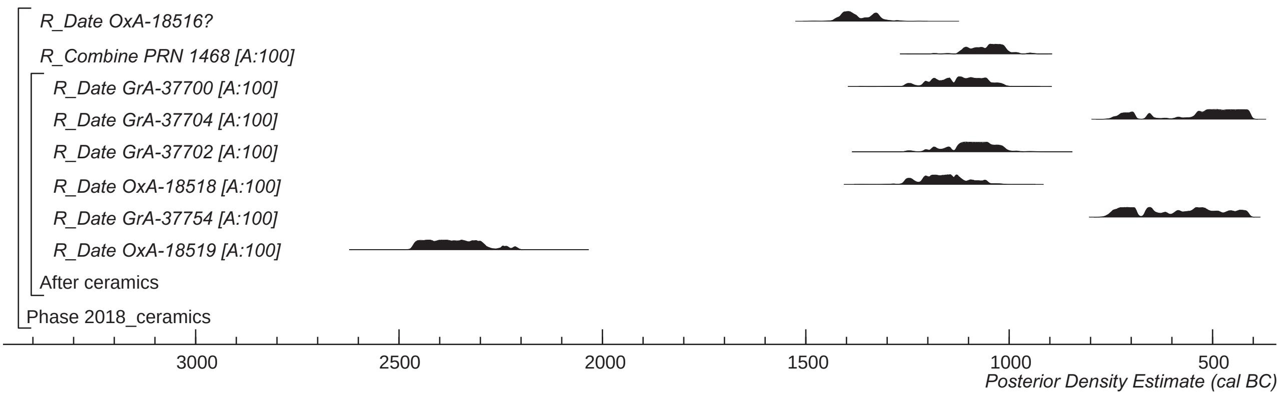



*Figure 3.4 Probability distributions of dates relating to ceramics from Mortuary Feature 2018. Each distribution represents the relative probability that an event occurs at a particular time. For each of the radiocarbon dates two distributions have been plotted, one in outline, which is the result of simple calibration, and a solid one, which is based on the chronological model used. Figures in brackets after the laboratory numbers are the individual indices of agreement which provide an indication of the consistency of the radiocarbon dates with the prior information included in the model (Bronk Ramsey 1995). The large square brackets down the left hand side along with the OxCal keywords define the model exactly*

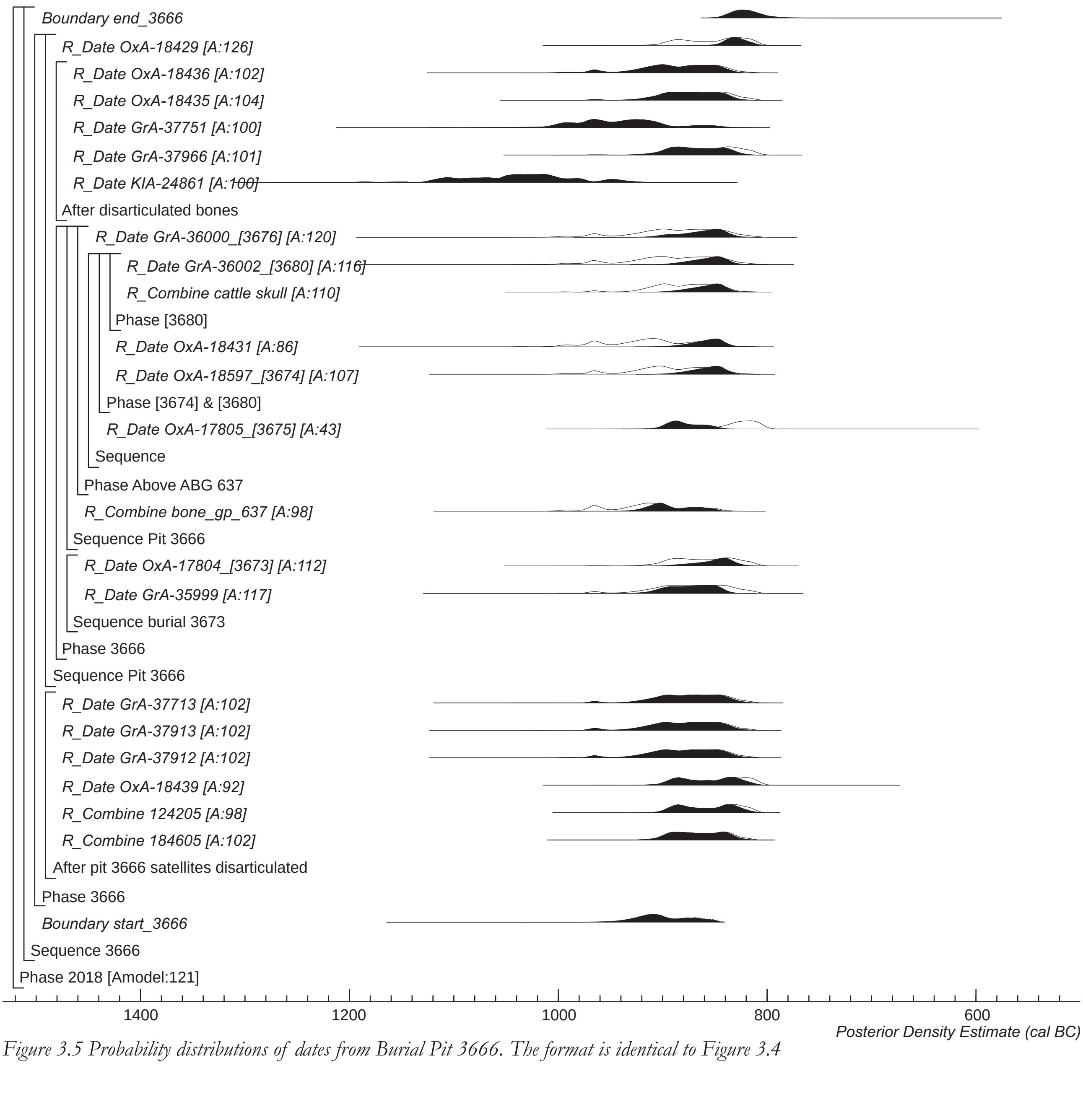



*Figure 3.5 Probability distributions of dates from Burial Pit 3666. The format is identical to Figure 3.4*

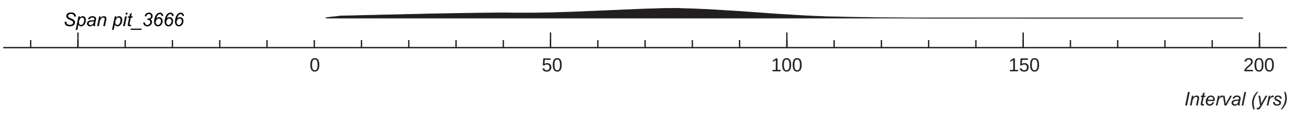



*Figure 3.6 Probability distributions of the number of years during which various activities in Burial Pit 3666 occurred derived from the model shown in Fig. 3.5*

The ceramics from Mortuary Feature 2018 (Table 3.7; Fig. 3.4) for the most part only provide *termini post quos* for their contexts as they were primarily dated to help in constructing a chronology for the ceramics. Two dated residues do though come from sherds that also provide a date for their context, as they are from multiple sherds from single vessels. OxA-18516 is significantly earlier than anything else dated from 2018 and would suggest that at least part of the feature could date as early as 1440–1300 cal BC (OxA-18516). However, there is some uncertainty over the reliability of this result as the date is too old for the type of vessel (an ovoid pot with decorated rim more typical of Late Bronze Age assemblages) and it has therefore been excluded from the analysis. The probability that the vessel belongs to the earlier Deverel-Rimbury style is unlikely and a slightly younger date after 1150 cal BC would be expected.

*OxA-18517 (PRN 1468; 1130–980 cal BC)* provides a further early date for 2018 that is consistent with the death of the individual dated by *KIA-24861*.

Both *OxA-18517 (PRN 1468)* and the possibly problematic OxA-18516 are on groups of related vessel sherds that are likely to be broadly contemporary with the early use of the Mortuary Feature 2018.

***Burial Pit 3666; satellite burial and bone deposits***

The model provides estimates for the earliest excavated deposits from Burial Pit 3666 of *950–845 cal BC (95% probability; start_3666*; Fig. 3.5) and probably *930–860 cal BC (68% probability)* and for its closure (for deposition of human remains) of *850–785 cal BC (95% probability; end_3666*; Fig. 3.5) and probably *835–805 cal BC (68% probability)*.The first *in situ* burial (3675) was made during *910–845 cal BC (95%*

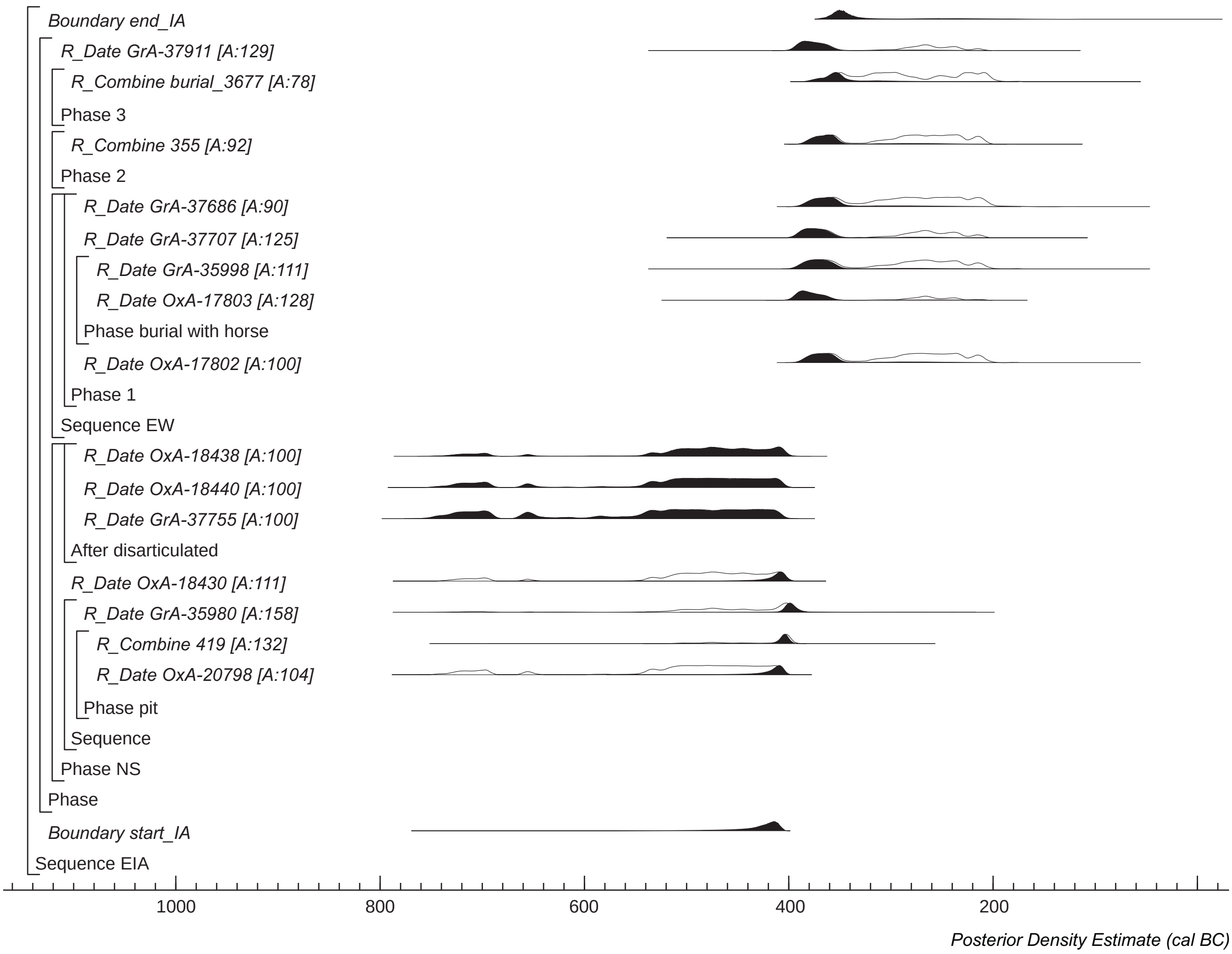



*Figure 3.7 Probability distributions of dates relating to Iron Age mortuary activity. The format is identical to Figure 3.4*

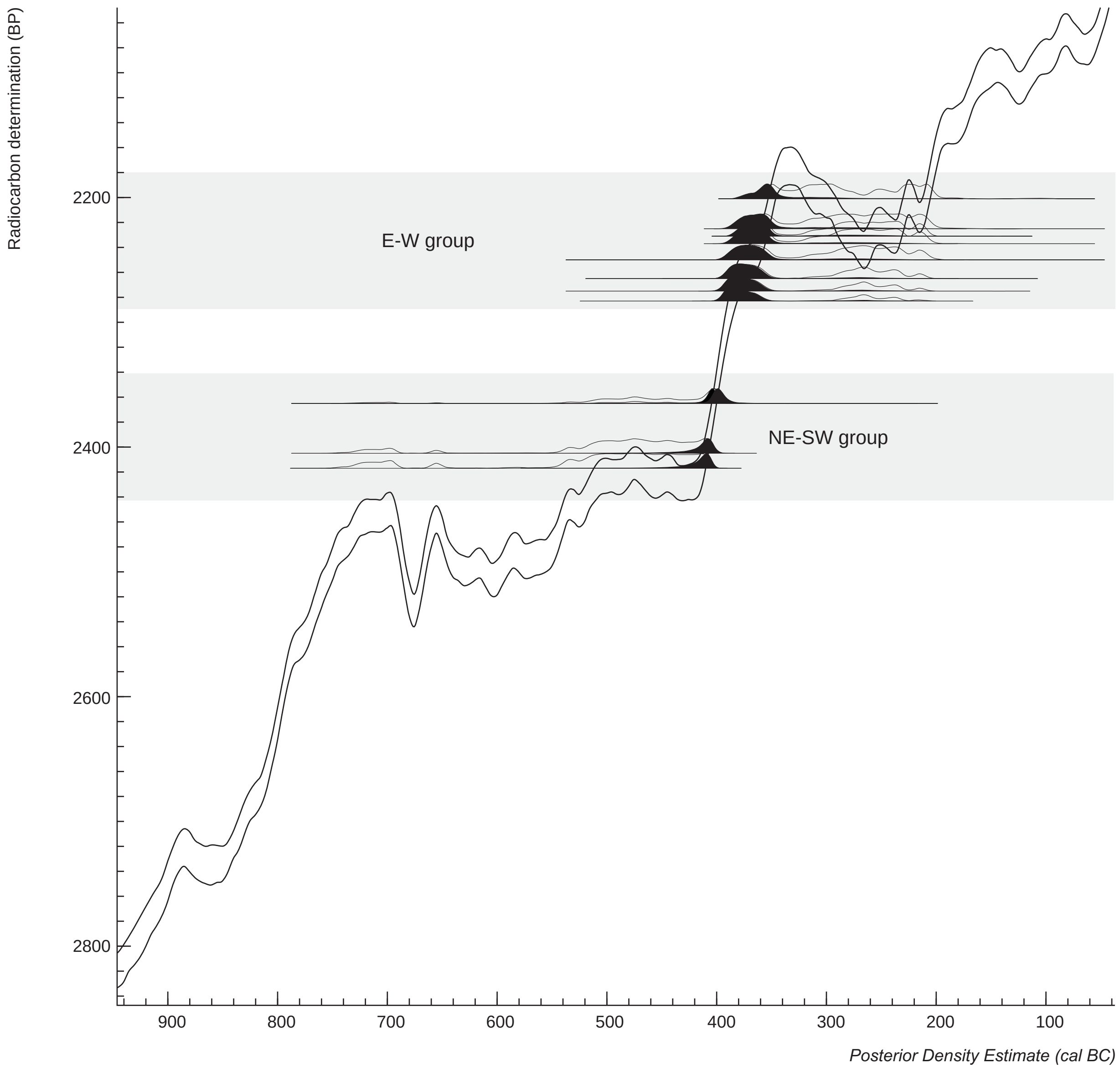



*Figure 3.8 Iron Age burials from Mortuary Feature 2018 plotted on the radiocarbon calibration curve (Reimer* et al. *2009)*

*probability; OxA-17805_ 3675* Fig. 3.5) and probably within *900–865 cal BC (68% probability).*

Overall the interment of articulated bodies lasted for between *10–85 years (95% probability*) and probably *30–75 years (68% probability)* or two to three human generations. The six articulated human burials from Burial Pit 3666 are statistically consistent (T'=5.6; ν=5; T'(5%)=11.1) and could therefore have all died within a very short period of time of each other. Overall activity within the pit appears to have lasted for slightly longer; *5–110 years (95% probability* Fig. 3.6) and probably *40–95 years (68% probability).*

Osteological analysis (see McKinley, Chapter 4) suggests that at least some of the burials within 3666 are likely to have been deposited well within a single generation as a number are in close proximity and show little or no evidence for disturbance and disarticulation. This is not disputed by the radiocarbon results (see above). In addition, the radiocarbon results from all the articulated/disarticulated individual deposited in Burial Pit 3666 are in fact statistically consistent (T'=14.6; ν=15; T'(5%)=25.0) – if KIA-24861 is excluded. It is therefore possible/likely that all of these individuals apart from KIA-24861 died either at the same time or within a very short space of time. However, it is beyond the resolution of our radiocarbon dating model to provide the necessary level of detail to disentangle the exact series of burial events within 3666.

### *Iron Age burial*

Following a gap of *300–440 years (95% probability)* and probably *265–425 years (68% probability)* after the end of the Late Bronze Age mortuary activity, an episode of Iron Age burial activity is estimated to have begun in *510–400 cal BC (95% probability; start_IA*; Fig. 3.7) and probably *440–405 cal BC (68% probability).*

This second phase of burial activity at the site lasted for between *40–255 years (95% probability)* and probably *45–135 years (68% probability)*.

The model suggests that a spread of burials along the north-east–south-west spine of Mortuary Feature 2018 (within the juxta-3666, North-west, East-central and Southern groups), that extend from the articulated burial 3656 in the north, just outside Burial Pit 3666, for 35 m south-west to at least bone deposit ON 437 (Southern group) (Fig. 4.1) are earlier than the east–west spread of burials (West-central and East-central groups) (Fig. 3.7). Such chronological separation is uncommon in the Iron Age due to the shape of the calibration curve (Reimer *et al.* 2009), however, these samples fall on a very steep piece of the curve with a clear distinction between the groups apparent (Fig. 3.8).

**Late Bronze Age enclosures and Midden Pit 2028**

The Midden Pit 2028 is located within the Northern Late Bronze Age enclosure (Fig. 2.6). This enclosure may have been rectilinear in plan (only partially revealed due to the extent of the excavation) and had at least one entrance (east facing). It is uncertain whether feature 2469 formed part of the ditch terminal or was a pit-like feature associated with the entrance (Fig. 2.6). It was only possible to partially investigate this feature as it was at the edge of the excavation. Further excavation would be required of the adjacent area to resolve this issue and, therefore, no attempt has been made to model the results.

The model for the Northern, Central and Southern Enclosures (Fig. 3.9) shows good agreement between the radiocarbon dates and prior information (Amodel = 93), in

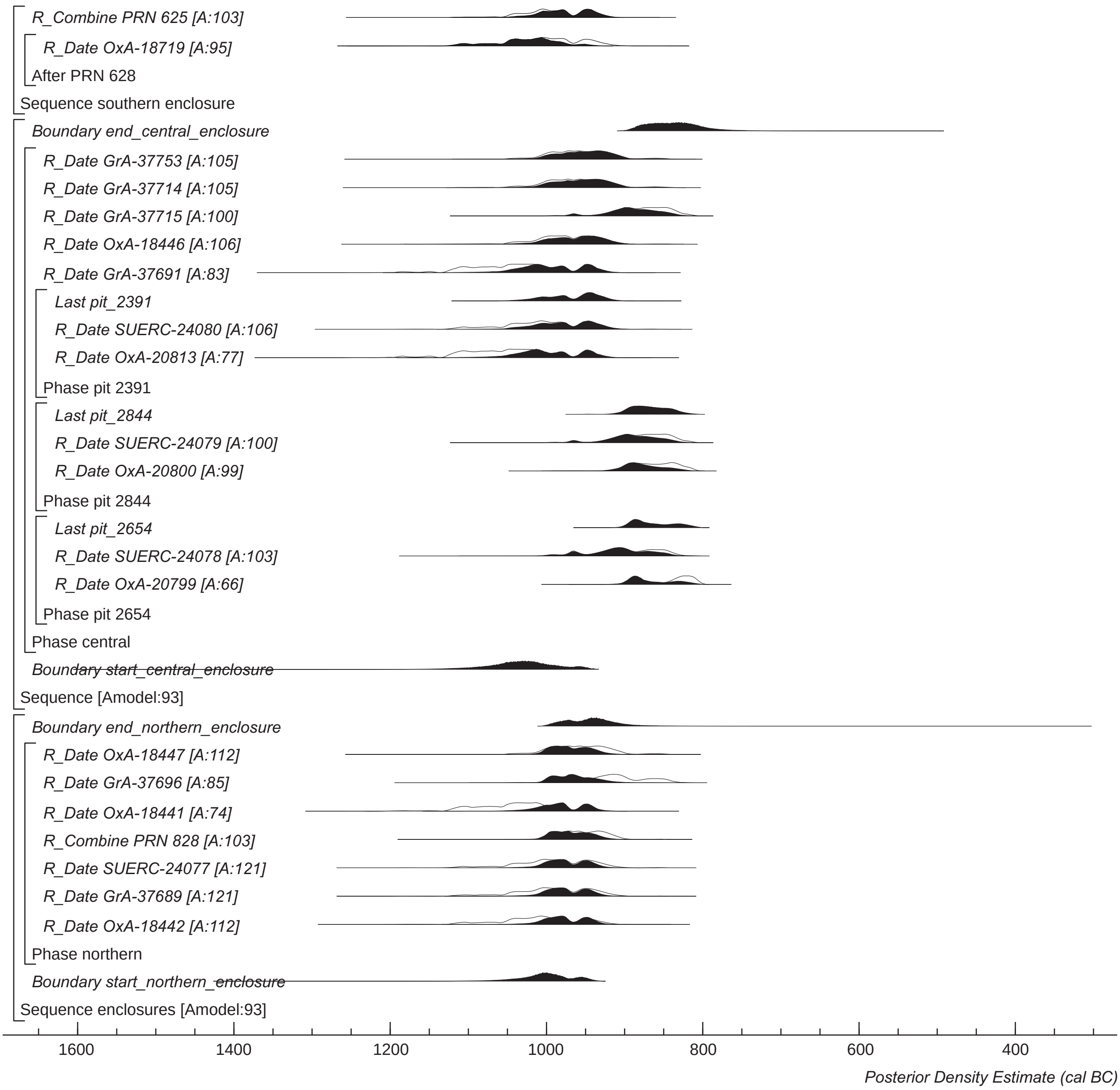



*Figure 3.9 Probability distributions of dates from the enclosures. The format is identical to Figure 3.4*

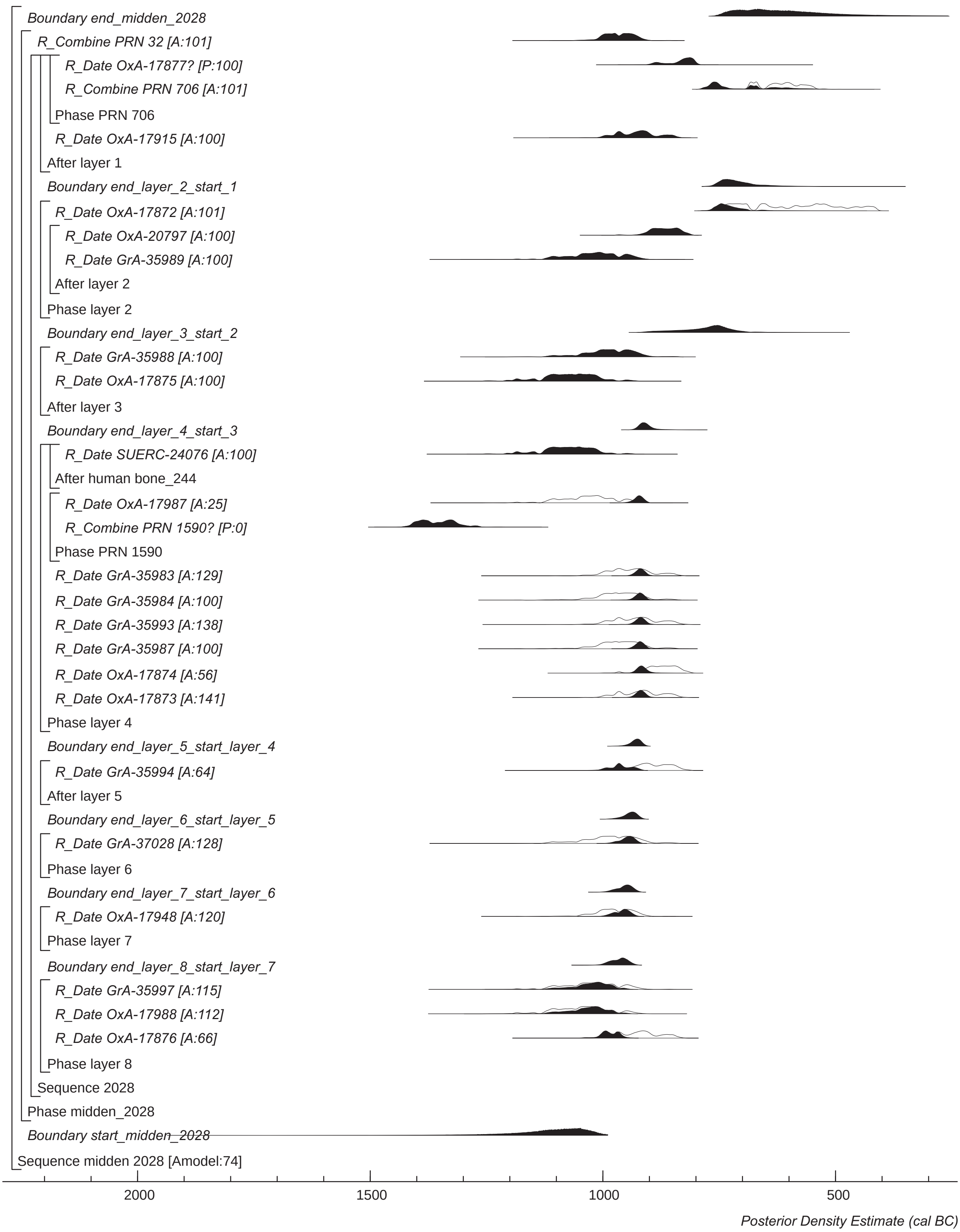



*Figure 3.10 Probability distributions of dates from the Midden Pit 2028. The format is identical to Figure 3.4*

this case that the samples from both the Central and Northern Enclosures represent single uniform phases of activity (Buck *et al.* 1992). This model has been pursued here since insufficient dates were obtained to allow the observed two phases of use of the enclosures to be modelled accurately. Due to the ambiguous nature of the primary archive no stratigraphic relationship between samples could be reconstructed.

The model estimates that the Northern Enclosure was constructed in *1075–935 cal BC 95% probability; start_northern_enclosure*; (Fig. 3.9) and probably in *1030–975 cal BC (68% probability)*, and the Central Enclosure in *1125–945 cal BC (95% probability; start_central_enclosure*; Fig. 3.9) and probably in *1075–985 cal BC (68% probability)*. Further analysis shows a *71% probability* that the Central Enclosure is earlier than the Northern Enclosure. However, this would contradict the recorded observation that the ditches of the Central Enclosure appear to respect those of the Northern one (Fig. 2.5 and see Leivers, Chapter 2).

Given the primary aim of the samples chosen for dating from the enclosures was to help in the construction of a chronology for the ceramics rather than to provide a precise estimate for the date of the enclosures, the estimated end dates are difficult to interpret. They clearly do not provide estimates for the end of activity and are probably best seen as *termini post quos* for the end of use of the enclosures.

Due to a paucity of measurements from the Southern Enclosure, it is not possible to say with any certainty how it relates to the Northern and Central ones, other than it is probably broadly contemporary.

### *The midden sequence*

Midden Pit 2028 (Fig. 2.7) provides a stratified sequence of pottery that appears to span the Late Bronze Age into the Earliest Iron Age (see Leivers, Chapter 5, Table 5.5). Measurements on two samples (PRN 1590 and PRN 706) have been excluded from the model (Fig 3.10). The three determination (OxA-17986–7 and GrA-35992) on samples from two sherds forming part of PRN 1590 are statistically inconsistent (T'=29.8; ν=2; T'(5%)=6.0). The two statistically consistent (T'=2.5; ν=1; T'(5%)=3.8) results (OxA-17986 and GrA-36004) are considerably earlier than any dated residue from 2028, while OxA-17987 is statistically consistent (T'=9.3; ν=6; T'(5%)=12.6) with the other six measurements on sherds from layer 4.

The three determinations (OxA-17877, OxA-17914 and GrA-36004) on samples from two sherds forming part of PRN 706 are statistically inconsistent (T'=16.2; ν=2; T'(5%)=6.0). Given the statistically consistent measurements (T'=0.9; ν=1; T'(5%)=3.8) on different sherds (OxA-17914 and GrA-36004) we have used the weighted mean (PRN 706; 2516±22 BP) as providing the most accurate age for this residue.

The model, Figure 3.10, shows good agreement between the radiocarbon dates and stratigraphic information (Amodel=74). It provides an estimate for the start of deposition of material in the midden of *1405–980 cal BC (95% probability; start_midden_2028*; Fig. 3.10) and probably *1165–1010 cal BC (68% probability)*. The accumulation of midden material is estimated to have stopped in *775–590 cal BC (95% probability; end_layer_2_start_1*; Fig. 3.10) and probably *760–685 cal BC (68% probability)* although some material (layer 1) accumulated after this date.

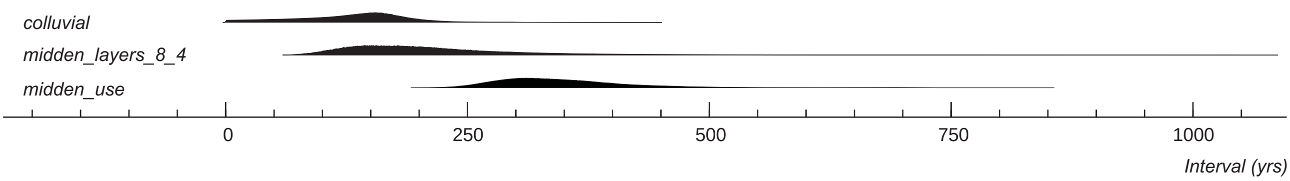



*Figure 3.11 Probability distributions of the number of years during which various parts of Midden Pit 2028 took to accumulate derived from the model shown in Figure 3.10*

| Parameter (Fig. 3.10) | *Posterior Density Estimate, cal BC (95% probability)* | *Posterior Density Estimate, cal BC (68% probability)* |
|---|---|---|
| *end_layer_8_start_layer_7* | *1005–930* | *985–940* |
| *end_layer_7_start_layer_6* | *990–920* | *970–930* |
| *end_layer_6_start_layer_5* | *975–915* | *955–920* |
| *end_layer_5_start_layer_4* | *955–905* | *940–915* |
| *end_layer_4_start_layer_3* | *940–865* | *925–895* |
| *end_layer_3_start_layer_2* | *910–660* | *825–715* |
| *end_layer_2_start_layer_1* | *775–590* | *760–685* |

*Table 3.8 Summary of major dated events from Midden Pit 2028*

This therefore indicates that the feature was in use for the deposition of midden material for *230–490 years (95% probability; midden_use*; Fig. 3.11) and probably *265–390 years (68% probability)*.

The model also provides precise estimates for the start/end dates of layers within the midden (see Table 3.8).

The lower layers in the midden, ie layers 8–4, accumulated in an estimated *100–260 years (68% probability; midden_layers_8_4*; Fig. 3.11) before the inwash of colluvial material (layer 3). Although layer 2 is poorly dated, it does suggest an interval of between *75–195 years (68% probability; colluvial*; Fig. 3.11) occurred before the midden was used again following this hiatus represented by the colluvial deposit.

### *Ceramic Sequence and Chronology*

Late Bronze Age pottery is traditionally divided into three broad phases: an early phase that follows on from Deverel-Rimbury style ceramics that is characterised by simple plain ovoid and straight-sided jars and bowls (12th and 11th century cal BC in date), a secondary phase marked by the appearance of a greater range of vessels that includes more shouldered forms and limited decoration and a final phase in which decoration becomes more important (Barrett 1980; Needham 2007a; Barclay 2006, 96; Barclay *et al.* 2006, fig. 7.2). Within the final phase more elaborate and/or complex decoration and new or slightly modified forms appear. This material is commonly considered to mark the beginnings of the Iron Age and is referred to as Earliest Iron Age (Cunliffe 1991, 61).

Typologically the assemblage from Cliffs End has its beginnings in the 11th century and it runs on to at least the 8th or 7th centuries. Unfortunately the later part of this sequence is less well dated. However, the dating programme does provide an independent framework for this assemblage from which other sites in Kent (eg, Highstead and Monkton Court Farm: Couldrey 2007; Macpherson-Grant 1995) can be re-evaluated (see Leivers, Chapter 5).

#### **Forms and decoration**

Our understanding of the Late Bronze Age pottery of Lowland England is based on the seminal work of John Barrett (1980), which since its publication has been largely enhanced by the detailed publication of new assemblages and the increasing availability of radiocarbon results (summarised and re-evaluated in Needham 1996a and 2005). Barrett identified five broad classes of vessel based around the forms of bowls, jars, cups and a miscellaneous category that includes dishes and/or lids (*ibid.*, 302–3). Barrett was able to subdivide the assemblages he analysed into an earlier 'plain ware' and a later 'decorated ware' (*ibid.*, 306–9). In the 30 years since the publication of Barrett's work his model for ceramic development has been further defined. The beginning of the Late Bronze Age phase has been pushed back to *c.*1150 cal BC, while an end date of *c.* 800 cal BC is in general use (see Needham 1995; 2005). Some authors (the writer – A Barclay included) have suggested an initial phase when assemblages were largely dominated by mostly plain ovoid and straight-sided jars and to a lesser extent bowls and that the appearance of shouldered vessels was a slightly later development. At some point, possibly the late 11th or early 10th century cal BC, the range of vessels was then increased and at a later date still (9th century onwards) there was an increase in the range and use of decorative techniques (principally finger-nail/tip impressions and incised lines). Towards the end of the 8th century cal BC developments in the 'decorated ware assemblages' have been noted and include the appearance of red-finish, modification of fineware vessel forms and the occasional occurrence of more complex decorative motifs. Following the work of Cunliffe (1991, 61) the term 'Earliest Iron Age' has been adopted by some authors to describe assemblages of this character.

Cliffs End presented a good opportunity to test the widely accepted model for the development of Late Bronze Age ceramics as outlined above (see Leivers, Chapter 5 and Fig. 5.5). It was therefore decided to model the following selected traits:

1. The appearance of finger-tip impressed decoration on the shoulders and rims of predominantly coarseware jars – a key trait of 'decorated ware' assemblages;
2. The use of linear incised/tooled decoration on fineware jars and bowls – another key trait of 'decorated ware' assemblages;
3. The appearance of shouldered vessel forms (jars, bowls and cups) that are considered to occur in a secondary or developed phase of 'plain ware' and before the appearance of 'decorated ware' assemblages.

Our expectation based on previous work and what is outlined above is that trait 3 should predate 1 and 2. Traits 1–2 should be broadly contemporary and later than trait 3 by between 100 to 200 years.

The currencies for these three traits are shown in Figure 3.12. The appearance of shouldered bowls and jars (as characterised by Barrett (1980) and see Leivers, Chapter 5) occurs after: *1405–980 cal BC (95% probability; start_midden_2028*; Fig. 3.12) and probably *1165–1010 cal BC*

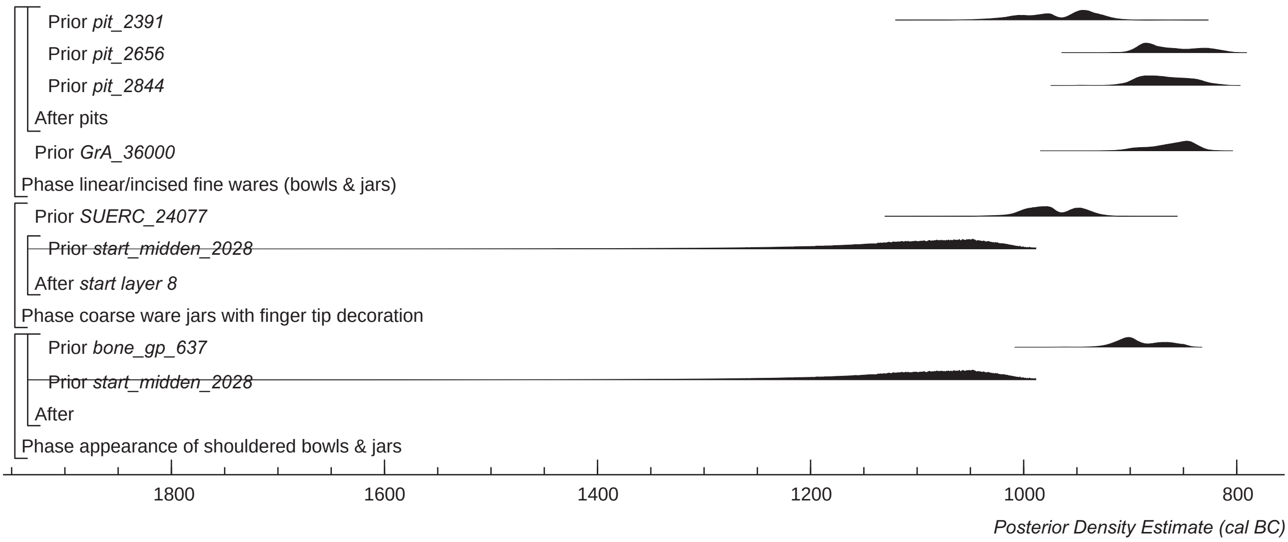



*Figure 3.12 Probability distributions for ceramics forms derived from the models shown in Figures 3.5, 3.9–*3.10

*(68% probability)*, and after *930–845 cal BC (95% probability; ABG 637*; Fig. 3.12) and probably *920–885 cal BC (68% probability)*.

Coarse ware jars with finger-tip impressions on the rim and shoulder are in use by *1025–920 cal BC (95% probability; SUERC-24077*; Fig. 3.12) and probably by 1*005–940 cal BC (68% probability)*, and after *1405–980 cal BC (95% probability; start_midden_2028*; Fig. 3.12) and probably *1165–1010 cal BC (68% probability)*.

Vessels with linear tooled, incised or scratched decoration occur from *910–825 cal BC (95% probability; GrA-36000*; Fig. 3.12) and probably *880–835 cal BC (68% probability)* and after *910–825 cal BC (95% probability; pit_2844*; Fig. 3.12), *905–815 cal BC (95% probability; pit_2656*; Fig. 3.12), and *1035–915 cal BC (95% probability; pit_2391*; Fig. 3.12).

Due to the lack of well dated examples it has not been possible to produce robust estimates for the three traits outlined above, however, the methodology has shown that evaluating the hypothesis should be feasible given a site with a good selection of recognisable vessels.

**Discussion**

One implication of these currency estimates is that the so-called decorated ware phase (should such a thing still be tenable) could have appeared at an early stage of the Late Bronze Age (10th century and certainly by the 9th century at Cliffs End) in the east and coastal areas of southern England (see Barrett and Bond 1980, 37) (see Leivers, Chapter 5) and possibly at a slightly later date in more central areas such as the Middle and Upper Thames Valley and north Wessex. This possibility would, however, require further work that is beyond the scope of the current study if it is to be clarified. At present there are relatively few well dated assemblages to compare with the one from Cliffs End and the chronology of many well-known sites (eg, Mucking North and South rings, Essex (Bond 1988); Runnymede Bridge/Petters Sports Field, Surrey (O'Connell 1986; Needham 1991); Green Park/Reading Business Park, Berkshire (Brossler *et al.* 2004); White Cross Farm, Wallingford (Cromarty *et al.* 2006); Eynsham Abbey, Oxfordshire (Barclay *et al.* 2001); Ram's Hill,

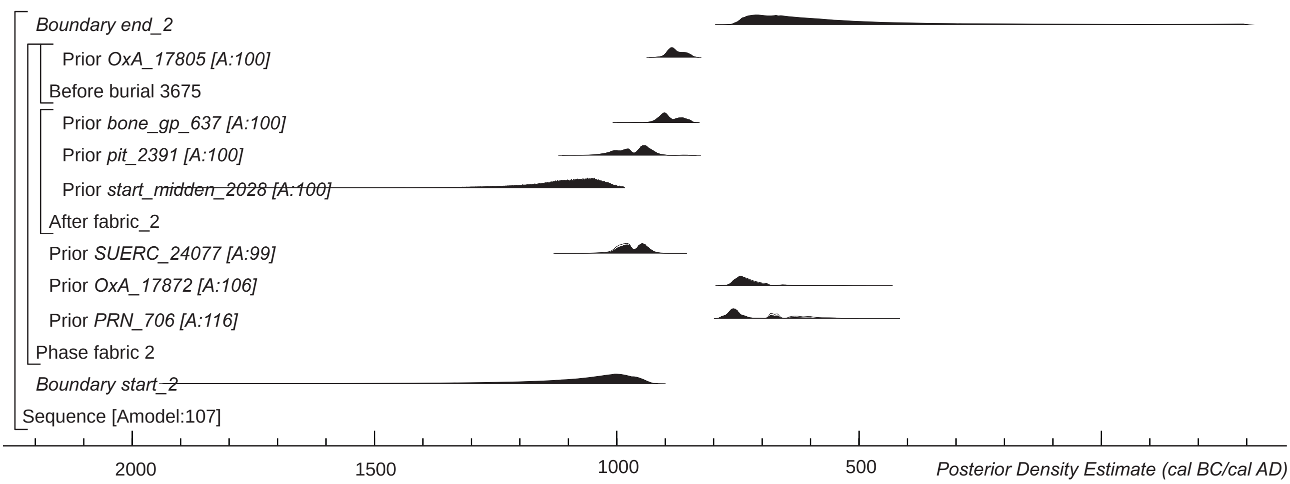



*Figure 3.13 Probability distributions of dates relating to Fabric 2 (F2). The format is identical to Figure 3.4*

Berkshire (Needham and Ambers 1994) and Potterne, Wiltshire (Lawson 2000) depend on single or relatively small sets of dates. Needham has provided a review that reconsiders most of these sites (2007a), although many of these datasets require critical re-evaluation and the assemblages re-dating if a more precise understanding of the chronological development of the sites and pottery styles is to be achieved. The results from Cliffs End do suggest that the present broad framework or periodisation model for the Late Bronze Age and Early Iron Age (see Needham 1996a and 2007a) needs some considerable adjustment and that developments may not always have been synchronous across southern England.

**Fabrics**

An attempt was made to provide a currency for selected fabrics by obtaining a series of 50 radiocarbon measurements on internal residues adhering to sherds of eight fabric groups (F1–F3, F6–F9 and F11) (see Leivers, Chapter 5 and Tables 5.5–5.6). Twenty-seven measurements were obtained from a sequence through Midden Pit 2028 (Table 3.2), nine from the Mortuary Feature 2018 (Table 3.7), 14 from the Northern, Central and Southern Enclosures (Table 3.4) and a single measurements from pit 3455 (Table 3.6) (see Leivers, Chapter 5). Unfortunately, not enough sherds with residues could be found to sample all of the defined fabric groups, in particular those with inclusions of quartz, grog and shell. It was thought possible to construct currency models for six of the flint fabric groups (F2–3, and F6–9).

The construction of these models was complicated by the fact that sherds with charred residues were not evenly distributed through the midden sequence, as it was known that sherds of certain fabrics occurred stratigraphically earlier than those sherds that had been sampled (see Leivers, Chapter 5 and Table 3.2). Therefore our model had to combine both the directly dated residue results and the estimates for layer formation in the midden sequence. Any attempt not to include the latter set of information would result in a biased model.

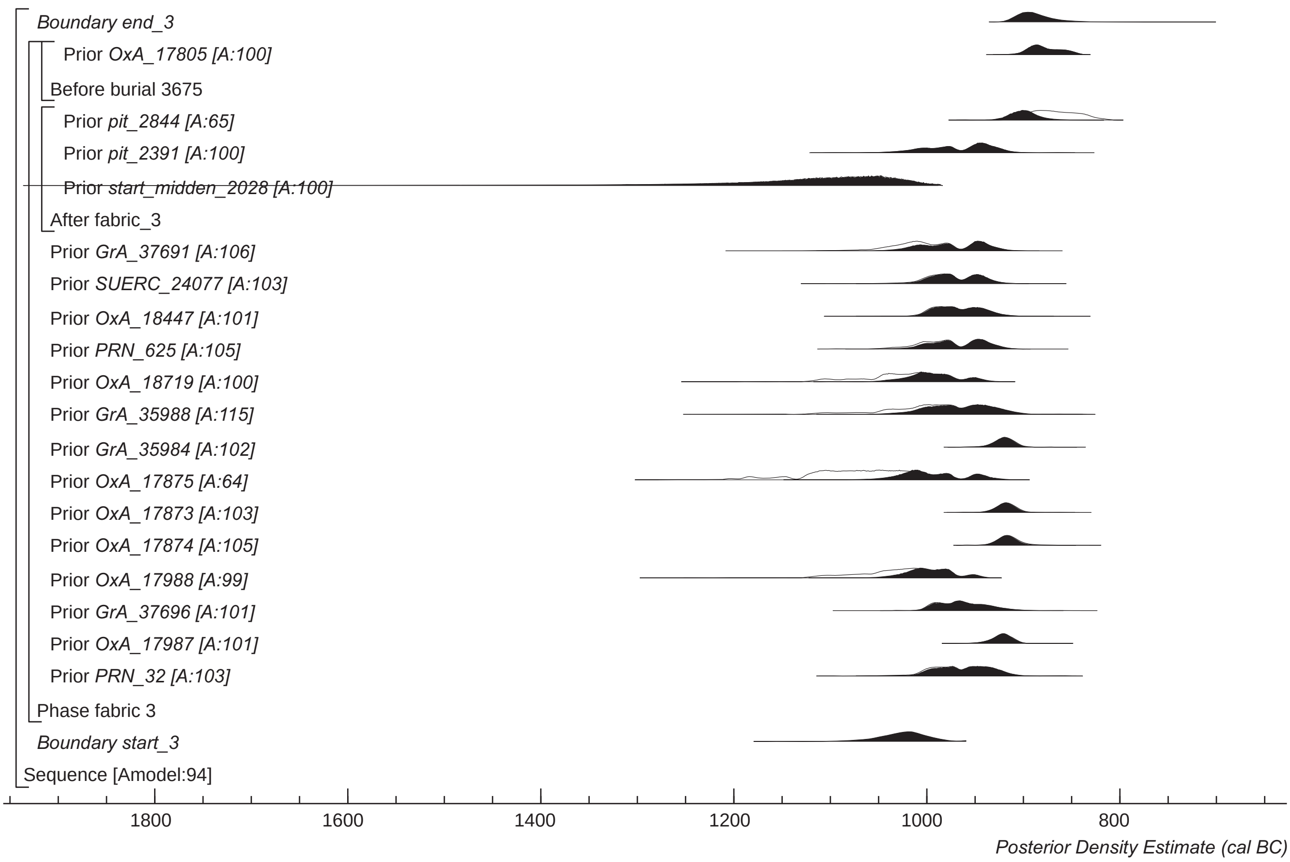



*Figure 3.14 Probability distributions of dates relating to Fabric 3 (F3). The format is identical to Figure 3.4*

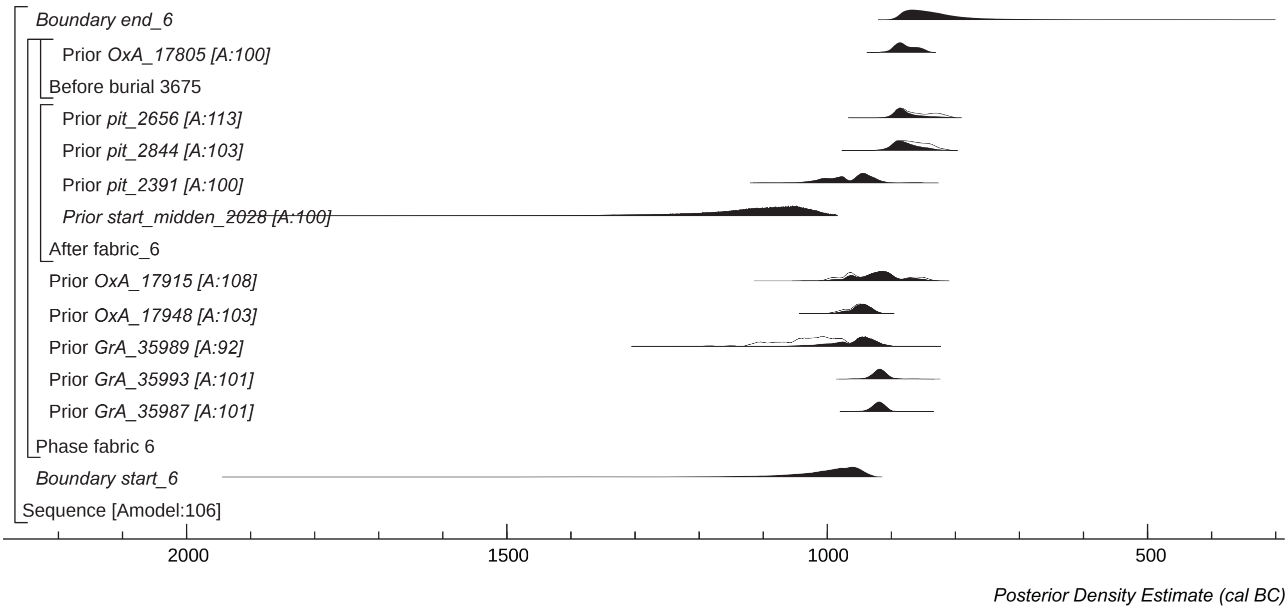



*Figure 3.15 Probability distributions of dates relating to Fabric 6 (F6). The format is identical to Figure 3.4*

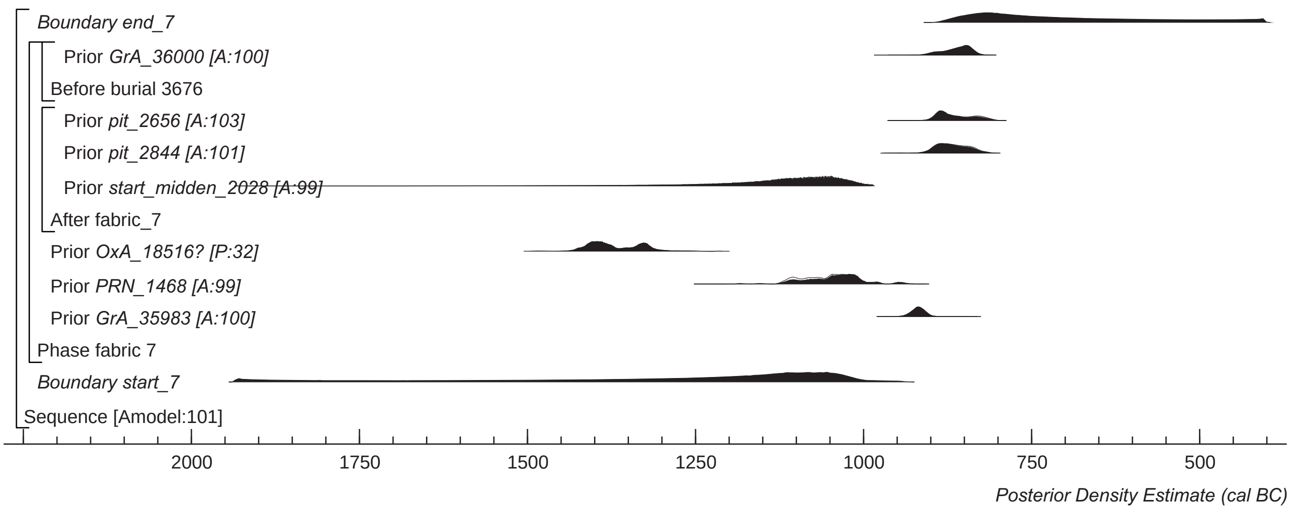



*Figure 3.16 Probability distributions of dates relating to Fabric 7 (F7). The format is identical to Figure 3.4*

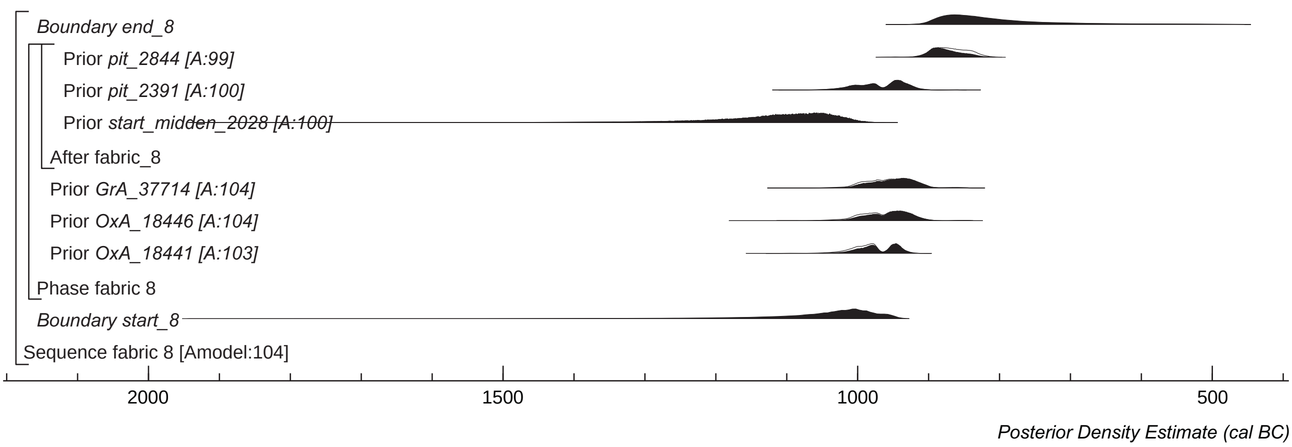



*Figure 3.17 Probability distributions of dates relating to Fabric 8 (F8). The format is identical to that of Figure 3.4*

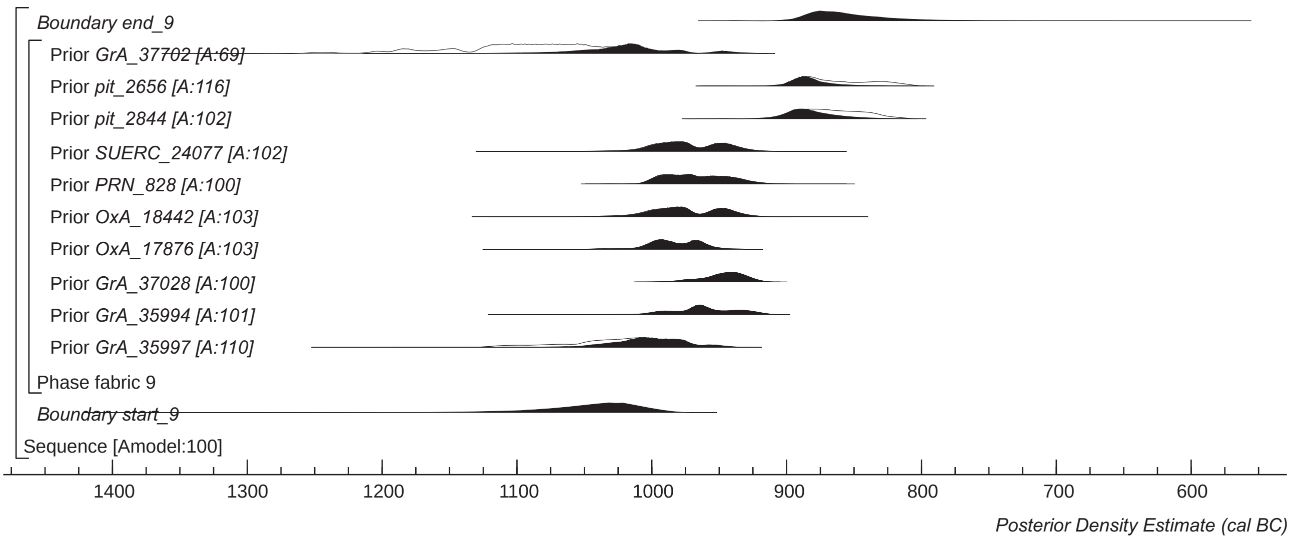



*Figure 3.18 Probability distributions of dates relating to Fabric 9 (F9). The format is identical to Figure 3.4*

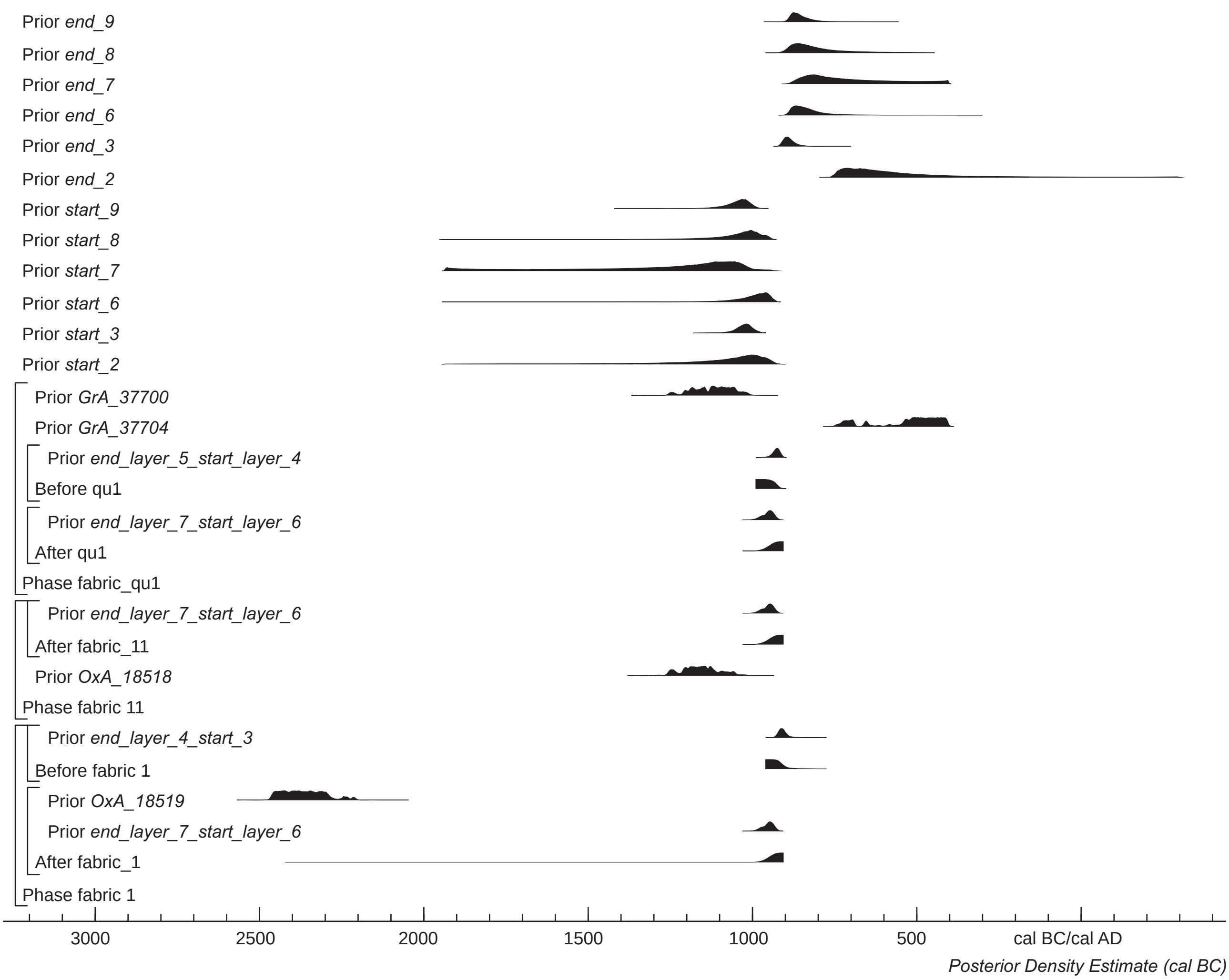



*Figure 3.19 Probability distributions of dates relating to beginnings and endings of ceramic fabric use derived from the models shown in Figures 3.13–3.18. (Flint fabrics (F) = 1–3, 6–9 and 11; Quartz fabric (Q1=qu1) )*

| | Start (cal BC) | | End (cal BC) | |
|---|---|---|---|---|
| | **95% probability** | **68% probability** | **95% probability** | **68% probability** |
| **Fabric F2** | *1635–915* | *1160–935* | *65–10* | *750–505* |
| **Fabric F3** | *1085–975* | *1050–995* | *925–845* | *910–875* |
| **Fabric F6** | *1140–925* | *1025–940* | *900–715* | *890–815* |
| **Fabric F7** | *1940–1715 (8%) or 1675–980 (87%)* | *1935–1915 (2%) or 1395–1005 (66%)* | *880–400* | *875–630* |
| **Fabric F8** | *1485–930* | *1090–950* | *920–550* | *900–770* |
| **Fabric F9** | *1135–980* | *1070–1000* | *905–785* | *890–835* |

*Table 3.9 Posterior density estimates for beginnings and endings for fabrics 2–4 and 6–9*

| | ***start_2*** | ***start_3*** | ***start_6*** | ***start_7*** | ***start_8*** | ***start_9*** |
|---|---|---|---|---|---|---|
| ***start_2*** | | 65.7% | 75.9% | 27.5% | 56.9% | 57.8% |
| ***start_3*** | 34.3% | | 70.6% | 6.6% | 41.5% | 32.5% |
| ***start_6*** | 24.1% | 29.4% | | 6.5% | 27.3% | 21.3% |
| ***start_7*** | 72.5% | 93.4% | 93.5% | | 80.8% | 88.4% |
| ***start_8*** | 55.0% | 10.4% | 72.2% | 3.8% | | 50.9% |
| ***start_9*** | 42.2% | 67.5% | 78.7% | 11.6% | 52.0% | |

*Table 3.10 Percentage probabilities for the relative order of the beginning of use of fabrics 2–4 and 6–9. The cells show the probability of the distribution in the left-hand column being earlier than the distribution in the top row. For example, the probability that ceramic fabric 3 was used earlier than ceramic fabric 2 is 34.3%*

| | ***end_2*** | ***end_3*** | ***end_6*** | ***end_7*** | ***end_8*** | ***end_9*** |
|---|---|---|---|---|---|---|
| ***end_2*** | | 0% | 1.6% | 23.5% | 7.8% | 0.1% |
| ***end_3*** | 100.0% | | 91.0% | 98.7% | 90.3% | 85.7% |
| ***end_6*** | 98.4% | 9.0% | | 85.0% | 59.7% | 35.6% |
| ***end_7*** | 74.7% | 1.3% | 15.0% | | 25.3% | 7.8% |
| ***end_8*** | 92.2% | 9.7% | 40.4% | 74.7% | | 29.2% |
| ***end_9*** | 99.9% | 14.3% | 64.4% | 92.2% | 70.8% | |

*Table 3.11 Percentage probabilities of the relative order of the end of use of ceramic fabrics 2–4 and 6–9. The format is identical to Table 3.10*

### *Currency models*

The currency models for fabrics, F2, F3, F6, F7, F8, and F9 are shown in Figures 3.13–3.18 and summarised in Figure 3.19 and Table 3.9.

Figure 3.19 illustrates the probable start and end dates for the six selected fabrics, with the percentage probabilities for the sequences shown in Tables 3.10 and 3.11. These results suggest that fabric F7 is the earliest to be used on the site followed by fabrics F3, F2, F8, and F9 at approximately the same time, with fabric F6 probably the last to come into use. Thus all of the fabrics that we have dated appear to have been in use by the end of the 11th century cal BC. The results also show that fabric F2 has the longest duration and was still being used to manufacture vessels in the Early Iron Age, finally going out of use in *755–590 cal BC (68% probability; end_2*; Fig. 3.19). In contrast fabrics F3, F6, F7, F8, and F9 had almost certainly gone out of use by the late 9th/early 8th centuries cal BC (Fig. 3.19).

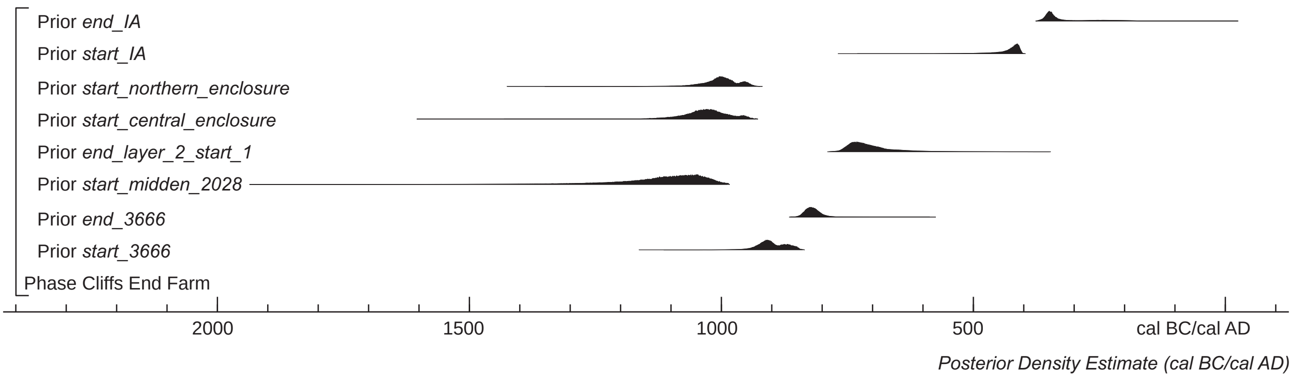



*Figure 3.20 Probability distributions of dates of major archaeological events. The estimates are derived from the chronological models shown in Figures 3.5, 3.7, 3.9–3.10*

| Parameter | *start_3666* | *end_3666* | *start_midden_2028* | *end_layer_2_start_1* | *start_central_enclosure* | *start_northern_enclosure* |
|---|---|---|---|---|---|---|
| ***start_3666*** | | 99.9% | 0.0% | 100.0% | 0.4% | 0.8% |
| ***end_3666*** | 0.1% | | 0.0% | 99.9% | 0.0% | 0.0% |
| ***start_midden_2028*** | 100.0% | 100.0% | | 100.0% | 84.3% | 94.1% |
| ***end_layer_2_start_1*** | 0.0% | 0.1% | 0.0% | | 0.0% | 0.0% |
| ***start_central_enclosure*** | 99.6% | 100.0% | 15.7% | 100.0% | | 71.0% |
| ***start_northern_enclosure*** | 99.2% | 100.0% | 5.9% | 100.0% | 29.0% | |

*Table 3.12 Percentage probabilities for the relative order of major archaeological events at Cliffs End. The format is identical to Table 3.10*

## Site Chronology

A chronological framework for the major events in the history of Cliffs End is shown in Figure 3.20, with the percentage probabilities for this sequence shown in Table 3.12. The radiocarbon evidence from the models provides a most likely order (63.9% probability) for these events taking place as follows:

Midden Pit 2028> Central Enclosure> Northern Enclosure> Pit 3666

The mortuary use of Pit 3666 took place some *95–315 years (68% probability)* after the initial deposition of material in the midden and *45–150 years (68% probability)* after the construction of the Northern Enclosure. The use of pit 3666 is broadly contemporary with midden layers 5 and 6. The use of pit 3666 for Late Bronze Age mortuary activity occurred while the midden was still in use, it is estimated that it continued to be used for a further *60–145 years (68% probability)*.

The final accumulation of midden material occurred in *775–590 cal BC (95% probability)*, after which there was a gap of *240–340 years (68% probability)* before the short intense period of Iron Age mortuary activity in 2018.

## Conclusion

The radiocarbon dating programme has provided a precise chronology for the burial events and mortuary practices present at Cliffs End. Known remains of Late Bronze Age inhumation burials are still generally rare in southern England, although in the absence of radiocarbon dating many that are unaccompanied may simply be missed or have their date assumed. The site of Barrow Hills, Radley, Oxfordshire

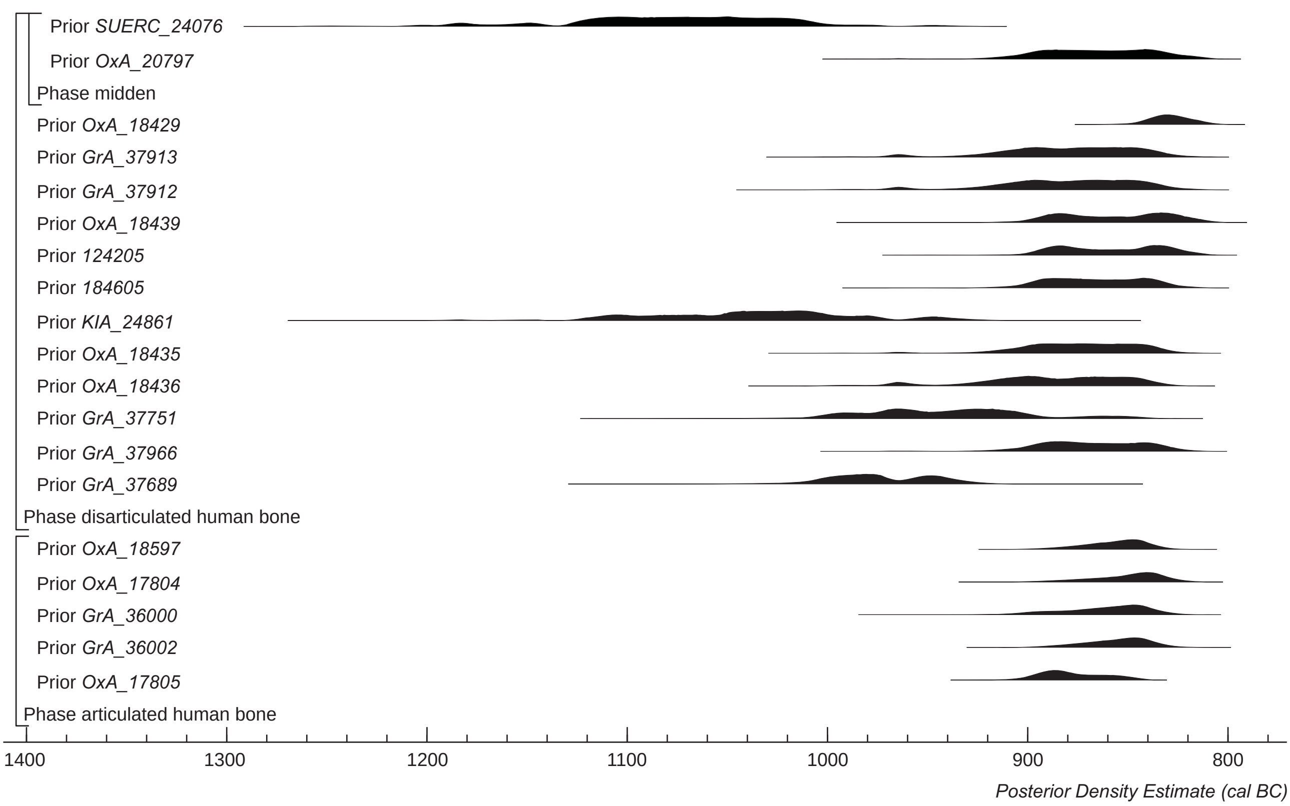



*Figure 3.21 Probability distributions of dates for disarticulated and articulated human bone derived from the models shown in Figures 3.5 and 3.7*

offers one of the few parallels for pit burial associated with earlier barrows (Barclay and Halpin 1999, fig. 9.10, 309 and 325), while isolated graves are known from various sites in the Middle and Upper Thames Valley (Lambrick *et. al.* 2009, 294–300). The burials at Cliffs End were all initially assumed to be of probable Late Bronze Age date, while the dating programme has revealed quite a complex sequence. Of particular importance is that the radiocarbon programme has enabled the recognition of contemporaneous deposits of articulated corpses and body parts, and disarticulated human remains (Fig. 3.21). It also allows for a greater understanding of the mortuary process (see McKinley, Chapter, 2).

Just as important is the identification and precise dating of two phases of Iron Age mortuary activity on a site that has produced little contemporaneous settlement activity or material culture. The Iron Age burials add to a growing number of formal cemeteries in Kent and southern England that have now been recognised, partly through the use of radiocarbon dating (eg, Yarnton, Oxfordshire; Suddern Farm and Winnall Down, Hampshire; Rowbarrow, Wiltshire; Mill Hill, Deal; and EKAR: see Hey *et al.* 1999; Lambrick *et. al.* 2009, 303; Powell in prep; Andrews *et al.* forthcoming).

# Chapter 4
# Human Bone and Mortuary Deposits

*by Jacqueline I. McKinley*

The human bone assemblage comprises a combination of *in situ* articulated remains, redeposited partial articulated remains, dispersed semi-articulated remains, and disarticulated bones and bone fragments. All the bone is unburnt with the exception of a small amount of cremated bone from one context (posthole 2787; Fig. 2.8); the bone from three contexts (3682, 2470 and 2471) had been subject to slight secondary scorching/burning. The majority of the material derived from the large Late Bronze Age–Middle Iron Age Mortuary Feature (2018, Figs. 2.1, 2.23) which dominated the north-eastern portion of the site and incorporated the Late Bronze Age Burial Pit 3666 (Tables 4.1–4.3). Disarticulated bone was also recovered from several deposits within the Late Bronze Age Midden Pit 2028 and amongst midden-like deposits in ditch/pit 2469 and its recut 3699, all situated on/adjacent to the northern margins of the site *c.* 23–38 m to the west of 2018 (Table 4.4). Single deposits of small bones or bone fragments were recovered from four other features distributed across various parts of the site. No bone was recovered from the four graves set within the confines of the Early Bronze Age ring-ditches (Barrows 1–4; NB. the remaining two barrows had no associated grave cuts).

The *in situ* remains of 13 articulated skeletons were recovered from Mortuary Feature 2018, together with the articulated remains of a partial skeleton (3673; Table 4.1). Seven of the deposits, including the latter, were recovered from within or in close association with the large Burial Pit 3666 located in the northern portion of 2018; the rest formed a dispersed west–east group extending across the width of the feature *c.* 9–27 m to the south (Figs. 2.11, 2.23). Samples from each skeleton (one duplicated) were subject to radiocarbon dating (see Marshall *et al.*, Chapter 3); six, including all except one of the deposits from/associated with Burial Pit 3666, were dated to the Late Bronze Age (11th–9th century cal BC); two, one associated with Burial Pit 3666 and one from the central area of the southern band of burials, are Early Iron Age (5th century cal BC); and six, all from the southern area, are Middle Iron Age (4th–3rd century cal BC). Details of the burial sequence are discussed in Chapter 2 (McKinley, *Mortuary Feature 2018*).

Recovery of the disarticulated human bone was facilitated by several means (see McKinley, Chapter 2; Schuster, Chapter 1). The initial finds from Mortuary Feature 2018, made prior to the recognition of its extensive size and nature, were recovered by context only or by object number (ON; and hence 3D recorded) within that context. Finds of human bone from discrete features external to 2018 were recorded by the same mechanism. Few discrete layers or features were distinguishable within the Mortuary Feature in excavation (see McKinley, Chapter 2); in addition to the seven graves containing the remains of individual *in situ* burials (no grave cut was observed for two of the burials), a small quantity of redeposited bone was recovered from a couple of shallow pits discernible in the southern portion of the Mortuary Feature (3631 and 3658, Fig. 2.10). Only one major feature forming a component of 2018 was found to contain human remains, Burial Pit 3666, which appears to have comprised the primary focus of mortuary activity within the feature (Figs 2.11, 2.14, 2.16). Most of the layers within 3666 were attributed discrete context numbers and finds of human bone within them were recorded by context number and ON (but see McKinley, Chapter 2). The rest of feature 2018 and parts of 3666 were excavated as a series of 2 x 2 m blocks and spits of mostly *c.* 0.20 m depth, each unit being attributed a unique six-figure code (easting-northing-spit number; NB in the blocks where the upper levels were excavated by machine the '00' spit number is equivalent to spits 1–2 and part of spit 3; for detail see Schuster, Chapter 1, and McKinley, Chapter 2). Most finds of human bone within this recording system were also attributed an ON, all the latter being subject to 3D recording. In this way, a detailed plot of each bone or group of bones was recorded (Fig. 2.23).

Following the regime outlined, disarticulated human bone in the form of individual skeletal elements, fragments of individual elements, small collections of several skeletal elements or fragments thereof were collected as 223 separate entities within Mortuary Feature 2018 (Tables 4.2–4.3). Bone from a further 27 contexts/ONs were recorded from features external to 2018 (Table 4.4).

Bone samples from 21 of these record numbers, mostly from Mortuary Feature 2018, were submitted for radiocarbon dating (* in Tables 4.2–4.4; see Marshall, *et al.*, Chapter 3). Most (16, excluding duplicates) returned a Late Bronze Age date, five are Early Iron Age and one Middle Iron Age (Tables 4.2–4.4; Fig. 4.1). The Late Bronze Age dates were obtained from material recovered from the northern portion of Mortuary Feature 2018, predominantly within and around Burial Pit 3666,

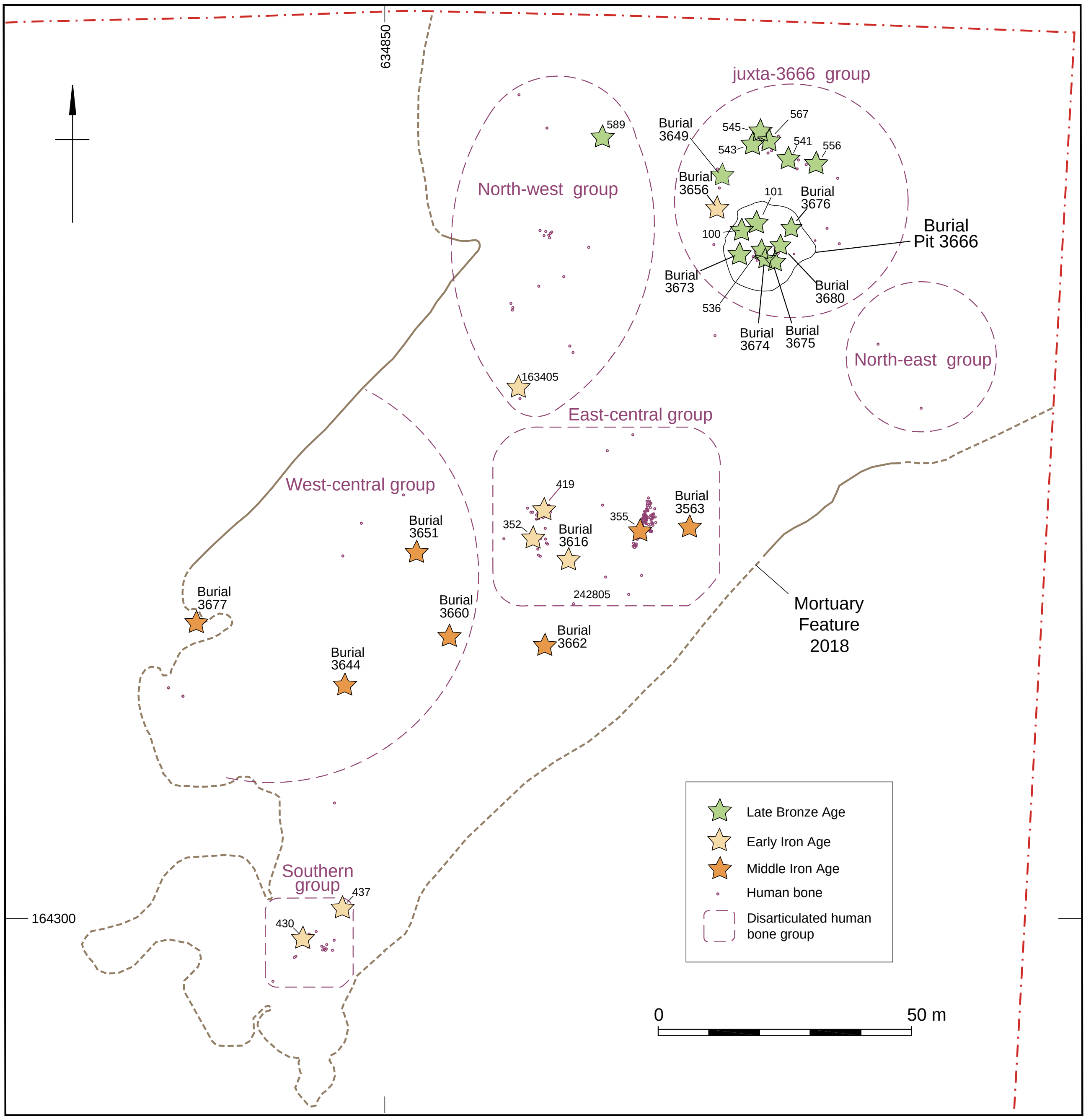



*Figure 4.1 Mortuary Feature 2018 showing location of radiocarbon samples*

and from the midden-like material within the features associated with the Late Bronze Age Northern Enclosure. The Early Iron Age dates were mostly from material found in the southern portion of the Mortuary Feature, as was the single Middle Iron Age date.

The radiocarbon results obtained from the bone samples assisted in the overall phasing of the Mortuary Feature (see above, McKinley, Chapter 2) and, thereby, the rest of the disarticulated human bone assemblage. The redeposited human bone from the midden-type deposits within the Northern Enclosure and most of that from the northern portion of Mortuary Feature 2018 is all likely to be of a roughly commensurate Late Bronze Age date (see Marshall *et al.*, Chapter 3 and McKinley, Chapter 2, for further detail). The majority of the bone from the southern portion of 2018 and the upper levels of the northern portion of the feature is most likely to be Early Iron Age, though some overlap between this and the earlier phase may be represented at the junction between the two areas. The only Middle Iron Age date was obtained from what appears to represent the dispersed semi-articulated remains of a single individual situated in the southern portion of the site; this, together with the stratigraphic distribution of the disarticulated bone, suggests that none of the redeposited bone is likely to relate to this phase.

## Methods

The degree of erosion to the bone was recorded using the writer's system of grading (McKinley 2004a, fig. 7.1–7). The minimum number of individuals (MNI) within the disarticulated bone assemblage was ascertained following criteria presented in McKinley (2004a). Recording of ancient modification and data pertaining to the formation processes affecting the assemblage was also undertaken (*ibid.*).

Age was assessed from the stage of tooth and skeletal development (Beek 1983; Scheuer and Black 2000), and the patterns and degree of age-related changes to the bone and teeth (Buikstra and Ubelaker 1994; Miles 1962). Sex was ascertained from the sexually dimorphic traits of the skeleton (Bass 1987; Buikstra and Ubelaker 1994); where the quantity and quality of sexing criteria was compromised the indicated sex may be qualified (?probable; ?? most likely). Measurements were taken (Brothwell 1972, 79–81 and 85; Brothwell and Zakrzewski 2004, tables 1–2) and various indices calculated according with Trotter and Gleser (1952; 1958: stature estimation); Brothwell (1972, 88: cranial index); and Bass (1987). Non-metric traits were recorded in accordance with Berry and Berry (1967) and Finnegan (1978). Pathological lesions were described and diagnosis suggested where appropriate. Specific methods for scoring various conditions are presented in the appropriate sections below.

The prehistoric disarticulated bone assemblage comprises *c.* 313 'units' of material. A 'unit' comprises either complete skulls (minus mandibles); joining fragments of cranium; individual skeletal elements (including teeth recovered as individual entities), or bone fragments. As with the animal bone assemblage (see Grimm and Higbee, Chapter 5), where fragments of a single skeletal element were found to join they were counted as a single 'unit'; this includes both complete skeletal elements and parts of individual elements (see Tables 4.2–4.4).

The disarticulated material from feature 2018 (*c.* 93.5% of the disarticulated bone assemblage) fell into seven broad spatial groups which will be used for ease of reference throughout the text (Fig. 2.23: North-west; juxta-3666; Burial Pit 3666; North-east; West-central; East-central, and Southern). A large quantity of material was recovered at several different levels within Burial Pit 3666 (*c.* 28.4% of assemblage; Tables 4.2, 4.5) and in the area immediately around it (juxta-3666, within *c.* 3 m; 8.6%; Tables 4.3, 4.5); all this material is Late Bronze Age in date (Figs 2.12–2.13), with the exception of a single burial of Middle Iron Age date located on the edge of the ring-ditch marking Burial Pit 3666 (burial 3656, Fig. 4.1). The east-central (East-central) group forms another sizable part of the assemblage (41.6%) and includes material of both Early and Middle Iron Age date deposited at different levels (Tables 4.3, 4.5; Figs 2.12–2.13). Much smaller quantities of material were recovered within the remaining groups; the North-west group, including both Late Bronze Age and Early Iron Age material, comprised *c.* 4% of the assemblage; the Early Iron Age Southern group *c.* 6.3%; the probable Early Iron Age West-central group 3.6%; and the Late Bronze Age/Early Iron Age North-east group *c.* 0.7% (Tables 4.3, 4.5).

All the radiocarbon dated remains from which appropriate tooth samples could be extracted (20 individuals; 10 Late Bronze Age, three Early Iron Age and seven Middle Iron Age) were subject to strontium/oxygen (Sr/O) and, where possible, carbon/nitrogen (C/N) isotope analysis (see Millard, below). Samples were also extracted from three other securely dated Late Bronze Age and two probable Early Iron Age individuals.

## Results

A summary of the results including phasing, Sr/O isotope data, skeletal indices and the recorded level aOD from which the remains were recovered, is presented in Tables 4.1–4.4; full details are held in the archive.

### *Taphonomy and Ancient Modification*

Whilst a variety of intrinsic and extrinsic factors may affect bone preservation, in general the nature of the soil matrix – including water permeability – represents the major factor affecting bone survival. A highly acidic burial environment will have a detrimental affect on the mineral components of the bone and an overly alkali one on the organic components; both, particularly where coupled with a free-draining environment, result in bone degradation (Henderson 1987; Nielsen-Marsh *et al.* 2000; Millard 2001). The variability of bone preservation in relation to the geology of Kent is well documented. Mays and Anderson (1995) drew attention to the frequent fragility of bone recovered from graves cut through the chalk, and the highly detrimental effects of burial within the free-draining acidic Greensands forming a north-west–south-east belt through the county was well illustrated during the archaeological investigations undertaken as part of the Channel Tunnel Rail Link (CTRL) project (McKinley 2006a). The deleterious effects of brickearth (silty clays) on bone is well known, examples from Kent including the Romano-British and Anglo-Saxon cemeteries at Springhead (McKinley 2011a–b). Graves cut through the natural brickearth and backfilled with the same material frequently result in the destruction of all the human remains, though

| Context | Cut | Isotope data | Quantification | Age/sex | Pathology | Basic indices | Level & condition |
|---|---|---|---|---|---|---|---|
| **Late Bronze Age** | | | | | | | |
| 3649 | - | local | *c.* 60% | subadult<br>*c.* 14–16 yr.<br>??female | calculus; *cribra orbitalia*; mv – man. l.M3 absent, lambdoid ossicles, hypotrochanteric fossa (bi), lateral squatting facets, double anterior calcaneal facets | - | 17.82–17.95 m aOD. (3). Longitudinal cracking |
| 3673* | 3666 | 'Scand.' | *c.* 40% s.a.u. | adult<br>*c.* 30–40 yr.<br>male | calculus; hypoplasia; periodontal disease; osteoarthritis – T9–10 c-v; ddd – C4; surface defect – l.man. condyle; calcified cartilage – thyroid; pitting – T11 c-v; mv – cusp variations, man. tooth rotation, ossicle at lambda, lambdoid ossicles, Atlas r. transverse process incomplete, l. parietal notch, C6 accessory transverse foramen | ES: 1.76 m (*c.* 5′ 9¼″) | 16.54–16.67 m aOD. (0). Many fresh breaks; scapula semi-green breaks from dorsal side |
| 3674 | 3666 | southern | *c.* 77% | juvenile<br>*c.* 9–10 yr.<br>??female | calculus; surface defect – T ap; mv – 3 lower C accessory transverse foramen, r. lateral squatting facets, lateral talar extension | - | 16.47–16.60 m aOD. (1–2). See 2330A |
| 3675 | 3666 | local | *c.* 99% | adult >55 yr.<br>?female | amtl; caries; abscess; calculus; sharp weapon trauma – skull; periosteal new bone – maxilla, r. temporal (man. fossa); hypervascularity – maxilla; endocranial new bone; osteoarthritis – r. acromio-clavicular, r. 4th distal IP (hand), r. hip; Sch – T6–11, L1–S1; ddd – C5–7, T8–10, L3; enth – anterior manubrium, iliac crest, ischial tuberosities, scapulae, prox. & distal humeri, femora, patellae, distal fibulae, calcanea; calcified cartilage – rib; op – C4 & 7 ap, T4–11 bsm, L1–S1 bsm, r. s-c, shoulders, wrists, carpals, MtC-P (bi-lateral), hand IP joints, r. hip, r. patella, r. ankle, r. tarsals, MtT & IP joints, l. IP (foot), c-v; pitting – l. acromio-clavicular, sterno-clavicular, c-v; mv – ossicle at asterion (bi), semi-double condylar facets, Allen's fossa (bi), lateral squatting facets (bi), lateral talar extension, double calcaneal anterior facets & talar inferior facets | ES: 1.57 m (*c.* 5′ 1¾″)<br>CI: 69.1 (dolicho.)<br>PI: 86.0/96.7 (eury.)<br>PcI: 74.9/79.9 (eury.)<br>RI: 129.1/127.7 | 16.43–16.68 m aOD. (0–1; fib. 4) |
| 3676 | 3666 | local | *c.* 98% | juvenile<br>*c.* 10–11 yr.<br>??male | calculus; hypoplasia; *cribra orbitalia*; endosteal new bone – occipital; periosteal new bone – anterior sacrum, right scapula (dorsal & ventral); mv – occipital bunning, ossicles at lambda, lambdoid ossicles, ossicle at asterion (bi), double condylar facet, pre-condylar tubercle, C5 accessory transverse facet, r.3rd trochanter, l. anterior calcaneal facet double | - | 16.54–16.71 m aOD. (0–1). Skull slightly warped |
| 3680 | 3666 | local | *c.* 99% | subadult<br>*c.* 17–18 yr.<br>?female | calculus; *cribra orbitalia*; ?fracture – left 5th middle foot phalanx; destructive lesion (infection) & body collapse – L5 & S1 (?brucell/TB?); periosteal new bone – anterior sacrum, r. fibula; endosteal new bone – occipital; cortical defects – humeri, tibiae, naviculars; mv – tooth root & cusp variations, metopic suture, lambdoid ossicles, 3rd trochanters (bi), septal aperture, hypotrochanteric fossa (r.), lateral squatting facets | ES: 1.57 m (*c.* 5′ 1¾″)<br>CI: 75.6 (dolicho.)<br>PI: 93.5/86.9 (eury.)<br>PcI: 65.1/66 (meso.)<br>RI: 97.9/101.2 | 16.44–16.69 m aOD.<br>(0; hum. 3–4) |
| **Early Iron Age** | | | | | | | |
| 3616 | 3615 | 'Scand.' | *c.* 39% | subadult<br>*c.* 14–18 yr.<br>??female | calculus; hypoplasia; *cribra orbitalia*; tooth wear – max. r.I1 (?cultural); periosteal new bone – l. tibia; mv – cusp & root variations, tooth rotation | - | 16.95–17.12 m aOD. (1–3) |
| 3656 | 3655 | 'Scand.' → local | *c.* 95% | adult<br>*c.* 30–35 yr.<br>?female | calculus; sinusitis; fracture – l. fibula; spondylolysis – L4 & L5; hydatid cysts; periosteal new bone – tibia, l. fibula; hypervascularity – vault; ivory osteoma; solitary bone cysts – carpals; op – C1, L4–5 bsm, c-v; enth – calcanea; mv – sternal aperture, lambdoid ossicle, navicular coalition? | ES: 1.57 m (*c.* 5′ 1¾″)<br>CI: 66.8 (dolicho.)<br>PI: 78.5/75.9 (platy.)<br>PcI: 78.5/73.3 (eury.)<br>RI: 128.1/135.4 | 17.56–17.70 m aOD. (0–2) |

*Table 4.1 Summary of results from* in situ *human bone from Mortuary Feature 2018*

| Context | Cut | Isotope data | Quantification | Age/sex | Pathology | Basic indices | Level & condition |
|---|---|---|---|---|---|---|---|
| **Middle Iron Age** | | | | | | | |
| 3563 | ? | local | *c.* 95% | adult<br>*c.* 40–45 yr.<br>female | amtl; caries; abscess; hypoplasia; periodontal disease; secondary sinusitis; osteoarthritis – 2T (inc. T12), 3L; spondylolysis – 1L; Sch – T6–12, 1L; vertebral body collapse – T7–12; periosteal new bone – T7, r. fibula; destructive lesion (infection) – T12; plastic changes – r. prox. femur; surface defect – navicular; op – C1; mv – partial ossicle, septal aperture (l.), Allen's fossa (l.), hypotrochanteric fossa (bi), squatting facets (l.) | ES: 1.56 m (*c.* 5′ 1⅓″)<br>PI: 81.8/91.9 (platy/eury)<br>PcI: 66/66.8 (meso.)<br>RI: 117.8 | 17.52–17.75 m aOD. (2–4).<br>Skull warped |
| 3644 | 3642 | 'Scand.' | *c.* 95% | adult<br>*c.* 30–40 yr.<br>female | calculus; hypoplasia; periosteal new bone – r. tibia; Sch – 2T; hypervascularity – vault; pitting – T ap, r. acromio-clavicular, r. c-v; surface defect – l.5th distal IP (foot); mv – max. tooth displacement, man. l.M3 absent, ossicles at lambda & vault asymmetry, lambdoid ossicles, Atlas posterior bridging, Allen's fossa (bi), lateral squatting facets | ES: 1.58 m (*c.* 5′ 2″)<br>CI: 74.9 (dolicho.)<br>PI: 81.1/85.2 (platy/eury)<br>PcI: 69.8/71.7 (meso/eury)<br>RI: 118.8/107.7 | 17.38–17.77 m aOD. (0–1).<br>Longitudinal cracking |
| 3651 | 3702 | 'Scand.' | *c.* 94% | subadult<br>*c.* 14–16 yr.<br>?male | calculus; *cribra orbitalia*; destructive lesion – T11 ap; periosteal new bone – anterior manubrium, r. tibia; cortical defect – r. clavicle, r. prox. humerus; surface defect – axis superior surface, T ap; pitting – T11 ap; mv – man. l.M3 absent, max. M3 impacted, maxillary cusp variations, Atlas superior facets double, ossicle at lambda, Allen's fossa (bi), hypotrochanteric fossa (bi), 3rd trochanter (bi), Vastus notch (r.) | PI: 79.7/79.4 (platy.)<br>PcI: 73.2/70.4 (eury.)<br>RI: /133.2 | 17.26–17.46 m aOD. (0–4) |
| 3660 | 3665 | 'Scand.' | *c.* 96% | subadult<br>*c.* 15–17 yr.<br>?male | abscess; calculus; hypoplasia; hypervascularity – vault; hydatid cysts; periosteal new bone – tibiae, r.3rd MtT; cortical defects – prox. tibia; surface defect – r. navicular; mv – L6 partly sacralised, man. left M3 absent, lambdoid ossicles, pre-condylar tubercle, r.3rd trochanter, r. medial squatting facets, double anterior calcaneal facets (bi) | PI: 93.8/89.6 (eury.)<br>PcI: 68.5/64.7 (meso.) | 17.46–17.59 m aOD. (0–1).<br>Longitudinal cracking |
| 3662 | 3663 | 'Scand.' | *c.* 97% | adult<br>*c.* 29–34 yr.<br>female | amtl; caries; abscess; calculus; hypoplasia; *cribra orbitalia*; osteoarthritis – 3 r. c-v; spondylolysis – L5; r. fibula medial bowing; op – C1, c-v; mv – left double mastoid, lambdoid ossicles, L6 sacralised, C5–7 accessory transverse foramen, l. septal aperture, l. hypotrochanteric fossa & 3rd trochanter, lateral squatting facets (bi) | ES: 1.56 m (*c.* 5′ 1⅓″)<br>PI: 75.1/84.3 (platy.)<br>PcI: 59.6/58.1 (platy.)<br>RI: 130.3 | 17.35–17.52 m aOD. (1–2) |
| 3677 | 3678 | ?non-local | *c.* 92% | subadult<br>*c.* 14–16 yr.<br>??male | calculus; max. l.I2 – wear (?cultural); *cribra orbitalia*; periosteal new bone – anterior sacrum, medial clavicles, humerus shafts, r. prox. ulna, femoral necks, left tibia, left fibula; plastic changes (vascular; skull); *spina bifida occulta*; mv – max. r. M3 absent, tooth rotation, lambdoid ossicles, suprascapulae foramen, lateral squatting facets, Vastus notches | - | 18.0–18.14 m aOD. (0–1).<br>Skull warped |

* partial skeleton

**KEY:** s. = skull, a. = axial skeleton, u. = upper limb, l. = lower limb (skeletal areas represented where all are not present); amtl = *ante mortem* tooth loss; op = osteophytes; ddd = degenerative disc disease; Sch = Schmorl's node; enth = enthopathies; mv = morphological variation; man. = mandible; C = cervical; T = thoracic; L = lumbar; S = sacral; bsm = body surface margins; ap = articular process; c-v = costo-vertebral; MtT/C = metatarsal/metacarpal; IP = interphalangeal; P = phalangeal; prox. = proximal

*Indices*: where bi-lateral left/right. ES = estimated stature; CI = cranial index; PI = platymeric index; PcI = platycnemic index; RI = robusticity index (femur)

*Table 4.1 cont. Summary of results from* in situ *human bone from Mortuary Feature 2018* the inclusion of other materials within the burial and the grave fills can have an ameliorating effect.

It was, consequently, not unexpected that little or no human bone survived in the graves associated with the Early Bronze Age Barrows (1–4) or the Anglo-Saxon graves at Cliffs End (see below). Both groups of features were cut through and rapidly backfilled with the natural brickearth, and were similarly located on or close to the ridge of high ground with which the western part of the site corresponded. The surviving depths of the graves, although not substantial, were commensurate with those commonly encountered in archaeological investigations; the Early Bronze Age graves having a range of 0.15–0.31 m.

The features from which the rest of the human bone derived had, as with the earlier prehistoric and Anglo-Saxon graves, all been cut through the natural brickearth, but their slowly accumulated backfills of reworked brickearth had incorporated a variety of other materials sufficient to have a favourable effect on the burial environment. Although showing some variation in preservation both within and between deposits, the condition of the bone from Mortuary Feature 2018 and the few non-grave contexts from which human bone was recovered is generally good (Tables 4.1–4.4). There is little overall difference between the articulated and disarticulated redeposited bone, but some slight temporal variation was observed within some groups of material and location was clearly significant in some cases.

### Articulated *in situ* remains

Most of the *in situ* Late Bronze Age material is in good condition (grades 0–2, see Pl. 2.3), though individual bones from two burials are unaccountably less well preserved than the rest (grades 3–4 – moderate surface erosion across all cortex). The condition of the bone and lack of disturbance is reflected in the high levels of skeletal recovery (98–99%) from half of the deposits. The remains of the juvenile 3674 were probably disturbed during the recutting of the initial investigative sondage into the feature (see McKinley, Chapter 2) which appears to have removed most of the right hand, probably the components of the left knee joint and potentially at least some of the skull. Much of the former and some of what may represent the skull from this individual were recovered under context numbers allocated during this initial investigation (2330 and 2058). If, however, the latter skull fragments did derive from this individual, modern disturbance cannot have been the only mechanism involved since bone fragments recovered from other parts of the lower fill of Burial Pit 3666 join to form a large proportion of the cranial vault; ONs 106 and 521 recovered *c.* 1.27 m apart at similar levels (Fig. 2.21). A possible alternative for the skull of 3674 is the almost complete cranium recovered as ON 535 from the fill *c.* 0.45 m above burial 3676; again implying ancient manipulation of the juvenile remains and possible redeposition of the disturbed bone in the fills made immediately above the *in situ* remains.

There is clear evidence for ancient manipulation of others amongst the *in situ* remains from 3666. The partial remains of the adult male 3673, comprising the skull, spine and upper left limb arranged to form a neat bundle (probably originally bagged or bound together) of two groups of articulated body parts (see McKinley, Chapter 2; Figs 2.14, 2.17) had obviously been subject to ancient modification. The corpse must have been largely decomposed to allow such manipulation, skeletal elements remaining attached via the more resilient soft tissues (ligaments, muscle/tendons). Some of the old fragmentation observed to the right scapula, superior to the acromion neck, appears to have been made to semi-green bone; a dorsal blow had created a jagged edge at the point of impact with bevelling on the ventral side. Similarly, an area approximately 11.2 mm in diameter of very slightly 'pushed-in' bone in the lower part of the 10th thoracic vertebra anterior body surface appears to have been sustained when the bone was semi-green, suggesting damage caused during partition of the partially decomposed corpse. The anomalous position of the skull of the juvenile 3676 (which is slightly warped due to soil pressure) suggests that the head had been forcibly rotated whilst still articulated though possibly partly decomposed (see McKinley, Chapter 2; Fig. 2.16; Pl. 2.7). There is no evidence for cuts to the bone suggestive of dismemberment or the severing of connective tissues in either case; nor is the bone in noticeably poorer condition or more severely fragmented than the rest within this group.

Fragmentation of the *in situ* bone from 3666 was generally limited. The skulls had suffered more than the rest of the bone but only to an extensive degree in the case of the subadult 3649, the last of the Late Bronze Age burials to be made. The latter lay more than 1.0 m above those in the base of 3666, the burial apparently having been made within the shallow ring-ditch cut through the upper fills of 3666 to mark the main focus of its location. The bone is noticeably more eroded than the rest, much of the trabecular bone is degraded or had disintegrated, and bones of both forearms and hands are missing resulting in relatively low skeletal recovery (*c.* 60%; Fig. 2.26). The mechanism by which the arm bones were removed is a matter of conjecture. There are, again, no indications of cut marks to the bone but there is some

| Context | Obj No. (ON) | Location | Phase | Isotope data | Quantification | Age/sex | Pathology | Basic indices | Level & condition | Associations |
|---|---|---|---|---|---|---|---|---|---|---|
| 2019 | - | above 3666 | ?LBA | - | 3 frags. parietal | subadult/adult >13 yr. | - | - | *c.* 17.60 m aOD. (1) old breaks, eroded | - |
| 2058 | 100 | NW | LBA* | NW Europe → southern | *c.* 15% skull (– mandible) | subadult *c.* 15–18 yr. ?female | calculus; mv – occipital bunning, lambdoid ossicle, absence max. M3s, max. I2 accessory tubercle | CI: 72.3 (dolicho) | *c.* 17.12 m aOD. (0) | © MNI |
| 2058 | 101 | NW | LBA* | 'Scand.' → non-local (N. Britain) | *c.* 15% skull (– mandible) | adult *c.* 35–45 yr. ??female | abscess; calculus; new bone – palate; mv – lambdoid ossicle, ossicle at asterion | CI: 75.3 (meso) | *c.* 17.12 m aOD. (1–2) old & fresh breaks | © MNI |
| 2058A | inc. 102, 110 | NW | LBA* | | *c.* 20% a.u.l. | adult *c.* 30–40 yr. male | *spina bifida occulta*; op – S1 bsm, c-v; mv – Allen's fossa, hypotrochanteric fossa | ES: 1.72 m (*c.* 5′ 7¾″) PI: 83.3/70.6 (platy) RI: 115.8 | *c.* 17.12 m aOD. (0–1) inc. fresh breaks no joins | could all be same ind.; most could = 3673 |
| 2058B | inc. 106+ 521 (join) | NW | LBA* | | *c.* 15% s.l. | juvenile *c.* 6–10 yr | hypervascularity – femur; mv – ossicle at lambda | - | *c.* 17.12 m aOD. (0–1) old & fresh breaks (some no join); cess-like precipitate adhering | ON 521 from 204406; could be same ind. © MNI |
| 2326/ 3671 | - | NW | LBA | - | 5 bones a.u.l. | adult >18 yr. ??male | - | - | *c.* 16.91 m aOD. (0–1) some fresh breaks (no joins) | ??= 3673 |
| 2328/ 3670 | - | NW above *in situ* bone | LBA | - | 2 frags. thoracic | adult >30 yr. | ddd – 1T | - | *c.* 16.77 m aOD. (0–1) old breaks | ??= 3673 |
| 2330A/ 3667 | - | NW level of *in situ* bone | LBA | - | 4 l. foot bones | adult >18 yr. | - | - | *c.* 16.72 m aOD. (0) | ??= 3673 |
| 2330B/ 3667 | - | NW level of *in situ* bone | LBA | - | *c.* 2% r. hand bones & r. prox. humerus | *c.* juvenile 9–11 yr. | - | - | *c.* 16.72 m aOD. (1) dark staining | prob. = 3674 |
| 3670 | 593–599 | - | LBA | a) local | a) 2 frags. s.a. b) 5 frags. a.u.l. | a) juvenile *c.* 9–10 yr. b) adult >18 yr. | a) mv – 4 cusp man. M1 | - | *c.* 16.44–16.51 m aOD. (0) | a) not = 3674; ?= ON 106/521 |
| 3673b | - | - | LBA | - | r. patella | juvenile *c.* 10–12 yr. | - | - | 16.54 m aOD. (3) | prob. 3676 (?wrongly labelled in p.exc.) |
| 3674b | - | with *in situ* bone | LBA | - | 5 bones u.l. | adult >18 yr. | - | - | *c.* 16.50 m aOD. (0–1) | min. some not = 3673 |
| 3676b | - | with *in situ* bone | LBA | - | 5 frags. u.l. | adult >18 yr. | - | - | *c.* 16.54 m aOD. (0–1) | - |
| 3681 | 628 | below *in situ* | LBA | - | 1) 5 r. foot bones 2) 2 frags. occipital | 1) adult >18 yr. ??male 2) juvenile *c.* 5–12 yr. | - | - | 16.39 m aOD. (0) | 1) could =3673 2) could = 3674 |
| 3682 | - | below *in situ* 3676 | LBA | - | 21 frags. a.u. | adult >18 yr. ??female | - | - | *c.* 16.50 m aOD. (1–2) old breaks; dry bone burning/scorching | could all be same ind.; ?= semi-articulated dispersed |
| 3689 | - | below *in situ* 3676 | LBA | - | 1 frag. MtC | subadult/adult >15 yr. | - | - | *c.* 16.30 m aOD. (3) old breaks; ?canid gnawing | prob. same as 3682 |
| 204404 | 499, 502 | E. half | LBA | - | r. ulna & radius | adult >18 yr. male | cortical defect – radius; enth – prox. ulna | - | 17.39–17.44 m aOD. (1–2) some fresh breaks no join | pair; size suggests not = *in situ* 3673 |
| 204405 | - | E. half | LBA | - | frag. r. MtT | adult >18 yr. ??male | - | - | *c.* 17.29 m aOD. (1–2) fresh break no join | ?same ind. as 204404 |
| 204406 | 521, 522 | E. half | LBA | - | l. tibia | adult >18 yr. | - | - | 17.16 m aOD. (1–2) slight longitudinal splitting; some 'cess'-like adherence | ON 521 skull join ON 106 in 2058; 522 not fit femur 537 from lower spit |
| 204407 | 535 | E. half | LBA | - | *c.* 8% vault | juvenile/subadult *c.* 10–14 yr. | ?healed depressed fracture; mv – lambdoid ossicles | - | 17.03 m aOD. (0–1) 'cess'-like adherence | © MNI |
| 204407 | 536 | E. half | LBA* | southern | *c.* 15% skull (– mandible) | adult *c.* 20–25 yr. male | calculus; mv – ossicle at lambda, lambdoid ossicles, max. I2 accessory tubercles | CI: 79.3 (meso) | 17.12 m aOD. (0–1) | © MNI could = ind. as femur ON 537 |
| 204407 | 537 | E. half | LBA | - | l. femur | adult *c.* 20–35 yr. male | - | ES: 1.70 m (*c.* 5′ 7″) | 17.10 m aOD. (1) old damage (not broken) | could be same ind. as skull ON 536 |
| 204408 | - | E. half | LBA | - | 4 frags. r. hand | adult >18 yr. | - | - | *c.* 16.85 m aOD. (0) old & fresh breaks some no joins | - |
| 204409 | 601 | E. half | LBA | - | 5 frags. s.a.u. | juvenile *c.* 8–10 yr. | mv – non-fusion C1 transverse processes | - | *c.* 16.40–16.60 m aOD. (0–1) some longitudinal splitting | some ?=3674 some ?= ON 521 2058B |

* radiocarbon dated. Approximate (*c.*) levels extrapolated. © MNI – included in count of minimum number of individuals

**KEY:** s. = skull, a. = axial skeleton, u. = upper limb, l. = lower limb (skeletal areas represented where all are not present); amtl = *ante mortem* tooth loss; op = osteophytes; ddd = degenerative disc disease; Sch = Schmorl's node; enth = enthopathies; mv = morphological variation; man. = mandible; C = cervical; T = thoracic; L = lumbar; S = sacral; bsm = body surface margins; ap = articular process; c-v = costo-vertebral; MtT/C = metatarsal/metacarpal; IP = interphalangeal; P = phalangeal; prox. = proximal

*Indices*: where bi-lateral left/right. ES = estimated stature; CI = cranial index; PI = platymeric index; PcI = platycnemic index; RI = robusticity index (femur)

*Table 4.2 Summary of results from redeposited human bone within and above Burial Pit 3666*

| Context | Obj No. (ON) | Phase | Isotope data | Quantification | Age/sex | Pathology | Basic indices | Level & condition | Associations |
|---|---|---|---|---|---|---|---|---|---|
| **Group juxta-3666** | | | | | | | | | |
| 164405 | 550 | LBA | - | 1 frag. lumbar | subadult/adult >13 yr. | - | - | 17.88 m aOD. (3) old breaks | - |
| 164605 | 534 | LBA | - | frags. r. femur | adult *c.* 20–40 yr. male | enth – femur | ES: 1.75 m (*c.* 5′ 8¾″) PI: -/78.9 (-/platy) RI: -/120.9 | 17.51 m aOD. (1–2) | © MNI |
| 164605 | 543 | LBA* | - | frags. l. parietal | juvenile *c.* 8–12 yr. | - | - | 17.47 m aOD. (1–2) old breaks, some dark stain | © MNI |
| 164605 | 545 | LBA* | - | *c.* 5% l. parietal | subadult/adult *c.* 15–25 yr. female | - | - | 17.51 m aOD. (1–2) old breaks | © MNI joins ON 565 184605 |
| 184205 | - | LBA | - | frag. r. calcaneum | adult >20 yr. ??male | mv – double anterior calcaneal facet | - | *c.* 17.60 m aOD. (0) old breaks | - |
| 184404 | - | LBA | - | innominate frags. | adult *c.* 23–25 yr. male | - | - | *c.* 17.40 m aOD. (1–2) old breaks; dark staining? | same ind. as 2304407 in burial pit 2666 |
| 184604 | 541 | LBA* | - | frags. l. parietal | juvenile *c.* 8–12 yr. | | | 17.56 m aOD. (0–1) heavily frag. some fresh no join, dark staining | © MNI Not = ON 567 |
| 184605 | ON 542, 569 & u/ no. | LBA | - | *c.* 9% vault | adult *c.* 30–40 yr. male | - | CI: 71.8 (dolicho) | 17.40–17.54 m aOD. (1–2) slight dark staining | ?= 164605 ON 534 or ON 570 |
| 184605 | 564, 567 | LBA* | southern | *c.* 6% skull | juvenile/subadult *c.* 11–14 yr. ??female | calculus | - | 17.47 m aOD. (0–1) dark stain | © MNI prob. match of ONs |
| 184605 | 565 | LBA* | - | 3 frags. occipital | subadult/adult *c.* 15–25 yr. female | calculus | - | 17.49 m aOD. (1–2) old breaks | secure C14 from joining frag. ON 545 164605 |
| 184505 | 568 | LBA | - | *c.* 5% vault | adult *c.* 35–50 yr. ??female | mv – ossicle at lambda, lambdoid ossicles, asterion ossicle | - | 17.40 m aOD. (2) | © MNI |
| 184605 | 570 | LBA | - | frags. r. femur | adult *c.* 30–45 yr. male | mv – Poirier's facet | PI: -/87.9 (eury) | 17.60 m aOD. (1–2) | ?= ON 542/569 |
| 184804 | 556 | LBA* | - | *c.* 15 % skull (– mandible) | adult >45 yr. ??female | ?abscess; *cribra orbitalia*; endosteal new bone; mv – ossicle at l. asterion , pre-condylar tubercle | - | 17.43–17.57 m aOD. (1–2) heavily frag. (fresh) old breaks | © MNI ?= ON 560 & 561 |
| 184804 | 560, 561 | LBA | - | l. femur & fibula | adult >30 yr. ?male | - | ES: 1.73 m (*c.* 5′ 8″) PI: 90.6 (eury) RI: 114.5 | 17.51 m aOD. (1–2) | could be same ind. as 556 |
| 204605 | 581 | LBA | - | 16 frags. parietal | subadult/adult >15 yr. | - | - | 17.47 m aOD. (1–2) heavily frag., patchy black staining | - |
| 204605 | 582 | LBA | - | frags. l. femur | adult >18 yr. | - | - | 17.51 m aOD. (3–4) old breaks; dark stain | - |
| 204605 | 584 | LBA | - | finger phalanx | adult >18 yr. | - | - | 17.42 m aOD. (3–4) | - |
| 204804 | 588 | LBA | - | frags. r. fibula | adult >18 yr. ??male | - | - | 17.50 m aOD. (1) | - |
| 204000+ 204004 | - | ?LBA/ ?EIA | - | frags. r. tibia | adult >20 yr. ??male | - | PcI: -/75.9 (-/eury) | *c.* 17.60 m (or >) & 17.45 m aOD. (3–4) old breaks (join), bleached | - |
| **North-west group** | | | | | | | | | |
| 084002 | 592 | ?LBA | - | 3 frags. l. radius | adult >18 yr. | - | - | 17.79 m aOD. (0) fresh breaks no joins | - |
| 104205 | - | ?LBA | - | frag. l. rib | adult >18 yr. | - | - | *c.* 17.40 m aOD. (0) old breaks | - |
| 123802 | 276 | ?LBA/ EIA | - | 3 frags. (join) l. frontal | adult >18 yr. ??male | - | - | 18.24 m aOD. (2) discoloured, old breaks | - |
| 123803 | 300 | ?LBA/ EIA | - | 5 frags. u. | - | - | - | 17.95 m aOD. (2) old breaks | - |
| 123804 | - | ?LBA/ EIA | - | 2 frags. (join) l. ulna | subadult/adult >15 yr. | periosteal new bone – ulna; exostoses – ulna | - | *c.* 17.55 m aOD. (2) old breaks | - |
| 124205 | 589 | LBA* | - | frags. r. parietal | subadult/adult *c.* 15–25 yr. | hypervascularity | - | 17.34 m aOD. (0–1) fresh breaks (1 no join) | ?match juxta-3666 164605 ON 545/565 |
| 143602 | 278 | ?EIA | local | frags. mandible | adult *c.* 45–60 yr. female | amtl; calculus; mv – M1 4 cusp variant, man. M3 absent | - | 18.24 m aOD. (2–3) dark staining | ?match juxta-3666 184605 ON 568 |
| 143801 | 265 | ?EIA/ LBA | - | 19 frags. femur | subadult/adult >15 yr. | - | - | 18.47 m aOD. (3) heavy frag. most fresh some no join | - |
| 163400 | 530 | EIA | - | 2 frags. l. parietal | adult *c.* 18–35 yr. | - | - | 17.52 m aOD. (2) old breaks | joins ON 540 |
| 163205 | 540 | EIA | - | 3 frags. parietal | adult *c.* 20–40 yr. | - | - | 17.46 m aOD. (2) | joins ON 540 & 163405+ |
| 163405+ | - | EIA* | - | 6 frags. l. parietal | adult 20–40 yr. | - | - | *c.* 17.55 m aOD. (2) some fresh breaks no joins | = ON 530 & 540 |
| 163603 | 305 | ?EIA | - | parietal frag. | adult >18 yr. | - | - | 17.98 m aOD. (2) dark stain | - |
| 163604 | - | ?EIA | - | frags. l. tibia | adult >18 yr. ??male | - | - | *c.* 17.60 m aOD. (2) old dry breaks, bleached, splitting | ??pair with juxta-3666 204000/04 |

| Context | Obj No. (ON) | Phase | Isotope data | Quantification | Age/sex | Pathology | Basic indices | Level & condition | Associations |
|---|---|---|---|---|---|---|---|---|---|
| **North-east group** | | | | | | | | | |
| 264407 | 549 | ?LBA/ EIA | - | tooth | adult >45 yr. | - | - | 16.86 m aOD. (0) | - |
| 284205 | - | ?LBA/ EIA | - | tibia frag. | adult >20 yr. ??male | - | - | *c.* 17.40 m aOD. (1–2) old breaks, longitudinal fissures | |
| **West-central group** | | | | | | | | | |
| 3659 | 552, 554 | ?EIA | - | 9 frags. u.a. | subadult/adult *c.* 18–23 yr. | periosteal new bone – r. ribs | - | 18.15 m aOD. (0) canid gnawing | ?all same ind. |
| 162605 | - | ?EIA | - | 2 frags. frontal | subadult/adult *c.* 13–30 yr. | - | - | *c.* 17.60 m aOD. (2) old breaks, dark stain | - |
| 162807 | - | ?EIA | - | frag. l. humerus | adult >18 yr. | - | - | *c.* 17.20 m aOD. (0) old dry breaks; canid gnawing, human manipulation (polish) | © MNI |
| **East-central group** | | | | | | | | | |
| 202803 | 281 | ?EIA/ MIA | - | 3 frags. occipital | adult *c.* 25–45 yr. | - | - | 17.87 m aOD. (2) | - |
| 202805 | 301 | ?EIA/ MIA | - | frags. l. humerus | adult >18 yr. ??male | - | - | 17.55 m aOD. (2–3) | © MNI |
| 202806 | 352–3, 388–393 | EIA* | - | 8 frags. r. foot | adult >18 yr. | - | - | 17.16–17.18 m aOD. (3–4) | dispersed from semi-articulated male |
| 202807 | inc. 424–6 & 501 | ?EIA | - | 15 frags. s.a.u.l. | adult *c.* 18–45 yr. ??male | - | - | 16.93 m aOD. (2–3) | not necc. all same ind.; long bones similar robusticity; ?=dispersed semi-articulated male |
| 202808 | 490 | ?EIA | - | l. patella | adult *c.* 20–35 yr. ??male | enth – patella; mv – Vastus notch | - | 16.95 m aOD. (0) | could = ON 425–6 (size matches); ?= dispersed semi-articulated male |
| 203003 | 277 | ?EIA | - | frontal frags. | adult >20 yr. ??male | - | - | *c.* 17.80 m aOD. (1) machine damage | could = 425–6/490 to S? |
| 203004 | 423 | ?EIA | - | finger phalanx | adult >18 yr. | - | - | 16.99 m aOD. (0) | ?=dispersed semi-articulated female |
| 203007 | 409, 419–22 | EIA* | local | *c.* 5% s.a.u. | adult *c.* 50–70 yr. ?female | aries; abscess; calculus; periodontal disease; mv – C5–6 accessory transverse foramen, medial talar facet | - | 16.99–17.03 m aOD. (3) | dispersed semi-articulated; fit with ON 480 spit below |
| 203007 | - | ?EIA | - | frags. 2 tarsals | adult >20 yr. | - | - | *c.* 17.0 m aOD. (3) | ?=dispersed semi-articulated female |
| 203008 | 477–89, 500, 503–4, 509 | ?EIA | - | *c.* 6% a.u. | adult *c.* 25–40 yr. ?female | exostoses – prox. humerus; op – T3 bsm; mv – circumflex sulcus | - | 16.40–16.97 m aOD. (0) old breaks | © MNI ON 480 fits ON 422 above; all same ind. with spit above; = dispersed semi-articulated |
| 203008 | 515 | ?EIA | - | frag. r. patella | adult >20 yr. | enth – patella; mv – Vastus notch | - | 16.76 m aOD. (0) | ?= dispersed semi-articulated |
| 203404 | 534 | ?EIA/MIA | - | frags. l. innominate | adult >25 yr. | mv – acetabular crease | - | *c.* 17.30 m aOD. (2–3) old breaks | alone to N. |
| 223203 | 274 | ?MIA | - | frags. l. frontal | adult>18 yr. ??male | *cribra orbitalia* | - | 17.66 m aOD. (0–1) fresh breaks no joins | © MNI ?=223204 |
| 223204 | inc. 282–3 | ?MIA | - | 3 frags. s.u. | min. 1 adult *c.* 20–30 yr. | - | - | 17.53 m aOD. (3–4) | s. & u. not necc from same ind. ?=223203 |
| 223403 | 528 | ?EIA | - | 4 frags. parietal | subadult/adult >12 yr. | - | - | 17.50 m aOD. (0–1) | prob. = 243204 ind. |
| 242805 | - | ?EIA/MIA | - | frags. l. humerus | subadult/adult >15 yr. ??female | trauma – ?fracture | - | 17.35 m aOD. (1) fresh breaks no joins (prob. complete bone) | © MNI |
| 243005 | 348–9 | ?MIA | - | 2 teeth | subadult/adult *c.* 15–25 yr. | hypoplasia; calculus | - | 17.27 m aOD. (0) | prob. = 243204 conc. 1–2 m to N |
| 243204 | 287–293, 306–9, 312–325, 327–331, 333–343, 354–389, 398, 414, + 3 u/no. finds | MIA* | southern | *c.* 29% s.a.u.l. | subadult *c.* 12–14 yr. ??female | hypoplasia; calculus | - | 17.30–17.62 m aOD. (0 some left & lower ribs 4, limb bones 3–4) skull heavily fragmented | © MNI. ONs 348–9 could be from same ind. (rest teeth *c.* 2 m N). Semi-articulated dispersed |
| 243205 | 326, 394–8, 399, 400–7 | ?EIA/MIA | - | *c.* 8% s.a.u.l. | subadult *c.* 13–15 yr. ??female | hypoplasia; surface defect – C ap | - | 17.31–17.47 m aOD. (3–5 some 0–1) | prob. same ind. as 243204 |
| **Southern group** | | | | | | | | | |
| 240801 | 431 | EIA | - | 5 frags. parietal | subadult/adult >12 yr. | - | - | 18.54 m aOD. (5+) | - |
| 241001 | 429 | EIA | - | cervical frag. | subadult/adult >13 yr. | - | - | 18.52 m aOD. (1) | - |
| 241001 | - | EIA | - | tooth | subadult/adult *c.* 15–25 yr. | hypoplasia | - | *c.* 18.51 m aOD. (1) | - |
| 241601 | inc. 430 | EIA* | - | 13 frags. parietal | adult *c.* 25–40 yr. | mv – ?ossicle at lambda | - | 18.53 m aOD. (3–4) some fresh breaks no joins | © MNI |
| 3610 | 437, 442 | EIA* | - | 3 frags. s.a. | subadult/adult >13 yr. | mv – metopic suture | - | 18.39 m aOD. (0–1) old breaks | ?= 4614 |
| 3614 | 444–445, 447–451, 453–454 | EIA | local | *c.* 2% s.a.u. | adult *c.* 35–50 yr. male | amtl; abscess; hypoplasia; calculus; mv – enamel pearl | - | 18.4–18.51 m aOD. (0–1) old breaks | same ind. ? semi-articulated r. arm dispersed? (1.5 x 0.5m area) |

* radiocarbon dated; © MNI – included in count of minimum number of individuals **KEY:** see Table 4.2

*Table 4.3 (and facing page) Summary of results from redeposited human bone within Mortuary Feature 2018 excluding those shown in Table 4.2*

| Context | Obj No. (ON) | Location | Phase | Isotope data | Quantification | Age/sex | Pathology | Basic indices | Level & condition | Associations |
|---|---|---|---|---|---|---|---|---|---|---|
| **Midden pit 2028** | | | | | | | | | | |
| 2029 | - | midden pit | LBA | - | 2 frags. s.l. | adult *c.* 18–30 yr. | - | - | (1) old worn breaks, eroded | ?= 2470/1 ON 494 |
| 2116 | - | midden pit | LBA | - | occipital frag. | subadult/adult >16 yr. | - | - | (1) old breaks | - |
| 2117 | - | midden pit | LBA | - | l. 3rd MtT | adult >18 yr. | - | - | (1) old abraded break | - |
| 2118 | - | midden pit | LBA | - | 4 frags. s.l. | adult >25 yr. | - | - | (0–1) old breaks | not necc. same ind. |
| 3231 | - | midden pit | LBA* | - | 3 frags. s.a.u. | 1) juvenile *c.* 8–12 yr.<br>2) min. 1 adult *c.* 20–40 yr. | Sch – T12; op – T12<br>bsm & c-v; pitting – c-v | - | (0–1) | - |
| 3233 | 239, 240 | midden pit | LBA | - | l. humerus & r. femur | adult *c.* 20–35 yr. male | exostoses – humerus; mv – hypotrochanteric fossa, third trochanter | PI: -/71.3 (-/platy) | (1) cess-like staining? | same ind.? = burial pit 3666 ON 536 |
| 3309 | 244 | midden pit | LBA* | - | frag. r. parietal | subadult/adult *c.* 15–30 yr. | - | - | (1) fresh breaks no joins, exocranial bleaching & splitting | - |
| **Ditch terminal & recut 2469 & 3699** | | | | | | | | | | |
| 2470 | - | ditch terminal recut | LBA | - | frag. l. scapula | adult >23 yr. | - | - | (0) | - |
| 2470–1 | 494 + (join) | ditch terminal recut | LBA* | - | 6 frags. occipital | adult *c.* 25–40 yr. ??female | - | - | (1) old breaks but fresh joins; ?dry bone burning | © MNI not join other 2471 skull frags. |
| 2471 | 461–2 (join) | ditch terminal | LBA | local | *c.* 12% skull<br>(– mandible) | subadult *c.* 15–18 yr.<br>??male | hypervascularity (lice?) – parietal; *ribra orbitalia*; mv – epiteric bone, circumflex sulcus | - | (0–1) | © MNI |
| 2471 | 465 | ditch terminal | LBA | - | r. femur | adult *c.* 20–40 yr. ??male | mv – Allen's fossa | ES: 1.68 m (*c.* 5′ 6″)<br>PI: -/99.3 (/eury)<br>RI: -/121.5 | (0–1) | © MNI not =<br>ON 467 or 507 |
| 2471 | 493 | ditch terminal | LBA | - | r. femur | adult >20 yr. ??male | contour variation – femur shaft;<br>mv – Allen's fossa | ES: 1.67 m (*c.* 5′ 6″) | (0) discoloured | © MNI |
| 2471 | 498 + 506 | ditch terminal | LBA | - | r. femur | adult *c.* 20–40 yr. male | - | ES: 1.79 m (*c.* 5′ 10¼″) | (0–1) fresh joining breaks | © MNI could = ON 507 |
| 2471 | 466, 525 | ditch terminal | LBA | - | r. fibula & scapula | adult >18 yr. ??male | - | - | (0–1) | - |
| 2471 | 463, 511, 514 | ditch terminal | LBA | - | l. rib + 2 frags. | subadult/adult *c.* 17–23 yr. | sharp-weapon trauma – rib | - | (0); ?canid gnawing | not necc. all same ind. |
| 2471 | 467 | ditch terminal | LBA | - | l. innominate | adult *c.* 35–40 yr. male | - | - | (0–1) | none of 3 femora fit |
| 2471 | 507 | ditch terminal | LBA | - | 2 frags. innominate | adult *c.* 30–45 yr. ?male | - | - | (0–1) fresh break no join; ?dry bone burning | ON 506 could fit |
| **Miscellaneous features** | | | | | | | | | | |
| 2048 | - | 2016 ditch fill | LBA | - | 1 frag. l. ulna | adult >18 yr. | - | - | 1–2, fresh breaks (no join) eroded & abraded | ditch Gp 2241 |
| 2789 | - | 2787 posthole | LBA | - | 2.3g *(cremated)* | subadult/adult >13 yr. | hypoplasia; calculus | - | - | - |
| 3469 | 254 | 3468 pit | LBA | 'Scand.' | 12 teeth | juvenile/subadult<br>*c.* 10–14 yr. | calculus mv – tooth variation | - | crowns only | - |
| - | - | 3635 pit/ditch | LIA/RB | - | 8 frags. s. | adult >18 yr. | - | - | 0–1, old breaks | - |

* radiocarbon dated; © MNI – included in count of minimum number of individuals

**KEY:** s. = skull, a. = axial skeleton, u.= upper limb, l.= lower limb (skeletal areas represented where all are not present); amtl = *ante mortem* tooth loss; op = osteophytes; ddd = degenerative disc disease; Sch = Schmorl's node; enth = enthopathies; mv = morphological variation; man.= mandible; C = cervical; T = thoracic; L = lumbar; S = sacral; bsm = body surface margins; ap = articular process; c-v = costo-vertebral; MtT/C = metatarsal/metacarpal; IP = interphalangeal; P = phalangeal; prox. = proximal *Indices*: where bi-lateral left/right. ES = estimated stature; CI = cranial index; PI = platymeric index; PcI = platycnemic index; RI = robusticity index (femur)

*Table 4.4 Summary of results from redeposited human bone from outside Mortuary Feature 2018* slight evidence suggestive of possible short-term exposure of part of the skeleton in the form of limited longitudinal splitting to the shafts of the lower limb bones. Whilst the deliberate removal of the arm bones as a continuation of the practice of human manipulation of burial remains for which there is earlier evidence is a distinct possibility, the physical and stratigraphic location of 3649 may have been a factor. The skeleton lay in the uppermost Late Bronze Age levels, apparently almost immediately covered by Early Iron Age deposits (Fig. 2.12). It is highly likely that during the *c*. 300–400 year hiatus in activity between the Late Bronze Age and the Early Iron Age within Mortuary Feature 2018, the deposits overlying 3649 were reworked, and during the course of this reworking some bones could have been accidentally removed and others exposed to a deleterious burial environment from which the deeper deposits were protected.

There is considerable variation between the two Early Iron Age *in situ* articulated skeletons in terms of condition and levels of recovery. The only later burial to have been made in the northern portion of 2018, 3656 appeared to have been made within the confines of the Late Bronze Age ring-ditch overlying Burial Pit 3666 (Figs 2.24, 2.28). The bone is in good condition and most of the burial survived intact (95% recovery) although the cranium was heavily fragmented. In contrast, 3616, recovered from the southern portion of the mortuary feature (Figs. 2.11, 2.23), has the lowest skeletal recovery of any of the articulated *in situ* remains (39%); the trabecular bone was particularly poorly preserved and much of the bone visible in the ground did not survive lifting (Fig. 2.28). The burial had been made above one of the large pits cut in this area prior to its use for mortuary purposes. At the end of its use the latter had apparently been sealed by a layer of sand and it is possible that this variation in the burial environment was sufficient to adversely affect the survival of the bone. Alternatively, the poor condition of this skeleton compared with the rest of the articulated bone assemblage may intimate an undetected difference in mortuary treatment. The other human remains of this date in this East-central area of 2018 appear to represent dispersed semi-articulated body parts and disarticulated bone (see below; Fig. 2.30), the condition of some of which is also poor.

There were high levels of skeletal recovery from all the Middle Iron Age *in situ* burial remains (92–97%) and in general the condition of the bone is good, the greatest variation being seen in the earliest of the burials made in the central part of the area (3563 and 3651) where the trabecular bone had suffered preferentially (Figs 2.29–2.30, 2.34; Pls 2.9–2.14). The presence of a partial articulated horse carcass in grave 3665 had had no notable effect on the preservation of the human remains. Most of the crania were heavily fragmented and the two from the latest burials at either end of the row 3653 and 3677, are slightly warped; some of the damage to the latter – located on the very western margins of the Mortuary Feature – was sustained in machine stripping. The lower limb bone shafts from two of the central graves (3642 and 3665) have slight longitudinal splitting suggestive of possible short-term exposure of parts of both skeletons; the upper limb bones from 3665 are also slightly affected.

### Disarticulated remains

The majority (63%) of the disarticulated bone (including that interpreted as dispersed semi-articulated; see below) is in good condition (grades 0–1) with only 12% being moderately-heavily eroded/degraded (>grade 3). As observed above, there was some marked temporal and spatial variation in bone condition potentially reflective of differential mortuary treatment and/or undetectable changes in the burial environment. Since the entire fill of 2018 appears to comprise largely undifferentiated reworked brickearth predominantly accumulated by colluviation, this suggests adaptations in landuse and activities being undertaken in the western (upslope) part of the site.

The bone from the midden-type deposits is consistently in good condition (all grades 0–1), undoubtedly due to the more neutral burial environment. The majority of the disarticulated bone from Burial Pit 3666 is also in good

| | | Burial Pit 3666 | Juxta-3666 group | North-west group | North-east group | West-central group | East-central group | Southern group | Midden-type deposits |
|---|---|---|---|---|---|---|---|---|---|
| Overall proportion of assemblage | | 86 / 28.4% | 27 / 8.9% | 12 / 4% | 2 / 0.7% | 11 / 3.6% | 126 / 41.6% | 19 / 6.3% | 20 / 6.6% |
| Complete elements | | 49 / 57% | 7 / 25.9% | - | 1 / 50% | - | 35 / 27.8% | - | 8 / 40 % |
| Skeletal areas: | skull | 9 / 10.5% | 12 / 44.4% | 6 / 50% | 1/ 50% | 1/ 9.1% | 25 / 19.8% | 8 / 42.1% | 2/ 10% |
| | axial | 15 / 17.4% | 2 / 7.4% | 1 / 8.3% | - | 8 / 72.7% | 58 / 46.0% | 3 / 15.8% | 6 / 30% |
| | upper lumber | 41 / 47.7% | 1 / 3.7% | 3 / 25% | - | 2 / 18.2% | 18 / 14.3% | 8 / 42.1% | 4 / 20% |
| | lower lumber | 21 / 24.4% | 12 / 44.4% | 2 / 16.7% | 1 / 50% | - | 25 / 19.8% | - | 8 / 40% |

*Table 4.5 Distribution of prehistoric disarticulated human bone by location and skeletal area (number of units/percentage; see also Tables 4.1–4.4)*

| Groups | Grades | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 0–1 | 0–2 | 1–2 | 2 | 2–3 | 3 | 3–4 | 0–5 | 3–5+ |
| 3666 | 71% | - | 21% | - | - | 8% | - | - | - |
| Juxta–3666 | 20% | - | 60% | - | - | - | 20% | - | - |
| North-west | 23% | | - | - | 77% | - | - | - | - |
| North-east | 100% | - | - | - | - | - | - | - | - |
| West–central | - | 100% | - | - | - | - | - | - | - |
| East–central | 46% | - | - | 5.5% | 16% | 10.5% | 10.5% | 10.5% | - |
| Southern | 66.7% | - | - | - | - | - | - | - | 33.3% |

*Table 4.6 Grading of bone condition; semi-articulated and disarticulated bone from Mortuary Feature 2018 (see also Tables 4.1–4.4)*

condition (Table 4.6), and the Late Bronze Age material in general appears to have fared slightly better than that from the later phases; the well preserved material from the North-east group all lay in the Late Bronze Age northern portion of this area whilst that scoring grades 2–3 lay further south and is generally Early Iron Age in date (Fig. 4.1). A large proportion of the bone from the juxta-3666 group scored grades 1–2 and there is less variation than seen in the East-central group to the south. Bone from the small North-east (Late Bronze Age) and East-central (Early Iron Age) groups is in similar condition (grades 0–2), demonstrating inconsistencies in the general pattern and suggesting the involvement of numerous factors in bone preservation. The few fragments of bone from Late Bronze Age contexts external to 3666 and the midden deposit, and that from the Late Iron Age/Romano-British context, are mostly in good condition. The poorest preserved bone is that of Middle Anglo-Saxon date (see McKinley, Chapter 7).

The preservation of the disarticulated animal bone is commensurate with that of the human bone; most of the Late Bronze Age material was scored at grades 0–2, that from the Mortuary Feature and the midden pits (those with and without human bone) is in better condition than that from elsewhere, and the Anglo-Saxon material is the least well preserved (see Grimm and Higbee, Chapter 5). The levels of fragmentation and element recovery are, however, in contrast with that recorded for the human bone. Amongst the latter, 35.3% of the disarticulated material is represented by complete skeletal elements compared with only 1% of the animal bone (from the midden pit only); the latter is generally heavily fragmented with indications of surface trampling of the material from 2018 (Grimm and Higbee, Chapter 5; Table 4.6). This indicates that different modes of manipulation and deposition were affecting the two assemblages.

Table 4.5 shows that the frequency of complete skeletal elements compared with incomplete ones varied dependent on location (NB fragments which joined were counted as a single 'unit' as with the animal bone). The highest proportion of complete skeletal elements was recovered from Burial Pit 3666; here there were numerous small bones of the hand and foot (63.3% of complete bones) and several vertebrae (8.2%), individual skull elements inclusive of three skulls minus the mandible and one complete cranium, and several complete long bones (10.2%). The bone fragments from 3666 tend to be large and the articular surfaces are present. A high proportion of the human bone from the midden-type deposits comprises complete elements, including long bones (50% of complete bones) and a skull minus the mandible, but the proportion of complete hand/foot bones is substantially less than from 3666 (12.2% of complete bones).

The bone from the juxta-3666 group includes a much smaller proportion of complete bones than from 3666 itself, and although one skull minus the mandible was recovered, the three other cranial vaults are incomplete. The few hand and foot bones from this area (7.4% group assemblage) are partial; articular surfaces are present but some long bone 'tubes' or 'cylinders' were also observed. The relatively high percentage of complete bones from the East-central group includes a high proportion of vertebrae (37.1% complete elements) and hand/foot bones (37.1%); in contrast to the other group assemblages there are also a large number of teeth (14, including a set of 10).

With the exception of one rib, all the bone from the North-west group represents only part of an element and the one complete element from the North-east group is a tooth. The small fragmentary assemblages from these two areas and the West-central group are devoid of any trabecular bone, and long bone tubes were recorded in all except the latter. The southern group shares some similarities with the other small bone groups in that there are no complete skeletal elements, but unlike the others trabecular bone did form part of the assemblage and there were no long bone tubes.

The reduction in the size and diversity of the skeletal elements recovered from different parts of the site reflect varying levels of reworking and manipulation to which the disarticulated bone assemblages has been subject by an

| | Skull | Axial skeleton | Upper limb | Lower limb |
|---|---|---|---|---|
| Overall proportion of assemblage | 64 / 21.1% | 93 / 30.7% | 77 / 25.4% | 69 / 22.8% |
| Complete elements | 18 / 28.1%<br>skull minus mandible: 5 / 7.8%<br>crania: 4 / 6.2%<br>teeth only: 9 / 14.1% (NB. 1 unit = set of 10) | 24 / 25.8% | 27 / 35.1% | 38 / 55.1% |
| Parts of elements | 46 / 71.9% | 69 / 74.2% | 50 / 64.9% | 31 / 44.9% |

*Table 4.7 Distribution of disarticulated human bone by skeletal area (number of units and percentages; see also Tables 4.1–4.4)*

assortment of mechanisms. Although trabecular bone is known to be subject to preferential destruction in aggressive burial environments (Nielsen-Marsh *et al.* 2000), most of the bone recovered from the mortuary-related deposits was well preserved, and only some of the long bones represented by 'tubes' were scored at a grade to suggested possibly loss of the articular surfaces via this mechanism. The loss of trabecular bone elements and the production of long bone tubes is also a characteristic of exposure of remains and the removal of all or parts of individual elements by canids (Binford 1981, 171–3, figs 4.56–4.57; McKinley 2008a, 493–506). Direct evidence for canid gnawing at Cliffs End, in the form of puncture marks and crenulated ends to the bones is, however, limited. Such features were recorded in only *c.* 1.9% of the assemblage, *c.* 1.4% of the Late Bronze Age and *c.* 2.9% of the Early/Middle Iron Age. The proportions are less, but not substantially so, than those recorded for the disarticulated animal bone where from the Mortuary Feature 2018 as a whole only *c.* 2.9% of the bone had been subject to canid gnawing, though there was a two-fold increase when considering the Late Bronze Age material alone (*c.* 5.6%; Grimm and Higbee, Chapter 5). The Late Bronze Age examples of gnawing to human bone included a metacarpal from below the *in situ* remains at the base of Burial Pit 3666 and a fragment of rib shaft from the midden-type deposit within 3699; the latter also has evidence for sharp weapon trauma (see below). The Early Iron Age examples all came from the West-central group located on the western margins of the southern part of 2018. Here both ends of a clavicle have the crenulated appearance and cracking consistent with canid gnawing (Pl. 4.1), and the broken ends of several ribs shafts and the distal end of a humerus had been gnawed. The latter also has clear evidence for human manipulation of what was already a broken bone in the form of a 21 x 13 mm, U-shaped area in the posterior surface of the broken proximal end of the bone which had been polished flat (depth *c.* 1–2 mm; (Pl. 4.2). Examples of worked human bone have been recovered from numerous Late Bronze Age and Iron Age contexts; Brück (1995) presents cases from five Late Bronze Age sites. In each instance the skeletal element involved is the skull, as in a further case from Reading Business Park, Berkshire (Brossler *et al.* 2004, 124–5), though a fragment of ulna from Lidbury Camp, Wiltshire had apparently been '...worked into a scoop-like shape...' (Brück 1995, 271). The potential ammuletic value attributed to the human skull and the relative frequency of its use suggests its human origin was known and the choice deliberate. There is greater ambiguity surrounding the possible conscious use of other human skeletal elements which may no longer have been recognised as of human origin if, as in this case, they had been exposed, and especially if they had been mixed with similarly disarticulated animal bone. The context of the fragment of worked humerus from Cliffs End could argue for the calculated use of human bone, but to what end remains debatable.

Further possible evidence for short-term exposure, possibly of only already defleshed and disarticulated bones, comes in the form of longitudinal dry fissures – such as those observed in some of the articulated remains (see above) – and slight bleaching. This form of fissuring was observed in four Late Bronze Age elements (1.3% of assemblage), distributed between three of the groups from the northern part of 2018 (3666, the North-east and North-west groups) and the Midden Pit 2028. Slight bleaching of the bone was seen in three Late Bronze Age elements (0.9% of assemblage) including two of those with fissuring. With both conditions most of the


*Plate 4.1 Early Iron Age clavicle from West-central group showing crenulated ends and cracking consistent with canid gnawing*


*Plate 4.2 Early Iron Age humerus from west-central group showing manipulation of already broken bone – a U-shaped area which has been polished flat*


*Plate 4.3 Fragments of Late Bronze Age human bone from Burial Pit 3666 subject to burning or scorching as dry or almost dry bone*

examples represent tibia; the two bleached bones – one right and one left – were found at similar levels only 6 m apart and could represent a pair. A fragment of parietal vault from the Midden Pit had changes to the exocranial vault only. There may be some significance in the observation that in the few cases of longitudinal fissuring observed in the articulated remains the lower limb was always affected (see above).

A few fragments of Late Bronze Age bone from two locations (3666 and the midden-type deposits) had been subject to burning or scorching as dry or almost dry bone (Pl. 4.3). A charcoal-rich layer (3682) close to be base of Burial Pit 3666, deposited prior to the burials being made, contained several – possibly related – elements of hand/forearm which had been subject to low level burning (dark tan and black in colour). Charcoal sufficiently hot to cause this level of burning to the bone (*c.* 300°C; Holden *et al.* 1995) may have been hot enough to discolour the underlying redeposited brickearth but no such discolouration was observed; it should be noted, however, that in experiment a deposit of hot charcoal (*c.* 400°C) made into a pit cut through a silty clay matrix had no visual effect on the soil (pers. obs.). Consequently, it appears most likely that the scorched bone formed part of the deposit rather than having been in the pit prior to its deposition. Small, dark brown patches of burning/scorching were observed on a fragment of skull vault and pelvic bone from the entrance of the Northern Enclosure (2469 and its recut 3699). The occurrence of such burning may have been incidental rather than deliberate but the inclusion of the burnt deposits within the base of Burial Pit 3666 is likely to have been an intentional ritual act (see McKinley Chapter 6 below). The *c.* 2.2% of the assemblage affected in this way is less than that observed within the disarticulated animal bone assemblage from Mortuary Feature 2018 (5.1%), both being significantly less than that recorded in the Anglo-Saxon animal bone assemblage chiefly recovered from the pits (12%) (see Grimm and Higbee). Whilst the mechanisms responsible for the latter, and most likely that of the prehistoric animal bone, are doubtless related to cooking, it is less easy to deduce the factor(s) responsible for burning to the human bone.

Two fragments of immature skull vault from Burial Pit 3666 (2058B and 204404 ON 535) and a right femur from the midden pit (3233) have a greenish precipitate adhering to them (>1% of assemblage). Such material is characteristically observed on materials deposited in a water-logged, cess-like environment. Whilst such conditions may at times have prevailed in the Midden Pit, and some of the burnt deposits made in the base of 3666 represent the remains of charred dung (Stevens, Chapter 5), the implied surroundings did not exist anywhere within Mortuary Feature 2018 and there is no evidence to indicate they were prevalent elsewhere on site. No such adherence was observed on other materials recovered from these deposits. The presence of this precipitate indicates that these few bones were at some stage deposited in a different environment from that in which they were found or that experienced by other materials recovered from the site. A point of note is that one or other of the two immature skull vaults represented from the Burial Pit could have originally derived from the *in situ* articulated remains 3674 which appear to have been subject to some level of ancient manipulation (see above).

Patchy dark brown staining was observed to some bones/fragments within a small proportion of the assemblage (*c.* 4.7%). Most of the affected bone is of Late Bronze Age date (*c.* 77%) and derived from the Burial Pit and the juxta-3666 group, and the rest is Early Iron Age from the North-west and West-central groups. Skull fragments were most commonly involved (80%), especially in the juxta-3666 group (four crania), but some upper and lower limb elements/fragments were also affected. The cause of this staining is not known, but it is comparable in appearance to the discolouration observed to bone which has had leather/skins/furs laid next to it, and may similarly be related to the proximity of some form of organic material in this instance.

## *Demographic Data*

### Minimum number of individuals

The overall minimum number of prehistoric individuals (MNI) identified is 39, comprising 24 Late Bronze Age (including one cremated), seven Early Iron Age and eight Middle Iron Age. NB: Unless otherwise stated, the following text and accompanying tables deals with the 38 individuals identified within the two parts of the unburnt bone assemblage only, and excludes the very small quantity (2.3 g) of Late Bronze Age cremated bone recovered from a pit in the Central Enclosure.

The calculations are based on a number of criteria, principally the most frequently occurring skeletal element within the assemblage as whole, allowing for the indicated age of the individual (broad categories only), the sex of the individual where appropriate, and, in response to the wide programme of radiocarbon dating undertaken and secure phase allocation for all the *in situ* remains and most redeposited material, the date of the material. This approach allows not only the calculation of the MNI but helps demonstrate aspects of taphonomy, highlighting potential human manipulation of the material in the form of selection of certain skeletal elements for retention/removal and/or deposition in specific locations. These additional considerations are pertinent to understanding the formation processes affecting the assemblage and interpretation of the mortuary rites discussed in Chapter 6.

| | LBA | EIA | MIA | Totals |
|---|---|---|---|---|
| **Immature** | | | | |
| Juvenile *c.* 9–11 yr. | 2 (??F; ??M) | | | **2** |
| Subadult *c.* 14–18 yr. | 2 (?F, ??F) | 1 (??F) | 3 (2 ?M, 1??M) | **6** |
| **Adult** | | | | |
| Adult *c.* 29–40 yr. | 1 (M) | 1 (?F) | 2 (F) | **4** |
| Adult *c.* 40–50 yr. | | | 1 (F) | **1** |
| Adult >55 yr. | 1 (?F) | | | **1** |
| **Totals** | **6 (4F, 2M)** | **2 (2F)** | **6 (3F, 3M)** | **14 (9F, 5M)** |

*Table 4.8* In situ *articulated human remains (including partial skeleton); summary of age and sex by phase*

| | LBA | EIA | MIA | Totals |
|---|---|---|---|---|
| **Immature** | | | | |
| Juvenile<br>*c.* 6–12 yr. | 2 | - | - | **2** |
| Juvenile/subadult<br>*c.* 10–14 yr. | 2<br>(1??F) | - | 1<br>(??F) | **3**<br>**(2F)** |
| Subadult<br>*c.* 14–18 yr. | 2<br>(?F; ??M) | - | - | **2**<br>**(1F, 1M)** |
| Subadult/adult<br>*c.* 15–25 yr. | 1<br>(F) | - | - | **1**<br>**(F)** |
| **Adult** | | | | |
| Adult *c.* 20–25 yr. | 1<br>(M) | - | 1<br>(??M) | **2**<br>**(2M)** |
| Adult *c.* 25–45 yr. | 8<br>(3??F; 3M, 2??M) | 3<br>(1?F, 1M, 1??M) | - | **11**<br>**(4F, 7M)** |
| Adult >45 yr. | 1<br>(??F) | 2<br>(1F, 1?F) | - | **3**<br>**(3F)** |
| **Totals** | **17**<br>**(7F, 7M)** | **5**<br>**(3F, 2M)** | **2**<br>**(1F, 1M)** | **24**<br>**(11F, 10M)** |

*Table 4.9 Disarticulated remains (including dispersed semi-articulated); summary of age and sex by phase*

Calculation of the MNI using only joint counts gives 22 individuals; 12 Late Bronze Age, three Early Iron Age and seven Middle Iron Age. The most frequently recovered joints (overall assemblage) comprise the left temporo-mandibular (22), the right proximal femur (18) and the left distal ulna (15); there are also 22 right orbits. A similar overall figure of 22 is obtained using the teeth/sockets but the distribution is slightly different with 11 Late Bronze Age, four Early and seven Middle Iron Age. The maxillary left 1st permanent molar tooth and socket were most frequently recorded in the assemblage as a whole (20), but there are variations within the different phases; maxillary right M2 socket in the Late Bronze Age, several mandibular left and right teeth and sockets in the Early Iron Age, and several mandibular and maxillary teeth in the Middle Iron Age. Comparison of these figures with those presented in Table 4.8 show that they predominantly derive from the articulated skeletal remains. This reinforces observations in the preceding section concerning the condition of the material within the disarticulated bone assemblage and its composition.

Tables 4.8–4.9 give a summary of the MNI and their age and sex by phase within the two assemblages; the *in situ* articulated remains including the partial skeleton from Burial Pit 3666 (Table 4.8); and the disarticulated bone including the dispersed semi-articulated remains from the southern portion of Mortuary Feature 2018 (Table 4.9; see Chapter 6, *Mortuary rites*). The structure of the disarticulated bone assemblage is outlined and discussed in further detail by phase. Those remains which have been included in the MNI for each phase are denoted '©' in Tables 4.2–4.4 and notes on possible associations between deposits are included in the appropriate category of the tables.

### *Late Bronze Age*

The MNI for the Late Bronze Age assemblage as a whole is 23; six from the articulated skeletal remains and 17 from the disarticulated (Tables 4.8–4.9). The latter group of material was considered as a single assemblage irrespective of location. It is certainly feasible – if not probable – that parts of the same individual were disposed of in different areas of the site as semi-articulated or disarticulated remains (see below). It should be noted that calculations made via this criteria are prone to produce an underestimate of numbers; though in this case any such underestimate is unlikely to be substantial.

*Immature individuals*

Disarticulated duplicate immature skeletal elements were recovered from within Burial Pit 3666, from the juxta-3666 group and from the midden-type deposits to the north-west of Mortuary Feature 2018 (Figs 2.24–2.25). Some elements (the right hand and parts of the skull) from the *in situ* juvenile 3674 are probably present amongst the material recovered from Burial Pit 3666 and this eventuality was included in the calculations. The most frequently occurring skeletal element amongst the immature remains (overall Late Bronze Age assemblage) is the left parietal, large parts (unduplicated) or all of which were occasionally recovered alone amongst the disarticulated remains, but more frequently with other adjoining skull elements. Of the deposits from pit 3666, five are worth considering in further detail.

The subadult cranium 2053 ON 100 derives from the group of redeposited bones forming what appears to have been a deliberate placement of material within the central fill of Burial Pit 3666. The radiocarbon date suggests this individual died before most of those whose corpses were buried at the base of the pit (Table 2.2). Parts of two juvenile crania, both inclusive of large parts of the left parietals, were recovered from a similar level in the pit fill as ON 100; 2058B ONs 106 and 521 (left parietal and occipital Fig. 2.21), and 204407 ON 535 (cranium minus occipital). Either of these two could have derived from the *in situ* 3674, from which all of the skull except the left mandible was missing, though the former is more likely in terms of assessed age. One factor which argues against the possibility of either representing part of 3674 is the greenish precipitate adhering to both, indicative of deposition for a time (perhaps only a few months) in a very different environment to that of Burial Pit 3666 (see above). Whilst it is not impossible that the cranium of 3674 was removed, deposited in a wet environment external to 3666 and subsequently returned together with fragments of a second cranium from the same deposit, it may be viewed as improbable; notwithstanding, the remains of the younger individual (2058B) have not been included in the MNI count. The juvenile left femur recorded under the same number does not originate from 3674, however, but may relate to one of the other two juveniles recorded for this period amongst the disarticulated remains; the same is also true for the right mandible recorded as 3670 ON 598. Only some of the various fragments of juvenile bone recorded as 204409 ON 601 could have come from the *in situ* 3674, some – possibly all – must relate to another individual.

Large parts of two juvenile left parietals were recovered from the juxta-3666 group (164605 ON 543 and 184604 ON 541 Fig. 2.25). Although either could have come from the *in situ* 3674, the radiocarbon dates suggest that the deaths of these individuals post-dated that of 3674; (see Marshall *et al.*, Chapter 3 for further details; Table 2.2). Two other immature individuals were identified, one from the juxta-3666 group and one from the midden-type deposits. In the latter case (2471) most of the skull including the left parietal was recovered; in the former (184605 ONs 564 and 567), although the large proportion of the skull represented includes only a small part (anterior) of the left parietal it is not duplicated elsewhere within the MNI count. The juvenile right radius found in the midden-type deposit (3231) could have derived from either of the two individuals within this age category amongst the disarticulated remains but, if so, it would indicate the curation and movement of the remains of individuals between different parts of the site (this has not been included in the MNI counts).

*Adults*

Disarticulated duplicate adult skeletal elements were recovered from 3666, the juxta-3666, and the midden-type deposits. The most frequently occurring skeletal elements within the overall Late Bronze Age assemblage are crania (disarticulated remains including seven complete or near-complete; five female or probably female, two male), specifically the occipital region, and right femora (seven complete or near complete disarticulated examples; all male or probably male). Over half of the latter were found in the midden-type deposits from which part of only one cranium was recovered. Two crania and one right femur were recovered from 3666; four crania and two right femora from the juxta-3666 group. Adult skeletal elements were recovered from the North-west and North-east groups but none were duplicated elsewhere within the overall assemblage and several suggested a match with individuals represented by other elements or parts thereof. A large proportion of the *in situ* adult male 3673 from the base of 3666 was missing in antiquity (see above); numerous skeletal elements recovered from the fill of the Burial Pit could belong to this individual but there are no direct joins or fits, and none of the remains can be matched conclusively. Adjustments have, however, been made for such possible associations in the assessment of the MNI. The most pertinent deposits are considered here in more detail.

A skull minus the mandible (2058 ON 101) and a complete cranium (204407 ON 536) were recovered from the lower/central fills of Burial Pit 3666 (Fig. 2.21). The former represents part of the apparently placed deposit of skeletal elements made in the partially in-filled pit, and the individual's death appears to have preceded that of all others within the overall assemblage (Table 2.2; Marshall *et al.*, Chapter 3). A left femur (ON 537) recovered with ON 536 could have derived from the same young adult male. All or some of the upper and lower limb bones of a mature adult male, 2058A ONs 102 and 110, could represent the remains of the *in situ* 3673; however, this collection of material includes a duplicate 11th thoracic vertebra and the date obtained from the right femur suggests the individual's death occurred before that of 3675, the earliest of the *in situ* burial remains at the base of 3666. As already discussed, the dating sequence is based on probabilities, consequently it may be unwise to take this as conclusive evidence that this individual and 3673 are not one and the same (see Chapter 3 for further discussion). Although another adult male may be indicated, on the basis of the minimum number counts of the right femora one must be discounted as possibly originating from 3673, accordingly, 2058A has not been included in the MNI counts. Other bones which may have belonged to the *in situ* 3673 include a right forearm (204404 ONs 499 and 502) and a left tibia (204406 ON 522); the latter did not fit the femur ON 537 (see above). The axial skeleton and upper limb fragments recovered from the burnt layer 3682, situated below the *in situ* remains, could originate from the same individual as skull ON 101; both are in the unusual position of apparently pre-dating the *in situ* material and both were assessed as probably female.

A skull minus the mandible (184804 ON 556), most of a cranium (184605 ONs 542 and 569), a cranium minus the frontal (184606 ON 568) and a left parietal with the occipital (164605 ONs 545 and 565), were recovered from the juxta-3666 group (Fig. 2.25). Lower limb bones from 184804 (ONs 560–1) could be from the same individual as the skull, as could the right femur ON 570 found with the skull in 184605; but the right femur ON 534 from 164605 indicates a different age and sex to the skull recovered there and does not match the demographic data of the other crania. Other elements from this area could represent parts of one of these five individuals, but the right innominate 184404 does not fit femur ON 534 nor does it match ON 570 in age, it may, however, be linked with one of the right femora from the midden-type deposits (2471 ON 498/506) which potentially matches in age, sex and size.

Although the bone recorded as 2471 ON 494 from the midden deposits included only a single skull element – the occipital – it is duplicated in all the other crania and is therefore included in the MNI; a fragment of left parietal (2029) could be from the same skull. Four complete or almost complete right femora were recovered from these deposits, all from individuals of a comparative age and the same sex (young/mature adult males). One of the four could have originated from the same corpse as the young male cranium from Burial Pit 3666.

In summary, the seven crania, and four of the seven right femora which exclude those which may match 3673 or the male crania, provide the MNI for the adults and the subadult/adult within the disarticulated assemblage (Tables 4.2–4.4).

***Early Iron Age***

The overall MNI for the Early Iron Age assemblage is seven; two from the articulated skeletal remains and five from the disarticulated (Tables 4.8–4.9). No immature remains were identified in the latter part of the assemblage.

Although the quantity of disarticulated material of this date is substantially less than for the preceding phase and was confined to Mortuary Feature 2018, in some respects its distribution appears more dispersed. Bone radiocarbon dated to the Early Iron Age was recovered from the North-east, East-central and Southern groups, that from the West-central group probably all belongs in this phase and some from the North-east group may do. A further complication was the difficulty of phasing with confidence some of the bone from the East-central group; on balance, given the nature and distribution of the reliably dated deposits, most of those designated Early/Middle Iron Age in Table 4.3 probably belong in the earlier period.

The most frequently recorded element in the overall assemblage for this phase was the left humerus; no complete bones were recovered amongst the disarticulate remains (both *in situ* skeletons had their left humeri), but the mid-shaft section was represented in four cases. Most examples were recovered from the East-central group with one from the West-central. The latter (162807 Fig. 2.29) is the unsexed adult mid-distal shaft described above, which had been subject to canid gnawing and human manipulation via polishing (Pl. 4.2). The proximal end-mid shaft fragment 203008 ON 477 appears to form part of a dispersed semi-articulated body part comprising the left upper limb and thorax area of a probable female adult aged *c.* 25–40 yr. (Fig. 2.30 see Chapter 6, *Mortuary rites*). The phasing of the remaining two examples, 242805 and 202805 ON 301, is inconclusive but most likely to be Early Iron Age rather than Middle; the former comprises the entire shaft minus the articular surfaces and the latter most of the shaft but a shorter central segment (fresh breaks with no joins at either end indicate that the segment was longer but was not fully recovered in excavation). The size and robusticity of ON 301 indicates it represents the remains of an adult, most likely a male, and its location suggests it may form part of another dispersed semi-articulated body part (or parts) similar to that of the adjacent female mentioned above. No obvious links are indicated for the fourth example, 242805, which lay in isolation on the southern margins of the group not far from the Middle Iron Age *in situ* remains 3662 (Fig. 2.29); the bone derived from an older subadult/adult (>15 yr.), possibly a female.

The second most frequent element was, as within the Late Bronze Age assemblage, the left parietal, disarticulated duplicate fragments of the dorsal portion of which were recovered from the North-west and Southern groups; ie, in different locations to the humeri. Irrespective of the latter observation, in two cases the skull fragments could still have originated from one of the same individuals represented by the humeri; 163400 ON 530 (North-west group) and 3610 ON 437 (Southern group) deriving from an unsexed young/mature adult (*c.* 20–35 yr.) and an unsexed subadult/adult (>12 yr.) respectively. The third case, 241601 ON 430, from an unsexed *c.* 25–40 year old adult also within the Southern group, may relate to adjacent (*c.* 1.0 m spread) adult male remains recovered as 3610 and 3614 (Figs 2.29, 2.31). These bones appear to represent a further case of dispersed semi-articulated remains such as those observed in the East-central area, but do not belong to the same adult male as identified there. Consequently, although there is no strict duplication of the element in this case, it is believed probable that these collective remains are those of a fifth individual.

Two mandibles from the North-west and East-central groups, although not providing conclusive evidence of further individuals, do indicate a tighter age range and more conclusive sex assessment for two of the MNI. Both were identified as older adults, 143606 ON 278 *c.* 45–60 yr. and 203007 as *c.* 50–70 yr., the former being confidently sexed as female and the latter as a probable female (Figs 2.27, 2.30).

***Middle Iron Age***

The total MNI for the Middle Iron Age assemblage is eight; six from the articulated skeletal remains and two from the disarticulated bone assemblage (Tables 4.8–4.9). Both assemblages were limited in their distribution, the disarticulated material being recovered from only the East-central group and located towards the eastern end of the east–west belt of *in situ* remains. Most of the disarticulated bones pertain to one individual, a possibly female juvenile/subadult *c.* 12–14 years of age, represented by a substantial proportion of the skeletal remains (mostly 243204 but including 243005 and 243205). The distribution of the bones suggests a dispersed semi-articulated skeleton (Figs 2.30, 2.32; see Chapter 6, *Mortuary rites*).

A few fragments of skull and upper limb bone (223203/4) found on the eastern margins/amongst the subadult bone derived from a second individual, a possibly male adult (*c.* 20–30 yr.). The only proviso here pertains to the date of this material which was not confirmed by radiocarbon analysis but attributed on stratigraphic grounds; although located some distance from and at a higher level than the disarticulated material from the preceding phase, it is possible that this adult bone could be residual.

***Late Iron Age–Romano-British***

The small amount of bone from the Late Iron Age/Romano-British context could be residual prehistoric but the deposit is so far removed from the focus of that mortuary activity, and upslope of it, as to render this unlikely. Little can be said regarding the individual but the presence of the bone is intriguing, suggesting a continuum of mortuary activity in the area for which we currently have very little evidence.

**Age and Sex**

The demographic structures of the different prehistoric groups share some characteristics but differ markedly in other respects. The overall assemblage contains 15 immature individuals (39.5%) and 23 adults (60.5%). Whilst these figures suggest a closer to 'normal' population than is commonly recorded in archaeological assemblages, where immature individuals are frequently under-represented for a variety of reasons, no infant remains were recovered and the minimum age identified is *c.* 6 years, with most of those within this broad age category comprising subadults (ie, 'teenagers'; Tables 4.8–4.9). The proportions of adults to immature individuals differ within the three periods (Table 4.10); other than in the earliest phase the numbers involved are small and the observations may be of limited significance, but the generally high proportion of subadult as opposed to younger immature individuals is noteworthy. In a 'normal' population, this typically represents the least vulnerable group within the immature category (eg, Lewis 2007; Roberts and Cox 2003, 303–4, table 6.5). This suggests that either they derived from populations where there was a particularly high mortality rate amongst the younger immature individuals (unrepresentative here), that the latter have been removed/excluded from the assemblage by some mechanism (eg, scavenging or cultural factors), or that subadults have been specifically selected for inclusion within the assemblages (at least in the Late Bronze Age and Middle Iron Age).

A discrepancy in the proportions of adult to immature individuals within each phase on the basis of apparent treatment of the corpse may intimate one of the factors affecting the population structures. In the two earlier phases there is a greater proportion of immature individuals amongst the *in situ* remains than amongst the disarticulated (Table 4.10). Whilst this may signal an age-dependent variation in mortuary rite it could also indicate the loss of immature remains from the disarticulated bone assemblages. Substantial damage can be inflicted on young immature remains by canid scavenging, sufficient to result in total destruction of the skeleton; there may also be physical removal of partial or even whole corpses to a 'safe' place for further consumption (T Legge pers. comm.; McKinley 2008a 493–7; Smith 2006).

Although a sex has been attributed to most of the Late Bronze Age (87%) and all the Early and Middle Iron Age individuals identified, it has frequently been qualified by varying degrees of confidence; this is primarily due to the young age of most of these individuals and the poor definition (or absence, where no sex has been attributed) of sexually dimorphic features within these immature age groups. Other than in the Middle Iron Age assemblage, where equal numbers of females and males appear to be represented, the proportion of females is consistently higher than that of the males; 47.8% compared with 39.1% for the Late Bronze Age, and 71.4% compared with 28.6% for the Early Iron Age. It should be noted that of these sexed individuals only five females and six males were sexed with confidence, a further six females and two males are probable, with nine female and seven male identifications being most

| | LBA | EIA | MIA |
|---|---|---|---|
| Overall | 56.5% : 43.5% | 85.7% : 14.3% | 50% : 50% |
| *in situ* | 33.3% : 66.7% | 50% : 50% | 50% : 50% |
| Disarticulated | 64.7% : 35.3% | 100% : 0% | 50% : 50% |

*Table 4.10 Proportions of adult and immature individuals by phases and deposit type*

likely; however, even were the latter group to prove unreliable, there would still be more females than males within the overall assemblage. One interesting observation is that all four of the older adults (ie, those confidently identified as >45 years) are female.

Comparative data for these prehistoric periods, both regionally and nationally, is sparse. The *in situ* remains of Late Bronze Age burials are rare, and cremation is currently believed to have predominated (Bradley 1990, 112), with some suggestion that graves may have been inserted into earlier barrows in the Late Bronze Age/Early Iron Age transition period in places (Whimster 1981, 33). Brück's 1995 review recorded only nine sites in mainland Britain from which the possible remains of Late Bronze Age inhumation burials have been recovered (though most of the examples are inconclusive), all situated in the north and west (Brück 1995, fig. 8). Numbers have increased in the last decade or so and the distribution is more widespread (eg, The Bostle, East Sussex (McKinley 2004b); Ramsgate Harbour, Kent (Clark *et al.* in prep.); Imperial College, Middlesex (Powell *et al.* in prep. a), probably largely due to the increased employment of radiocarbon analysis to date otherwise undated/insecurely dated burial remains, but the quantity continues to be small. Most unburnt remains of this date have been recovered as disarticulated fragments from non-grave contexts, the majority deriving from settlement sites (Bradley 1990, 11; Brück 1995, 249 and fig. 1) with deposition in water (notably of skulls) representing another relatively frequent and interesting feature. Amongst this disarticulated material Brück found a majority of adults (71.9%; similar proportions of males and females) with only 3.5% comprising subadults, and infants and juveniles making-up – as is commonly observed – the largest part of the immature category (24.6%; *ibid.* fig. 5). At the settlement site of Runnymede in Surrey, of the 11 MNI only one was recovered *in situ* (an infant), the others being represented by redeposited bone fragments (93 'finds'; Boylston *et al.* 1995). Slightly more immature (six) individuals were identified than adults (five), the former including two infants (0.5–5 yr.), two juveniles (6–10 yr.) and one subadult (15–18 yr.); none of the adults was over 35 years of age and there are equal numbers of males and females (*ibid.*; table 4 NB figures in text differ slightly from the table). At the Bostle, all five of the burials were those of young immature individuals (neonatal – 4 years; McKinley 2004b). The small group from Ramsgate Harbour comprises one subadult male (*in situ* burial remains) and two adult males (disarticulated fragments; McKinley 2007).

The number of burials recorded from Kent across this prehistoric temporal range is very small. The MNI for the Late Bronze Age is *c.* 33, mostly derived from the remains of cremation burials (Mays and Anderson 1995; McKinley 2006a; 2007; Moody 2008, 108). Small numbers of graves have been recovered principally from sites close to the east coast where they occurred either singly or in small groups (eg, O'Connor 1975; Cruse 1985; Mays and Anderson 1995; McKinley 2006a fig. 3). The remains include those of individuals across the age ranges from juvenile (*c.* 5–12 yr.) to older adult (>45 yr.), and both sexes are represented amongst the adults. Redeposited unburnt bone has been recovered from several sites in the area including Ramsgate Harbour (see above), Broadley Road, Northdown/Margate (McKinley 2009a, 69), and East Northdown, Margate (Smith 1987) where a bundle of bones from a young adult were found in segment 517 of the earlier ring-ditch.

Early–Middle Iron Age burials from the county were until recently more sparse (Parfitt 2004a, 16); in their 1995 review Mays and Anderson cite a MNI of less than five (1995, 380–1). Elsewhere slightly larger numbers are intimated, with reports of pit burials from several sites and five 'conventional' graves from North Foreland (Moody 2008, 124; Perkins 1995a); but the latter were dated on the basis of a piece of residual pottery from one of the graves (Perkins 1995b, 21–4) and the confidence with which some of these cases can be viewed would probably benefit from more secure dating. Although the tradition of pit burial is considered to have been most popular in the Middle–Late Iron Age, there is growing evidence for an earlier genesis to the practice (Boylston *et al.* 1995; Whimster 1981). The number of Early–Middle Iron Age burials found in Kent had been bolstered in the last decade (*c.* 13 inhumation and four cremation burials; McKinley 2006a), particularly by the recovery of a minimum of nine Early–Middle and 17 Middle Iron Age (unburnt) individuals during the EKAR excavations in 2010, predominantly from Zones 12 and 13 which lay *c.* 500 m to the north-west and north-east respectively of Cliffs End (pers. obs.); however, the overall numbers remain low.

The comparative data, by virtue of its limited nature, serves to emphasise, particularly for the Late Bronze Age, the unusually large size of what might otherwise appear to represent a relatively small assemblage at Cliffs End. Even the small Iron Age groups add significantly to the numbers previously recovered from the county and are rendered more conspicuous due to their close proximity and obvious associations to one another.

## *Metric and Non-metric Data*

### Skeletal indices

A summary of the indices it was possible to calculate is given in Table 4.11. The major indices calculated for each individual are shown in Tables 4.1–4.4, as are some of the non-metric traits/morphological variations recorded; further details are held in the archive.

Stature could be estimated for 13 adults (*c.* 59.1%) including seven males (70%) and six females (50%). All the males derived from the Late Bronze Age assemblage and the mean estimated stature coincides with that given by Roberts and Cox (2003, 86) for the Bronze Age as a whole, though the range extends slightly above that recorded from their sample of 61 individuals. Strontium/oxygen (Sr/O) isotope data was obtained from only one of these males, showing he had spent his childhood in 'Scandinavia' (Table 4.1; see Millard, below). The estimated stature for the females remains remarkably stable across the temporal range (although the numbers involved are small), falling slightly below the means of 1.61 m and 1.62 m given by Roberts and Cox for the Bronze Age and Iron Age respectively (*ibid.*, 86 and 103). Isotope analysis was undertaken for all these females and showed a range of childhood origins including local, 'Scandinavian' and some demonstrating movement between the two (Table 4.1; see Millard, below).

The cranial index could be calculated for only eight adults (36.4%) including six females (50%) and two males (20%), mostly from the Late Bronze Age assemblage (66.7% adults).

| | Female | | | Male | | |
|---|---|---|---|---|---|---|
| | **number** | **range** | **mean** | **number** | **range** | **mean** |
| **Late Bronze Age** | | | | | | |
| Estimated stature | 2 | 1.57 m (*c.* 5' 1¾ " ) | 1.57 m (*c.* 5' 1 ¾ " ) | 7 | 1.67–1.7 9m (*c.* 5' 5¾" – 5' 10 ½ ") | 1.72 m (*c.* 5' 7¾") |
| Cranial index | 4 | 69.1–75.6 (dolichocranial) | 73.1 (dolichocranial) | 2 | 71.8–79.3 (dolicho-mesocranial) | 75.5 (mesocranial) |
| Platymeric index | 2 | 86.9–96.7 (eurymeric) | 91.0 (eurymeric) | 5 | 70.6–99.3 (platy-eurymeric) | 81.9 (platymeric) |
| Platycnemic index | 2 | 65.1–79.9 (meso-eurycnemic) | 71.5 (eurycnemic) | 1 | 75.9 (eurycnemic) | - |
| Robusticity index | 2 | 97.9–129.1 | 114.0 | 3 | 115.8–121.5 | 119.4 |
| Brachial index | 2 | 74.6–76.4 | 75.5 | 2 | 75.3–80.2 | 77.8 |
| Crural index | 2 | 80.6–82.1 | 81.4 | - | - | - |
| Intermembral index | 2 | 63.6–69.1 | 66.4 | - | - | - |
| **Early Iron Age** | | | | | | |
| Estimated stature | 1 | 1.57 m (*c.* 5' 1 ¾ ") | - | - | - | - |
| Cranial index | 1 | 66.8 (dolichocranial) | - | - | - | - |
| Platymeric index | 1 | 75.9–78.5 (platymeric) | 77.2 (platymeric) | - | - | - |
| Platycnemic index | 2 | 73.3–78.5 (eurycnemic) | 75.9 (eurycnemic) | - | - | - |
| Robusticity index | 2 | 128.1–135.4 | 131.7 | - | - | - |
| Brachial index | 1 | 68.6 | - | - | - | - |
| Crural index | 1 | 82.0 | - | - | - | - |
| Intermembral index | 1 | 69.1 | - | - | - | - |
| **Middle Iron Age** | | | | | | |
| Estimated stature | 3 | 1.56–1.58 m (*c.* 5' 1½ "– 5' 2 ¼ ") | 1.57 m (*c.* 5' 1¾ ") | - | - | - |
| Cranial index | 1 | 74.9 (dolichocranial) | - | - | - | - |
| Platymeric index | 3 | 75.1–91.9 (platy-eurymeric) | 83.2 (platymeric) | 2 | 79.4–93.8 (platy-eurymeric) | 85.6 (eurymeric) |
| Platycnemic index | 3 | 58.1–69.8 (platy-mesocnemic) | 65.3 (mesocnemic) | 2 | 64.7–73.2 (meso-eurycnemic) | 69.2 (mesocnemic) |
| Robusticity index | 2 | 107.7–133.2 | 120.4 | 2 | 117.8–130.3 | 124.1 |
| Brachial index | 1 | 76.3 | - | - | - | - |
| Crural index | 1 | 77.6–79.7 | 78.8 | - | - | - |
| Intermembral index | 1 | 70.7 | - | - | - | - |

**KEY:** brachial index (radius L x 100 /humerus L); crural index (tibia L x 100/femur L); intermembral index (radius + humerus x 100/tibia + femur)

*Table 4.11 Summary of the major indices recorded within the prehistoric assemblage*

All the female crania fell into the dolichocranial (long-headed) range; isotope data from all six individuals again showed a mix of origins focusing on either 'Scandinavia' or this part of Kent, with some movement between the two during childhood years (Tables 4.1–4.2). The two male crania fall into different ranges, one sharing that of the females, the other lying in the mesocranial range; only the latter of the two was subject to isotope analysis and proved to have had southern origins.

The platymeric index (demonstrating the degree of anterior-posterior flattening of the proximal femur) was calculated for 13 individuals comprising seven males and six females. Although the numbers are small (isotope data available for only eight of these individuals; Table 4.1), there is some indication that the slight temporal shift in the shape of the female femora from eurymeric (rounded) to platymeric (broad or flat front-back) may be linked to the individual's origins. The two Late Bronze Age females had local origins, the Early Iron Age female had moved from 'Scandinavia' to Kent during her childhood, and two of the three Middle Iron Age females, and both males, had 'Scandinavian' origins.

The platycnemic index (illustrating the degree of meso-lateral flattening of the tibia) was calculated for 10 individuals, mostly females (seven). The index for both sexes is relatively stable within the two earlier phases, all falling within the eurycnemic range. The Middle Iron Age tibia of both sexes are all more flattened laterally, though most lay in the mesocnemic range with only one female in the platycnemic category.

The robusticity index, expressing the relative size of the femur shaft, was assessed for six females and five males. Although the small numbers render the results of limited value they do suggest a general increase in robusticity within both sexes between the Bronze Age and Iron Age phases of activity. On average, the femora of males in both the Late Bronze Age and Middle Iron Age groups are more robust than those of the females (thought there is individual overlap), but the average for the females in the later groups is greater than that for the Late Bronze Age males. Given that there is no temporal increase in the average stature for the females this suggests a possible increase in physical exertion undertaken by the later females.

Where both femora were available for measurement a marked variation between the left and right sides was observed in most individuals. The right femora of all three Middle Iron Age females have higher platymeric indices than the left (4.1–10.1); one of the males from this phase also shows a marked difference of 4.2 but with the higher reading from the left side. Elsewhere, in two Late Bronze Age females and the Early Iron Age female there are variations of between 6.6–9.8 between the sides, the right in two cases and the left in one. The only other male from which both sides were recovered showed little variation between them. There is less variation between the tibiae, all five Middle Iron Age pairs having similar readings. The greatest variation in platycnemic index was seen in the Early Iron Age female (left 5.2 higher) and the right tibiae of one Late Bronze Age female has a reading 5.0 higher than for the left. These figures suggest an imbalance in the distribution of physical stress experienced by the individuals which at times was fairly marked.

***Non-metric variations***

Variations in skeletal morphology may indicate population diversity or homogeneity. The potential interpretative possibilities for individual traits is complex and most are not yet readily definable, particularly on a 'local' archaeological level (Tyrrell 2000). Some traits have been attributed to developmental abnormalities or mechanical modification (ibid. 292). Some traits, such as extra ossicles in the lambdoid suture (or wormian bones) are frequently observed (prevalence at Cliffs End *c.* 60% in the Late Bronze Age, *c.* 66.7% in the Middle Iron Age) whilst others appear to be relatively uncommon in British prehistoric assemblages.

All of the *in situ* remains and many of the individuals represented amongst the disarticulated remains featured one or more morphological variation. Table 4.12 shows the frequency of occurrence by phase of a selection of the most commonly observed traits at Cliffs End; a further record of some of these and other traits is shown by context in Tables 4.1–4.4. Table 4.13 shows the distribution of traits observed in more than one skeleton, together with the location, origin and phase of the remains.

Other than in cases of traits with known strong familial links, such as tarsal coalitions (Case and Burnett 2005), of which there is only one example from Cliffs End (the Early Iron Age 3656), single traits cannot be used to signal potential links between individuals. Where several of the less frequently recorded traits are shared there is the prospect of a genetic association being indicated. An additional problem with the current assemblage, however, is the disarticulated nature of much of it, with many of the MNI identified, particularly in the Late Bronze Age assemblage, being represented by incomplete remains. Notwithstanding, a few such instances are suggested (Tables 4.12–4.13).

Ossicles at the lambda were recorded in *c.* 31.2% of the Late Bronze Age and *c.* 28.6% of the Middle Iron Age skulls. Two of these individuals also shared accessory transverse foramen in the cervical vertebrae (3673 and 3676, Late Bronze

| Trait | Presence | | Absence | |
|---|---|---|---|---|
| | Left | Right | Left | Right |
| | | | | |
| ***Cranial*** | | | | |
| Metopic suture | BA-1: E-1 | | BA-11: E-2: M-7 | |
| Sutural bones: Lambda | BA-5: M-2 | | BA-11: E-1: M-5 | |
| Lambdoid suture | BA-9: M-4 | BA-9: M-4 | BA-6: E-1: M-2 | BA-4: E-1: M-2 |
| Epipteric | - | BA-1 | BA-2 | BA-2 |
| Parietal notch | BA-2 | BA-1 | BA-6: E-1: M-2 | BA-6: M-3 |
| Asterion | BA-4 | BA-4 | BA-5: E-1: M-2 | BA-5: E-1: M-2 |
| Posterior condylar canal | BA-3: M-1 | BA-2: M-1 | BA-2: M-1 | BA-2: M-2 |
| Double condyle facets | BA-2: M-1 | BA-2: M-1 | BA-5: M-2 | BA-5: M-3 |
| Pre-condylar tubercle | BA-2: M-1 | | BA-4: M-2 | |
| | | | | |
| ***Post-Cranial*** | | | | |
| **Axial Skeleton** | | | | |
| Atlas bridging: posterior | M-1 | M-1 | BA-4: E-1: M-5 | BA-4: E-1: M-5 |
| **Upper Limb** | | | | |
| Septal aperture | BA-1: M-2 | BA-1 | BA-5: E-1: M-4 | BA-5: E-1: M-5 |
| **Lower Limb** | | | | |
| Allen's fossa | BA-3: M-3 | BA-4: M-2 | BA-5: E-1; M-3 | BA-6: E-1: M-3 |
| Hypotrochanteric fossa | BA-2: M-3 | BA-3: M-2 | BA-8: E-1: M-3 | BA-9: E-1: M-3 |
| Third trochanter | BA-1: M-2 | BA-3: M-2 | BA-6: E-1: M-4 | BA-7: E-1: M-3 |
| Squatting facets: medial | M-1 | M-1 | BA-2: E-1: 3 | BA-4: E-1: M-3 |
| lateral | BA-2: E-1: M-4 | BA-4: E-1: M-2 | M-1 | M-2 |
| Vastus notch | E-2: M-1 | E-2: M-2 | BA-3: M-4 | BA-3: M-4 |
| Anterior calcaneal facet double | BA-2: M-1 | BA-3: M-1 | BA-2: E-3: M-4 | BA-2: E-2: M-3 |
| Anterior calcaneal facet absent | - | - | BA-4: E-3: M5 | BA-4: E-2: M-4 |
| Peroneal tubercle | BA-2: M-1 | BA-2: M-1 | BA-1: E-1: M-2 | BA-1: E-1: M-2 |

**KEY:** BA – Late Bronze Age; E – Early Iron Age; M – Middle Iron Age

*Table 4.12 Scoring of a selection of non-metric traits (absence of score shows none observed)*

Age, 'Scandinavian' and local origin), two a femoral third trochanter (3676 and 3651, Late Bronze Age and Middle Iron Age, both 'Scandinavian' in origin) and two a femoral Allen's fossa (3644 and 3651, both Middle Iron Age of 'Scandinavian' origin). The intra-assemblage prevalence rates for all these traits is quite high (eg, third trochanter *c.* 30% Late Bronze Age and *c.* 33% Middle Iron Age), rendering a suggestion for homogeneity inconclusive, though the apparently persistent 'Scandinavian' link is intriguing.

Four other shared traits are also worth further examination, although none show prevalence rates which could confidently be interpreted as significant. Three individuals had pre-condylar tubercles, which while relatively frequent here (*c.* 33% overall), have rarely been observed elsewhere by the writer; two of the individuals (3676 and 3660, Late Bronze Age and Middle Iron Age of 'Scandinavian' origin) also have a third trochanter and double anterior calcaneal facets (36.4% overall rate). The congenital anomaly of a 6th lumbar vertebra was recorded in two spines (3660 and 3662, both Middle Iron Age of 'Scandinavian' origin), both with full or partial sacralisation of the bones. These individuals both also have third trochanters and lambdoid ossicles. Two atlas vertebrae have incomplete ossification of the transverse processes, 3673 (Late Bronze Age; 'Scandinavian' origin; Pl. 4.4) and ON 601 from Burial Pit 3666 (probably derived from the juvenile 3674; Late Bronze Age of southern origin); the latter and 3673 also share accessory transverse foramen in the cervical vertebrae. Finally, three individuals with a septal aperture in the distal humerus (30% overall rate) also have third trochanters and hypotrochanteric fossae in the femora, two have spondylolysis


*Plate 4.4 Late Bronze Age Burial 3673 atlas vertebrae with incomplete ossification of transverse process*

| Location and phase | Origin | Metopic suture | Occipital bunning | Lambdoid ossicles | Ossicle at lambda | Ossicle at asterion | Parietal ossicles | Double condylar facets | Precondylar tubercle | Cervical accessory foramen | 6th lumbar | Septal apperture | Allen's fossa | Hypotrocha-nteric fossa | 3rd trochanter | Vastus notch | Double anterior calcaneal facets |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Late Bronze Age** | | | | | | | | | | | | | | | | | |
| pit 3666 | local | | | 3649 | | | | | | | | | | 3649 | | | 3649 |
| pit 3666 | 'Scandinavian' | | | 3673 | 3673 | | 3673 | | | 3673 | | | | | | | |
| pit 3666 | 'Southern' | | | | | | | | | 3674 | | | | | | | |
| pit 3666 | local | | | | | 3675 | | 3675 | | | | | 3675 | | | | 3675 |
| pit 3666 | local | | 3676 | | 3676 | | | 3676 | 3676 | 3676 | | | | | 3676 | | 3676 |
| pit 3666 | local | 3680 | | 3680 | | | | | | | | 3680 | | 3680 | 3680 | | |
| pit 3666 | NW Europe–south | | ON 100 | ON 100 | | | | | | | | | | | | | |
| pit 3666 | 'Scandinavian'-northern Britain | | | ON 101 | | ON 101 | | | | | | | | | | | |
| pit 3666 | | | | | | | | | | | | | 2058A | 2058A | | | |
| pit 3666 | | | | | 2058B | | | | | | | | | | | | |
| pit 3666 | | | | ON 535 | | | | | | | | | | | | | |
| pit 3666 | 'Southern' | | | ON 536 | ON 536 | | | | | | | | | | | | |
| juxta-3666 | | | | | | | | | | | | | | | | | 184205 |
| juxta-3666 | | | | ON 568 | ON 568 | ON 568 | | | | | | | | | | | |
| juxta-3666 | | | | | | ON 556 | | | ON 556 | | | | | | | | |
| E-central | | | | | | | | | | | | | | | | ON 490 | |
| E-central | ?=next | | | | | | | | | 203007 | | | | | | | |
| E-central | ?=above | | | | | | | | | | | | | | | ON 515 | |
| S group | | | | | 241601 | | | | | | | | | | | | |
| S group | | 3610 | | | | | | | | | | | | | | | |
| midden-type deposits | | | | | | | | | | | | | | 3233 | 3233 | | |
| midden-type deposits | | | | | | | | | | | | | 2471<br>ON 493 | | | | |
| **Early Iron Age** | | | | | | | | | | | | | | | | | |
| above pit 3666 | 'Scandinavian'-local | | | 3656 | | | | | | | | | | | | | |
| **Middle Iron Age** | | | | | | | | | | | | | | | | | |
| 2018 | local | | | | | | 3563 | | | | | 3563 | 3563 | 3563 | | | |
| 2018 | 'Scandinavian' | | | 3644 | 3644 | | | | | | | | 3644 | | | | |
| 2018 | 'Scandinavian' | | | | 3651 | | | | | | | | 3651 | 3651 | 3651 | 3651 | |
| 2018 | 'Scandinavian' | | | 3660 | | | | | 3660 | | 3660 | | | | 3660 | | 3660 |
| 2018 | 'Scandinavian' | | | 3662 | | | | | | 3662 | 3662 | 3662 | | 3662 | 3662 | | |
| 2018 | ?non-local | | | 3677 | | | | | | | | | | | | 3677 | |

*Table 4.13 Multiple occurrences of non-metric traits in the prehistoric assemblage*

(a traumatic condition with possible congenital predisposition; see below), and two have Allen's fossae (3680, 3563, 3662; one Late Bronze Age and two Middle Iron Age; two local and one 'Scandinavian' origin).

There are vague indications in some of this data suggestive of genetic links, particularly between those of 'Scandinavian' origin, but also between those with different isotopic values and across the temporal range. There is, however, nothing conclusive. Only with the further refinement of aDNA analysis and a research programme beyond the scope of the present investigations can these tantalising possibilities be affirmed or refuted.

## *Pathology*

Tables 4.1–4.4 contain summaries of the pathological lesions observed and the bones affected. Some pathological changes were observed in all the *in situ* remains, a minimum of nine of the MNI within the Late Bronze Age disarticulated bone assemblage and all of those within the Iron Age disarticulated assemblage. The nature and form of the latter part of the assemblage will undoubtedly have affected the type and location of lesions which could be observed; relatively few articular surfaces and spinal elements were recovered amongst the disarticulated bone limiting evidence for joint diseases, for example, to the articulated remains. The impossibility of detecting confident associations between disarticulated skeletal elements has sometimes restricted diagnosis. Although some lesions were observed in the small quantity of Late Bronze Age cremated bone recovered the following text relates only to the unburnt prehistoric remains.

### Dental disease

Fourteen deciduous teeth and tooth positions were recorded, all from the Late Bronze Age assemblage. A total of 438 permanent teeth and 477 tooth positions were observed, mostly from the articulated *in situ* remains within all three phases (Table 4.14). In general, similar proportions of maxillary and mandibular teeth, and teeth and tooth positions were recorded. The exception is in the Late Bronze Age assemblage where there are substantially more maxillary socket locations than teeth; this reflects the recovery of all or parts of crania from which the teeth had been lost prior to their final deposition as dry bone. In all phases a higher number of female compared with male dentitions were recovered (NB. in view of the small numbers involved all the sexed individuals are considered together irrespective of the attributed confidence level).

Dental attrition appears to have been comparatively low. Young adults (*c.* 18–30 yr.) have mild-moderate polishing of the tooth enamel in all except the M2 and M3, with slight exposure of the dentine in all cusps other than that of the M3. Mature adults (*c.* 30–45 yr. range) have moderate occlusal polishing in all crowns with moderate-marked exposure of the dentine in all except the M3 crown and some amalgamation between the cusps generally in only the M1 crowns. Individuals over 45 years have, at a minimum, moderate exposure of dentine in all cusps and amalgamation between them in all except the M3 crown. There are several cases of heavy wear through the crown, particularly on the palatial/labial side of the tooth. The Late Bronze Age elderly female 3675 has heavy and extensive tooth wear, the entire crown having been worn through in several teeth with occlusal polish to the surface of the remaining root (Pl. 4.5). Few of the teeth from the Early Iron Age mature/older adult male 3614 survived, but the premolars are heavily worn, through to the root in one tooth. Similarly, the elderly female 143602 ON 278 (?Early Iron Age) has excessive wear to the premolars and molars, the crown having worn away in the M1.

*Table 4.14 Summary of prehistoric permanent dentitions by sex and phase*

| | Max. teeth | Man. teeth | Total no. teeth | Max. tooth positions | Man. tooth positions | Total no. tooth positions |
|---|---|---|---|---|---|---|
| Late Bronze Age | | | | | | |
| Female | 52 | 45 | **97** | 89 | 51 | **140** |
| Male | 46 | 24 | **70** | 56 | 26 | **82** |
| **Total (inc. unsexed)** | **98** | **83** | **181** | **147** | **80** | **227** |
| Early Iron Age | | | | | | |
| Female | 31 | 45 | **76** | 21 | 47 | **68** |
| Male | 4 | 1 | **5** | 8 | 0 | **8** |
| **Total (inc. unsexed)** | **36** | **47** | **83** | **29** | **47** | **76** |
| Middle Iron Age | | | | | | |
| Female | 45 | 43 | **88** | 38 | 47 | **85** |
| Male | 27 | 27 | **54** | 30 | 30 | **60** |
| **Total (inc. unsexed)** | **90** | **84** | **174** | **81** | **93** | **174** |
| **Overall total** | **224** | **214** | **438** | **257** | **220** | **477** |

In one case the excessive wear was limited in extent suggesting abnormal loading on those teeth; the Middle Iron Age mature adult female 3563 has very heavy wear through the maxillary M1 crowns (unfortunately the mandibular 1st molars are missing *post mortem* so the symmetry/asymmetry of the wear cannot be confirmed). Maxillary incisors from two subadults (3616, an Early Iron Age female and 3677, a Middle Iron Age male) show abnormal wear suggestive of cultural/occupational modification. The medial portion of the occlusal surface of the right 1st incisor from 3616 has lost *c.* 2 mm in height due to discrete wear in this area of the crown; similar but much slighter changes were observed in the left incisor. The palatial surfaces of the left 1st and 2nd incisors from 3677 both have a concave, almost scooped-out appearance indicative of abnormal wear. In both cases the changes could have resulted from the repetitive action of running some form of thread/sinew between/behind the teeth.

Dental calculus (calcified plaque/tartar) harbours the bacteria which predispose to periodontal disease and the development of dental caries. Calculus deposits were observed on two (13.3%) of the deciduous teeth and 289 (*c.* 66%) of the permanent teeth from a minimum of 21 dentitions (11 Late Bronze Age, minimum four Early Iron Age and six Middle Iron Age; Table 4.15). The severity of the deposits shows an age-related increase with very slight-mild deposits in the juvenile dentitions, slight-moderate in the subadult dentitions, and slight to moderate with more in the moderate range in the adult dentitions (scored according with Brothwell 1972, fig. 58b). Even the elderly individuals appear to have only moderate deposits and there is no noticeable variation between the prehistoric phases. The rates also remain fairly static across the temporal range suggesting there were no major changes in diet or dental hygiene. This generally tallies with the C/N isotope data which distinguished only one individual from the rest with regard to diet (see Millard, below), the Late Bronze Age adult female 2058 ON 101, who was one of three adults to have only very slight calculus deposits. Useful comparative rates for the condition are not forthcoming, the reasons for which are largely two-fold: the available rates tend to be in the form of crude prevalence rates (CPR; ie, numbers of individuals affected as a proportion of the MNI) which are a less reliable and representative reflection of prevalence than the true prevalence rates (TPR; ie, number of teeth affected as a proportion of the number recovered, for example, Roberts and Cox 2003, table 2.29); also, calculus is easily lost both in the ground and during excavation/post-excavation processing which can lead to an under-representation of the condition making intra-site comparisons particularly problematic.

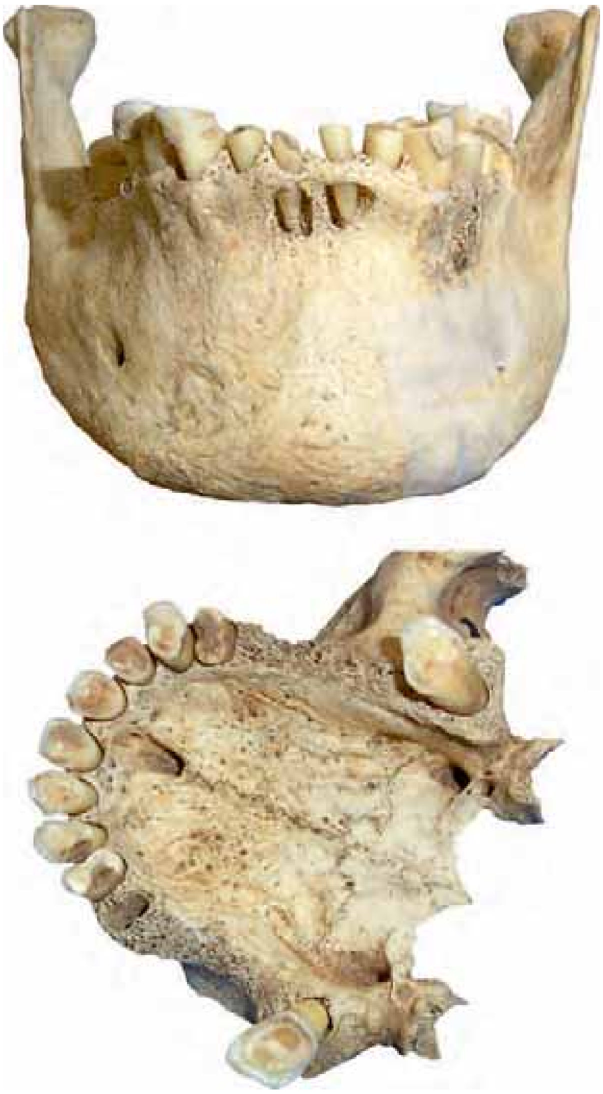


*Plate 4.5 Late Bronze Age Burial 3675 showing heavy extensive tooth wear*

Periodontal disease (a gum infection; gingivitis) may lead to bone resorption with consequent loosening of the teeth and exposure of more of the tooth surface to caries attack. Lesions reflective of the condition were observed in one dentition from each phase, two female and one male (all over 30 years of age), all from the *in situ* articulated deposits. Between one and three sockets were slightly-moderately affected in each case (Ogden 2005) with prevalence rates (TPRs) of 1.1–1.3%.

*Ante mortem* tooth loss was observed in five adult dentitions including one Late Bronze Age (older female), two Early Iron Age (one older female one mature male), and two Middle Iron Age (females, mature and older). The 1st molars were most frequently affected (63.6%) followed by the 2nd molar (27.3%); the only other tooth involved was a premolar. Between one and six teeth were lost from each dentition, the elderly Late Bronze Age female (3675) having lost most. As is commonly observed, the frequency of the condition appears to increase with age, the youngest individual with such lesions being *c.* 29–35 years of age. There is little variation in rate between the phases, the slightly lower figure for the Middle Iron Age probably reflecting the smaller number of mature and older adults in this part of the assemblage compared with the earlier phases. The rates are considerably lower than the TPRs of 13.2% (table 2.31) and 3.2% given by Roberts and Cox (2003, tables 2.27 and 2.51) for the Bronze and Iron Ages respectively, again probably largely due to the young age of a large proportion of the individuals identified at Cliffs End.

Dental caries, resulting from destruction of the tooth by acids produced by oral bacteria present in dental plaque, were recorded in four adult female dentitions, including three of the Late Bronze Age and Middle Iron Age dentitions with *ante mortem* tooth loss, and one Early Iron Age dentition of an older adult from the disarticulated bone assemblage (East-central group). Between one and five teeth were affected in each dentition, the highest number being recorded in the elderly Late Bronze Age female and the Middle Iron Age woman in her early 30s. Other than in the latter case most lesions were small and either cervical or interproximal in location. Total destruction of the tooth crown had occurred in several of the affected teeth in the younger adult female dentition, and where the origin of the lesion could be discerned they were both interproximal and occlusal. The molars were primarily affected but lesions were also seen in several premolars and one canine. The Late Bronze Age rate (Table 4.15) is lower than the TPR of 4.8% given by Roberts and Cox (2003, table 2.27) for the Bronze Age; the Early Iron Age rate being similar to their TPR of 2.9% for the Iron Age (*ibid.,* table 2.46). The relatively high rate for the Middle Iron Age at Cliffs End has undoubtedly been skewed by the poor condition of the dentition of 3662, a relatively young female who appears out of kilter with what one would normally expect to see. Her diet or oral hygiene may have been less adequate than that of others within her population of origin, and she, along with other individuals, appears to have experienced some deficiencies in her childhood diet (see below), but it is possible that her personal oral chemistry placed her at a disadvantage.

Dental caries was probably the major reason for *ante mortem* tooth loss and dental abscesses are also commonly associated with gross carious lesions; infection tracking down through the exposed pulp cavity of the tooth into the supportive structure (Hillson 1986, 316–8). Periapical voids, which may include granulomata, cysts and abscess lesions (Ogden 2008; all generally referred to as abscesses in the currently available comparative data), were seen in eight dentitions including all of those with dental caries and one other with *ante mortem* tooth loss; three Late Bronze Age, two Early and three Middle Iron Age. Most are mature/older adults (>35 yr.) and all except two are female. Between one and three lesions were recorded in each dentition, all except three were in molar sockets. Excessive wear to the anterior mandibular teeth of the elderly Late Bronze Age female 3675, coupled with a carious lesion in one case, had opened two of the pulp cavities to infection which had tracked down in to the supportive structure resulting in the development of a chronic abscess. A 5 mm diameter lesion at the apex of the mandibular left 1st incisor socket of the Middle Iron Age subadult 3660 was associated with a smooth-margined lesion in the labial alveolus exposing the socket almost to the apex (*c.* 10 mm), and further exposing the roots of adjacent incisors (probable abscess). The tooth itself is missing but what appears to represent a healed abscess lesion may have been associated with damage to the tooth resulting in exposure of the pulp cavity, particularly since the anterior teeth are not usually prone to abscess formation by the same mechanisms as the distal teeth. The severity of lesions varied from relatively small diameter features in the socket apices (?granulomata/cyst) to large abscess lesions extending from the socket apex to the alveolar margin and generally exiting

| | **Calculus** | ***Ante-mortem* tooth loss** | **Caries** | **Abscess** | **Hypoplasia** |
|---|---|---|---|---|---|
| Late Bronze Age | | | | | |
| | T 119<br>(64 max.; 55 man.)<br>Rate 65.7% | T 6<br>(4 max.; 2 man.)<br>Rate 2.6% | T 5<br>(2 max.; 3 man.)<br>Rate 2.8% | T 4<br>(2 max.; 2 man.)<br>Rate 1.8% | T 3<br>(0 max.; 3 man.)<br>Rate 1.7% |
| Early Iron Age | | | | | |
| **Total** | T 54<br>(19 max.; 35 man.)<br>Rate 65.1% | T 2<br>(1 max.; 1 man.)<br>Rate 2.6% | T 2<br>(0 max.; 2 man.)<br>Rate 2.4% | T 2<br>(1 max.; 1 man.)<br>Rate 2.6% | T 4<br>(2 max.; 2 man.)<br>Rate 4.8% |
| Middle Iron Age | | | | | |
| **Total** | T 116<br>(47 max.; 69 man.)<br>Rate 66.7% | T 3<br>(1 max.; 2 man.)<br>Rate 1.7% | T 10<br>(4 max.; 6 man.)<br>Rate 5.7% | T 6<br>(1 max.; 5 man.)<br>Rate 3.4% | T 28<br>(12 max.; 16 man.)<br>Rate 16.1% |

NB. Rates shown are true prevalence rates (TPR)

*Table 4.15 Summary of dental lesions (permanent dentitions)* buccally or, in one case (the Middle Iron Age 3563), superiorly into the antrum via a *c.* 4 mm diameter, smooth margined fistula through the antrum floor from the apex of the right 2nd molar socket, with consequent spread of the infection to the sinuses. The rates (all lesions considered together for comparative purposes) are all higher than the 1% and 1.1% TPRs given by Roberts and Cox (2003, tables 2.28 and 2.50) for the Bronze and Iron Ages respectively; though it should be noted that there is a lot of variation within their samples for all these dental disease rates.

Dental enamel hypoplasia is a condition represented by developmental defects in the tooth enamel formed in response to growth arrest in the immature individual, the predominant causes of which are believed to include periods of illness or nutritional stress (Hillson 1979). Lesions in the form of one to 11 faint horizontal lines were observed in nine permanent dentitions; two Late Bronze Age (males), two Early Iron Age (one female and one male) and five Middle Iron Age (four females and one male). The rates increase across the temporal range, with only a slightly variation between the two earlier phases but a substantial rise in the Middle Iron Age (Table 4.15). The two Late Bronze Age cases involved only one or two teeth; canine or premolar, and with single cervical lines. Similarly, only one or two teeth were affected in the two Early Iron Age cases, though here they are the 3rd molars with single cervical lines. The Middle Iron Age cases involved more and a greater range of teeth (between two and 11, mostly canines and premolars but also some incisors and 3rd molars) some having two rather than a single line. The data suggest that the 3rd–6th years represented those in which most children were potentially under greatest stress; this is probably linked to weaning and the development of the child's own immune system (at *c.* 6 years) which can leave the child particularly exposed during these years (Lewis 2007, chapter 6). The Early Iron Age and a few of the Middle Iron Age cases suggest a potential second period of stress around the 11th–12th years. Although the lesions are fairly minor, the data demonstrate a change in the Middle Iron Age which may be associated with diet, childhood illness or perhaps a cultural bias relating to the part of the population being buried at Cliffs End. Comparative data are mostly in the form of CPRs, 12.3% for the Bronze Age and 16.7% for the Iron Age but the few TPRs available show a much lower percentage of 8.0% and 7.1% respectively (both from only one site in each sample; Roberts and Cox 2003, tables 2.32 and 2.49). The TPRs from Cliffs End are substantially lower for the Late Bronze Age and Early Iron Age and much higher for the Middle Iron Age, again highlighting the apparent distinctiveness of the latter group.

**Trauma**

Seven individuals showed evidence of trauma; four Late Bronze Age, two Early and one Middle Iron Age. Three cases, all from the Late Bronze Age, are indicative of weapon trauma.

***Weapon-trauma***

The elderly female 3675 appears to represent the first of a series of corpses to have been laid in the base of the Late Bronze Age Burial Pit 3666 (see McKinley, Chapter 2). She had been arranged on her left side, her legs flexed at the hip, her right arm extended above her head with the index finger apparently pointing to the south-west, and the left arm flexed to bring the hand, holding a small lump of chalk, in front of the face. She had been killed via a series of four blows to the back of the head with a sharp weapon (Fig. 4.2; Pl. 4.6).

The two shortest cuts are set parallel, *c.* 18 mm apart and at a *c.* 5° angle to the horizontal, in the upper left side of the occipital crossing the fused (almost obliterated) lambdoid suture onto the left parietal. The lower cut is *c.* 27.6 mm long and the upper 52 mm; both have one sharp superior edge angled at *c.* 10° and a ragged inferior edge with *c.* 3.3 mm between the exocranial margins of the two edges. Shock-fractures extend away from either end of both cuts. The longest lesion (*c.* 65 mm) lies superiorly to the two aforementioned; set *c.* 45° to the horizontal, it cuts across the superior-dorsal portion of the left parietal crossing the lambdoid suture into the superior portion of the occipital. The sharp superior edge lies at an acute angle to the skull, steeper than those in the previously described cuts, with a *c.* 3 mm gap between this and the inferior ragged edge. Shock-fractures extend anteriorly across the left parietal and posteriorly down the occipital, apparently ending at the lambdoid suture. The longest and the shortest of these three cuts did not penetrate the endocranial surface but the force of the blows fractured it; the remaining cut appears to have gone through the surface only in the central section. A fourth cut, 60 mm in length, lay in the dorsal portion of the right parietal. Set at almost 90° to the horizontal, this cut was made at an obtuse angle to the skull from behind and to the left, passing through the exocranial surface and *c.* 12 mm of diploe before fracturing-off a 'flap' of bone along all but the superior 13 mm length of the lesion, where there is a small partially spalled flake of bone instead. The cut penetrated to the endocranial surface only along the central 17 mm of its length. The main force of the blow appears to have fallen on the inferior end of the cut from where short shock-fractures extend anteriorly to the squalmous edge of the parietal, dorso-lateral to the lambdoid suture, and dorsally to the edge of one

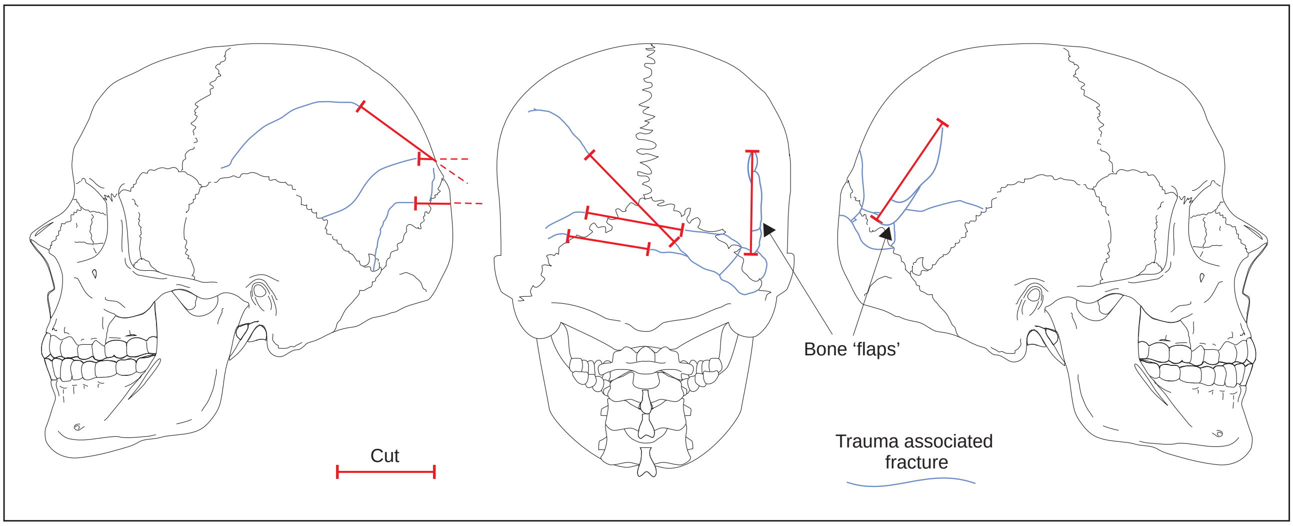



*Figure 4.2 Location of weapon trauma to skull 3675*

of the fractures associated with the longer of the two parallel cuts; thereafter, apparently traversing down to abut the fracture extending inferiorly from the longest cut.

The order of the two parallel cuts, with the blows apparently delivered from above and behind to the right, cannot be deduced. The appearance of the intersection between the longest cut and the upper-most of these two parallel cuts, together with the line followed by the fracture extending from the left side of longest cut, suggest that this blow, again apparently coming from behind and to the right but with the head possibly tipped further forward, was made after the other two. Quite how the 'glancing' blow, again made from behind but this time from further to the left (?back-hand, ?double-handed or by a second ?left handed individual), fits into the sequence is uncertain, but the fracture extending dorsally from its lower-end appears to cease at the fracture emanating from the right side of the longest of the parallel cuts suggesting it was made subsequent to them.

What appears to be a very fine covering of woven new bone was observed over the exposed diploe in the lower *c*. 18 mm of the sharp cut edge of the lesion in the right parietal (Pl. 4.7). These changes were examined by computerised tomography (CT scan) at the Natural History Museum to ascertain whether they may be indicative of slight healing of the wound (suggesting the woman had survived for a few days) but the scan shows no sign of healing (M Clegg pers. comm.). No similar changes were observed in association with any of the other cuts and this oblique blow appears to represent the last made to the skull. The new bone observed is, therefore, likely to relate to some pre-existing condition affecting the diploe. The injuries would have been sustained very shortly before the woman's death, though she may have survived for a few hours.

*Plate 4.6 Late Bronze Age Burial 3675 sharp weapon trauma – above back of skull showing the series of cuts to occipital and right parietal; below detail of cut to right parietal with bone flap in place*

*Plate 4.7 Late Bronze Age Burial 3675 – detail showing interior of lower end of cut to right parietal*

The cuts were clearly made to green bone using a fairly long sharp-edged weapon with a relatively narrow blade, most probably a sword – a weapon type that had become common by the Late Bronze Age (Kristiansen 2002; Osgood and Monks 2000, 23). This visual interpretation was supported by the CT scan, from which it was concluded that the weapon had '... sliced into the bone rather than embedding in the wound as a axe might, nor is there a sudden termination of the cut, [further] suggesting a long bladed weapon' (M Clegg pers. comm.).

The number, location and apparent sequence of the cuts, the lack of evidence for other skeletal trauma suggestive of the individual trying to defend herself (almost complete skeletal recovery renders it unlikely other injuries have been missed), together with the type of weapon employed, and the age and sex of the individual, indicate this is not combat trauma. Whilst head injuries are most frequent recorded in skeletal material in such circumstances they are more commonly associated with males (Aranda-Jiménez *et al.* 2009; Boylston *et al.* 2000; Kristiansen 2002). These combined factors also suggest she was an unlikely victim of a violent attack. Though females did suffer as massacre victims (eg, Boylston *et al.* 2000; Windl 1996), and it is feasible that the elderly female from Cliffs End may have fallen foul of a raiding party, it is questionable whether she would have represented the only injured party of such an event – as appears to have been the case – or that a repeatedly wielded sword would have been the most likely weapon to have been used against an elderly woman in an incident of this type. Although swords had become relatively common by the Late Bronze Age they still represented high status weapons, the preserve of the 'top ranks', and their use in warfare appears to have predominantly been in single combat between warrior elites (Kristiansen 2002). Whereas one of the functions of 'professionally trained warriors' from the Middle Bronze Age onwards may have been used to extract tribute from unwilling 'clients' via raiding – often for cattle (Kristiansen and Larsson 2005, 227) – it is debatable whether an old lady would have been considered worthy of such violence, unless, perhaps, she herself represented someone of status within the community being targeted. It has been observed that the victims of violent weapon trauma are often subject to 'deviant' burial, lacking graves goods or the 'customary rituals' (Boylston *et al.* 2000; Osgood and Monks 2000, 47; Charlier 2008); whilst the Cliffs End case would certainly fit this criteria in some regard, this woman's burial was undertaken with great care and obvious ceremony suggestive of far more than the disposal of an uncared-for corpse. The loss of an individual held in high regard by their community as the victim – perhaps a deliberately selected victim – of a raid may indeed have elicited such a meticulous mortuary rite, but such an interpretation would not sit easily with the singularity of the woman as the only individual to suffer such a fate or the rest of the mortuary deposits made within Burial Pit 3666. The remaining options for the cause of the trauma are execution or sacrifice, either of which could have been responsible for the injuries seen here; both – particularly the former – are often undertaken from behind/to the side of the victim and focus on the head. The advanced age and sex of the individual render her an unlikely candidate for execution, and decapitation would be more characteristic of such an action than repeated blows to the head (particularly when it is probable that at least three of any one of these four injuries would have resulted in her death, unless deliberate mutilation was the aim). The possibility of sacrifice, however, would not be out of kilter with the evidence; an elderly female, possibly seen as a wise matriarch or, alternatively, as a dispensable member of the community, would be a suitable subject for such an act. The burial context also strongly supports sacrifice over execution; careful and unusual positioning of the corpse, with the individual forming the focus of a non-normative burial group within what was clearly an unusual and important mortuary feature.

The second case of sharp weapon trauma was to a lower left rib from an unsexed individual *c.* 17–23 years of age. The bone was recovered together with other disarticulated skeletal elements from one of the Late Bronze Age midden-type deposits (2471 ON 463). There is a sharp, narrow blade-cut through the superior border of the shaft *c.* 100 mm from the head, which extends about half-way through the lateral side of the shaft and *c.* 3 mm down the visceral side (Pl. 4.8). The anterior edge of the lesion is sharp and the posterior edge ragged. The blow was probably made upwards between the ribs from behind and to the left (though there are other alternatives); in the absence of any other injuries this would probably have been fatal, puncturing one or more vital organs (probably the lung). The blow was clearly peri-mortem and probably made with a dagger or knife rather than a heavier/larger blade, but since the rib represents a single disarticulated element the full nature of the assault on this individual cannot be ascertained. He/she too could have been a chosen sacrifice but such a lesion is more in keeping with either combat trauma or violent personal assault.

A shallow, *c.* 14 mm diameter depression straddling the sagittal suture in the distal parietal bones of a Late Bronze Age immature (*c.* 10–14 yr.) cranium (204407 ON 535) probably represents a healed depressed fracture. The lesion is evident endocranially as a slight 'tori' along the sagittal suture. The injury could have been sustained by a fall but could also represent blunt weapon trauma.

Evidence for Late Bronze Age weapon trauma in Britain is sparse; a paucity partly blamed on the predominance of the mortuary rite of cremation in this period both here and across much of the rest of Europe (Boylston 2000; Osgood 1999; Osgood and Monks 2000). What little evidence there is from Britain takes the form of projectile trauma (ie, spears and arrows) rather than injury via sharp bladed weapons; the previously assumed date of a possible case excavated in the 1960s from a re-used Bell Barrow at Sutton Veny, Wiltshire (young adult male with single sword cut to the head), has since been called into question with a probable Anglo-Saxon date being argued as more likely (Osgood 1999; the skeleton is now missing so radiocarbon dating cannot be undertaken). The three cases of projectile weapon trauma, from Tormarton in Gloucestershire and Dorchester-on-Thames in Oxfordshire, all featured spear-wounds to the axial skeleton (pelvis and vertebrae) inflicted on adult males, and are indicative of combat trauma (Osgood 1999; Osgood and Monks 2000, 21–22; Osgood 2005). Such injuries appear characteristic of the weapon trauma seen elsewhere in Europe at this time, with arrowheads and spear-tips, or wounds inflicted by the same, being recorded in remains from the Netherlands, Denmark and parts of Central Europe (Osgood and Monks 2000, 20–3 and 73–6). There is also some evidence for blunt-weapon trauma from Central Europe (*ibid.,* 75–6), but injury via a sharp (bladed) weapon appears limited to a case (adult male, cut to skull) from Alicante in Spain (*ibid.*, 47). There is, however, an example from Late Bronze Age Rome which potentially has affinities with the elderly female at Cliffs End. Here, a subadult female found in an isolated, non-mortuary and formerly marshy location, had been killed by an axe blow to the top of the head (right superior-anterior parietal); she is believed to have been a sacrificial victim possibly chosen due to her affliction by a congenital condition (Down's Syndrome; Charlier 2008).

Swords and axes were common weapons by the Late Bronze Age and are frequently portrayed in images (rock carvings, stelae and frescos) from Scandinavia, Spain and Greece (Kristiansen and Larsson 2005; Osgood and Monks 2000, 31, 144–5), and recovered in metalwork hoards. Several hoards inclusive of bronze weaponry have been found in Thanet, for example, axes and fragments of sword blade (one almost complete) were included in the hoards from Minnis Bay (ON 3, fig. 64 2008 111–115) and Weatherless (Andrews *et al.* 2009). This being so, it is perhaps surprising that there is so little evidence for sword-use (or axe-use) in combat in the form of skeletal weapon trauma. Undoubtedly much of the trauma inflicted in acts of aggression would have only affected the soft tissues, particularly where thrusts to the trunk of the body in face-to-face combat were involved, but Late Bronze Age swords (leaf-shaped or 'Carp's Tongue) could be used as either thrusting or slashing weapons, and the head (including the face and throat) would be a common target (Boylston 2000; Kristiansen 2002; Osgood and Monks 2000, 122–4; Parker Pearson 2005). Since the head has no protective soft tissue to absorb a blow, trauma is easily visible


*Plate 4.8 Sharp weapon trauma to lower left rib from an unsexed individual (redeposited), Late Bronze Age midden-type deposits (2471, ON 463), pit 2469, Northern Enclosure*

in skeletal remains; protective gear may be effective but only up to a point (helmets can be knocked-off or damaged). Although cremation does render the recognition of weapon trauma difficult, largely due to the incomplete recovery of the cremated remains for burial, most cremation burials include at least some of the readily identifiable skull vault (McKinley 2000a), and it might be expected that if this type of combat injury was commonplace that at least some evidence of such trauma would be observed in the remains (eg, Musgrave 1985).

The effectiveness and versatility of the Late Bronze Age sword as a weapon have been questioned (Parker Pearson 2005), and it has been suggested that although common at this time, swords were viewed as prestige weapons, representing 'symbols of power and beauty' as well as (if not more so) than weapons of war, and that in general combat thrusting spears were the usual weapon employed (Osgood and Monks 2000, 22–23). A small proportion (*c.* 20%) of the Late Bronze Age swords recovered from the Thames had never been used (York 2002), and Kristiansen draws a distinction between form and function of different swords – one an operative weapon and the other largely for 'power display' (2002; Kristiansen and Larsson 2005, 218). There is, however, substantial evidence for the use of swords in the form of blade damage and resharpening (Kristiansen 2002; York 2002), but, as mentioned above, the ownership of such weapons (elite professional warriors) and the form of combat in which they operated (single combat) limited their distribution within society and, thereby, those upon who they may be used. It may be that the potentially multiple character and symbolism of the sword rendered it the most suitable of implements with which to undertake what may have represented an important act of sacrifice at Cliffs End. One other potential point of interest, given the southern, potentially Iberian link for one of the juveniles buried in pit 3666 (Table 4.1), is the strong links hinted at by the distribution the Carp's Tongue sword, which occurs in Southern Britain, Northern France and Iberia (*ibid.,* 143).

Whilst rare in the Late Bronze Age, violent trauma to the skull (resulting from conflict, punishment or ritual activity) appears to have became more frequent in the Iron Age with osteological evidence recorded from numerous Iron Age sites in Britain, mostly from the Middle–Late phases (Whimster 1981, 187; Dent 1983, 120–128; Hooper 1984, 471; Hooper 1991, 429–30; Anderson 1995, 121–2; McKinley 1999; 2008b). The majority of cases involved blunt-weapon trauma, with evidence for sharp-weapon trauma from one Early Iron Age (McKinley 2009b), and four Middle–Late Iron Age sites, including White Horse Stone, Kent (Boylston 2000; Bulleid and Gray 1917 and Wheeler 1854 cited in Whimster 1981, 187; Craig *et al.* 2005; Witkin 2006); one other Early–Middle Iron Age case from Maiden Castle, Dorset indicates modification associated with secondary mortuary rites rather than peri-mortem weapon trauma (Redfern 2008, table 2). The only other record of skull trauma from an Iron Age site in Kent is for blunt-force trauma to an Early/Middle Iron Age individual (young adult female) from Little Stock Farm (McKinley 2006b). The Iron Age, especially the Middle/Late phases, is commonly viewed as a time of growing territorial stress leading to conflict, resulting in increased evidence for inter-personal violence. In the wider European arena, whilst defensive settlements in some areas fell into disrepair and were abandoned in the Late Bronze Age, elsewhere there is evidence for new pressures for land, increasing conflict over prestige resources and the need to protect trade-routes (eg, Central Europe, Italy and the Aegean), with the possible 'emergence of a tribal identity preceding the known Iron Age tribal groupings' (Osgood and Monks 2000, 147). The recent recovery of data from the Early Iron Age and these Late Bronze Age examples from Cliffs End could be seen to lend support to this intimated earlier origin for commencement of renewed population/territorial pressure in Britain. The paucity of supporting data, rather than being 'evidence of absence' may be an artefact of the apparently prevailing mortuary rite of cremation and/or the failure to acquire confident dates via radiocarbon analysis for unaccompanied skeletal material previously dated by assumed association.

#### *Fractures*

Four individuals have indications of healed fractures to one or, in one case, three bones. The left 5th middle phalanx of the Late Bronze Age subadult female 3680 has a slight bony callus and lateral angling of the distal portion of the toe indicative of a healed fracture (1:20 middle phalanges). Fractures to foot phalanges generally result from either dropping a heavy item on the unprotected foot or, particularly with this being the 5th phalanx, from accidental or deliberate kicking against a hard object. A disarticulated humerus shaft fragment (?Early Iron Age subadult/adult, ??female 242805) has what appears to be bony callusing over a 56 mm length of the mid-shaft region with a slight lateral bend to the bone. The bone is damaged and incomplete, and the X-radiograph unclear, so it is uncertain if this represents a well-healed fracture or was related to trauma to the *brachialis* and/or *deltoid* muscles. Another Early Iron Age individual (adult female 3656) has a well-healed but slightly misaligned fracture in the distal shaft of the left fibula *c.* 35 mm from the head

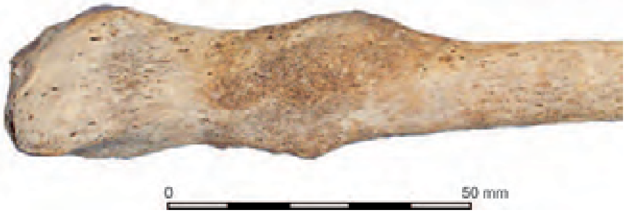



*Plate 4.9 Burial 3656, well-healed but slightly mis-aligned fracture in the distal shaft of the left fibula* c. *35 mm from the head*

(1:4: Pl. 4.9). The X-radiograph shows an oblique, probably spiral fracture suggesting a rotational force (eg, turning the leg whilst the foot remained fixed). Although the undamaged tibia probably acted as a splint there is some indication for very slight foreshortening of the fibula with slight dorsal angling. The bone does not appear to have been quite fully healed at the time of death, and both the fibula and the tibia have slight fine-grained woven periosteal new bone on the adjacent shafts suggesting soft tissue damage and infection was sustained at the same time as the fracture.

The same individual had one of three recorded cases of spondylolysis, though the injuries would not have been related. The aetiology of spondylolysis – involving the loss of bony continuity between the superior and inferior vertebral articular processes – has been subject to some debate (Adams 1986, 224; Roberts and Manchester 1997, 78; Aufderheide and Rodríguez-Martín 1998, 63–4). Some believe there is an underlying congenital weakness to the condition, which is likely to represent a stress fracture, arguably in the immature individual (Adams 1986, 224). The condition is often symptomless but may cause deep lumbar back pain (*ibid.*). The three cases observed at Cliffs End involved the 4th and 5th lumbar vertebrae in the Early Iron Age adult female (3656; Pl. 4.10), the 5th lumbar vertebra in the Middle Iron Age female 3662, and an un-numbered (?2nd–4th) lumbar vertebra in one other Middle Iron Age adult female (3563).

### Cortical defects

Cortical defects were observed in between one and six elements in three immature individuals (two Late Bronze Age and one Middle Iron Age). All are situated at tendon insertions and similar to exostoses indicate muscle trauma, either from specific injury or, more likely from repeated stress. The most extensive lesions were seen in the Late Bronze Age subadult female 3680 at the *teres major* attachments in the humeri, the soleus muscle attachments in the tibiae and the *tibialis posterior* attachments in the naviculars; this suggests this individual may have often been engaged in strenuous walking over rough ground and probably carrying heavy items.

### Enthesophytes and exostoses

Enthesophytes are new bone growths which may develop at tendon insertions most frequently as a consequence of repeat trauma from muscle exertion, and exostoses are commonly associated with injury or damage to the muscle as a result of strenuous exertion causing bleeding in the tissue with subsequent ossification of the haematoma (Rogers and Waldron 1995, 23–5). Both may be indicative of occupational


*Plate 4.10 Burial 3656, 4th and 5th lumbar vertebrae with evidence for spondylolysis*

stress or injury, though other causative factors may include advancing age or various diseases stimulating skeletal hyperostosis, some individuals possibly being predisposed to the formation of new bone (*ibid*., 53). It is not always possible to be conclusive with respect to the aetiology of particular lesions.

At Cliffs End, age-related repeat trauma is likely to have been the main causative factor for enthesophytes; lesions were seen in only one of the articulated skeletons (Late Bronze Age elderly female 3675) affecting 17 non-cranial sites (Table 4.1). Disarticulated bone fragments from a minimum of one other Late Bronze Age individual has lesions and those from a probable two Early Iron Age individuals (an adult male and an adult female). The anterior patella was most frequently affected (13.3% overall rate; 14.3% Late Bronze Age, 66.7% Early Iron Age); this is a very common site for such lesions in adults due to the repeated stresses of everyday-life on the knee in societies devoid of motor transport and easy-chairs, and the variation in rates is likely reflective of the demographic structure of the different temporal groups. The proximal femur shaft (dorsal) was also affected in two Late Bronze individuals (9.1% overall rate, 16.7% Late Bronze Age) and the proximal ulna in one (5.3% overall, 20% Late Bronze Age).

Exostoses were only recorded in disarticulated bone fragments from one Late Bronze individual and the two Early Iron Age adults with enthesophytes. One of the latter has already been discussed above in association with periosteal new bone suggestive of a traumatic origin for both lesions. The remaining two cases are both in the proximal humerus shafts (*c.* 9.5% overall rate) and probably also reflect muscle trauma to the *deltoid* (*c.* 25% Early Iron Age) and *brachialis* (*c.* 10% Late Bronze Age) muscles.

**Joint disease**

The various forms of joint disease are usually amongst the most commonly recorded conditions in archaeological skeletal material. Similar lesions – osteophytes and other forms of new bone development, and micro- and macro-pitting – may be formed as a consequence of one of several different disease processes, some also occurring as lone lesions largely reflective of age-related wear-and-tear. Many of the conditions are known to increase in frequency and severity with age, consequently they are commonly viewed as degenerative in nature, though this is an oversimplification as other factors are frequently involved, and some conditions have a more complex and not entirely clearly understood aetiology. Lesions were recorded in the joints of at least nine individuals comprising a minimum of three Late Bronze Age, two Early and four Middle Iron Age (Tables 4.1–4.4 and 4.16). Several of the Late Bronze Age lesions were recorded in disarticulated remains from three contexts, two from within the fill of Burial Pit 3666 and one from one of the midden-type deposits; all these remains could have derived from the same individual.

Schmorl's nodes result from a rupture in the intervertebral disc and the protrusion of the disc material into the vertebral body surface forming a pressure defect, often of irregular shape (Rogers and Waldron 1995, 27). They occur most frequently in the most stressed area of the spine – the lower thoracic and lumbar vertebrae – and stress-related trauma is implicated as a major cause of the condition (Roberts and Manchester 1997, 107). Lesions were seen in the spines of four individuals at Cliffs End; two Late Bronze Age (one female, one unsexed) and two Middle Iron Age (females). No lesions were seen above T6, and although the highest rates were recorded in T6–7 (2:9 vertebrae; 22.2%) the numbers are all too low to render this of any significance. The most lesions were seen in the spine of the elderly Late Bronze Age female 3675 (12 vertebrae), though almost as many were seen in the spine of the mature Middle Iron Age female (11 vertebrae). None were severe, the majority taking the form of small, shallow depressions. The Bronze Age rate is slightly higher than that of 8% observed in the Early Bronze Age assemblage at Twyford Down, Hampshire, though there the prevalence was greatly increased by the high rate amongst the males (20%) compared with the more commensurate 10% seen in the females (McKinley 2000b).

Degenerative disc disease is characterised by coarse pitting in the surface of the vertebral body, invariably accompanied by osteophyte growth on the body surface margins (Rogers and Waldron 1995, 27). The condition results from the breakdown of the intervertebral disc and reflects age-related wear-and-tear. Lesions were observed in three Late Bronze Age spines, one female, one male and one unsexed (Table 4.16). None of the lesions are severe but an age-related increase in extent is indicated. The rates are similar to those recorded in the Early Bronze Age assemblage at Twyford Down with an overall TPR of 5%, 11% for the females and 5% for the males (McKinley 2000b).

Osteoarthritis is manifest by eburnation and/or pitting within the surface of a synovial joint in association with osteophyte formation on the surface margins; there may also be alteration of the bony contours (Rogers and Waldron

| | No. vertebrae | Osteoarthritis | Schmorl's nodes | Degenerative disc disease | Lone osteophytes | Lone pitting |
|---|---|---|---|---|---|---|
| Late Bronze Age | | | | | | |
| Female | 82 (63.1% total) | - | 12 (14.6%) | 7 (8.5%) | 2 (2.4%) | - |
| Male | 46 (35.4% total ) | - | - | 1 (2.2%) | - | - |
| **Total (inc. unsexed)** | **130** | **-** | **13 (10.0%)** | **9 (6.9%)** | **2 (1.5%)** | **-** |
| Early Iron Age | | | | | | |
| Female | 43 (89.6% total) | - | - | - | 2 (4.6%) | - |
| Male | 2 (4.2% total) | - | - | - | - | - |
| **Total (inc. unsexed)** | **48** | **-** | **-** | **-** | **2 (4.2%)** | **-** |
| Middle Iron Age | | | | | | |
| Female | 89 (52.7% total) | 5 (5.6%) | 10 (11.2%) | - | 3 (3.4%) | 20 (22.5%) |
| Male | 55 (32.5% total) | - | - | - | - | 1 (1.8%) |
| **Total (inc. unsexed)** | **169** | **5 (3.0%)** | **10 (5.9%)** | **-** | **3 (1.8%)** | **21 (12.4%)** |

*Table 4.16 Summary of number and rates of spinal lesions by sex and phase (includes 1st sacral)*

1995, 43–4). The aetiology is complicated and includes the effects of age, mechanical alteration through activity or injury and genetic predisposition (Rogers *et al.* 1987; Rogers and Waldron 1995, 33). Slight-moderate lesions were seen in the remains of two Late Bronze Age and two Middle Iron Age adults; all female with one exception. The condition was recorded in the lower spine of one mature Middle Iron Age female (Table 4.16). Extra spinal lesions were seen in three individuals. In two cases (mature adult male 3673 and younger/mature adult female 3662) only the costo-vertebral joints were affected (overall TPR 4.8%; 5% Late Bronze Age, 6.8% Middle Iron Age). The elderly Late Bronze Age female had lesions in three right joints; the acromio-clavicular (overall TPR 14.3%; 50% Late Bronze Age), a distal finger phalanx (overall TPR *c.* 2.4%, Late Bronze Age *c.* 5%) and the hip (overall TPR 5.5%, 9.1% Late Bronze).

Osteophytes, irregular growths of new bone on the margins of synovial joints or vertebral body surfaces, may be associated with a number of joint diseases (Rogers and Waldron 1995, 25–6). Where they occur as lone lesions they appear to be a 'normal accompaniment of age' (*ibid.*) and, other than possibly contributing to increased stiffness and decreased mobility in the joint, are unlikely to result in any significant pathological symptoms unless their extensive development impinges on a neighbouring nerve (most likely in the spine). Lone osteophytes were recorded in the remains of six adults; a minimum of two Late Bronze Age (elderly female and mature adult male), two Early Iron Age mature adult females and two Middle Iron Age females. The most extensive lesions were seen in the elder Late Bronze Age female where 17 vertebrae (15 body surface margins and two synovial joints) were affected, and 16 extra-spinal joints of the upper and lower limb with a emphasis on the right side similar to that seen with the osteoarthritic lesions. Other cases all involve either vertebral body surface margins (four individuals; overall rate *c.* 5.5%, *c.* 13.1% Late Bronze Age and *c.* 4.2% Early Iron Age), the C1-C2 anterior facet (three adult females; overall rate 21.4%, 100% Early Iron Age and 28.6% Middle Iron Age) or and costo-vertebral joints (three Late Bronze Age, one Early and one Middle Iron Age; overall rate 37.1%, 32.5% Late Bronze Age, 71.4% Early Iron Age and 25% Middle Iron Age). The lesions are all slight-moderate in severity.

As with osteophytes, macro- and micro-pitting and other destructive lesions in the surfaces of synovial joints may develop in response to a number of conditions, but it is probable that they are most commonly reflective of the early stage of osteoarthritis. Lone lesions were seen in the remains of five individuals; three Late Bronze Age and two Middle Iron Age. Spinal lesions were observed only in the Middle Iron Age individuals, including one subadult (Tables 4.1 and 4.16); most other cases were seen in the costo-vertebral joints (five individuals; overall rate *c.* 13.3%, *c.* 32.5% Late Bronze Age and *c.* 2.3% Middle Iron Age), two in the acromio-clavicular joint (overall rate 13.3%, 14.3% Late Bronze Age and 25% Middle Iron Age) and one sterno-clavicular (16.7%, 50% Late Bronze Age). As with all the other joint lesions, the elderly Late Bronze Age female had the most extensive involvement.

Solitary bone cysts or 'pseudo-erosions', generally small juxta-articular or peri-articular cyst-like formations, are particularly common in the wrist and ankle (Rogers and Waldron 1995, 61). Lesions were recorded in several carpal bones from one Early Iron Age individual (overall rate *c.* 2.9%, *c.* 50% Early Iron Age).

Seven individuals, three Late Bronze Age and four Middle Iron Age, had small surface defects in discrete joints. Lesions occurred in all four skeletal areas, the only skeletal element affected in more than one individual is the navicular, but there is generally no pattern to joint involvement.

**Infection**

Lesions indicative of some form of infection were observed in the remains of a minimum of 11 individuals; five Late Bronze Age (minimum), three Early and three Middle Iron Age. The majority of the changes manifest as new bone formation, predominantly periosteal new bone, and related to a variety of conditions not all of which could be diagnosed.

***Periosteal new bone***

Periosteal new bone is formed in response to infection of the periosteal membrane covering the bone. Infection may be introduced directly to the bone as a result of trauma, develop in response to an adjacent soft tissue infection, or spread via the blood stream from foci elsewhere in the body. It is often not possible to detect the causative factors involved in individual cases, and lesions are frequently classified as indicative of a non-specific infection either active (woven) or healing (lamellar) at the time of death. Lesions were observed in between one and nine skeletal elements from nine individuals. A variety of elements from all areas of the skeleton are affected with most frequent involvement of the tibia (three cases).

Lamellar new bone in the palate of one Late Bronze Age female and the woven bone in the maxilla of a second are related to dental infections. The latter individual, the elderly female 3675, also has slight lesions around the nasal spines (hypervascularity) which suggest a slight nasal infection, and a small (14 x 6 mm) area of micro-pitting on the upper part of the maxilla which may relate to an infection/sore in the overlying soft tissue.

Fine-grained woven and lamellar new bone on the visceral surfaces of two redeposited right ribs from the West-central group (Early Iron Age; 3659; Pl. 4.11) indicates that the individual represented suffered from some form of recurrent lung infection which could include pleurisy, bronchitis or tuberculosis (overall TPR *c.* 1.9%; Early Iron Age *c.* 9.5%).


*Plate 4.11 Fine-grained woven and lamellar new bone on visceral surfaces of two redeposited right ribs from West-central group (3659)*

One case probably linked to direct trauma to the bone has already been discussed above (Early Iron Age 3656), a second case with possible traumatic links is the ?Late Bronze Age redeposited upper limb bone from the North-west group (123804). Here there is slight lamellar new bone over an area of bony callusing/exostoses which corresponds with an unnatural angulation in the distal end of the ulna shaft fragment; although the X-radiograph shows no fracture line it is likely that this represents a well-healed break to the bone with associated soft tissue injury and infection. Small patches of fine-grained new bone along the upper margins of the *flexor digitorum longus* muscle attachments in both tibiae from the Middle Iron Age 3660 could be associated with trauma to the soft tissues, particularly since there are marked cortical defects along the soleal lines (attachment for the *soleus* muscle). A small area of active new bone in the right 3rd metatarsal medial shaft may also be linked to soft tissue trauma given the proximity of these bones to the surface of the foot.

It has been observed that some bones, specifically the long bones of the lower limb, are more prone to infection via transmission for other foci than others and that usually only one bone is involved (Manchester 1983, 37; Roberts and Manchester 1997, 129–130). Lesions in the tibia in particular have also been linked with minor shin trauma, varicose veins and ulceration (Manchester 1983, 37; Roberts and Manchester 1997, 129–130). Woven lesions in the right fibula (Late Bronze Age 3680) and lamellar bone in the left tibia (Early Iron Age 3616) are probably of this type. Thin patches of mostly fine-grained woven new bone were recorded in ten post-cranial skeletal elements from the Middle Iron Age subadult 3677 with some thicker and coarser-grained lesions on the anterior of the sacrum and right proximal ulna shaft. Such extensive involvement indicates a systemic infection rather than a localised condition. Likewise for the Late Bronze Age juvenile 3676, where two disparate skeletal elements were affected and some endocranial new bone (see below) was also recorded.

In two individuals, the Late Bronze Age subadult 3680 and the Middle Iron Age adult female 3563, periosteal new bone on the lateral sides of vertebral bodies appears to be associated with lytic lesions in the body surfaces and anterior collapse of several vertebrae. Both individuals also have some endocranial new bone. In the younger individual the 5th lumbar and 1st sacral are affected with lytic lesions in the adjacent body surfaces, with slight new bone formation creating a ‘melted’ appearance, slight anterior collapse of the L5 and patches of periosteal new bone on the left anterior-lateral of the sacrum (Pl. 4.12). X-radiograph shows some


*Plate 4.12 Late Bronze Age Burial 3680, S1 superior surface (above) and detail of sacrum anterior surface showing destructive lesions and periosteal new bone (below)*


*Plate 4.13 Middle Iron Age Burial 3563, T12 showing destructive lesion in the inferior body surface*

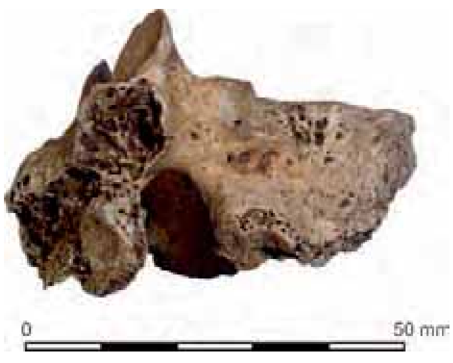



*Plate 4.14 Middle Iron Age Burial 3563, T7 showing periosteal new bone*

loss of trabecular bone in the L5 with a small area of translucency in the right side of the anterior body suggestive of a sub-surface destructive lesion. The inferior surface of the 12th thoracic vertebra from the adult female (3563) has similar lytic lesions to those observed in 3680 but with no sub-surface lesions here or elsewhere in the spine (Pl. 4.13). There is more extensive collapse of the vertebral bodies, by up to 10 mm in the T7, T9 and T12, though this could be due to osteoporosis. The extent of the periosteal new bone is unclear due to post-mortem damage to the vertebrae but at minimum it extended over the right side of T7 body (Pl. 4.14). It is not conclusive that the various lesions are associated.

A variety of conditions could be indicated including brucellosis, tuberculosis or a fungal infection; the former is certainly a possibly diagnosis for the Bronze Age individual. This is a recurrent or acute infectious disease caused by any species of *Brucella*, and is an occupational disease of individuals working with cattle or other animals which may form a host for these intercellular parasitic organisms (inter-personal transmission is uncommon), infection by which, though rarely fatal, can be debilitating and prolonged. Destructive and reparative processes tend to occur simultaneously in brucellosis in contrast to the largely destructive processes in tuberculosis, though vertebral body collapse is not normally associated with the former (Aufderheide and Rodríguez-Martín 1998, 192–3; Rogers and Waldron 1995, 89–95). The collapse of the six thoracic vertebral bodies in the adult female could also be indicative of osteomalacia; the adult form of vitamin D deficiency which can reflect abnormal loss of calcium from the body due to kidney or intestinal disease, closely spaced multiple pregnancies and prolonged breast feeding (Roberts and Manchester 1997, 175; Brickley *et al.* 2005).

### Endocranial new bone

Three Late Bronze Age individuals have thin layers of new bone on the endocranial surface of parts of the skull vault. The redeposited cranium of an older adult ??female, (ON 556, juxta-3666 group) has a small area of fine-grained bone (pitted lamellar) in the centre of the frontal bone. The subadult ?female 3680 from Burial Pit 3666 has patches of smooth (slightly pitted) lamellar new bone along the grooves for the transverse and superior sinus in the occipital bone. Similarly located lesions, but active at the time of death (fibre/capillary form), were observed in the juvenile 3676, also extending along most of the sagittal groove to at least the mid-point (Pl. 4.15). Such lesions form as a consequence

*Plate 4.15 Late Bronze Age Burial 3676 new bone on endocranial surfaces of the occipital vault*


*Plate 4.16 Evidence for tapeworm infection: fragments of calcified hydatid cyst recovered from amongst the bones of Early Iron Age adult female 3656 and Middle Iron Age subadult male 3660*

of meningeal infection or haemorrhage, and the aetiology of individual cases can be difficult to determine, various conditions potentially being reflected including trauma, vitamin C deficiency and tuberculosis (Lewis 2004). No diagnoses have been made for these cases, but both immature individuals had evidence for non-specific infection elsewhere in the skeleton to which the endocranial lesions may have been linked (see above).

***Sinusitis***

Two adult females have lesions indicative of infection in the right maxillary sinus cavities (overall TPR 7.4%). The Middle Iron Age example, which developed secondary to a dental abscess, has been discussed above. The Early Iron Age example is one of primary infection (10% Early Iron Age), with extensive fine-grained (active) periosteal new bone across walls of right antrum, extending slightly onto floor at lateral sides. The development of sinusitis is generally linked to the atmospheric pollution caused by smoky, poorly ventilated living/working conditions, but the problem appears to have been fairly minimal for the various Cliffs End populations; possibly due to much of their time being spent out-doors, at least in the warmer months, where better light would have been available.

***Parasitic infection***

The tape worm, genus *Echinococcus*, lives in the intestines of dogs and foxes, and if food or water supplies contaminated by the egg-carrying faeces of these animals is ingested by humans, they too will become infected (Manchester 1983, 49). The worm develops multi-cystic structures which may inhabit various organs, predominantly the liver and, less frequently, the lungs (*ibid.*). The effects of tapeworm infestation include constant blood loss, diarrhoea and abdominal discomfort, which in advanced cases could lead to the death of the individual (Manchester 1983, 50; Roberts and Cox 2003, 125). Fragments of calcified hydatid cyst were recovered from amongst the bones of two Iron Age individuals, the adult female 3656 and the subadult male 3660 (Pl. 4.16). The thin 'shell-like' fragments were recovered from the axial area of the skeletons but it was not possible to deduce the focus (or foci) of infestation.

**Metabolic conditions**

Metabolic conditions are generally reflective of deficiencies or excesses within the body's system, commonly – though not exclusively – linked to dietary intake; the resulting disorders are frequently described as 'stress indicators' (Roberts and Manchester 1997, 163–4). *Cribra orbitalia*, manifest as pitting in the orbital roof, is generally believed to be associated with childhood iron deficiency anaemia, and various factors contributing to anaemia, such as parasitic infection, are recognised (Molleson 1993; Roberts and Manchester 1997, 166–9; Robledo *et al.* 1995). Although changes predominantly develop in childhood the lesions can persist into adulthood. Some authors have observed that individuals with iron deficiency have an increased susceptibility to severe infections (Aufderheide and Rodríguez-Martín 1998, 349; Roberts and Cox 2003, 307).

The condition was recorded in one (three cases) or both orbits of ten individuals (39.5%); five Late Bronze Age (41.7%), one Early Iron Age (40%), and four Middle Iron Age (28.6%). Immature individuals are mostly involved (seven) but slight lesions were seen in the orbits of three adults. Similar numbers of males and females were affected but there are temporal variations in both numbers and rates. In the Late Bronze Age the female rate is slightly higher (TPR 50% female, 40% male); only one Early Iron Age individual – a female – has such lesions (50% females), but in the Middle Iron Age there is a marked difference between the sexes, a greater proportion of the males having the condition than females (80% and 14.3% respectively). Most of the lesions are slight and porotic or cribotic in type (Robledo *et al.* 1995, fig. 1), but two subadult females (the Late Bronze Age 3649 and the Early Iron Age 3616) have severe extensive lesions. One Middle Iron Age subadult male (3677) had moderate cribotic lesions. Where the origin of the individuals could be discerned those in the earliest phases were local (three of four individuals) whilst in the Iron Age phases they were of 'Scandinavian' origin (three of five).

Only three of the individuals with *cribra orbitalia* also had some level of dental enamel hypoplasia (another childhood stress indicator), including the Early Iron Age subadult with severe lesions. Both the latter individual and four others with *cribra orbitalia* (50%) also had skeletal indications of infection, mostly in the form of periosteal new bone which in several cases was reflective of severe conditions (see above); this suggests there may be some link between the metabolic deficiency and the individual's vulnerability to infection. The condition was not recorded in either of the individuals with evidence for parasitic infection.

### Neoplastic

A very small (1.6 mm diameter) ivory osteoma – smooth spherical projections of dense bony tissue – was recorded in right frontal bones of the Early Iron Age adult 3656. Such small, asymptomatic lesions are commonly recorded in archaeological skeletal material, predominantly in the frontal bone (overall rate for Cliffs End *c.* 5.3%)

### Congenital anomalies

*Spina bifida occulta*, incomplete fusion of the neural arch in the sacrum, was recorded in two individuals (overall rate 16.7%); one Late Bronze Age adult (20%) and one Middle Iron Age subadult (16.7%), both sexed as probable males (Pl. 4.17). This largely asymptomatic condition has a high prevalence rate in modern populations (*c.* 5–25%), especially amongst males (Aufderheide and Rodríguez-Martín 1998, 61). NB. See *non-metric traits* for anomaly of transitional 6th lumbar vertebra and its sacralisation.

*Plate 4.17* Spina bifida occulta*, incomplete fusion of the neural arch in the sacrum, Late Bronze Age probable adult male (2058A)*

### Miscellaneous lesions

#### *Calcified cartilage*

As with other forms of new bone there may be a variety of triggers to the calcification/ossification of cartilaginous material within the body, including bone forming diseases such as DISH and a predisposition to hyperostosis. In most cases, however, advancing age is the major factor. The remains of two Late Bronze Age adults included some calcified cartilage; several fragments of rib cartilage from the elder adult female 3675 and part of the thyroid cartilage from the mature adult male. At least the former case is likely to be age-related.

#### *Hypervascularity; ?porotic hyperostosis*

Areas of hypervascularity were observed in five skull vaults (overall TPR 17.9%; two Late Bronze Age (10.2%) and three Middle Iron Age (42.9%)). The changes are generally located in the superior distal parietals/superior occipital regions, though in two of the Middle Iron Age cases there are also slight changes in the frontal bone. The lesions may represent the early stages of *porotic hyperostosis*, a condition with the same aetiology as *cribra orbitalia*, involving thinning of the outer table of the vault (characteristically the frontal and parietal bones, symmetrically) exposing the underlying diploe (Aufderheide and Rodríguez-Martín 1998, 348–9; Roberts and Manchester 1997, 167). However, the characteristic 'pitting' does not, in most cases, appear to be due to thinning of the outer-plate, which has a normal appearance; it is believed that in most cases this represents hypervascularity suggesting that the individuals suffered from head-lice, the scratching associated with which increases the blood supply to the affected area (Capasso and Di Tota 1998). None of these individuals had *cribra orbitalia*.

***Plastic changes***

Over time bone will react to pressures exerted upon it by a number of physical mechanisms including muscle action, increased vascular/neural activity and soft tissue growths. A 42 mm long 'bulge' in otherwise normal bone of the lateral mid-shaft of a Late Bronze Age adult femur, ON 465 from context 2471 (disarticulated), is of unclear aetiology. X-radiography shows no additional features, and the lesion does not have the appearance of exostoses associated with muscle trauma; however, it may represent the healed remnant of such a lesion, or possibly some form of plastic change associated with muscle action. The right femur of the Middle Iron Age adult 3563 has marked anterior angulation of the head and neck in comparison with that of the left side (damage to the bone precluded measurement of the degree of angulation). This suggests either a congenital/developmental malformation or a long-term variation in the individual's movement/stance leading to the change in angle. The strength of the variation suggests the former is more likely, but plastic changes could have occurred in association with the spondylolysis (see above) observed in one of the upper/middle lumbar vertebrae. The frontal vault of the Middle Iron Age subadult 3677 has pronounced supra-orbital foramen located more central and superior to the supra-orbital margins than normal (*c.* 12 mm above), and there are marked vascular erosions extending up the frontal bone from both sides indicative of increased vascular activity. This individual had extensive periosteal new bone indicative of a chronic systemic infection and the two conditions may have been associated, but if so it is unclear by what mechanism.

## *Health Status Overview*

The relatively low rates of dental attrition and level of calculus deposits in the Cliffs End dentitions imply a fairly self-cleaning diet, not overly dependent on carbohydrates or incorporating much abrasive materials such as grit/sand (potentially acquired during food processing). The low caries levels also suggest a fairly high protein diet. The higher rates observed in the Middle Iron Age for most conditions are at least in part reflective of the influence of one individual, a fairly young adult female (3662), who may have had specific dental problems. In general the dental evidence, in keeping with that from the isotope analysis (see Millard, below), does not suggest any major dietary variations between the phases. However, the higher rate of enamel hypoplasia in the Middle Iron Age does suggest these individuals were subject to greater childhood nutrition stress or periods of illness than their earlier counterparts. Potentially associated factors are difficult to detect. Although a higher proportion of the Middle Iron Age females than males appear to have had hypoplasia (CPR 100% compared with 25% males), the TPR shows there was actually little difference between the sexes (18.2% for the females, 20.4% for the males). There is a higher proportion of individuals with 'Scandinavian' origin in this phase than in the others (57% of those for whom origin was deduced compared with only 30.7% from the Late Bronze Age and 16.7% from the Early Iron Age) and there does appear to be some correlation here; 55.6% of those with enamel hypoplasia had 'Scandinavian' origins compared with 33.3% local and 11.1% southern. There may, therefore, have been a slight geographic variation in childhood health/nutrition, though the numbers are rather too low to make any conclusive statement to this effect.

Leaving aside the two unique cases of sharp weapon trauma, at least one of which is suggestive of sacrifice, the other evidence for trauma demonstrates the normal range of fractures and soft tissue damage that might be expected within a prehistoric assemblage. There is little suggestion of specific or undue physical demands on individuals, most lesions being slight-moderate in severity and limited in extent but demonstrating a general, and to be expected, age-related increase. Two or three individuals, including both sexes, do have stress-related changes indicative of strenuous use of the arm and leg muscles (eg, walking over rough ground and carrying/manoeuvring heavy weights).

The relatively low CPR of 23.7% for any form of joint disease reflects the nature and form of large parts of the assemblage (disarticulated and incomplete) and the high proportion of immature individuals. However, all the adults amongst the *in situ* articulated material had some form of joint disease and, as is commonly observed, there appears to be an age-related link in the number of joints affected if not in the severity of the lesions. Although the elderly adult female 3675 has many lesions affecting most parts of the skeleton, none of them are severe or suggestive of a particularly or specifically stressful physical lifestyle. The emphasis on the right side shown for many of the lesions may indicate a link to handedness, most individuals being right handed and therefore favouring the right side in many activities. There is insufficient data to suggest any temporal or gender-based patterning, but it may be pertinent to note the absence of Schmorl's nodes in the male vertebrae, even those of young individuals, since these lesions are frequently associated with excess stress in the spines of older subadults/young adults and tend to be more frequent in males.

There is evidence for some debilitating infections, and one or two conditions may have been life threatening or indeed have contributed to the death of the individual. Infections associated with dental disease or trauma appear most common, however, though the potentially serious consequence of both should not be underestimated. The possible presence of brucellosis is perhaps not unexpected; the animal bone assemblages from the site show a dominance of cattle which, at least in the Late Bronze Age, seems to have been used for their secondary products (dairy), whilst sheep/goat and to a lesser extent pig were the prime meat source (Grimm and Higbee, Chapter 5).

Other metabolic conditions indicative of stress were limited to *cribra orbitalia*, which although relatively common was rarely severe. There is an interesting dichotomy between these data and those for enamel hypoplasia; in direct contrast to figures for the latter, the lowest rates were seen in the Middle Iron Age population where most of the affected individuals were male. This suggests that whatever form of childhood stress is reflected in the higher rates of enamel hypoplasia for the Middle Iron Age, the content of their diet was more beneficial and they may have been less exposed to parasitic infection (even if the one case of such infection in the assemblage was observed in a Middle Iron Age individual of 'Scandinavian' origin).

## Isotopic Investigation of Residential Mobility and Diet

*by Andrew Millard*

Isotope analysis of human and animal remains was carried out in order to address the following aims and objectives.

For strontium and oxygen isotope analyses:

- What was the origin of the individuals included in the mortuary deposits?
- Were those individuals subject to one mortuary treatment of a different origin to those treated in another fashion?
- To help illustrate if the rites being undertaken within Mortuary Feature (2018) were reflective of a 'native tradition' or one brought in from outside the area.

For carbon and nitrogen isotope analyses:

- What was the predominant diet of those included in the prehistoric mortuary rite?
- Are there any apparent differences in diet between those included in different parts of the mortuary rite?

Answering these questions will allow examination of similarities/differences in the diet which will contribute to a discussion of possible social stratification which in turn may be related to specific social groups that were involved in, or chose/were chosen to undergo, this mortuary rite. They can also potentially contribute to the modelling of the radiocarbon dates.

### *Principles*

People who are born and grow up in a particular geographical region have a specific combination of stable isotopes preserved in the enamel of their teeth (Budd *et al.* 2004). Unlike minerals in bone, these values do not change during the lifetime of the individual. Isotope ratios of oxygen and strontium are particularly useful in this kind of geographic study. Oxygen isotopes in teeth are derived from drinking water which is usually mostly derived from local rain water, whose composition varies systematically with climate, so that drinking water maps have been devised for Britain and Europe. Dietary strontium isotopes vary with geology, so that a combination of geological maps, past measurements on soils and rocks, and, where possible, measurements local to the site, are used to interpret movement of people.

Carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) isotope ratios are informative about the diet of past people. In a British context they allow us to distinguish between marine and terrestrial food sources, and within terrestrial food sources sometimes to distinguish diets with protein mainly derived from meat or freshwater fish from those where protein derives from plants.

Some teeth form during the period when a child is likely to still be suckling at the breast, and suckling is known to elevate $\delta^{15}N$ values, to slightly increase $\delta^{13}C$ values (Fuller *et al.* 2003), and to raise $\delta^{18}O$ values (Wright and Schwarcz 1998) from what they would be if the child shared the mother's diet. This can complicate the interpretation of the isotope values, and so where possible such teeth are avoided for sampling.

### *Materials*

Twenty-six human individuals (all from the prehistoric assemblage except for one Middle Anglo-Saxon individual; see Chapter 7) and three sheep/goat teeth were sampled, with 13 of the humans represented by two teeth (Table 4.17), together with one sample of the underlying brickearth from the site.

The sheep/goat and the brickearth samples provide a local control for comparison with the measurements from the human remains. Sheep were selected in preference to either

| Sample reference | Cut | Deposit type | Period | Age group | Sex | δ¹³C (‰) | δ¹⁵N (‰) | Atomic C/N ratio[a] | Earlier tooth | Later tooth | $^{86}Sr/^{87}Sr$ ratio ±2se[b] | | δ¹⁸O enamel phosphate (‰ VSMOW) | | δ¹⁸O drinking water (‰ VSMOW)[c] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Earlier tooth | Later tooth | Earlier tooth | Later tooth | Earlier tooth | Later tooth |
| 2058/ON100 | 3666 | redeposited | LBA* | subadult | ?F | -19.57 | 8.05 | 3.39 | M1 | P2 | 0.709823 (07) | 0.709708 (11) | 19.41 | 21.40 | -3.83 | -0.76 |
| 2058/ON101 | 3666 | redeposited | LBA* | adult | ??F | -17.98 | 9.87 | 3.06 | P2 | M3 | 0.712317 (06) | 0.713351 (05) | 15.39 | 16.71 | -10.02 | -7.99 |
| 2471 | 2469 | redeposited | LBA | subadult | ??M | -19.56 | 11.26 | 3.22 | P1 | - | 0.710051 (07) | - | 17.13 | - | -7.34 | - |
| 3469 | 3468 | redeposited | LBA | juvenile/ subadult | - | - | - | - | M2 | - | 0.710477 (04) | - | 15.57 | - | -9.74 | - |
| 3563 | ? | *in situ* | MIA | adult | F | -20.30 | 11.47 | 3.14 | P2 | M3 | 0.709010 (09) | 0.709757 (10) | 18.03 | 16.85 | -5.95 | -7.77 |
| 3614 | 3613 (2018) | redeposited | EIA | adult | M | -18.86 | 11.07 | ***2.64*** | M3 | - | 0.709392 (04) | - | 16.81 | - | -7.83 | - |
| 3616 | 3615 (2018) | *in situ* | EIA | subadult | ??F | - | - | - | P2 | M3 | 0.710468 (05) | 0.710572 (04) | 15.38 | 15.57 | -10.03 | -9.74 |
| 3644 | 3642 (2018) | *in situ* | MIA | adult | F | -20.26 | 9.72 | 3.11 | P2 | M3 | 0.709022 (10) | 0.708963 (06) | 17.26 | 14.48 | -7.14 | -11.42 |
| 3649 | - | *in situ* | LBA | subadult | ??F | -20.24 | 9.81 | 3.40 | P2 | M3 | 0.709798 (08) | 0.709682 (04) | 17.56 | 18.16 | -6.68 | -5.75 |
| 3651 | 2018 | *in situ* | MIA | subadult | ?M | -19.80 | 9.25 | 3.32 | M2 | - | 0.708798 (07) | - | 13.88 | | -12.34 | - |
| 3656 | 3655 (2018) | *in situ* | EIA | adult | ?F | -20.48 | 9.85 | 3.40 | P2 | M3 | 0.711990 (06) | 0.717299 (08) | 14.45 | 14.67 | -11.47 | -11.13 |
| 3660 | 3665 (2018) | *in situ* | MIA | subadult | ?M | -19.73 | 10.43 | 3.33 | M2 | - | 0.710264 (09) | - | 15.07 | | -10.51 | - |
| 3662 | 3663 (2018) | *in situ* | MIA | adult | F | -20.00 | 10.44 | 3.03 | P2 | M3 | 0.709738 (16) | 0.710040 (08) | 14.12 | 14.45 | -11.98 | -11.47 |
| 3670 (a) | 3666 | redeposited | LBA | juvenile | - | -19.25 | 9.04 | 3.12 | RC | - | 0.709469 (04) | - | 18.66 | - | -4.98 | - |
| 3673 | 3666 | redeposited | LBA | adult | M | -19.01 | 10.85 | 3.13 | P2 | M3 | 0.710158 (06) | 0.710108 (07) | 14.23 | 13.98 | -11.81 | -12.19 |
| 3674 | 3666 | *in situ* | LBA | juvenile | ??F | -19.00 | 10.23 | 3.24 | DM1 | M1 | 0.709388 (04) | 0.709542 (05) | 20.84 | 20.08 | -1.63 | -2.80 |
| 3675 | 3666 | *in situ* | LBA | adult | ?F | -19.79 | 10.82 | 3.13 | P2 | M3 | 0.710552 (05) | 0.710560 (05) | 17.63 | 18.33 | -6.57 | -5.49 |
| 3676 | 3666 | *in situ* | LBA | juvenile | ??M | -20.16 | 10.33 | 3.35 | M2 | - | 0.709456 (05) | - | 18.78 | - | -4.80 | - |
| 3677 | 3678 (2018) | *in situ* | MIA | subadult | ??M | -19.00 | 7.69 | 3.18 | M2 | - | 0.712352 (03) | - | 17.26 | - | -7.14 | - |
| 3680 | 3666 | *in situ* | LBA | subadult | ?F | -19.92 | 9.34 | 3.12 | P2 | M3 | 0.708282 (06) | 0.708464 (07) | 16.10 | 17.69 | -8.93 | -6.48 |
| 143602 | 2018 | redeposited | ?EIA | adult | F | -19.93 | 14.26 | 3.55 | M2 | - | 0.709676 (06) | - | 18.00 | - | -6.00 | - |
| 184605 | 2018 | redeposited | LBA* | juvenile/ subadult | ??F | -20.11 | 9.19 | 3.28 | M1 | - | 0.710612 (06) | - | 19.63 | - | -3.49 | - |
| 203007 | 2018 | redeposited | EIA* | adult | ?F | -19.68 | 8.87 | 2.95 | P2 | M3 | 0.709225 (04) | 0.709550 (05) | 18.73 | 18.33 | -4.88 | -5.49 |
| 204407 | 2018 | redeposited | LBA* | adult | M | -18.95 | 10.66 | 3.05 | P2 | - | 0.711519 (04) | - | 20.71 | - | -1.83 | |
| 243204 | 2018 | redeposited | MIA* | subadult | ??F | -19.50 | 10.55 | 3.10 | P2 | - | 0.709775 (06) | - | 21.33 | - | -0.87 | |
| 2839 | 2834 | redeposited | MAS* | adult | ??F | -18.82 | 9.47 | ***3.62*** | M3 | - | 0.709850 (10) | - | 18.27 | - | -5.58 | |
| 163803 | - | sheep/goat | - | - | - | - | - | - | M2 | - | 0.710056 (04) | - | 18.45 | - | -6.53 | |
| 202204 | - | sheep/goat | - | - | - | - | - | - | M2 | - | 0.709409 (04) | - | 19.14 | - | -5.77 | |
| 264406 | - | sheep/goat | - | - | - | - | - | - | M3 | - | 0.709672 (05) | - | 19.22 | - | -5.68 | |
| Brickearth | - | - | - | - | - | - | - | - | - | - | 0.708174 (05) | - | - | - | - | |

a. C/N ratios in bold italic fail quality control criteria. b. Uncertainties in strontium isotope ratios are shown in parenthesis as the uncertainty in the last two digits. c. Calibrated using equation 6 of Daux *et al.* (2008) for humans and that of Delgado Huertas *et al.* (1995) for sheep/goats.
* bone subject to radiocarbon dating

*Table 4.17 Samples and isotope measurements* cattle or horse as being less likely to have been moved over any great distance during their lifetime. The sample of reworked brickearth provides a value for the strontium isotope composition of the immediate local geology of the site.

The human samples represent the majority of individuals from the site yielding teeth suitable for analysis. Wherever possible the second premolar (PM2) and third molar (M3) were extracted from each individual, in order to include teeth forming at a range of childhood ages whilst avoiding teeth where the composition may be influenced by breast-feeding. Where this was not possible, the M2 was the preferred substitute in the absence of the PM2, giving a narrower age range, but still avoiding suckling effects. Other substitutions were required in some cases in the absence of these preferred teeth.

## *Methods*

### Sample preparation

Each tooth was sectioned using a flexible diamond impregnated cutting disc, and enamel and dentine separated for separate chemical processing. Where there was sufficient material, only half of the tooth was used.

The crown and cut surfaces of the enamel were abraded from the surface to a depth of ~100 μm using a tungsten carbide dental burr and the removed material discarded. Any adhering dentine was then removed using the burr and the resulting core enamel isolated for oxygen, and strontium isotope analysis.

The soil sample was leached overnight in 10% v/v acetic acid (Romil UpA) to extract total exchangeable cations representative of labile, and therefore ancient bioavailable, strontium. Leachates were evaporated to dryness and then treated in the same way as cleaned enamel samples.

### O-isotope analysis

Sub-samples of enamel were taken and prepared for isotope analysis using a slightly modified version of the method of Dettmann *et al.* (2001). The sample was dissolved in 2M $HNO_3$, HF was added to precipitate calcium as $CaF_2$ and the solution centrifuged. The decanted solution was diluted and KOH and $NH_3OH$ were added to bring it near to neutral pH. Then 2M $AgNO_3$ was added and fine-grained silver phosphate ($Ag_3PO_4$) was precipitated. The sample was centrifuged, decanted, then rinsed, centrifuged and decanted twice before drying. Measurements on the resulting yellow-brown precipitate were conducted by the Laboratoire Paléoenvironnements et Paléobiosphère, at the University of Lyon, following the method of Lécuyer *et al.* (2007). About 0.45 mg of silver phosphate was weighed into silver capsules mixed with 0.5 mg nickelised carbon. Measurement of $Ag_3PO_4$ $\delta^{18}O$ was carried out using Continuous Flow Isotope Ratio Mass Spectrometry (CF-IRMS). The instrumentation comprised a EuroVector EuroEA3028-HT (high temperature elemental analyser) coupled to a GVI IsoPrime isotope ratio mass spectrometer. Results were calculated assuming a value of 21.7‰ for NBS120c, following Lécuyer *et al.* (2007). Mean reproducibility on batch controls was 0.22‰ (1σ, n=4).

### Sr-isotope analysis

Tooth enamel samples of ~20–175 mg were cleaned in deionised water and dissolved in 16M $HNO_3$ (Romil UpA) for analysis. Sr was extracted as a fraction eluted from a column of Sr-Spec (a crown-ether based exchange chromatography medium, Eichrom). Procedural Sr blanks were <0.7ng. $^{87}Sr/^{86}Sr$ ratios were measured using a ThermoFinnigan Multi-collector ICP Mass Spectrometer (MC-ICP-MS) in the Northern Centre for Isotopic and Elemental Tracing at Durham University. For Sr, reproducibility of the standard NBS987 during analysis was 0.710265 ± 19 ppm (2σ, n=31).

### C-, and N-isotope analysis

Samples of dentine between 150 and 500 mg were taken (depending on availability), and processed following a modified Longin method. Samples were demineralised in 0.5M HCl for several days in a refrigerator, with a change of acid every day. The resulting insoluble collagen was solubilised by gelatinisation at pH 4 and 75°C over night. Low molecular weight contaminants were removed by ultrafiltration with a 30,000 Da cut-off. The purified gelatin was lyophilised and aliquots of 0.3–0.4 mg weighed into tin capsules and sealed. Isotopic measurements of prepared samples were conducted by the Alaska Stable Isotope Facility, at Fairbanks Alaska. All measurements were made in duplicate. Samples were loaded into an automatic sampler on a sample preparation module. Carbon and nitrogen contents were measured using an elemental analyser, and the samples automatically passed to a Finnigan Delta V plus Isotope Ratio Mass Spectrometer. The reference material used during analysis of the samples was a peptone with expected isotopic values of $\delta^{13}C$ = -15.80 ‰ and $\delta^{15}N$ = 7.00 ‰. Values measured during the analysis were $\delta^{13}C$ = -15.87±0.29 ‰ and $\delta^{15}N$ = 7.08±0.15 ‰ (1σ, n=5). Comparison of the 24 pairs of collagen measurements gives mean standard deviations of 0.1 ‰ for both $\delta^{13}C$ and $\delta^{15}N$.

*Statistical Analysis*

All statistical analyses have been conducted in PAST (Hammer *et al.* 2001) and, as there is no reason to expect the distribution of isotope values in a single population to follow any particular statistical distribution, comparisons have been made using the non-parametric Mann-Whitney U-test.

**Results and discussion**

Isotope analysis results are shown in Table 4.17 and Figure 4.3. Whilst it would be interesting to examine patterns in the isotope data by sex, from the 25 individuals analysed only seven are sexed confidently, six probably, and 10 most likely, while two are unsexed juvenile/subadult, so the sample size is too small to make this worthwhile. In order to have coherent groups for statistical analysis, the results need to be divided by period. There are 13 individuals from the Late Bronze Age, five from the Early Iron Age and seven from the Middle Iron Age. Patterns are therefore explored by burial rite (14 articulated *in situ* burials versus seven redeposited individuals), by feature (eight individuals from Burial Pit 3666, 11 individuals from Mortuary Feature 2018 external to 3666, and two from other features) and by period (LBA versus EIA and MIA).

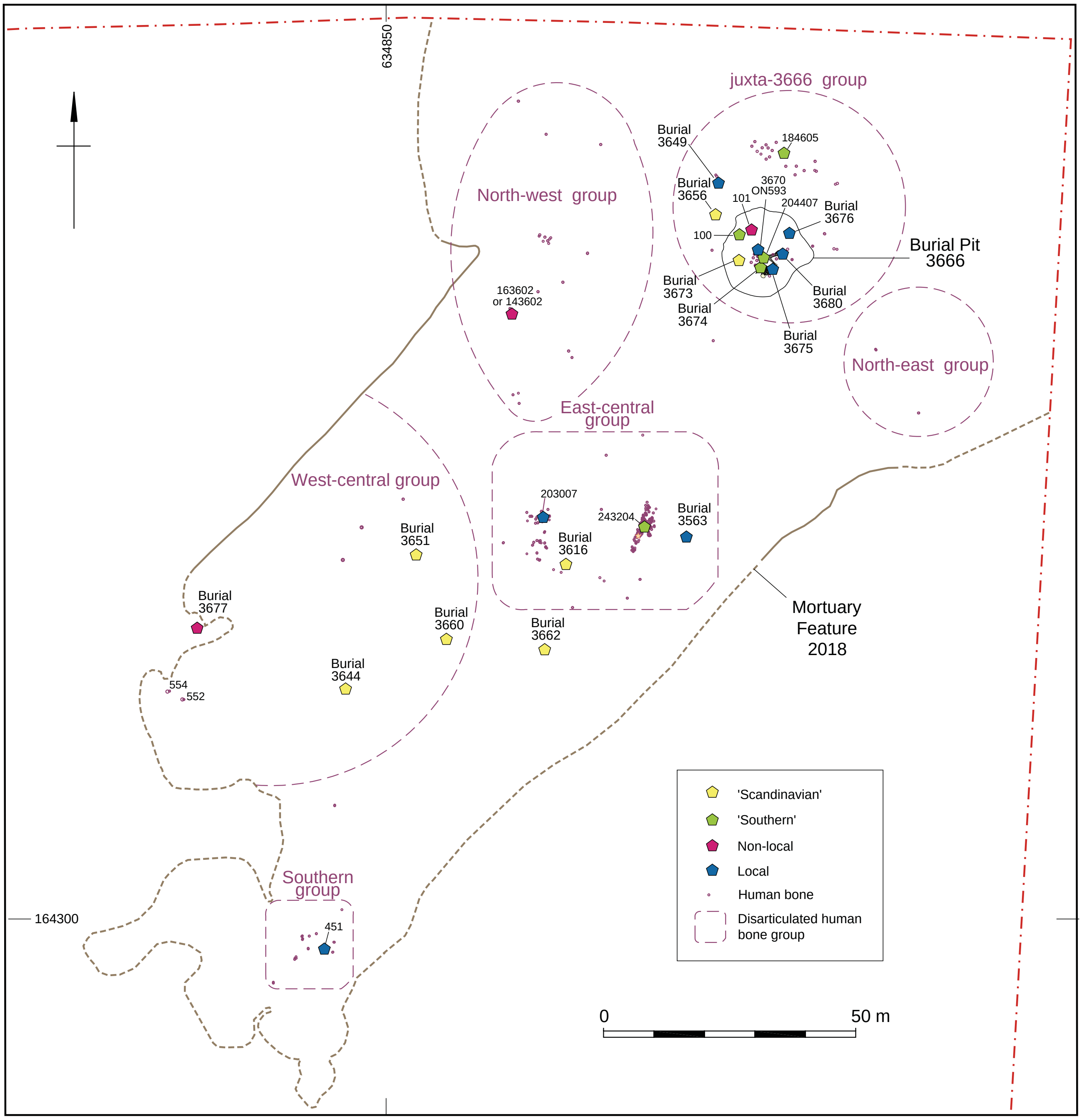



*Figure 4.3 Mortuary Feature 2018 showing location of isotope samples*

### *Carbon and nitrogen isotopes*

Quality control on extracted collagen is given by examination of the C/N atomic ratio, which should normally lie in the range 2.9 to 3.6 (DeNiro 1985). One sample (3614) fell outside this range and must therefore be considered less reliable. It (together with the Middle Anglo-Saxon 2839 which similarly fell outside the range, see Millard Chapter 7) is marked on all graphs for $\delta^{13}$C and $\delta^{15}$N by using open symbols, and has been omitted from statistical comparisons. Two samples have no $\delta^{13}$C and $\delta^{15}$N results as they failed to yield sufficient collagen for analysis (3469 and 3616).

Figure 4.4a shows $\delta^{15}$N versus $\delta^{13}$C, distinguished by period. In the overall set of results there are two visually apparent outliers, from contexts 2058/ON 101 and 143602. The sample from 2058/ON 101 has a notably higher $\delta^{13}$C value than all the other individuals, which might indicate higher consumption of marine resources, but as this seems to be ruled out by the absence of the increase in $\delta^{15}$N that would be expected for marine food consumption. The difference from the next highest values is less than 1 ‰, and small differences in $\delta^{13}$C due to diet are known to occur due to climatic variations (van Klinken *et al.* 2000), so this difference could arise from migration. The Early Iron Age individual from 143602 has elevated $\delta^{15}$N, almost 3 ‰ above the nearest value, but shows no shift in $\delta^{13}$C, so this elevation is likely caused by significantly higher consumption of freshwater fish than others in the population. The two outliers are both disarticulated individuals from cut 2018. The rest of the population shows a range of values that indicate mostly terrestrial food consumption, but with some variability in food sources. Excluding the two outliers, the variation is similar to that of the Iron Age populations from Wetwang Slack (Jay and Richards 2006) and Dorset (Redfern *et al.* 2010), though the range at Wetwang is shifted to slightly lower values in both carbon and nitrogen. This can probably be explained by small differences in diet and climate.

The distributions of isotope ratios by period, shown in Figure 4.4a, show no discernible difference in values, and this is confirmed by Mann-Whitney U-tests (Table 4.18). Carbon and nitrogen isotope values for the two burial rites, shown in Figure 4.4b, appear to differ in $\delta^{13}$C but not in $\delta^{15}$N, but Mann-Whitney tests show that the slight difference in $\delta^{13}$C is only weakly significant (Table 4.18). The distribution of isotope ratios by archaeological context, shown in Figure 4.4c, suggests that samples from Burial Pit 3666 have lower $\delta^{13}$C than those from the rest of Mortuary Feature 2018, but do not differ in $\delta^{15}$N. This is confirmed by Mann-Whitney tests (Table 4.18). The difference in mean $\delta^{13}$C values is small, with means of -19.92 ‰ for 2018 and -19.29 ‰ for 3666, so inferring what, if any, difference in diet there was is difficult.

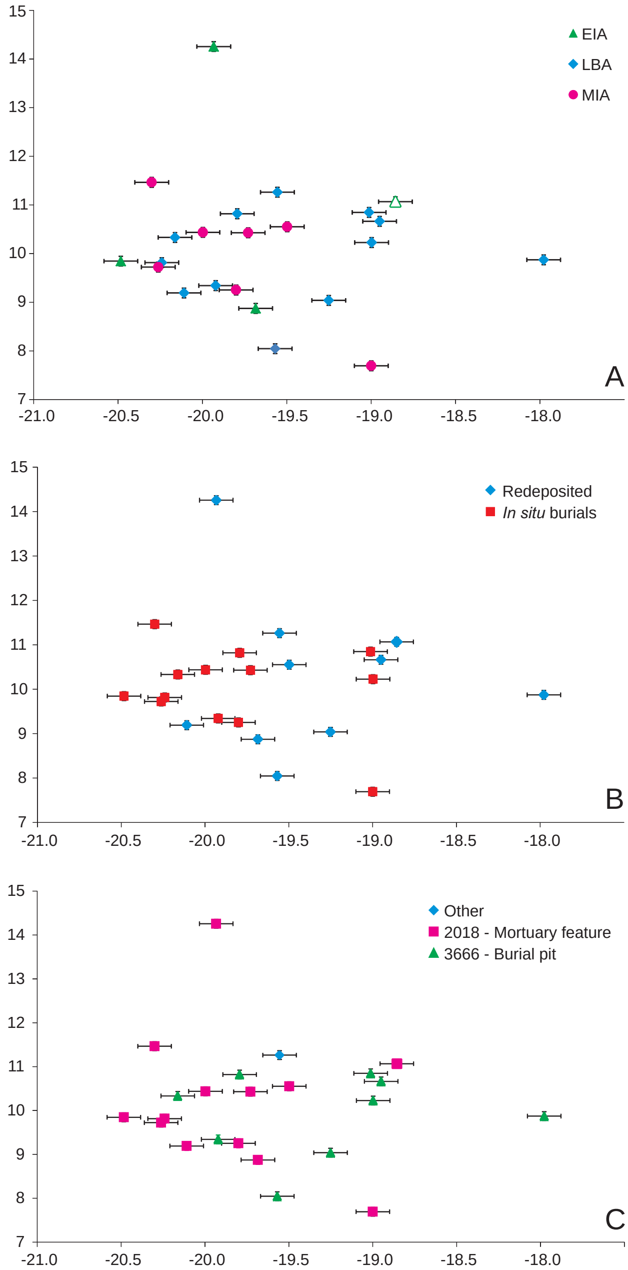



*Figure 4.4 Nitrogen and carbon isotope results by period (a), burial rite (b) and archaeological context (c)*

### *Strontium isotopes*

The strontium isotope values are presented in Figure 4.5a comparing earlier and later teeth from each individual, arranged by period, in Figure 4.5b sorted by burial rite and in Figure 4.5c sorted by archaeological context. The range of human tooth enamel strontium isotope ratios, 0.7083–0.7173, is very large, and exceeds all possible evaluations of the range of local strontium isotope variation.

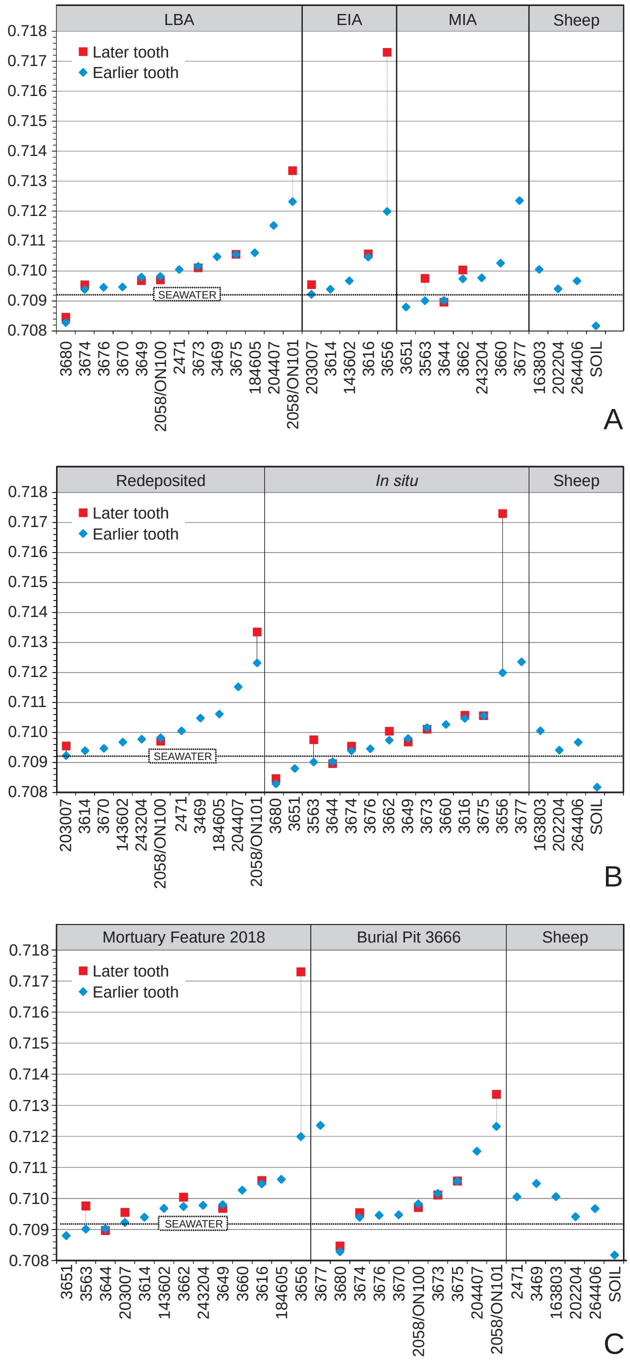



*Figure 4.5 Strontium isotope ratio results by period (a), burial rite (b) and archaeological context (c)*

The sample of brickearth from the site gives the value for the immediate location, 0.7082, but as brickearth in the Wealden District is a very variable material (Gallois 1965) it cannot be taken as typical for the surrounding area. Some of the surrounding area is covered by alluvium, which, given the eastward flow of the River Stour is likely mostly to be reworked brickearth. Values are available for soils formed on some of the formations found further afield (from an unpublished survey across Sussex by Hughes and Millard, and for London Clay from P Budd pers. comm.): chalk (0.7074–0.7075) outcrops a few kilometres to the north-east, and London Clay (0.7100–0.7115) some 15 km due west. Moving south-west across Kent there is a succession of chalk, clay-with-flints (0.7080–0.7119), Upper Greensand (0.7079), Lower Greensand (0.7105–0.7114), Weald Clay (0.7104) and Hastings Beds (no value available). Slightly further away Sykes *et al.* (2006) reported that animals believed to be local to Fishbourne in West Sussex had a ratio of 0.7093±0.0003.

The three ovicaprids from the site have a range in strontium isotope ratios of 0.7094–0.7101, which is somewhat higher than the brickearth from the site, but well within the range of local soils. If significant amounts of marine foods were being consumed, the humans' ratios might be shifted towards the seawater value, 0.7092 (McArthur and Howarth 2004), but this is also within the range of local soils. Consequently, the local range of strontium isotopes is based on local soils at 0.7074–0.7119.

This means that all but four of the human isotope values fall within the range of values that might be found within a day's walk of the site. However, both the values for 2058/ON 101 and the single value from 3677, are clearly not local. The M3 from 3656, at 0.7173, is amoungst the highest values for archaeological human remains so far reported from Britain, whilst at 0.7120 the P2 is marginally higher than has been observed locally, but not convincingly so, given that the range of values for clay-with-flints is based on only three samples. The ratio of 0.7173 from the M3 of 3656 implies time spent in later childhood in an area of ancient, pre-Cambrian rocks. Montgomery *et al.* (2006), using bottled mineral waters from Great Britain as a proxy for environmental strontium isotope ratios, found only one value as high as this, 0.7206 from Speyside, Morayshire. Such values are also found in other areas of Europe, such as the values of 0.717–0.725 from streams in the Vosges Mountains of Alsace (reviewed in Bentley 2003). On geological grounds they are also possible in parts of Brittany, parts of the Alps, and Norway.

Five of the 13 individuals with two teeth analysed (2058/ON 101, 203007, 3563, 3662, 3656) show strong evidence for migration during childhood from differences in strontium isotope ratios.

Visually there are no strong differences in strontium isotope ratios by period (Fig. 4.5a), between the *in situ* and redeposited remains (Fig. 4.5b), nor between contexts (Fig. 4.5c), and Mann-Whitney U-tests confirm this (Table 4.18).

### *Oxygen isotopes*

The oxygen isotope values are presented in Figure 4.6a by period comparing earlier and later teeth from each individual, in Figure 4.6b sorted by burial rite and in Figure 4.6c sorted by archaeological context. The range of human tooth enamel oxygen isotope ratios, 13.88–21.40 ‰ is very large, and exceeds that possible from the whole of the British Isles. Humans drinking a single source of water are expected to show a range of approximately 1‰ (Longinelli 1984). Conversion of the values measured in the phosphate of human tooth enamel to drinking water values is required to interpret the geographical location of origin, and this process has recently been placed on a sounder footing by the work of Daux *et al.* (2008). The values from sheep/goat tooth enamel are converted using the equation of Delgado Huertas *et al.* (1995) for sheep and goats.

Modern data on the composition of precipitation in the British Isles (Fig. 4.7b; Darling and Talbot 2003) suggests that the local drinking water value here ought to have $\delta^{18}O$ of about -7.1 ‰. Climatic changes since the Bronze Age may

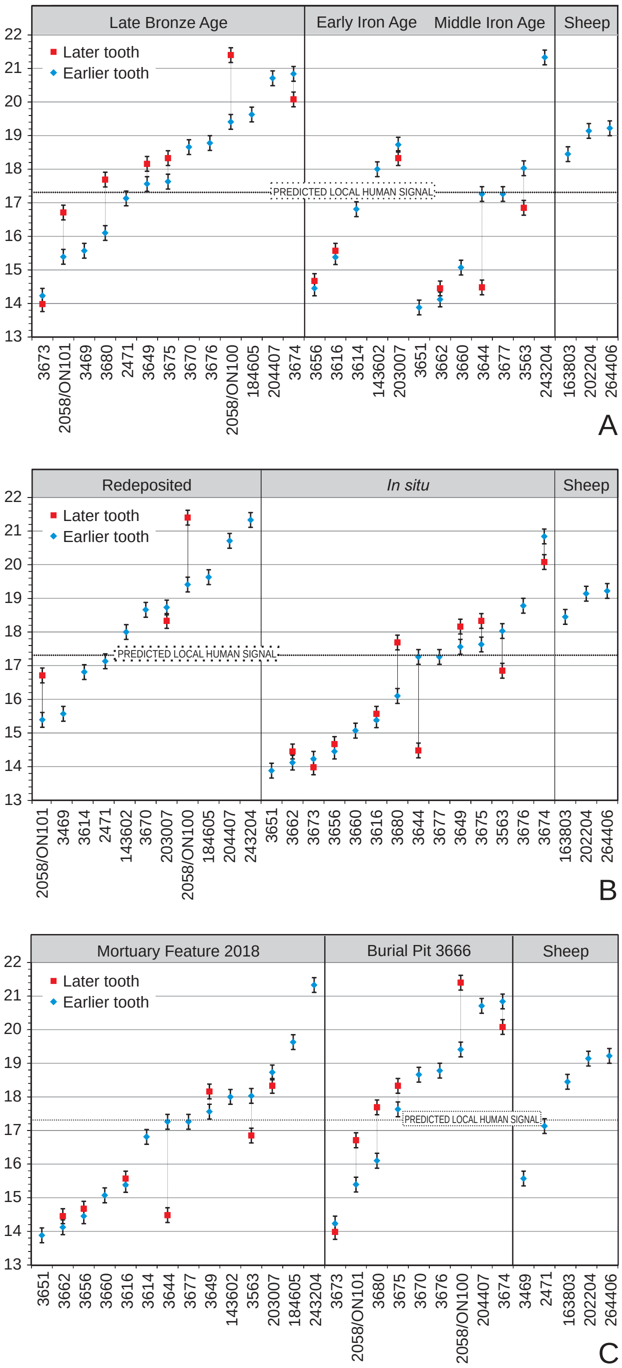



Figure 4.6 *Oxygen isotope results on enamel phosphate by period (a), burial rite (b), and archaeological context (c)*

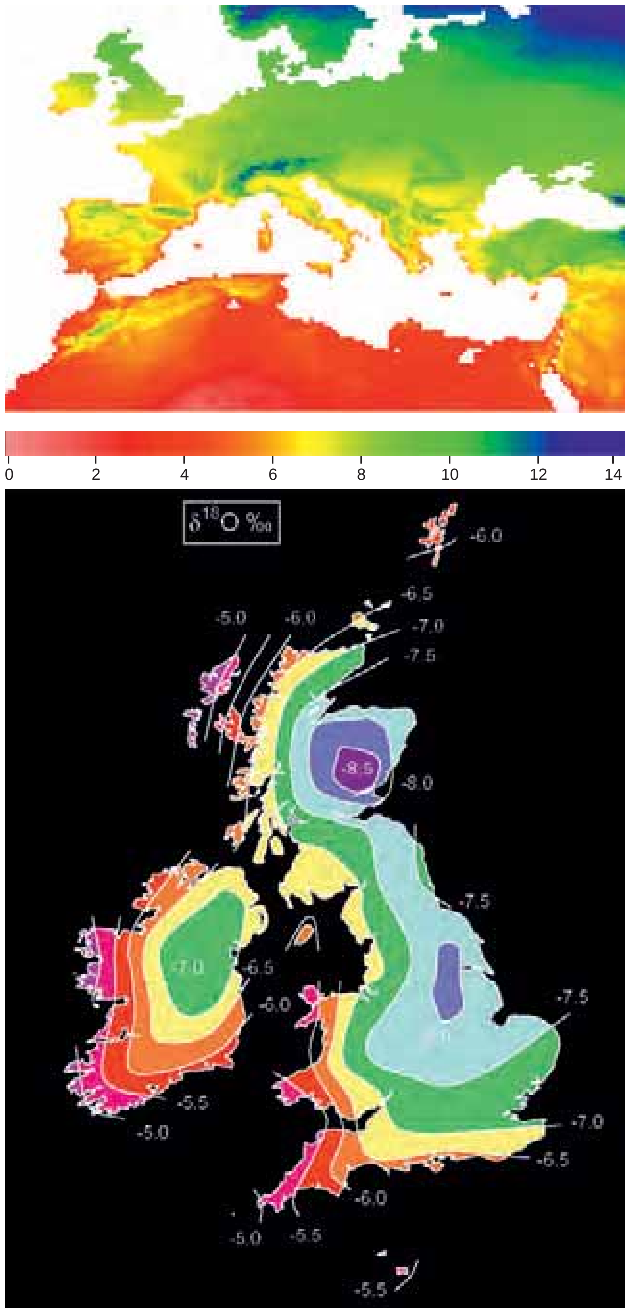



*Figure 4.7 Mean annual oxygen isotope composition of precipitation over Europe and the Mediterranean (a), and modern mean oxygen isotope composition of precipitation in the British Isles (b) (based on Darling* et al. *2003)*

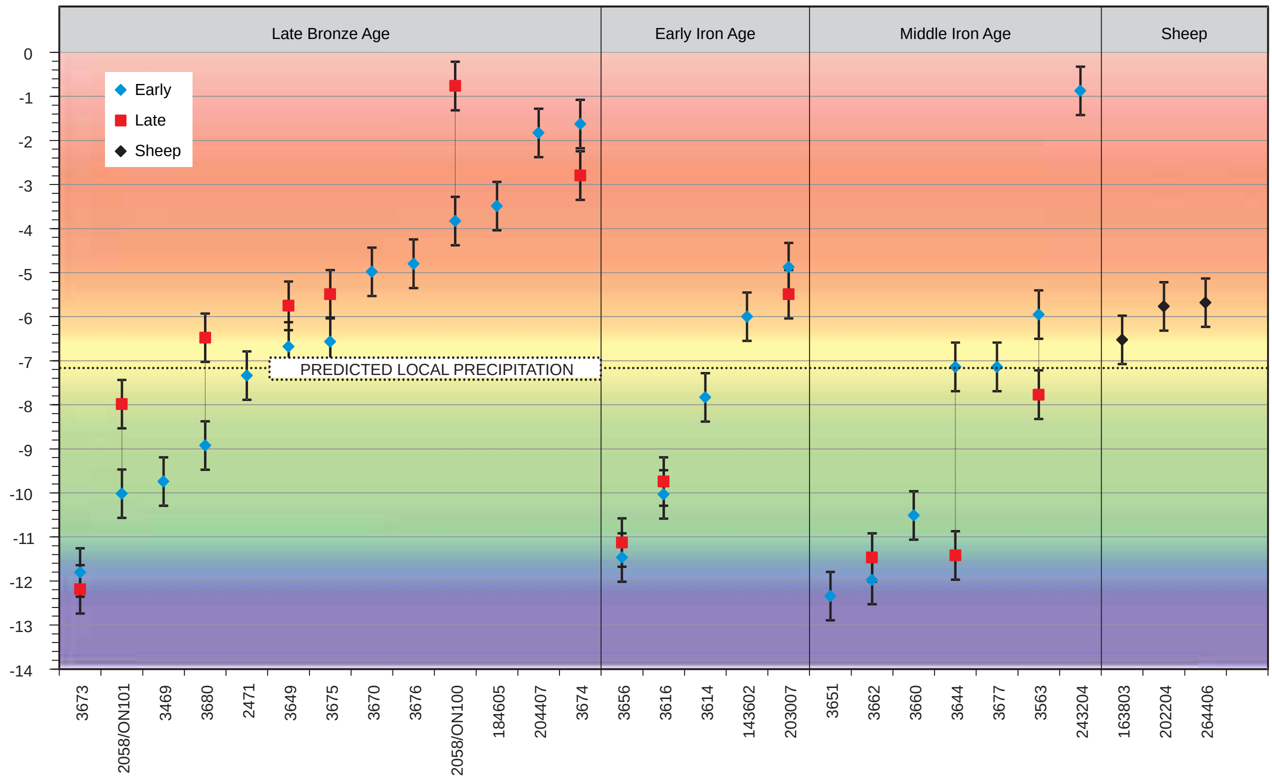



*Figure 4.8 Oxygen isotope results calibrated to drinking water values sorted by period*

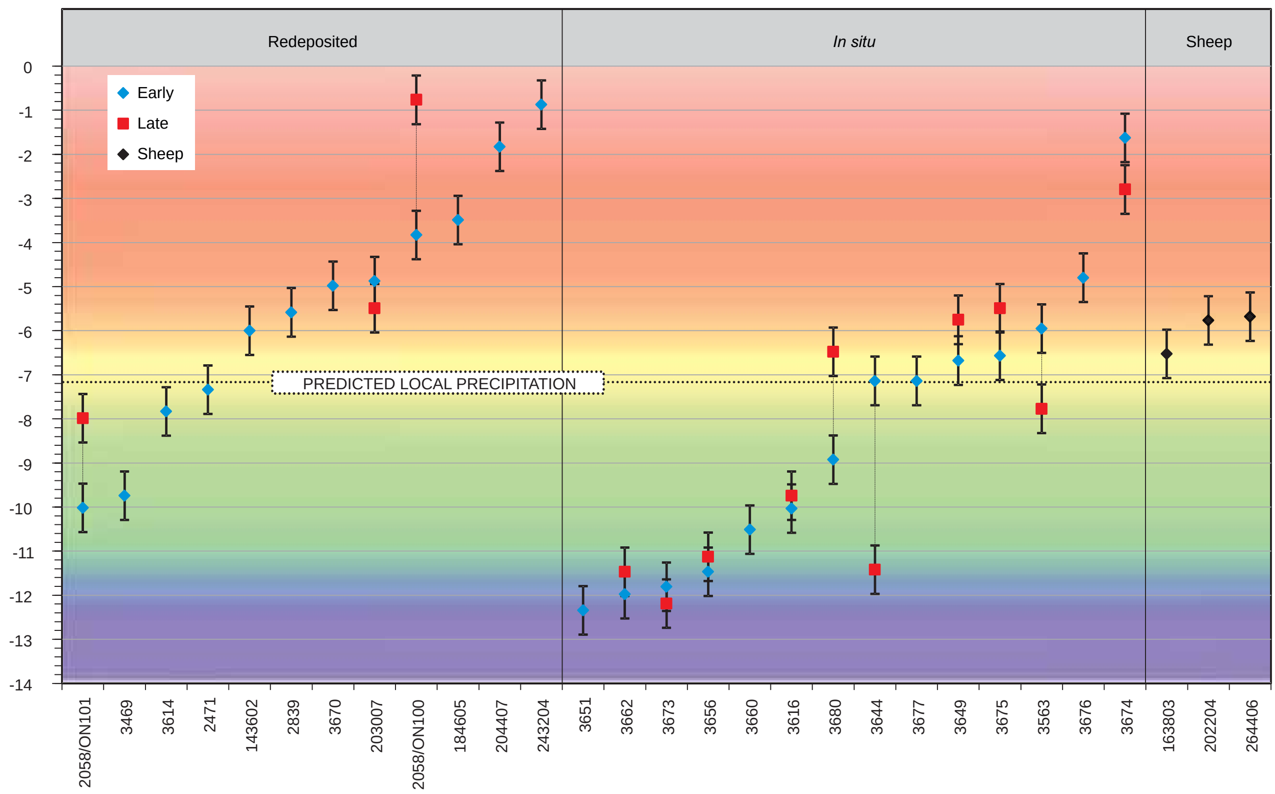



*Figure 4.9 Oxygen isotope results calibrated to drinking water values sorted by deposition type*

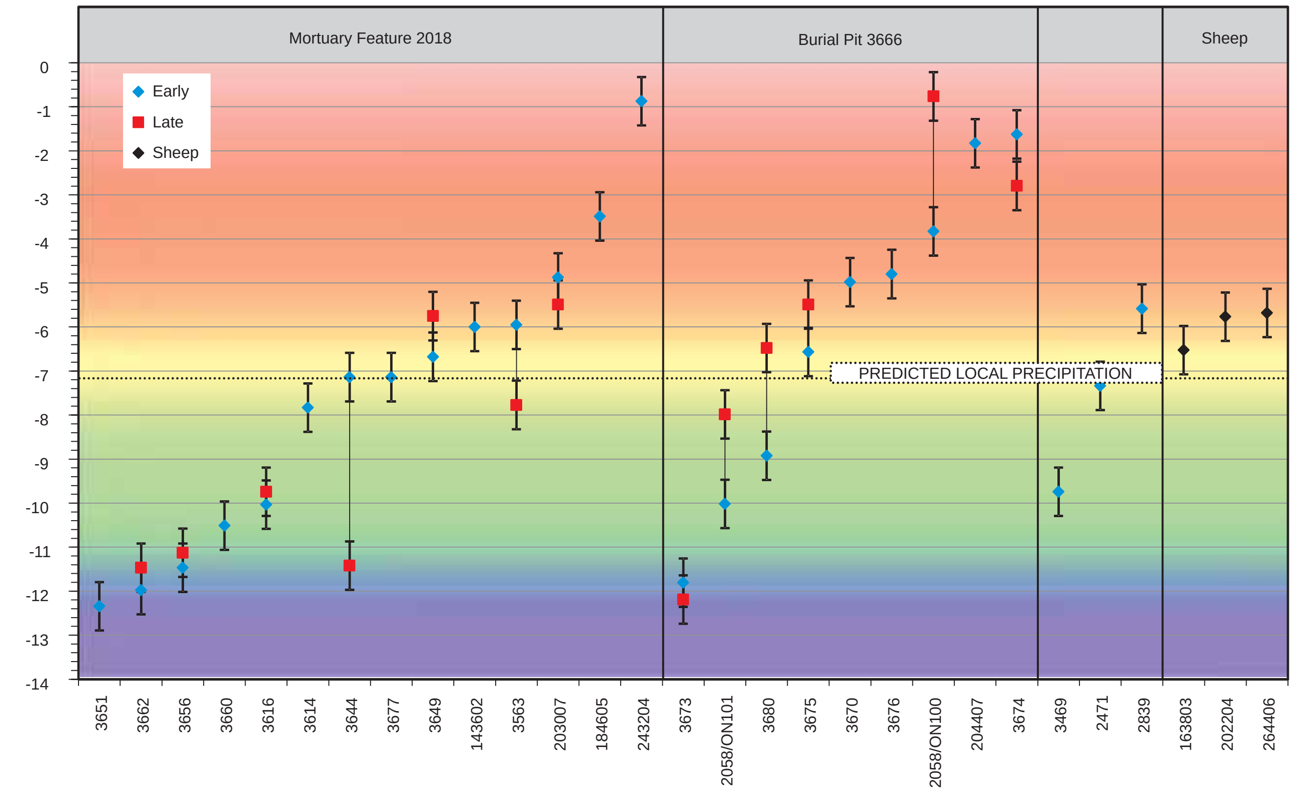



*Figure 4.10 Oxygen isotope results calibrated to drinking water values sorted by feature*

| | **Redeposited v. *in situ*** | | **Burial Pit 3666 v. others from Mortuary Feature 2018** | | **LBA v. EIA+MIA** | |
|---|---|---|---|---|---|---|
| | Including outliers | Without outliers | Including outliers | Without outliers | Including outliers | Without outliers |
| $\delta^{13}C$ | 0.059 | 0.079 | **0.019** | 0.052 | 0.127 | 0.237 |
| $\delta^{15}N$ | 0.848 | 0.485 | 0.808 | 0.600 | 0.974 | 0.766 |
| $^{87}Sr/^{86}Sr$ | 0.458 | - | 0.898 | - | 0.530 | - |
| $\delta^{18}O$ | **0.011** | - | 0.127 | - | **0.032** | - |

*Table 4.18 P-values from Mann-Whitney U-tests comparing groups of burials. Tests yielding significant results at the 5% level are marked by bold type*

have altered this slightly, but, with $\delta^{18}O$ changing only 0.22 ‰ per °C (Darling 2004), the shifts will not have been large. The drinking water values calculated from the three sheep/goat samples average at -6.0 ‰. However, the uncertainty on this prediction is likely to exceed the 0.55 ‰ 1σ-uncertainty from the much better studied human conversions, and so it can be considered consistent with the modern value.

Even if one were to allow for a wide range of possible values, perhaps -4.5 to 7.5 ‰, as calibrated values from enamel consistent with 'local' drinking water (based on the sheep/goat values and the clustering in Fig. 4.11), this population shows a large number of migrants, some with lower values, indicating migration from higher, colder and/or more easterly areas and some with higher values, indicating migration from warmer and/or more westerly areas.

Changes in oxygen isotopes between two teeth of the same individual provide evidence for migration of individuals from contexts 3644, 3680 and 2058/ON 100, whilst there is weaker evidence for those from contexts 3563 and 2058/ON 101. For all of these the analyses were conducted using P2 and M3, except for 2058/ON 100 where M1 and P2 were analysed. As the M1 values might be elevated by suckling, the difference between the oxygen isotope values may have been reduced for 2058/ON 100. Other individuals with values possibly elevated by suckling include 2471 (P1), 3670 (C), 3674 (DM1 and M1), and 184605 (M1).

Visually, the Late Bronze Age seems to have more individuals with high oxygen isotope ratios than those from the Early and Middle Iron Age (Figs 4.6a and 4.8). This is confirmed by a significant Mann-Whitney U-test (Table 4.18). The redeposited bone seems to have higher oxygen isotope ratios than that from *in situ* burials (Figs 4.6b and 4.9), and this difference is also confirmed by a Mann-Whitney test (Table 4.18). However, individuals from all locations show similar distributions of oxygen isotope ratios, and a

Mann-Whitney test is not significant (Figs 4.6c and 4.10; Table 4.18). Examination of Figure 4.8 shows that in the Late Bronze Age there were migrants from areas of both higher and lower oxygen isotope ratios, whilst in the Early and Middle Iron Age migrants tended to mostly come from areas of lower ratios. Figure 4.14 shows that just over half of those from the *in situ* burials have oxygen isotope ratios compatible with local childhoods, but with 3680 and 3644 showing evidence for having spent at least part of their childhood somewhere with precipitation with lower oxygen isotope ratios.

### *Strontium and oxygen isotopes combined*

Figure 4.11 shows the combined results of the strontium and oxygen isotope analysis, with definite migrants to Cliffs End labelled with context numbers. There appear to be three major groups, with some outliers. Most individual childhood migrations demonstrated by differences in isotope composition between teeth are within these groups, and only two individuals cross between groups (3644 and 3680), though in opposite directions. Two individuals do not fit this pattern of three groups: 2058/ON 101 and 3677.

The largest group is of those with 'local' isotope signatures, for whom we have no positive evidence of migration. Within this group are the one Middle Iron Age and three Early Iron Age individuals analysed, and three Late Bronze Age individuals from *in situ* burials and two whose remains had been redeposited.

The next largest group has drinking-water $\delta^{18}O$ values below 9 ‰ but a range of Sr isotope ratios. These $\delta^{18}O$ values imply either an origin to the east or north of Britain, or possibly high in the Alps. North or east of Britain, Scandinavia is the nearest suitable place, as the north Atlantic islands were not colonised until the late 1st millennium AD. Reported bioavailable strontium isotope ratios for this area are few, but Sjøgren *et al.* (2009) analysed wild animals from Falbygden and adjacent areas of Sweden, yielding a range of 0.7127 to 0.7292, and Åberg *et al.* (1998) analysed five supposedly non-migrant medieval humans from across Norway ranging from 0.7109 to 0.7323, whilst eight late 20th-century humans had values from 0.7077 to 0.7177, though these may have been influenced by imported foodstuffs. Thus the rocks of the Baltic Shield, exposed in Norway and Sweden, could account for the high Sr isotope ratio of the M3 of 3656, whilst the other ratios could come from areas of Scandinavia with more recent sediments, or, in principle, from diets which mix marine and terrestrial food sources, though the carbon isotope values obtained here eliminate this as an explanation.

For the high Alps, oxygen isotope measurements have been reported on carbonate in modern human teeth and the

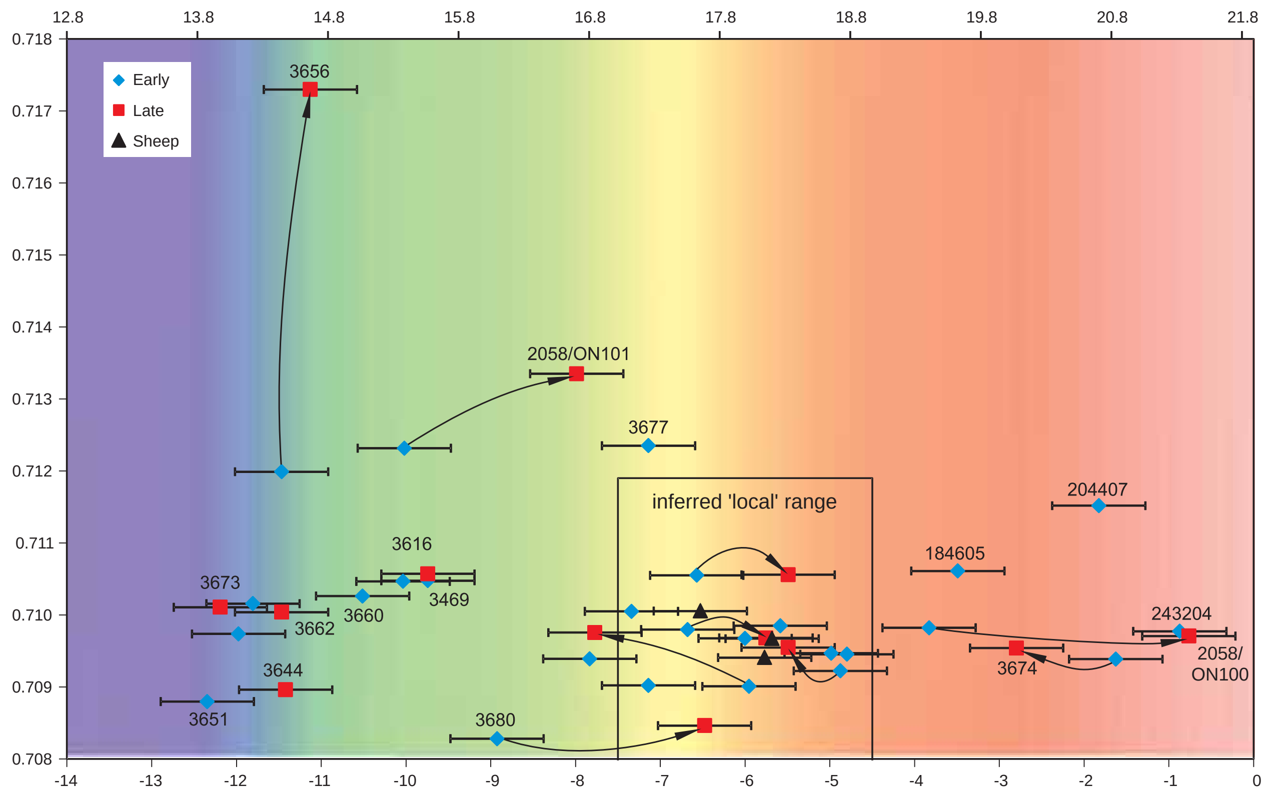



*Figure 4.11 Plot of strontium isotope values against the drinking water oxygen isotope values*

Ice Man (Müller *et al.* 2003), from which drinking water values derived using the approach of Millard and Schroeder (2009) range from -12.9 to -8.4 ‰. Soil strontium isotope ratios for the same area north of Bolzano have a range of 0.7128 to 0.7238, whilst ice from the Ice Man location ranges 0.7174 to 0.7288 (Müller *et al.* 2003), and the Ice Man's enamel 0.7203 to 0.7206. Thus only the M3 of 3656 could be compatible with this region. On the northern flanks of the Alps, Price *et al.* (2004) summarise a variety of rock and bone strontium isotope ratios, with the rocks ranging 0.7070 to 0.7095, and site-averaged bones 0.7082 to 0.7104. For the southern flank in Italy, Müller *et al.* (2003) report soil values ranging 0.7053 to 0.7194. On this basis some the individuals in this group could have come from the flanks of the Alps, but the high Alps are the only part consistent with the values of 3656.

There is, therefore, a large inhabited area of southern Norway and Sweden isotopically compatible with the values of this group from Cliffs End, but only a small area of the high Alps. Consequently, on balance an origin in Scandinavia seems more likely. This group includes seven individuals recovered as *in situ* articulated skeletons within Mortuary Feature 2018, and one (3649) redeposited in a pit within the confines of the Late Bronze Age Northern Enclosure preserved only as tooth crowns.

The final, smallest, group has $\delta^{18}O$ of drinking water above 4 ‰, and consists of five individuals and seven data points, including very high calculated drinking water values (above 2 ‰). Using the calibration equation of Daux *et al.* (2008) requires it to be extrapolated beyond their reference data to obtain calibrations for $\delta^{18}O$ phosphate above 19.5 ‰, and, therefore, the uncertainties on these high values might be larger than the others. Drinking water values of about -4 ‰ are found around the coast of much of the eastern Mediterranean apart from the Adriatic, but higher values are only found in the interior of north Africa (Lykoudis and Argiriou 2007), or possibly in south-west Iberia (Bowen and Revenaugh 2003). The only reported archaeological data from this region is that of White *et al.* (2004), at Wadi Halfa in northern Sudan where the Nile is predicted to have a value of at least +2 ‰ and the humans have a range of 21.4 to 26.0 ‰ in tooth enamel phosphate. At face value, therefore, an origin in north Africa is possible, but given the increased uncertainty of these extrapolated calibrations this may just result from the scatter that is to be expected in a population on a single drinking water source. The strontium isotope values of this group are not particularly distinctive. It is only possible to conclude that these people must have come from an area substantially south of, and warmer than, Britain, perhaps south-west Iberia or even north Africa.

This group comes from diverse archaeological contexts. One individual (234204) is of Middle Iron Age date, and the other four are Late Bronze Age. One Late Bronze Age individual (3674) formed one of the *in situ* skeletons within Burial Pit 3666 whilst the remains of the other three had been redeposited.

**Individual migrations**

Age at death given for all individuals is taken from the main osteological report (Tables 4.1–4.4).

***'Scandinavian'***

**3469**: The M2 of this LBA individual shows that at age 3½–6 years she/he spent time in a similar environment to 3616, before migration to Cliffs End and burial at age *c.* 10–14 years.

**3616**: The P2 to M3 shift in isotope ratios is small in this EIA subadult, and therefore her childhood from 3–6 years and 9–12 years was likely spent in one place, but by *c.* 14–18 years she had moved to Cliffs End where she were buried. The M3 isotope ratio is very close to that of the M2 of 3469.

**3644**: The P2 of this MIA woman shows that her childhood from 3–6 years was spent in a place isotopically similar to Kent, but the M3 shows that she had migrated to a place of more 'Scandinavian' characteristics by the age of 9–12 years. This is the only individual whose isotope values would be consistent with a migration from Cliffs End and a return at a later date before burial in adulthood.

**3651**: The M2 of this MIA young male (?) shows that at age 3½–6 years he spent time in an area of low $\delta^{18}O$ precipitation, before being buried at Cliffs End aged *c.* 14–16 yr.

**3656**: This EIA female shows the clearest evidence for Scandinavian origins, with low $\delta^{18}O$ coupled with very high $^{86}Sr/^{87}Sr$. She spent the period of formation of her P2 (3–6 years) in an area of relatively high strontium isotope ratio, but by the ages of 9–12 years (M3 formation) had moved to an area of very old volcanic rocks, before migration to Cliffs End and burial at the age of *c.* 30–35yr.

**3660**: The M2 of this MIA individual shows that at age 3½–6 years he spent time in an area similar to that of 3616, 3649, 3662 and 3673, before coming to Cliffs End and being buried aged *c.* 15–17yr.

**3662** and **3673**: The isotope ratios for this MIA woman and LBA man are very similar. Like 3616, they show limited evidence for movement between P2 formation (3–6 years) and M3 formation (9–12 years) within a 'Scandinavian' isotopic zone, though if there was movement they moved in opposite directions. Between the ages of *c.* 12 and *c.* 29–34 yr. and *c.* 30–40 yr. respectively they moved to Cliffs End.

***'Southern'***

**2058**/ON 100: This LBA female shows evidence for changing drinking water $\delta^{18}O$ during childhood between MI formation (0–2 years ) and P2 formation (3–6 years). Her P2 values can only be consistent with a southerly climate, but her M1 values could derive from north-western continental Europe, and might even be elevated by a suckling effect. This implies a migration southwards before moving north again and arriving at Cliffs End where she was buried aged *c.* 15–18yr. Her P2 isotope values are almost identical to those of the P2 of 243204.

**3674**: This LBA child spent the early years of its life in a more southerly and/or warmer climate than Britain, with DM1 forming there before five months of age and M1forming in an isotopically similar place before two years of age. By age *c.* 9–10 yr. he/she had moved to Cliffs End.

**184605**/ON 564: This LBA juvenile/subadult of *c.* 11–14 years spent the period of formation of her M1 (0–2 years) in a more southerly and/or warmer climate than Britain.

**204407**/ON 536: This LBA man's P2 shows that at ages 3–6 years he lived an area of warmer climate and relatively high strontium isotope ratios.

**243204**: This MIA subadult's P2 shows that at ages 3–6 years she lived in an area of very similar isotope ratios to the place where the M3 of 2058/ON 100 formed, before moving to Cliffs End by the age of *c.* 13–15 yr.

It is notable that all the individuals with a 'southern' signature, except 3674, were redeposited in Mortuary Feature 2018, and four of the five are of Late Bronze Age date.

***Other individuals***

**2058**/ON 101: This LBA female (??) is interesting as she shows evidence for migration in both $\delta^{18}O$ and $^{87}Sr/^{86}Sr$, as well as having a distinctive $\delta^{13}C$ value. Her P2 shows that at age 3–6 she was in an area not dissimilar to the place where 3656 was at the same age, and this would fit with the 'Scandinavian' group. However, the combined $\delta^{18}O$ and $^{86}Sr/^{8}$ Sr values for her M3, are not exhibited by anyone else in the population. Her $\delta^{13}C$ value is likewise unique, and suggests more fish consumption than the rest of the population. The area of higher strontium and oxygen isotope ratios to which she had migrated by age 9–12 is difficult to identify, though there are small areas in northern England (eg, at Ferrybridge, Budd 2005), or in Scotland that might match.

**3677**: This *c.* 14–16 year old MIA subadult has an M2 (formed at 3.5–6 years) strontium isotope which seems to fall above the Cliffs End local range, so he may be a migrant, though a conservative interpretation would be that the local strontium isotope ratios are not well characterised enough to completely rule out a local childhood.

## Conclusions

The diet of the people buried at Cliffs End was primarily terrestrial and does not differ much, if at all, with burial rite or archaeological context. The Late Bronze Age adult ??female 2058/ON 101 stands out, as she has a distinctive diet, and a migration pattern that differs from other people at the site.

The burial population at Cliffs End shows a very varied set of strontium and oxygen isotope ratios. Considering the isotope results one ratio at a time, there does not seem to be any clear connection between burial location and origins. Although there is a statistically significant difference in carbon isotope composition between those recovered from Burial Pit 3666 and elsewhere within Mortuary Feature 2018, it is small and not meaningful in terms of diet. The bivariate analysis of strontium and oxygen isotopes in comparison to expected local signals (Fig. 4.18) suggests that the people at Cliffs End must have come from at least three different regions, which are characterised above as having 'local', 'Scandinavian' and 'southern' isotope signatures, though two individuals do not fit this pattern. Of the five 'southern' individuals, three were Late Bronze Age redeposited remains, and of the eight 'Scandinavian' individuals six are from *in situ* burials external to Burial Pit 3666. This patterning led to statistically significant differences in oxygen isotope ratios when comparing redeposited and *in situ* articulated bone, and when comparing Late Bronze Age to Iron Age individuals.

In conclusion, the people buried at Cliffs End show no evidence for substantive differences in diet associated with burial rite or location, but they do show an association of burial rite with place of origin, with 'southern' individuals tending to be amongst the redeposited remains and 'Scandinavian' individuals from *in situ* burials. With five of seven Middle Iron Age, two of five Early Iron Age, and seven of 13 Late Bronze Age individuals showing evidence for immigration, this could be characterised as a mortuary site dominated by migrants.

# Chapter 5

# Prehistoric Finds and Environmental Evidence

## Prehistoric Pottery

*by Matt Leivers*

The excavations produced a total of 10,739 sherds weighing 90,797 g. Very small quantities of Early Neolithic, Middle Neolithic Peterborough Ware, Beaker and Early Bronze Age, and Middle–Late Iron Age proto-bead rimmed ceramics are present within the assemblage, which is dominated by Late Bronze Age and Early Iron Age material (Figs 5.1–5.5). Important groups of material came from a series of Late Bronze Age enclosures and associated features. Quantities of Late Bronze Age pottery recovered by feature group are given in Table 5.1 (the 749 sherds weighing 5566 g (7.43 g average weight) not tabulated were of other periods, redeposited in later features or unstratified).

| Feature Group | No. Sherds | Weight (g) | Average weight (g) |
|---|---|---|---|
| **Northern Enclosure** | **3,394** | **42,214** | **12.44** |
| Midden Pit (2028) | 2,588 | 33,679 | 13.01 |
| Outer enclosure ditch (2193, 2469) | 507 | 5,884 | 11.60 |
| Inner enclosure ditch (3602) | 239 | 2,258 | 9.45 |
| External features (2021, 2027, 2201, 2216, 2020, 2197) | 33 | 277 | 8.39 |
| Internal Features (3229, 3267, 3242) | 27 | 116 | 4.30 |
| **Mortuary Feature** | **3,390** | **24,504** | **7.23** |
| Mortuary Feature (2018) | 3,333 | 24,109 | 7.23 |
| Associated Features (2102, 2104, 3537, 3613) | 57 | 395 | 6.93 |
| **Central Enclosure** | **2,459** | **15,052** | **6.12** |
| Outer enclosure ditch (2203) | 409 | 2,855 | 6.98 |
| Inner enclosure ditch (2195, 2382) | 361 | 2,585 | 7.16 |
| Internal pits (2340, 2341, 2396, 2688, 2790, 2812, 2815, 2876) | 797 | 4,469 | 5.61 |
| Internal postholes (2348, 2357, 2359, 2372, 2383, 2654, 2673, 2776, 2777, 2779, 2787, 2803, 2805, 2810, 2832, 2847, 2853, 2855, 2861) | 704 | 3,608 | 5.12 |
| Spread 2311 | 188 | 1,535 | 8.16 |
| **Southern Enclosure** | **741** | **3,261** | **4.40** |
| Ditches (2241/2242) | 680 | 2,812 | 4.13 |
| Associated features (2217, 2219) | 61 | 449 | 7.36 |
| **Layer 2925** | **6** | **200** | **33.33** |
| **Total** | **9,990** | **85,231** | **8.53** |

*Table 5.1 Later prehistoric pottery totals by feature group*

### *Methods*

The material was analysed in accordance with Wessex Archaeology's recording system (Morris 1994), which follows the nationally recommended guidelines of the Prehistoric Ceramics Research Group (PCRG 2010). Sherds were examined using a x20 binocular microscope to identify clay matrices and tempers, and fabrics were defined on those bases.

### *Condition*

A large proportion of the assemblage was typified by a high degree of fragmentation, a lack of featured sherds, and varied wear patterns (overall average sherd weight is only 8.45 g). This is especially true of sherds from the Mortuary Feature (2018), where a large portion of the assemblage is likely to have entered the features through natural processes. In some other groups (most notably the Midden Pit (2028) in the Northern Enclosure group and some features within the Central Enclosure group) sherds were larger, and both sherd groups from individual vessels and refitting sherds can be identified. This is an indication that several processes were responsible for the incorporation of ceramics in features.

### *Fabrics*

In total 25 fabrics were defined on the basis of principal inclusion. The majority are flint-tempered, with less sand temper, and grog, shell and other organic material only present as minority fabrics. In many cases (and especially with the flint-tempered examples) fabrics merge imperceptibly; consequently, many of these types mark points on a spectrum rather than bounded distinct entities. Fabric descriptions are given in Appendix 2. A breakdown by type is in Table 5.2. The 69 sherds weighing 72 g not tabulated were crumbs too small to assign to fabric type.

Some of the fabric groups are chronologically distinct: for instance, F10 occurs only as Early Neolithic bowl and Middle Neolithic Peterborough Ware, and O1 appears to be predominantly Beaker. Some of the flint-tempered groups, however, are likely to subsume significant chronological variation, as suggested by the Middle Bronze Age radiocarbon dates on sherds which are visually indistinguishable from the

| Fabric | No. sherds | Weight (g) | ASW (g) | % |
|---|---|---|---|---|
| F1 | 283 | 2,422 | 8.56 | |
| F2 | 1,708 | 13,883 | 8.13 | |
| F3 | 3,721 | 33,947 | 9.12 | |
| F4 | 50 | 252 | 5.04 | |
| F5 | 155 | 1,848 | 11.92 | |
| F6 | 471 | 6,020 | 12.78 | |
| F7 | 431 | 3,221 | 7.47 | |
| F8 | 565 | 3,722 | 6.59 | |
| F9 | 1,365 | 11,368 | 8.33 | |
| F10 | 7 | 92 | 13.14 | |
| F11 | 141 | 1,118 | 7.93 | |
| | 8,897 | 77,893 | 8.75 | 83.43 |
| G1 | 229 | 2,470 | 10.79 | |
| G2 | 92 | 570 | 6.19 | |
| G3 | 132 | 999 | 7.57 | |
| G4 | 54 | 362 | 6.70 | |
| G5 | 59 | 197 | 3.34 | |
| G6 | 36 | 632 | 17.55 | |
| | 602 | 5,230 | 8.69 | 5.64 |
| O1 | 29 | 131 | 4.52 | |
| O2 | 15 | 119 | 7.93 | |
| | 44 | 250 | 5.68 | 0.4 |
| Q1 | 448 | 2,634 | 5.88 | |
| Q2 | 261 | 1,227 | 4.70 | |
| Q3 | 134 | 1,011 | 7.54 | |
| Q4 | 5 | 45 | 9 | |
| Q5 | 258 | 2,294 | 8.89 | |
| | 1,106 | 7,211 | 6.52 | 10.39 |
| S1 | 15 | 140 | 9.33 | |
| | 15 | 140 | 9.33 | 0.14 |
| **Total** | **10,644** | **90,724** | **8.52** | **100** |

ASW= Average Sherd Weight

*Table 5.2 Pottery by fabric type*

main groups of Late Bronze Age flint-tempered ceramics. Similarly, Middle and Late Iron Age ceramics are suspiciously under-represented in the Mortuary group of features, where it is likely that the highly fragmented and abraded condition of the material makes it impossible to separate the sandy and grog-tempered material into meaningful groups.

None of the fabric types need be of non-local manufacture, and the types and their proportions conform to the pattern seen in other local Late Bronze Age and Early Iron Age assemblages. At both Monkton Court Farm (Macpherson-Grant 1994) and Highstead (Couldrey 2007), for instance, the dominance of flint temper is even more pronounced (in each case over 90% of the assemblage) with grog-tempered, organic-tempered and sandy fabrics together accounting for the remaining sherds.

### Early and Middle Neolithic

A small group of ten sherds recovered from the fills of inner and outer ditches of Early Bronze Age Barrow 1 in the south-western corner of the site derive from at least three Neolithic vessels. Six sherds (three in Fabric F10; three in F11) in section 3455 of the inner ditch included one dated (pottery record number (PRN) 732), to 3960–3700 cal BC (GrA 37690, 5035±35). Feature 3455 was one of a pair of pit-like segments of the interrupted ditch and, given that no later material was present in that feature, it is possible (if not necessarily likely) that it is in fact an Early Neolithic pit fortuitously incorporated into – or cut by – the barrow ditch. Four Peterborough Ware sherds in Fabric F10 from section 3444 of the outer ditch have clearly been redeposited in that location, although they need not have moved a great distance from their original location (perhaps a pit subsequently cut through).

Seven of the sherds (portions of at least two vessels) represent the entirety of fabric F10, while a further three (perhaps all the same vessel) occur in a variant of F11, which is more common as a minority Late Bronze Age fabric. The recurrence of this fabric type suggests a local clay source and manufacture. The sherds derive from at least three vessels: one a bowl of uncertain form, one either a Mortlake or Fengate Peterborough Ware vessel, and one other sherd, and their occurrence only in the ditches of this single barrow suggests that they have not moved a great distance from their original location, even if 3455 was not a pit subsequently cut through.

The most notable sherd is a portion of the rim and upper body of a Peterborough Ware vessel of uncertain form (Fig. 5.1). The rim is sharply expanded internally, and slightly convex (although this effect may be the result of the deeply impressed decoration on an otherwise flat-topped rim). Both the rim top and exterior surface carry multiple parallel curvilinear grooves and ridges. The surfaces are worn, but on the exterior at least the lines seem to have been made by impressed twisted cord. The form of this vessel is difficult to reconstruct with certainty, but it may be paralleled by two vessels from Pit II at Heathrow, Middlesex (Grimes 1960). Grimes' vessel 12 has certain affinities of form (and to some extent decoration: see *ibid*., 192 fig. 77, no. 12), as does no. 20, a narrow oval bowl (Grimes 1960, 193, fig. 78), although this last example is plain except on the rim top. The near lack of curvature on the Cliffs End sherd may indicate an oval bowl form. An alternative interpretation has this sherd deriving from the collar of a Fengate-type vessel. Examples of this form are best seen at Baston Manor (Smith 1973, 11 fig. 6, nos 8 and 9), where the decorative scheme (although

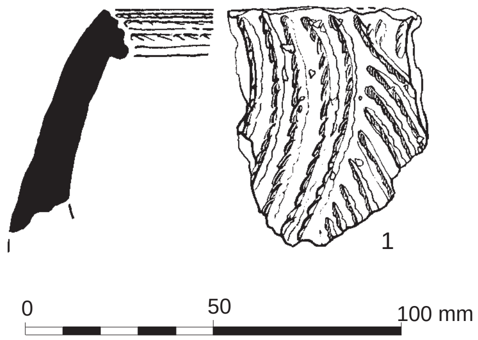



*Figure 5.1 Peterborough Ware rim sherd*

not method of execution) is very similar to the example from Cliffs End.

The remaining sherds are plain, not certainly decorated, or decorated with rows of simple fingernail impressions. All are body sherds: one is thick and quite sharply angled, perhaps a portion of a flat base/wall angle, or a shoulder from a wall/neck junction. Some rather crude dimples on this sherd may be decorative (perhaps bone impressions) but could equally be accidental wear.

Early Neolithic ceramics are known in the area at Chalk Hill, Ramsgate (Gibson 2006), Laundry Road, Minster (Boast and Gibson 2000, 368–370), and East Kent Access Road (Leivers forthcoming), and the Cliffs End examples provide further evidence of a significant Early Neolithic presence in this part of Thanet. In north-east Kent Mortlake and Fengate-type Peterborough Wares are not common. A pit on Chalk Hill, 1.25 km to the east of Cliffs End, contained portions of three Ebbsfleet or Mortlake vessels (Cleal 1995). A series of four pits containing portions of up to five Mortlake bowls were found less than 1 km west of Cliffs End, at Cottington Road (Leivers 2009). Further Peterborough Ware sherds have been recovered from slightly further west in Cottington Road at Oaklands Nursery (Perkins 1998), at Laundry Road, Minster (Boast and Gibson 2000) and on the route of the Monkton Gas Pipeline (Perkins 1985). Some of these sherds were found in small pits, others in secondary contexts. Fengate material was recovered from the causewayed enclosure at Chalk Hill, Ramsgate (Gibson 2006). Stray sherds were recovered from a barrow at Manston (Perkins and Gibson 1990).

The identification of locally significant trends of form, decoration, use or deposition is generally fruitless with such small quantities of material. At the very local level, it is becoming apparent that pits and other features containing Peterborough Wares occupy a linear zone along the northern edge of the former Wantsum Channel. The Cliffs End material, although likely to be redeposited, doubtless belongs in this group.

**Beaker and Early Bronze Age**

Seven very small highly abraded thin-walled sherds in fabric O1 came from the fill of grave 2887 in the centre of Barrow 1. Two of these sherds are decorated with incised herringbone or chevron motifs. Context, thickness, fabric and decoration combine to suggest that these sherds probably derive from probably a single Beaker vessel. Two further sherds in fabric O1 came from the fill of feature 2546 at the centre of Barrow 2. Although featureless, these sherds may be from a second Beaker, potentially associated with a burial in this feature.

In addition to these Beaker ceramics, small sherds in fabric G5 were also recovered from these two features, four from 2887 and one from 2546. All were featureless, and without any chronologically significant traits other than the fabric. These sherds may derive from Early Bronze Age vessels, but it is impossible to be certain.

Beakers and Beaker sherds are not uncommon in Kent generally, or in the more immediate locality. An almost complete vessel was found in a grave in Cliff View Road, 600 m to the NNW of the site, in 1967 (Macpherson-Grant 1968). The Cliffs End sherds are too fragmentary to justify further discussion.

**Late Bronze Age and Early Iron Age**

With the exception of a very small number of possibly Middle Iron Age sherds noted below, the rest of the prehistoric ceramic assemblage is of Late Bronze to Early Iron Age date.

Recent considerations of what was once known as Post-Deverel-Rimbury (Barrett 1980) have moved towards a convention of assigning the earlier Plainware stage of that tradition to the Late Bronze Age (perhaps from 1100 to 800 cal BC), and the later Decorated stage to the period after 800 cal BC which tends to be referred to as the Earliest Iron Age (Needham 2007a; Morris 2006). While the distinction has a lot to recommend it (not least in relating changes in potting to other social and technological changes) there are – as Morris herself has stated – no criteria for 'just how much pottery can be decorated before assignment of an assemblage to the 'decorated' phase' (*ibid.*, 61) is justified.

In terms of the Cliffs End assemblage, neither the terminology (of Plain and Decorated) nor the suggested turn from the one to the other (at or around 800 cal BC) proves especially useful for understanding the material, since the vast majority of the radiocarbon determinations fall in or before the 9th century, and decoration is fairly common throughout. Given this, for the purposes of this report the sub-assemblages are referred to by century: thus as 10th-century ceramics, 9th-century ceramics, 7th-century ceramics.

*Plate 5.1 Sherds broken along joins between 'straps' (PRN 833)*

### *Manufacture, Technological Attributes and Surface Treatments*

Although there is no direct evidence of manufacture on the site, there is nothing to suggest that the pots were not made locally, although the variety of naturally-occurring opening materials suggests the use of more than one clay source. A small number of over- or re-fired sherds could be interpreted as wasters (particularly the very small number of spalled sherds), but these always occur in deposits dominated by much larger numbers of normally-fired sherds. Indeed, the occurrence of normally- and re-fired sherds deriving from the same vessel suggests that most if not all of the re-firing does not derive from manufacture, but is a use or post-discard trait. Alistair Barclay has suggested that some Late Bronze and Early Iron Age vessels may have been transformed by burning in a manner suggestive of their 'killing' as objects (Barclay 2002, 95), or during pyrotechnical-related activities (metalworking, cooking, pottery production, rubbish disposal, etc; Barclay 2006, 82): the possible contexts of burning of individual vessels are considered under *Feature Group Assemblages* (see below).

All vessels appear to have been ring- or slab-built. Join voids are visible in a small number of sherds, and breaks along ring joins are fairly frequent. One notable example is a jar (PRN 833; Pl. 5.1) in fabric F9 from pit 2649 in the 2nd phase entrance of the Northern Enclosure, which has fractured along the weakly-joined rings into a series of broad flat straps, very similar to Early–Middle Iron Age examples from Dolland's Moor (Macpherson-Grant 1990), although the Cliffs End vessel dates to the first half of the 10th century. Other vessels seem to have been slab-built: one large jar (PRN 1516; Pl. 5.2; Fig. 5.3, 25) from layer 8 (early 10th century) in Midden Pit 2028 in the Northern Enclosure has a break pattern suggestive of construction from large sub-rectangular slabs which (on the basis of the few visible join voids and remnant finger-smoothing on the interior) may have approximated to 70 mm square.

Nigel Macpherson-Grant and Peter Couldrey have identified a number of manufacturing attributes in the 1st millennium assemblages from both Monkton Court Farm and Highstead (Macpherson-Grant 1994; Couldrey 2007), which also occur in the Cliffs End material (the relative dating of these assemblages is discussed below). The most obvious

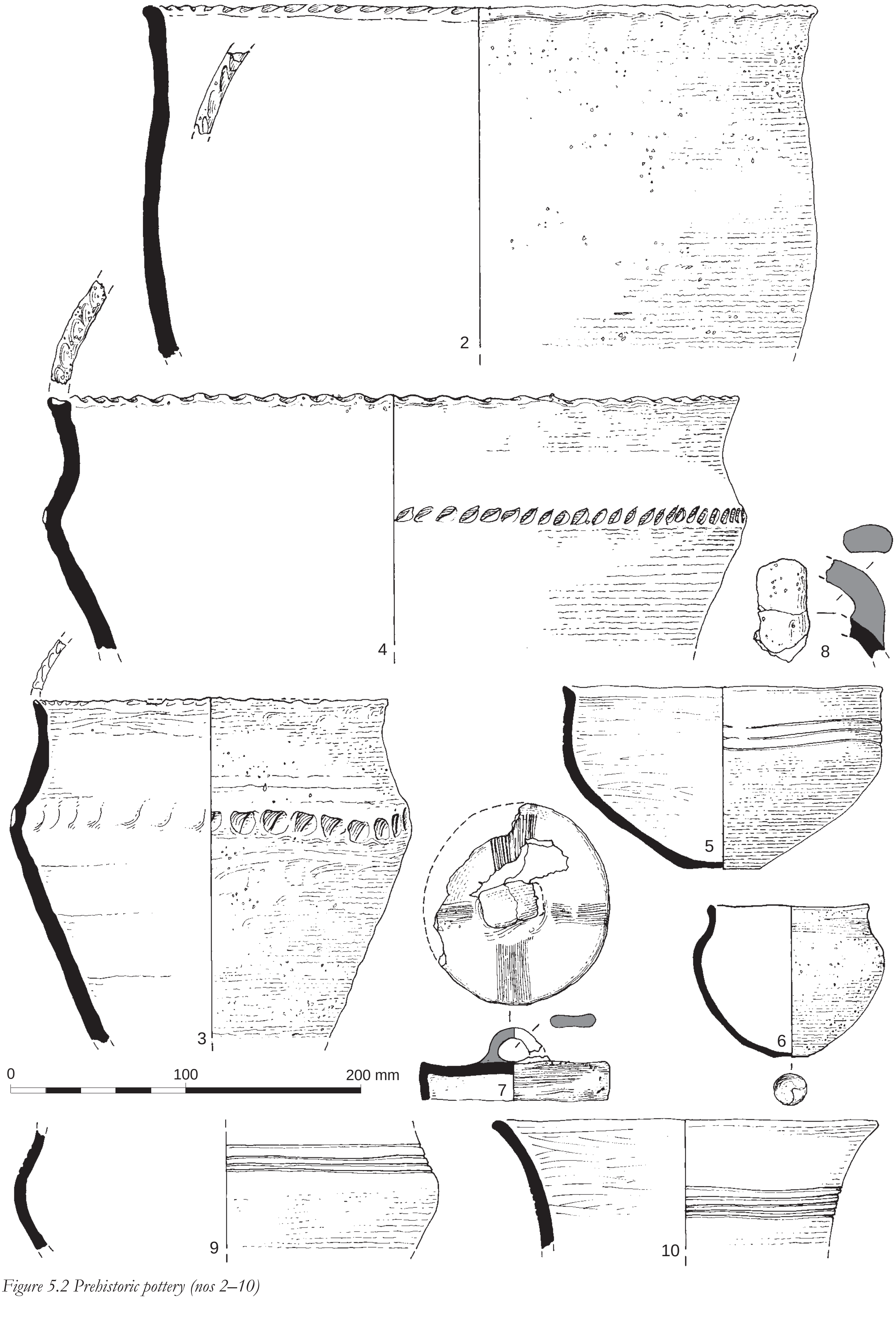



*Figure 5.2 Prehistoric pottery (nos 2–10)*

*Plate 5.2 Slab-built jar (PRN 1516)*

of these is the gritting of vessel bases with profuse (usually finely crushed) burnt flint. This effect may be to facilitate movement during manufacture: building and/or drying a vessel on a bed of crushed flint would help prevent the vessel sticking to the surface it was manufactured on.

Only 11 instances (out of approximately 175 individual vessel bases) were noted at Cliffs End in the Northern Enclosure group, the Mortuary Feature group, the Southern Enclosure group, and the Central Enclosure group, making the trait a minor, if persistent, feature of potting. If a manufacturing aid, one wonders why the trait is not more common, leading to the possibility that it was a desired feature of certain vessels.

Perhaps gritted bases can be argued to have had more 'grip' than smooth examples once fired, suggesting that certain vessels were built with uses in particular situations in mind from the outset. Cooking pots may not have required gritted bases, for instance, whereas large table or storage vessels may have.

Thin-walled fineware bowls with profuse fine flint temper are present (usually in fabric F7), as are large thin-walled storage jars with remnant finger presses (PRN 614; Pl. 5.3 and Fig. 5.3, 21), although associated rim forms at Cliffs End do not reflect the illustrated Monkton Court Farm examples.

Surface treatments include vegetable wiping, tooled or finger smoothing, slipping, burnishing and rustication. Treated surfaces are more commonly above the shoulder (but not exclusively), or better above the shoulder than below it: this is true whether the finish is a fine burnish or a crude finger-smeared smooth. The best below-shoulder finishes occur inside vessels, on both jars and bowls: some of both are well-smoothed or burnished onto the base. All of the finishes vary in quality, most notably the burnishes, which span the range from cursory to very fine.


*Plate 5.3 Jar with remnant finger presses (PRN 614)*


*Plate 5.4 Sherd with finer-gritted exterior coating (PRN 636)*

A small number of sherds (primarily from large coarse decorated bowls in F2) have an applied layer of clay on the exterior which often has a slightly finer temper than the body of the sherd. Sherds with this coating invariably have dark grey to black surfaces and regularly oxidised orange margins. Most common in the Northern Enclosure group, some of these sherds are similar enough to derive from a single episode of manufacture or to be the work of a single potter. The illustrated example (PRN 636; Fig. 5.3, 16 and Pl. 5.4) derives from layer 8 of Midden Pit 2028, dated to the beginning of the 10th century cal BC.

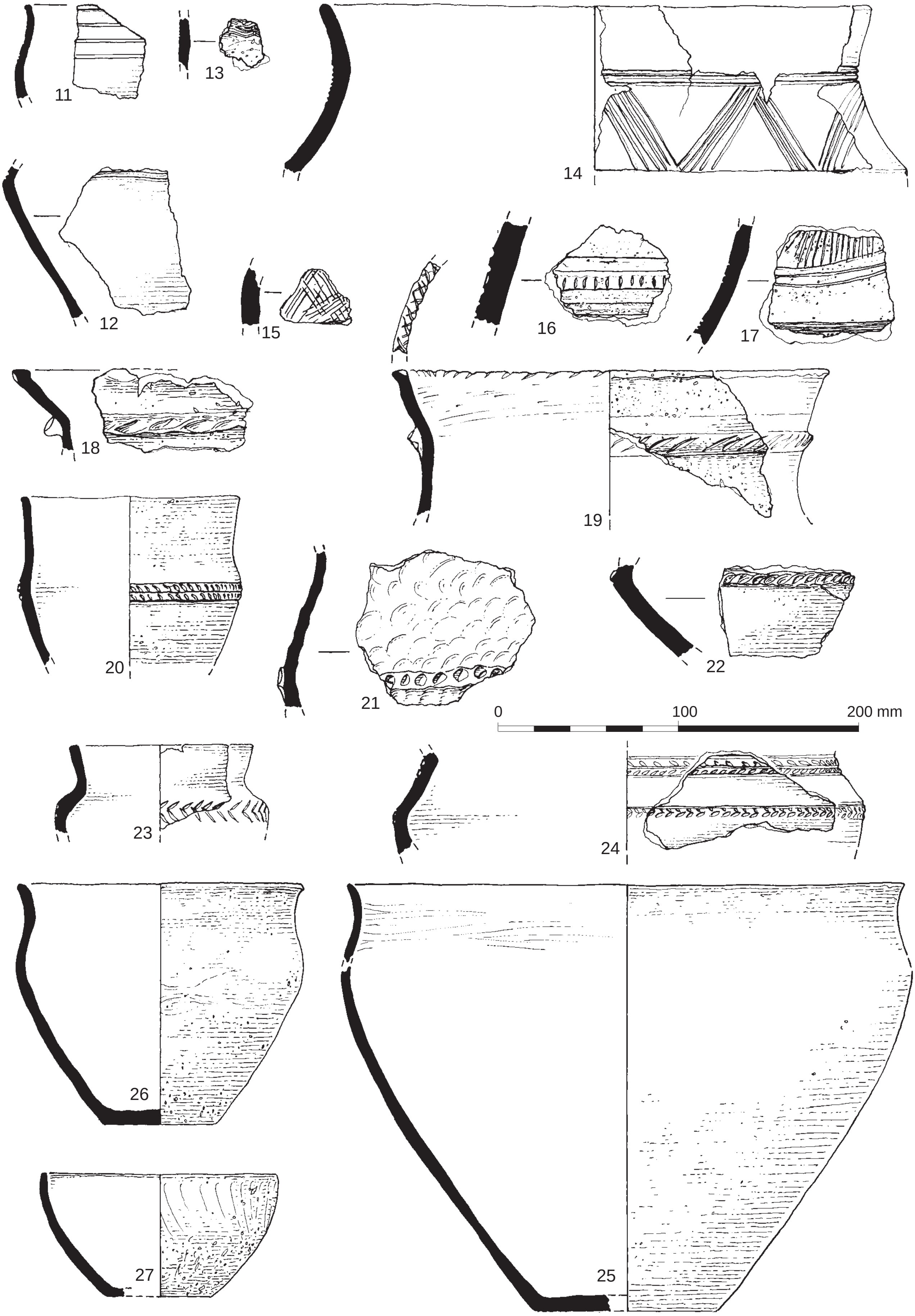



*Figure 5.3 Prehistoric pottery (nos 11–27)*


*Plate 5.5 Thick gritted slurry applied as rustication (PRN 918)*

Rustication is a very notable element in the assemblage, occurring primarily below the shoulder of jars, but also immediately below rims. This trait again can take a number of forms from the application of a thick very densely flint-gritted slurry (PRN 918; Pl. 5.5), to the smearing of discontinuous clay patches across parts of the surface. At this end of the scale the technique merges into the rough finger fluting seen on the lower third of some jars. Macpherson-Grant has argued that particular forms of rustication emerge as a technique at or around 600 cal BC (Macpherson-Grant 1990) and Peter Couldrey has demonstrated an exclusively east Kentish distribution associated with red-finished finewares (in Macpherson-Grant 1991). The implications of the Cliffs End assemblage for this dating are discussed below.

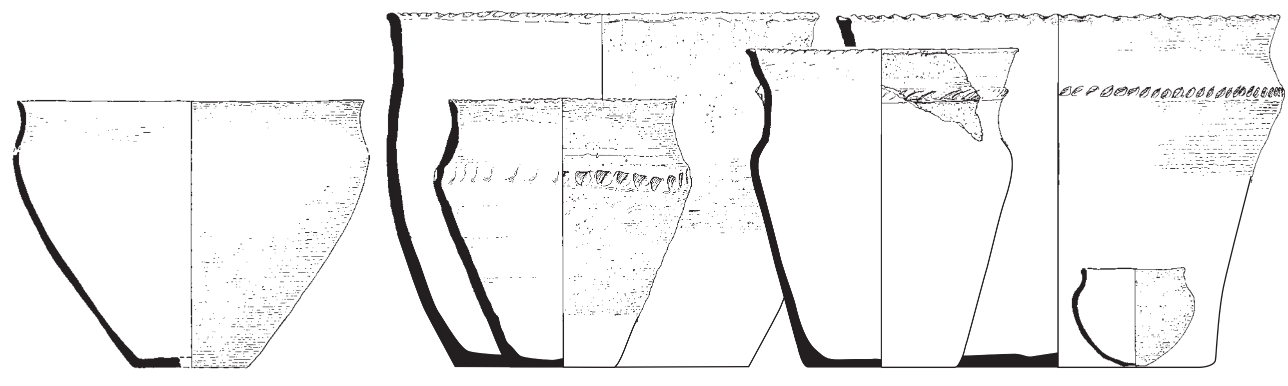
**Form**

Because the assemblage is dominated by very fragmentary vessels, assignation to form is impossible in most instances, and there are correspondingly few complete profiles. Rim, neck, shoulder and base types can all be identified, but rarely can upper and lower parts of individual vessels be identified with confidence.

For the most part (Fig. 5.5), the assemblage is divided into often thin-walled high-shouldered short-necked jars (of which early 10th-century cal BC PRN 1516 is an atypical example; Pl. 5.2 and Fig. 5.3, 25); large, thick-walled, coarseware (but often well-finished) bowls (PRN 839, Fig. 5.2, 4), not closely dated, but most probably of the 10th century; long-necked, often quite thin-walled shouldered jars (PRN 178, Fig. 5.2, 3), most common in later 10th-century layers; very short-necked jars with globular bodies (PRN 768, Fig. 5.2, 2), probably belonging to the 9th century; and fine-tempered but sometimes thick-walled, generally neutral bowls. The bowls break down into a basic distinction between hemispherical or very weakly-shouldered examples which are generally plain (PRN 345, Fig. 5.3, 27) and much more firmly bipartite vessels, generally with tooled or incised decoration in the neck (PRN 858, Fig. 5.2, 5). Both forms appear to date to the 9th century.

Amongst the minor forms, noteworthy instances include small cups, the most complete example of which (PRN 458; Fig. 5.2, 6 – stratified between layers dating to the 10th century cal BC) has a markedly off-centre omphalos base; and a flat handled lid (PRN 507; Fig. 5.2, 7). This very unusual form has diameter of approximately 100 mm, with a 22 mm deep lip externally (13 mm deep internally). The central handle was plugged into the thickness of the lid at either end and seems to have been hemispherical. Radiating from the handle are four bands of combed lines. One band has 20 lines, one 19, one 22, and one more than 12 (this one is much abraded), suggesting that one comb was not used repeatedly. The outside of the lip is also decorated with combed lines, usually 15. Pit 2654, from which the lid was recovered, was radiocarbon dated to *905–810 cal BC*.

10th century



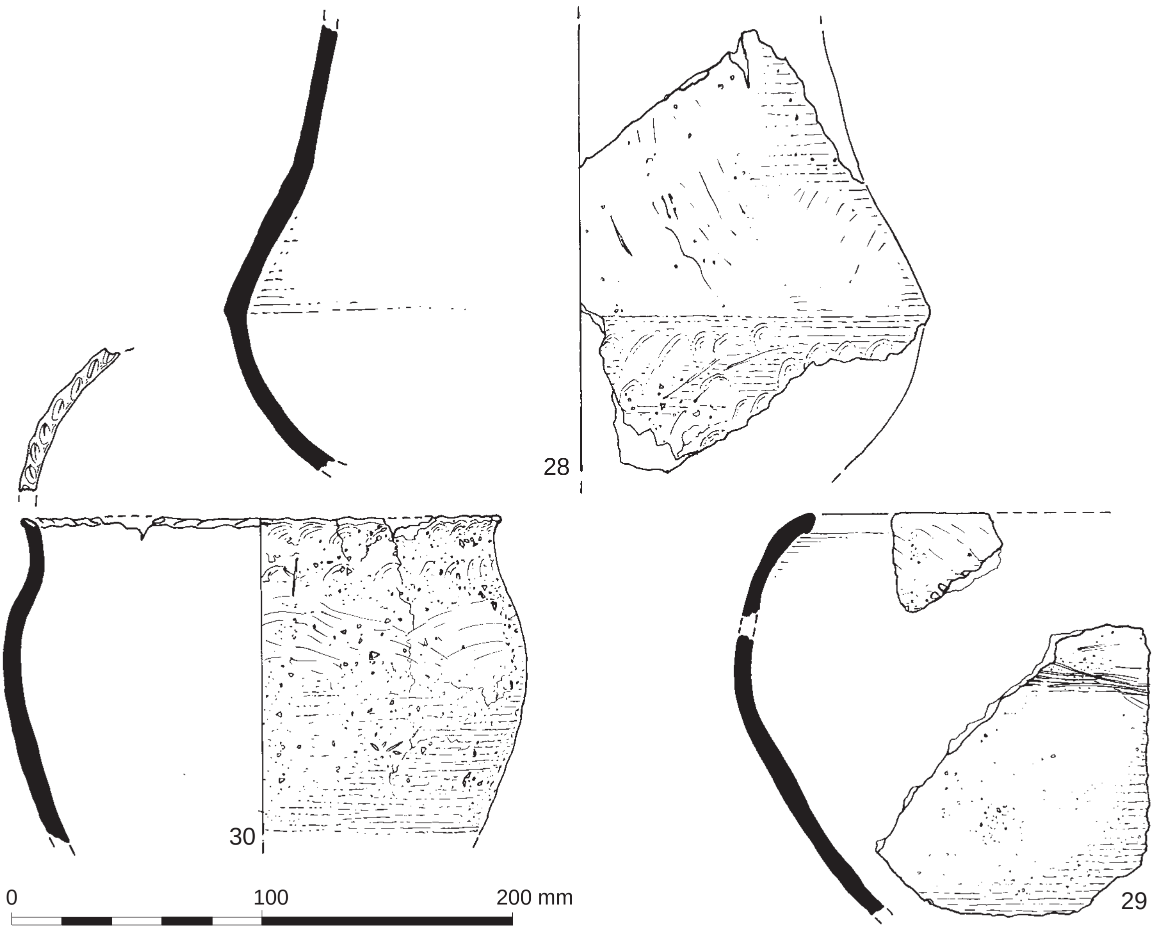



*Figure 5.4 Prehistoric pottery (nos 28–30)*

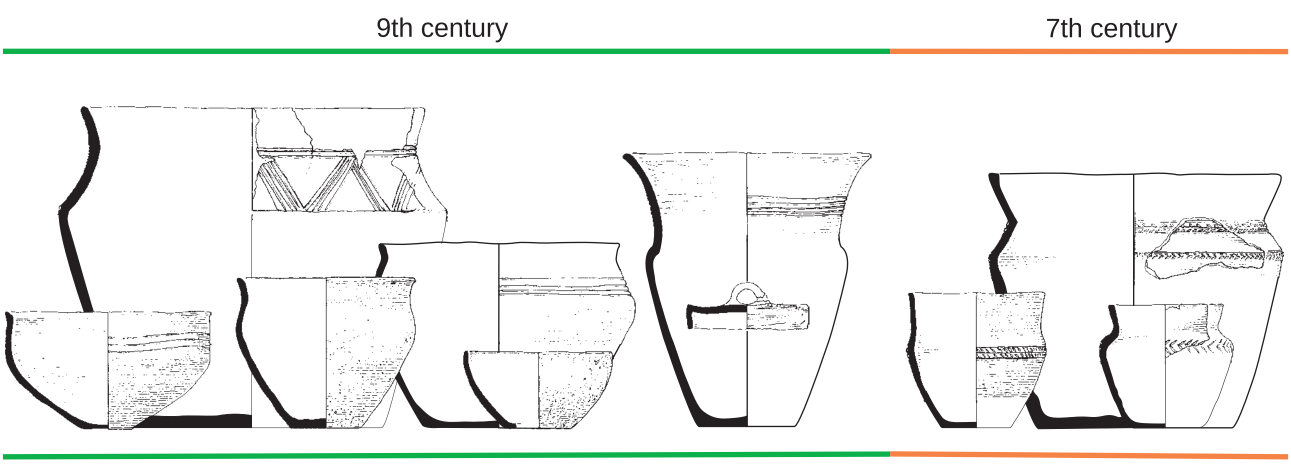
### *Handles*

A large handle fragment (undated except by fabric and morphology) had been plugged through the thickness of the vessel wall (PRN 655; Fig. 5.2, 8). A second example – possibly dating to the 10th century cal BC, but found in the part of the inner ditch of the Central Enclosure containing later ceramics from the overlying occupation layer – seems to be a small boss, lug or handle stub, very crudely shaped.

### *Rims*

Twelve rim forms were identified, as shown in Table 5.3. As at Monkton Court Farm, simple upright or everted rims were the most common.

*Below and facing page*
*Figure 5.5 Prehistoric pottery vessel typology*



| | | Flint | Quartz | Grog | Total |
|---|---|---|---|---|---|
| R1 | simple, inturned | 4 | 1 | - | **5** |
| R2 | simple, upright rounded | 36 | 3 | - | **39** |
| R6 | simple, upright squared or flattened | 20 | 1 | 3 | **24** |
| R8 | simple, upright pointed | 14 | - | - | **14** |
| R3 | everted, rounded or pointed | 35 | 12 | - | **47** |
| R4 | everted, squared or flattened | 15 | 8 | - | **23** |
| R5 | convex, internal horizontal moulding | 1 | - | - | **1** |
| R7 | flaring | 7 | 1 | - | **8** |
| R9 | internally thickened | 4 | - | - | **4** |
| R10 | folded over inwards | 2 | 4 | - | **6** |
| R11 | flat, out-turned | 26 | 2 | 1 | **29** |
| R12 | proto-bead | 2 | 1 | - | **3** |
| | | **166** | **33** | **4** | **203** |

*Table 5.3 Rim form by fabric*

### *Necks*

Necks were for the most part short and plain, but some jars had horizontal lines of finger-tip impressions or applied cordons which could themselves have either diagonal slashes (PRN 454, Fig. 5.3, 19; first half of the 10th century) or lines of finger-tip impressions (PRN 445, Fig. 5.3, 18; probably broadly contemporary); while bowl necks had horizontal incised, combed or tooled lines (PRN 858, Fig. 5.2, 5; PRN 331, Fig. 5.2, 10; PRN 617, Fig. 5.3,11). These are all likely to be 9th-century BC traits.

### *Shoulders*

Shoulders are either rounded or angular (PRN 127, Fig. 5.3, 22), the latter probably of 7th-century cal BC date. Most rounded forms are quite slack, but there are a number of vessels which approach globular (PRN 768, Fig. 5.2, 2), and these are mainly 9th-century forms. Shoulders are quite often decorated, with a variety of motifs: applied and pinched-up cordons (PRN 614; Fig. 5.3, 21 and Pl. 5.3; 10th century), lines of finger-nail and/or tip impressions (PRN 178, Fig. 5.2, 3; later 10th century; PRN 614, Fig. 5.3, 21 and Pl. 5.3; PRN 839, Fig. 5.2, 4; both 10th century), and incised lines of diagonal slashes, impressions (PRN 90, Fig. 5.3, 23; PRN 127, Fig. 5.3, 22; PRN 1605, Fig. 5.3, 20; all 7th century), and tooled designs all occur.

### *Bases*

Bases occur primarily in two types: flat with and without feet (27 and 36 examples). Some have decoration at the base/wall angle, usually finger dimples or vertical finger fluting. Among the less frequent base forms are omphalos (seven examples), a very small flat base of only 10 mm diameter, and a footring of 50 mm diameter.

### Decoration

A basic division of decorative technique has coarse jars with finger-tip or nail motifs, sometimes on applied cordons, and fine bowls with tooled, incised or combed lines. Both are most prevalent on rims, in necks and on shoulders, although a few jars have finger impressions and/or fluting above the base/wall angle. A division of decoration by type and feature group is given in Table 5.4. Only featured sherds are tabulated, which partly accounts for the proportion of the decorated assemblage coming from the Northern Enclosure group.

| **Position/motif** | **Feature Group** | | | |
|---|---|---|---|---|
| | Northern Enclosure | Mortuary Feature | Central Enclosure | Southern Enclosure |
| **Outside Rim** | | | | |
| Finger tip | 1 | - | 1 | - |
| Chevron | 1 | - | - | - |
| **Rim Top** | | | | |
| Finger nail | 2 | 1 | - | - |
| Finger tip | 3 | - | 3 | - |
| Diagonal slash | 2 | 1 | - | - |
| Cabled | 5 | - | 2 | - |
| Incised line | 1 | - | - | - |
| **Inside Rim** | | | | |
| Finger nail | 1 | - | - | - |
| Finger tip | 2 | - | 1 | - |
| Diagonal slash | 1 | - | - | - |
| **Below Rim** | | | | |
| Chevron | 1 | - | - | - |
| Diagonal slash | 1 | - | - | - |
| Incised line | 1 | - | 1 | - |
| Finger nail | - | - | - | 1 |
| **On Shoulder** | | | | |
| Applied cordon | 2 | 1 | 3 | - |
| Pinched-up cordon | - | - | 1 | - |
| Combed | 1 | - | - | - |
| Finger nail | 2 | 1 | - | - |
| Finger tip | 4 | 1 | - | 1 |
| Chevron | 2 | - | - | - |
| Diagonal slash | 3 | - | - | - |
| Incised line | 1 | 2 | 5 | - |
| Tooled line | 2 | - | - | - |
| **In Neck** | | | | |
| Applied cordon | 4 | 2 | 1 | 1 |
| Pinched-up cordon | 1 | - | - | - |
| Combed | 1 | - | - | - |
| Finger tip | 1 | - | - | - |
| Incised line | 6 | - | 4 | - |
| Tooled line | 1 | - | - | - |
| **Base/Wall Angle** | | | | |
| Finger fluting | 2 | - | - | - |
| Incised line | - | 2 | - | - |
| Finger tip | - | - | 1 | - |
| **Total** | **55** | **11** | **23** | **3** |

*Table 5.4 Decorated featured sherds by feature group and motif*

Tooled, incised and combed lines generally occur in the necks of 10th- and 9th-century cal BC bowls as simple horizontal bands of one, two, three (PRN 858; Fig. 5.2, 5), four (PRN 508; Fig. 5.2, 9) or five (PRN 331; Fig. 5.2, 10) lines. Multiple bands are rare in this period (two on PRN 287–8, three on PRN 617). There is a single instance of a 9th-century bowl with at least three horizontal lines on the very sharp shoulder (PRN 364; Fig. 5.3, 12).

More complex motifs are uncommon: a rather coarse body sherd in a 9th-century cal BC context has a band of wavy combing (PRN 568; Fig. 5.3, 13); joining sherds from the rim and neck of a large 9th-century vessel have chevrons between bands of horizontal line (PRN 245 and 283; Fig. 5.3, 14); a group of rather flat sherds from an unidentified vessel has a similar decorative scheme (PRN 346), and a sherd with cross-hatching may be related (PRN 1391; Fig. 5.3, 15); both are also likely to derive from 9th-century vessels. A sherd from a thick-walled vessel in an early 10th-century context has the shoulder and neck decorated with horizontal lines, between two of which is a row of short deep vertical stabs (PRN 636; Fig. 5.3, 16 and Pl. 5.4); a sherd in a very similar fabric has horizontal lines immediately above the shoulder, with a band of lighter lines higher in the neck with vertical lines above (PRN 780; Fig. 5.3, 17).

Cordons occur on shoulders and in necks. The latter are nearly always cabled or have decoration approximating to cabling (PRN 445, Fig. 5.3, 18; PRN 454, Fig. 5.3, 19, first half of the 10th century), while those on shoulders are more varied, with plain and finger-tipped examples (PRN 614; Fig. 5.3, 21 and Pl. 5.3) also probably 10th century, and cabled examples (PRN 1605; Fig. 5.3, 20) a later, 7th-century technique. Lines of finger-tip impressions also decorate shoulders without cordons, on both jar (PRN 178; Fig. 5.2, 3) and bowl forms (PRN 839, Fig. 5.2, 4), both of the 10th century. Motifs on the shoulders of 7th-century vessels include deeply impressed cabling (PRN 127; Fig. 5.3, 22) and stabbed herring-bone (PRN 90; Fig. 5.3, 23).

Finger tipping occurs in the 10th-century inside rims, on rim tops (PRN 839, Fig. 5.2, 4) and on the outer edge, sometimes with very visible and regular nail impressions. Ninth-century rims can have diagonal slashes on the inner edge (PRN 768, Fig. 5.2, 2).

There are five sherds from three red-finished bowls. All are in a fine variant of fabric Q2. One is an otherwise featureless rather abraded angled sherd; one a sharply shouldered sherd; and the remaining three are joining sherds from a tripartite bowl (PRN 42, Fig. 5.3, 24). The lower angle has very neat rows of impressions apparently of impressed plaited cord placed above and below the angle in an arrangement resembling narrow herring-bone, with a single horizontal line above. The neck below the upper angle has a similar although more widely spaced motif, between horizontal incised lines. These are likely to be of 7th-century date.

### *Function and Use*

Sooting and burnt residues (both internal and external) survive, suggesting cooking or the preparation of foodstuffs and other materials. Only one perforated sherd was found: a single post-firing perforation off-centre in the base of an F3 jar. Other uses are presumed: finer vessels can be assumed to have been tablewares; a division of coarsewares into storage and cooking pots may exist, but cannot be detected in most instances.

### *Absolute Dating and Feature Group Assemblages*

The importance of the Cliffs End assemblage lies not only in its size and good stratigraphic associations, but also because it provided 50 radiocarbon determinations from internal carbonised residues on sherds, supported by a suite of other dates from human and animal bone (22 and seven measurements respectively), giving a total of 79 dates (see Marshall *et al.* Chapter 3). This is the largest set of directly and indirectly dated pottery from the period in Kent, and is therefore of the utmost importance in providing the foundation for an independently dated type series for the site and wider region.

A number of shortcomings need to be highlighted at the outset of any discussion of the pottery dating. Foremost among these is the nature of the dated samples themselves. Sherds were selected for dating only when they met a number of criteria, the most important of which was that they came from secure contexts and had sufficient carbonised residues on the interior surface. The diagnostic nature of the sherd itself was very much further down the list of criteria, and in fact no sherds with rims, cordons, decoration or other directly diagnostic traits were included in the dating programme.

This fact, coupled with the largely fragmentary nature of much of the assemblage, has rendered attempts at seriation futile. In consequence, the dating of the ceramics depends on extrapolation. In this respect it is fortunate that 23 dates were obtained from a securely-stratified sequence of ceramics throughout the vertical extent of Midden Pit 2028 in the Northern Enclosure, and that the resulting dates generally provide an internally consistent sequence. It is the dating and sequence of this part of the assemblage that provides the foundation for the chronology of the material as a whole.

| Laboratory code | Sample; Pottery fabrics series | Layer | Radiocarbon age (BP) | Weighted Mean | Calibrated date, cal BC (95% confidence) | *Posterior density estimate, cal BC (95% probability)* |
|---|---|---|---|---|---|---|
| OxA-18445 | PRN 32B; F3 | * | 2815±28 | 2817±21 BP | 1020–905 | *1020–905* |
| GrA-37699 | PRN 32A; F3 | * | 2820±30 | - | - | - |
| OxA-17915 | PRN 705; F6 | 1 | 2778±28 | - | 1010–830 | *1005–840* |
| OxA-17877 | PRN 706; F2 | 1 | 2669±33 | - | 900–790 | - |
| OxA-17914 | PRN 706; F2 | 1 | 2531±27 | 2516±22 BP | 770–540 | *790–720 (52%) or* |
| GrA-36004 | PRN 706; F2 | 1 | 2490±35 | | | *695–555 (45%)* |
| GrA-35989 | PRN 699; F6 | 2 | 2850±35 | - | 1130–910 | *1125–915* |
| OxA-17872 | PRN 128; F2 | 2 | 2459±29 | - | 770–400 | *785–640* |
| OxA-17875 | PRN 153; F3 | 3 | 2886±32 | - | 1210–940 | *1210–970* |
| GrA-35988 | PRN 154; F3 | 3 | 2830±35 | - | 1120–910 | *1115–900* |
| OxA-17874 | PRN 206; F3 | 4 | 2734±30 | - | 970–810 | *945–858* |
| OxA-17873 | PRN 194; F3 | 4 | 2773±30 | - | 1010–830 | *945–895* |
| GrA-35987 | PRN 197; F6 | 4 | 2810±35 | - | 1050–850 | *945–895* |
| GrA-35993 | PRN 1591; F6 | 4 | 2780±35 | - | 1020–830 | *945–895* |
| GrA-35984 | PRN 193; F3 | 4 | 2810±35 | - | 1050–850 | *945–895* |
| GrA-35983 | PRN 204; F7 | 4 | 2790±35 | - | 1020–830 | *945–895* |
| GrA-35992 | PRN 1590; F3 | 4 | 3025±45 | 3081±28 BP | 1430–1260 | - |
| OxA-17986 | PRN 1590; F3 | 4 | 3115±35 | | | |
| OxA-17987 | PRN 1590; F3 | 4 | 2860±32 | - | 1130–920 | *950–900* |
| GrA-35994 | PRN 1550; F9 | 5 | 2760±35 | - | 1010–830 | *1015–915* |
| OxA-17948 | PRN 776; F6 | 6 | 2824±28 | - | 1060–900 | *995–925* |
| GrA-37028 | PRN 1584; F9 | 6 | 2825±40 | - | 1120–890 | *985–920* |
| OxA-17876 | PRN 635; F9 | 8 | 2775±30 | - | 1010–830 | *1040–940* |
| OxA-17988 | PRN 633; F3 | 8 | 2868±33 | - | 1190–920 | *1125–950* |
| GrA-35997 | PRN 1518; F9 | 8 | 2855±35 | - | 1130–910 | *1155–905* |

KEY: PRN = pottery record number; * = layer not recorded

*Table 5.5 Radiocarbon determinations from charred residues on sherds in Midden Pit 2028*

**Midden Pit 2028**

The creation and first phase of use of this feature, situated within the rectilinear Northern Enclosure, belongs – on the basis of dated ceramics from its lower fills – in the earliest phase of Late Bronze Age activity on the site, pre-dating both the Central Enclosure immediately to the south and the earliest burials in the Mortuary Feature to the east, at the start of the 10th century cal BC.

Interpreted as a feature given over to the disposal of waste (primarily pottery, animal bone, cereal processing waste and other organics, see Leivers, Chapter 2), feature 2028 was filled by a sequence of alternating layers of naturally-accruing material (collapsing sides, colluvial inwash, etc.) and deliberately dumped 'midden' material. The deliberately-deposited layers seem to have formed relatively quickly, as the result of discrete episodes of activity (perhaps over weeks) rather than as accumulations over time (perhaps years); this is suggested by the condition of both the pottery (freshly broken, unabraded) and animal bone (most not gnawed or with other traits of prolonged exposure). Given this, the dates obtained from charred residues of the interiors of sherds from these layers can be taken to date the formation of those layers very closely. The durations of the intervals between the formation of these layers are less clear, but are most likely to be measured in decades. For descriptive convenience these layers have been numbered from 1 to 9, with 1 the latest, 9 the earliest (see Fig. 2.7).

The six lowest layers (9–4) are likely to have formed quickly, over a period of as few as 65 years in the 10th century cal BC. These layers contain a substantial ceramic assemblage and provided 15 radiocarbon determinations on charred residues (layers 8, 6, 5 and 4 in Table 5.5). It is estimated that layers 8–4 formed over *65–505 years (95% probability*; Fig 3.11) and probably *100–260 years (68% probability)*.

The lowest (undated) layer (9) contained only two sherds, each weighing 7 g, one a fragment of the simple upright rim of a thin-walled closed cup or bowl.

Layer 8 contained a very much more substantial assemblage of pottery, and provided three dates suggesting formation in the first half of the 10th century cal BC. Forms from this level include the large, substantially complete short jar (PRN 1516; Fig. 5.3, 25 and Pl. 5.2); globular vessels (one with an everted rim with internal bevel); long-necked jars with and without finger-pressed shoulders and cordons, and cabled rims; coarse rusticated jars; burnished fineware bowls (some shouldered; some with horizontally-incised necks) and one of the sherds with distinctive finish and decoration noted above (PRN 636; Fig. 5.3, 16 and Pl. 5.4).

Layer 7 contained no ceramics or other datable evidence, but appeared to be a rapidly formed colluvial or erosion deposit. Above it, Layer 6 was a second deposit of ceramic-rich rubbish; on the basis of the two associated radiocarbon dates formed between *990–920* and *975–915 cal BC* (Table 3.5). Short-necked jars were common, mostly with plain upright rims, although one had an expanded cabled rim. Some had finger impressions on the shoulder. Surface finishes on these jars varied: some were rusticated, while others had visible coil smoothing and some had been wiped, probably with a pad of vegetable matter. One example with a plain, slightly rolled-out rim, had been smoothed above the shoulder, but left rough below it. Some bases were gritted. Bowls in this layer included plain but highly burnished examples, and vessels with horizontal incised lines on the shoulder. Sherds from a number of vessels in this layer had been burnt prior to deposition.

Layer 5 was another layer of colluvial inwash or erosion, but it contained fragments of a rusticated necked jar (the form is not entirely clear) and approximately half of a burnt and abraded fine bowl with a rounded, slightly out-turned rim, a short neck and rounded shoulder. Other sherds in this layer dated to between *975–915* and *955–905 cal BC* (Table 3.8).

Layer 4 contained a very substantial quantity of ceramics, dated residues from which suggest formation at the very end of the 10th century cal BC. Forms in this layer include the usual short-necked jars, some with finger impressed, pinched or cabled shoulders and/or rims; high-shouldered well-finished bowls, some with horizontal tooling or incision on or above the shoulder; a very thin-walled angled bowl with fine smoothed inner and outer surfaces; a small thin-walled cup or bowl with an omphalos base, rounded shoulder, short neck bearing four horizontally-combed lines, and a slightly out-turned rim (another sherd may be from a second vessel of the same type), similar to PRN 458 from the pit in the phase 2 entrance of the Northern Enclosure (Fig. 5.2, 6); and a large jar (diameter perhaps 420 mm) with a flat flared cabled rim and a short 'neck' in which sits a cabled cordon. Above the cordon the vessel has a slip coating; below this it is rusticated. Overall the form is akin to that of No. 8 in the Monkton Court Farm series (Macpherson-Grant 1994, fig. 21). Other jars have rustication, wiping and scoring (mostly below the shoulder) and slip coatings and (exceptionally) burnish above the shoulder.

Layer 3 contained a small number of sherds with residues which date to between *940–865* and *915–660 cal BC* (PRN 153, OxA-17875, at 95% probability, see Table 3.8 and Fig. 3.5). No identifiable vessel forms were present other than a bowl with incised horizontal lines.

There is no real distinction to be drawn between the vessels from these layers, with only the presence of small bowls or cups with omphalos bases and jars with neck cordons in Layer 4 indicating any change in the ceramic repertoire. Above Layer 3, however, there seems to have been a very marked change in the use of the feature, as the two uppermost layers all seem to be naturally (and probably quite gradually) accumulated deposits, which demonstrate a significant degree of mixing and redeposition of ceramics.

The dating of these layers is not straightforward. Sherds (PRN 128) from Layer 2 provided a date of *785–635 cal BC* (OxA-17872, at 95% probability (Table 3.8, Fig. 3.5)) which is perhaps too late. Soil micromorphology reveals a very disturbed horizon of colluvial inwash and domestic waste, with the material deposited wet, then trampled, bioworked, and strongly contaminated by the disposal/drainage of cess between periods of waterlogging (see Macphail, below).

Given this, a mixed assemblage of ceramics is perhaps unsurprising. What is more significant is that it is at this level that new forms begin to be present within the assemblage, including a long-necked jar with a slightly flared plain rim and bands of incised and tooled decoration on the shoulder (Fig. 5.3, 20); bowls with diagonally-slashed or impressed sharp shoulders (for instance Fig. 5.3, 22); highly burnished bowls (including examples in shell-tempered fabrics); and red-finished bowls.

Layer 1 has a range of dates, but is most likely to be dated by OxA-17914/GrA-36004 (*790–725(50%) cal BC* or *695–555 (45%) cal BC* (OxA-17914, GrA-36004, combined date at 95% probability; see Table 3.5, Fig. 3.5), which does not seem at odds with the ceramics at this level. These include grog- and shell-tempered fabrics amongst the mass of flint and quartz, and also some forms which could be considered as more properly earliest Iron Age, including a round-shouldered jar with herringbone incision and a light burnish (Fig. 5.3, 23) and joining sherds from a tripartite red-finished bowl with horizontal bands of impressed decoration (Fig. 5.3, 24). On the basis of the ceramics from these two fills, it seems likely that the final infilling of this feature happened gradually over more than a century.

**Other feature group assemblages**

The dated sequence from Midden Pit 2028 allows an at least broad chronology for the other ceramics on the site to be proposed. Vessels from the outer ditch of the Northern Enclosure (from both the northern terminal of the ditch and the large pit in the entrance) include short-necked jars with finger-pressed shoulders and rims (PRNs 776 and 1548) akin to forms in Layer 6 of 2028 and there dated between *995* and *910 cal BC*. Charred residues on a sherd (PRN 784) from a fill high in the second phase of the outer enclosure ditch is estimated to date to *1015–920 cal BC* (*OxA-18447*;Table 3.3) for this type of vessel. Small cups with omphalos bases and jars with neck cordons from similar levels should be broadly contemporary with the Layer 4 ceramics from 2028, suggesting dates towards the end of the distribution, not contradicted by dates on charred residues and human bone from the pit in the entrance, which suggest a range between *1030* and *910 cal BC* (Tables 3.4 and 3.5).

Other ceramics are more difficult to date, but two groups from the Central Enclosure have broad indications of sequence and dating. Sherds from the outer ditch include long-necked jars with finger-pressed cordons, which should be contemporary with material from Layer 8 of 2028. Much of this material comes from the phase 2 ditch on the eastern side, and the condition of some of it is markedly worse than that from 2028, suggesting redeposited sherds that may more properly date the first phase of the enclosure (dates from charred plant remains indicate a 10th-century date for the single phase inner ditch). Material from the group of pits and postholes within the enclosure is more varied, and includes forms not seen elsewhere (plain hemispherical bowls, vessels with wavy combed decoration) as well as forms and decoration more similar to the 9th-century material from Mortuary Feature 2018. Associated radiocarbon dates (on charred plant remains) indicate a 9th-century date for the material, placing it between the two sequences from 2028 – later than the 10th-century material in Layer 9–3, earlier than that in Layers 1 and 2.

The only other meaningful group of ceramics comes from the Mortuary Feature 2018, and more particularly from some of the features contained within it, especially those containing articulated human burials and groups of disarticulated human bone. Of these, Burial Pit 3666 is the only one to contain ceramics worth individual consideration.

***Burial Pit 3666***

Relatively little pottery came from this feature, but the position and associations of what there was suggests some significance to the deposits. With the exception of a few very small sherds (none weighing more than a single gram, and all probably accidental inclusions or material incorporated later through natural processes) all came from the vicinity of skeleton 3676 (see Chapter 2, Figs 2.14, 2.16, Pl. 2.7).

Portions of four vessels were recovered, in spits 9 and 8 of square 2044 and the corresponding stratigraphy (skeleton 3676; layers 3682 and 3689). One was a large, well-finished biconical vessel with a high shoulder and cylindrical neck, present in spits 9 and 8 and in layer 3682; most of the flat base was present, along with several wall sherds with interior and exterior burnish, one of which had burnt deposits on the outside. Spalling and other indications of having been exposed to heat were present on both the base and outer wall (Fig. 5.4, 28). In form, this vessel has some similarities with Urnfield ceramics (S Needham pers. comm.), although in every other respect it is indistinguishable from the rest of the Cliffs End assemblage, and is without doubt of local manufacture.

A second vessel (present in spits 9–8 and layer 3689) consisted of six sherds (one large and slightly shouldered) from a thick walled heavily gritted vessel. The third was represented by three large sherds, a small rim fragment and numerous small pieces from a thin-walled well finished bowl (large sherds in layers 3682, 3689 and (as refitting fragments) in spit 9; small sherds in spit 8), burnished on both surfaces and with a narrow band of lightly scored or wiped irregular horizontal lines on the rounded shoulder (Fig. 5.4, 29). A second bowl, one half complete, burnished and decorated with a band of three horizontal lines above the low shoulder, had been placed adjacent to the skull of 3676 (Fig. 5.2, 5). Radiocarbon dates on human and animal bone in the same layers places this assemblage in the 9th century cal BC, later than most of the material in layers 9 to 3 of the Midden Pit (2028), and more broadly contemporary with the material from the Central Enclosure. The fourth vessel consisted of a thin-walled well finished bowl (from fills 3682 and 3689) (Fig 5.4, 30).

Elsewhere in Mortuary Feature 2018, ceramics are typified by small abraded sherds spread throughout the vertical and horizontal extent of the feature. As noted, the condition of this material suggests that it entered the feature as a result of being washed down slope from the west, gradually and over a period of perhaps centuries, during the gradual colluvial infilling of 2018. Given this, the vertical positions of different ceramics within the bulk of the fills is not necessarily indicative of their age, but rather of the point in an on-going process at which sherds of different ages were redeposited.

Taken as a whole, then, there is little to distinguish the material. Having said that, some weak patterning is evident if the assemblage is examined in terms of fabrics. Flint and sand-tempered wares cluster in two places: a less numerous group over and to the west of Burial Pit 3666, and a very much more numerous group west of 3608. To some extent, the apparent differences in the densities amongst these

| Laboratory code | Sample; Pottery fabrics series | Layer | Radiocarbon age (BP) | Weighted Mean | Calibrated date, cal BC (95% confidence) | *Posterior density estimate, cal BC (95% probability)* |
|---|---|---|---|---|---|---|
| OxA-18519 | PRN 1242; F1 | 202007 | 3881±37 | - | 2480–2200 | *2470–2275 (90%) or 2250–2210 (5%)* |
| OxA-18719 | PRN 628; F3 | 3009 | 2842±28 | - | 1120–910 | *1120–945* |
| OxA-18444 | PRN 625; F3 | 2996 | 2858±27 | - | 1060–920 | *1040–920* |
| GrA-37695 | PRN 784; F3 | 2365 | 2207±30 | - | 1040–890 | *1015–920* |
| OxA-18447 | PRN 784; F3 | 2365 | 2807±29 | | | |
| OxA-18517 | PRN 1468; F7 | 264208 | 2886±29 | 2876±22 BP | 1130–980 | *1130–975* |
| GrA-37916 | PRN 1644a; F7 | 264008 | 2865±30 | | | |
| OxA-18441 | PRN 423; F8 | 2461 | 2865±28 | - | 1130–930 | *1040–925* |
| OxA-18446 | PRN 379; F8 | 2378 | 2822±29 | - | 1060–900 | *1030–900* |
| OxA-18442 | PRN 833; F9 | 3646 | 2846±29 | - | 1120–910 | *1030–925* |
| GrA-37697 | PRN 828b; F9 | 3645 | 2815±30 | 2804±21 BP | 1015–900 | *1010–920* |
| OxA-18443 | PRN 828; F9 | 3645 | 2793±29 | | | |
| OxA-18516 | PRN 1501; F9 | 284405 | 3099±29 | - | 1440–1300 | *1435–1295* |
| OxA-18518 | PRN 1465; F11 | 264205 | 2942±27 | - | 1270–1040 | *1260–1050* |
| GrA-37690 | PRN 732; F10 | 3456 | 5035±35 | - | 3960–3700 | - |
| GrA-37691 | PRN 615; F3 | 2988 | 2870±30 | - | 1130–930 | *1025–910* |
| GrA-37696 | PRN 830; F3 | 3645 | 2775±30 | - | 1010–930 | *1010–910* |
| GrA-37700 | PRN 1476; Q3 | 264405 | 2920±30 | - | 1260–1010 | *1255–1235 (3%) or 1215–1010 (92%)* |
| GrA-37702 | PRN 1302; F9 | 204000 | 2900±30 | - | 1220–1000 | *1215–1000* |
| GrA-37704 | PRN 965; Q1 | 142805 | 2425±30 | - | 750–400 | *750–640 (22%) or 595–400 (73%)* |
| GrA-37714 | PRN 412; F8 | 2440 | 2810±30 | - | 1050–890 | *1030–895* |
| GrA-37715 | PRN 318; F6 | 2343 | 2740±30 | - | 980–810 | *975–955 (4%) or 940–825 (91%)* |
| GrA-37753 | PRN 294; F9 | 2342 | 2805±30 | - | 1040–890 | *1025–890 (94%) or 875–855 (1%)* |
| GrA-37754 | PRN 1176; F4 | 138407 | 2455±30 | - | 770–400 | *755–410* |

KEY: PRN = pottery record number

*Table 5.6 Radiocarbon determinations from charred residues on sherds from features other than 2028*

groups and the rest of the feature are a result of the excavation methodology (the upper two and a half spits being removed by machine in alternate six metre-wide sections). Given that the majority of the pottery was recovered from the upper four spits in the hand-excavated sections, there is an obvious bias in their favour. Nonetheless, densities in the hand-excavated sections are very much lower, away from the two concentrations mentioned, which do appear to be distortions of a real pattern as opposed to merely an effect of excavation technique.

Grog-tempered material shows a slightly different distribution. The highest concentrations still occur west of 3608, but for these fabric groups Burial Pit 3666 does not appear to be a focus, and instead a second concentration lies south of 3608. This is of interest, given that there could be assumed to be a significant chronological difference between the bulk of the flint-tempered material and the bulk of the grog, with the former being predominantly Late Bronze Age and Early Iron Age, and the latter Middle or even Late Iron Age. Charred residues are estimated to date to *595–400 cal BC* (*73% probability; GrA-37704*; Table 3.2) and *755–410 cal BC* (*GrA-37754*; Table 3.2).

***Other dated ceramics***

None of the other radiocarbon determinations on charred residues add significantly to this picture (Table 5.6). Only the apparently anomalous dates of PRN 1242 and PRN 1501 are particularly worthy of note. Both came from spits low in the sequence in the Mortuary Feature, where it is evident that material built up over a very considerable period of time. Neither dates the feature. Given the difficulty of assigning individual flint-tempered body sherds to ceramic traditions it is not possible to state with any certainty that PRN 1242 derives from a Beaker or contemporary vessel, or that PRN 1501 is of Deverel-Rimbury type, although in both cases it is possible. The likelihood of other misidentifications amongst the mass of plain flint-tempered body sherds must be borne in mind.

## *Discussion*

The Late Bronze Age and Early Iron Age assemblage from Cliffs End is of considerable importance, given its size and the availability of a suite of associated radiocarbon dates, many of which were specifically targeted on carbonised residues (see Marshall *et al.*, Chapter 3). Previously, dating for the region's ceramics in these periods depended almost entirely on a very small number of isolated radiocarbon dates and primarily on schemes built up with reference to external links, and while internal sequences for individual sites could be considered as more or less secure, the establishment of dates more often than not relied upon dated typological parallels the precedence or antecedence of which could only be assumed. Consequently, site specific sequences – whilst sound in themselves – have a tendency to remain defined only in terms of a range of centuries.

Where the Cliffs End assemblage differs is that the sequence can be dated, both directly (by determinations of charred residues adhering to the inner surfaces of sherds) and indirectly (by the dating of human bone, animal bone, and plant remains). This variety of dated materials is one of the sequence's strengths, since it considerably lessens the possibility of a systematic error affecting the dates obtained from charred residues.

At Cliffs End, there are three broad horizons identifiable within the ceramic assemblage: firstly, the ceramics from the lowest four layers of the Midden Pit 2028, which are typified by varieties of coarse and fine jar, with and without finger-pressed shoulders, cordons and rims; and bowls variously burnished, shouldered and decorated with horizontally-incised shoulders or necks. This group dates to the 10th century cal BC on the basis of an internally coherent series of radiocarbon dates on carbonised food residues taken from the interior surfaces of the sherds themselves, and appears to be beyond doubt.

Most of the forms are paralleled in other assemblages from Kent, the south-east of England and more widely. In terms of local parallels, the closest are undoubtedly to be found at Monkton Court Farm (Macpherson-Grant 1994) and in the Period 2 assemblage at Highstead (Couldrey 2007). Both of these assemblages are considered to begin in the 9th century cal BC. The Cliffs End material seems to be at least a century earlier: the material from layer 8 at the base of 2028 is likely to date to between 1040 and 970 BC; that in layer 4 to between 930 and 910 (Table 3.8): a 10th-century date seems undeniable, more comparable to the first 'undecorated' phase of activity at Iwade (Bishop and Bagwell 2005).

The material in layers 8–4 of the Midden Pit is rather uniform: there is little variation in form or decoration between any of the layers. Most of the forms typical of Late Bronze Age ceramics are present from the very beginning of the sequence: high shouldered short-necked plain jars; globular vessels with everted, internally-bevelled rims; jars with longer necks, many with finger-pressing on shoulders or shoulder cordons; jars with roughened surfaces; shouldered bowls, some with incised necks, some burnished; as well as sherds from an unusual vessel of unknown form with a dark finely-gritted exterior coating and incised decoration.

It is difficult to ascertain to what degree apparent additions to this repertoire in later 10th-century layers are genuinely new. In any case, they are few: gritted bases and horizontally-incised bowl shoulders appear in layer 6, but other than that there are no significant changes until the very end of the century. At this time (in layer 4, 930–910 cal BC) finger pressing appears on jar rim tops, as do more markedly angular bowl forms, small cups with omphalos bases and decorated shoulders and necks, and additions to the jar repertoire including large vessels with flat flared cabled rims and cabled neck cordons. Differential surface finish becomes more common on jars, usually with a slip (which can be burnished) above the shoulder and roughening of the surface (wiping, scoring or rustication) below.

The 9th-century beginning of Highstead Period 2 is in fact the point at which the relative frequency of ceramic forms at Cliffs End seems to have been changing. Assemblages from the recuts of the ditches of the Central and Northern Enclosures, from the base of Mortuary Feature 3666 and from features within the Central Enclosure show a decrease in the frequency of existing forms, and the emergence of new types. Many of the jar forms continue, with the addition of globular very short-necked examples with finger-pressed rims. New decorative motifs on jars include short diagonal slashing on rims and shoulders and incised motifs (geometric patterns of incised triangles between bands of horizontal lines, or simply a band of horizontal incision) in necks. Bowl forms now tend to be dominated by smaller hemispherical and larger bipartite forms with inturned rims, both often highly burnished inside and out and decorated externally with incised, combed or tooled horizontal lines. In addition, there is a single instance of a very curious decorated lid.

The third horizon is only definitely identifiable in the upper two layers of Midden Pit 2028. Here, a range of forms and finishes are present which appear nowhere else, including sharp-shouldered bowls with diagonal cabling, red-finished bowls (including tripartite forms), long-necked jars with diagonal slashes and horizontal lines at the shoulder, and round-shouldered jars with herringbone slashes on the shoulder. This horizon is not as closely dated, but belongs in the 8th or more probably 7th centuries cal BC on the basis of the few associated radiocarbon determinations (from carbonised food residues – see Table 3.8 estimated dates for these layers). Parallels for this material are not immediately obvious in the locality, although there are some similarities with Highstead Period 3 (Couldrey 2007).

What are the implications of these groups and the associated dating? At the most basic level, the sequence from the Midden Pit and the groups from the Mortuary Feature and Central Enclosure allow a much finer resolution to be brought to the internal chronology of assemblages: both the Monkton Court Farm (dated to 850/800–600 cal BC) and Highstead Period 2 (900–600 cal BC) material for instance contain forms that are absent from the Cliffs End 9th-century groups but which are present in the 10th-century sequence.

By any reckoning, the material from layers 9–5 in the Midden Pit (2028) belongs to the 'Plainware' phase of Post-Deverel-Rimbury. In this light, it is worth noting the presence of neck-cordoned jars, cabled rims, and finger-press decoration in multiple locations. In combination, these traits are generally taken to be markers of 'Decorated' assemblages which – in the most recent reassessments (Morris 2006; Needham 2007a; Brudenell 2008) – are of earliest Iron Age date, that is, post-800 cal BC.

While decoration is certainly present at Cliffs End, the material is Late Bronze Age, and thus not 'Decorated'. One cannot help but remember Morris' observation that no-one has ever been able to quantify just how much decoration is required for an assemblage to be 'Decorated' (Morris 2007, 61), and wonder if these terms are helpful. In point of fact, there is a marked discontinuity in identifiable ceramics at Cliffs End at precisely the point at which 'Decorated' or 'Earliest Iron Age' or 'Latest Bronze Age' or whatever one wishes to call 8th-century ceramics would occur. Activity in the 8th century cal BC is ostensibly absent: the material in layers 1 and 2 of the Midden Pit is Early Iron Age, and thus 7th century, and the associated absolute dates do not absolutely contradict such an assertion (see Marshall *et al.*, Chapter 3).

***Catalogue of illustrated pieces (Figs 5.1–5.4)***

PRN = pottery record number

1. F10. Rim and upper body of a Peterborough Ware vessel of uncertain form; PRN 730 fill (3446) in ditch 2285
2. F3. Very short-necked jar with globular body; cabled rim; PRN 768 fill (3549) ditch 35523
3. F3. Long-necked, thin-walled shouldered jar, finger-impressed shoulder; PRN 178 fill (2118) Miden Pit 2028 layer 4
4. F3. Large, thick-walled, coarseware bowl with impressed rim and shoulder; PRN 839 fill (3646) pit 2469
5. F7. Fine bowl with incised neck; PRN 858 fill (3676) Burial Pit 3666
6. Q1. Small cup with off-centre omphalos base; PRN 458 fill (2471) pit 2469
7. F6. Small handled lid, decorated with combed lines on the top and sides; PRN 507 fill (2655) pit 2654
8. F2. Fragmentary handle; PRN 655 fill (3001) ditch 2907
9. F9. Shouldered bowl with four incised lines; PRN 508 fill (2656) pit 2654
10. F3. Rim and neck with five incised lines; PRN 331 fill (2345) pit 2396
11. F7. Very thin-walled bowl with incised decoration; PRN 617 fill (2988) ditch 2986
12. Q1. Shoulder of bowl with incised decoration; PRN 364 fill (2360) posthole 2359
13. F3. One sherd with wavy comb decoration; PRN 568 fill (2844) posthole/pit 2847
14. F7. Rim and neck with incised chevron decoration; PRNs 245/283 fill (2342) posthole 2341
15. G6. One sherd with cross-hatched decoration; PRN 1391 fill 242804 Mortuary Feature 2018
16. F2. One sherd with impressed and incised decoration; PRN 636 fill (3044) Midden Pit 2028 layer 8
17. F2. One decorated sherd; PRN 780 fill (3555) ditch 3554
18. F5. Rim/shoulder, cabled cordon in neck; PRN 445 fill (2466) ditch 2463
19. F5. Rim/shoulder, rim incised and incised cordon in neck; PRN 454 fill (2471) pit 2469
20. F1. Rim and cabled shoulder; PRN 1605 fill (3233) Midden Pit 2028 layer 2
21. F3. Finger impressed cordon; PRN 614 fill (2988) ditch 2986
22. F2. Cabled shoulder; PRN 127 fill (2117) Midden Pit 2028
23. F4. Rim and shoulder with herringbone stabs; PRN 90 fill (2116) Midden Pit 2028 layer 1
24. Q2. Red-finished tripartite bowl; decorated with very neat rows of impressed plaited cord above and below the angle, with a single horizontal line above. The neck below the upper angle has a similar although more widely spaced motif, between horizontal incised lines; PRN 42 fill (2029) Midden Pit 2028 layer 1
25. F6. Thin-walled high-shouldered short-necked jar; PRN 1516 fill (3310) Midden Pit 2028 layer 8
26. F7. Bowl or short jar, weakly shouldered; PRN 366 fill (2360) posthole 2359
27. G3. Small bowl; PRN 345 fill (2349) in posthole 2372 (recut within 2348)
28. F2. Large, well-finished biconical vessel with a high shoulder and cylindrical neck; PRN 860 fill (3682) Burial Pit 3666

29. F5. Thick-walled heavily gritted jar; PRN 862 fill (3689) Burial Pit 3666
30. F5. Thin-walled well finished bowl; burnished on both surfaces; a narrow band of lightly scored or wiped irregular horizontal lines on the rounded shoulder; PRN 861 fills (3682) and (3689) Burial Pit 3666

## Fired Clay

*by Matt Leivers*

Fired clay was found from across the site, with 705 fragments weighing 12,137 g recovered from Early Bronze Age ring-ditches, Late Bronze Age features including the Midden Pit and Mortuary Feature, Early Iron Age and Roman pits and ditches, Saxon graves and postholes. With the exception of the Saxon examples (see Leivers, Chapter 7), post-Bronze Age pieces are probably residual. In addition four spindlewhorls were recovered from the Midden Pit and Mortuary Feature.

The majority of pieces are featureless and abraded, but a significant number retained either wattle impressions, flat surfaces, or both. The presence of such features implies use in structural situations (as opposed to pit linings, for instance). Many pieces showed evidence of burning.

Wattle impressions were of varied diameters. In some instances wattle had been woven with smaller paired rods in and out of thicker uprights. Daub could be very thick beyond the wattles (>25 mm) or very thin (<10 mm). The daub often included voids where vegetable matter had burnt out. Some pieces had wattle impressions bearing clear bark marks.

The fills of the Late Bronze Age Mortuary Feature 2018 contained 130 fragments with an average weight of 20.48 g. For the most part these were abraded and featureless, although some had surfaces or wattle impressions. It is most likely that these represent a background level of domestic debris disposal, similar to the 63 fragments (average weight 30.71g) from Midden Pit 2028.

Other sizeable groups (more than 30 pieces in any one context) were recovered from a group of features and layers in the centre of the site, associated with the Central Enclosure (2203). Fragments were recovered from the ditch and features within the area defined by it, as well as in a spread of material sealing an inner ditch and a series of postholes (47 pieces weighing 660 g). A second group (37 pieces weighing 170 g) came from burnt spread 2944.

Fragments of four spindlewhorls were recovered:

1. ON 236; context 3233 (Midden Pit 2028 layer 2). Very fragmentary, perhaps 40–50 mm diameter. Appears to be conical with flat base. Surviving thickness 28 mm. Pre-firing perforation *c.* 10 mm diameter. Sparse poorly sorted very fine to coarse flint temper.
2. ON 232; context 3231 (Midden Pit 2028 layer 2). Sub-circular, *c.* 35 mm diameter. Biconical with flattened base. 22 mm thick. Pre-firing perforation 7 mm diameter, worn at each end. Sparse poorly sorted very fine to coarse flint temper.
3. Context 2311 (Central Enclosure, spread). Three fragments of a spindlewhorl similar to ON 232: sub-circular, perhaps 50 mm diameter. Sub-biconical, slightly flattened on one face, 23 mm thick. Pre-firing perforation *c.* 7 mm diameter. Sparse poorly sorted very fine to coarse flint temper.
4. Context 143801 (Mortuary Feature 2018). Sub-circular, *c.* 40 mm diameter. Saucer-shaped, 14 mm thick centrally. Pre-firing perforation measuring 9 mm diameter on concave face, 7 mm on convex face. Sparse very fine to flint and quartz sand probably naturally occurring.

Similar spindlewhorls are known from the locality. At Monkton Court Farm, a fragment of a single flint-tempered example was recovered from a pit, in association with a perforated ceramic plaque, burnt wattle-impressed daub, and numerous pot sherds (Perkins *et al.* 1994, 243 and fig.4.2). This example is of *c.* 40 mm diameter, with a perforation of *c.* 7 mm. A domestic function is suggested. The contextual associations and fabrics are sufficient to date these items to the Late Bronze Age.

## Flint

*by Matt Leivers and Phil Harding*

Small portions of the assemblage dated to the Palaeolithic, Mesolithic and Neolithic, with major groups belonging to the Early and Late Bronze Age. The main features of the various period assemblages are outlined below; full details are held within the site archive; selected pieces are illustrated in Figures 5.6–5.7.

### *Palaeolithic, Mesolithic and Neolithic Flint*

A limited amount of material is likely to date to these periods, all redeposited in later contexts. The identified component consists of blades struck with soft hammers, blade and bladelet cores exhibiting a similar technology, and a small number of retouched tools.

| | Barrow 1 | | Barrow 2 | | | Barrow 3 | | Barrow 4 | | Barrow 5 | Barrow 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ditches | Grave | Ditch | Grave | Post | Ditch | Grave | Ditches | Grave | Ditches | Ditch |
| Flakes | 133 | 126 | 30 | 6 | 1 | 6 | 4 | 6 | 2 | 3 | 27 |
| Cores | 8 | 3 | 1 | 1 | - | 7 | - | - | - | 1 | 3 |
| Knives | 1 | 23 | 1 | - | - | - | - | - | - | - | - |
| Serrates | 1 | - | 1 | - | - | - | - | - | - | - | - |
| Fabricator/scraper | - | - | 1 | - | - | - | - | - | - | - | - |
| Burin/scraper | 1 | - | - | - | - | - | - | - | - | - | - |
| Scraper | 3 | 8 | - | - | - | - | - | - | - | 2 | - |
| Hammer | 2 | - | - | - | - | - | - | - | - | - | - |
| Misc. | 5 | 11 | - | - | - | - | - | - | - | - | 4 |
| Arrowheads | - | 2 | - | - | - | - | 1 | - | - | - | - |
| Piercer | - | - | - | - | - | - | - | - | - | - | 1 |
| **Sub-total** | **154** | **173** | **34** | **7** | **1** | **13** | **5** | **6** | **2** | **6** | **35** |
| **Total** | **327** | | **42** | | | **18** | | **8** | | **6** | **35** |

*Table 5.7 Lithics from the barrows*

This material indicates a generally low level of (probably intermittent) activity in the vicinity of the site prior to the Early Bronze Age. It is likely that these early lithics are evidence of short-term transient activities in the area. Some may have been brought to the site from elsewhere in Early or Late Bronze Age rubbish deposits, or (in the case of the larger pieces) collected from surface exposures for use as cores in the Later Bronze Age.

## *Early Bronze Age Flint*

An assemblage of 436 pieces of worked flint was recovered from six sets of barrow ditches and associated features (postholes and central settings), and a further 38 redeposited tools can be assigned to the period with some confidence.

Material in the barrow ditches will not necessarily be contemporary with their construction, but the assemblages from the central features of Barrows 1–4 will be more securely associated as they are likely to have been sealed below mounds. The status of the material from the ditches is varied: the condition of some of it precludes its having spent prolonged periods in surface deposits prior to deposition. It is therefore likely that some results from deliberate deposition, with others transported through natural processes, especially erosion of surrounding land surfaces. It is likely that most pieces from the ditches are contemporary with the barrows' continued period of significance, rather than with their construction.

The raw material varies. Most is a dark greyish brown flint, some with large pale grey inclusions, some without inclusions or obvious flaws. Bullhead flint is present, as is a small amount of a pale mottled grey flint. Surviving cortex is generally thin and heavily weathered, but some has a thicker chalkier cortex. The sources of this material are not presently certain. Bullhead flint occurs locally in chalk overlain by Thanet sands (Smart *et al.* 1966). The better-quality pieces are of more obscure derivation: it is possible that flint of this quality occurs in the local chalk (nodular flint is present in quantity, see Robinson 1994, 11; and tabular flint recorded at points across north Kent, Bradshaw *et al.* 1991), but equally some nodules may have been imported. At least one piece derives from a ground flint tool.

Technology is hard hammer, direct percussion. Cores are irregular, with single or multiple striking platforms. Platform abrasion is entirely lacking in some instances. Platform rejuvenation tablets, *flanc de nucléus* and other trimming and maintenance flakes indicate core rejuvenation by the removal of flaking errors and the creation of fresh platforms.

The majority of the assemblage came from Barrow 1. Table 5.7 shows the division of the lithics between the barrows and features.

### Central features

Features 2887, 2546, 2539, and 2595 were rectilinear features at or near the centres of Barrows 1 to 4 respectively. Feature 2570 was a posthole at the south-eastern corner of 2546. Apart from feature 2887 (which contained a very much larger assemblage and is discussed separately) each contained only small quantities of lithics. Barrows 5 and 6 did not have surviving features at their centres.

#### ***Features 2546, 2570, 2539 and 2595***

The majority of the material from these features consists of flake and core debitage, most of which has micro-chipping on the edges, likely to have resulted from use. Traits identified below by Harding are present in this group of flakes: dorsal surfaces indicate mainly 'flat-faced' cores with off-centre guiding ridges. Feathered and hinge terminations are present in equal numbers. The single blade has a strong central guiding ridge, and very obvious ripples on both surfaces.

| | (3012) | (2888) group | (2888) other | (2916) | Total |
|---|---|---|---|---|---|
| **Scrapers** | | | | | |
| End | - | 3 | - | - | **3** |
| End and side | 1 | 2 | - | - | **3** |
| Probable | - | 2 | - | - | **2** |
| **Projectile points** | | | | | |
| Barbed & Tanged | - | 1 | - | - | **1** |
| Broken, unfinished | - | 1 | - | - | **1** |
| **Knives** | | | | | |
| Plano-convex | - | 5 | - | - | **5** |
| Triangular bifacial | - | 5 | - | - | **5** |
| Edge-flaked | - | 8 | - | - | **8** |
| Other | - | 5 | - | - | **5** |
| **Other tools** | - | 8 | - | - | **8** |
| **Flakes** | | | | | |
| Retouched | - | 3 | - | - | **3** |
| Primary | - | 6 | - | - | **6** |
| Secondary | - | 25 | 19 | 4 | **48** |
| Tertiary | - | 28 | 19 | 7 | **54** |
| Thermal | - | 5 | - | - | **5** |
| Chips | - | 10 | - | 3 | **13** |
| Burnt pebble | - | 1 | - | - | **1** |
| Cores/fragments | - | - | 3 | - | **3** |
| | **1** | **118** | **41** | **14** | **174** |

*Table 5.8 Feature 2887 (context 2888) lithics by context, quantity and type*

Most pieces have micro-chipping on the edges, which is likely to have resulted from use. This is true of both larger and smaller flakes and the blade, and is absent only in 2595.

A chisel arrowhead of type E (Green 1984) was recovered from feature 2539 (ON 160, Fig. 5.7, 20). The piece is worn, suggesting that it may have been of some age when it was deposited. The dorsal surface has no flake scars, suggesting the piece was made on either a thermal flake, or from a fragment of a ground flint tool.

### *Feature 2887*

The bulk of the material from 2887 came from a single group in fill (2888). The lowest fill (3012) contained a single end and side scraper made on the distal portion of a broken flake. The uppermost fill (2916) most probably represents material gathering in the hollow left by the settling of (2888); this material consists of undiagnostic flakes and chips.

### Context (2888) group 215

*by Phil Harding*

An assemblage of 118 pieces of worked flint was found clustered at the north edge of the 'grave', in an elongated 'figure-of-eight' spread approximately 0.40 m long and 0.20 m wide, apparently representing two bags of material that were placed next to one another (Pl. 2.1, Table 5.8).

One of the most striking qualities of the entire assemblage is the quality of the raw material. It is, almost without exception, of the finest quality pure black flint, which shows no hint of serious thermal flaws. There is the inescapable feeling that the entire assemblage was derived from one, or at the most two or three large nodules that were flaked specifically for the burial. Most of the assemblage adheres to this raw material description, although there are a few pieces that have grey mottled inclusions. This may increase the potential numbers of nodules represented in the assemblage; however, it is possible that this merely reflects flaking into the central part of a nodule, where the quality of the flint not infrequently changes character becoming coarser and greyer.

The cortex is generally thin and heavily weathered; however, there are patches of cortex that are considerably thicker and chalkier in character. These variations in cortex type do not make it easier to identify individual nodules, as it is quite possible to encounter cortex of varying types and thickness on the same nodule. One flake with a particularly thin cortex is also characterised by a surface that is peppered with incipient cones of percussion and is probably from a gravel source.

None of the pieces appears to refit; however, the absence of broken pieces and the results of the artefact analysis indicates that the 'blanks' underwent a deliberate selection policy, and most of the broken material and trimming waste was probably considered to be unusable. The broken material is likely to have represented a considerable component of the flaking process, and its absence reduces the potential ability to refit flaking sequences.

Knapping was undertaken using a hard hammer, by direct percussion. The points, cones and bulbs are especially clearly defined making it more likely that the percussor was not of flint, but of a harder, denser stone. Although there are no cores, the pattern of scars on the dorsal surfaces of flakes indicates that they were usually removed from cores with single striking platforms. Scars aligned at right angles to the main striking platform indicate that flaking sometimes migrated around the edge of the core and developed into a radial pattern, consistent with Late Neolithic and Early Bronze Age technologies.

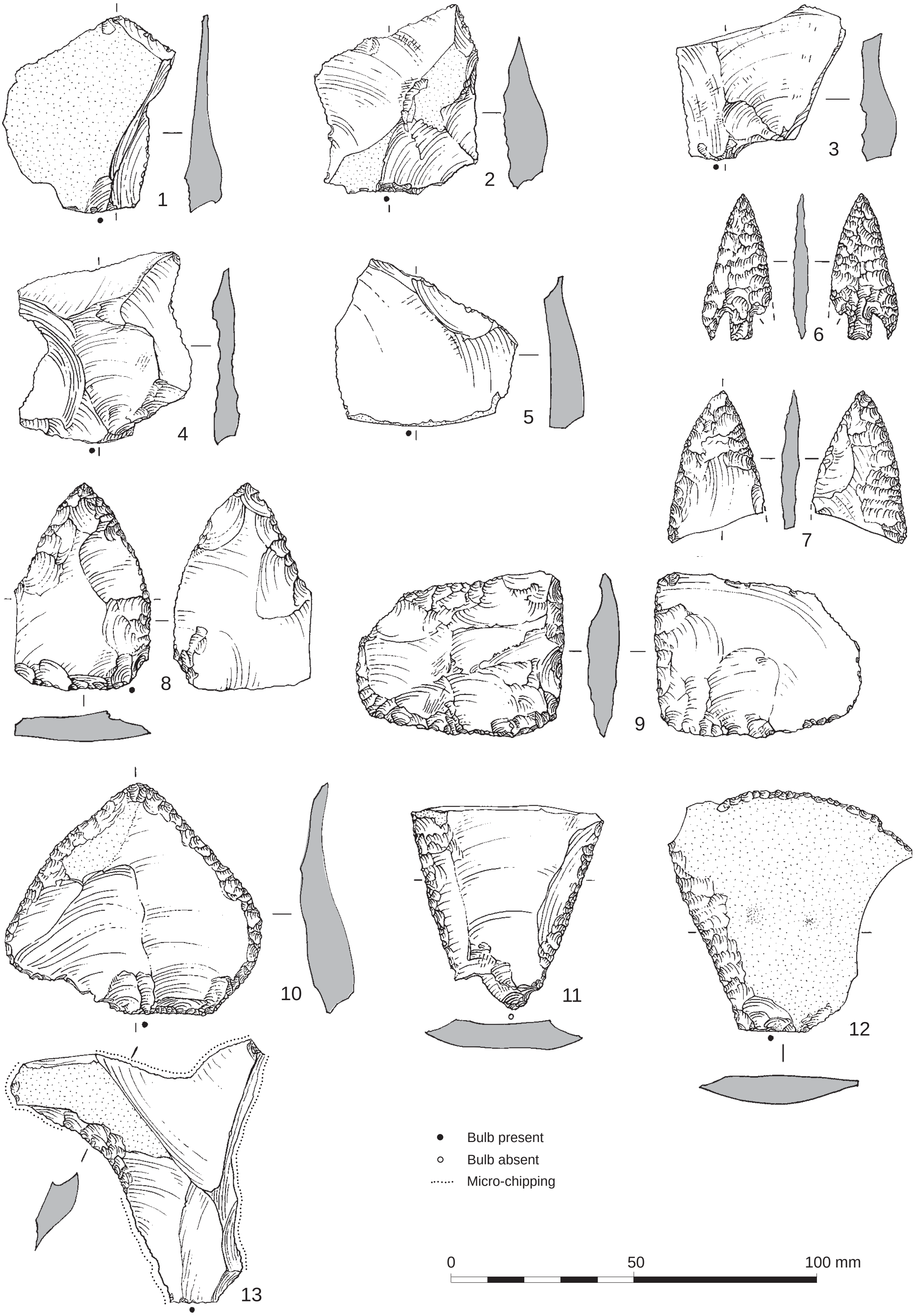



*Figure 5.6 Worked flint (nos 1–13)*

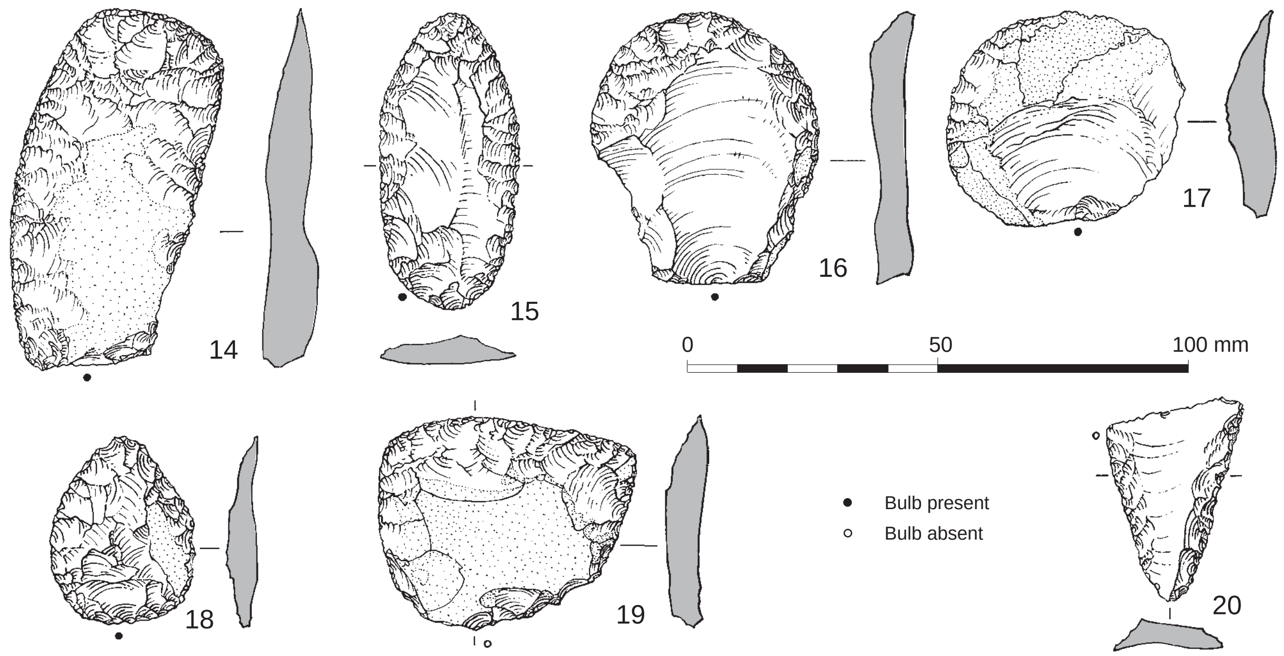



*Figure 5.7 Worked flint (nos 14–20)*

Elsewhere facetted striking platforms show that cores were frequently rejuvenated by rotating the core to preserve the flaking angle and create fresh flaking surfaces.

Platform abrasion to prepare the edge of the core before the flake was removed is present. However, its value as a technique to strengthen the edge of the striking platform is somewhat diminished by the fact that the blow was more frequently positioned well behind the edge of the striking platform. This suggests that the abrasion represents no more than basic trimming or tidying of the striking platform before flaking.

There were 75 unretouched pieces, including ten chips and 19 broken pieces. Sixty-four flakes were analysed in an attempt to define any consistent parameters that might have determined their selection for inclusion in the grave. Comparisons were made with the results obtained from a study of the retouched tool component. The sample is statistically small; however, the results of the analysis of the 43 flakes which produced complete sets of results have established that consistent characteristics are present in these flakes that make them suitable blanks for conversion into certain types of retouched tools but not for others. However the analysis has also indicated that these pieces may themselves be tools.

The results have shown that the 'type' flake measures 35–65 mm both long and broad (maximum dimensions measure 27–90 mm and 23–71 mm respectively). They are 7–10 mm thick (4–13 mm) and have a butt breadth of 4–8 mm (2–10 mm). The absence of smaller material demonstrates conclusively that the assemblage is 'biased' and that smaller knapping debris was not selected for inclusion in the grave. The recorded morphology of the flakes is also consistent with the technology used and with the dimensions of the flakes.

Virtually all pieces have edges that are characterised by marginal micro-edge chipping. It is likely that this flaking resulted from use, either in the preparation of the grave or from ceremonies or feasting immediately associated with and preceding the burial.

The retouched tools are predominantly knives, characterised by flat, invasive retouch with five more specialised plano-convex examples. The assemblage is dissimilar to burial groups, which frequently contain a higher proportion of barbed and tanged arrowheads in 'warrior' 'archer' or 'hunter' burials, or scrapers, which are more usual in domestic assemblages.

***Arrowhead***

The single barbed and tanged arrowhead was an elongated Green's Sutton C type (Fig. 5.6, 6). It is well made with covering pressure flaked retouch on both sides. The tip shows no evidence of impact while the tang is squared and nicely formed. Only one pointed barb is present, the other having snapped during formation. The arrowhead is made of light grey flint, which is unlike most of the flint from the grave, but is similar to the raw material used to make a bifacial knife. There are three other thin pieces with bifacial pressure flaking which are likely to represent unfinished arrowheads broken and abandoned in manufacture.

***Bifacial knives***

There were five bifacial knives that were generally triangular in plan (Fig. 5.6, 8–9). Metrical analysis indicates that the blanks were of similar size and shape to the unretouched 'blanks'. Bifacial flaking was used in selected areas primarily as a means of thinning the butt, a snapped flake or a hinge fracture. Retouch elsewhere is direct. The retouch is consistently irregular and was almost certainly undertaken by direct percussion. One implement retains a lump near the distal tip that resisted attempts to remove it. Instances such as this and the general standard of flaking gives the impression that the tools were merely 'roughed-out' or that they served a different function to other better made pieces.

***Edge flaked knives***

A group of eight implements were of consistent enough form to be classified in this category (Fig. 5.6, 10–13), with one implement that may equally be classed as a 'convergent' side scraper. Analysis demonstrated that they contained significant variations from the unretouched material. Blanks selected for edge flaked knives were overall bigger and, although they were all generally broad, included a higher proportion with a divergent plan form. Retouch to create a functional edge was often, but not exclusively, restricted to one edge. Two knives were 'backed' along the opposite edge, either by deliberate flaking or by the truncated scars of a rejuvenation flake. Retouch to the blade was often relatively low angle, direct and almost certainly pressure flaked to strengthen a straight edge along all or part of its length. Two knives, one with a length of flaking to create a concave edge along part of its extent, included areas of alternating micro-edge chipping along areas of unretouched edges. This unsystematic flaking is unlike any chipping that might be used to prepare an edge for flaking but is similar to the edge damage present on the unretouched flakes. It may provide the only evidence to suggest that the retouched tools were also used before they were included in the grave.

***Plano-convex knives***

These five knives differed not only with the unretouched material but also the other groups of retouched tools (Fig. 5.7, 14–15). The blanks were longer, profiles were consistently straight and they retained larger areas of cortex. This suggests that potential blanks were removed from the core at an earlier stage in the flaking process, including core preparation, than many of the other flakes. Regular, direct, invasive or covering retouch was applied by pressure frequently to both edges. These implements appear to have been finished, although one retained evidence of a manufacturing flaw as a lump on the edge caused by a flaking angle that was too steep to remove by retouch.

***Scrapers***

Three end scrapers, two end/side scrapers and two other probable scrapers represent this group of tools (Fig. 5.7, 16–18). Scraper blanks were of similar dimensions to the unretouched material but retained more cortex and were characterised by a slightly dipping distal end. They were all generally well made using direct percussion to trim and strengthen the distal end to provide a semi-abrupt scraping angle. One probable scraper was made on a flake that was apparently derived from a gravel deposit. The other probable scraper was made on a flake and was characterised by identical cortex to that seen on a possible unfinished arrowhead, an 'other' knife and a miscellaneous tool retouched by pressure. It is intriguing that four different types of retouched tools, none of them particularly diagnostic and with similar cortex suggesting that they were removed from the same nodule, should be included in such a well-furnished grave assemblage.

***Other retouched tools***

The remainder of the assemblage contains five 'other' knives (eg, Fig. 5.7, 19) which are broader but otherwise similar to the unretouched 'type' flake, and three flakes with miscellaneous retouch. Interestingly the edge of one of these flakes is in mint condition and showed no traces of the edge damage so frequently seen on most of the other 'unretouched' edges. There were also six other unclassified pieces with retouch, five of which appear to have been broken in manufacture.

***Chips***

The spoil was not sieved, although it is likely that if significant quantities of micro-debitage were present they would have been noted at the time of excavation. The composition of the group and the photographic record suggests that it was probably never present. The absence of chips is not surprising given that the assemblage contains retouched tools and material that probably represents discarded unretouched implements. There were however two small broken flakes and eight chips, which became incorporated in the assemblage. They are generally undiagnostic, although the chips include two that probably result from tool manufacture or resharpening. One is from the blade of a retouched scraper, while the other is from the distal end of a flake that terminated in a small hinge fracture. Neither chip appears to refit to any of the tools in the grave.

An additional small tertiary flake and numerous chips were recovered from a sample of material from around the main flint group. As with the eight chips from amongst the group, this material is generally undiagnostic, although the tertiary piece appears to be a by-product of pressure flaking. This component of very small pieces may be indicative of knapping in the vicinity of the grave while it stood open: while larger pieces of debitage could easily have been removed, these small chips may have escaped detection and remained to re-enter the grave during backfilling.

***Other material from context 2888***

A quantity of lithic material from elsewhere in fill (2888) did not belong to group 215. Tabulated above (Table 5.8), this material consists mainly of unretouched secondary and tertiary flakes, and is markedly dissimilar to the material in group 215, with a wider range of raw material and blank shape and size, and multi-platform cores present.

**Ditches**

As with the central graves, struck flint was most frequent in the ditches of Barrow 1. The raw material and technology identified by Harding is repeated amongst the broader range from the ditches, indicating that some of this material at least forms part of a larger assemblage with the selected blanks and tools.

The difficulty in confidently assigning the hard-hammer struck debitage and cores from the ditches to the same narrow chronological span or even episodes of knapping as the selected material in context 2888 lies in the uncertainty regarding the mechanisms by which the material entered the ditches. Some at least may have been deposited deliberately when the ditches were newly open or beginning to silt, but it seems more likely that the majority of the flint entered the ditches subsequently, either deliberately during later silting episodes or (perhaps more likely) during episodes of erosion from surface scatters or deposits. This latter possibility is perhaps supported by the condition of many of the technologically-similar pieces: still relatively fresh, but on the whole noticeably more abraded or damaged than the material from context 2888.

A partially roughed-out barbed and tanged arrowhead came from feature 2894, within Barrow 5. The piece is bifacially worked, with one barb and the corresponding side of the tang formed. The work is crude, and the piece appears to have been used as a scraper subsequent to its abandonment.

**Redeposited material**

Early Bronze Age lithics were recovered as residual pieces from later features and layers, primarily Late Bronze Age features and Anglo-Saxon graves. No attempt has been made to separate flake and irregular debitage, and only notable instances of retouched tools are noted here.

A single well-made barbed and tanged arrowhead belonging to Green's (1984) Sutton B type came from the fills of the Late Bronze Age Mortuary Feature. The piece has invasive pressure flaked retouch on both sides. One barb has snapped, probably during manufacture.

Seventeen Early Bronze Age scrapers were recovered from Late Bronze Age Mortuary Feature 2018. Length:breadth ratios were calculated for complete examples and these were compared to the length:breadth ratios of the seven examples from 'grave' 2887.

Three classes are present (following Riley's 1990 classification). Class 4 dominates (12 examples), with three Class 5 and two Class 7. The seven examples from 2887 consisted of five in Class 4 and two in Class 5. Class 7 scrapers are the least difficult to date, being thumbnail types of Beaker/Early Bronze Age date. Class 4 scrapers are very common, and are often found throughout vertical Neolithic–Bronze Age sequences (for instance Windmill Hill; Pollard 1999), while Riley (1990) assigned Class 5 to the Earlier Neolithic. Technologically the Cliffs End Class 5 scrapers are not of that date, and the inclusion of mint examples in grave 2887 indicates that they are at home in the Early Bronze Age, along with those of Class 4 and 7.

**Discussion**

It is difficult to place the Cliffs End lithics in a meaningful context since very few local sites of this period have been fully excavated, and less are adequately published. What is clear is that the assemblage from the central feature of Barrow 1 is remarkable. No similar groups of high quality, deliberately-selected lithics are known from the locality, although there are occasional individual finds of broadly similar material. The immediate impression gained from the Barrow 1 assemblage is of a high status burial subsequently serving as a focus for a cemetery. There are, however, a number of difficulties with this interpretation. Firstly, there is no trace of a body in the 'grave', and while this is most probably due to soil conditions (see Leivers, Chapter 2), there remains the fact that the assemblage is not at all typical of those normally associated with burial groups (see Harding, above).

The only indication of chronology between the barrows comes from the two projectile points, with a chisel type E in Barrow 3 and a barbed and tanged Sutton type C in Barrow 1. This however is unhelpful: the types overlap by at least 200 years, and the chisel was probably an heirloom at the time of its deposition.

In the lack of adequate local comparanda, it is necessary to look further afield. The physical location of Thanet means that comparative material can be sought over a very broad area. This includes not only Essex to the north, but also the European mainland: Cruse and Harrison (1983, 93) have identified the possible Dutch associations of the four-post structure in the Wouldham barrow; the Ringlemere cup has its scarce parallels scattered across north-west Europe (Needham 2006, 55 fig. 28). The presence of very high status items such as the Ringlemere cup highlight the widespread contacts existing at this time in north-east Kent, and also its association with what would traditionally be called the Wessex Culture.

Other materials suggest a link with Wessex, particularly the small group of Kentish slotted 'incense cups', which includes one from Lord of the Manor (Perkins 1980a). It is perhaps in the rich barrow burials of the central Wessex chalklands that the best parallels for the Barrow 1 lithics will be found. Even here, these comparisons may be general rather than specific for, as Harding has noted, the contents of the Cliffs End assemblage are dissimilar to burial groups, lacking both the frequencies of barbed and tanged arrowheads which tend to typify warrior/archer/hunter burials and the scrapers which are more usual in domestic assemblages.

This raises the question of the status of this assemblage as a whole, and particularly of its sources. The group from feature 2887 can be readily envisaged as having special status, clearly selected deliberately for deposition there, and perhaps even created especially for that purpose, during ceremonies associated with the digging of the grave or as part of other, wider mortuary rites. This explanation will not hold for the bulk of the material, however. While the chisel arrowhead in the Barrow 3 grave can possibly be considered a 'grave good', the majority of the assemblage has no inherent features to distinguish it as special. Given this it is unclear what these lithics represent: it is possible that the material in the ditches is the detritus from successive episodes of knapping around the barrows over an extended period, perhaps associated with additions to the group. On the other hand, it may be that the material represents more general refuse which simply became caught in the ditches as they filled, with no particular association with the barrows themselves. Natural transport is unlikely given the condition of the bulk of the pieces, and the location of the barrows on a hilltop. If this suggestion has any validity, a further question is posed, namely where is the associated settlement? Early Bronze Age remains (mainly ring-ditches) are known to cluster above the former south coast of the island, from Ramsgate westwards broadly along the line of the A253 at least as far as Monkton. Two sites within this group have been recognised as Early Bronze Age settlements: Laundry Road, Minster (Boast and Gibson 2000) and Oaklands Nursery, Cliffsend (Perkins 1998). Extensive excavations along the line of the East Kent Access Road have revealed some Beaker and Early Bronze Age activity but surprisingly little ceramic material (Andrews *et al.* forthcoming; Leivers, forthcoming). It is possible then to envisage a dispersed linear barrow cemetery on the higher ground behind a zone nearer the coast within which more sites of domestic character remain to be discovered.

**Catalogue of illustrated objects (Figs 5.6–5.7)**

All pieces from context 2888 (grave 2887), except number 20 (ON 160) which is from pit 2539.

1. Flake, ON 1078
2. Flake, ON 1041
3. Flake, ON 1054
4. Flake, ON 1056
5. Flake, ON 1064
6. Elongated barbed and tanged arrowhead, Green's Sutton C, well made with covering pressure flaking. Nicely formed square tang with pointed barbs, one missing from pressure snap, other well formed. Light grey flint. No impact damage, ON 1000
7. Fragment of pressure flaked flint, probably an arrowhead, probably broken in manufacture, by flexion, ON 1004
8. Bifacial knife; bifacial flaking around distal end, forming a point. Retouch extends along right edge and proximal end as direct retouch. Some of bifacial work may be too thin a snapped edge. Some grey mottled flint, ON 1005
9. Bifacial knife; flake with bifacial retouch to thin the butt, distal edge has slight hinge termination, which has also been flaked away by direct flaking. General standard of flaking is irregular and probably by direct percussion. One length is very similar to scraper retouch, ON 1029
10. Edge-flaked knife; much more of a convergent side scraper, but edge angles generally quite low, ON 1100
11. Edge-flaked knife; flake with both edges retouched. One edge has short length of bifacial retouch, probably

insufficient to be significant. Hinged distal end, ON 1019

12. Edge-flaked knife; distal end also retouched by marginal low angle on convex edge. Distal edge broken in right corner (?in manufacture). Distal edge also much broken (?in use). Left edge still crisp, ON 1094
13. Edge-flaked knife; non-specific flake with hinge fracture distal end, with limited extent of concave retouch. Remainder of edge has direct micro-edge chipping. All other unretouched edges have some alternating micro-edge chipping, ON 1089
14. Plano-convex knife; invasive flaking that develops into covering at the distal end. Pressure flaked. Evidence for use lacking, ON 1101
15. Plano-convex knife; retouch extends along both edges. Crisp pressure flaking, ON 1006
16. End and side scraper; retouch extends round to right edge. Almost certainly direct retouch, ON 1003
17. End and side scraper; short length of retouch around left distal edge, ON 1008
18. Scraper; small discoidal piece with direct retouch, except for minor inverse flaking on butt. Possibly thumb-nail type. Probably pressure flaked, ON 1001
19. Knife; flake tool, possibly (?triangular) knife. Proximal end 'backed' by bifacial retouch, other edges retouched more by 'scraper' retouch. Thick cortex, ON 1032
20. Chisel arrowhead, ON 160

### *Late Bronze Age Flint*

An assemblage of 2,883 pieces of worked flint was recovered from features dating to the Late Bronze Age, along with 13 tools from later features which can be assigned to the period with some confidence. The Late Bronze Age features include the large Mortuary Feature, parts of the three sub-square enclosures, boundary and other ditches, and various pits and postholes. Redeposited pieces came primarily from Anglo-Saxon pits and graves, with smaller quantities from later features and layers.

Most features contained small quantities of flint. Larger assemblages came from Mortuary Feature 2018, Midden Pit 2028 within the Northern Enclosure, and from the Central Enclosure.

#### Raw material

Raw material is very varied, and no attempts appear to have been made to exploit a particular type of flint consistently (for a discussion of raw material use see Harding, forthcoming). The impression gained is that any readily available flint was utilised, regardless of quality. Some is indeed rather fine and would not have been passed over by earlier, more selective knappers: Bullhead flint continued to be used. Dark greyish-brown pieces with chalky cortex are frequent, and more variously coloured and flawed flints (including small quantities of a very distinctive banded brown flint) are dominant, generally with thin, abraded and peppered cortex. Some pieces that had been knapped in the past and had patinated were reused.

#### Technology

Rather than belonging to a readily defined technology, much of the Late Bronze Age assemblage is typified rather by the absence of recurring technological traits that would indicate a repeated or formalised reduction strategy (cf. Ford *et al.*, 1984; Young and Humphrey 1999). The few shared characteristics of this component are the use of hard hammers, with imprecise blow placement: incipient cones of percussion litter flake and core platforms, where these features can be identified. On many flakes formal platforms are not present, and the cores tend to demonstrate a similar haphazard approach towards flake removal. It is more than likely that useable flakes were not the desired end result of much of this flint working.

Within this generally chaotic pattern is a component typified by much more skilled knapping, or alternatively a component resulting from the intentional production of flakes and flake tools. Flakes tend to be as broad as they are long (or broader) and to have very pronounced dorsal ridges. Those ridges can however run in any direction across the face of the flake and appear to have played no role in guiding the removal of successive flakes. Unsurprisingly, flakes tend to splay outwards and to terminate in hinge and step fractures far more frequently than in feathered terminations. The better cores can be either single or multi-platform, show little or no evidence of maintenance, and were abandoned due to the

| Type | Number | % | Redeposited | % redeposited |
|---|---|---|---|---|
| Scrapers | 37 | 35.59 | 17 | 45.95 |
| Projectiles | 1 | 0.96 | 1 | 100 |
| Piercers | 5 | 4.81 | 2 | 40 |
| Knives | 3 | 2.88 | 2 | 67 |
| Hammers | 15 | 14.42 | 0 | 0 |
| Truncation | 1 | 0.96 | ? | ? |
| Backed flake | 1 | 0.96 | ? | ? |
| ?Rods | 2 | 1.92 | ? | ? |
| Tongued flakes | 2 | 1.92 | ? | ? |
| Serrates | 2 | 1.92 | 2 | 100 |
| Backed bladelet | 1 | 0.96 | 1 | 100 |
| Retouched flakes | 34 | 32.70 | ? | ? |
| **Total** | **104** | **100** | **25** | **24.04** |

*Table 5.9 The retouched tool assemblage*

destruction of platform edges, the recession of angles, the proliferation of large hinge termination scars, or were simply discarded for no apparent reason.

The range of implement types is limited, as is typical of assemblages of this period, and is reduced even further once the redeposited earlier component has been removed (Table 5.9).

The scrapers divide into two broad groups: one is generally well-made, while the other is much cruder. Both are hard-hammer struck, and the distinctions are mostly in terms of blank selection and quality of retouch. The latter group is assumed to be Late Bronze Age, and indeed compares well with other Late Bronze Age scrapers from the locality (for instance at Monkton Court Farm: Perkins *et al.* 1994). All of the Late Bronze Age examples fit into Riley's (1990) Class 9: irregular flakes with a little coarse (possibly denticulate) retouch.

## Major feature groups

### *Midden Pit 2028*

This feature contained 378 pieces of flint. The material was spread throughout the vertical sequence, but was concentrated horizontally in the south-east quadrant. The single core fragment and eight flakes and chunks in the lowest fills (colluvial wash present in the south-east only) were unpatinated and very fresh, with sharp edges. This material had clearly not spent a protracted period in surface deposits and probably entered 2028 very soon after knapping. It was probably thrown into the pit whilst the basal deposits were forming.

The secondary fills contained very large quantities of debitage and very few tools. The condition of this material is very much more varied than that in the primary fills, with some fresh pieces and also a notable proportion that has been abraded, patinated and damaged. It is evident that this material did not derive from a single source, and it appears to have entered the feature gradually over a prolonged period. Among the frequent smashed nodules and chunks (some of which are burnt) are fragments of recognisable cores and a number of flakes. A few of the better flakes have marginal micro-chipping that is likely to have resulted from use, probably cutting. Tools are limited to two flakes with semi-abrupt marginal retouch, a pebble very crudely trimmed to form a rough chopping edge, a scraper and an irregular chunk with a semi-abrupt concave retouch on one end (perhaps a scraper) and one corner retouched to a piercer. Four roughly spherical flint cobbles pecked all over are either hammerstones or dressers. A serrated blade is clearly residual.

The uppermost fills contain a minimum of what can be considered as the results of knapping, among large quantities of smashed flint nodules. Some of these may be cores or very crude chopping/pounding tools, and appear to be more akin to Early Iron Age assemblages.

As a whole, the material in 2028 seems to result from the dumping of refuse. There is no patterning among the material to suggest that the deposits were formed with any care or intentional placement.

### *Mortuary Feature 2018*

An assemblage of 1587 pieces of flint came from Mortuary Feature 2018. The majority of this material was typical unretouched debitage (mostly flakes and chunks). Cores are well represented, as are hammerstones, but other indicators of knapping are largely absent.

In broad terms, the lithics are distributed throughout the feature horizontally, with the highest densities between grid lines 28–40 and 44–46 north. Vertically, the distribution is similarly broad, with the highest densities in spits 01 to 05 (corresponding with the uppermost metre of fills), in broadly the same areas as indicated by the horizontal distribution.

There is very little to suggest that there was any deliberation guiding the deposition of this material. The most likely mechanisms through which the bulk of it entered the feature are the discard of waste and the erosion of surrounding deposits. A number of factors suggest that this is the case. Many pieces are patinated, worn or otherwise damaged, suggesting periods of surface exposure. With only a single exception, no square contained more than three tools (including miscellaneous retouched flakes). There does not appear to be any correlation between the lithics and the human remains within the fills of 2018.

Within the general episodes of deposition and filling of 2018 are a number of identifiably separate units. The foremost of these is Burial Pit 3666. One of the basal fills contained a struck fragment of tabular Bullhead flint with a white patina on every non-cortical surface. With this exception (and the few pieces associated with the skeletons discussed below) all of the lithic material came from the upper fills of the feature, stratigraphically late and likely to represent casual and gradual accumulations of material in the top of the pit into the Middle and Late Iron Age.

Interestingly, the contexts containing the skeletons and other artefacts were almost entirely free of lithics. Only the material around skeleton 3676 contained any worked flint, and these five pieces were all small tertiary flakes. They are probably accidental inclusions deriving from fill 3682 below, which contained a further 20 similar pieces.

This material is typical of the lithics associated with the skeletons elsewhere in 2018 which, whether in detectable grave cuts or not, never have more than two flakes associated with them. In each instance (3653, 3651, 3649, 3616 and 3662) the flakes are likely to be accidental inclusions in the surrounding backfilled or accumulated material.

***Central Enclosure***

This group contained 254 pieces of struck flint, 98 of which came from the outer ring (2203). The majority of these were core fragments, chunks and crude flakes of Late Bronze Age date, with no tools. On the eastern side (in sections 2598 and 2713) 35 flakes and a serrate are Early Bronze Age, and likely to derive from the ditch of Barrow 2 which is cut away by the Central Enclosure at this point.

Pit 2812, close to the centre of the enclosure, contained 13 flakes, five cores and two chunks, all typically Late Bronze Age. Around this pit (predominantly to the south) was a scatter of small pits and postholes, some of which had struck flint in their fills. The only notable elements of this material were a single flake and a group of three hammers in posthole 2359 (one a smooth ovate flint cobble, one a sub-square heavily battered flint cobble, one a tabular piece of Bullhead flint) and a single flake and a second group of three hammers in pit 2341.

**Discussion**

The majority of the lithics from Late Bronze Age features derive from the casual disposal of undifferentiated domestic waste. This applies to all of the feature types from which Late Bronze Age lithics were recovered. The only exceptions of potentially significant deposits of stone tools are from features in the interior of the Central Enclosure (pits and postholes containing hammerstones and collections of flake and non-flake debitage). The largest assemblage (from Mortuary Feature 2018) is almost entirely homogeneous, and displays no significant variations throughout its fills (either horizontally or vertically) that could represent deliberate or separate depositional units or episodes. The predominance of the lithics in the upper metre of fills suggests that most of the flint entered the feature between its two periods of use as a focus for mortuary activities, during rubbish disposal and silting. No refits were identified within 2 $m^2$ spits (none were sought between spits, but the nature of the material suggest that they are unlikely to exist) suggesting that knapping did not take place in (or in the immediate vicinity of) the feature.

Over the last 20 years Bronze Age lithic technologies across Britain have become firmly established and understood (eg, Ford *et al.* 1984; Young and Humphrey 1999), and the Cliffs End assemblage fits comfortably within this scheme, both locally and more broadly. The closest parallels come from Monkton Court Farm (Perkins *et al.* 1994). At this site, the flint assemblage was associated with Carp's Tongue metalwork of the Ewart Park phase, and parallels almost exactly that from Cliffs End. Healey typifies the assemblage as distinctive in its lack of standardisation (1994, 303), a description appropriate for the Cliffs End material also.

## Animal Bone

*by Jessica M. Grimm and L. Higbee*

The prehistoric animal bone assemblage comprises 5432 fragments. The greatest proportion of this material (3284 fragments; 60.5%) was recovered from the Late Bronze Age–Middle Iron Age Mortuary Feature 2018, where it was frequently recovered together with residual Late Bronze Age pottery and flint within the colluvial deposits that formed the predominant fills within the feature (Figs 2.18–2.20). Although some of the animal bone from 2018 is of Iron Age date (see below), much of the disarticulated bone is probably Late Bronze Age commensurate with the associated pottery, and related to activities being undertaken upslope in and around the Late Bronze Age Enclosures rather than within the Mortuary Feature itself. Most of the rest of the material is either Late Bronze Age (2061 fragments; 38%) or Late Bronze Age/Early Iron Age (65 fragments; 1.2%) in date, and predominantly derived from the Enclosures and associated features. Only one fragment of bone was recovered from an Early Bronze Age context, and 21 fragments from later Iron Age deposits.

### *Methods*

The following characteristics were recorded for each bone fragment where possible/applicable: species, skeletal element and side, degree of fusion, stage of mandibular tooth wear (following Grant 1982), sex, and measurements (von den Driesch 1976). Data published by Prummel and Frisch (1986) was used to distinguish between sheep and goat, and Prummel (1987) was used to identify the foetal bones of domesticates.

The positions of butchery marks (following Lauwerier 1988) and burnt areas were described (Wahl 1981), together with evidence of gnawing. The condition of the bone was recorded according with McKinley (2004a; Grades 1–5) to allow comparisons between the animal and human bone assemblages (see McKinley, Chapter 2 and Chapter 4), and completeness was also recorded (zonation after Serjeantson 1996). Conjoining fragments were counted as one bone in order to minimise distortion. Fragments that could not be identified to species or family were recorded as small, medium or large mammal, bird or fish. The fish bone was identified with the help of Sheila Hamilton-Dyer.

Withers heights were calculated using von den Driesch and Boessneck (1974, cattle), Matolcsi (1970), Teichert (1975, sheep), Clark (1995, dogs), Harcourt (1974, dogs), Kiesewalter (1988), Vitt (1952, horses) and May (1985, horses). Ages were estimated using Habermehl (1975) and Jones (2006), sheep and horse pelves were sexed based morphology (Nickel *et al.* 2004, 103).

Details are held in the archive.

## *Animal Bone from Mortuary Feature 2018*

The methods of finds recovery specific to Mortuary Feature 2018 have been outlined above (Chapters 1–2). Articulated bones and skeletal elements potentially representative of placed deposits (eg, skulls) were allocated an object number (ON) in excavation and 3D recorded. Most of the disarticulated bone was recorded by block and spit, or by individual context number where the bone derived from a discrete negative feature.

A small amount of the animal bone was found in direct association with human remains and had clearly formed part of the same deposition event (ie, burial). A slightly larger proportion of the assemblage comprised animal bone – articulated and disarticulated – deposited in proximity to human remains, and in some cases possibly affected by the same mechanisms, but no direct relationship could necessarily be drawn between the different osseous components within the deposits. A substantial amount of the disarticulated material is residual, in particularly that recovered from the upper spit levels within all areas of the feature (Fig. 2.19).

## *Late Bronze Age: 11th–9th Century cal BC*

### Burial Pit 3666

Burial Pit 3666 formed the focus of Late Bronze Age activity in the northern portion of Mortuary Feature 2018. Animal bone was recovered from all levels of the pit fill and residuality is less likely to have been a mechanism of deposition in this area than elsewhere within 2018.

#### Remains from basal layers

The basal layers within the pit comprised silting and redeposition of the natural brick-earth from which both articulated and disarticulated bone was recovered. The latter included bones from a variety of domestic species (adult and subadult cattle, juvenile sheep/goat, neonate pig, and horse), some of which was butchered. The preservation condition varied slightly and this suggests that at least some of the material had been reworked. Less ambiguous are the *in situ* remains of two neonate lambs (ABG 637) that were placed over the top of these silting episodes. The slightly larger of the two is represented by most of the left fore and hind feet, but the smaller lamb is complete except for a few small bones.

Two dumps of scorched/burnt disarticulated and articulated animal bones were subsequently deposited in the north-eastern areas of the pit. This material includes bones from cattle, adult and subadult sheep/goat, and neonatal and subadult pig. The element representation from one sheep/goat shows that a whole right hind limb was burnt. The lack of scorching to the underlying neonate lamb remains suggests the burnt material had cooled by the time it was thrown in the pit (see McKinley, Chapter 2). The second of these two dumps (3682) contained the scorched/burnt remains of at least two further neonate lambs in addition to ABG 637 (Fig. 2.15).

#### Material associated with/deposited in proximity to *in situ* human remains

Articulated animal remains were directly associated with three of the *in situ* human burial deposits made close to the base of 3666. The remains of at least two neonate lambs, one larger than the other, were recovered from the pelvic region of the elderly female (3675) forming the primary burial. The individuals are represented by skull, axial skeleton and elements from the hind limbs. The partial skeleton of a frog was also found in a sample from the thorax region of the female skeleton, indicating the pit lay open at least for a short while.

The head of the subadult female 3680 was found resting on the anterior portion of a cattle skull (ABG 608; Figs 2.14, 2.16; Pl. 2.8). The skull is from a short-horned breed of cattle. The skull is from an animal aged 12–13 years (Habermehl 1975, 88) and was found in articulation with the mandibles, atlas vertebra and hyoid. The left part of the hyoid has numerous parallel cut marks on the ventral surface, which is a result of the removal of the tongue. Both lower 2nd premolars are missing, which is a common genetic trait in cattle. Several other cattle bones and fragments thereof were found around this individual, but it is unclear whether or not they were deliberately placed either during or following the initial deposition (Figs 2.14, 2.16), or are entirely coincidental.

The elements comprise; a horncore (ON 614) with chop marks at the base, a cranium fragment (ON 615), a fragment of acetabulum (ON 618), and the butchered left scapula blade of a juvenile (ON 630).

A complete left cattle foot (ON 627) was overlain by the partial, manipulated articulated remains of a human adult male 3673. These remains probably represent a placed deposit associated with the human remains (Fig. 2.17). A caudal vertebra of cattle was also recorded as belonging to this group of bones but this could be incidental.

**Bone from the backfills of the pit**

Fragments of well-preserved burnt animal bone (subadult, adult and neonatal sheep/goat, and cattle) were recovered from the thin layer of burnt material deposited over the human juvenile 3674 (Fig. 2.16). The rest of the burial remains were sealed by a relative sterile series of backfills that contained a few well-preserved fragments of animal bone, predominantly cattle, with some horse and sheep/goat. Fracture patterns suggest that some of the cattle bones were broken when still fresh, by processes including trampling, and human or carnivore action.

The upper fills of the pit include layer 2058, in which placed deposits of human skeletal elements had been made (Fig. 2.22). The animal bone (mostly cattle and sheep/goat) from this context was all disarticulated and includes a wide range of elements. The preservation state is quite variable and this coupled with the evidence that some of the bones were broken as a result of trampling suggests that at least part of the assemblage was redeposited, most probably from 'normal' accumulations of waste.

The material from the later fills including the final sealing deposit, is in a similar condition and was probably therefore subjected to the same formation processes. Again, the taphonomic evidence and the presence of a wide range of anatomical elements characterises this assemblage as 'normal' waste. The frequent presence of residual fragments of Late Bronze Age pottery in these contexts suggests that at least some of the animal bone may also represent redeposited material incorporated within colluvial silting from upslope (Figs 2.18–2.20).

**Material from around Burial Pit 3666 (juxta-3666)**

Five near complete cattle skulls (ON 416, 544, 557, 578 and 590) were recovered from around the margins of Burial Pit 3666 (Fig. 2.22). The even distribution of the skulls indicates that their deposition formed part of the mortuary practices associated with the burial pit. The skulls are from animals of different ages and one of the skulls is from a horned breed. Amongst the other animal bones/groups in this area are the partial remains (right wing and left leg) of a buzzard (ON 510, spit 4). The remains are quite large and thus probably belong to a female bird. The other bones (from spits 4–7) all belong to cattle and include an articulated left hind foot, which was found to the south-west of the 3666 (ON 304; spit 2).

Object numbers 571 to 576 formed a group to the north of Burial Pit 3666 (spits 5–6), where there was also a concentration of redeposited human bone (Fig. 2.22). Cattle skeletal elements dominate and these include a horncore from a short-horned breed (ON 574). Other identified remains include two sheep horncores, one of which is from a ewe and the other from a ram and a horse femur (ON 572). The general character and preservation condition if this group of bones suggests they are part of the mortuary deposits analogous with the human bone from this same location.

**Other deposits from the northern half of 2018**

Two adjacent spreads of burnt material (3650 and 3652) to the south-east of Burial Pit 3666 (Fig. 2.22) contained the charred remains of two neonatal lambs. Layer 3650 includes parts of the axial skeleton, right forelimb and distal parts of the left hind limb, while layer 3652 includes the near complete skeleton. The latter was a little over 5–7 months of age at death – assuming a spring lambing season, this means that the animal died or was killed sometime in the autumn or early winter.

The remaining material from the northern, Late Bronze Age half of the Mortuary Feature (spits 4–10) consisted mostly of cattle bone fragments (102), with smaller quantities of sheep/goat (48, including a minimum of one goat and one sheep), pig, horse and dog. The majority (84%) is well preserved but scores across the range of the preservation index underlines the redeposited nature of at least a proportion of the material. The breakage pattern confirms the fragmentation of fresh bone by trampling and other human or carnivore activities. The recovery of a few groups of articulating cattle bones from the area to the south and south-east of Burial Pit 3666 (spits 4–9), indicate that some of the material comes from intentional depositions.

**Late Bronze Age Mortuary Rite**

The inclusion of neonatal lambs seems to have been a feature of the Late Bronze Age mortuary rite. The remains of two lambs (ABG 637) were placed near the base of Burial Pit 3666, the remains of two burnt neonate lambs were found in layer 3682, also towards the base of the pit, and the remains of two neonate lambs were placed on the abdomen of the elderly female (3675). Single bones of neonate lambs were recovered elsewhere in the pit fill, together with neonatal pig bones. The lambs generally occur in pairs; one larger than the other. Size differences occur naturally as a result of twin births and sexual dimorphism. Successful multiple births in sheep are not unusual in modern farming however this does not mean that they were a common occurrence in the past. If rare then it is understandable that twin lambs were selected for ritual sacrifice since their very existence symbolises fecundity. Similarly a male and a female lamb may have been selected for the same reason.

The lambing season in the prehistoric period will have fallen later in the spring than is now common in Western agriculture. At the experimental farm at Butser, where Soay sheep are kept, the lambing seasons in 1985–7 fell between 29th March and 22nd May with a mean birth date of 17th April (57 lambs; Jones 2006, 157). Two of the lambs at Cliffs End (ABG 637) were firmly associated with a human skeleton – the elderly female 3675 – and her burial (and presumably her death) can, consequently, be placed in the spring. The potential symbolism of their presence and location could be related simply to the season in which the individual died or might reflect ideas about rebirth, though various forms of symbolism may have been acting in unison (see McKinley, Chapter 2).

Comparison of the species represented within the different parts of the assemblage show only minor differences (Fig. 5.8). No articulated remains of horse or pig were found, and the mortuary rite mainly involved the remains of cattle and sheep. This is markedly different from the species proportions in the Midden Pit (2028) associated with the Late Bronze Age Northern Enclosure, where sheep/goat is less well represented and the proportion of horse slightly greater (see below). Meat consumption/ deposition as part of the mortuary rite thus differed from that undertaken in the Northern Enclosure. This undoubtedly reflects the different – though potentially related – activities being undertaken in the two areas, one associated with the dead and the other with the living.

There are, however, marked differences between the various parts of the assemblage from the Mortuary Feature in terms of body parts represented. The articulated material not directly associated with the human remains is dominated by cranial fragments and, to a lesser extent, foot bones. Cranial fragments also dominate in the small proportion of the assemblage directly associated with human remains, and the axial skeleton is better represented, while the disarticulated material is dominated by cranial fragments and limb bones.

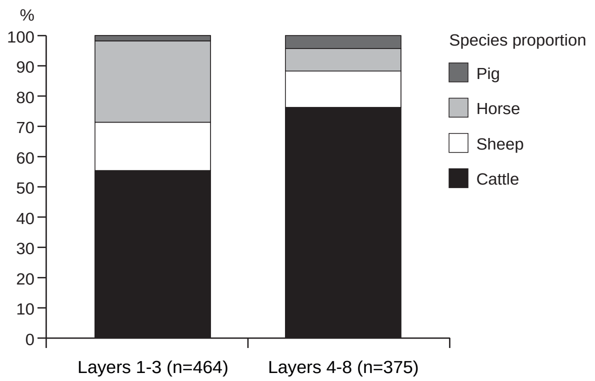



*Figure 5.8 Animal bone species proportions in different layers of the Midden Pit (2028)*

The articulated animal bones almost certainly represent placed deposits and some of the disarticulated bone found in close proximity to the human remains might also have a similar origin (see above). The placed deposits, including those associated or potentially associated with the human remains, were not the best cuts of meat; rather they are dominated by newborn lambs and those elements (ie, skulls and feet) normally discarded as primary butchery waste.

However, most of the disarticulated material from the colluvial deposits consists of redeposited general food waste that probably derived from feasting or similar activities undertaken in or around the Northern Enclosure upslope from 2018 (see McKinley, Chapter 2). It includes few cranial fragments and a high proportion of elements from the limbs and trunk, which suggests that the best cuts were eaten by the living, rather than given to the dead.

The dental age evidence from the Mortuary Pit assemblage demonstrates that the cattle remains mainly belonged to older animals: two at 15–18 months and six over 36 months of age. Apart from the neonate lambs, most of the sheep remains were of animals aged 14–27 months or 3.5–6 years, and one pig mandible belonged to a sow well over two years of age. These age ranges are similar to those encountered in the Midden Pit (2028) assemblage. The neonate lambs are the only animals that appear to have been specifically selected on age grounds to partake in the mortuary rite.

## *Early Iron Age: 5th Century cal BC*

Disarticulated animal bones recovered from spits 5–10 in the southern portion of Mortuary Feature 2018 are likely to have been deposited in the Early Iron Age, however since Late Bronze Age pottery was also recovered from these spits it is likely that some of the bone is residual (Figs 2.12, 2.18–2.20). Similarly residual material was incorporated into the backfills of graves 3655 (in the northern portion of the Mortuary

Feature) and grave 3655 in the southern portion; in both cases cattle and horse remains were recovered, with the addition of sheep/goat in the latter grave.

The fragments recovered from the spits again comprised mostly cattle (110 fragments), with smaller quantities of sheep/goat, horse, pig (including one possible wild boar femur) and dog. The presence of frog and mole bones indicates that the feature was left open for a period of time. Differences in preservation condition indicate that some of the material is redeposited, while the fracture pattern confirms the breaking of fresh bone by trampling and other human or carnivore activities.

**Mortuary Rite During the Late Early Iron Age**

The small size of the assemblage and the likelihood of much – if not all – of the material being residual Late Bronze Age, renders the reliability of any comment on the possible significance of animals within the mortuary rite of this period somewhat suspect.

The material does, however, differ from the Late Bronze Age assemblage with regard to species proportions. Horse is more strongly represented, and sheep and pig are only rarely present, but overall, cattle remain the most important species. Given the problems of residuality and differences in preservation condition between the Late Bronze Age and Early Iron Age, this apparent change in species selection for inclusion in mortuary rites should be treated with caution.

The body part representation resembles that of the disarticulated Late Bronze Age assemblage, which underlines the probability that most of this material represents redeposited Late Bronze Age bone. This is further confirmed by similarities in the dental age data for cattle and sheep.

## *Middle Iron Age: 4th–3rd Century cal BC*

**Articulated Remains**

The human subadult male buried in grave 3665 had been laid over the partial remains of a male horse (ABG 591; Figs 2.11, 2.34, Pl. 2.12) with an estimated withers height of *c.* 1.30 m. The elements recovered comprise most of the axial skeleton, both scapulae, the right humerus and the right hind limb. No butchery marks were observed on any of the bones however, careful dismemberment does not always leave traces on the bones and parts of the carcass could have been removed in an advanced stage of decomposition.

Pathological lesions were observed in the right hind limb and the spinal column. A small area of periosteal bone on the proximal dorsal side of the tibia shaft indicates an active inflammation at time of death. Nodules (inclusive of osteophytes and enthesophytes) and grooves on and around the articular surfaces of several of the foot bones could indicate an early stage of spavin, which might have led to mild lameness. Osteophytes were observed on the body surface margins of several thoracic and lumbar vertebrae and on the proximal sacrum, and three lumbar vertebrae had very slight nodules and fissures on the articular surfaces. These changes are indicative of old age, an active life or a combination of both.

Possibly associated with the mortuary rite – though showing no direct link with any human remains – are the remains of an adult male dog with a terrier-like skull morphology (ABG 455; spit 2) found *c.* 3 m to the east of grave 3678 (Figs. 2.11, 2.29, 2.33). Only the head (with mandibles and hyoid), distal part of the right radius and ulna, left front and hind paws and right front paw, together with the tail (10 vertebrae) and the *os penis* were present This suggests the deposition of a dog pelt rather than a complete skeleton. Evidence in support of this includes horizontal cut marks just above the *foramen major* that result from decapitation during skinning. The dog has an estimated withers height of *c.* 0.46 m and the remains seem to have been positioned so that it appeared that the animal was chasing its own tail (Fig. 2.33).

The dispersed remains of a juvenile human skeleton (243204) were recovered from the East-central group within the Mortuary Feature (Figs 2.29–2.30, 2.32; see McKinley, Chapter 2). These remains are believed to represent the once articulated skeleton of an individual that have been scattered by avian scavengers (see McKinley, Chapters 2, 4). Fragments of young pig and cattle bone from the same area and spit level are likely to represent incidental residual material, however part of a skull from a young adult horse (ON 264) might have originally been associated with the burial, since it was recovered from the central part of the spread of human bone.

**Disarticulated Animal Bone**

Disarticulated animal bone was recovered from the colluvial infill of 2018, most of which is from spit 4. This material was deposited during the Middle Iron Age however, residual Late Bronze Age pottery was relatively common (Figs 2.18–2.20), therefore some of the bone is also likely to derived from earlier phases of activity. Also included in the residual category are bones from around two of the human burials (3563 and 3651). While the bones recovered from two pits (3608 and 3658: Figs 2.10, 2.12) are likely to be a mixture of Middle Iron Age and residual material.

The small number of identified bones from pit 3608 are mostly from cattle and the breakage pattern is indicative of trampling and deliberate human or carnivore activity. Pit 3658 (Fig. 2.10) contained three fragments of cattle bone, as well as disarticulated human bone.

The rest of the assemblage from the colluvial infill of 2018 is dominated by young and adult cattle (75 fragments). The remains of young and adult sheep/goat, dog and horse were also present. The majority (*c.* 95%) of the bone is well preserved, which suggests that there had been minimal reworking of deposits. The breakage pattern is similar to that recorded in other areas of the site.

### *Late Iron Age/Romano-British*

A large proportion of the animal bone from Mortuary Feature 2018 (1084 fragments, 33%) derived from spits 0–3 of the colluvial fill and was deposited in the Late Iron Age/Romano-British period. As elsewhere within this feature, a substantial amount of residual Late Bronze Age pottery was found in these levels (Figs 2.18–2.20), some of the bone is therefore also likely to be residual and this is confirmed by variations in the preservation condition of bones from these levels.

The assemblage is dominated by cattle (305 fragments), with some sheep/goat (96 fragments) and horse (30 fragments), and much smaller quantities of pig, dog and red deer. Most parts of the beef and mutton carcass are represented and the disarticulated and fragmented condition of the bones suggests that the material recovered from these later levels is normal waste from different stages in the carcass reduction sequence (ie, butchery through to consumption).

Bone was also recovered from pit 2010, which cut through the upper fill of 2018, single fragments of cattle, neonatal sheep/goat, pig and red deer antler were identified. While ditch 2026 (see Leivers, Chapter 2), which is external to 2018, included single fragments of cattle and horse bone.

### *Animal Bone from Other Prehistoric Features*

#### Beaker and Early Bronze Age

The outer ditch 2285 of Barrow 1 contained a small piece of badly preserved medium-sized mammal bone. It is likely that it was redeposited. No other animal bone came from the barrows.

#### Late Bronze Age and Early Iron Age

##### ***Northern Enclosure***

Breakage patterns indicate that fresh bones were trampled. A few bones show signs of contact with fire and the incidence of gnawed bone is relative high at 10%.

##### ***Ditches***

The animal bone from ditches 2193 and 3602 of the Northern Enclosure comprised fragments of cattle, horse, sheep/goat and pig. The preserved condition of this material is similar to that from the Late Bronze Age Mortuary Feature. One instance of loose but matching epiphyses shows that at least some of this material represents primary deposits.

According to bone weight, the assemblage is dominated by post-cranial fragments, especially limb bones. The available age information is of limited analytical value but does at least indicate the presence of both juvenile and adult horse. Pathological changes (eburnation) on the proximal and distal articulations of one horse femur can be attributed to either old age or heavy work.

##### ***Entrance features***

Ditch 2027 and slot 2197 both contained a small number of cattle bones and the former also included a fragment of a right sheep/goat radius.

Most of the identified bones from pit 2469 are from mature adult cattle. Sheep/goat bones are also common and a range of ages is represented, from neonate through to adult. Other identified species include horse, pig, dog and ?common gull. Body part representation indicates that limb bones are common and this supports the idea that the Northern Enclosure was the focus for communal feasting events.

##### ***Midden Pit 2028***

The animal bone from the Midden Pit is slightly less well preserved than that from the ditches of the Northern Enclosure. Pottery analysis and soil micromorphology has shown that there is a marked difference between layers 1–3 (upper levels) and 4–9 (lower levels), with layers 1–3 having being reworked. This has not however, significantly affected bone preservation.

With regard to species proportions, Figure 5.8 shows that both phases are dominated by cattle, with a much higher proportion of horse in the second phase.

Most parts of the carcass are represented, which suggests that whole animals were slaughtered nearby and the waste from all stages in the reduction sequence (ie, from butchery through to consumption) were disposed of in the Midden Pit. The much higher proportion of leg bones in the upper layers indicates that a greater abundance of good quality meat was consumed, which suggests that pre-prepared cuts were brought to the site to supplement the meat provided by the local slaughter of livestock. The ages of the animals selected for slaughter is similar in both phases.

### *Central Enclosure*

*Outer ditch*

The animal bone from the outer ditch of the central enclosure 2203 is probably residual and was very poorly preserved; indeed only a few of the more robust/durable elements (eg, teeth) were recovered.

*Inner ditch*

The animal bone from the inner ditch is slightly better preserved that that recovered from the outer ditch, however it is also likely to have been redeposited. The identified remains include two sheep bones (mandible and metapodial), a cattle scapula and horse metapodial.

*Internal features*

A small number of bones were recovered from four cut features and spread 2311 in the interior of the enclosure. The identified fragments included a few cattle, sheep/goat, pig, horse and fish bones. The latter is considered to be intrusive and probably originates from a Saxon deposit (see Grimm and Higbee, Chapter 7).

### *Southern Enclosure*

A small number of cattle, sheep/goat, horse and fish bones were recovered from two of the ditches forming the Southern Enclosure. Most of the identified bones are from ditch 2241. The fish bones are considered to be intrusive finds of Saxon date (see Grimm and Higbee, Chapter 7).

### *Enclosures summary*

Whatever activities took place in the Central and Southern Enclosures they did not leave behind as much evidence as the activities taking place in the Northern Enclosure. This suggests either that feasting was restricted to the Northern Enclosure or that adverse soil conditions have removed all traces of such deposits in the other enclosures.

## *Animal Keeping in the Late Bronze Age/Early Iron Age*

There is little merit in attempting to interpret husbandry practices for the later phases of activity since much of this material is likely to be residual. Similarly there is no point assigning any significance to slight variations in species proportions between the main Late Bronze Age features (ie, Midden Pit 2028 and Mortuary Feature 2018) since these features clearly had different functions and are linked to activities outside the normal and everyday (ie, feasting and burial). The Late Bronze Age animal bone assemblage is unlikely therefore to be truly representative of the wider local pastoral economy, since certain animals (cattle) and age classes (lambs) were clearly preferentially selected for sacrifice.

Most of the cattle slaughtered at Cliffs End were mature animals, which suggest that secondary products such as milk, manure and traction were more important than meat production. This fits with evidence from other contemporary sites in Britain which show that cattle were intensively managed for milk (see for example, Serjeantson 2007). The sheep/goat mortality profile is skewed by the deposits associated with Mortuary Feature 2018, however high rates of morality amongst neonatal sheep/goat have been recorded at other contemporary sites such as Potterne in Wiltshire and Runnymede Bridge in Surrey (Locker 2000; Serjeantson 1996). This it is suggested is indicative of an autumn cull strategy to reduce the flock to a manageable size for the purposes of providing winter grazing or fodder (Locker 2000, 115; Hambleton 1999, 70).

### Ritual versus economic behaviours

There are two main aspects to the animal bone assemblage from Cliffs End that require further explanation (also see McKinley, Chapter 2). The first is the evidence for communal feasting from the Midden Pit 2028 in the Northern Enclosure and the second is the association of certain animals and body parts with the Mortuary Feature 2018. There is little doubt that these two activities (ie, feasting and burial) were intimately linked and this is supported by some of the strands of evidence recovered from the site, for example the inclusion of burnt human bones in both features.

The assemblage from the Midden Pit is dominated by large fragments of cattle bone, in particular the more meat-rich parts of the beef carcass. These large animals clearly provide a substantial amount of meat, which makes them more suitable candidates for slaughter at large social gatherings than other livestock. Serjeantson (1996; 2006) has outlined some of the evidence types used to distinguish the remnants of feasts from everyday meal waste from the Middle Neolithic and Late Bronze Age midden deposits at Runnymede Bridge in Surrey. In addition to the size of the food animals, she suggests that feasting waste can be differentiated on the basis of fragment size and patterns of charring, both of which generally indicate that whole animals or joints were cooked over an open fire. While accumulations of bone waste from individual family groups tend to include smaller butchery units that have been extensively exploited in soups and stews. Given these criteria it is evident that the animal bones from the Midden Pit represent the remnants of communal feasts that took place within the

Northern Enclosure and it is possible that these social gatherings were initiated to commemorate the dead, maintain social cohesion and reinforce allegiance.

The main elements of the animal bone assemblage from the Mortuary Feature are the charred remains, the pairs of newborn lambs and the cattle skulls. The charred remains, which are from near the base of Pit 3666 include bones from all three main livestock species, as well as some burnt human bone. This combination of animals with human remains suggests that for certain events the sacrifice of all three animals was deemed appropriate (see for example Pollard 2006, 138; Serjeantson 2011, 76). The significance of the location (near the base) and potential symbolism (transformation and cleansing) behind this deposit are further discussed in Chapter 6.

Several pairs of lambs were found both within and around the outside of Burial Pit 3666. These include the earliest 'foundation' deposits within the Burial Pit, the remains associated with the elderly female and the pair of slightly older lambs to the south-east of the Burial Pit. This repeated pattern – the pairing of lambs of the same age but slightly different sizes – suggests that twins or different sexes were selected for this particular rite. The spring lambing season coincides with one of the busiest and most important times in the agricultural cycle, when preparations for the future provision of food are made. The birth of new livestock, and in particular any unusual occurrences such as twin births, is likely to have been a powerful symbol of renewed fertility, as such it is easy to see why these animals were sacrifice for the common good (ie, secure future success). The lambs placed with the elderly female indicate that this symbolism was also linked to more intimate ideas concerning human and animal relationships.

There is a close physical association between cattle bones and human remains throughout British prehistory and the cattle skulls placed in and around the Burial Pit have parallels with earlier mortuary traditions. For example cattle skulls and 'head and hooves' have been recorded from a number of Late Neolithic and Early Bronze Age mortuary contexts (Serjeantson 2011, 81–4). These deposits can involve single skulls that are buried with the human remains (Robertson-Mackay 1980) or large accumulations of skulls that are 'displayed' on the surface (Deighton and Halstead 2007; Davis and Payne 1993: Davis 2008). Pollard (2006, 141) has suggested that the consumption of beef was reserved for celebrations associated with the transference of the dead to an ancestral community, in this regard the cattle skulls placed in and around the Burial Pit can be seen as token offerings that commemorate/memorialise the event.

## Bronze Age Metalwork

*by Lorraine Mepham with Jörn Schuster*

A total of 38 copper alloy objects of Bronze Age date was recovered, including 12 from the Mortuary Feature 2018, although most of these came from upper levels of the feature, dated as Middle to Late Iron Age. Fifteen objects came from enclosure ditches (2193/2469 and 2203), two from a hillwash deposit (2925), and six from other features (pits 2028, 2102 and 2812, grave 2887). In addition, an object clearly of Late Bronze Age date (an ingot) was recovered from ditch 2026, which is thought to be Late Iron Age.

The object from grave 2887, within Barrow 1, comprised a heavily corroded and (even after conservation treatment) unidentifiable lump.


*Plate 5.6 Four Late Bronze Age ingots from context 2532 (ditch 2193), Northern Enclosure including the compete plano-convex example*

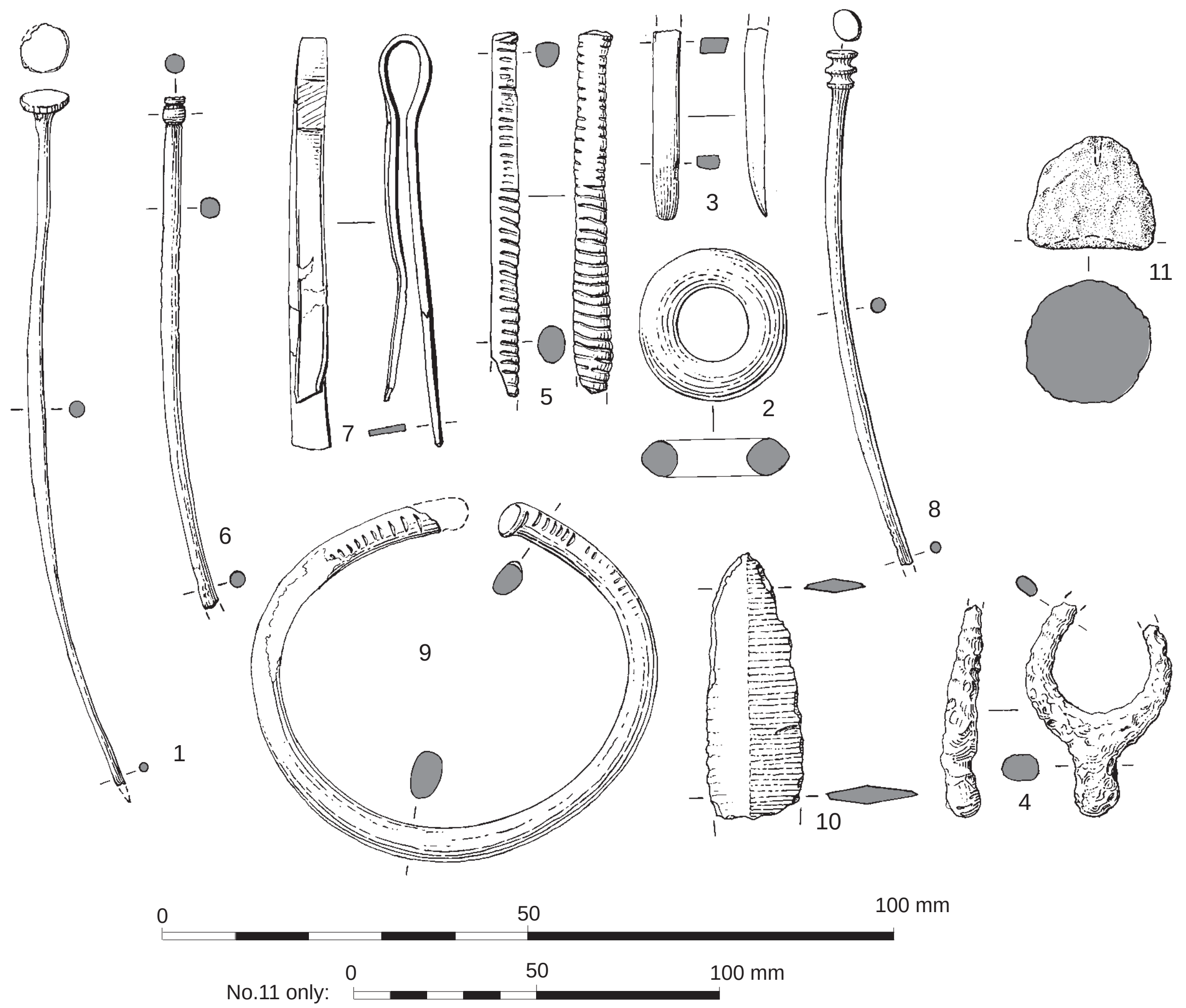



*Figure 5.9 Late Bronze Age metalwork*

Two groups of copper ingots were found (Fig. 2.5, Pl.5.6). Four came from ditch 2193 (Northern Enclosure, section 2531, Fig. 2.5), including the only complete example – a plano-convex ingot (Pl. 5.6), and nine from ditch 2203 (Central Enclosure). Two more ingots were recovered, one from Midden Pit 2028 (within the Late Bronze Age Northern Enclosure), and one from Late Iron Age ditch 2026, which is almost certainly redeposited from the Northern Enclosure ditch given its location (Fig. 2.5). Ten ingots/fragments were analysed (see Northover, below). These ingots presumably represent discrete hoards, and can be added to the significant concentration of Late Bronze Age 'Carp's Tongue' metalwork hoards already recorded around the Isle of Thanet and the Wantsum Channel (Lawson 1995, 277). Other discoveries from Thanet are summarised by Perkins (1991, 259–61) and, more recently, by Andrews *et al.* (2009, 76 fig. 2.8), and Andrews *et al.* forthcoming. Many of the Thanet hoards contain ingots, which provide evidence for an efficient industry that was recycling scrap metal, probably from both sides of the Channel.

It is difficult to say how many of the other Late Bronze Age objects recovered, if any, might have originally formed part of these putative hoards. Other objects from ditch 2193 (Northern Enclosure) comprise a small group of tiny undiagnostic fragments (recorded as a single object); no other objects came from ditches 2026 or 2203.

There were 12 metal objects from Mortuary Feature 2018, of which five can be identified with varying degrees of confidence. A nail-headed pin, missing the tip (original length *c.* 98 mm) has a flat, disc-shaped head (diameter 6 mm) placed directly on to the circular-sectioned shank, both top and underside of the head being quite flat (ON 303; Fig. 5.9, 1). Nail-headed pins of this form are known from a number of Late Bronze Age sites across England and Wales, including both hoards and settlement sites (cf. Coombs 1991, 135; 2001, fig. 10.9, 174–9), and there is evidence in the form of clay mould fragments that nail-headed pins, although with square rather than circular cross-sectioned shanks, were being cast at Highstead, near Chislet, about 12 km to the west (Needham 2007b). In addition, although too wide a subject to be covered adequately here, the continental parallels should not be overlooked (eg, Kubach 1977, taf. 81, 1328; Audouze and Courtois 1970, pl. 7, 198–205).

A small, circular-sectioned ring, with an external diameter of 20 mm, is perhaps a harness fitting (ON 428; Fig. 5.9, 2), although it appears unusually thick for such an object, with a section width of 5 mm (compare examples from the hoard from Minnis Bay, Birchington, Kent: Worsfold 1943, plate XII, no. 52; and from Flag Fen, Cambridgeshire: Coombs 2001, fig. 10.10, 215–31). Rings of similar size and thickness were found at the Breiddin hillfort, Powys, and also identified as possible harness fittings, but these were unequal-sided and were well stratified in Iron Age contexts (Coombs 1991, fig. 56, no. 164).

A short, tapering, rectangular-sectioned shaft is probably from an awl, or perhaps a chisel tang (ON 347; Fig. 5.9, 3). A ring-handled object (the ring is incomplete, but has an external diameter of 20 mm) with a short length of circular-sectioned shaft, is perhaps from a razor (ON 280; Fig. 5.9, 4).

A short length of circular-sectioned rod, broken at both ends, and with transverse incised decoration, is probably from a bracelet (ON 587; Fig. 5.9, 5). The object has a casting mark and may be unfinished. Three more rod fragments (ONs 275, 412, 527, not illustrated) could represent further pins.

One small copper alloy ring was associated with a tubular bone object (ON 607, see Grimm, *Worked Bone*, below; Pl. 5.9, 3); this was found with burial 3673 in Burial Pit 3666 within the Mortuary Feature (see Chapter 2, Fig. 2.17). The remaining objects from Midden Pit 2018 comprise small, completely undiagnostic fragments.

A second identifiable pin, a vase-headed type (ON 248; Fig. 5.9, 6) and a pair of tweezers (ON 238; Fig. 5.9, 7) came from Midden Pit 2028 (within the Northern Enclosure). The pin has a double-moulded head with a flat top and a slight bead below; there is a close parallel from Runnymede Bridge, Surrey (Needham 1991, fig. 65, M5).

Other identifiable copper alloy objects include another pin, with a multiple ribbed head (ON 436; Fig. 5.9, 8; Northern Enclosure ditch 2469). This is an unusual type, with few parallels in Britain, but is not necessarily an import, although there are continental comparanda (S Needham, pers. comm.; see, for example, Carancini 1975, taf. 57, 1910, 1917, 1921). An example from Minnis Bay (not from the hoard) has two ribs, although the head above the ribs is globular (Worsfold 1943, fig. 5).

A solid cast penannular bracelet, decorated with transverse grooves (ON 174; Fig. 5.9, 9), and a small blade fragment (ON 213; Fig. 5.9, 10) both came from hillwash deposit 2925. Late Bronze Age bracelets more commonly have expanded terminals, although two examples from the Minnis Bay hoard have blunt or constricted terminals (Worsfold 1943, plate XII, nos. 40, 43). The blade could come from a knife (compare an example from Wylye, Wiltshire: Moore and Rowlands 1972, no. 88); the possibility that it is the tip of a Middle Bronze Age rapier or dirk cannot be ruled out as this object is not well stratified, but given the paucity of evidence for Middle Bronze Age activity on the site this seems unlikely.

The very corroded fragments of another possible second ring were found (ON 116; unstratified).

All the identifiable objects can be paralleled within Late Bronze Age metalwork assemblages, including hoard sites such as those known from Thanet (Perkins 1991; Andrews *et al.* 2009). Alternatively, the provenance of several of these object types within a substantial midden deposit can be paralleled at other sites such as Potterne, Wiltshire (Gingell 2000); the Potterne assemblage contained objects which could be largely assigned to the Ewart Park tradition, and included awls, tweezers and pins, all of which types are known from Late Bronze Age settlement sites such as Runnymede Bridge.

### *A Probable Lead Alloy Weight from Burial Pit 3666*

*by Jörn Schuster*

A small lead alloy cone (ON 600; Fig. 5.9, 11) was found in spit 9 (at 16.54 m OD) in the central area of the Burial Pit, immediately to the north-west of – but not necessarily associated with – burial 3680 (local, subadult ?female) whose head rested on a cattle skull (Fig. 2.16). There is nothing to suggest that the object found its way into the pit as the result of later (eg, Iron Age or Anglo-Saxon) disturbance, and it can therefore be assumed that it was deposited in the pit as part of the funerary deposits made there in the 9th century cal BC (see above McKinley, Chapter 2). As such, the object is of some significance as the number of Late Bronze Age lead objects known from Britain remains very small (cf. Needham and Hook 1988, appendix 1).

The object weighs 144 g, has convex sides, a concave base, and a *c.* 8 mm deep hole at the top. Its surface is irregular, pitted, with a powdery texture and off-white/beige colour. The only morphologically comparable lead object known from a contemporary, Late Bronze Age, site in Britain is a lead cone from Runnymede Bridge, Surrey (Needham and Hook 1988, 261 fig. 2,4). However, the Runnymede cone has more or less straight sides and ends in what appears to be the remains of a snapped-off feeder of a casting: it can therefore best be interpreted as a casting sprue.

The hole at the top of ON 600 may have been the socket for some sort of fitting, perhaps a suspension ring; the object may then have served as a plumb bob or weight. It is certainly too light to have been used as a sounding lead for maritime purpose; such objects frequently weigh several kilograms and tend to have a well formed cavity at the bottom to hold tallow or another sticky substance designed to bring up samples of the sea bed as an aid for navigation (A Firth pers. comm.; Oleson 2008, 118). While the shape cannot be matched among known weights from Bronze Age Europe, its weight of 144 g is very close (1.6% under-weight) to 12 units of a denomination of 12.2 g recognised as a basic unit in the Late Bronze Age Terramare and Pfahlbau Cultures in the Po-Valley and Western Alpine region, respectively (Pare 1999, 500–5 and tab. 15, series A). This circumstance, taken on its own, may not prove ON 600's identification as a weight; however, it would not be the only metrological object retrieved from the Morturary Feature (cf. bone balance beam ON 257; see Schuster, *Worked bone*, below).

This is the only lead object recovered from a prehistoric context at Cliffs End, and only one other lead object, a small folded strip, was found in Anglo-Saxon pit 2182 (see Schuster, Chapter 7). This may suggest that there might have been a negative selection of lead objects because of the difficulty of their physical recognition, resulting in the more amorphous dull-coloured pieces to be passed by as stones (cf. Needham and Hook 1988, 265). While this possibility cannot be excluded in every case, it should be mentioned that the retrieval rate of lead objects from Roman and later sites by similar teams of excavators is frequently much higher, and the dearth of lead objects at Cliffs End probably reflects a real absence.

**Catalogue of illustrated objects (Fig. 5.9)**

1. Nail-headed pin. ON 303, context 143603, Mortuary Feature 2018
2. Small ring. ON 428, context 204405, Mortuary Feature 2018
3. Awl or chisel tang section. ON 347, context 163803, Mortuary Feature 2018
4. Ring handle. ON 280, context 203003, Mortuary Feature 2018
5. Bracelet fragment (unfinished?) with transverse incised decoration. ON 587, context 263404, Mortuary Feature 2018
6. Vase-headed pin with double-moulded head. ON 248, context 2118, Midden Pit 2028 layer 4
7. Tweezers. ON 238, context 2116, Midden Pit 2028 layer 1
8. Pin with multiple ribbing at head. ON 436, context 2470, pit 2469
9. Penannular bracelet. ON 174, hillwash deposit 2925
10. Blade, probably from knife. ON 213, hillwash deposit 2925
11. Lead ?weight. ON 600, context 204409, Burial Pit 3666 in Mortuary Feature 2018

## Slag

*by Phil Andrews*

The excavation produced approximately 3 kg of material that was initially classified as possible metalworking debris. Of this total, 0.98 kg probably represents iron smithing slag, predominantly from Anglo-Saxon contexts (see Schuster, Chapter 7), but including 59 g of amorphous, non-diagnostic slag recovered from context 3636 (Mortuary Feature 2018), which cannot certainly be identified as iron smithing slag. In addition to this, there is a rather larger quantity (2.031 kg) of grey vesicular material that has been classified as fuel ash slag, virtually all from Late Bronze Age contexts, with almost half from contexts 3231 (Midden Pit 2028 layer 2; 0.381 kg), 2448 (Central Enclosure ditch 2434/2203; 0.307 kg) and 2351 (pit 2340; 0.305 kg). This material has been formed in high temperatures but is not indicative of metalworking. There are also single, small fragments of fuel ash slag, cinder, coke, natural concretion and corrosion product.

## Analysis and Metallography of Ingots and Metalworking Waste

*by J. Peter Northover*

Ten pieces of copper-based metal excavated from Late Bronze Age contexts (see Mepham, above) were submitted for metallurgical study. They comprised a complete plano-convex copper ingot, ingot fragments and two pieces of apparent metalworking waste.

### *Sampling and Analysis*

A small sample was cut from each object with a jeweller's saw (samples numbers are given in Table 5.10).

The samples were hot-mounted in a carbon-filled thermosetting resin, ground and polished to a 1 mm diamond finish. Analysis was by electron probe microanalysis with wavelength dispersive spectrometry; operating conditions were an accelerating voltage of 25 kV, a beam current of 30 nA, and an X-ray take-off angle of 40°. Seventeen elements were analysed as indicated in Table 5.11; counting times were 10s per element and pure element and mineral standards were used. Detection limits were 100–200 ppm for all elements.

| Sample | Object Number | Object | Context | Feature | Plate |
|---|---|---|---|---|---|
| CE 1 | 111 | Bronze sprue | 2080 | Ditch 2026 | 5.7a–b |
| CE 2 | 156 | Dribble | 2718 | Ditch 2203 | - |
| CE 3 | 155 | Ingot | 2718 | Ditch 2203 | - |
| CE 4 | 156 | Ingot fragment | 2718 | Ditch 2203 | - |
| CE 5 | 154/2 | Ingot fragment | 2532 | Ditch 2193 | - |
| CE 6 | 154/1 | Ingot | 2532 | Ditch 2193 | 5.7c–d |
| CE 7 | 154/3 | Ingot fragment | 2532 | Ditch 2193 | 5.8c–d |
| CE 8 | 154/4 | Ingot fragment | 2532 | Ditch 2193 | - |
| CE 9 | 201 | Ingot fragment | 2814 | Pit 2812 | 5.8a–b |
| CE 10 | 138 | Ingot fragment | 2029 | Midden Pit 2028 | - |

*Table 5.10 Metallographic samples*

| Analysis | Context | ON | Object | Fe | Co | Ni | Cu | Zn | As | Sb | Sn | Ag | Bi | Pb | Au | Cd | S | Al | Si | Mn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CE 1/1 | 2080 | 111 | Bronze sprue | 0.06 | 0.01 | 0.03 | 89.90 | 0.00 | 0.26 | 0.00 | 9.60 | 0.00 | 0.04 | 0.07 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 |
| CE 1/2 | | | | 0.07 | 0.00 | 0.04 | 94.50 | 0.01 | 0.11 | 0.00 | 5.08 | 0.04 | 0.08 | 0.02 | 0.05 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 |
| CE 1/3 | | | | 0.06 | 0.06 | 0.02 | 89.87 | 0.03 | 0.20 | 0.03 | 9.56 | 0.01 | 0.00 | 0.00 | 0.08 | 0.00 | 0.06 | 0.00 | 0.01 | 0.01 |
| CE 1/4 | | | | 0.03 | 0.02 | 0.02 | 90.31 | 0.05 | 0.26 | 0.00 | 9.26 | 0.01 | 0.00 | 0.00 | 0.04 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| CE 1/5 | | | | 0.07 | 0.03 | 0.06 | 91.95 | 0.02 | 0.20 | 0.00 | 7.47 | 0.01 | 0.00 | 0.00 | 0.02 | 0.00 | 0.12 | 0.00 | 0.00 | 0.04 |
| CE 1/6 | | | | 0.09 | 0.03 | 0.02 | 85.08 | 0.00 | 0.32 | 0.00 | 13.83 | 0.00 | 0.04 | 0.32 | 0.04 | 0.00 | 0.20 | 0.00 | 0.00 | 0.02 |
| CE 1/7 | | | | 0.07 | 0.03 | 0.10 | 89.06 | 0.01 | 0.27 | 0.01 | 10.10 | 0.01 | 0.02 | 0.14 | 0.02 | 0.00 | 0.16 | 0.00 | 0.00 | 0.00 |
| CE 1/8 | | | | 0.04 | 0.02 | 0.03 | 88.53 | 0.00 | 0.24 | 0.04 | 10.36 | 0.00 | 0.00 | 0.25 | 0.02 | 0.00 | 0.47 | 0.00 | 0.00 | 0.00 |
| **CE 1/Mean** | **2080** | **111** | **Bronze sprue** | **0.06** | **0.03** | **0.04** | **89.90** | **0.01** | **0.23** | **0.01** | **9.41** | **0.01** | **0.02** | **0.10** | **0.04** | **0.00** | **0.13** | **0.00** | **0.00** | **0.01** |
| CE 2/1 | 2718 | 156 | Dribble? | 0.00 | 0.01 | 0.03 | 99.22 | 0.03 | 0.02 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.03 | 0.02 | 0.59 | 0.00 | 0.00 | 0.01 |
| CE 2/2 | | | | 0.01 | 0.00 | 0.00 | 97.21 | 0.00 | 0.03 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 2.70 | 0.00 | 0.01 | 0.00 |
| CE 2/3 | | | | 0.00 | 0.01 | 0.00 | 98.24 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 1.69 | 0.00 | 0.00 | 0.02 |
| CE 2/4 | | | | 0.01 | 0.00 | 0.00 | 99.06 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.89 | 0.00 | 0.00 | 0.00 |
| CE 2/5 | | | | 0.01 | 0.00 | 0.01 | 98.80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.02 | 1.15 | 0.00 | 0.00 | 0.00 |
| CE 2/6 | | | | 0.02 | 0.02 | 0.00 | 98.53 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.38 | 0.01 | 0.00 | 0.00 |
| CE 2/7 | | | | 0.00 | 0.00 | 0.00 | 98.61 | 0.00 | 0.00 | 0.02 | 0.00 | 0.03 | 0.00 | 0.00 | 0.04 | 0.00 | 1.29 | 0.00 | 0.00 | 0.01 |
| CE 2/8 | | | | 0.00 | 0.00 | 0.00 | 98.93 | 0.00 | 0.00 | 0.00 | 0.02 | 0.02 | 0.00 | 0.00 | 0.00 | 0.12 | 0.91 | 0.00 | 0.00 | 0.00 |
| **CE 2/Mean** | **2718** | **156** | **Dribble?** | **0.00** | **0.01** | **0.00** | **98.58** | **0.01** | **0.01** | **0.01** | **0.00** | **0.01** | **0.00** | **0.00** | **0.02** | **0.02** | **1.33** | **0.00** | **0.00** | **0.01** |
| CE 3/1 | 2718 | 155 | Ingot | 0.01 | 0.00 | 0.05 | 98.91 | 0.00 | 0.01 | 0.02 | 0.00 | 0.01 | 0.00 | 0.00 | 0.04 | 0.01 | 0.89 | 0.00 | 0.00 | 0.03 |
| CE 3/2 | | | | 0.00 | 0.00 | 0.02 | 98.56 | 0.00 | 0.02 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.33 | 0.00 | 0.02 | 0.01 |
| CE 3/3 | | | | 0.00 | 0.01 | 0.02 | 97.66 | 0.00 | 0.03 | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.02 | 0.03 | 2.17 | 0.00 | 0.00 | 0.01 |
| CE 3/4 | | | | 0.00 | 0.00 | 0.06 | 98.06 | 0.00 | 0.01 | 0.06 | 0.00 | 0.10 | 0.00 | 0.00 | 0.05 | 0.00 | 1.64 | 0.00 | 0.02 | 0.00 |
| CE 3/5 | | | | 0.00 | 0.00 | 0.08 | 98.58 | 0.00 | 0.00 | 0.03 | 0.00 | 0.06 | 0.00 | 0.00 | 0.01 | 0.00 | 1.24 | 0.00 | 0.00 | 0.00 |
| CE 3/6 | | | | 0.00 | 0.00 | 0.04 | 98.83 | 0.00 | 0.00 | 0.03 | 0.00 | 0.03 | 0.00 | 0.00 | 0.02 | 0.03 | 1.00 | 0.00 | 0.00 | 0.02 |
| CE 3/7 | | | | 0.00 | 0.00 | 0.04 | 98.22 | 0.00 | 0.02 | 0.05 | 0.00 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 0.00 | 0.00 | 0.01 |
| CE 3/8 | | | | 0.00 | 0.00 | 0.03 | 98.32 | 0.03 | 0.00 | 0.05 | 0.00 | 0.10 | 0.00 | 0.00 | 0.10 | 0.02 | 1.35 | 0.00 | 0.00 | 0.00 |
| **CE 3/Mean** | **2718** | **155** | **Ingot** | **0.00** | **0.00** | **0.04** | **98.39** | **0.00** | **0.01** | **0.04** | **0.00** | **0.05** | **0.00** | **0.00** | **0.03** | **0.01** | **1.40** | **0.00** | **0.01** | **0.01** |
| CE 4/1 | 2718 | 156 | Ingot fragm. | 0.00 | 0.03 | 0.01 | 98.09 | 0.00 | 0.00 | 0.04 | 0.00 | 0.09 | 0.00 | 0.10 | 0.04 | 0.01 | 1.57 | 0.00 | 0.01 | 0.01 |
| CE 4/2 | | | | 0.00 | 0.00 | 0.00 | 97.61 | 0.00 | 0.00 | 0.07 | 0.00 | 0.11 | 0.00 | 0.00 | 0.01 | 0.04 | 2.16 | 0.00 | 0.00 | 0.00 |
| CE 4/3 | | | | 0.01 | 0.00 | 0.01 | 99.05 | 0.00 | 0.00 | 0.04 | 0.00 | 0.08 | 0.00 | 0.19 | 0.00 | 0.00 | 0.62 | 0.00 | 0.00 | 0.00 |
| CE 4/4 | | | | 0.00 | 0.02 | 0.00 | 98.86 | 0.06 | 0.02 | 0.02 | 0.00 | 0.02 | 0.00 | 0.00 | 0.04 | 0.01 | 0.94 | 0.00 | 0.00 | 0.00 |
| CE 4/5 | | | | 0.00 | 0.01 | 0.02 | 98.89 | 0.00 | 0.00 | 0.03 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 | 0.04 | 0.93 | 0.01 | 0.00 | 0.00 |
| CE 4/6 | | | | 0.00 | 0.01 | 0.02 | 99.22 | 0.00 | 0.00 | 0.02 | 0.00 | 0.08 | 0.00 | 0.00 | 0.02 | 0.00 | 0.58 | 0.00 | 0.02 | 0.02 |
| CE 4/7 | | | | 0.00 | 0.01 | 0.01 | 99.69 | 0.00 | 0.00 | 0.01 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.00 | 0.00 | 0.00 |
| CE 4/8 | | | | 0.00 | 0.00 | 0.00 | 98.28 | 0.01 | 0.00 | 0.07 | 0.00 | 0.16 | 0.00 | 0.00 | 0.06 | 0.04 | 1.39 | 0.00 | 0.00 | 0.00 |
| **CE 4/Mean** | **2718** | **156** | **Ingot fragm.** | **0.00** | **0.01** | **0.01** | **98.71** | **0.01** | **0.00** | **0.04** | **0.00** | **0.09** | **0.00** | **0.04** | **0.02** | **0.02** | **1.05** | **0.00** | **0.00** | **0.00** |
| CE 5/1 | 2532 | 154/2 | Ingot fragm. | 0.00 | 0.00 | 0.11 | 98.80 | 0.00 | 0.09 | 0.00 | 0.02 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.92 | 0.00 | 0.00 | 0.02 |
| CE 5/2 | | | | 0.00 | 0.00 | 0.09 | 99.56 | 0.00 | 0.08 | 0.00 | 0.00 | 0.04 | 0.01 | 0.00 | 0.00 | 0.02 | 0.22 | 0.00 | 0.00 | 0.00 |
| CE 5/3 | | | | 0.00 | 0.00 | 0.06 | 97.23 | 0.00 | 0.40 | 0.05 | 0.21 | 0.11 | 0.04 | 0.29 | 0.03 | 0.00 | 1.56 | 0.00 | 0.01 | 0.00 |
| CE 5/4 | | | | 0.01 | 0.01 | 0.10 | 96.83 | 0.01 | 0.05 | 0.00 | 0.02 | 0.05 | 0.00 | 0.00 | 0.01 | 0.03 | 2.87 | 0.00 | 0.02 | 0.00 |
| CE 5/5 | | | | 0.00 | 0.01 | 0.10 | 98.96 | 0.00 | 0.09 | 0.00 | 0.00 | 0.07 | 0.00 | 0.00 | 0.04 | 0.00 | 0.73 | 0.00 | 0.00 | 0.00 |
| CE 5/6 | | | | 0.02 | 0.01 | 0.06 | 97.30 | 0.00 | 0.07 | 0.00 | 0.01 | 0.02 | 0.00 | 0.00 | 0.01 | 0.03 | 2.43 | 0.00 | 0.03 | 0.00 |
| CE 5/7 | | | | 0.01 | 0.01 | 0.04 | 99.17 | 0.00 | 0.05 | 0.00 | 0.00 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.61 | 0.00 | 0.00 | 0.00 |
| CE 5/8 | | | | 0.01 | 0.01 | 0.07 | 99.32 | 0.00 | 0.10 | 0.00 | 0.00 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.34 | 0.00 | 0.02 | 0.01 |
| **CE 5/Mean** | **2532** | **154/2** | **Ingot fragm.** | **0.01** | **0.01** | **0.08** | **98.40** | **0.00** | **0.11** | **0.01** | **0.03** | **0.07** | **0.01** | **0.04** | **0.01** | **0.01** | **1.21** | **0.00** | **0.01** | **0.00** |
| CE 6/1 | 2532 | 154/1 | Ingot fragm. | 0.00 | 0.01 | 0.15 | 97.29 | 0.00 | 0.03 | 0.19 | 0.00 | 0.15 | 0.00 | 0.57 | 0.05 | 0.00 | 1.55 | 0.00 | 0.01 | 0.00 |
| CE 6/2 | | | | 0.00 | 0.00 | 0.19 | 98.56 | 0.00 | 0.00 | 0.09 | 0.00 | 0.25 | 0.00 | 0.18 | 0.03 | 0.00 | 0.69 | 0.00 | 0.00 | 0.00 |
| CE 6/3 | | | | 0.00 | 0.00 | 0.16 | 99.20 | 0.00 | 0.01 | 0.09 | 0.00 | 0.21 | 0.00 | 0.06 | 0.00 | 0.00 | 0.25 | 0.00 | 0.00 | 0.01 |
| CE 6/4 | | | | 0.00 | 0.00 | 0.17 | 98.71 | 0.00 | 0.00 | 0.03 | 0.00 | 0.11 | 0.00 | 0.06 | 0.00 | 0.01 | 0.90 | 0.00 | 0.00 | 0.00 |
| CE 6/5 | | | | 0.00 | 0.00 | 0.18 | 99.24 | 0.00 | 0.01 | 0.10 | 0.00 | 0.20 | 0.00 | 0.04 | 0.10 | 0.04 | 0.08 | 0.01 | 0.00 | 0.00 |
| CE 6/6 | | | | 0.00 | 0.00 | 0.19 | 98.75 | 0.02 | 0.04 | 0.04 | 0.00 | 0.07 | 0.00 | 0.18 | 0.04 | 0.00 | 0.66 | 0.00 | 0.00 | 0.01 |
| CE 6/7 | | | | 0.01 | 0.00 | 0.17 | 95.86 | 0.00 | 0.00 | 0.08 | 0.00 | 0.24 | 0.00 | 0.56 | 0.06 | 0.07 | 2.94 | 0.00 | 0.00 | 0.00 |
| CE 6/8 | | | | 0.02 | 0.00 | 0.18 | 98.75 | 0.00 | 0.03 | 0.08 | 0.00 | 0.17 | 0.00 | 0.22 | 0.09 | 0.02 | 0.44 | 0.00 | 0.00 | 0.00 |
| **CE 6/Mean** | **2532** | **154/1** | **Ingot fragm.** | **0.00** | **0.00** | **0.17** | **98.30** | **0.00** | **0.01** | **0.09** | **0.00** | **0.18** | **0.00** | **0.23** | **0.05** | **0.02** | **0.94** | **0.00** | **0.00** | **0.00** |
| CE 7/1 | 2532 | 154/3 | Ingot fragm. | 0.00 | 0.00 | 0.09 | 98.28 | 0.00 | 0.00 | 0.04 | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 | 0.10 | 1.43 | 0.00 | 0.00 | 0.00 |
| CE 7/2 | | | | 0.02 | 0.02 | 0.07 | 99.05 | 0.00 | 0.02 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.03 | 0.03 | 0.72 | 0.00 | 0.00 | 0.01 |
| CE 7/3 | | | | 0.00 | 0.01 | 0.05 | 98.30 | 0.00 | 0.01 | 0.02 | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 | 0.06 | 1.49 | 0.00 | 0.00 | 0.00 |
| CE 7/4 | | | | 0.02 | 0.00 | 0.06 | 98.88 | 0.01 | 0.01 | 0.00 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 | 0.06 | 0.88 | 0.00 | 0.01 | 0.01 |
| CE 7/5 | | | | 0.00 | 0.00 | 0.05 | 98.50 | 0.02 | 0.02 | 0.03 | 0.00 | 0.06 | 0.00 | 0.00 | 0.00 | 0.01 | 1.29 | 0.00 | 0.00 | 0.00 |
| CE 7/6 | | | | 0.00 | 0.00 | 0.05 | 98.72 | 0.00 | 0.00 | 0.01 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 1.15 | 0.00 | 0.02 | 0.00 |
| CE 7/7 | | | | 0.01 | 0.00 | 0.08 | 99.23 | 0.00 | 0.00 | 0.02 | 0.00 | 0.07 | 0.00 | 0.00 | 0.06 | 0.00 | 0.51 | 0.00 | 0.00 | 0.01 |
| CE 7/8 | | | | 0.00 | 0.00 | 0.05 | 98.55 | 0.00 | 0.02 | 0.04 | 0.00 | 0.06 | 0.00 | 0.00 | 0.01 | 0.01 | 1.25 | 0.00 | 0.00 | 0.00 |
| **CE 7/Mean** | **2532** | **154/3** | **Ingot fragm.** | **0.01** | **0.00** | **0.06** | **98.69** | **0.00** | **0.01** | **0.02** | **0.00** | **0.06** | **0.00** | **0.00** | **0.01** | **0.03** | **1.09** | **0.00** | **0.00** | **0.00** |

*Table 5.11 Results of electron probe microanalysis with wavelength dispersive spectrometry*

| Analysis | Context | ON | Object | Fe | Co | Ni | Cu | Zn | As | Sb | Sn | Ag | Bi | Pb | Au | Cd | S | Al | Si | Mn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CE 8/1 | 2532 | 154/4 | Ingot fragm. | 0.00 | 0.00 | 0.07 | 98.59 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 1.31 | 0.00 | 0.00 | 0.00 |
| CE 8/2 | | | | 0.00 | 0.00 | 0.04 | 98.19 | 0.03 | 0.04 | 0.03 | 0.00 | 0.01 | 0.00 | 0.00 | 0.13 | 0.00 | 1.52 | 0.00 | 0.00 | 0.00 |
| CE 8/3 | | | | 0.00 | 0.00 | 0.03 | 99.19 | 0.00 | 0.02 | 0.00 | 0.05 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.65 | 0.00 | 0.00 | 0.00 |
| CE 8/4 | | | | 0.02 | 0.00 | 0.03 | 98.61 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 1.23 | 0.01 | 0.00 | 0.00 |
| CE 8/5 | | | | 0.01 | 0.00 | 0.06 | 98.87 | 0.00 | 0.00 | 0.04 | 0.01 | 0.06 | 0.00 | 0.00 | 0.00 | 0.05 | 0.87 | 0.01 | 0.00 | 0.01 |
| CE 8/6 | | | | 0.00 | 0.01 | 0.08 | 98.58 | 0.00 | 0.00 | 0.03 | 0.00 | 0.10 | 0.00 | 0.01 | 0.00 | 0.00 | 1.19 | 0.01 | 0.00 | 0.01 |
| CE 8/7 | | | | 0.00 | 0.00 | 0.03 | 98.80 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.08 | 1.03 | 0.01 | 0.00 | 0.00 |
| CE 8/8 | | | | 0.00 | 0.00 | 0.07 | 98.32 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.34 | 0.08 | 0.00 | 1.17 | 0.00 | 0.01 | 0.00 |
| **CE 8/Mean** | **2532** | **154/4** | **Ingot fragm.** | **0.00** | **0.00** | **0.05** | **98.64** | **0.00** | **0.01** | **0.02** | **0.01** | **0.03** | **0.00** | **0.04** | **0.03** | **0.03** | **1.12** | **0.00** | **0.00** | **0.00** |
| CE 9/1 | 2814 | 201 | Ingot fragm. | 0.01 | 0.00 | 0.00 | 98.90 | 0.00 | 0.60 | 0.06 | 0.01 | 0.11 | 0.00 | 0.01 | 0.00 | 0.00 | 0.29 | 0.00 | 0.00 | 0.01 |
| CE 9/2 | | | | 0.00 | 0.00 | 0.00 | 98.10 | 0.00 | 0.54 | 0.09 | 0.06 | 0.12 | 0.00 | 0.08 | 0.02 | 0.04 | 0.91 | 0.00 | 0.00 | 0.03 |
| CE 9/3 | | | | 0.00 | 0.00 | 0.00 | 98.89 | 0.01 | 0.57 | 0.03 | 0.00 | 0.07 | 0.00 | 0.00 | 0.03 | 0.00 | 0.40 | 0.00 | 0.00 | 0.00 |
| CE 9/4 | | | | 0.00 | 0.04 | 0.05 | 98.33 | 0.00 | 0.47 | 0.02 | 0.05 | 0.13 | 0.00 | 0.11 | 0.00 | 0.01 | 0.78 | 0.00 | 0.00 | 0.02 |
| CE 9/5 | | | | 0.00 | 0.00 | 0.04 | 98.11 | 0.00 | 0.48 | 0.02 | 0.00 | 0.06 | 0.00 | 0.00 | 0.05 | 0.00 | 1.24 | 0.00 | 0.00 | 0.00 |
| CE 9/6 | | | | 0.00 | 0.01 | 0.00 | 98.20 | 0.00 | 0.56 | 0.03 | 0.03 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 1.04 | 0.00 | 0.00 | 0.01 |
| CE 9/7 | | | | 0.00 | 0.00 | 0.05 | 98.37 | 0.00 | 0.67 | 0.04 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.83 | 0.00 | 0.00 | 0.00 |
| CE 9/8 | | | | 0.00 | 0.01 | 0.00 | 96.94 | 0.00 | 0.74 | 0.15 | 0.16 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 1.95 | 0.00 | 0.00 | 0.00 |
| **CE 9/Mean** | **2814** | **201** | **Ingot fragm.** | **0.00** | **0.01** | **0.02** | **98.23** | **0.00** | **0.58** | **0.06** | **0.04** | **0.08** | **0.00** | **0.03** | **0.01** | **0.01** | **0.93** | **0.00** | **0.00** | **0.01** |
| CE 10/1 | 2029 | 138 | Ingot fragm. | 0.00 | 0.00 | 0.03 | 99.02 | 0.00 | 0.01 | 0.00 | 0.01 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.84 | 0.00 | 0.00 | 0.01 |
| CE 10/2 | | | | 0.00 | 0.00 | 0.01 | 99.06 | 0.00 | 0.00 | 0.03 | 0.00 | 0.04 | 0.00 | 0.00 | 0.01 | 0.00 | 0.83 | 0.01 | 0.00 | 0.00 |
| CE 10/3 | | | | 0.00 | 0.00 | 0.02 | 99.03 | 0.03 | 0.01 | 0.01 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.83 | 0.00 | 0.00 | 0.03 |
| CE 10/4 | | | | 0.00 | 0.00 | 0.01 | 98.98 | 0.00 | 0.00 | 0.02 | 0.01 | 0.08 | 0.00 | 0.00 | 0.00 | 0.07 | 0.80 | 0.00 | 0.00 | 0.03 |
| CE 10/5 | | | | 0.00 | 0.00 | 0.00 | 99.05 | 0.00 | 0.00 | 0.02 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.86 | 0.00 | 0.02 | 0.00 |
| CE 10/6 | | | | 0.01 | 0.01 | 0.00 | 99.02 | 0.00 | 0.00 | 0.00 | 0.01 | 0.13 | 0.00 | 0.00 | 0.00 | 0.03 | 0.78 | 0.00 | 0.01 | 0.00 |
| CE 10/7 | | | | 0.00 | 0.02 | 0.02 | 98.89 | 0.00 | 0.03 | 0.02 | 0.00 | 0.03 | 0.00 | 0.00 | 0.03 | 0.00 | 0.95 | 0.00 | 0.01 | 0.00 |
| CE 10/8 | | | | 0.00 | 0.00 | 0.00 | 98.75 | 0.00 | 0.00 | 0.02 | 0.00 | 0.07 | 0.00 | 0.00 | 0.12 | 0.02 | 1.04 | 0.00 | 0.00 | 0.00 |
| **CE 10/Mean** | **2029** | **138** | **Ingot fragm.** | **0.00** | **0.00** | **0.01** | **98.98** | **0.00** | **0.01** | **0.02** | **0.00** | **0.06** | **0.00** | **0.00** | **0.02** | **0.01** | **0.87** | **0.00** | **0.01** | **0.01** |
| CE 1/Mean | 2080 | 111 | Bronze sprue | 0.06 | 0.03 | 0.04 | 89.90 | 0.01 | 0.23 | 0.01 | 9.41 | 0.01 | 0.02 | 0.10 | 0.04 | 0.00 | 0.13 | 0.00 | 0.00 | 0.01 |
| CE 2/Mean | 2718 | 156 | Dribble? | 0.00 | 0.01 | 0.00 | 98.58 | 0.01 | 0.01 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.02 | 0.02 | 1.33 | 0.00 | 0.00 | 0.01 |
| CE 3/Mean | 2718 | 155 | Ingot | 0.00 | 0.00 | 0.04 | 98.39 | 0.00 | 0.01 | 0.04 | 0.00 | 0.05 | 0.00 | 0.00 | 0.03 | 0.01 | 1.40 | 0.00 | 0.01 | 0.01 |
| CE 4/Mean | 2718 | 156 | Ingot fragm. | 0.00 | 0.01 | 0.01 | 98.71 | 0.01 | 0.00 | 0.04 | 0.00 | 0.09 | 0.00 | 0.04 | 0.02 | 0.02 | 1.05 | 0.00 | 0.00 | 0.00 |
| CE 5/Mean | 2532 | 154/2 | Ingot fragm. | 0.01 | 0.01 | 0.08 | 98.40 | 0.00 | 0.11 | 0.01 | 0.03 | 0.07 | 0.01 | 0.04 | 0.01 | 0.01 | 1.21 | 0.00 | 0.01 | 0.00 |
| CE 6/Mean | 2532 | 154/1 | Ingot fragm. | 0.00 | 0.00 | 0.17 | 98.30 | 0.00 | 0.01 | 0.09 | 0.00 | 0.18 | 0.00 | 0.23 | 0.05 | 0.02 | 0.94 | 0.00 | 0.00 | 0.00 |
| CE 7/Mean | 2532 | 154/3 | Ingot fragm. | 0.01 | 0.00 | 0.06 | 98.69 | 0.00 | 0.01 | 0.02 | 0.00 | 0.06 | 0.00 | 0.00 | 0.01 | 0.03 | 1.09 | 0.00 | 0.00 | 0.00 |
| CE 8/Mean | 2532 | 154/4 | Ingot fragm. | 0.00 | 0.00 | 0.05 | 98.64 | 0.00 | 0.01 | 0.02 | 0.01 | 0.03 | 0.00 | 0.04 | 0.03 | 0.03 | 1.12 | 0.00 | 0.00 | 0.00 |
| CE 9/Mean | 2814 | 201 | Ingot fragm. | 0.00 | 0.01 | 0.02 | 98.23 | 0.00 | 0.58 | 0.06 | 0.04 | 0.08 | 0.00 | 0.03 | 0.01 | 0.01 | 0.93 | 0.00 | 0.00 | 0.01 |
| CE 10/Mean | 2029 | 138 | Ingot fragm. | 0.00 | 0.00 | 0.01 | 98.98 | 0.00 | 0.01 | 0.02 | 0.00 | 0.06 | 0.00 | 0.00 | 0.02 | 0.01 | 0.87 | 0.00 | 0.01 | 0.01 |
| CE 1/Mean | 2080 | 111 | Bronze sprue | 0.06 | 0.03 | 0.04 | 89.90 | 0.01 | 0.23 | 0.01 | 9.41 | 0.01 | 0.02 | 0.10 | 0.04 | 0.00 | 0.13 | 0.00 | 0.00 | 0.01 |
| CE 2/Mean | 2718 | 156 | Dribble? | 0.00 | 0.01 | 0.00 | 98.58 | 0.01 | 0.01 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.02 | 0.02 | 1.33 | 0.00 | 0.00 | 0.01 |
| CE 4/Mean | 2718 | 156 | Ingot fragm. | 0.00 | 0.01 | 0.01 | 98.71 | 0.01 | 0.00 | 0.04 | 0.00 | 0.09 | 0.00 | 0.04 | 0.02 | 0.02 | 1.05 | 0.00 | 0.00 | 0.00 |
| CE 10/Mean | 2029 | 138 | Ingot fragm. | 0.00 | 0.00 | 0.01 | 98.98 | 0.00 | 0.01 | 0.02 | 0.00 | 0.06 | 0.00 | 0.00 | 0.02 | 0.01 | 0.87 | 0.00 | 0.01 | 0.01 |
| CE 3/Mean | 2718 | 155 | Ingot | 0.00 | 0.00 | 0.04 | 98.39 | 0.00 | 0.01 | 0.04 | 0.00 | 0.05 | 0.00 | 0.00 | 0.03 | 0.01 | 1.40 | 0.00 | 0.01 | 0.01 |
| CE 7/Mean | 2532 | 154/3 | Ingot fragm. | 0.01 | 0.00 | 0.06 | 98.69 | 0.00 | 0.01 | 0.02 | 0.00 | 0.06 | 0.00 | 0.00 | 0.01 | 0.03 | 1.09 | 0.00 | 0.00 | 0.00 |
| CE 8/Mean | 2532 | 154/4 | Ingot fragm. | 0.00 | 0.00 | 0.05 | 98.64 | 0.00 | 0.01 | 0.02 | 0.01 | 0.03 | 0.00 | 0.04 | 0.03 | 0.03 | 1.12 | 0.00 | 0.00 | 0.00 |
| CE 5/Mean | 2532 | 154/2 | Ingot fragm. | 0.01 | 0.01 | 0.08 | 98.40 | 0.00 | 0.11 | 0.01 | 0.03 | 0.07 | 0.01 | 0.04 | 0.01 | 0.01 | 1.21 | 0.00 | 0.01 | 0.00 |
| CE 9/Mean | 2814 | 201 | Ingot fragm. | 0.00 | 0.01 | 0.02 | 98.23 | 0.00 | 0.58 | 0.06 | 0.04 | 0.08 | 0.00 | 0.03 | 0.01 | 0.01 | 0.93 | 0.00 | 0.00 | 0.01 |
| CE 6/Mean | 2532 | 154/1 | Ingot fragm. | 0.00 | 0.00 | 0.17 | 98.30 | 0.00 | 0.01 | 0.09 | 0.00 | 0.18 | 0.00 | 0.23 | 0.05 | 0.02 | 0.94 | 0.00 | 0.00 | 0.00 |

*Table 5.11 cont. Results of electron probe microanalysis with wavelength dispersive spectrometry*

Eight areas, each 30x50 μm, were analysed on each of the samples; the individual analyses and their means are given in the accompanying table. All concentrations are in weight %.

After analysis the samples were examined metallographically in both as-polished and etched states. The etches used were an acidified aqueous solution of ferric chloride, further diluted with ethanol, and an ammoniacal solution of hydrogen peroxide.

## *Compositions*

All the items analysed proved to be of copper except for the fragment of sprue (ON 111, CE 1), and this is discussed first. The sprue fragment is formed in an unleaded medium tin bronze containing 9.4% tin; the principal impurities were 0.06% iron, 0.03% cobalt, 0.04% nickel, 0.23% arsenic, 0.10% lead and 0.13% sulphur. There are also small traces of antimony, silver, bismuth, and, possibly, gold.

This composition is remarkably undiagnostic as to date and could occur at most periods in the Bronze Age and is not untypical of bronze in the Middle and Late Iron Age in southern England. The absence of lead in the alloy does not preclude a Late Bronze Age date: lead-free bronze was used for sheet bronze components, especially vessels, and not all imported scrap bronze in south-east England was leaded even during the Ewart Park period of the Late Bronze Age. It could also be residual from an earlier period and a Middle Bronze Age date in either the Taunton or Penard periods would be feasible.

All the other samples were of copper, including that listed as a dribble (ON 156, CE 2) which appeared to be a piece of melting waste. All the copper is characterised by a high sulphur content, in the range 0.9–1.4% for the Cliffs End samples. A compilation of analyses of copper ingots from the British Late Bronze Age was created as an appendix to this report and is available in the archive. In the copper-sulphur system there is a eutectic at 0.77wt% sulphur and 1067°C so that the structures of all the ingots will be close to the copper-copper sulphide ($Cu_2S$) eutectic and, as the sulphur content increases a monotectic is found so that above 1.5wt% sulphur and 1105°C the molten copper will separate into two liquids,

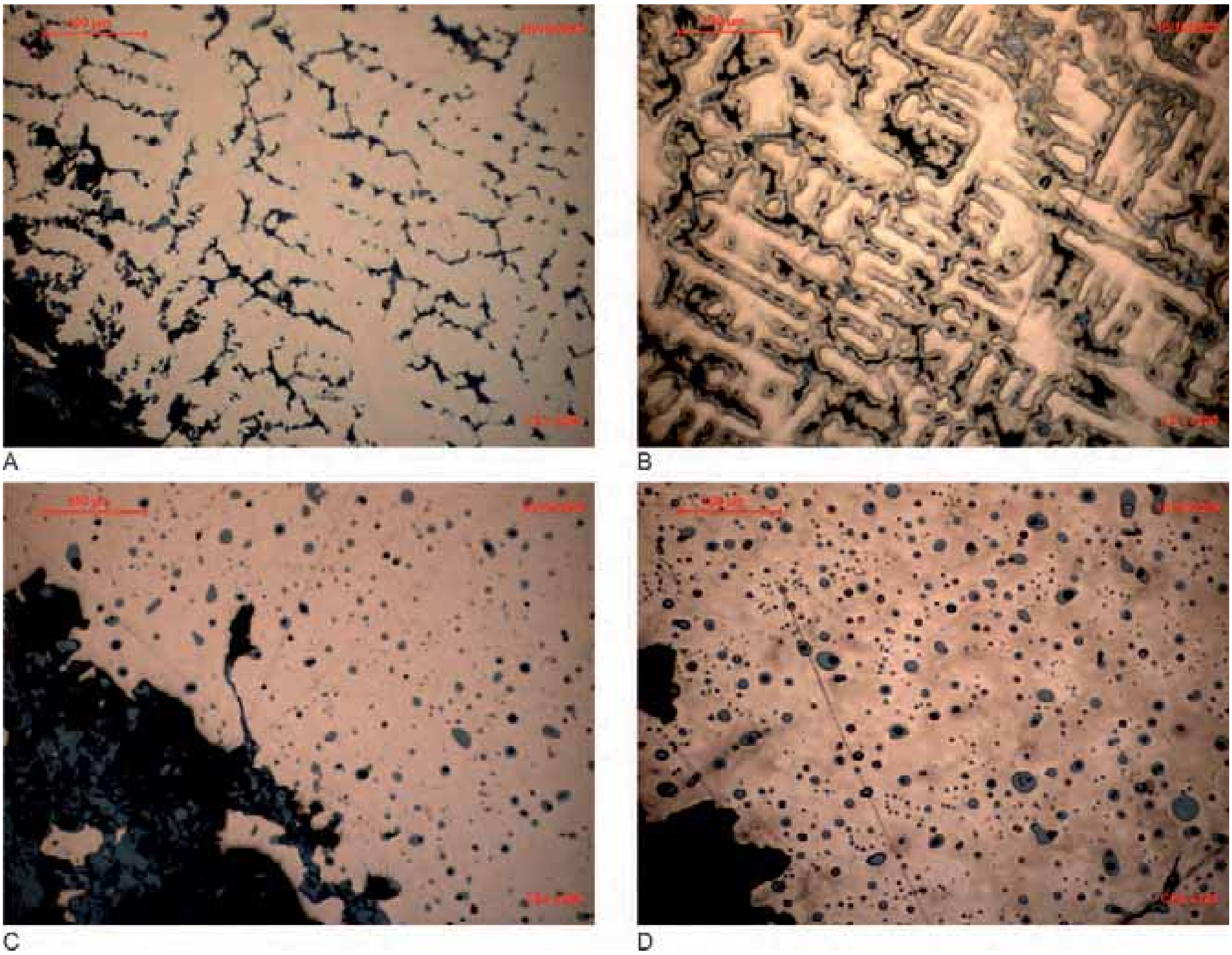



*Plate 5.7 Metallographic sections through Late Bronze Age metalwork: a–b bronze sprue (CE 1) from ditch 2026; c–d ingot (CE 6) from ditch 2193*

one rich in copper and the other rich in copper sulphide. This does not affect the analysed areas in the samples from Cliffs End but might apply in other parts of the same ingots. Elsewhere in southern England sulphur contents can approach 4–5% with a consequent effect on the structure of the ingots.

Beside the sulphur contents the total concentrations of impurities in copper ingots from the British Late Bronze Age are generally very low. This is particularly so with the dribble ON 156 (CE 2) where there are no significant impurities other than sulphur. Similar, but with detectable antimony and silver, are ingot fragments ON 156 (CE 4) and ON 138 (CE 10). Next, with a slightly higher (0.04–0.06%) nickel content are the ingot ON 155 (CE 3) and ingot fragments ON 154/3 (CE 7) and ON 154/4 (CE 8). The remaining three ingot fragments are much more varied: ON 154/2 (CE 5) has nickel, arsenic, and silver as its principal impurities, albeit at rather low values. This impurity pattern is quite like that in the bronze sprue but the sprue has a much smaller silver concentration. Ingot fragment ON 201 (CE 9) has an elevated arsenic content at 0.58%, something matched in several ingot hoards, while ingot fragment ON 154/1 (CE 6) has nickel (0.17%), antimony (0.09%), silver (0.18%), and lead (0.23%) as its principal impurities, the lead content being the highest in all the material analysed here. This composition suggests that at least some of the copper in the ingot is of a continental *Fahlerz* origin.

### *Microstructures*

All the samples were examined metallographically and selected samples are illustrated in as-polished and etched states.

The piece of bronze sprue (Pls 5.7a–b) has, as might be expected, an as-cast, cored dendritic structure which has been deeply penetrated by interdendritic corrosion. Some uncorroded eutectoid remains and the absence of inclusions also confirms the low measured lead and sulphide concentrations: melting and alloying ingot copper will tend to lower the sulphur content as the sulphur becomes oxidised; recycling can decrease this still further.

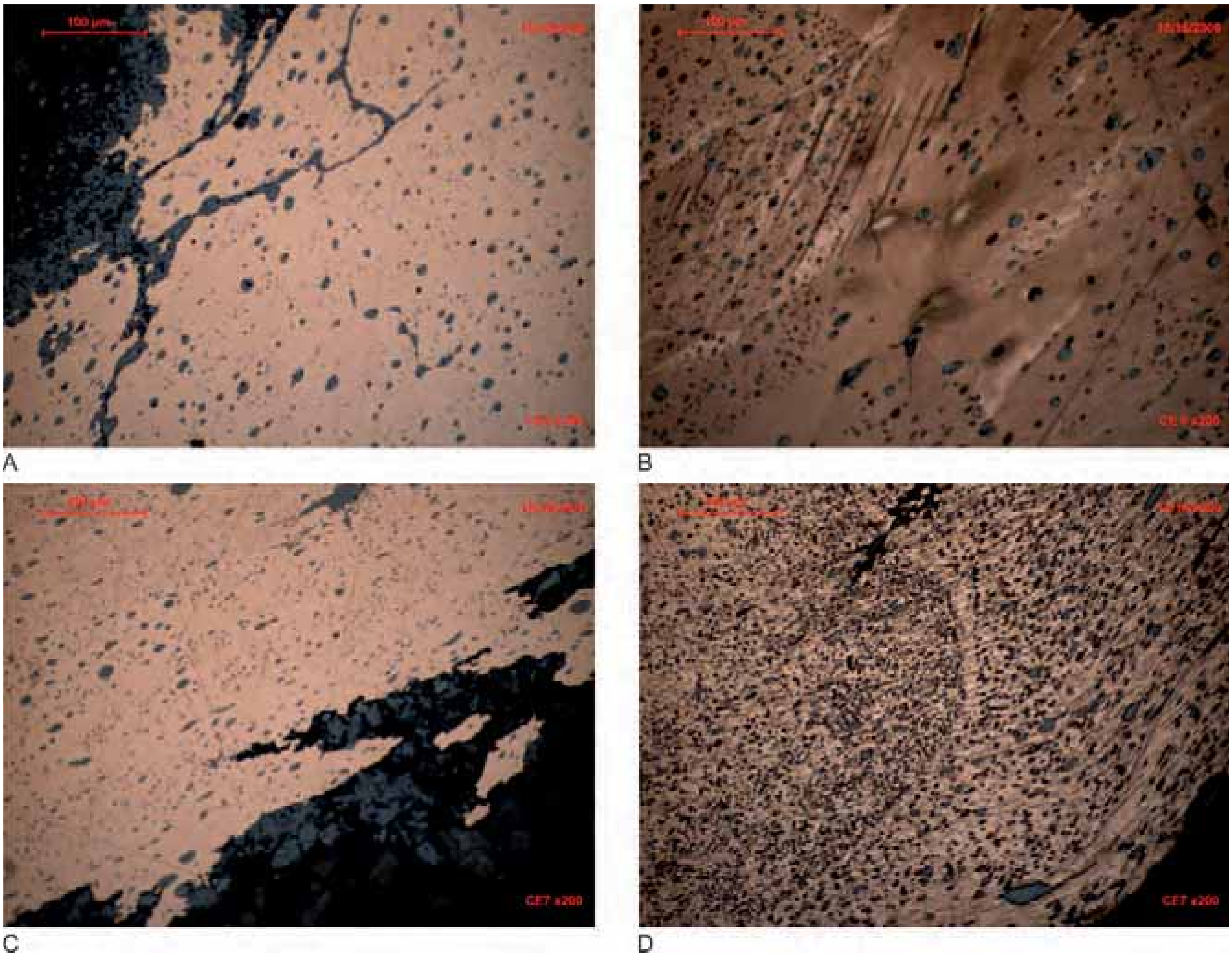


*Plate 5.8 Metallographic sections through Late Bronze Age metalwork: a–b ingot fragment (CE 9) from pit 2812; c–d ingot fragment (CE 7) from ditch 2193*

All the copper samples contain, as expected, an extensive dispersion of copper sulphide particles in a copper matrix. The size and spacing of the particles is a function of both sulphur content, the presence of other impurities, the temperature at which the metal was poured and the cooling rate. With the small population of samples analysed here no systematic conclusions can be drawn. Another consistent feature is the state of corrosion with the copper being relatively resistant compared with the bronze in CE 1. Most attack is at the surface in the form of pitting but there is some intergranular corrosion (eg, CE 6 (Pls 5.7c–d), CE 9 (Pls 5.8a–b)) and a greater degree of penetration where the structure is severely deformed (CE 7 (Pls 5.8c–d)) Other features that may be noted is that some samples (eg, CE 4, CE 5 CE 6 (Pls 5.7c–d)) show some colour contrast within the as-cast grains caused by segregation of impurities. Perhaps of more interest are the deformed structures of part of some ingots (CE 7, Pls 5.8c–d) and CE 9 (Pls 5.8a–b). There has been some debate about how ingots were broken up, both hot and cold chiselling having been proposed (R Tylecote pers. comm.).The extensive deformation twins in Plate 5.8b indicate cold deformation, and this is probably the case in Plate 5.8d. hot chiselling would probably have produced a recrystallised microstructure. It is, unfortunately, not possible to determine whether the breaking up of these ingots had been carried out at Cliffs End or whether they had arrived already fragmented; both is possible.

## *Discussion*

Ingot copper can be found on a number of chronological horizons in the European Bronze Age but, on present evidence from hoards and ceramically or absolutely dated contexts, it is only in the Ewart Park period of the Late Bronze Age that they occur in mainland Britain. The ingots are plano-convex in form while the microstructure is usually characterised by a dense dispersion of copper sulphide inclusions, the only exceptions being when the ingots have an unusual composition. Also, the ingots are almost always fragmentary: before the intact example was found at Cliffs End only two others were known from the British mainland

(Forty Acre Brickfield, Worthing, and Bexleyheath, Kent (Coombs and Bradshaw 1979), more recently the total of intact ingots has been increased by several examples from a shipwreck find off the Devon coast (A Elliott pers. comm.).

The distribution of Late Bronze Age copper ingots in the British Isles is restricted. There are none in Scotland, Ireland, and north-west England, and only one find in Wales, from the western tip of Pembrokeshire, and there are two pieces from the Isle of Man. In the rest of England the distribution is very much coastal and estuarine with finds inland coming mainly from Essex and East Anglia, and a small proportion from Kent and East Sussex. In the south they reach up the Thames estuary to London, but not far up the non-tidal Thames, and along the south coast as far west as West Sussex; then there is a gap with another concentration around the coasts of Cornwall, Devon and into Somerset. The coastal location of Cliffs End fits this pattern very well. We must now consider what evidence for metalworking is provided by the Cliffs End material.

Understanding the contexts of copper ingots in the metalworking of the Ewart Park period is not straightforward. Hoards containing copper ingots can roughly be divided into three categories. The first has bronze in the majority, for example Stourmouth, Kent (Coombs and Bradshaw 1979) or Hatfield Broad Oak, Essex (Davies 1979), the second copper and bronze about equally balanced and the third copper very much in the majority. These last two are well represented by two recent hoards from St Erth, Cornwall (Needham 2002). Copper ingot fragments are also found as single finds or a scatter on occupation and other Late Bronze Age sites, as here at Cliffs End, at Truro College, Truro, Cornwall, where bronze working waste was associated with Late Bronze Age pottery (Northover 2008) and a single isolated find in Bronze Age occupation at Horton, Berkshire (A Barclay pers. comm.).

In the detailed analysis of four hoards from Essex comparisons were made between the compositions of copper ingots and bronzes in the hoards in which they are found, and with contemporary bronzes, it was shown that it is very difficult to link the two so that the contribution of ingot copper to the composition of bronze in circulation is difficult to gauge. Where copper was in the majority it was suggested that the copper had been imported to Britain, sometimes as fragments, sometimes as whole ingots along with bronze scrap of Carp's Tongue and other types, and represented a surplus being dumped from the Continent and alloyed with local bronze as far as was possible. Fragments of copper remaining after this process could even be simply thrown away, and were certainly not worth collecting from the waste on a metalworking site. Evidence from a small number of sites, for example Petters Sports Field (Needham 1990) suggests a context in which copper ingots might be alloyed by mixing with bronze, giving a mixed impurity pattern. We have as yet no direct evidence for the alloying of ingot copper and tin but tin and copper ingots have now been found together on the sea bed (A Elliot pers. comm.).

In contrast it is also possible that at times ingot copper was something of a problem to Late Bronze Age metallurgists. Some unusual compositions in a number of finds, for example at Truro College and St Erth, Cornwall (Northover 2008), Hertford Heath (Craddock and Tite 1980), Reach Fen (Tylecote 1979) and sites in Essex (Northover and Brown forthcoming), indicate a variety of sources for the metal. This conclusion is supported by lead isotope analysis (Rohl and Needham 1998), with many of the sources, maybe even most, being continental. This may be the situation at Cliffs End with the solitary fragment of sprue to be set against the weight of unprocessed copper.

## Worked Bone

*by Jessica M. Grimm with Jörn Schuster*

Twenty pieces of worked bone and two modified pieces of antler of Late Bronze Age or Late Bronze Age/Early Iron Age date were recovered. The assemblage is summarised and selected pieces are illustrated (Pls 5.9–5.10), further details may be found in the archive.

### *Raw Material*

At least four, and possibly five, species were identified. Seven objects were made from cattle bones, three of sheep/goat bones, two (possibly three) of horse bone, two of red deer antler and one possibly made from a roe deer bone. Due to heavy manipulation, six pieces of bone could not be identified to species; five were attributed to the large mammal category, and one piece could only be identified as mammal bone. For cattle and sheep/goat these proportions roughly reflect their proportions according to the NISP in the animal bone assemblage. However, the proportion of worked horse and deer bones is much higher. It seems that the source of raw material was chosen carefully. Horn was also used, attested by cut marks on the base of the horn cores of cattle and sheep.

The skeletal elements used include antler, femur, metacarpus, metatarsus, radius, tibia, splint bone (lateral horse metapodial) and ribs. Long bones were most frequently used with rib and antler being of lesser importance. Among the


*Plate 5.9 Selected worked bone from Late Bronze Age features (nos 1–8)*


*Plate 5.10 Selected worked bone from Late Bronze Age features (nos 9–12)*

long bones, the radius was most popular. More generally, preference for the lower legs and extremities was noted. These parts bear little meat, and are separated from the carcass early on in the butchery process and when not utilised for marrow, they remain undamaged. Furthermore, these bones are straight and have a relative thick cortex.

Two pieces of red deer antler with modifications were found in the Midden Pit 2028. The first piece consists of a fragment of a shed antler burr with horizontal chop marks. The second piece consists of the shed base of the antler with stumps of the brow and bez tine surviving as well as part of the beam. The antler came from an animal about 4–5 years old. Transverse cut/chop marks were observed on the brow tine. It seems that both antler fragments were not finished objects but are merely leftovers of raw material no longer useful.

### *Tool Types*

Tool types included a pin/needle, three worked ribs, five (possibly six) gouges, one pointed object, one spatula, one ornament, and two pieces of antler waste were present. Additionally, a fragment from a balance-beam was identified (see Schuster, below). Seven objects were too fragmented to assign them to a tool type. The dominance of gouges might point to a special activity performed at the site. The high surface polish on these objects may partly have been caused by handling the objects, but also possibly points to their use on wood, skins and/or textiles.

### **Bone balance-beam**

*by Jörn Schuster*

Object number 257 (Pl. 5.9, 1) has been identified as the fulcrum segment of the beam of a simple equal-arm balance, probably made out of the distal part of a horse splint bone and subsequently calcined. Outside the Aegean, weighing scales are extremely rare in Bronze Age Europe. In his survey of weights and weighing in Bronze Age Central Europe, Pare (1999, 449–54) lists only four certain scale-beams; three grave finds from north-eastern France (Marolles-sur-Seine, Dép. Seine-et-Marne: 'Gours-aux-Lions' grave 5 and 'La Crox de la Mission' grave 13; Monéteau, Dép. Yonne; *ibid.*, fig. 20, 14 and 21, B2) and one from a settlement pit at Bordjoš, Novi Bečej, in the Vojvodina region of northern Serbia (*ibid.*, fig. 22B). To these can be added three further examples, two from cave sites in the Charente region, at Vilhonneur 'Cave Chaude au Bois du Roc' and Agris, 'grotte des Perrats' (Peake *et al.* 1999) and one from the specialised settlement site at Potterne, Wiltshire (Seager Smith 2000, 236 fig. 97, 98). Fragments of copper alloy wire suspension loops were found in or with the beams from Marrolles grave 5, Monéteau and Vilhonneur. While only the ends of the former are missing, all that is left of the fragment from Monéteau is a *c.* 42 mm long segment of the beam around the fulcrum with remains of the copper alloy suspension loop still in place, slightly longer than, but essentially similar to ON 257.

It appears that there are two types of terminals (where these can be observed): one has a more or less straight, cylindrical beam, perhaps slightly thicker at the fulcrum and tapering slightly to the straight ends which have perforations (Bordjoš, probably Marolles grave 5); the other has trumpet-shaped or conically expanding ends with the holes in the flanges (Agris, Marolles grave 13, Potterne, Vilhonneur). No scale pans have been found with these scales, although this is probably due to the fact that they were made of organic material like horn, whereas in the Aegean and eastern Mediterranean bronze pans were used (Pare 1999, 454).

Based on his analysis of Central European burials with weighing equipment (including scales, but predominantly weights) and/or pouches containing, for instance, toilet articles, awls, lighting equipment, fish hooks, pigments, stone objects like palettes or pestles and raw materials (bronze, gold, amber), Pare (*ibid.*, 454–470) concludes that these burials belonged to men who had a high social rank in their respective local communities, some graves including drinking and feasting equipment, weapons and horse-gear indicating an aristocratic lifestyle. In the absence of any specialized tools from these graves, he speculates that the presence of raw materials in some of them may be the only indication of the economic function carried out by these individuals, namely the circulation and exchange of valuable materials that required precise weighing. In his discussion of the use of scales and weighing equipment in Aegean graves, Pare considers the Aegean and Near Eastern tradition of weighing scales as symbols of destiny or justice, but comes down in favour of their importance as personal possession emphasizing the elevated status of the individuals thus furnished, both in the Aegean of the 17th to 12th centuries BC and 13th-century BC Central Europe (*ibid.*, 476).

The scale fragment from Cliffs End was found in spit 1, forming the upper 0.20 m of probable colluvial infill within Mortuary Feature 2018, and located approximately 10 m to the south-west of Burial Pit 3666 (ie, *c.* 0.40 m above the final deposits made within the pit 3666 and stratigraphically at least half a millennium later). Obviously redeposited, the object does not have a closely defined original context date but commensurate with the formation processes of the Mortuary

Feature could range in date from the Late Bronze Age to the Late Iron Age (see McKinley, Chapter 2). It is not inconceivable that it had been part of the equipment of a burial that was subsequently disturbed as part of or because of the particular mortuary practices carried out at Cliffs End (see McKinley, Chapter 6). On the basis of the parallels indicated above, this postulated burial is most likely to have been part of the Late Bronze Age phase of activity at Cliffs End. Alternatively, and perhaps more likely, the object could have been incorporated into the upper level of the Mortuary Feature as part of the hillwash from further up-slope, possibly originating from a deposit in the Northern or Central Enclosures. Additional weight for this argument is provided by the fact that the object was calcined, as the only other bone in the same condition came from pit 2787 in the Central Enclosure (cremated human bone; see McKinley, Chapter 4, and Leivers, Chapter 2).

### *Distribution*

Two objects, a balance-beam fragment, (see above) and a pendant (ONs 257 and 607) were found in Late Bronze Age Mortuary Feature 2018. The balance beam was redeposited in the Mortuary Feature and the pendant associated with skeleton 3673. Eight objects derived from the fills of the Late Bronze Age/Early Iron Age Midden Pit 2028 (ONs 1181, 1193, 1199, 1208–1211 and 1213). The Northern enclosure ditches 2193 and 3602, contained six (ONs 1201–1206) and one object (1212) respectively. Three objects were recovered from pit 2469, one of the entrance features of the Northern Enclosure, (ONs 518, 1207 and 1214) which also contained disarticulated human bone.

Apart from the pendant found in Mortuary Pit 2018, the other objects seem to have been discarded after they were broken. Some objects continued to be used when the damage was only slight but they were eventually discarded. The absence of bone waste indicates that the objects were not made locally. However, ON 1193 seems to have been reworked. Interestingly, antler seems to have been worked at the site as attested by waste, but no antler objects were recovered, suggesting that they were taken elsewhere.

### *Discussion*

Many of the tool types found at Cliffs End can be paralleled with those from other Late Bronze Age sites such as Potterne, Bishops Cannings Down, Dean Bottom and Burderup Down, all in Wiltshire (Cleal 1992), Caldicot, Gwent (Compton 1997) and Late Bronze Age Rodenkirchen, Germany (Grimm 2003). As at Cliffs End, the Middle/Late Bronze Age site at Bovenkarspel, Netherlands is dominated by worked cattle bone, which corresponds with the main species in the animal bone assemblage. At Bovenkarspel worked ribs dominate and IJzereef (1981) postulated that they were used for dressing skins (in combination with ashes or fine sand). Alternatively, they might have been used in pottery production to scoop out superfluous clay from the inside or to smooth the exterior surface. Parallels to the gouges found at Cliffs End were also identified at Bovenkarspel where they were interpreted as being used in woodworking.

The range of tools suggests that a number of activities was being carried out at Cliffs End including dressing skins, textile manufacture, and possibly pottery production and woodworking.

**Catalogue of illustrated objects (Pls 5.9–5.10)**

1. Balance beam; solid round tube of polished bone, both ends broken off (possibly new breaks). Remaining L 14 mm, D 6 mm. Calcined bluish grey and white. A hole (D 2.1 mm) was drilled transversally from one side to the other. A small loop of a flattened copper alloy wire originally probably stuck in it as traces of the metal (stain) can be seen in the hole. Object probably made out of the distal part of a horse splint bone which would need little modification to be formed into a round tube of bone. Surface shows longitudinal scratches which are probably the result of rounding and polishing the bone. ON 257, context 183401, Mortuary Feature 2018
2. Bone pin or a needle made from a mammal bone, broken in antiquity (surviving length *c.* 48 mm), oval cross section at the top of *c.* 3 x 4 mm. Highly polished with longitudinal facets and scratches ON 518, context 3645, pit 2469
3. Composite bone and copper alloy pendant associated with skeleton 3673 (see Chapter 2 for description, Fig. 2. 17) ON 607, Burial Pit 3666
4. Perforated object made on the proximal part of a right sheep/goat radius (length 48 mm). Shaft has been split and the edge smoothed and crude circular hole made (dia *c.* 6 mm, modern break). Rim of the perforation is smoothed. Due to modern breaks, only half of the perforation survives. ON 1202, context 2461, Northern Enclosure ditch 2193
5. Polished object, proximal part of a right cattle radius, length 115 mm. Highly polished with crude rounded axial hole (19 x 23 mm). The distal part shows fine horizontal parallel cut marks under and above a broad V-shaped

groove made by repeat striking with a knife. Adjacent to this groove, another broad one runs vertically on the medial side to end where the bone was broken off. The hole at the top suggests that the bone was mounted onto some other material. Although it is unclear for what activity this object was used, the unusual shiny polish suggests repeated contact with skin or textile. ON 1193, context 2118, Midden Pit 2028 layer 4

6. Cattle rib (left rib), smoothed with one end ground into rounded tip, surviving length 141 mm. Highly polished surface with numerous parallel mainly longitudinal cut marks can be seen (particularly present on the lateral (outside) side of the rib). Some damage to the rounded tip might have occurred in antiquity. ON 1203, context 2462, Northern Enclosure ditch 2193
7. Spatula-like object made from a fragment of large mammal long bone shaft (surviving length 72 mm). The shaft was split and the edges smoothed. One end was ground into a rounded broad flat tip. Polish is visible on the whole surface and especially the surface on the front is marked by vertical striation. ON 1210, context 3310, Midden Pit 2028 layer 8
8. Pointed object made out of the split shaft of a horse long bone (surviving length 98 mm). The edges were cut (some cut marks still visible) and subsequently smoothed. The surface is polished. The tip is also polished and might be the original working surface. ON 1212, context 3486, Northern Enclosure ditch 3602
9. Gouge made from the distal part of a left cattle femur (length 94 mm). Formed by removing the distal articulation and cutting diagonally to form the working edge of the gouge. On the proximal end, cut marks show its separation from the rest of the shaft. Smoothing of this proximal cutting edge and clear wear on the inside of the shaft shows that the gouge was mounted. Its complete form would have resembled an axe. A high polish is found on the 'frontal' part of the gouge, also some vertical scratches. ON 1206, context 2466, Northern Enclosure ditch 2193
10. Blade, made from the medial part of a split large mammal rib (length 188 mm). The edges were cut and smoothed and the ends ground into rounded tips. The surface is slightly polished and one end shows subsequent gnawing marks. ON 1214, context 3645, ditch 2469 (part of Northern Enclosure)
11. Gouge made from the right radius of a horse (length 193 mm). The gouge was formed by cutting off the distal articulation and subsequently cutting across diagonally to form the working edge. The whole surface is highly polished. The gouge was possibly mounted onto another object, broken in antiquity but subsequently cut and polishing of the fractured edge shows that the gouge remained in use. ON 1213, context 3510, Midden Pit 2028
12. Gouge from the distal part of a right cattle radius (length 173 mm). Some wear on the inside of the distal part indicates that the gouge was mounted. The frontal part of the gouge is highly polished and shows a vertical cut mark. A large chip on the left side shows some polish, but the object was discarded after another chip came off on the right side. ON 1209, context 3231, Midden Pit 2028 layer 2

## Worked Stone

*by Kevin Hayward and Matt Leivers with Lorraine Mepham*

An assemblage of 146 fragments (53.25 kg) of worked stone was collected, deriving from Late Bronze Age, Early Iron Age and Anglo-Saxon contexts (see Leivers and Hayward, Chapter 7). Each example was examined using a hand lens (Gowland x10) in order to identify the rock type.

The most numerous worked stone objects are querns. Only saddle types are represented. The former occur in coarse Greensand in Late Bronze Age contexts. Examples came from Mortuary Feature 2018 (eight examples) and Midden Pit 2028 (four examples).

The only other recognisable objects were hone/whetstones and a fragment of a shale armlet. The latter came from the evaluation and comprised a part-finished, handmade armlet fragment, which was associated with Late Bronze Age pottery (ON 1, Trench 11, context 1109 = ditch 2203, Central Enclosure). Large-scale exploitation of the Kimmeridge shale beds of south Dorset began in the Early Iron Age, although it is not common for unfinished objects to travel far from the source during this period. Recent excavations at Margetts Pit, Burnham, Kent, have revealed a substantial shale-working industry dating from the Late Bronze Age and continuing into the Early Iron Age (Gittins *et al.* in prep.). Although the source of the shale at the latter site has yet to be identified, it is possible that the Cliffs End fragment is from a more local source than Kimmeridge.

The hones/whetstones occurred in Late Bronze Age/Iron Age contexts in fine and coarse Greensand and phyllite (three examples in Mortuary Feature 2018 and two in Midden Pit 2028), and in diorite (in ditch 2020). All will have been used for sharpening tools.

Rock fragments with signs of working (generally smoothed surfaces or distinctive wear patterns) were recovered. Most are flat or flattish pieces of sandstone in

Mortuary Feature 2018 (two examples), but there are also single fragments of porphyritic pitchstone, banded glauconitic siltstone and diorite in the same feature and other fragments in the same range of materials in other contemporary features.

A quantity of rubble stone was recovered from across the excavated areas. This consisted of sandstones, banded glauconitic siltstone, basic diorite, pink hornblende granite, aplite, and quartzite.

Eighteen tools from Late Bronze Age contexts are hammers, and five from Saxon contexts are probably residual. Thirteen are spherical, sub-spherical or ovate flint cobbles (Pl. 2.2). Eight have pecking over much or the entire surface, while five have more localised damage to one end. In addition, five are more irregular, and include chunks of tabular flint, large flakes, abandoned cores and irregular pebbles. Two are of other stones, and are irregular-shaped smooth cobbles with worn corners and sides.

The irregular pieces and the regular examples with localised damage may have been used for flint knapping, but those with all-over damage need not be. They may instead have been used in other stone-working technologies, such as dressing or grinding, or may have been used in some other domestic or industrial task, for instance as rubbers. Many of the examples grade in size, and strongly suggest elements of a toolkit of some sort.

### *Discussion*

During the Late Bronze Age/Early Iron Age occupation of the site, the coarse glauconitic sandstones from the Lower Greensand containing hard quartz grains (and in particular the variety with fragments of angular chert (type 1) which may or may not have derived from Lodsworth) were used for the grinding of foodstuffs. These must have been brought in over distances exceeding 30 km (the nearest outcrop is Folkestone: Peacock 1987; Shaffrey 2003). It is possible that some of the better quality sandstones (Lodsworth type) may have travelled even further (West Sussex).

During this period there was also opportunistic use of coarse-grained igneous materials deposited in a local shingle ridge near the Wantsum Channel (the Stonar Ridge, Hardman and Stebbing 1940–1942; Baden-Powell 1942) for the manufacture of saddle quernstones and rubstones.

Local materials were also used. The siltstones from the Thanet Beds were frequently found burnt in Late Bronze Age pits.

## Environmental Evidence
## Charred and Mineralised Plant Remains

*by Chris J. Stevens*

### *Introduction*

During the course of excavations at Cliffs End 107 bulk samples were taken from archaeological features for the recovery of charred and mineralised plant remains. These comprised four from an Early Bronze Age grave and a ring gully, 53 from probable Late Bronze Age features and the remaining 50 samples from Anglo-Saxon pits, ditches and graves.

The samples were all processed and assessed for charred plant remains. On the basis of this assessment 51 samples were chosen for full detailed analysis, two from the Early Bronze Age grave, 25 from the Late Bronze Age (although two from Mortuary Feature 2018, contexts 3650 and 3652, may be of Middle Iron Age date) and 24 from Anglo-Saxon features (see Stevens, Chapter 7).

### *Methods*

The bulk samples were processed by standard flotation methods with the flot retained on a 0.5 mm mesh, the residues were fractionated and sorted for charred plant remains. The flots were sorted under a x10–x40 stereo-binocular microscope with charred remains extracted, identified where possible and quantified (Table 5.12). Nomenclature follows that of Stace (1997) for wild species and Miller (1987) for cereals.

All the Bronze Age samples were sorted in full except that from Burial Pit 3666 (3668) where only 10% of the finest 0.5 mm fraction was examined. Remains in this fraction were multiplied by 10 to provide estimated counts prefixed with "e.".

### *Results*

**Early Bronze Age**

The two samples from Early Bronze Age grave 2887 associated with Barrow 1 were generally very sparse with only a few cereal remains, comprising single grains of barley (*Hordeum vulgare*), emmer/spelt wheat (*Triticum dicoccum/spelta*) and two unidentified cereal grains from fill 3012. The only other remains were a few fragments of hazelnut (*Corylus avellana*).

Given the paucity of such remains and the nature of the context it is possible that some of these remains may be intrusive. It might be noted that hazelnut shells were not particularly prolific in the Late Bronze Age samples but were recorded fairly uniformly from the Anglo-Saxon samples, including some of the pits in the vicinity of the grave.

| | | Barrow 1 | Barrow 1 | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | N-Enc Mid. | N-Enc Mid. | N-Enc Mid. | N-Enc Mid. | N-Enc Mid. | N-Enc Ent. | Burial Pit | Burial Pit | Burial Pit | Burial Pit | Burial Pit | Mort. Feature | Mort. Feature |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Phase | EBA | | BA | | | | | | | | | | | | | 1000-900 cal BC | | | | BA | 1000-800 cal BC | | | | | *c.*1100-900 cal BC | |
| | Feature Type | Grave | Grave | Post-h | Pit | Pit | Pit | Post-h | Post-h | Pit | Pit | Pit | Pit | Pit | Post-h | Post-h | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | - | - |
| | Feature Number | 2887 | 2887 | 2359 | 2654 | 2688 | 2688 | 2787 | 2776 | 2815 | 2812 | 2847 | 2396 | 2396 | 2861 | 3303 | 2028 | 2028 | 2028 | 2028 | 2469 | 3666 | 3666 | 3666 | 3666 | 3666 | 2018 | 2018 |
| | Context | 2916 | 3012 | 2363 | 2656 | 2690 | 2706 | 2789 | 2778 | 2817 | 2814 | 2844 | 2391 | 2395 | 2863 | 3304 | 3232 | 3233 | 3254 | 3310 | 2471 | 3668 | 3682 | 3682 | 3682 | 3689 | 3650 | 3652 |
| | Group | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2018 | 2018 | 2018 | 2018 | 2018 | 2018 | 2018 | - | - |
| | Sample | 042 | 047 | 010 | 020 | 023 | 024 | 029 | 030 | 035 | 036 | 037 | 063 | 065 | 038 | 061 | 086 | 087 | 088 | 090 | 099 | 165 | 174 | 207 | 208 | 211 | 110 | 124 |
| | Size Litres | 10 | 10 | 10 | 20 | 8 | 10 | 9 | 8 | 10 | 20 | 10 | 20 | 20 | 10 | 10 | 40 | 40 | 40 | 40 | 1 | 7 | 8 | 2 | 2 | 2 | 20 | 20 |
| | Flot Size ml | 30 | 15 | 30 | 175 | 30 | 15 | 60 | 10 | 25 | 25 | 25 | 25 | 10 | 40 | 10 | 25 | 40 | 20 | 10 | 7 | 80 | 20 | 30 | 20 | 15 | 40 | 15 |
| | Roots ml | 85 | 60 | 75 | 60 | 40 | 80 | 60 | 50 | 15 | 75 | 35 | 75 | 65 | 25 | 25 | 15 | 5 | 25 | 20 | 10 | 10 | 20 | 7 | 10 | 5 | 10 | 10 |
| **Cereals** | **Common Name** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Hordeum vulgare* sl (grain) | hulled barley | - | - | - | 19 | - | - | - | - | 1 | 2 | 2 | 1 | 2 | - | 6 | 3 | 1 | - | 2 | 1 | - | - | - | 1 | - | 12 | - |
| *Hordeum vulgare* sl (grain) | barley | - | 1 | 1 | 24 | 1 | - | 2 | 4 | - | 2 | 7 | - | - | - | - | 6 | 7 | - | - | 4 | 17 | - | - | - | 9 | 23 | 5 |
| *Hordeum vulgare* sl (awns) | barley | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | ++ | - | - |
| *Hordeum vulgare* sl (6-row rachis) | barley | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 2 | - |
| *Hordeum vulgare* sl (rachis) | barley | - | - | 1 | 15 | - | - | - | - | - | - | 2 | 1 | - | - | 2 | - | - | - | - | 1 | - | 1 | - | - | - | 14 | - |
| *Hordeum vulgare* sl (basal rachis frgs) | barley | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - |
| *Triticum* sp. (grains) | wheat | - | - | 4 | 12 | - | - | - | - | 2 | - | 13 | - | - | 17 | 3 | 2 | 3 | - | - | 2 | - | - | - | - | - | 1 | |
| *Triticum dicoccum* (grains) | emmer wheat | - | - | - | - | 1 | - | 6 | 1 | 3 | - | 1 | cf.1 | - | - | 2 | 1 | 5 | 1 | - | - | - | 6 | - | 1 | - | 2 | 10 |
| *Triticum dicoccum* (glume base) | emmer wheat | - | - | 7 | 51 | 14 | 18 | 28 | 16 | 107 | 80 | 47 | 7 | 1 | 23 | 28 | 13 | 26 | 21 | 24 | 7 | 2 | 13 | 10 | 7 | 2 | 40 | 90 |
| *Triticum dicoccum* (spikelet fork) | emmer wheat | - | - | 5 | 4 | 3 | - | 3 | - | 1 | - | 13 | 1 | - | 4 | 3 | 5 | 13 | 3 | 2 | 1 | - | 7 | 2 | 1 | 1 | 22 | 7 |
| *Triticum spelta* (glume bases) | spelt wheat | - | - | cf.1 | 38 | 7 | 7 | 12 | 2 | - | - | 16 | - | - | 7 | 10 | 9 | 17 | 11 | 4 | 4 | 2 | 6 | 3 | 1 | - | 29 | - |
| *Triticum spelta* (spikelet fork) | spelt wheat | - | - | - | 1 | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | - |
| *Triticum dicoccum/spelta* (grain) | emmer/spelt wheat | - | 1 | - | 12 | 3 | 2 | - | - | 1 | - | 15 | 1 | - | - | 5 | 2 | 7 | 3 | - | 3 | 4 | 4 | 5 | 2 | 2 | 28 | 74 |
| *Triticum dicoccum/spelta* (spikelet fork) | emmer/spelt wheat | - | - | - | 3 | 1 | - | - | 1 | 1 | - | 14 | - | - | 68 | 7 | 2 | - | - | 2 | 6 | 1 | 3 | - | 2 | - | 16 | 20 |
| *Triticum dicoccum/spelta* (glume bases) | emmer/spelt wheat | - | - | 29 | 111 | 28 | 22 | 83 | 18 | 3 | - | 222 | 51 | 12 | 2 | 190 | 118 | 142 | 92 | 100 | 30 | e.30 | 52 | 16 | 9 | 1 | 133 | 598 |
| *Triticum dicoccum/spelta* (rachis) | emmer/spelt wheat | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - |
| *Triticum aestivum* sl (grain) | bread wheat | - | - | - | cf.5 | - | - | - | cf.1 | cf.1 | 1 | - | 2+cf.2 | 3 | - | cf.1 | - | - | - | - | - | - | - | - | - | - | 1 | - |
| *Secale cereale* (grain) | rye | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - |
| *Secale cereale* (rachis) | rye | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Cereal indet. (grains) | cereal | - | 2 | 4 | 48 | 3 | 3 | 12 | 10 | 20 | 12 | 20 | - | 5 | 11 | 20 | 20 | 14 | 16 | 6 | 3 | 10 | 5 | 2 | 3 | 3 | 25 | 16 |
| Cereal frag. indet. (est. whole grains ) | cereal | - | - | 9 | 8 | 4 | 2 | 4 | 7 | 30 | 13 | 12 | 7 | 2 | 7 | 15 | 15 | 12 | 10 | 4 | 3 | 4 | 2 | 5 | 2 | 1 | 12 | 40 |
| Cereal (rachis frgs) | cereal | - | - | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Cereal (culm node) | cereal | - | - | - | 3 | - | - | - | - | - | - | 2 | - | - | - | - | - | - | 1 | - | - | - | 1 | 3 | - | - | 2 | 1 |
| **Species** | **Common Name** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Vicia faba* | broad bean | - | - | 1+cf.3f. | cf.2 | - | - | 1 | 1 | 1 | 1 | 9 | - | - | 6 | - | - | 2 | - | 1 | - | - | - | - | - | - | 1 | - |
| *Pisum sativum* | pea | - | - | - | 8 | - | - | - | 1 | - | 1 | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Pisum/Lens/Vicia* | pea, lentil, vetch | - | - | - | 1 | - | - | - | - | 4 | - | 2 | - | - | 1 | cf.1 | - | 12f | - | 2 | - | 2 | - | - | - | - | 3f | 4f |
| *Linum usitatissimum* | flax seeds | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 30 | - | - | - | - | - | - | - |
| *Linum usitatissimum* | flax seed capsules | - | - | - | - | - | - | - | - | - | - | - | - | - | - | cf.4 | - | - | - | - | 1000+ | - | - | - | - | - | 8 | - |
| *Linum usitatissimum* | flax root stems | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | cf.1 | - | - | - | - | - | cf.4 | - |
| **Species** | **Common Name** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ranunculus* subg. *Ranunculus* (arb) | buttercup | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | - | - | 3 | 1 | 1 | - | - | - | 1 |
| *Ranunculus parviflorus* | small flower buttercup | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - |
| *Papaver* cf. *rhoeas* (seed head 8 rays) | poppy | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Fumaria* sp. | fumitory | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - |
| *Urtica urens* | small nettle | - | - | - | 1 | - | - | - | - | - | - | - | - | cf.1 | - | cf.1 | - | - | - | - | - | - | - | - | - | - | 1 | - |
| *Alnus glutinosa* (male catkins) | female catkins/cones | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | cf.1 |
| *Corylus avellana* | hazelnut | 5 | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 1 | - | - | - | - | - | - | - | - | - | - |
| Chenopodiaceae indet. | goosefoot | - | - | - | - | 4 | - | - | - | 3 | 4 | - | - | - | 1 | - | 2 | 3 | 5 | 2 | 3 | - | 1 | 3 | - | - | 4 | 3 |
| *Chenopodium ficifolium* | fig-leaved goosefoot | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 1 | 2 | 1 | 3 | 2 |
| *Chenopodium album* | fat-hen | - | - | 16 | 61 | 1 | 1 | 14 | 1 | - | 6 | 26 | 3 | - | 31 | 23 | 1 | 18 | 4 | 5 | 12 | e.401 | 295 | 205 | 271 | 152 | 37 | 26 |

*Table 5.12 Charred plant remains*

| Species | Common Name | Barrow 1 | Barrow 1 | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | N-Enc Mid. | N-Enc Mid. | N-Enc Mid. | N-Enc Mid. | N-Enc Mid. | N-Enc Ent. | Burial Pit | Burial Pit | Burial Pit | Burial Pit | Burial Pit | Mort. Feature | Mort. Feature |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Phase | EBA | | BA | | | | | | | | | | | | | 1000-900 cal BC | | | | BA | 1000-800 cal BC | | | | | *c.*1100-900 cal BC | |
| | Feature Type | Grave | Grave | Post-h | Pit | Pit | Pit | Post-h | Post-h | Pit | Pit | Pit | Pit | Pit | Post-h | Post-h | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | - | - |
| | Feature Number | 2887 | 2887 | 2359 | 2654 | 2688 | 2688 | 2787 | 2776 | 2815 | 2812 | 2847 | 2396 | 2396 | 2861 | 3303 | 2028 | 2028 | 2028 | 2028 | 2469 | 3666 | 3666 | 3666 | 3666 | 3666 | 2018 | 2018 |
| | Context | 2916 | 3012 | 2363 | 2656 | 2690 | 2706 | 2789 | 2778 | 2817 | 2814 | 2844 | 2391 | 2395 | 2863 | 3304 | 3232 | 3233 | 3254 | 3310 | 2471 | 3668 | 3682 | 3682 | 3682 | 3689 | 3650 | 3652 |
| **Species** | **Common Name** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Atriplex* sp. | orache | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | cf.1 | - | - | 2 | - |
| *Montia fontana* subsp. *chondrosperma* | blinks | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - |
| *Stellaria media* | chickweed | - | - | - | 2 | - | - | 3 | 1 | - | - | - | - | - | - | 1 | - | 1 | 2 | 1 | 4 | e.60 | 84 | 29 | 48 | 3 | 20 | - |
| *Stellaria media/palustris* | chickweed | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | e.10 | - | - | - | - | - | - |
| *Spergula arvensis* | corn spurrey | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 28 | - | - | - | - | - | 1 | - |
| *Silene* sp. | campions | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Polygonaceae indet. | knotgrass | - | - | 1 | - | - | - | - | - | - | - | 2 | - | - | - | 1 | - | - | - | - | - | 4 | - | - | - | - | - | - |
| *Persicaria maculosa/lapathifolium* | redshank/pale persicaria | - | - | - | - | 2 | - | - | - | - | 1 | - | - | - | - | 1 | 2 | 3 | - | 2 | - | - | - | 1 | 3 | - | 32 | 4 |
| *Polygonum aviculare* | knotgrass | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 3 | - | 2 | - | - | - | 12 | 5 | 1 | - | - | - | 8 |
| *Fallopia convolvulus* | black bindweed | - | - | - | 12 | - | - | 1 | - | - | - | 2 | - | - | 1 | 1 | - | 4 | - | - | 3 | 15 | 9 | 1 | 4 | 2 | 6 | 7 |
| *Rumex* sp. | dock | - | - | - | 4 | 2 | - | 2 | - | 4 | 2 | 9 | 1 | 1 | 35 | 3 | - | 6 | - | 3 | - | e.13 | 2 | 1 | - | 2 | - | - |
| *Rumex acetosella* group | sheep's sorrel | - | - | 2 | 14 | - | 1 | 2 | 4 | - | - | 8 | 1 | - | 9 | 6 | - | 2 | - | 5 | 77 | e.20 | 1 | 3 | 6 | - | 16 | 32 |
| *Rumex* cf. *crispus* | curled dock | - | - | 1 | 14 | - | 1 | 3 | 1 | - | - | 16 | - | - | 6 | 4 | 5 | 9 | - | 3 | 57 | - | 6 | 2 | 6 | 4 | 25 | 3 |
| *Barbarea vulgaris* | winter-cress | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | cf.2 | - |
| *Camelina sativa* | gold-of-pleasure | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | cf.3 | - | - | - | - | - | - | - |
| *Thlapsi arvense* | field penny-cress | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | cf.1f | - | 1 | - | 1 | 1 | - | - |
| *Lepidium* sp. | pepperwort | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | cf.1 | - | - | - | - | - | - | - |
| *Brassica* sp. (*B. nigra/B.oleracea*) | wild mustard/cabbage | - | - | - | 2 | - | 2 | - | - | 4 | - | - | 1 | - | - | - | - | - | 2 | - | - | 1+cf.3 | - | 1 | - | - | - | - |
| *Raphanus raphanistrum* | runch | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1f | 1+4f | - | - | - | - | - | - | - | - | - | - |
| *Potentilla* sp. | cinquefoil/tormentil | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | 1 | - |
| *Aphanes arvensis* | parsley-piert | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 | 1 | - | - | - |
| *Prunus spinosa* | sloe | - | - | - | - | - | - | - | - | - | - | - | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Prunus spinosa/C. monogyna/* (thorns) | hawthorn/slow thorns | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | cf.6 |
| *Malus/Pyrus* sp. | apple/pear | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | cf.1 | - | - | - | - | - | - |
| *Crataegus monogyna* (fruit stones) | hawthorn berries | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | cf.1 | - | - | - | - | - | - |
| *Vicia./Lathyrus* sp. | vetch/pea | - | - | 2 | 27 | - | - | 2 | 1 | - | 3 | - | 1 | - | 9 | 6 | 9 | 17 | - | - | - | 33 | 6 | 1 | 5 | 3 | 2 | 2 |
| *Medicago lupulina* | black medick | - | - | - | 2 | - | - | - | - | - | - | 3 | - | - | 11 | - | - | 2 | - | - | - | 17 | - | - | - | - | - | 1 |
| *Trifolium* sp. | clover | - | - | 1 | 11 | 1 | 1 | 5 | - | - | - | 4 | - | - | 21 | 2 | - | 3 | 3 | 6 | - | e.580 | 10 | 1 | 1 | - | 11 | 15 |
| *Geranium dissectum* | cut-leaved cranes bill | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | cf.1 | - |
| *Torilis* sp. | hedge parsley | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - |
| *Plantago lanceolata* | ribwort plantain | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 | 1 | - | - | - | - | 1 | - | - | - | - | - | - | - |
| *Veronica hederifolia* | ivy-leaved speedwell | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - |
| *Odontites vernus* | red bartsia | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Sherardia arvensis* | field madder | - | - | - | 6 | - | - | 3 | - | - | - | - | - | - | 6 | - | - | - | - | - | 1 | 4 | 1 | 11 | 7 | 4 | 2 | - |
| *Galium aparine* | cleavers | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 4 | 2 | 3 | - | 1 | - | - | 5 | - | - | 3 | - | - |
| *Valerianella dentata* | narrow fruited corn salad | - | - | - | 2 | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | 1 | 1 | 2 | - | 2 | - |
| Asteraceae indet. (small) | | - | - | 1 | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Carduus/Cirsium* sp. | thistle | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 1 | - | - |
| *Anthemis cotula* | stinking chamomile | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Tripleurospermum inodorum* | scentless mayweed | - | - | - | - | - | - | - | - | - | - | - | 1 | - | 1 | - | - | 4 | 1 | c.1 | 2 | e.20 | 4 | 1 | 6 | 2 | 10 | 4 |
| *Eleocharis palustris* | common spike-rush | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | e.50 | - | - | - | - | - | 1 |
| *Carex* sp. | sedge | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 4 | - | - | - | - | - | - |
| *Carex* sp. (trigonous) | sedge (trigonous) | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | e.10 | - | - | - | - | 2 | - |
| Poaceae (mid-large indet.) | medium to large grass seed | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 9 | 5 | - | 1 | 2 | - | - | 5 | 2 | 1 | - | 10 | 12 | 6 |
| Poaceae (small indet.) | small grass seed | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | 1 | - | - | 2 | 4 | 11 | 8 | - | - |
| POACEAE (culm node) | grass culm node | - | - | - | 10 | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 3 | 2 | 1 | - | 2 | - | 3 |
| POACEAE (culms) | grass culms | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 20+ | - | - | - | - | - | - |
| POACEAE (basal culm nodes/rootlets) | grass basal stem | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - |

*Table 5.12 cont. Charred plant remains*

| | | Barrow 1 | Barrow 1 | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | C-Enc | N-Enc Mid. | N-Enc Mid. | N-Enc Mid. | N-Enc Mid. | N-Enc Mid. | N-Enc Ent. | Burial Pit | Burial Pit | Burial Pit | Burial Pit | Burial Pit | Mort. Feature | Mort. Feature |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Phase | EBA | | BA | | | | | | | | | | | | | 1000-900 cal BC | | | | BA | 1000-800 cal BC | | | | | *c*.1100-900 cal BC | |
| | Feature Type | Grave | Grave | Post-h | Pit | Pit | Pit | Post-h | Post-h | Pit | Pit | Pit | Pit | Pit | Post-h | Post-h | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | - | - |
| | Feature Number | 2887 | 2887 | 2359 | 2654 | 2688 | 2688 | 2787 | 2776 | 2815 | 2812 | 2847 | 2396 | 2396 | 2861 | 3303 | 2028 | 2028 | 2028 | 2028 | 2469 | 3666 | 3666 | 3666 | 3666 | 3666 | 2018 | 2018 |
| | Context | 2916 | 3012 | 2363 | 2656 | 2690 | 2706 | 2789 | 2778 | 2817 | 2814 | 2844 | 2391 | 2395 | 2863 | 3304 | 3232 | 3233 | 3254 | 3310 | 2471 | 3668 | 3682 | 3682 | 3682 | 3689 | 3650 | 3652 |
| **Species** | **Common Name** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lolium perenne* L. | rye-grass | - | - | - | 5 | - | - | 1 | 2 | cf.1 | - | - | - | - | - | - | - | 2 | - | - | 1 | - | 2 | 2 | 7 | - | - | - |
| *Poa* sp. | meadow grass | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 8 | 6 | 4 | 9 | - | - |
| *Poa/Phleum* sp. | meadow grass/cats'-tails | - | - | 1 | 2 | - | - | - | - | - | - | - | - | - | - | 2 | 1 | 1 | - | - | - | - | 1 | 3 | 2 | 2 | 3 | 4 |
| *Arrhenathermum elatius* var. *bulbosum* | false oat-grass | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | 1 | - | - | - | - |
| *Avena* sp. L. (grain) | oat grain | - | - | - | 16 | 12 | 2 | 1 | - | - | - | - | 6 | - | - | 2 | 7 | 6 | - | - | 2 | - | 2 | - | 2 | - | 22 | 3 |
| *Avena* sp. L. (awn) | oat awn | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 5 | 1 | 1 | - | - | - | - | 1 | 1 | 4 | - | - | 1 |
| *Avena* sp. (floret base indet.) | oat floret base | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| *Avena* L./*Bromus* L. sp. | oat/brome | - | - | 2 | - | - | - | - | - | 2 | 1 | 2 | - | - | 2 | - | 2 | - | 2 | 3 | 2 | 4 | - | - | - | 2 | 829 | 23 |
| *Phleum* sp. | cat's-tails | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 4 | - | 7 | - | - | - | - | 7 | 5 | 4 | - | 2 | - |
| *Anisantha sterilis* | barren brome | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | cf.19 | - | - | - | - | - | - | - |
| *Bromus* sp. L. | brome | - | - | 1 | 2 | 2 | 1 | - | - | - | - | 10 | 1 | - | 2 | 2 | 3 | 2 | - | 2 | 1 | 4 | - | - | - | 2 | 63 | 2 |
| Seed indet. | | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | 2 | - | 5 | - | 5 | 15 | 4 | 5 | - | 5 | 3 | - |
| parenchyma/conglomerate | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | 1 | ++++ | ++ | + | +++ | + | - | - |
| Rodent dropping | | - | - | - | - | - | - | cf.3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 | - | 7 | - | - | - |
| Bud | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - |

*Table 5.12 cont. Charred plant remains*

**Late Bronze Age**

Twenty-five samples were examined from Late Bronze Age features, of these 12 came from the Central Enclosure, six from pits and postholes that cut though the Midden Pit in the Northern Enclosure, five associated with the Burial Pit 3666 and a further two from other contexts in the Mortuary Feature 2018. It might be noted that these latter two samples from contexts 3650 and 3652, are undated. They are situated in colluvial deposits on the east side of 2018 towards the upper levels of the Late Bronze Age sequence, but may potentially be Early Iron Age in date.

With respect to cereal remains, glumes and spikelets of emmer wheat (*Triticum dicoccum*) are better represented than any other, with moderate to larger amounts of spelt seen in some of the samples. Grains of barley (*Hordeum vulgare*) are present throughout the samples and on occasion outnumber grains of hulled wheats. From finds of hulled grains and occasional 6-row rachis fragments it is probable that hulled 6-row barley was the commonest, if not only, form of barley cultivated during this period. Barley rachis fragments were present in several samples, but were slightly more numerous in the sample from Mortuary Feature 2018 (3650) and pit 2654.

Grains of free-threshing wheat (*Triticum aestivum/turgidum*) were encountered in several of the samples, although never in great number. However, given the possibility of intrusive elements, and that only in a few cases did preservation allow full identification, it is difficult to comment on its status as a crop during the Late Bronze Age.

A few single finds of rye were encountered within the samples, comprising the odd grain and occasional rachis fragment. However, given the high presence of this cereal within the later assemblage on the site, it seems certain that such remains are intrusive.

Other remains include those of pea (*Pisum sativum*) and bean (*Vicia faba*), particularly from features within the Central Enclosure. A single pea from pit 2654 (2656) was radiocarbon dated to between 900–800 cal BC (OxA-20799, 2683±26 BP) and an emmer/spelt grain from the same context to 1000–820 cal BC (SUERC-24078, 2760±30 BP, see Chapter 3). A few samples, within the Northern Enclosure and Mortuary Feature 2018, contained seeds and capsule fragments of flax (*Linum usitatissimum*). Most notably, a large number of flax capsule fragments, some 1000, were counted from the 1.0 mm fraction of the sample taken from pit 2469, along with some 30 seeds, while the 0.5 mm flot had a further 4 ml of almost pure flax capsule fragments.

Remains of wild foods were generally poorly represented in the Late Bronze Age samples. Fragments of hazelnut were fairly scarce, being recovered only from Midden Pit 2028 in the Northern Enclosure. Similarly fragments of sloe stones (*Prunus spinosa*) were generally scarce, being recovered from pit 2396, while thorns of sloe or hawthorn (*Crataegus monogyna*) were identified from Midden Pit 2028 and the Mortuary Feature, with a possible hawthorn stone and apple/pear (*Malus/Pyrus* sp.) pip from Burial Pit 3666 (3668).

Seeds of wild species were fairly common in the samples and seeds of smaller seeded species dominated many of the samples, in particular those of the Chenopodiaceae, including fat-hen (*Chenopodium album*), and fig-leaved goosefoot (*Chenopodium ficifolium*). Similarly associated with more nitrogen-rich waste soils were seeds of chickweed (*Stellaria media*) and occasionally small nettle (*Urtica urens*).

Other smaller seeds included those of corn spurrey (*Spergula arvensis*), a species of light, drier, sandier soils, that occurred in three samples, two of which were associated with remains of flax.

Other seeds included those of common arable weeds, such as black bindweed (*Fallopia convolvulus*), redshank/pale persicaria (*Persicaria maculosa/lapathifolium*), knotgrass (*Polygonum aviculare*), dock (*Rumex* sp.) and cleavers (*Galium aparine*).

Sheep's sorrel (*Rumex acetosella*) was also common in several of the samples and is a species often found on drier, sandier circum-neutral to acidic soils. Seeds of scentless mayweed (*Tripleurospermum inodorum*), a species also more commonly found on medium to light, well drained soils were present in a number of samples. Seeds of field penny-cress (*Thlaspi arvense*), which is more characteristic of sandy, acid soils, were recovered from a few samples, in particular those from Burial Pit 3666.

Seeds of wild mustard/cabbage (*Brassica nigra/oleracea*) were present in a few of the samples, and while seeds and plants of these species are commonly utilised, given that both species are particularly common in coastal environments, they are more likely derived from locally growing plants.

Associated more frequently with drier, calcareous soils are field madder (*Sherardia arvensis*), plantain (*Plantago lanceolata*), red bartsia (*Odontites vernus*), narrow fruited cornsalad (*Valerianella dentata*) and black medick (*Medicago lupulina*), whose seeds were present in several samples. Seeds of two further ecologically similar species, small flowered buttercup (*Ranunculus parviflorus*) were recovered from 3666 (3682), while a single seed of ivy-leaved speedwell (*Veronica hederifolia*), was recorded from 2028 (3232 layer 1).

A single seed of stinking mayweed (*Anthemis cotula*) was also found in pit 2812. The species is very common in Anglo-Saxon features and it seems probable that it is intrusive (see Stevens, Chapter 7).

Seeds of vetches/wild pea (*Vicia/Lathyrus* sp.) and clover (*Trifolium* sp.) were present in a number of the samples, with seeds of clover being particularly common in the sample from Burial Pit 3666 (3668). Of some interest was a probable seed of cut-leaved cranes bill (*Geranium dissectum*) from Mortuary Feature 2018 (3650), a species that is rarely recorded from charred assemblages.

Seeds of wetland species, while present, were generally scarce and comprised seeds of spike-rush (*Eleocharis palustris*), blinks (*Montia fontana* subsp. *chondrosperma*) and sedge (*Carex* sp.), all from the Mortuary Feature 2018 (including Burial Pit 3666). It might be noted that even wetter ground species, such as buttercup (*Ranunculus acris, repens, bulbosus* type (arb)) were generally poorly represented in the samples, and again more common within the Mortuary Feature (2018 and 3666).

Seeds of grasses were relatively common in several of the samples. In the main these comprised seeds of oats (*Avena* sp.), brome grass (*Bromus* sp.) and rye-grass (*Lolium* sp.), while several seeds of probable barren brome (*Anisantha sterilis*) were recovered from pit 2469. Seeds of probable brome grass were particularly common in the sample from context 3650 in Mortuary Feature 2018.

Notably seeds of small grasses such as meadow grass (*Poa* sp.) and cat's-tails (*Phleum* sp.) were also more frequent within the samples from the Mortuary Feature (2018 and 3666).

Along with seeds of wetland species and grasses, the samples from the Mortuary Feature were also notably higher in remains of woody stems, grass culms and probably straw, and in Burial Pit 3666 these were often within charred conglomerates of organic material. These were particularly prolific in contexts 3668 and 3682 and to a lesser extent in 3689, with lesser amounts in 3682.

A sample from posthole 2654 also had quite high numbers of culms of grasses, including those from probable cereals, and as noted above this same sample also had slightly more rachises of barley.

## *Discussion*

A number of sites are known of a similar Middle–Late Bronze Age date from Thanet, including Westwood Cross (Wessex Archaeology 2006c), Monkton Road, Minster (Martin *et al.* 2012), and the Weatherlees–Margate–Broadstairs Wastewater Pipeline sites (Stevens 2009a). Additionally a number of assemblages are known from Middle to Late

Bronze Age/Early Iron Age sites across Kent in general, including Kingsborough Manor, Sheppey (Stevens 2008), Little Stock Farm (Stevens 2006a), Saltwood Tunnel (Stevens 2006b) and Dartford (Pelling 2003).

At Westwood Cross, dated to the Middle to Late Bronze Age, barley and emmer dominated the assemblage with lesser amounts of spelt, and little to no free-threshing wheat (Wessex Archaeology 2006c), supporting the possibility that the grains observed here in the Bronze Age deposits are indeed intrusive. Spelt wheat is likely to have been introduced to Kent in the Middle Bronze Age (Pelling 2003), although it remains a minor component until the later Iron Age to Romano-British period (Stevens 2009b).

There is also good evidence for the cultivation and use of flax on the site. Most of these remains come from pit 2469, which dates to the earlier phase of Late Bronze Age activity, *1120–920 cal BC (SUERC-24077)* Table 3.3. Such finds are relatively unusual in Great Britain, although large numbers of charred fragments of flax capsules were also seen at Saltwood Tunnel (Stevens 2006b), and their presence would tend to imply the processing of capsules for seed and linseed oil rather than just fibre. The extent of such cultivation for seed and linseed oil, rather than fibre, is unknown, but such finds indicate that it was perhaps common in Bronze Age Kent at this date.

It might be noted that most of the seeds of corn spurrey, a species associated with sandier soils, occur in pit 2469 along with the high numbers of flax remains. Flax is often grown on sandier, drier, often poorer soils, and these seeds, along with those of both barren brome and sheep's sorrel, are then likely to have a greater association with flax cultivation on such soils than they have with cereal crops.

In all of the samples glumes of hulled wheats outnumbered grains, and this can be taken to indicate that most of the charred material derives from waste generated during the processing of hulled wheat spikelets. Such patterns are normal from Iron Age and later sites where they can be attributed to the processing of hulled wheat spikelets and barley grain taken from storage for consumption on a regular basis (Stevens 2003).

It might be noted that the sample from pit 2654 has slightly more culms and culm nodes as well as rachis fragments of barley. The proportion of rachis fragments to barley grains (approximately 1:3), along with the presence of straw, might even suggest the burning of whole sheaves, although given that rachis fragments rarely survive comparably to grain such an assemblage might originate rather from waste generated during the processing of sheaves or unthreshed ears.

The range of seeds of wild species is similar to that seen at Westward Cross and the Weatherlees–Margate–Broadstairs Wastewater Pipeline (Stevens 2009a), reflecting a small range of soil types ranging from well-drained calcareous soils to drier sandier circum-neutral to slightly acidic soils. As seen on the other sites the cultivation of wetter or seasonally flooded soils and fields seems to be rare, if at all practised.

Smaller seeds, in particular those of the Chenopodiaceae, appear more dominant in the assemblages from Cliffs End than either Westward Cross or the Weatherlees–Margate–Broadstairs Wastewater Pipeline where seeds of vetch/wild pea (*Vicia*/*Lathyrus* sp.) were more frequent. It might also be noted that a preliminary examination of samples from a probable later Bronze Age site at Monkton Road, Minster also indicated low amounts of Chenopodiaceae seeds in comparison to those of vetches/wild pea.

The generally high proportion of smaller weed seeds is of some interest in that it might imply that the crops were stored slightly less processed at Cliffs End than in the other sites studied from Thanet. The high proportion of smaller seeds, including grass seeds and those of wetland species, within the assemblages from the Mortuary Feature are at least in part likely to be related to the burning of probably dung. However, in comparison to other Middle to Late Bronze Age sites in Kent it might be noted that a number of the samples from Saltwood Tunnel were also high in small weed seeds, particularly those of the Chenopodiaceae.

Despite the unusual nature of the site there is generally little in the assemblage which is out of character with the range of material that would be expected on a relatively densely occupied settlement site.

The charred assemblages from at least the Burial Pit 3666 are likely to be a mixture of processing waste and charred dung. The presence of charred dung is unusual, but it might be noted that both at the similarly dated Late Bronze Age to Early Iron Age midden sites at Potterne and East Chisenbury, the presence of potential charred dung was noted (Macphail 2000; 2010). While, as seen at Cliffs End, other elements of the charred assemblages suggested the presence of processing waste, unlike the assemblage seen here there was no direct evidence for charred dung through the high presence of charred grass seeds and Poaceae stems (Straker 2000; Carruthers 2010).

While it is possible that the remains may relate to feasting activity associated with funerary/burial customs, the wide range of dates for this material – in particular given that some pre-date the burials, and also the amount of material – suggests processing waste that has been generated over several generations and therefore probably relates to normal settlement activity.

The proximity of such settlement is difficult to ascertain and it is possible that this material may have been transported from elsewhere during the formation of the midden deposits. In this light it might be noted that there is at least some suggestion for the reworking of older material into later deposits, for example that from 2396 (2391), where dates upon grains of emmer/spelt (OxA-20813, 2876±30 BP and SUERC-24080, 2845±30 BP) are more contemporary with the earliest phase of Late Bronze Age activity on the site dating between 1190–940 cal BC and 1120–920 cal BC).

## Wood Charcoal

*by Catherine Barnett*

Fifteen samples were chosen for analysis in order to examine aspects of Bronze Age and Early Iron Age mortuary-related and domestic activities on the site.

### *Methods*

All wood charcoal >2 mm was separated from the processed flots and the residue scanned or extracted as appropriate. All samples proved small, and an attempt was therefore made to identify them in their entirety without sub-sampling. The fragments were prepared for identification according to the standard methodology of Leney and Casteel (1975; see also Gale and Cutler 2000). Each was fractured with a razor blade so that three planes could be seen: transverse section (TS), radial longitudinal section (RL) and tangential longitudinal section (TL). The pieces were mounted on a glass microscope slide using modelling clay, blown to remove charcoal dust and examined under bi-focal epi-illuminated microscopy at magnifications of x50, x100 and x400 using a Kyowa ME-LUX2 microscope. Identification was undertaken according to the anatomical characteristics described by Schweingruber (1990) and Butterfield and Meylan (1980) to the highest taxonomic level possible, usually that of genus, with nomenclature according to Stace (1997). A species list is given in Table 5.13. Individual taxa were quantified (mature and twig separated), and the results tabulated (Table 5.14).

### *Results*

As shown in Table 5.13, the species list for the site is relatively large, with a minimum of 12 species identified from Bronze Age/Early Iron Age contexts. The assemblages are described by feature type below.

#### Grave 2887 and Burial Pit 3666

Early Bronze Age Grave 2887 contained a very small volume of charcoal, comprising only *Crataegus* type Pomoideae wood (hawthorn), which may well be intrusive or residual.

Four samples were analysed from two contexts in Late Bronze Age Burial Pit 3666. Each contained only small quantities of charcoal, with the richest, sample 165 of context 3668, comprising only 32 fragments >2mm. This assemblage was dominated by *Corylus avellana* (hazel) with some *Prunus* sp. (cherry-type wood) and *Quercus* sp. (oak). The other three samples contained small numbers of *Quercus* sp. with single occurrences of *Corylus avellana*, *Acer campestre* (field maple), Pomoideae and *Salix*/*Populus* sp. (willow/aspen).

#### Pits, Spreads and Postholes

The apparently non-mortuary-related spread and pits of Bronze Age and Late Bronze Age date (contexts 2814, 2656, 2844 and 3233) contained small, slightly variable wood charcoal assemblages, as shown in Table 5.14. *Quercus* sp. (oak) and *Corylus avellana* (hazel) dominated, but *Fraxinus excelsior* (ash), Pomoideae (pomaceous fruits) and *Prunus* sp.

| Taxon | Common name | Comments |
|---|---|---|
| **Bronze Age** | | |
| *Acer campestre* | Field maple | - |
| *Alnus glutinosa* | Alder | - |
| *Betula pendula/pubescens* | Silver/ downy birch | - |
| *Carpinus betulus* | Hornbeam | - |
| *Corylus avellana* | Hazel | - |
| *Fraxinus excelsior* | Ash | - |
| Pomoideae | Pomaceous fruits | Group of shrubs including *Cotoneaster, Sorbus, Pyrus, Crataegus* |
| Pomoideae (*Crataegus* type) | Pomaceous fruits (hawthorn type) | Sub-group of the Pomoideae includes *Pyrus, Crataegus, Malus* |
| *Prunus spinosa* type | Blackthorn | Type includes *P. spinosa, P. domestica* |
| *Prunus* sp. | Cherry-type wood | - |
| *Quercus* sp. | Oak | - |
| *Salix/Populus* sp. | Willow/ aspen or poplar | The two taxa are anatomically indistinguishable |
| *Taxus baccata* | Yew | Coniferous |

*Table 5.13 Wood charcoal species list: Bronze Age contexts*

| Sample no. | Feature | Context | Phase | Description | Comments | *Acer campestre* | cf. *Acer campestre* | *Alnus glutinosa* | *Betula pendula/pubescens* | cf. *Betula pendula/pubescens* | *Carpinus betulus* | immature 2–3yr *Castenea sativa* | cf. *Castenea sativa* | *Cornus* sp. roundwood | *Corylus avellana* | *Corylus avellana* roundwood | *Corylus avellana* twigwood | cf. *Corylus avellana* | *Fagus sylvatica* | *Fraxinus excelsior* | Pomoideae | Pomoideae (*Crataegus* type) | Pomoideae twigwood | Pomoideae twigwood | Twigwood cf. Pomoideae | *Prunus spinosa* | *Prunus* cf. *spinosa* type | *Prunus* sp. | *Prunus* sp. roundwood | twigwood cf. *Prunus* sp. | *Quercus* sp. | cf. *Quercus* sp. | *Quercus* roundwood | *Salix/Populus* sp. | cf. *Salix/Populus* sp. | *Taxus baccata* | *Tilia* sp. | Unidentifiable | Unidentifiable twigwood | Total identified | other remains (P=parenchyma) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Prehistoric** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | 2582 | 2583 | ?LBA/ EIA | Hearth | Small sample chosen to gauge $^{14}C$ potential, rejected as low | | | | | | | | | | | | | 1 | | | | 3 | | | | | | | | | | 1 | | | | | | | 1 | | |
| 124 | 2887 | 2916 | EBA | Grave | Very limited sample, most too small for confident ID | | | | | | | | | | | | | | | | | 3 | | | | | | | | | | | | | | | | 1 | | 4 | |
| 165 | 3666 gp2018 | 3668 | LBA | Burial Pit | occasionally vitrified | | | | | | | | | | 25 | 1 | | | | | | | | | | | | 1 | | | 4 | | | | | | | 1 | | 32 | 1 P |
| 174 | 3666 gp2018 | 3682 | LBA | Burial Pit | small sample of small fragments. Unid=knotwood. Also 1 Poaceae stem base in sample | <br>1 | | | | | | | | | 1 | | | <br>1 | | | <br>2 | | | | | | | | | | <br>2 | 1 | <br>2 | 1 | | | | 2 | <br>1 | 5<br>9 | 1 P, 1 bark |
| 207 | 3666 gp2018 | 3682 | LBA | Burial Pit | Quercus includes 10mm d branching r'wd | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 208 | 3666 gp2018 | 3682 | LBA | Burial Pit | small fragmentary sample | | | | | | | | | | | | | | | | | | | | | | | | | | 9 | | | | | | | | 1 | 10 | 1 P |
| 36 | ? | 2814 | LBA | Spread | poor condition, mineralised and friable. NB 1 piece of unid wood had degraded prior to charring: collected dead? | 1 | 2 | | | | | | | | 6 | | | | | | | | | | | | | | | | 1 | | | | | | | 2 | | 12 | |
| 20 | ? | 2656 | BA | Pit | poor condition, heavily mineralised and friable, a few large fragments, most small and sometimes rounded (rolled/moved down profile?) due to condition frags <4mm not identified. *Corylus* r'wd=3 yrs | | | | | 1 | | | | | | 3 | | 5 | | | | | | | | | | | | | 23 | | | | | | | 5 | | 37 | |
| 37 | 2847 | 2844 | LBA | Pit | moderate condition, mineralised | | | | | | | | | | 2 | | | | | 3 | 3 | | | | | | | 1 | 6 | | 8 | 1 | | | | | | 4 | | 28 | |
| 87 | 2028 | 3233 | LBA | Pit | poor, mineralised, several pieces vitrified | 1 | | | | | | | | | 8 | | | 1 | | 5 | 9 | | | | | | | | 3 | | 6 | | | | 1 | 1 | | 2 | | 37 | |
| 29 | ? | 2789 | LBA | Posthole | relatively rich but fragmentary sample | | | | | | 1 | | | | | | | | | 1 | 1 | | | | | | | | | | 35 | | 4 | | | | | | | 42 | |
| 38 | 2861 | 2863 | LBA | Posthole | very poor condition, mineralised and insect bored | | | | | | | | | | 1 | | 1 | 5 | | 2 | | | | | | | | | | | 1 | | | | | | | 3 | | 13 | |
| 10 | 2359 | 2363 | LBA/ EIA | Posthole | 4 or more taxa, not post. Poor condition, friable and mineralised | | | | | | | | | | | | | 1 | | 3 | | | | | | | | 5 | | | 1 | | | | | | | 3 | | 13 | |
| 70 | ? | 2952 | LBA/ EIA | Pit | small sample, sediment and mineral coated internal anatomy | | | 1 | | | | | | | 2 | | | | | | 1 | | | | | | | | | | 2 | | 1 | | | | | 4 | | 11 | |

*Table 5.14 Charcoal identification and sample details: prehistoric contexts*

(cherry type) were also important. The only fragment of *Taxus baccata* (yew) wood charcoal identified in this analysis came from context 3233 (layer 2) of Midden Pit 2028.

The charcoal from Late Bronze Age posthole 2789 was dominated by *Quercus* sp. and may be the remains of an oak post burnt *in situ*. However, the Late Bronze Age posthole fill 2863 and Late Bronze Age to Early Iron Age posthole fill 2363 contained a mixture of taxa, including *Carpinus betulus* (hornbeam), *Corylus avellana*, *Fraxinus excelsior* and *Prunus* sp., indicating these fragments entered the posthole before, during or after the use of the structure rather than being the posts themselves.

The wood charcoal in Late Bronze Age to Early Iron Age pit fill 2952 comprised small numbers of *Alnus glutinosa* (alder), *Corylus avellana*, *Fraxinus excelsior* and *Quercus* sp.

Sample 16 from a patch of burnt material (2582) on top of the hill wash is too small for meaningful interpretation. The small amount of pottery from the feature could on broadly be dated to the Late Bronze Age or Early Iron Age.

### *Interpretation*

The species represented in each individual sample generally varied little between the Bronze Age/Early Iron Age features. This relative homogeneity indicates that either, a particular group of taxa was routinely collected for both domestic and mortuary fuel use, or the samples comprise mixed and reworked pieces; the latter cannot be ruled out given the colluvial nature of many of the feature fills and the low volumes of charcoal in several of the features. In addition, the size and nature of the samples precludes useful comparison with wood charcoal assemblages of similar age at other sites. However, some useful data on local availability and exploitation of woody types in the Bronze Age/Early Iron Age has been presented. Large deciduous trees and shrubs such as *Fraxinus excelsior*, *Quercus* sp. and *Corylus avellana* were favoured, but a wide range of open woodland and hedgerow types were also collected, including *Crataegus* type Pomoideae (hawthorn), *Prunus* sp. (including probable blackthorn), *Carpinus betulus* and *Acer campestre*. The single occurrences of *Alnus glutinosa* and *Salix/Populus* sp. indicates some limited exploitation of wetter areas such as stands of trees growing on a floodplain edge and that of *Taxus baccata* (the only coniferous type represented) indicates presence and rare use of more calcareous/chalk soils in the wider area.

## Pollen Analysis of Midden Pit 2028 in the Northern Enclosure

*by Rob Scaife*

A series of pollen samples was taken from the fills of this Late Bronze Age/Early Iron Age pit feature. The profile contains evidence of a palaeosol and some associated artefactual material (see Leivers, Chapter 2). Pollen analysis has been undertaken in order to reconstruct the local vegetation and environment of the site and to examine the fills for any secondary plant materials which may have been disposed of in the pit. Sixteen samples were examined, all but one of which contained sub-fossil pollen and spores. However, the pollen is general sparse, poorly preserved and with evidence of differential preservation and skewing of the data in favour of the more robust pollen taxa.

### *Method*

Samples were taken throughout the pit profile using a box monolith tin. This, therefore, spanned the principal contexts, that is, basal 3310, 3254, 3231 and uppermost 3230. Pollen sub-samples of 2 ml volume were processed using standard techniques for the extraction of the sub-fossil pollen and spores (Moore and Webb 1978; Moore *et al.* 1992). Micromesh sieving (10μm) was also used to aid with removal of the clay fraction present in these sediments. Absolute pollen frequencies (APF) were calculated using an added exotic (*Lycopodium* tablets; Stockmarr (1971) to the known volumes of sample. A pollen sum of 300–400 or more grains of dry land taxa per level was counted for each level where preservation was more favourable. This was in the lower contexts. Pteridophyte spores were recorded outside of the basic pollen sum.

A pollen diagram (Fig. 5.10) has been plotted using Tilia and Tilia graph. Percentages have been calculated in a standard way as follows:

| | | |
|---|---|---|
| Sum | = | % total dry land pollen (tdlp) |
| Spores | = | % tdlp + sum of spores |
| Misc. | = | % tdlp + sum of misc. taxa |

Taxonomy, in general, follows that of Moore and Webb (1978) modified according to Bennett *et al.* (1994) for pollen types and Stace (1992) for plant descriptions. These procedures were carried out in the Palaeoecology Laboratory of the School of Geography, University of Southampton.

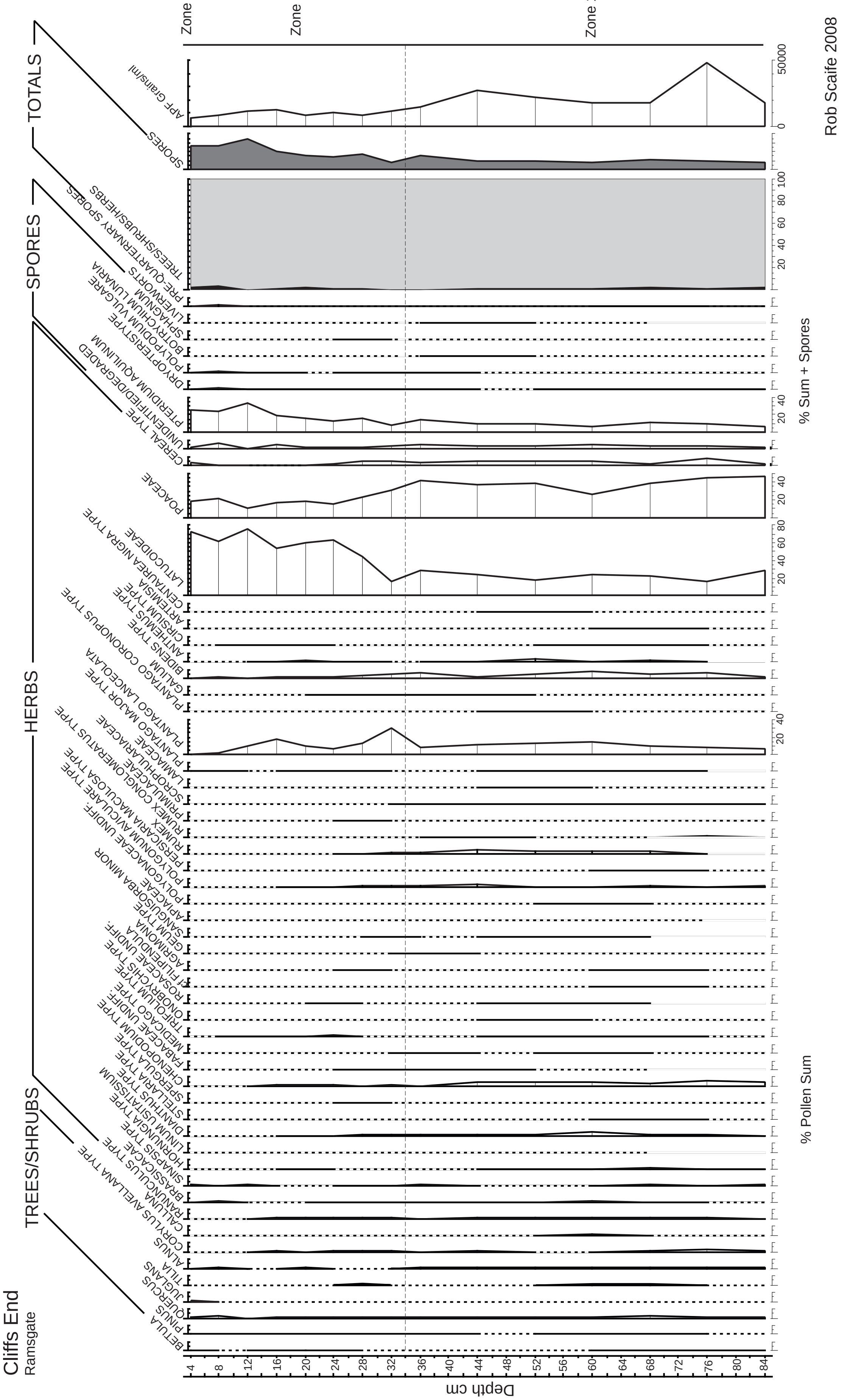



*Figure 5.10 Pollen diagram Midden Pit 2028*

### *Results*

Absolute pollen frequencies were calculated and overall, the values were small. These ranged from *c.* 6000 grains/ml in the upper levels to a maximum of 48,000 grains/ml at 76 cm. These data are presented in Figure 5.10. Two local pollen assemblage zones have been recognised, although the palynological changes on which these are based are due to the poorer pollen preserving conditions of the differing contexts and the effects of differential preservation. The two zones are characterised as follows:

**Zone 1**: 84 cm to 34 cm: Pollen is better preserved in this lower zone. This is reflected by the higher APF values and the greater taxonomic diversity than in subsequent zone 2. Herbs are dominant with Poaceae (Grasses; to 30%) and Lactucoideae (Dandelion types; to 46% at the base of the profile), *Plantago lanceolata* (ribwort plantain; 10%) and Bidens type (daisy types) being most important. Other taxa worth drawing attention to are cereal pollen, which occur between 28 cm and 54 cm, and taxa of waste and disturbed ground (Brassicaceae, Chenopodiaceae, Polygonaceae and Asteraceae types). A single grain of *Linum usitatissimum* (flax) was recorded from the lowest level. Trees and shrubs occur infrequently with occasional taxa including *Betula, Pinus, Quercus, Alnus, Corylus avellana* type and *Tilia*. Spores of ferns are dominated by *Pteridium aquilinum* (Bracken: 7–10%) with occasional monolete forms (Dryopteris type and *Polypodium vulgare*).

**Zone 2**: 34 cm to 4 cm: APF values decline from the preceding zone to a low of 6,000 grains/ml, and pollen was totally absent in the top sample (0 cm). Taxonomic diversity is also much reduced. Herbs are dominated by Lactucoideae which attains extremely high values (to 80%). Poaceae (to 18%) and *Plantago lanceolata* are also important (peak to 38% at 32 cm). Cereal pollen is much reduced. Small numbers of trees and shrubs remain with *Quercus, Pinus, Alnus* and *Corylus avellana* type. There are individual occurrences of *Tilia* and interestingly, *Juglans* at 4 cm (see below). Spores of ferns become more important with expansion of *Pteridium aquilinum* (to 37% sum+spores).

### *Discussion*

Within the profile changes in the pollen stratigraphy have been recognised as local pollen assemblage zones. However, these changes relate largely to the different fills recognised in this pit (see Leivers, Chapter 2) and the consequent differences in the taphonomy of the pollen. The basal contexts 3110 and 3254 (layers 8 and 4) (32–84 cm) are dominated by Poaceae, Lactucoideae with *Plantago lanceolata*, Chenopodiaceae and cereal pollen. Overall, the pollen assemblages indicate that the local environment may have been largely pastoral. However, there is also evidence of use of cereals. It is, however, possible that the latter may be of secondary/derived origin coming from a number of sources. These might include nearby crop processing activities which may liberate pollen trapped in cereal husks, domestic waste or, from animal faeces which may have been disposed of in this pit. The latter raises the question as to whether this was a watering hole given the size if the feature. Chenopodiaceae may be noted as important where there has been nitrification of the soils by animals. However, proximity to coastal salt marsh vegetation may also be considered since Chenopodiaceae are also diagnostic of salt marsh habitats. There are no significant differences between the single context sample (3310) and the overlying thicker sequence of context 3254.

Other than cereals, the only other possible cultigen recorded was a single grain of *Linum usitatissimum* (flax). Flax pollen is markedly under-represented and rare in pollen assemblages. It is unfortunately not possible to say from the pollen whether flax retting was being practised in the pit or whether, as with the cereals, it is of secondary/dumped origin. Presence of these types whether of secondary origin or not does demonstrate, however, cultivation and use of these crops.

The overlying contexts (3231; 3230 layers 2 and 1) (pollen zone 2), a possible soil, contains higher values of *Plantago lanceolata* and Lactucoideae. There is no cereal pollen and absolute pollen values are greatly reduced. This is in accord with the view that this context was a 'grassy' stabilisation phase in the pit in which there was biological activity and pollen degradation. Clearly, the very high values of Lactucoideae are an indication that there has been strong differential preservation in favour of more robust pollen types. Lactucoideae are notable in this respect and along with *Plantago lanceolata* suggest the data are very skewed towards robust pollen forms.

Tree and shrub pollen is consistently present, but in small numbers. Although the pollen catchment of such features (pits and ditches) is usually regarded as small, with pollen coming from the local area only, it seem likely that if woodland was present in the surrounding region, there would be a greater representation of the anemophilous trees and shrubs. It is likely that the arboreal and shrub pollen recorded here comes from wider regional sources where woodland remained. Of specific interest is the single occurrence of *Juglans* pollen in the upper fill (zone 2; at 4 cm). Walnut (*Juglans regia*) is considered to have been a Roman introduction into Europe as a whole. Thus, its occurrence in the top of this Late Bronze Age/Early Iron Age pit is incongruous, unless the pollen has been incorporated downwards into context (3230) or the upper levels are, in reality, of Romano-British date.

### *Conclusions*

Although pollen preservation is poor, especially in the upper contexts (3231 and 3230), it has been possible to produce a pollen diagram and to make some useful conclusions as to the local, Late Bronze Age/Early Iron Age environment of this site. It must, however, be stressed that pollen preservation is not good and there is evidence of differential preservation of thick walled pollen grains in the upper contexts whilst less robust forms are likely to have been destroyed. This has, therefore, skewed the data and any interpretation must take this into account. A second factor relates to the taphonomy of the pollen and, specifically the extent of the pollen catchment, which has contributed to the pollen spectra recovered. It is usually accepted that the pollen recovered will, in general, be derived from close proximity to the site, especially if vegetation is growing within the feature (eg, grasses). Taking these complex taphonomic factors into account, the analysis shows that the pit was probably situated in a predominantly pastoral/grassland environment. The cereal pollen and associated weeds of disturbed ground, although of probable secondary origin, show that arable agriculture was also being practised and thus, a mixed agricultural economy pertained. The presence of pollen of walnut in the upper levels may indicate that the upper level may be of a much later date; that is Romano-British or later.

## Soil Micromorphology of a Buried Soil in Midden Pit 2028

*by Richard I. Macphail*

Two soil monolith samples from a buried soil within Late Bronze Age/Early Iron Age Midden Pit 2028 were analysed. This dark soil sealed a probable midden fill that included pottery and animal bone. Soil micromorphology was applied to help define the nature and character of the upper fill and soil formation associated with burial of the fills.

### *Samples and Methods*

Two thin section subsamples were cut out of monolith blocks 152 and 153, in order to investigate buried soil layer 3231 (layer 2), and its relationship to overlying context 3230 (layer 1) and underlying context 3254 (layer 4) (see Tables 5.15–5.16).

| **Sample** | **M153** | **M152** | **M152** |
|---|---|---|---|
| Layer | 3231(3230) | 3231 | 3254 |
| Relative depth | 50–125 mm | 210–275 mm | 275–285 mm |
| MFT | B1 | A1 | A2 |
| SMT | 1c1, 1c2 | 1a | 1a (1b) |
| Voids | 35% | 20% | 20% |
| Chalk etc | - | a* | - |
| Burned chalk etc | - | a* | a* |
| Coarse Flint | a-2 | - | - |
| Burned Flint | a-1 | (a-1) | - |
| Burned soil | a | a* | a* |
| Charcoal | aa | aaa | aa |
| Stained bone | a-1 | - | - |
| Human(?) coprolite | a* | a-1(a*) | - |
| Phosphate nodules | a | aaaa | aaaa |
| Fused ash nodules | aa | aa | - |
| Phytoliths | a | aa | aa |
| Ash residue infills | - | aaaa | aaaa |
| Very dusty clay coatings | aaaa | aaaaa | aaa |
| Amorphous Fe-P | aa | aaaaa | aaaaa |
| Vivianite | a* | aa | aa |
| Broad burrows | aaaa | aaaa | aaaa |

**KEY:** * – very few 0–5%, f – few 5–15%, ff – frequent 15–30%, fff – common 30–50%, ffff – dominant 50–70%, fffff – very dominant >70%
a – rare <2% (a*1%; a–1, single occurrence), aa – occasional 2–5%, aaa – many 5–10%, aaaa – abundant 10–20%, aaaaa – very abundant >20%

*Table 5.15 Soil micromorphology: samples and counts*

Thin section samples M152 and M153 were impregnated with a clear polyester resin-acetone mixture; samples were then topped up with resin, ahead of curing and slabbing for 75 mm long thin section manufacture by Spectrum Petrographics, Vancouver, Washington, USA (Goldberg and Macphail 2006; Murphy 1986). Thin sections were analysed using a petrological microscope under plane polarised light (PPL), crossed polarised light (XPL), oblique incident light (OIL) and using fluorescent microscopy (blue light – BL), at magnifications ranging from x1 to x200/400. Thin sections were described, ascribed soil microfabric types (SMTs) and microfacies types (MFTs) (see Tables 5.15–5.16), and counted according to established methods (Bullock *et al.* 1985; Courty 2001; Courty *et al.* 1989; Goldberg and Macphail 2006; Macphail and Cruise 2001; Stoops 2003).

Two previous analogue studies have been carried out in in the vicinity of Cliffs End. The supposed Neolithic truncated argillic brown earth palaeosol formed in loess/brickearth was investigated in detail from Pegwell Bay (Weir *et al.* 1971), and thin section samples from the Ian Cornwall thin section reference collection (Institute of Archaeology, UCL) have been reviewed (Macphail and Linderholm 2004). In addition, the soil micromorphology and chemistry of a Neolithic pit and Middle/Late Bronze Age feature/hollow at nearby Broadstairs Retail Park were analysed (Macphail and Crowther 2006). Furthermore, Late Bronze Age anthropogenic fills and 'midden' deposits with some similarities, such as at Battlesbury and Potterne, Wiltshire, acted as additional comparisons (Macphail 2000; Macphail and Crowther 2002; Macphail and Crowther 2008).

## *Results*

### Local soils

The site is located on (Pleistocene) Brickearth overlying (Tertiary) Thanet Beds Sands, both of which were encountered on site, over (Cretaceous) Upper Chalk (Wessex Archaeology 2006a). The local mapped soils are Typical argillic brown earths

| Microfacies type (MFT)/Soil microfabric type (SMT) | Sample No. | Depth (relative depth)<br>Soil Micromorphology (SM) | Interpretation and Comments |
|---|---|---|---|
| MFT B1/SMT 1c1, 1c2 | M153 | 50–125 mm<br>SM: Homogeneous; *Microstructure*: massive with fine crack and channel, and coarse chamber; 35% voids, fine to medium (0.5–3 mm) planar voids, channels and chambers; *Coarse Mineral*: C:F 60:40, as below, with few fine sand; *Coarse Organic and Anthropogenic*: occasional, fine (200–300 µm; max 750 µm) yellowish amorphous (phosphate) nodules, many embedding charred organic matter; occasional very fine and fine charcoal (max 1mm); example of leached and stained (coprolitic?) 0.5 mm bone, with rare very fine probable coprolitic fragments; 2 examples of sub-horizontal oriented 5 mm size flint and 1 10+ mm burned flint (in coarse channel); trace amounts of sand-size burned soil; trace amount of very fine clay fragments; *Fine Fabric*: SMT 1c: very fine dusty and dotted (1c1) and little dusty (1c2) brown (PPL), generally low interference colours (close porphyric speckled and grano-striate b-fabric, XPL), greyish brown (OIL); moderate humic staining with many fine charred OM, rare phytoliths present; *Pedofeatures: Textural*: abundant extremely dusty mainly thin (25–50 µm) void coatings, with occasional intercalations, and 75 µm thick void infills (moderately poorly birefringent with included very fine charcoal; *Amorphous*: occasional Fe-P nodules (see above), with rare traces of vivianite; *Crystalline*: rare traces of vivianite; *Fabric*: very abundant fine fabric (burrowed) intercalations and mixing of SMT 1c1 and 1c2; very abundant broad (2 mm) burrows. | 3231(3230)<br>This is a similar fill to 3231 below, but is much more strongly diluted with Eb horizon coarse silt-very fine sands; it also contains more fine sand of likely eroded Thanet Beds Sand origin. It is a highly burrowed fill, with very finely mixed weakly humic natural Eb horizon soil and relatively finer charred and phytolith-rich anthropogenic brickearth soil. Phosphate nodules are present but less common than below, but very fine bone and coprolitic fragments occur alongside examples of coarse coprolites, flint and burned flint.<br>*Moderately eroded soil- (both brickearth Eb and Thanet Sand) dominated fill, with abundant mainly fine anthropogenic fill that includes coprolitic remains and fine charred organic matter; mixed fine bioworking (burrowing) features and slaking (interactions and dusty clay infills) testify to muddy, but bioactive conditions; presence of phosphate and vivianite record at least one period of waterlogging and anaerobic conditions.* |
| MFT A1/SMT 1a | M152 | 210-275 mm<br>SM: Homogeneous; *Microstructure*: massive with fine crack and channel; 20% voids, very fine to fine (300–500 µm) planar voids and channels; *Coarse Mineral*: C:F (Coarse: Fine limit at 10 µm); C:F, 70:30 for SMT 1a (SMT 1b, C:F, 80:20); very well sorted coarse silt and very fine sand-size quartz (with mica, feldspar and glauconite) (see below for coarse inclusions), with very few fine sand; *Coarse Organic and Anthropogenic*: abundant yellowish amorphous (phosphate) nodules, many embedding charred organic matter; many charcoal very fine and fine (mainly 1 mm-size fragments with 2.5 mm example of wood charcoal (phosphate-stained); occasional sand-size brown-stained fused aggregates with embedded charred monocotyledonous plant fragments and articulated phytoliths (burned plant processing waste?); rare to occasional phytoliths and articulated phytoliths; examples of very coarse sand-size (1–2 mm) rounded chalk and calcareous fine sandstone; 1.5 mm-size (probable human) coprolite (yellow, with dark reddish staining; anisotropic; autofluorescent under blue light); trace amounts of fine burned chalk and flint; *Fine Fabric*: SMT 1a: speckled and dotted, yellowish greyish brown (PPL), moderately low interference colours (close porphyric, speckled and grano-striate b-fabric; XPL), dotted grey and greyish brown (OIL); thin humic staining with many fine charred organic matter; rare to occasional phytoliths; rare trace of burned soil (eg. blackened topsoil with embedded monocot charcoal); P*edofeatures: Textural*: very abundant extremely dusty intercalations, infills (non- or very poorly birefringent charcoal and phytolith-rich 'ashed' residues; 100–200 µm) and very dusty clay void coatings (50–100 µm) that post-date intercalations and infills; *Amorphous*: very abundant amorphous yellow (sometimes Fe-Mn stained) phosphate nodules – many with central vivianite crystals, and embedded fine charred OM (0.5–1.5 mm size); some have clay coated voids; *Crystalline*: occasional vivianite; *Fabric*: very abundant broad (1–2 mm) burrows, most pre-dating phosphate and dusty clay inwash. | 3231<br>Strongly anthropogenic fill recording complex site formation processes. The fine soil is composed of decalcified Eb horizon loessic soil of coarse silt-very fine sand grain size, intimately mixed with fine charred organic matter, and phytoliths including articulated phytoliths; inclusions are charcoal (some phosphate stained), (Fe-P) phosphate nodules which embed charcoal and include vivianite, fused aggregates with embedded charred monocotyledonous plant fragments and articulated phytoliths (burned plant processing waste?), examples of probable human coprolites and fine burned chalk and flint. The fill has a pedofeature history of: being slaked (intercalations and very dusty clay infills), bioworking (burrowed), phosphate contamination (phosphate infills and nodule formation), followed by rooting and later inwash of dusty clay.<br>*Fill from inwash (mainly fine colluviation) of decalcified Eb horizon brickearth soils, alongside high concentrations of fine occupation debris recording plant processing associated with burning and coprolitic waste. This material was deposited wet and trampled, then bioworked prior to be strongly contaminated by the disposal/drainage of coprolitic waste (cess) – Fe-P phosphate and vivianite formation testifying to a period of waterlogging. Continuing inwash of anthropogenic sediments above led to a second phase of dusty clay inwash.* |
| MFT A2/SMT 1a (1b) | M152 | 275–285 mm<br>SM: as 3231, moderately heterogeneous with dominant SMT 1a and frequent (burrow fills) SMT 1b: speckled and dotted greyish brown (PPL), moderately low interference colours (close porphyric, speckled and grano-striate b-fabric; XPL), dotted grey (OIL); thin humic staining with many fine charred organic matter; rare phytoliths; burrowed 1–3 mm size fragments of impure yellowish clay containing monocot. charcoal and phytoliths. | 3254<br>*This is strongly mixed deposit containing moderately natural soil-diluted fine anthropogenic material; contains examples of fragmented dusty clay 'silting sediment' rich in fine charcoal, which probably records early phases of inwash into this feature; and which have not been totally worked by trampling and bioworking.* |

*Table 5.16 Soil micromorphology: descriptions and interpretations*

formed in aeolian silty drift (brickearth) over Tertiary strata (eg, Thanet Beds) (Hamble 1 soil association); these soils typically have a clay and iron-depleted topsoil and pale clay-depleted upper subsoil Eb horizon, and a darker brown coloured iron and clay-enriched lower subsoil Bt horizon (Jarvis *et al.* 1983; 1984, 184). No subsoil argillic Bt horizon material was encountered in context 3231, although anomalous occurrences of fine quartz sand in the very dominantly well sorted coarse silt-very fine sand (brickearth/loess) fill indicate probable included Thanet Beds Sand.

**Soil micromorphology**

Descriptions and counts are given in Tables 5.15–5.16 (further details including illustrations can be found in the site archive).

**M153**

*Context 3231 and uppermost earthworm mixed boundary to context 3254*

**context 3254**: This layer has a similar soil microfabric (SMT 1b) to context 3231 (SMT 1a), but contains less fine material, and phosphate staining, and hence its dark brown (10YR3/3) moist macro colour, compared to the very dark grey (10YR3/1) of 3231. Essentially, it has many of the same kind of anthropogenic inclusions (see below), but is distinguished by the earthworm worked clasts of yellow stained clayey 'sediment'. This clay contains fine charcoal, and rare phytoliths, and is phosphate stained.

**Interpretation**: This is a strongly mixed deposit containing moderately natural soil-diluted fine anthropogenic material. There are examples of fragmented dusty clay 'silting sediment' rich in fine charcoal, which are earthworm worked clasts (the technical term is 'papule') that probably record early phases of phosphate-contaminated inwash into this feature.

**Context 3231**: This is a markedly anthropogenic fill recording complex site formation processes. The fine soil is composed of decalcified Eb horizon brickearth (loessic) soil of coarse silt–very fine sand grain size, intimately mixed with fine charred organic matter, and phytoliths including articulated phytoliths. There are inclusions: of charcoal (some phosphate stained), (Fe-P) amorphous phosphate nodules which embed charcoal and *in situ*-formed crystalline vivianite, fused aggregates with embedded charred monocotyledonous plant fragments, articulated phytoliths and traces of calcite ash crystals (burned soil and plant processing waste?), examples of probable human coprolites and fine burned chalk and flint. The fill has a pedofeature history of being slaked (intercalations and very dusty clay infills), bioworked (burrowed), contaminated by phosphate (phosphate infills and nodule formation), and rooted; all of which is followed by further inwash of dusty clay.

**Interpretation**: This fill formed from the inwash (mainly fine colluvium) of decalcified Eb horizon brickearth soils, alongside high concentrations of fine occupation debris recording plant processing associated with burning, and coprolitic waste. This material was deposited wet and trampled, then bioworked prior to becoming strongly contaminated by the disposal/drainage of coprolitic waste (cess); Fe-P phosphate and vivianite formation testifies to a period(s) of waterlogging. Co-eval bioworking and continuing inwash of anthropogenic sediments above, led to a second phase of dusty clay inwash which coated and infilled voids.

**M152**

**Context 3231(3230)**: This is a similar fill to 3231 below (in M153), but is much more strongly diluted with natural Eb horizon coarse silt–very fine sands. It also contains more fine sand of likely eroded Thanet Beds Sand origin. The fill is more highly burrowed, with very finely mixed weakly humic natural Eb horizon soil and relatively finer charred and phytolith-rich anthropogenic brickearth soil. Phosphate nodules are present but less common than below; very fine bone and coprolitic fragments occur alongside examples of coarse coprolites, flint and burned flint. Abundant textural intercalations and dusty clay void coatings are present.

**Interpretation**: Upper 3231–3230 is a moderately soil-dominated fill (eroded from both brickearth Eb and Thanet Beds Sand), that still contains abundant mainly fine anthropogenic material such as coprolitic remains and fine charred organic matter. It has undergone fine bioworking (burrowing), and co-eval slaking (intercalations and dusty clay infills) testifies to muddy, but bioactive conditions. The presence of phosphate and vivianite again records at least one period of waterlogging and anaerobic conditions.

### *Discussion and Conclusions*

Although rooted and burrowed, the site formation processes dominating context 3231 are not simply soil formation, but colluvial sedimentation within an occupied environment. The fills 3254, 3231 and 3230 are accretionary. They record generally fine colluvial inwash of upper subsoil Eb horizon soil that has been enriched in fine charcoal, phytoliths, articulated phytoliths and fused/burned soil clasts (containing phytoliths of plant processing origin), and faecal matter (bone, coprolites, and phosphate-rich cess). Although pig slurry could be one component, no obvious pig coprolites (as at Potterne for example, Macphail 2000) were noted, and latrine waste is probably the *dominant* origin of this faecal matter (see below). In context 3254, yellow stained clay clasts indicate clayey silting that included plant processing waste and phosphate-contamination; it is possible that clayey argillic Bt horizon subsoil exposed in the lower part of this pit contributed to this clayey fill.

At Late Bronze Age–Early Iron Age Potterne, Wiltshire, and at Llanmaes, Gwent, fused/burned soil and associated burned soil and occurrence of phytoliths indicated plant (cereal?) processing (Macphail 2000; 2006); latrine waste disposal was also recorded in pit fills at Llanmaes. Unlike at Battlesbury and Potterne (and Chisenbury), no ashed herbivore dung was observed at Cliffs End, but the 'taphonomic' effects of colluvial transport and sedimentation of very fine material very likely precludes the preservation of such delicate micro-inclusions (Macphail 2000; Macphail and Crowther 2002).

The fill was often wet, and at times anaerobic conditions must have regularly prevailed, in order to allow amorphous phosphate and vivianite formation to be recorded throughout the 23 cm thick deposit (see Tables 5.15–5.16). Amorphous phosphate (probably composed of P, Fe and Ca) and vivianite neoformation has been investigated from both natural and archaeological sediments and soils using microprobe and FTIR (Fourier transform infrared) methods, with embedded pollen, nematode eggs and bran being found in the thin sections (Karkanas and Goldberg 2010; Landuydt 1990; Macphail *et al.* 2007). It has been suggested that phosphate stained charcoal is an indicator of 'nightsoil' when found in cultivated soils (Goldberg and Macphail, 2006, 206). Thus, in addition to colluvial silting with fine occupation debris the feature may have acted as a form of cess pit or soak-away for latrine waste disposal.

When wet, the deposits were trampled (producing abundant textural pedofeatures), and it is possible that scavenging animals such as pigs may have contributed to the overall phosphate content. As the deposit accreted (M152), anthropogenic materials became somewhat more diluted by the coarse silt–very fine sand of the 'natural' soil, and trampling effects continued alongside burrowing by small invertebrate mesofauna. Inwash into the feature and continuing trampling caused disturbed and mobilised fine soil to wash down-profile into the lower part of context 3231 (M153). The presence of many fine channels also testifies to the eventual development of a vegetated 'soil' surface.

It is noteworthy that no fragments of eroded Bt horizon of the local soils, was recorded. Equally, at Broadstairs Retail Park, a Neolithic pit fill only contained the more easily erodable Eb horizon soil (Macphail and Crowther 2006). This suggests that the subsoil Bt horizon was not being eroded.

## The Site and its Use in the Late Bronze,

# Chapter 6
# Discussion and Concluding Remarks

*by Stuart Needham, Jacqueline I. McKinley and Matt Leivers*

## Early and Middle Iron Age

*by Matt Leivers*

The Late Bronze Age occupation of Cliffs End consists primarily of two or possibly three enclosures and a large Mortuary Feature. The broad sequence (suggested by radiocarbon dating, morphology, ceramic typologies and limited stratigraphic relationships) appears to begin with a palisaded enclosure (Northern Enclosure) with an external ditch and a single entrance on the eastern side. With only a very small portion of the interior within the excavated area, determining the uses of the first phase of this enclosure is very difficult. Parallels with similar sites, Highstead, for instance (Bennett *et al.* 2007) would suggest a settlement enclosure.

It is possible to read the evidence in this fashion. Material recovered from the earlier phases of the Midden Pit and ditches included what could be normal domestic refuse – pottery, butchered animal bone, cereal processing waste, saddle quern fragments, and bone implements. If phase 1 of the Northern Enclosure was a settlement, then all other evidence relating to it (other structures, trackways, and fields) that might be expected would have lain to the north, beyond the limits of excavation.

An alternative interpretation can be offered, in which the Northern Enclosure was a ceremonial space. That the same set of material can be read as both the detritus of settlement activity and as the residues of ceremonial acts need not be a problem, given the fairly broad spectrum of material types present and the rather poor preservation of some elsewhere on the site. It is perhaps instructive that it is at the point when the first phase of use of the Northern Enclosure is coming to an end that other, more unusual types of material, begin to be present: for instance human bone and metal objects, as well as a larger number of querns.

The Central Enclosure is likely to have been constructed some time after the Northern Enclosure, but to have been in use concurrently. The material signatures of both enclosures are similar, and it is possible to read the material in the ditches of the Central Enclosure as ordinary domestic rubbish. The difficulty with this interpretation is that the whole of the Central Enclosure lay within the excavations, and there were no traces of any structures anywhere within it.

In form, the Central Enclosure appears to have been another palisaded enclosure with an external ditch and single east-facing entrance, morphologically very similar to the Northern Enclosure. The location and type of the features within the two enclosures were also very similar, with a large pit immediately inside the palisade adjacent to the entrance and a scatter of postholes and small features to the south. In the Central Enclosure the rest of the interior appears to have been empty, leading to the possibility that the same was true for the Northern Enclosure.

If these enclosures were not lived in, what were they? The strongest indications of their use are the very large quantities of pottery from the Midden in the Northern Enclosure, and the butchered animal bones found in the Midden Pit and in the ditches of both enclosures. What this material (and the cereal remains, querns and other materials) appears to demonstrate is the preparation and consumption of food on a considerable scale, and it is difficult to avoid the conclusion that feasting was going on, or at the very least that the residues of feasting were ending up in the Midden Pit and spread out over the surface of the Central Enclosure.

The chronological span of these activities is difficult to determine. The activity in the Northern Enclosure is certainly the earliest, and likely to overlap with the use of the Central Enclosure. Both probably predate the earliest modelled mortuary activity in Mortuary Feature 2018, and it may be the case that the primary use of Burial Pit 3666 coincides with the final use of the first phase of the Northern Enclosure, when human remains appeared in the midden and ditch fills.

It is also possible that the cessation of mortuary activity in 3666 and the insertion of the ring-ditch at some point in the 9th century (see burial 3649, OxA-18429) were coincident with the remodelling of the Northern and Central Enclosures. The entrances of both were altered, and in the case of the Central Enclosure the entrance was closed by a ditch and (presumably) bank. That both faced the Mortuary Feature, and that the Central Enclosure appears to have been referenced directly by the pointing finger of the slain woman (although see McKinley, below) in pit 3666 suggests that these features formed a complex which were both used together and were taken out of use together.

The later phases of activity in the Northern Enclosure seem to adhere to this pattern. By the Early Iron Age there appears to have been renewed activity in the Northern Enclosure, and this does appear to have been in some way related to settlement and domestic activity. Analysis of soil micromorphology indicated the presence of fine occupation debris including plant processing waste associated with burning, and coprolitic waste, probably of human origin. This material seems to have been deposited while wet (periods of waterlogging are attested) and to have been trampled and strongly contaminated by cess. The most likely source of this material is a nearby agricultural settlement (presumably to the north; a possibly contemporary field system and enclosure has been located and excavated 600 m away in the course of the excavations along the route of the East Kent Access Road, (Oxford Wessex Archaeology 2011; Andrews *et al.* forthcoming).

Pottery from the higher fills of the Midden Pit indicates activity in the Early Iron Age. This renewed activity is matched by a similar phase in the Mortuary Feature, with a single burial (3656) inserted inside the ring-ditch over pit 3666 which dated to *465–390 cal BC at 95% probability*.

The Late Bronze Age activity at Cliffs End is – in the current state of knowledge – unique, and this fact makes it very difficult to assess its place in the lives of the inhabitants of Thanet who created and used it. Other similar enclosures are known from elsewhere in north-east Kent, but few are published and of those that are, none have any significant association with mortuary practice. Given this, it must be concluded that the *form* of the enclosures is no clue to their *purpose*, with ostensibly very similar structures being used for very different practices. The morphologically similar enclosures (Highstead; Lofts Farm (Brown 1988)) are obviously of a very different sort, Lofts Farm having a single roundhouse set centrally and a 'timber longhouse' in the south-east corner. It is just possible that the arrangement of features within the enclosures at Cliffs End parallels the arrangement at Lofts Farm, with most activity in the southern portions and south-east corners particularly. Clusters of pits and 'empty' spaces within Late Bronze Age enclosures are far from unusual (see for example Highstead A24, Mucking North Ring (Bond 1988), Springfield Lyons (Buckley and Hedges 1987), Lofts Farm), but at each of these the pits and internal arrangements are associated with settlement whereas at Cliffs End the nature of that activity appears to have been very different. If the arrangement of features within the internal spaces of the enclosures at Cliffs End did mimic those of other enclosures, then that mimicry must have been symbolic (although it is worth bearing in mind Needham's suggestion that some ring-works may in fact have served to demarcate a non-secular – or not just secular – space within a larger settlement (1993, 54)).

The presence of perhaps three very similar enclosures in such close proximity is without parallel. Highstead again provides the nearest analogue, but even there the variation in enclosure form suggests a very different set of circumstances, as do the activities attested at the somewhat similar site at Kingsborough Manor, Sheppey (Allen *et al.* 2008). Other suggested multiple enclosure sites (South Hornchurch, for instance, Guttmann and Last 2000) stretch the definition of enclosure a little far: as the excavators themselves state, many of the post-built structures at South Hornchurch may not have been intended as substantial physical barriers (Guttmann and Last 2000, 353), which the enclosures at Cliffs End (and indeed Highstead B70) clearly were.

What the Cliffs End enclosures do share with other examples is the presence of material suggestive of metalworking. At Cliffs End, copper ingots and fragments were recovered in the ditches of the Northern and Central enclosures, and this material may in some way mirror the 'copper dross' from Enclosure B70 at Highstead, the bronze casting debris from the Springfield Lyons enclosure and the scrap bronze hoards in the ditch terminals at Petters Sports Field (O'Connell 1986).

## *Mortuary Rites*

*by Jacqueline I. McKinley*

Some facets of the mortuary rites at Cliffs End have parallels in Britain or elsewhere in Europe, but the complex combination of individual rites, the temporal continuity, broad geographic links signalled by the isotope data and location of the remains within one large extended mortuary feature, render the site unique.

The project has benefited enormously from an extensive programme of radiocarbon analysis (funded by English Heritage), including 40 samples (five of them duplicates) of human bone from *in situ* articulated and partially articulated skeletons, and redeposited skeletal elements or parts thereof (Marshall *et al.*, Chapter 3, Tables 3.1–4). This provided a robust chronological framework for a wide range of material which was otherwise largely temporally indistinguishable on a stratigraphic basis. Few of the human bone deposits were accompanied by directly associated datable artefactual material; residual Late Bronze Age pottery was ubiquitous almost to the exclusion of finds of other date (see Chapter 2). Without the radiocarbon analysis a Late Bronze Age date would probably have been assumed for all the human remains; the stratigraphic analysis of Mortuary Feature 2018 and its components could not have been undertaken with any exactitude, and the broad temporal range of the periodic use of this area for mortuary purposes would not have been recognised.

The value of the second programme of specialist scientific analysis, that of the Sr/O and C/N isotopes from 26 dated remains (Millard, Chapter 4), also funded by English Heritage, has been greatly enhanced by being able to link this data to precise dating. The results of this analysis were unattainable by any other mechanism. Although there are indications of some genetic links between individuals (see McKinley, Chapter 4) there was no way of distinguishing what such potential associations could signify. The limited quantity and nature of the artefactual material directly or indirectly linked with the human skeletal material gave no clue as to the individual's origins. The importance of this data cannot be over-estimated; archaeologists have long suspected the ready mobility of people, be that as individuals, small bands or larger population groups, but the evidence for such movement has been restricted to artefactual materials – either in the form of the artefacts themselves or the spread of ideas/forms/types. At Cliffs End there was no direct evidence for links with either Scandinavia or southern Europe, not such as would be recognised or contemplated without the isotope data (see Chapter 4). The great contribution that such analysis can potentially make to our understanding of population mobility in prehistory is yet to be realised.

Mortuary feature 2018 lay immediately downslope of a series of earlier monuments comprising six Early Bronze Age barrows, four with what were probably central graves (no bone survives), and two Late Bronze Age enclosures the establishment of which predate it (see Leivers, Chapter 2). The overall margin of 2018 did not have a distinct cut edge but rather appeared uneven, often 'puddled' or trampled like the edges around a natural pond; such as may be formed via frequent traffic across the area which may have come predominantly from the west. The nature and purpose of the pitting which appears to have preceded its mortuary use, particularly in the southern portion of the feature, remains enigmatic. The lack of finds from the basal layers of many of the pits renders interpretation difficult. During excavation feature 2018 was generally assumed to be the result of 'quarrying', and it has some similarities in appearance with such features, particularly in the plan outline of its southern 'linear' portion, but it is unclear to what end such 'quarrying' would have been undertaken. There is no evidence to support the excavated material having been used to construct barrow mounds or similar earthworks for example (though such could exist outside the investigated area). The nature of the 'brickearth' (a silty/clay loam) is such as to have probably rendered it unsuitable for construction or ceramic production (a deficiency in clay would have resulted in insufficient plasticity), and it does not appear to have attributes which would render it useful for agricultural purposes. It is intriguing that the same form of pitting seems to have extended across a broad temporal range in keeping with that of the mortuary use of the feature, each time being undertaken for an unknown length of time prior to the surviving mortuary deposits being made. Of the relatively small number of pits which lay in the northern portion of the site, the largest – forming the focus of activity – was in its final guise Burial Pit 3666. The area of densest pitting in the southern part of 2018 subsequently formed the focus for the Iron Age mortuary deposits, though these remains were placed above rather than within the pit fills.

There are several examples of abandoned chalk quarries subsequently being used as burial areas in the Early and Middle Iron Age (Cunliffe and Poole 2000a, 152–166; Sharples 2010, 273–280). In these cases the nature of the original features is not in doubt; these generally shallow (maximum 1.0 m deep) cuts having often been extended out on a level from pre-existing pits to extract the chalk presumably either for agricultural or building purposes (Cunliffe and Poole 2000a, 37–8): NB the base of F429 at Suddern Farm is recorded as 'very uneven' though the sections through other quarries from the same site suggest a relatively flat base (*ibid.*, 37 and 152). As in the lower levels of Mortuary Feature 2018, the fills were generally devoid of occupational debris and contained few artefacts, the unwanted spoil from the advancing quarry 'face' apparently being thrown back into the open quarry areas. The mostly unaccompanied burials (none have been subject to radiocarbon dating, the phasing being by association) were made in the abandoned and partially silted features. The four examples presented by Sharples all lay adjacent to Early Iron Age settlement enclosures which themselves seemed to be related to pre-existing boundaries (Sharples 2010, 273–280). In contrast with Cliffs End, none of the burials had associated articulated animal remains, most were made crouched or flexed on one side, and the demographic make-up of the groups was more akin to a normal domestic population (ie, inclusive of younger children). Sharples also suggests that deliberate exhumation and curation of skeletal elements from the cemeteries was being undertaken within the associated settlement areas (*ibid.*). Unlike at Cliffs End, the quarry backfills (deliberately incorporated material and silting) do not appear to have been repeatedly reworked or recut by individual pits prior to insertion of the graves.

Irrespective of the nature of the original features, the multiple reuse of these large features for burial in the Iron Age presents a marked parallel. The proximity of the quarry features to a settlement site imparts an obvious connection between the living and the dead absent – at least in this form (see below) – at Cliffs End, but the location of those enclosures adjacent to an earlier boundary could be seen to have connotations with the siting of 2018 close to the Early Bronze Age barrows and the Late Bronze Age enclosures. The reuse of pre-existing soft ground for burial in a chalk landscape could have had a practical basis in the Wessex quarries but such pragmatism would not have been necessary at Cliffs End. What does strike a significant note, however, is Sharples' observation that such cemeteries suggest a 'corporate sense of identity' by utilising the same feature for communal burial.

The location of 2018, within what would have been recognisable as an established ritual landscape – the barrows would have been extant if denuded and the Late Bronze Age enclosures, in existence for some time and still in use (see Leivers, Chapter 2) – is unlikely to have been fortuitous. There is some indication that the two foci within 2018 were aligned with the gap in the northern arc of the Barrow 5 ring-ditch to the south, and that there was a further connection, at least in the Late Bronze Age, with the entrance to the Northern Enclosure to the west. The surrounding ritual landscape (inclusive of earlier mortuary deposits), alignment and clear evidence for the subsequent mortuary use of the area, suggests that rather than being the product of purely pragmatic activity (like quarrying), the pits themselves had performed a ritual function. The lack of any tangible evidence to support this possibility inevitably renders the suggestion a tentative one, but if the pits had been excavated to act as some form of temporary repository it might explain their otherwise unfathomable apparent lack of contents and frequent recutting. The incorporation in the backfill of pit 3666 of redeposited skeletal elements which appear to predate the *in situ* remains laid towards the base may lend support to such an interpretation.

A range of mortuary rites are indicated, many associated with the theme of transformation: burial of the unburnt corpse with some subsequent manipulation of the remains; the use of communal and individual graves; excarnation with manipulation and redeposition of partially articulated body parts, and curation of individual skeletal elements; exposure with subsequent canid and possibly avian scavenging of remains, and bleaching or charring of some body parts and skeletal elements; and, potentially, human and animal sacrifice (see McKinley, Chapter 4). Most of these activities appear to have been undertaken to some extent in the Late Bronze Age, manipulation of the remains and movement of material across the site probably being at its most common in this phase. The complexity of the rites appears to diminish in the Iron Age but threads of continuity in practice as well as location remain with, in addition to the burial of complete corpse in individual graves, manipulation of remains including the deposition of body parts and exposure to canid and possible avian scavenging in the Early Iron Age, and potential exposure of one entire corpse to avian scavenging in the Middle Iron Age. Although artefactual grave goods are largely absent, the only deliberately placed items being from Burial pit 3666 in the form of the natural chalk lump found with the elderly female 3675, the worked bone object found with the partial articulated skeleton 3673 and the large vessel fragment associated with juvenile 2676, two of the Late Bronze Age (3675 and 3680) and one of the Middle Iron Age (3660) articulated skeletons had deliberate deposits of animal remains associated with them. Other animal remains, some comprising articulated body parts or complete skeletal elements, were occasionally recovered in the proximity of human remains (particularly from within and juxta-3666; see Grimm and Higbee, Chapter 5), but none can conclusively be said to have 'accompanied' a specific individual, and animal bone from some graves was undoubtedly residual 'waste' material fortuitously incorporated in the fills.

Most of the rites seen here – exposure, excarnation, manipulation and curation, charring and association of human remains with midden-type deposits – are characteristic of assemblages from periods in early and later prehistory in Britain: Early Neolithic causewayed enclosures such as Hambledon Hill, Dorset and Etton, Cambridgeshire (McKinley 2008a; Mercer and Healy 2008; Pryor 1998); cairns and chambered tombs (eg, Smith 2006; Reilly 2003; Whittle and Wysocki 1998); and cave deposits (Leach 2008): Late Bronze Age middens/settlement deposits (Boylston *et al.* 1995; Brück 1995; McKinley 2000c): Early–Middle Iron Age settlements and hillforts (Hill 1995; Carr and Knüsel 1997; Cunliffe 1992; McKinley 2008b; Whimster 1981; Walker 1984). The combined occurrence of all these actions, however, together with probable sacrifice by sharp weapon trauma and communal burial of individuals from such a wide geographic sphere, render the evidence from Cliffs End exceptional, but also difficult to comprehend and interpret.

The mortuary use of the northern part of feature 2018, particularly in and around Burial Pit 3666, appears likely to have been of relatively short duration, spanning several years rather than decades. Although the dating evidence gives a potential range of up to 45 years for the formation of the deposits, burial 3649, which appears to represent the closing deposit associated with pit 3666, was probably made within 10 years of the placing of the elderly female (3675) close to the base of the cut (see Marshall *et al.*, Chapter 3). The apparent sacrifice of this local woman did not mark the beginning of the sequence, however, several of the skeletal elements placed further up in the pit fill derived from individuals who died before her, including a mature adult female of 'Scandinavian' origin who moved to northern Britain as a child (2058 ON 101) and a young adult male from southern Europe (204407 ON 536). The broad geographic connection which distinguishes the overall assemblage was present from the start of mortuary activity at Cliffs End; but what drew these individuals together and allied them in this place – other than the sea, visible from a few metres up slope past the barrows and the Central Enclosure, and from which at least three of the former were probably visible – remains enigmatic.

The bones of the mature adult female and young adult male (ONs 101 and 536) had clearly been curated but not subject to the exposure and fragmentation (by various mechanisms) seen in other parts of the disarticulated bone assemblage (Table 4.7). They were recovered together with other skeletal elements, mostly complete or near complete bones (see Table 4.2), purposely deposited rather than incidentally incorporated within what appears to have been an episode of deliberate backfilling *c.* 0.40 m above the articulated corpses. This group of material incorporated the remains of some individuals of a commensurate date to the articulated skeletons and others who appear to have died subsequent to most of them (with the possible exception of 3680); ie, a collection of curated bones of mixed – if close – date. This raises the possibility that the earliest material from 'Scandinavia' and southern Europe could have arrived at Cliffs End in the condition it was found in, as dry curated bone rather than the individuals themselves arriving whilst alive. It may be possible to answer this question at some future date once the problems of undertaking Sr/O isotope analysis on bone (due to the effects of diagenesis) have been resolved (Trickett *et al.* 2003); the isotopes from bone having the potential to illustrate where an individual spent the last five years or so of their lives.

In addition to the articulated skeletons not representing the oldest remains recovered, they were also not amongst the first human remains to be placed in Burial Pit 3666. The pit itself is likely to have been recut, maybe several times, before acquiring its final excavated form, and it is possible that some of the redeposited human bone recovered from the fill and the juxta-3666 group could originally have lain at or close to the base as complete/partial articulated skeletons or disarticulated bones, only to be moved in subsequent acts of excarnation/manipulation. It may be pertinent to note that most of the juxta-3666 remains were recovered from the area to the north of the pit, and that the thick deposits of initial silting in its base also came in from the north, possibly from up-cast lying on this side. Although, with the exception of the few bones from 2058 mentioned above, all the dated redeposited bone from in and around the pit lay at a similar or later level in the dating sequence to the articulated remains (Table 2.2), not all this bone was subject to scientific dating and some of it could feasibly predate the elderly female 3675. None of the few human bones and fragments recovered from below the *in situ* remains were subject to radiocarbon analysis either, but at least some is likely to be of an earlier date than the elderly woman (some fragments from one dump of natural (3681) could have been incorporated from above via bioturbation).

The human bone from the two burnt layers 2682 and 2689, below the articulated skeletons, could represent parts of the same individual (upper limb and axial elements). It had clearly, been exposed long enough at some stage for some of it to have been subject to slight canid gnawing and other elements had been burnt/scorched as dry/semi-green bone (Pl. 4.3). Some of the other material within these deposits had also been heated/burnt (flint, stone and clay), though the mix of burnt and unburnt finds suggests materials from two or more places had been amalgamated before this final deposition. Human bone burnt in this manner was only found in one other location, in the midden-type deposits associated with the Northern Enclosure to the west; providing one of several possible links between the features. A smaller proportion of the human compared with animal bone from the prehistoric assemblages had been affected by burning, though it was not extensive in either case (see McKinley, Chapter 4), and the similarity of location is therefore of interest. The mostly burnt/charred remains of two neonatal lambs were recovered from layer 2682 (fragments of burnt sheep, pig and cattle were also found in these layers). The burnt/charred remains of a further pair of older lambs were contained within the dumps of burnt material found to the south-east of Burial Pit 3666 (3650 and 3652). The deposition of pairs of lambs is a recurrent feature of Burial Pit 3666 (Fig. 2.22); a pair of neonatal lambs represents the primary placed deposit in the base of the pit after the episodes of initial silting (layer 3681; ABG 637); the remains of a pair of neonatal lambs were included in the early burnt deposits; and the remains of a pair of neonatal lambs were recovered from the pelvic area of the elderly female 3675 (the remains of one other neonatal lamb may have been associated with one of the juveniles (3674) or have been residual from the underlying layer).

There are two themes here which are pertinent to the initial use of Burial Pit 3666 in its final form; the potential symbolism of the burnt deposits and spring lambs. Burning/charring of dry/semi-green human bone has been observed in small quantities of remains from numerous prehistoric sites featuring assemblages of disarticulated bone. At the Neolithic causewayed enclosure of Hambledon Hill, for example, 1.4% of the human bone was in this condition (compared to only 0.7% of the animal bone; McKinley 2008a), and similarly small quantities were observed from Fussell's Lodge and West Kennet, Wiltshire (Brothwell and Blake 1966, 40; Piggott 1962, 24; Wells 1962, 81), Hazleton, Gloucestershire (Saville 1990, 104, 183 and 260), and other long barrows (Kinnes 1992, 101). Fewer examples have been reported from final Bronze Age/Earliest Iron Age 'midden' or settlement deposits, including Potterne, Wiltshire (McKinley 2000c) and Runnymede, Surrey (*c.* 2.1%; Boylston *et al.* 1995). There are also later examples from some Iron Age 'structured' pit deposits eg, Ham Hill, Somerset (McKinley 1998). In all these cases fragments of skull were predominantly affected, the burning generally appearing to have occurred after the bone was broken. What is unclear is whether this burning was deliberate or accidental; ie, occurring after the main process of transformation had blurred the distinction between human and animal bone and any other 'debris'. The inclusion of charcoal, burnt animal bone and other burnt materials within the same context may suggest the latter. One case from Runnymede, where a fragment of fairly well oxidised skull was 'buried' under a cairn (Boylston *et al.* 1995), indicates the significance and symbolism of this treatment was not consistent, however, and there may be cases where the burnt deposit itself was of symbolic significance. The burnt/charred bone fragments from Cliffs End differ from most of these examples in the skeletal elements affected and the location of the deposits. Fire has two powerful symbolic motifs – those of transformation and cleansing; it may have been in both capacities, as a purifying agent inclusive of several 'transformed' materials themselves of potentially symbolic significance that the burnt deposits were included amongst those initially made in the base Burial Pit 3666.

The recurrent inclusion of neonatal lambs in the three earliest placed deposits in the base of 3666 is unlikely to have been coincidental or fortuitous. The lambing season would have fallen predominantly within the month of April (see Grimm and Higbee, Chapter 5); a transition period between winter and summer, prone to variable and unreliable weather, a time in the annual cycle in which much of the year's prosperity would be decided with the birth – and death – of the new season's livestock and a successful start to the growing season. The physical pairing of the lambs could reflect a number of factors (*ibid.*). The degree of articulation and completeness of the carcasses is not conclusive in each case, but there is compelling evidence to suggest they were probably made in fairly rapid succession, not necessarily all in one season (a 1–10 year interval is indicated by the radiocarbon results between the first pair of lambs and the burial of the elderly female) but possibly successive ones. The initial silting and slumping within 3666 could have occurred following successive seasonal downpours, and the series of shallow deliberate deposits made thereafter also suggest rapid formation probably within one or two seasons on the basis of the absence of further silting. Had the lambs died of natural causes or been sacrificed? Not a question we can answer but either case would cause or indicate a concern for the future; to lose precious lambs at birth or to feel compelled to give them up. The physical link between one of these pairs of lambs and the elderly female 3675, and her death and deposition within one or the same season as those placed in the base of the pit, implies a connection between the events. It also indicates that the woman had died in the Spring, her unhealed head wounds and burial position/location strongly suggesting she was killed deliberately, perhaps sacrificed to assuage or intervene with whatever could or was killing/affecting part of her community's future and to ensure their continued prosperity. Wise matriarch or dispensable old lady? The former would make a more worthy negotiator, potentially a greater sacrifice to the community. There may also have been a deliberate dichotomy between the new-born and someone approaching the end of a long life; entry and exit, new and old, carer and cared-for. Such themes, encompassing liminality (which can take various forms beyond the obvious physical), renewal, and, significantly for Cliffs End, identity and continuity, have been explored by numerous researchers (Bradley 1981; Bloch and Parry 1982; Brück 1995; 2001; Hill 1995; Parker Pearson 1996; Van Gennep 1977). The observation that 'the control of

*Plate 6.1 Detail of burial remains 3675 showing chalk lump*

agricultural production appears to have become explicitly articulated as a basis of political power' in the Late Bronze Age (Brück 1995, 264), may be particularly pertinent in regard to these 'foundation' deposits in the base of 3666, suggesting the intent to affect a wider arena than that of a single community.

Contemporaneous evidence for potential victims of sacrifice is sparse and, the contexts suggest, of a different nature to that seen here. The two most convincing cases both involved subadult ('teenage') females; both appear to have been killed by one or more blows to the head, and neither received the carefully orchestrated burial of the elderly female at Cliffs End. The case of the Trisomic girl from Rome, deposited in an isolated grave in a marshy area, was outlined above (see McKinley, Chapter 4; Charlier 2008). In the second case, from Stillfried, Austria, the girl had been struck five/six times in the head (right parietal) with a ?club/mace and subsequently buried under the rampart (Osgood and Monks 2000, 75–76, fig. 4.4). One other case suggested as representing the remains of 'votive ritual practice' is the mass burial of 205 individuals from Cezavy Hill in Moravia (*ibid.*, 74–5), though none of the remains had skeletal evidence of trauma.

The enigmatic and rather bizarre posture of the elderly female within 3666 is difficult to decipher, and there are no known parallels. It is likely she was arranged in position within hours of death, and whilst the symbolism of the small piece of chalk she held clasped in her left hand as in a posture of sniffing or being about to eat may have been clear to those who buried her, it is currently unfathomable. Chalk artefacts featured in deposits with human bone in the Neolithic (Leach 2008), and the white colouring of the material – as with white quartz pebbles in much later early Christian graves – may have had some symbolism associated with purity, renewal or have been ascribe healing power (Gilchrist and Sloane 2005, 144–5): 'I will also give him a white stone with a new name on it ...' (Revelations 2: 17 (NIV)); 'Behold this white pebble by which God will effect the cure of many diseases amongst the heathen nation' (Adamnan, *Life of St. Columba* (AD 521–97) Book II, Chapter XXXIV). The Cliffs End example (ON 624), however, was not modified in anyway and did not even appear to mimic any particular shape; it was, ostensibly, just a small fragment of chalk (Pl. 6.1). Similarly, the right finger extended above the woman's head apparently pointing to the south-west (NB. the 'pointing' action of the index finger as seen here can be assumed naturally in sleep (pers. obs.) but combined with the extended arm makes it appear a deliberately adopted posture in this case); what was she pointing at? There was nothing surviving within the pit which could have been the subject of attention, nor within the wider mortuary feature; the sea, which one might anticipate she was indicating, lies to the south not the south-west; however, the projected line directed does appear to pass through the centre of the Central Enclosure. The latter was still in use at this stage but the nature of the activities being undertaken within it are uncertain; as far as can be deduced it served a ritual function probably associated with feasting (see Leivers, Chapter 2). There may then, have been a direct relationship between the Central Enclosure and the mortuary activity, feasting perhaps being undertaken to coincide with stages in the transformation process such as may be observed in ethnographic parallels (Metcalf and Huntingdon 1991, 108–130).

The other corpses, excavated as articulated skeletal remains (two locals and one southern European), appear to have been placed in respect to the elderly female, either in close (touching) proximity or focusing on her (3676 turned to 'face' her). How rapidly these corpses were incorporated into this communal burial pit is unclear. As previously noted, the radiocarbon sequence indicates that 3666 was filled and 'closed' by the deposition of the subadult 3649 potentially within a decade. There is no evidence to suggest the pit was backfilled and re-excavated in order to make subsequent interments, which implies either relatively rapid deposition or the employment of an effective temporary cover (wood/textile/skins) which ensured little/no silting or access by scavengers. The presence of a temporary cover is further supported by the apparent manipulation of the two juvenile skulls whilst in at least a semi-decomposed state (which may have required only a few months dependent on the burial conditions), and by the slightly 'relaxed' attitude of some of the remains suggesting they were not tightly packed-around with soil (Pl. 2.7).

There are no parallels for communal graves of this form in the Late Bronze Age. Early Bronze Age/Beaker graves containing the remains of multiple burials and/or redeposited bone from several individuals are, whilst not frequent, well known in the British archaeological record (Fitzpatrick 2011). There are Early/Middle Bronze Age examples from outside Britain but they tend to be of a specific nature related, for example, to war dead/massacre victims (Louwe Kooijmans 2005; Osgood and Monks 2000, 45–48). A currently undated prehistoric pit, of similar shape and size (*c.* 4.0 x 4.0 m) to 3666, was excavated *c.* 400 m north of Cliffs End in 1974. The remains of two articulated skeletons were recovered from individual graves cut within the overall feature, but no other mortuary deposits were found (Willson 1984).

The partially articulated and disarticulated skeletal elements and bone fragments, both human and animal, scattered within 3666 at the same level as and immediately above the *in situ* remains have the appearance of deliberately incorporated material, but without the grouped/placed form of the remains from layer 2058 *c.* 0.40 m above. The incorporation of partially articulated remains again raises the possibility that 3666 had functioned as a burial pit before the deposition of the corpses whose remains were *in situ* at the time of excavation, and that these articulated elements represent a median stage in the decomposition/fragmentation process. The alternative of the material being incorporated from outside the pit is potentially supported by the partial articulated remains 3673, which post-date three of the four articulated skeletons in the burial sequence (Table 2.2) so could not have been ejected to make way for their incorporation. The two possibilities do not have to be mutually exclusive, however. The four complete articulated skeletons were confined to only one half (the south-eastern) of the pit and the partial articulated skeleton 3673 was bundled in the south-west 'corner' (Fig. 2.14). The latter could originally have been deposited as an entire corpse and subject to later manipulation without disturbing the remains in the other half of the pit. Other corpses could have been treated likewise but have been subject to less obvious curation. The reworking and redeposition of remains at various stages in the 'transformation' process within the one feature, their fragmentation increasing with each new interment and disturbance, has analogies with Neolithic chambered tombs and could also be postulated for some Iron Age midden pit deposits (McKinley 2008b); though any similarities with the earlier mortuary practice would doubtless be unrecognised by the Late Bronze Age practitioners.

This idea of 'revisiting' the burial pit is further supported by the apparent manipulation of the two juvenile skeletons, one to manoeuvre the skull (3676; Pl. 2.7) and the other to remove parts of it (3674). Although the identification is not conclusive, what could be parts of the latter were later returned to the pit amongst the deliberate deposit of bones made in layer 2058 (see McKinley, Chapter 4). If this were to be the case, the condition of the bone (there are two possible cranial contenders) implies it lay amongst wet, cess-like material for at least several months before being returned to 3666. The only other bone in the assemblage which shares the appearance of these cranial fragments is a long bone from the midden-type deposits associated with the Northern Enclosure – a second possible link between the material in these two locations (see above and McKinley, Chapter 4). Removal and redeposition of skeletal elements in a more fragmented state is also indicated by occasional joins between bone fragments situated up to 1.27 m apart (Table 4.2: Fig. 2.21). Such joins between elements, indicative of reworking and increased break-down, were also seen amongst the redeposited bone from the juxta-3666 and North-east group; all elements of skull distributed over 0.40–1.84 m.

One of the major differences between Cliffs End and other sites with contemporaneous deposits of a similar form is the nature and setting of those deposits and the features with which they are associated. The majority of such Late Bronze Age material derives from settlement sites (*c.* 64.3% Brück 1995, fig. 3), mostly from the fills of negative features (81.8%; *ibid.* fig. 2) and generally in association with midden/occupation debris (*ibid.*; Boylston *et al.* 1995; McKinley 2000c); the skeletal elements are predominantly fragments and there are sometimes indications of extensive gnawing (Boylston *et al.* 1995; Brück 1995; McKinley 2008b). The disarticulated bone assemblage at Cliffs End predominantly derives from Mortuary Feature 2018 (90.4%; Table 4.7), however, a small proportion was recovered from the midden-type deposits within features forming components of the Northern Enclosure, and there is evidence suggestive of interaction/interchange between these deposits and those within Burial Pit 3666. The limited recovery of burnt bone and that with a precipitate indicative of temporary deposition in a wet environment (possibly a surface midden) from these locations has already been mentioned. The levels of fragmentation seen in material from the two locations is also similar, both including a higher portion of complete skeletal elements than seen elsewhere in this phase. Despite the recovery of a few fragments of bone with clear canid gnawing from both places this implies limited exposure of the remains (though it should be noted that carnivores can scavenge a corpse without leaving any visible marks in the bone Haynes 1980; Horwitz and Smith 1988). This observation is further supported by the recovery of a higher proportion of the bones of the axial skeleton from these contexts than from others of this date (Table 4.7; see McKinley, Chapter 4).

There are differences between the assemblages; 3666 contained a greater proportion of the small hand and foot bones than the midden-type deposits, which in turn included a greater proportion of adult femora, some of which, together with other elements, could directly relate to remains deposited in Burial Pit 3666. Overall, however, the appearance of the material from these two locations is suggestive of manipulated material subject to excarnation by mechanisms other than exposure. Evidence from the partial articulated skeleton 3673 for the separation of body parts by physical force, including smashing bones, demonstrates one such mechanism, for which there are also indications in Early–Middle Iron Age assemblages of this type (McKinley 2008b). Some of the remains from both areas probably originated from a third place, and it is not improbable that, as suggested for the oldest dated human bone from layer 2058 discussed above, some may represent material brought into the site from elsewhere; however, more of the bone within Burial Pit 3666 may have derived from corpses originally deposited within or adjacent to it. Any interchange between the locations (which is hinted at) may have included the deliberate selection of specific skeletal elements for deposition in one or the other; certainly the inclusion of four right male femora within the midden-deposits compared with only one in 3666 suggests selection.

The other Late Bronze Age deposits show a reduction in the size and diversity of the skeletal elements which, although devoid of visible signs of gnawing, are likely to have been subject to more canid scavenging than the material from the cut features, as well as more frequent episodes of human manipulation (see above). The gnawing is no surprise given that this material was probably subject to exposure as green or semi-green material at surface level.

There is some slight evidence for limited bleaching and longitudinal splitting in material from most of the Late Bronze Age contexts, but this could have resulted from burial in shallow graves (where the effects of temperature changes would be more readily experienced and a minimal soil cover could wash-off to expose some of the bone) as much as from surface exposure. None of the bone is substantially bleached, however, suggesting there was no long-term exposure of the bone.

The most frequently recovered skeletal elements at Cliffs End are in keeping with those recorded from such assemblages across the temporal range; elements of skull and femora predominating (adult occipital bone and right femur; immature left parietal). At Hambledon Hill the parietal vault and right femur were most common (though the siding of the latter was not significant; McKinley 2008a). Cranium and femur were again the most frequent elements at Runnymede and Potterne, with no marked siding preference for the femora at the former but a dominance of the right side from the latter (Boylston *et al.* 1995; McKinley 2000c). The right femur has also been noted to dominate in many of the Iron Age assemblages (McKinley 2008b; Walker 1984; Whimster 1981, 183; Wait 1985; Wilson 1981). Whilst preferential preservation would undoubtedly have been a factor to a large extent in this pattern (see McKinley, Chapter 4) it cannot have been the only factor; skull and femora comprise easily recoverable and readily recognisable human elements, which is likely to have made them preferential subjects even without the symbolism so often attributed to the skull from the Neolithic onwards. The apparent preference for the right femur – or the left if one considers that may have been removed preferentially – is as yet unexplained.

It has been observed that Late Bronze Age/Early Iron Age pit burials sometimes appear to afford similar treatment to animals and humans, for example; burials of a horse (almost complete, forelimbs removed prior to burial and placed with the rest of the animal in the pit, possibly for practical reasons (ease of manipulation)), a lamb and a ewe were found in pits at Runnymede (Boylston *et al.* 1995; Done 1991; Needham 1991, 110); and articulated elements of several species, particularly horse and cattle, were recovered from the late Early Iron Age pit 297 at Broom, Bedfordshire (Cooper and Edmonds 2007, 169–171). The possible symbolism of the inclusion of neonatal lambs in the Late Bronze Age deposits at Cliffs End has been discussed above, but they did not comprise the only placed animal deposits within the assemblage. The cattle remains with the subadult female 3680 clearly comprised a deliberate deposit, and other cattle elements were recovered from the same level in Burial

Pit 3666; most were in commensurate condition to the redeposited human bone at the same level (ie, complete bones not fragments) which suggests they did not represent food waste (see Grimm and Higbee, Chapter 5). The composition of the prehistoric animal bone assemblage indicates that cattle represented the most important species in the Late Bronze Age but that it was being utilised for its secondary products rather than as a primary meat source. It is likely to be the animal's importance within the economy which led to part of one of the creatures being used as a pillow for this young woman (Pl. 2.8). Since the suggested use of the Central Enclosure, which the elderly female 3675 appeared to be indicating as a place to be taken note of, was for feasting, it is perhaps unsurprising that much of the disarticulated animal bone comprises food waste (see Grimm and Higbee, Chapter 5). Should the suggested reason for that feasting be correct (see above), the inclusions of 'joints' not necessarily representative of the best cuts with the mortuary deposits would also seem a reasonable hypothesis. Alternatively, if one subscribes to the role of human remains as being within the scheme of transition, renewal, agricultural fertility and power (Brück 1995), then direct association between the human remains and material derived from the source of economic/agricultural fertility could represent a powerful favourable combination; though, yet again, the two ideas do not have to be mutually exclusive.

The burial of a substantial portion of an adult male horse with a subadult male (3660) in the Middle Iron Age is probably linked to the species' growing importance as a mode of transport, particularly for those of warrior status, since the Late Bronze Age (Osgood and Monks 2000); though why the creature was so mutilated before deposition in this case is not known. The horse remains from pit 247 at Broom, although representing only parts of the animal (skull and limb), had been treated differently from the other domesticates recovered from the feature (mostly disarticulated and butchered sheep bone), again suggesting the adoption of a special attitude towards this species (Cooper and Edmonds 2007, 169–171; also see reference above to the Late Bronze Age horse from Runnymede). Elsewhere, the juxtaposition between animal and human remains involved other species; for example, the remains of a MNI 38 beasts, 14 of them articulated/partially articulated, were recovered with those of five *in situ* human burials from what was originally termed a 'working hollow' at Aylesbury, Buckinghamshire (Farley and Jones 2012, 20–49). Here sheep/goat predominated, over half of the articulated remains representing those of young lambs (*c.* 3 months).

With the exception of the bone associated with the dog pelt, much of the other disarticulated bone from the Iron Age phases is likely to be residual Late Bronze Age commensurate with most of the pottery recovered from the same levels (Figs 2.18–2.20). It is possible, however, that some tradition of mortuary-related feasting was continued, both on behalf of the living and the dead, and if so there are indications that the offerings to the latter were more generous than previously in the quality of the cuts presented (see Grimm and Higbee, Chapter 5).

The Iron Age mortuary rites appear to have been less complex than in the Late Bronze Age, particularly in the Middle Iron Age where most of the MNI derived from the articulated remains (Tables 4.8–4.9); this may represent early signs of the shift from the '... fragmented partible people of the Middle Iron Age to those circumscribed and sacrosanct individuals of the Late Iron Age' expressed by Sharples (2010, 280). Meanwhile, there remained a strong continuity in terms of location, the depleted but still present practice of excarnation, and in the origin of the individuals included in the mortuary rite. The latter maintained a marked 'Scandinavian' link with a few locals, one 'southern' individual and one non-local of uncertain (?British) origin. The positioning of the only Iron Age individual (3656) to be buried in the northern portion of Mortuary Feature 2018 must have been deliberate, placed as she was within the curve described by the presumably much eroded/partially erased (the grave cut through a layer overlying both the ditch and surrounding area; see Chapter 2) but extant ring-ditch which was inserted to mark the location of Burial Pit 3666 when it ceased to be used and was effectively 'closed' (Fig. 2.22). There is also the intriguing fact that she, in common with one of the two oldest known occupants of the pit (see above), had a 'Scandinavia' origin and moved as a child to Britain, though in this instance she moved to the locality in which she was buried rather than somewhere to the north (see above).

With one exception (3563), the articulated Iron Age skeletons were all recovered from individual graves cut through the various fills of Mortuary Feature 2018. These graves survived to only a shallow depth, all had been diminished by the reworking of the redeposited brickearth and were difficult to distinguish; it is probable that burial 3563 had also been made in a grave but that all traces had been eroded via these various mechanisms. It is possible that at least some of the graves had been shallow to begin with; longitudinal splitting, as described above, was observed to lower or upper limb bones from three graves suggesting the overlying depth of soil was fairly thin. The confined positions of some skeletons and slightly odd arrangement of others do not necessarily have sinister connotations; some had clearly been affected by normal post-depositional subsidence (see Chapter 2) and others may have had parts of their anatomy bound for ease of manoeuvring the corpse (eg, hands bound at wrists to stop the arms flopping about).

The exposure patterns observed in the Early and Middle Iron Age phases seem to take slightly different forms, and in neither case is it clear whether we are seeing less advanced stages of what may have been undertaken in the Late Bronze Age or something different. There is, for example, limited evidence in the Iron Age phases for the manipulation and excarnation by means other than exposure which was postulated for the Late Bronze Age. There is evidence, both direct and indirect, for canid gnawing in the Early Iron Age assemblage, at a slightly higher rate than in the Late Bronze Age, particularly within the West-central group. There is evidence for the exposure of adult body parts to both canid and possibly avian scavenging in the East-central and Southern groups (see Chapters 2 and 4); right upper limb and neck elements spread over a *c.* 1.50 x 0.50 m area in the Southern group; left upper limb and thorax (*c.* 0.75 x 0.55 m area) and left lower limb (*c.* 1.20 x 0.65 m area) in the East-central group (Fig. 2.32). These deposits are reminiscent of the partial skeleton 3673 within Burial Pit 3666, although, unlike in that case, there is no surviving evidence for the physical break-down of the remains by human action (ie, bone breakage/smashing) which is likely to have occurred. A similar, Middle Iron Age case from the same East-central group suggests the exposure of a full corpse (12–14 year old ?female). Here *c.* 30% of the skeleton was recovered, including elements from all parts of the body, spread over a *c.* 2.0 x 0.65 m area (Fig. 2.32); although there was mixing of elements from different areas, and joins between fragments up to 1.85 m distant clearly demonstrating manipulation of the remains, a general north-south anatomical distribution can be discerned with most of the skull to the north, upper limb in the central zone, axial skeleton spread from north-south and lower limb towards the southern end. No hand bones were recovered but foot bones were; much of the trabecular bone of the axial skeleton has gone but the dorsal portions of at least half the vertebrae and most complete cervical vertebrae are present; similarly many of the unfused epiphyses of the long bones are absent but some were recovered; interestingly, the largest long bone shafts – femora and tibiae – were not found. Whilst much of the missing bone is that which may be expected to be lost via canid scavenging, the latter – particularly in view of the preservation of the foot bones, lower limb epiphyses and patellae – is indicative of deliberate removal by human action.

The patterns of preservation seen in these bone groups and the spread of the material indicates a mix of agencies involved in their fragmentation; human (body part deposition and removal of lower limb bones from the complete corpse); some canid gnawing and possible avian scavenging. Some of the elements removed from all these corpses is typical of that seen in canid scavenging, but if they were readily exposed to such activity one would expect to see greater loss of foot bones and articular surfaces than has occurred. Canid activity may have been deliberately limited by posting ‘guards’ (eg, a child with a stick) to keep them at bay or inserting a barrier of thorny vegetation above/around the remains to deter them (branches from such vegetation are often pushed into the ground over/around fresh graves in parts of central Europe to deter animal disturbance; pers. obs.). Some of the movement observed could have resulted from avian scavenging, which seldom leaves direct physical signs on the bones (Bochenski *et al.* 2009; Khan 2006). The use of excarnation towers or ‘tree burials’ is documented in the ethnographic record, particularly from North America and Australia (Hammerton 1922, 299; Ubelaker and Willey 1978), and the existence of such platforms has been argued for at several sites in Britain (Scott 1992). Placing the corpse above ground would offer some level of protection from canid activity (until/unless parts fell to the ground) whilst leaving the corpse exposed to defleshing by birds and insects. Most of the research into avian scavenging behaviours has focused on carrion birds, ie, vultures and large scavengers such as eagles. There is no evidence for the former in Britain but eagles, buzzards and kites would probably have been in the area (S Hamilton-Dyer pers. comm.), and the various corvids are notorious scavengers (as are seagulls); consequently, the presence of the remains of a buzzard from the fill of Burial Pit 3666 may have been other than fortuitous (Fig. 2.22; see Grimm and Higbee, Chapter 5). Most of these birds would be active in removal and consumption of the soft tissues, potentially leaving little evidence on the bones themselves, but scattering of bones is common and some of the larger raptors could remove some bones from the site (Bochenski *et al.* 2009; Khan 2006; Robert and Vigne 2002).

There are no observable links between the age or sex of the individual and the mortuary rite undertaken (other than a greater proportion of immature individuals amongst the articulated remains which could reflect a variety of factors), nor between the latter and the origin of the individual. There are indications of a temporal shift in emphasis in relation to origin, but a mix of indicated origins is consistent throughout. Hints of greater homogeneity amongst the females, irrespective of date and origin, may indicate they represent 'stability' and the source of continuity linking the widely geographically and temporally dispersed communities coming together at Cliffs End. The role of memory (oral tradition) and place would be paramount if such were to be the case. It has been observed that human remains represented 'a medium of expression for some of the main concerns of communities during this period' (Brück 1995), and the key to understanding the concerns of the Cliffs End populations may lie in the location of the site. Situated on a geographically significant sea-board boundary, projecting into the Channel, did Cliffs End represent a 'triangulation point' between distant but similarly located coastal communities with which it shared economic interests, and where the roles of ritual and 'politics' remained firmly intertwined?

## Thanet: Fulcrum of the North-Western Seaways

*by Stuart Needham*

This section draws heavily on the observations of the excavators and the deductions of the post-excavation analysts presented in this volume. The opportunity has been taken to consider how in principle we interpret such a remarkable body of evidence as has emerged at Cliffs End. Some alternative ideas are explored in order to explain site sequence and both internal and external relationships. It should be noted that the principal investigators in this project may not subscribe to all that follows.

It is novel enough to have found a site with three phases of mortuary activity of the 1st millennium BC; however, undoubtedly the most stunning discovery is that the buried population includes a significant number of 'isotopic aliens'. Although it is far from surprising to discover that people moved around in this period, the tremendous importance of these results lies in their empirical evidence for the movement of people and/or their bones independent of the assumptions derived from artefactual and structural evidence. While it may now be accepted that movement around the western and northern seaways of Europe was endemic in later prehistory (eg, Cunliffe 2001), enormous questions remain regarding which specific members of society might have been engaged in travel, the typical distances involved and whether the primary pursuit was trade or whether that was just one element in a broader package of social interactions.

One inevitable question in relation to the Cliffs End site is whether the geographical position of the Isle of Thanet might have led to it being more frequented by foreigners than other areas of north-west Europe. Aside from being coastal, much has been made of its crucial position alongside the Wantsum Channel, which during later prehistory offered a short-cut for sea craft heading for the Thames estuary from Continental coasts and *vice versa* (Perkins 1992; 2007; Parfitt 2004b). Cliffs End itself overlooks the eastern entrance to the Wantsum. But Thanet's position may well have seemed nodal in another respect; even before the advent of Cartesian maps it would undoubtedly have been appreciated that eastern Kent was situated at a major interface between one major seaway, the North Sea, and another, the Channel, the former giving passage to northern Britain, Scandinavia and the Baltic coastlands, the latter being the conduit to a wider Atlantic world. This stretch of Kentish coast (from parts of which the continental shores can be seen on a clear day) was in essence a fulcrum within the maritime highways of north-western Europe (Fig. 6.1). Furthermore, the special properties of islands (eg, Rainbird 2007) may have made Thanet an obvious hub or special place within this fulcrum and two major rivers penetrating southern Britain and the Continent turn this into a 'cross-roads'. Looked at from this geographically deterministic viewpoint, the presence of isotopic aliens at Cliffs End may seem rather unsurprising, but the fact that some come from what may have been the limits of the 'known world', from the perspective of a Thanet community in later prehistory, is of considerable potential significance.

Arguably the biggest methodological challenge for the kind of isotopic data now being generated for sites such as Cliffs End, and in wider projects such as that for Iron Age populations on the Yorkshire Wolds (Jay *et al.* 2013) or the *Beaker People Project* (Jay *et al.* 2012), lies in the non-uniqueness of any given isotope combination. If we are left with multiple possible answers, should we assume that the childhood origins of humans are most likely to conform to patterns otherwise recognisable in the material evidence, or should we grasp the nettle that this data could relate to an entirely different facet of the social system than seen in more conventional forms of evidence, and thereby point to unexpected connections?

These two branches of evidence probably refer to very different aspects of the social system(s) giving rise to them. Material culture can be very fickle in its representation and, moreover, a mismatch could easily be exacerbated by the potentially specialised nature of the interactions responsible

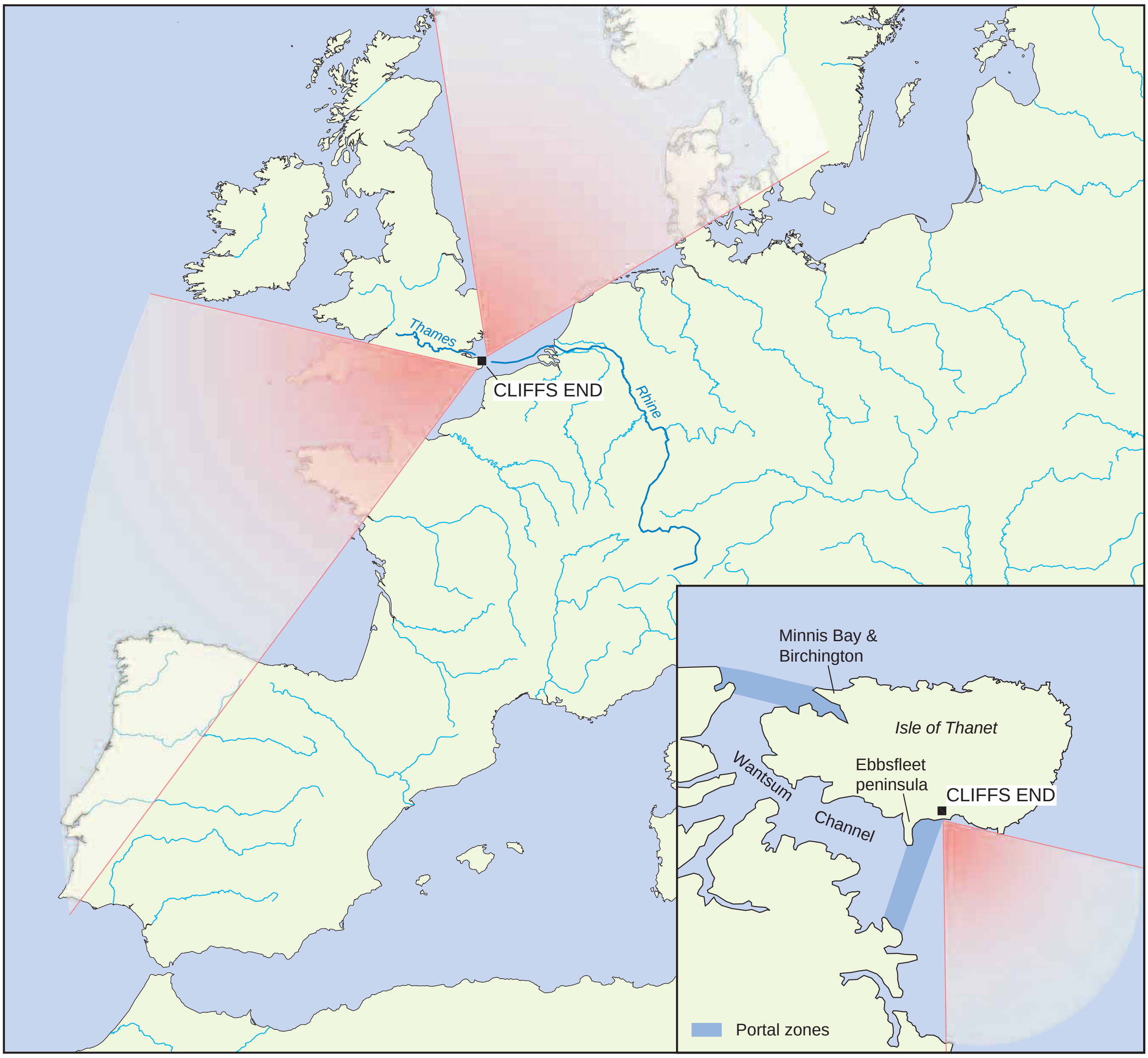



*Figure 6.1 Thanet and the east Kent coast as a fulcrum in the north-western seaways and, inset, the sea vistas from Cliffs End*

for bringing foreign individuals, or their body parts, to Thanet. The overwhelmingly indigenous character of the durable material assemblage at Cliffs End (unfortunately only represented for the Late Bronze Age phase) would seem to rule out it being, for example, an entrepôt site or a distant colony on the Phoenician or Greek models. Instead, despite the high incidence of 'foreigners' and the unusualness of some of the mortuary contexts, the activities represented in the excavated area evidently took place within a cultural setting rooted in the locality, in the Late Bronze Age at least.

Only a very small and unexceptional proportion of the material assemblage can be unequivocally identified as having been imported, notably the copper ingot fragments (see below). There are various possible reasons for this being the case. Foreigners who married into the local community or foreign children who were adopted would quickly have come to rely on local equipment for their everyday activities. Individuals taken from their homelands against their will – prisoners, slaves or abducted minors – might be expected to have been deprived of their own cultural trappings and if clothing was sometimes an exception its almost inevitable loss through decay robs us of the evidence. Yet other complications might arise if some or all of the Cliffs End isotopic aliens were, whatever their place of childhood upbringing, actually part of a specialised seafaring group whose material culture was not particularly closely tied to any single land-based culture; however, this cannot be argued from the material assemblage even if it might seem a feasible scenario from the skeletal side. The apparent mismatch between artefactual and skeletal assemblages from the site as a whole could in fact be artificially enhanced if the buried population was biased in favour of foreigners, and this may well have been the case in both the Bronze and Iron Ages although not necessarily for the same reason. In this situation, although dominating the burial record, they might only represent a tiny proportion of the local population generating the cultural debris encountered on the site and in the locality.

Another crucial question arises in McKinley's discussion. When *in situ* burial remains are shown to be isotopic aliens, as is the case for several at Cliffs End, it is natural to think in terms of the movement of humans through life. However, this need not be the case for disarticulated remains, which could have circulated within and between societies for various arcane reasons. Moreover, the suggestion that bodies were mummified in the Bronze Age at Cladh Hallan in the Outer Hebrides (Parker Pearson *et al.* 2005; see also Lally 2008, 123), introduces yet another theoretically possible component, the movement of long-dead corpses, or parts of them. So we may not assume that all the skeletal remains came to Cliffs End as living humans.

There will always have been some elements of society who travelled much and/or afar – for example war-bands, religious specialists, traders and leaders. From the dietary and health evidence (see Chapter 4) there is no obvious indication that Cliffs End individuals were unusually well fed, so they need not have been of especially high status, though equally there is no osteological evidence to suggest they were of particularly low status either (McKinley, Chapter 4). Most discussions relating to mobility during this 1st millennium revolve around warfare and trade, and the latter will be discussed in more depth below. However, these activities do not obviously in themselves explain the appearance of foreigners at Cliffs End, where articulated skeletons were weighted collectively towards females and adolescents (probably of both sexes); Redfern's deduction that women were often involved in violence during the Iron Age at Maiden Castle, Dorset, does not invalidate this statistical point even if this 'conflict mortality profile' comes to be found elsewhere in due course (Redfern 2011).

Another noteworthy aspect of the age-gender profile of the human skeletal assemblage, true of all three phases, is that infants below the age of about six are absent and remains of children aged up to 10 years are few and very fragmentary (Tables 4.1–4.4). This runs against the grain of the wider evidence, particularly where it is relatively abundant from Iron Age settlement sites and hillforts (eg, Lally 2008). Thus despite some similarities in the post-mortem treatment of human remains, the Cliffs End assemblage stands out as rather specialised in this respect as well as in the high incidence of isotopic aliens.

The key to further discussion is to split the Cliffs End evidence into its phase constituents for not only is the broad-scale cultural background very different from one phase to another, but it also emerges that the character of mortuary activity and the balance of isotopic aliens is not uniform. The Early Bronze Age barrow group apparently creates the stage for successive activity within the Late Bronze Age (c. 1000–800 cal BC), Early Iron Age (c. 500–400 cal BC) and Middle Iron Age (c. 400–300 cal BC), and then yet again in early Saxon times (see Chapter 7).

### *The Influence of the Early Bronze Age Barrow Group*

The Early Bronze Age barrows at Cliffs End (Fig. 1.5) clearly acted as a focus for later mortuary activity at different times, but would these particular barrows have seemed special in any way? Rather little has been discovered about the barrows themselves owing to their total levelling and the presumed decay of skeletons in four grave-like features. To put this barrow group in perspective we need to consider the broader pattern of barrow distributions flanking the Wantsum Channel. In recent years it has become apparent that barrows were extremely abundant in Thanet and on the opposing shores of mainland Kent (Moody 2008, 94 fig. 45) – they probably constituted one of the densest concentrations in Britain. Hence, when activity resumed at Cliffs End in the Late Bronze Age, it is probable that the island of Thanet would still have been studded with upstanding ancient mounds and if all that was deemed important in siting the Enclosures and Mortuary Feature was proximity to such earlier monuments, the choice would have been bewildering. So the choice of this particular barrow group is likely to have been influenced by other factors; one obvious factor is its specific location in relation to the local topographic context with its juxtaposition of channel, sea, island and opposing mainland. It is surely significant that Late Bronze Age society chose this particular barrow group overlooking the eastern entrance to the Wantsum Channel, with views southwards down the Kentish coast towards the Strait of Dover and eastwards across the sea towards the Rhine delta and ultimately the Baltic (Fig. 6.1). At a general level, it is not unreasonable to see this choice as being connected with the presence of foreigners and foreign bones at Cliffs End with their clear implication of maritime connections.

It may be presumed that Late Bronze Age societies saw the innumerable barrows as having special and/or supernatural significance. Contemporary delving or destruction may well have shown that they contained human bones, but even if this was not the case, there is the likelihood that such mounds were regarded as supernatural creations or mythical places – to be revered and/or feared. One only has to look at how often Early Bronze Age barrows were flanked by Anglo-Saxon burial grounds (as at Cliffs End itself) to comprehend their power to attract later funerary deposits. This attraction could have independently affected different groups of people intermittently over time and repetition of funerary use does not presuppose continuity in itself (discussed more fully below); in abstract, referencing the mythical past could have been a guiding force that cropped up recurrently and independently.

### *The Late Bronze Age Ritual System at Cliffs End*

Up to four key structural entities belong to the Late Bronze Age phase: three enclosures of modest size (ranging from 38 m to 45 m) and close by to the north-east a large subsurface feature, 2018 probably formed by the aggregation of many more limited features dug at different times and containing the mortuary deposits. This has been referred to in this volume as a 'Mortuary Feature' in order to distinguish it from the contained 'pits' of more limited extent. The nature of the brickearth soil rendered it impossible to discern all features with clarity and some may have remained undetected (see McKinley, above), so a degree of latitude must be allowed in interpreting the structural and stratigraphic evidence. In fact, the Mortuary Feature must be treated as two features of quite different ages (see above) and only the northern part of the Mortuary Feature, 2018 N, is associated with Late Bronze Age mortuary activity.

The excavators consider it possible that the full limits of the feature were the accretive result of digging smaller pits in juxtaposition and superimposition over time and, if this was so, it is difficult to be sure how much of a hollow (or hollows) would have been discernible at any one time. However, it is clear from the main section (Fig. 2.12) that both at the time pit 3666 was dug and at overlying horizons a sizeable area was depressed relative to the original ground surface. Even if the full extent of the feature was not defined early on, it would appear that over time the patchwork diggings resulted in a recognisable depressed and disturbed zone within which mortuary deposition was focused. This could easily have been enhanced by surrounding dumps of the upcast spoil, not all of which was returned as feature fills. The levelling of above ground features means we cannot know what form those dumps might have taken, but unless moved further away it is entirely possible that they would have ringed the pitted zone and helped give it spatial framing.

The three enclosures uncovered by the excavation, only one fully, are nestled in amongst the group of earlier barrows; the spatial relationships make it clear that the barrows were still perceptible monuments and unless there had been an intervening phase of agricultural activity, they may have been little denuded. The mounds would have further enclosed, or screened the complex, but they could also have been used, depending on sight-lines around and over any palisades standing at the time, as viewing platforms for those entitled to witness the rituals performed in the hollow. It is not known whether more enclosures existed in other directions. Although there are differences in their detailed plans, they seem to be comparable in scale and potentially parallel in their functions. Incomplete excavation of two leaves their full structural and material inventories uncertain, but the excavated parts lack evidence for any structures (see Leivers, Chapter 2) and this reinforces comparability between at least the Northern and Central enclosures. Leivers draws a contrast with similar contemporary enclosures elsewhere and argues for divorcing form from function (see above). This allows the Cliffs End enclosures to have served a different purpose than the domestic one normally assumed for this period.

The two more complete enclosure plans at Cliffs End are both sub-square and double-bounded. In this respect they have passing resemblances to Romano-Celtic temples and the loosely defined Iron Age enclosures known as *Viereckschanken*, possibly represented in Britain (Collis 1984, 146–7) – the single internal pit may also strike a chord here – were they some kind of antecedent to the enclosure form standardised in later temples? The character of the Cliffs End enclosures does therefore look a little unusual for the Late Bronze Age, although a small square-ditched enclosure containing a pit and set within a Middle Bronze Age enclosure at Church Lammas, Staines, Surrey, may possibly offer a near contemporary parallel (Hayman *et al.* 2012, fig. 1.9).

Whatever the relative chronology of construction, the disposition of the Cliffs End enclosures around the Mortuary Features (2018 N and S) certainly encourages consideration of them all being interconnected parts of a system of ritual behaviour that resulted in, amongst other things, the deposition of human remains. There may well have been a protracted and overlapping sequence of activity within some or all these structural components. The comprehensive evidence that the Northern Enclosure was in use from the beginning of the 1st millennium cal BC at first sight places it earlier than the main activity in the Mortuary Feature, but activity resulting in deposition of pottery and other refuse continued at the Northern Enclosure into the 9th century

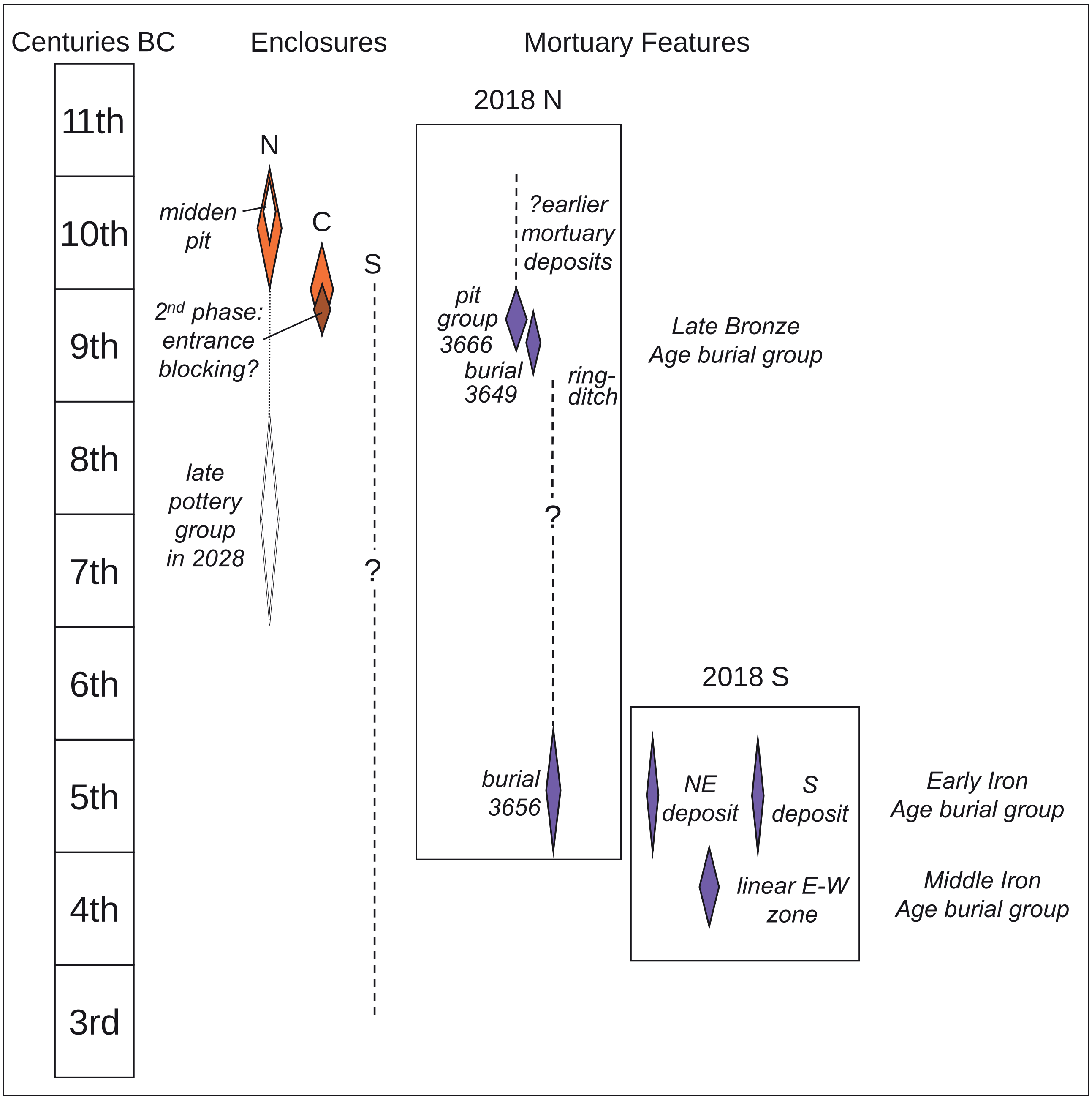



*Figure 6.2 Schematic chronology for the main features of prehistoric Cliffs End. The most probable time-spans are shown (see Chapters 2, 3 and 4 for full possibilities). Broader, shorter diamonds indicate more confident and precise dating than narrower, longer diamonds. Orange/brown relates to the enclosure structures, white to occupation material and purple to human burials. Dashed lines refer to less certain spans or linkages; the dotted line to possible but unproven continuity of use*

cal BC, the date of the concentrated burial sequence in Burial Pit 3666, and later still (Fig. 6.2). In addition, as McKinley emphasises (Chapter 2 and above), the high visibility of the pit 3666 sequence probably masks a longer history of burying human remains in and around the feature. For example, two disarticulated bones in the stratigraphically later bone group in layer 2058 (ON 101, ON 110) are most likely to be earlier than the *in situ* deposits on the evidence of their radiocarbon determinations. In the Northern Enclosure itself a left parietal bone from the ditch (2470–1, ON 494) is similarly dated earlier than the 9th century, while a fragment of a juvenile skull is from its phase 1 slot (3468), thus approximately of 10th century date. However, given the wide occurrence of human bones amongst occupation material at this date (Brück 1995), these cannot necessarily be linked to the kind of mortuary rituals recorded in Burial Pit 3666.

There was little evidence to date the Southern Enclosure, but it cut a linear ditch whose terminal, butting up to Barrow 5, involved a complex of slots some of them probably replacements for others. Carbonised residues on pottery from two of these terminal slots have yielded Late Bronze Age dates (Table 3.3) and the overlying enclosure could have been constructed at any time after the mid-10th century cal BC. The Central Enclosure was clearly constructed after the Northern one, which it abuts, whilst two of three dated samples of charred plant remains suggest it too was in use contemporary with the highly visible deposits in the Mortuary Feature. One interesting detail, however, is that at a secondary stage its entrance facing the Mortuary Feature was blocked by a ditch and perhaps therefore also a bank; Leivers (Chapter 2) has suggested this closure may mark a critical transition in the use of enclosure and Mortuary Feature alike, but the chronological evidence is not refined enough to suggest any specific correlation.

Although of obviously distinct forms, it is possible to make some comparison between the enclosures and Mortuary Feature 2018 N. The ground area covered by each may have been broadly similar (for example, within a factor of two) and, more positively, the North and Central Enclosures and the Mortuary Feature each contained a distinct large pit between 5 and 9 m across. Pit 3666 is not the only pit in the feature, but it is the only substantial one fully discerned under excavation and is distinguished by being the main receptacle of human remains still *in situ*. A case might therefore be made for there being a deliberate structural parallelism between the two kinds of delimited zone. The large pit in each could have been used as the formal repository of material deemed appropriate in the respective contexts. The assemblages from the two excavated enclosure pits are distinct from one another; that in the Northern Enclosure contains the sequence of refuse-rich deposits that has been well analysed above (see Leivers, Chapter 2), while that in the Central Enclosure contained rather little and instead a refuse-rich layer overlay the cluster of smaller features immediately to the south. These smaller features themselves contained varied material, one including cremated human bone (2787). This feature cluster is mirrored in the Northern Enclosure, but unfortunately only seven of the features there could be excavated.

Leivers and McKinley have contrasted the nature of the excavated assemblages in the enclosures and Mortuary Feature; to a large extent they are complementary. Pottery and animal bone refuse suggests that feasting took place in the enclosures, although not necessarily throughout their use. Another possibly significant feature of the refuse accumulated in the enclosures is the frequent recurrence of worked bone artefacts, one or two per significant deposit. The pattern could suggest their deliberate inclusion at each major depositional event, rather than their discard or accidental loss. McKinley has argued persuasively that those gathering at the enclosures also frequented the Mortuary Feature from time to time – they would presumably have been involved in digging, depositing human remains and the manipulation of earlier deposits, sometimes removing selected bones. Ongoing exchanges may account for many of the disarticulated bones at both poles of the relationship – ie, deposits in both the enclosures and the Mortuary Feature backfills – and similar processes may have redistributed some cultural material at the same time.

Overall then it may be suggested that these two major components – enclosures and mortuary zone – were parts of a 'symbiotic' system in which, while there were elements of parallelism, for the most part there was deliberate contradistinction in the nature of activities and hence in the character of aggregate deposition. There is undoubtedly scope for there having been a sequence of constructions and reconstructions within this complex, but it makes sense to see the enclosures as having a function interrelating directly with the Mortuary Feature, as part of a single ritual system lasting for much of the 10th and 9th centuries cal BC, and possibly later. The interdependent relationship suggested here links the living to the Otherworld by means of representative elements of the dead and a constructed 'portal' which is totally novel for the period. But who and what did these interments of human remains represent?

### *The Late Bronze Age Mortuary Deposits and Disarticulated Human Bones*

The Mortuary Feature 2018 N, and particularly the internal pit 3666, was clearly a place for the selective deposition of human and animal remains rather than simply a place for interment. The implication of both the relationships deduced above and the character of the skeletal assemblage is that disposal of human remains was but part of a broader objective. In terms of the disarticulated assemblage, this would be consistent with interpretations of use of human bone in this period more generally (Brück 1995). The main context, pit 3666, however, provides an extremely unusual assemblage of remains for the early 1st millennium cal BC; as well as some disarticulated bones, there were five closely juxtaposed bodies or body parts and significant deposits of animal bone, some articulated, some not. In this respect, the deposits anticipate many Iron Age structured deposits involving human remains and a variety of other material (eg, Lally 2008). The form of the pit itself, with rather sloping sides, is not similar to classic Iron Age storage pits, but the frequent occurrence of human skeletons or part skeletons in those latter contexts, sometimes in multiple as for example at Danebury, Hampshire (Cunliffe 1983, 161–2; Cunliffe and Poole 1991, 418–31), could suggest that the Cliffs End pit was an early example of a more general phenomenon.

Given the presence of a reasonable number of disarticulated bones, it is crucial to ask whether these were the bones from skeletons that had originally received burial or exposure in other regions, rather than locally (see Millard, Chapter 4). Four of five isotopically analysed disarticulated Late Bronze Age individuals (80%) are non-local and at least one of these (ON 101; 'Scandinavian', or 'cold-climate' origin – see definition below) could be earlier than its context based on its radiocarbon determination. Disarticulation and earlier dating could of course simply be due to reworking on site, but the alternative is that these bones represent long-circulated items brought in by either foreign visitors or locals who had travelled afar. It is possible that exchange of bones was one element within the complex web of interactions that ran through the north-western seaways. However, if dry bones were being moved around, this was clearly not the total explanation for the presence of foreign bone at Cliffs End because three isotopic aliens (of six articulated skeletons belonging to this phase) were buried as corpses. Two of the three, those from the most extreme 'warm-climate' and 'cold-climate' environments (3673, 3674), were found as partial corpses, although they had been subjected to different histories of deposition and manipulation (McKinley, Chapter 4).

The question of whether bones circulated at an inter-regional scale is critical to further interpretation of the Late Bronze Age mortuary group. If such circulation accounted for most of the disarticulated remains, then it would be very likely that the articulated remains (excluding for the moment the possibility of mummified corpses) represent a discrete practice and purpose. Conversely, if many of the disarticulated remains started on site as articulated deposits, then the *in situ* burial group low in Burial Pit 3666 may only be the last of a sequence of similar deposits – the one that did not get dispersed by subsequent actions. This latter scenario would question whether those engaged in the rituals ever meant burials to remain *in situ* in perpetuity; that instead this was only ever intended to be an intermediate stage in a recurrent, standardised mortuary process.

Given the quantity of disarticulated bones from a minimum number of 24 individuals and the fact that all but one of the articulated skeletons were in a tight-knit group probably buried over a very restricted time span, it is certainly feasible that there was a standard sequence in which articulated skeletons were merely those at an intermediate stage of a more extended ritual process which ultimately resulted in them being dug up again for later rites. Exhumed bones could be reincorporated on the spot, deposited elsewhere in the complex, or transported to other places as significant relics. Such a sequence could have happened many times within the Mortuary Feature prior to the deposition of the set of contexts that remained *in situ*. If this had been the case, the five close-knit burials low in Burial Pit 3666, apparently resulting from a single act or as an orchestrated series of acts over a very limited passage of time (Pl. 6.2), would represent skeletal material that had become 'frozen in time' part way through the normal process. The implication would be that there was some irregular disruption to normal procedure and one possible explanation is ventured below.

*Plate 6.2 View across Burial Pit 3666*

While the articulated burial group gives us an extremely rare insight into certain mortuary practices at the beginning of the 1st millennium BC, it cannot in any way be assumed to be a typical way of dealing with the dead. On the contrary, the continuing rarity of contemporary formal burials strongly suggests that excarnation and possibly even 'keeping the dead living' were the more regular ways of dealing with the immediate post-mortem passage (see Lally 2008 for a useful recent discussion of these processes in relation to the Iron Age). Despite the apparent variety of burial rites in pit 3666, particularly in orientation, there are some intriguing repetitions of particular phenomena. McKinley (Chapter 4) has observed that some of the crouched burials (of all phases) were probably bound and some may have had their wrists tied; she notes, however, that these are probably frequently used solutions to dealing with the dead body and constricting it to the desired postures for burial. Two other phenomena are less easy to dismiss in pragmatic terms.

The very nature of the complex and dense remains in the pit makes it difficult to be sure which objects might have been intended as accompaniments to the human bodies. However, a single object was found close to four of the five *in situ* sekeletal remains, all found near to the skull. Unequivocally associated, the elderly 'founder' female 3675 held a simple lump of chalk (ON 624) to her mouth with her left hand (Pl. 6.1). The polished bone tubular object with attached bronze ring (ON 607) found on the grave base below the cervical/upper thoracic vertebrae (elements of one of several body parts in the bundle; Figure 2.17), possibly placed or worn, at the neck of the male adult to the west, 3673 (brought up in a distant region) is also a probable accoutrement. Half of a fineware bowl (ON 609) was found adjacent to the skull of the juvenile, 3676, to the north-east; the head had been rotated from its correct articulation as if to face the bowl; McKinley (Chapter 2) believes this was a post-interment manipulation. The association of the fourth object is more tenuous; a lead weight (ON 600) recovered from a later layer above the skull of subadult 3680 could conceivably have been disturbed from that burial. The remaining burial of this group, 3674, another juvenile (brought up in a distant region), seems to lack an individual artefact but most of the skull had been removed subsequent to burial.

The choice of accompanying objects is not easily comprehended, but that does not deny there having been some logic in terms of the strategic purpose of the ritual performers. What is noteworthy is their variety in both material and function and this in itself may further indicate the degree of orchestration involved in this burial group. One suggestion is that the bone tube was a pendant (see Chapter 2), in which case its presence in the burial pit need not be significant in terms of ritual symbolism, instead reflecting the attire of the deceased individual. However, a radical alternative is that it served as a collar or slide for a ligature around the neck, a seductive idea given the blatant evidence for the violent dispatch of the elderly woman, 3675. The chalk lump, being unshaped, is intriguing – it could represent the functional possibilities of the material (chalk paste, etc) or signify origins by representing chalk bedrock, chalk cliffs, etc (see McKinley, Chapter 2, and above).

Few near-contemporary burials in Britain are known with accompaniments and these tend to be pots, usually vessels containing cremated bones (Needham 1995). There are a few instances of artefacts associated with human bodies (or parts thereof) dating to the middle stages of the Iron Age or earlier (for Thames valley examples, see Lambrick with Robinson 2009, 320; also Cunliffe and Poole 2000a, 167 burial C18; 2000b, 79). Intriguingly, these too are extremely variable in type and almost always single objects per burial context. Thus there is no suggestion that the categories of object are part of a wider pattern signifying different categories of person.

If the head was potentially highlighted by the positioning of the objects, it may have been further emphasised by special treatment of various kinds (see McKinley, Chapter 4 for details). The elderly female had received severe trauma of the head probably by sword blows; both 3673 and 3676 had had their skulls re-positioned, almost certainly by human agency, after partial decomposition, and most of the skull of 3674 was removed after initial burial; finally, the head of 3680 was found resting on a 'pillow' comprising a cattle's head. Special treatment of the head is not surprising; it is a natural focus for attention given its crucial sensory organs as well as features that confer individuality. Much has been made in past literature of the widespread existence in Iron Age Europe of a 'cult of the head', based on classical writings, carved representations and archaeological finds (eg, Ross 1962; 1967). Ian Armit has recently questioned the extent to which this was a homogeneous phenomenon with a single meaning (Armit 2010) and this Late Bronze Age instance of a focus on the head need only relate loosely to the later suites of evidence.

In their specific time-place context, the sort of associations and treatments seen in this small burial group at Cliffs End are both distinctive and unusual in combination and seem to further bind these five burials together. This begs the question as to whether they were closely connected in life, or whether they were instead united only through being subjected to a particular package of rituals. The possibility that they were somehow related, while feasible, cannot be ascertained at present and would need to take account of the very varied places of upbringing. It may be more profitable to think instead in terms of these individuals being assembled in order to represent an alliance. If this was indeed the intention of the orchestrators, then it may be very revealing that the group was chosen to represent not only the local population, but also individuals from afar. The aggregate pit deposit was further enriched with animal remains, disarticulated human bones and cultural material: pair-of-lambs deposits were placed at three different points in the fill, while five near complete cattle skulls (animal bone nos 416, 544, 557, 578, 590) were spaced more or less evenly around the pit (Fig. 2.22). Burnt material as well as one neonatal lamb pair in the basal fill was perhaps a necessary preparation for the ensuing deposits.

All in all, the impression gained from the various aspects of their context, origins, and demographic structure is of a very contrived group of serial interments and accompanying deposits. Whether they were strictly contemporary or placed in relatively quick succession need not bear on the evident existence of a grand plan. McKinley has argued above that the 'founder' female burial (3675) was most likely a sacrificial victim, having suffered four clear wounds to the head probably inflicted by a sword, but the measure of coherence in the features discussed suggests this may in fact be an appropriate interpretation for the whole group. The subjects appear to have been carefully chosen to make particular points in the community's intercession with the gods. The implied later visitations, resulting especially in various 'manipulations' of the victims' heads/skulls, and other details such as the founder female's seemingly oracular pointing finger, do much to support such an interpretation.

It remains to consider the purpose of these rituals. McKinley (Chapter 2 and above) sees the deposit as being concerned with fertility, based on the seasonal implications of the lamb accompaniments. This is an obvious and perennial concern among early societies, one that has often been raised in relation to Iron Age deposits (eg, Cunliffe 1983, 164; Bradley 1990, 161–4; Hill 1995), but if part of a broader practice in Britain during this Late Bronze Age period there is little sign of comparable deposits involving human sacrifice. Could the rituals have been directed towards a less parochial concern? It is clear that the origin of either people or their dry bones was an important consideration in their selection for the rituals undergone at Cliffs End. The use of far-travelled and far-displaced people, or relics thereof, could have had a particularly poignant potency in rituals relating to the all-important maritime interactions of the time. The far-flung and eclectic nature of the incorporated human remains could very easily be a way of proudly proclaiming the scale of the local community's interests, at the same time claiming a degree of control over others within the wider network. The purpose of the deposit could have been to ensure continued success within the network and also, in the process, to demonstrate to the spirit world the power and far-flung influence of the social group responsible. This interpretation need not actually be entirely incompatible with the fertility hypothesis, since success in interregional affairs is fecundity of another kind.

### *Resumption of Mortuary Activity in the Iron Age*

Just one of the Iron Age human deposits occurs close to the Bronze Age concentration; it is one of the earliest (3656), most likely dating to the 5th century cal BC, although conceivably as early as around the turn of the 8th/7th centuries (very minor probability). It may be inferred that the Bronze Age Mortuary Feature was still discernible as a shallow depression at this stage, although the absolute levels of this burial and Late Bronze Age burial 3649 makes it clear this could only have been shallow (Fig. 2.12). A ring-ditch, difficult to observe under excavation, had been cut into the top of the Late Bronze Age deposits and, although above pit 3666, it was not concentric with it. It is believed to belong to the end of the Late Bronze Age phase and before the deposition of a layer of colluvium (see McKinley, above); it is therefore intriguing that skeleton 3656 was laid in a disposition (Fig. 2.28) which seems to respect the inside edge of the ring-ditch.

The remaining sequence of Iron Age burials are associated with the southern half of the Mortuary Feature, 2018 S. As for the earlier feature it impinges upon, it is believed that its final form as excavated came about through the union of smaller features dug over a period of time. However, the parallel (albeit diffusely defined) sides and rather squared south-western end shown by the middle contours in Figure 2.11 could suggest a predetermined plan; any initial cut feature could easily have been blurred by the processes of repeated pit digging, churning and trampling deduced by McKinley. Towards the south-west end the feature becomes steadily shallower and its lip as seen in plan is rather ragged (Fig. 2.10). These features can be explained by assuming that Barrow 5 was still extant as a mound and that the new hollow rose up onto it, removing part of the mound on its north-east flank. The remainder of the mound would have delimited this end, while the spoil from the destroyed part of the mound and any from hollow itself could have been used to embank the sides of the Mortuary Feature. It may be significant that 2018 S runs between the Late Bronze Age Mortuary Feature, now a mere depression, and Barrow 5. It thus linked together two earlier 'monuments' of contrasting forms.

Once 2018 S had been dug, further deposition of human remains with the exception of burial 3656 appears to have been confined to it for the rest of the Iron Age sequence, although it cannot be ruled out that other remains were inserted into flanking upcast and have since been eroded with them. Beyond the burial described above, only a few deposits of Early Iron Age date have been identified, mostly of disarticulated bones; they occur in two well separated groups – the western part of the East-Central group, near burial 3616, and the Southern group (Fig. 4.1). Overall, it is intriguing that these sparse Early Iron Age deposits nevertheless occupied the full span of the new zone, from barrow to ring-ditch. In contrast, Middle Iron Age mortuary deposits occupied an east–west zone across the centre of the southern Mortuary Feature; these took up a good part of the zone between the earlier groups. While it appears that these Middle Iron Age burials respect the limits of the underlying feature (2018 S), presumably still visible as a depression, their disposition in an east-west band might suggest that some additional guiding principle had come into play.

The possibility that the Iron Age sequence of buried human remains were mainly placed in the fill of a large hollow draws parallels elsewhere (also see McKinley, above). Niall Sharples has recently linked together four sites in Wessex that feature multiple burials within 'quarry hollows' (Sharples 2010). Not all are closely dated but they are of 1st millennium BC date; New Buildings, Hampshire, could be as early as Late Bronze Age and certainly prior to the 6th/5th centuries BC (Cunliffe and Poole 2000b, 59). These quarry hollows are immediately alongside enclosures, all of them, including a hillfort at Spettisbury, Dorset, being of considerably larger in size than those excavated at Cliffs End. Also pertinent here is the burial of three individuals in a single pit at the base of a freshly dug quarry hollow at the rampart on the northern side of Danebury hillfort, Hampshire (Cunliffe 1983, 155–6). Cunliffe interprets them as a propitiatory offering when the rampart was reconstructed.

A connection with the planning or construction of a hillfort is also a possible explanation for a ritual deposit comprising a mix of human and animal skeletal remains in a hollow at Aylesbury, Buckinghamshire (Farley and Jones 2012, 75). Although these remains occupied a sub-triangular hollow, this only survived to 0.3 m in depth and its spatial extent (5.5 x 5.3 m) was only enough to contain the profuse deposits made. In this respect it is not therefore comparable to the 'quarry hollow' sites discussed; instead it is an unusually shaped pit or set of intersecting pits. However, the complex mix of articulated human body parts, articulated animals and disarticulated bones of both, sometimes deposited in clusters, draws some analogy with the contents of Cliffs End Burial Pit 3666, especially since by far the dominant animals present were young lambs probably slaughtered in high summer (Farley and Jones 2012, 20–49). Mike Farley had some difficulty finding good contemporary parallels for this composition; Iron Age human burials in southern Britain are only occasionally unequivocally accompanied by animal bones, and rarely by articulated beasts. While superficially Burial Pit 3666 might offer a parallel, there is a considerable difference in date; the Aylesbury deposit is tightly dated to the early part of the 4th century cal BC, thus about half a millennium later than the pit 3666 deposit.

The 'quarry hollow' sites could suggest a recurrent practice that was in some way distinct from the mass of contemporary burial contexts, including both the cemeteries that are increasingly coming to light and the prevailing practice of placing human bodies or parts in backfilled pits or ditches (eg, Lally 2008). Notwithstanding the potential practical uses of the excavated soil and rock (see McKinley, above), digging a hollow may have been a way of 'preparing the ground' to receive multiple human remains; where it is present, it does seem that it was necessary to confine interments to it and was potentially thus a conceptual container and, indeed, a ritually-demarcated space. Without further detailed analysis of these in comparison with non-hollow sites, it is difficult to assess whether there were significantly different intentions. There is plenty of evidence for what we might consider to be 'disrespectful' treatment of bodies and body parts at most of these sites – hardly exceptional in the world of Iron Age mortuary practice. Most of the articulated Iron Age skeletons at Cliffs End were unaccompanied, the pattern encountered more widely, but noteworthy was a large portion of a horse with burial 3660. There were also two flint objects and animal bone with burial 3616. The rare artefact associations at other sites have been discussed above (*Late Bronze Age mortuary deposits*; see also Farley and Jones 2012, 72).

The Middle Iron Age articulated burials are mainly crouched or flexed, the corpse placed on its left side. Crouched burials are familiar in the storage-pit tradition of human 'burial' of the Iron Age, examples of which are known locally (Moody 2008, 124–6). However, these contrast with the extended inhumations encountered in Middle–Late Iron Age cemeteries, notably at Deal, not far to the south of Cliffs End (Parfitt 1995; Champion 2007, 123–7). The earliest burials at Deal date from at least the 3rd century cal BC, whereas Bayesian analysis of the latest Cliffs End group suggests they were buried in the 4th century cal BC; even so, it is not clear yet how swiftly this change in burial rite took place.

### *Continuity and Recurrence*

The fact that human remains were buried in the Iron Age very close to those of the Late Bronze Age immediately raises the question of continuity. The Iron Age burial sequence, as recovered by excavation, might be separated from that of the Late Bronze Age by as much as three centuries – roughly 15 generations (Marshall *et al.*, Chapter 3) – but this does depend on modelling them as a coherent phase group. The Iron Age sequence itself has been divided into two chronological groups which prove to have some different characteristics, although there may not have been a significant temporal break between.

The relationship between the different phases of mortuary activity needs to be considered in terms of location, structure and various aspects of mortuary rite. The latter can be broken down into: position/orientation of *in situ* burial remains, the proportions of articulated to disarticulated remains, and demographic balance. Another relevant factor might have been the presence of enclosures or related activity areas alongside, but the limits of the excavated trench preclude useful discussion.

To summarise McKinley's results, minimum numbers of individuals based on articulated and disarticulated bones respectively for the Early Iron Age (2:5) are in similar proportion to the Late Bronze Age (6:18). By contrast the Middle Iron Age figures are overwhelmingly in favour of articulated burials (6:2); indeed, one of the two disarticulated cases is probably a dispersed single skeleton. Another difference is that the Middle Iron Age burials were mainly placed crouched or flexed on their left sides (one was on its back and slightly curved), whereas earlier burials show a mix of left and right sidedness.

The gender and age balance of the phase groups may have more in common, but are based on very small numbers of articulated burials (Table 4.1); there is seemingly a consistent bias in favour of females over males, adolescents between *c.* 9 and 18 years old are always significantly present (8 of 14 for all three phases) and there is a total absence of infants and juveniles (below six years). Given the survival of neonatal lambs in the Mortuary Feature, 2018 N, the preferential scavenging of infant remains is an unlikely explanation unless there were some crucial differences in depositional circumstance (see Chapter 4). Absence may most likely therefore be ascribed to the specific selection processes at work in the different phases. Again, despite evidence for a degree of exposure of bones, there is relatively little canid activity in any mortuary phase. The balance between bones of local and non-local origin remains relatively stable if all analysed bones are included (Table 4.1), but this masks a switch from predominance of non-locals amongst the Late Bronze Age disarticulated bones to their predominance amongst articulated skeletons of Iron Age date. This could perhaps have a taphonomic explanation if some of the disarticulated remains of the earlier period were originally deposited on site as articulated bodies (see discussion above).

There are therefore various changes of emphasis and practice during the whole mortuary sequence. It is not always easy to pinpoint when particular characteristics change because of the smallness of the Early Iron Age sample. However, there certainly seems to be a significant shift between the Late Bronze Age and the Middle Iron Age. This is characterised by the appearance of a more standardised burial rite – mainly articulated skeletons placed on their left sides.

In addition to the changes just described, any acceptance of continuity in ritual tradition from Late Bronze Age to Early Iron Age has to explain the apparent lack of burial evidence from the excavated site during an interlude of up to three centuries. That there was some activity during this period is suggested by the presence of pottery of approximately 8th–7th centuries cal BC in the uppermost fills of the Midden Pit of the Northern Enclosure, but there is no strong evidence for contemporary human remains. One possibility is that the funerary related activity had simply shifted to another location in the vicinity, but an alternative is that local oral tradition held onto the knowledge that this particular spot had been used for mortuary acts many generations earlier. A third possibility is that to 5th century cal BC eyes the depression marking the Late Bronze Age mortuary site was just another component of the early barrow cemetery. Whether other Iron Age burials were placed in the barrow mounds themselves, as apparently happened at the North Foreland (Moody 2008, 124), we cannot know because of their later destruction.

In the case of the Early/Middle Iron Age transition, there may not have been any significant break in the use of 2018 S either side of *c.* 400 BC. By contrast, the Late Bronze Age to Early Iron Age succession of mortuary activity saw both a big interruption in time and a modest dislocation in space. It may be that the spatial shift, involving the creation of a new mortuary feature, was essential simply because there had been a significant lapse of time and the rituals being undertaken were different in both form and objective. Superficially the new 'structure' was similar to that formed in the course of Late Bronze Age mortuary pursuits and this might be construed as signalling continuity. However, archaeological recognition of this type of large feature will doubtless increase with continuing large-scale developer-funded excavation and there may well prove to be a longer running understanding during the 1st millennium cal BC that 'quarry hollows' or coalesced pit features were suitable receptacles for mortuary deposits in certain circumstances. Moreover, we cannot be sure that the two parts of the Cliffs End feature were formed in exactly the same way.

In conclusion, it would seem that there are threads that connect the different mortuary phases together and this could certainly suggest that the local community continued to conduct mortuary rites with certain similarities over a large part of the 1st millennium cal BC, from the 10th or 9th to the 3rd centuries BC. However, this was not an unchanging set of practices and the phase-groups may well have been responding to both broader changes in ritual expression and very locally and temporally specific circumstances. Nor, if we are to assume continuity in the immediate locality during the 8th–6th centuries' interlude, was it consistently tied to exactly the same spot in the landscape and this itself is an element of discontinuity.

### *The Inter-regional Connections Implied by the Human Remains*

Who were these people? To what purpose did some travel, or get brought, from distant places to end up in this one mortuary/ritual complex? Millard's interpretation of his analytical results (Chapter 4) is suitably cautious given the thin and patchy coverage of background data for oxygen and strontium isotopes. Nevertheless, there can be no doubt that the analysed assemblage of individuals from Cliffs End had diverse origins; indeed, despite the lack of precision possible in suggesting source regions, it is clear that some of the individuals represented must have spent their childhoods at a considerable distance from the south-east corner of Britain.

In the current absence of widespread comparative data for later prehistory plus some uncertainty about whether the oxygen isotopes map based on modern rain-water values will need age-related correction (this is unlikely to be more than a minor shift – Darling 2004 – and may be out-weighed by other sources of variation), it may be a mistake at present to be unduly concerned about the precise regions implied. Instead, Millard's two-way plots of oxygen and strontium isotopes may be taken as a schematic 'map' illustrating variation in isotopic environments, rather than geographic space as such. Different parts of the plot will be highly significant in terms of where an individual was at his/her given age, but they will rarely give unique correlations with single geographical regions. Moreover, distances apart between plotted points are *not* proportionally related to geographic distances. For example, a relatively small movement (on the continental scale) may sometimes take an individual from bedrocks of one geological age to those of a radically different age with consequent marked effects on absorbed strontium. Variation in the carbon and nitrogen isotope ratios, while considered mainly to be a function of major dietary intake, can also contribute to the interpretation of mobility (eg, Jay *et al.* 2013).

It may seem surprising that the isotopic environment diversity has proved to be large for all three phase groups of human remains. At first glance, the period specific patterns appear similar to one another, but this similarity could in part be due to the fact that mixed-origin populations *are* involved in each case. In European terms the oxygen isotope values for Thanet are very much at the middle of the spectrum, so incomers from different geographical directions would almost inevitably introduce values to one side or the other, or both (Fig. 4.14). Interestingly, variation on the strontium isotope axis is considerably less with only three analysed teeth yielding higher values (> 0.712). It is not possible to generalise on the likely origins of these higher values, except to say that they exclude the Cretaceous geologies of south-east England and northern France and all other sedimentary marine carbonates, such as limestones (A Millard pers. comm.). In fact, the three strontium isotope outliers all have rather different oxygen isotope ratios from one another and, moreover, belong to different phases, so there is no need to connect them.

Defining the 'local range' for the Cliffs End oxygen isotope ratios ($\delta^{18}O$) is fraught with problems, partly because of the theoretical possibility of an age-related correction and partly because of the possibility of diet-affected modification (see for example the recent discussion in Brettell *et al.* 2012), but also at this site because of the very wide spread of values – if people from afar are represented, then why not others from much nearer the true local isotopic environment. These could easily blur the edges of the local range. This is not the place for a detailed inter-comparison with other newly obtained isotope results, but it is worth noting that the main clusters of $\delta^{18}O$ values obtained from early medieval skeletons by Brettell *et al.* (2012) and from Chalcolithic to Early Bronze Age skeletons by the Beaker Isotopes team (M. Jay pers.comm.) from sites in Thanet and easternmost Kent are broadly similar to the 'local range' cluster defined by Millard at Cliffs End.

In the phase discussions below, the oxygen isotopic outliers will be referred to as either 'cold(er)-climate' (lower $\delta^{18}O$) or 'warm(er)-climate' (higher $\delta^{18}O$) relative to south-east England. These terms mask greater complexity in the background to the $\delta^{18}O$ range – involving climate, altitude and distance from the coast – and are only intended as a neutral convention to avoid prejudicial judgement on actual regions of origin.

### Late Bronze Age

In the Late Bronze Age, non-local inputs are more or less equally split between those from 'colder' and those from 'warmer' climates (Fig. 4.16a). One of each extreme is represented amongst the *in situ* burial group in pit 3666, but the oxygen isotope signature for burial 3680 also implies a significantly 'cooler' environment for early childhood. Even the two results within the inferred 'local' range (burials 3675, 3676) started in early life somewhat apart and it cannot be certain they were indeed local, rather than just from isotopically comparable environments. It was suggested above that the diverse backgrounds of this group might be due to deliberate choice. The detached and possibly later articulated burial (3649) seems to have had a very similar history of movement, potentially within near regions, to the 'matriarch' burial 3675.

The disarticulated bones show a similar spread of oxygen isotope values to the six articulated burials, although none is from an extremely 'cold' environment and one has higher strontium that may be significant (ON 101). This bone and another (3469) are, like burial 3680, from temperate but 'cooler' environments which could include parts of Britain (especially perhaps the northern half on current evidence) and large parts of Europe north of the Alps, from the Rhinelands eastwards. These could, for example, indicate inter-group connections to the north European plain; although not a dominant axis of interest at this time, there are examples of bronze metalwork coming from that direction, for example, the 'North Dutch' socketed axes found at Minnis Bay (Thanet), Southchurch (Essex) and Shinewater (East Sussex) (O'Connor 1980, 165, map 49; Greatorex 2003, 91), or the *Warzenkopfnadeln* from Runnymede and Sion Reach (Needham 1996b, 188; O'Connor 1980, 201–2). Again, a British style shield of Yetholm type reached Sørup Mose, Denmark (Coles 1962), only slightly before the period in question. In mentioning these material links, it is not intended to give preference to origins on the Continent over parts of Britain.

The cold-climate articulated individual, an adult male (3673), could come from northern Europe, probably to the north of southernmost Sweden, or alternatively from the circum-Alpine region, which lay well within the extensive Urnfield cultural complex of central Europe. Although in general terms the Urnfield complex is seen to be in opposition to the cultural umbrella known as the 'Atlantic Bronze Age', into which Thanet was locked, there was certainly contact across the boundary running through northern France and the Low Countries. Southern British Late Bronze Age metalwork, although broadly 'Atlantic' in character, does include items that reflect or imitate late Urnfield types. Among them are end-winged axes and vase-headed pins, the latter type being represented on the site. Occasional metalwork finds of the 10th–9th centuries BC in Britain are imports from the Urnfield world. In addition, there were influences on British pottery including occasional close imitations of Urnfield pot types, as at Cliffs End itself (Fig. 5.4, 28). Indeed, another noteworthy occurrence of Urnfield style pottery (in an assemblage mixed with acceptable indigenous forms, occurs just across the Wantsum Channel at Milner's Gravel Pit, Sturry (unpublished; British Museum registration no 1956, 1008).

The four results indicating 'warmer' childhood environments (burial 3674 and three disarticulated bones) are unlikely to have originated nearer than south-west France (even allowing for some environmental change since the Late Bronze Age) and some could have come from Mediterranean lands or north Africa (see Millard, Chapter 4). Although location to more precise regions is not yet feasible, it does appear that these 'warmer-climate' individuals represent a spectrum of environments; there is certainly no clustering suggestive of a single region of origin. Furthermore, while most inevitably attest an inward movement before burial on Thanet (though conceivably as dry bones), the two-tooth analysis of ON 100 implies a marked 'outward' movement during childhood, before arriving at this location. Neither can it be ruled out that some bones may derive from intermediate zones such as western France among the values currently admitted within the 'inferred local range' ($\delta^{18}O$ around -5 to -6). This all points to a spectrum of implied connections rather than any narrowly defined ones.

There is of course ample evidence from regional metalwork assemblages for a series of interconnections along this axis, southwards along the Atlantic façade of Continental Europe to the 'pillars of Hercules' (Straits of Gibraltar) (Chevillot and Coffyn 1991; Jorge 1998). No individual types are of particular relevance to the Cliffs End evidence and while there was undoubtedly some long-distance contact, its effect on the regional material repertoires spanning the length of the Atlantic façade was limited; generic classes of object rather than specific types were shared widely. Of particular note in this context is the recent deconstruction of a long-held belief in the unity of the Carp's Tongue sword all the way from southern England to southern Iberia (Burgess and O'Connor 2008; Brandherm and Moskal-del Hoyo 2014).

The 'warm-climate' children also broach the much discussed issue of the interaction of this network with that of the Mediterranean world. On current understandings of isotopic ranges, we cannot rule out the possibility that some of the Late Bronze Age individuals represented at Cliffs End were children of the Mediterranean, especially that represented by mandible ON 100 at the age of three–six years and possibly those represented by articulated burial 3674 and disarticulated tooth ON 536. The presence of Phoenicians in the far west (including south-western Iberia) early in the 1st millennium BC points to the consolidation of trading networks along the length of the Mediterranean, networks that were anticipated by earlier contacts (eg, Armada Pita *et al.* 2005; Mederos Martín 2006; Koch 2010, 199; Armada 2011, 176). All this raises again the legend of Phoenician interest in Cornish tin, for even if direct contacts were exceedingly rare, knowledge of distant places would have travelled along the network.

Even at the more local scale there is evidence for movement. Of the three 'local' individuals present amongst the *in situ* burial remains, the two for which two-tooth analysis was possible (3675, 3649) both show a significant shift in their oxygen isotope environment. In fact, the movement implied for these two is very similar, towards a slightly 'warmer' zone later in childhood. However, both environments are closely matched by analysed sheep teeth from the site, so both may be relatively local, unless sheep too were sometimes being brought in from further afield.

The differentiation made between individuals from the 'inferred local range' and those from farther afield seems to be supported in this phase group by the dietary indicators, $\delta^{15}N$ and $\delta^{13}C$. The two groups largely separate on the $\delta^{13}C$ scale with the former (five results) between -19.55 and -20.3, while five of six clear isotopic aliens, from both 'cooler' and 'warmer' environments, have a wide spread of values between -18.0 and -19.55; only one falls within the 'local' distribution. This would certainly seem to reinforce that they come from outside a combined environment-cum-diet signature for Late Bronze Age south-east England.

Seen from this specific site perspective, it can appear as if Thanet had a gravitational pull on isotopic aliens and/or their bones during the Late Bronze Age. Out of seven two-tooth analyses, there are three clear examples of movement to different isotopic environments *prior* to the movement of the person or his/her jaw/teeth to Cliffs End; moreover, one of these was seemingly a movement *away* from south-east Britain, from a 'warmer' climate to an even warmer one (ON 101). It can be argued instead that there was a widespread system involving the movement of people and their skeletal remains. While there are many uncertainties over specific origin regions, the range of isotopic environments implied could all be linked to various regions flanking seaways to the south-west (Channel, Atlantic seaboard), to the north (Britain) and to the east (Scandinavia, North European plain). In other words, it might be construed as a natural assemblage to emerge from a maritime skein which, as experienced from Thanet, was centred on Thanet. If the extreme cold-climate individual was instead from the circum-Alpine Zone, that hardly alters the general picture. This human bone assemblage can be seen to be consonant, at a broad level, with an extensive maritime interaction zone.

**Early Iron Age**

There is relatively little evidence for this period, but there does seem to be a bias towards incomers from colder-climates, three of five analysed examples coming from that side of the inferred local range (burials 3656, 3616, bone 3614; Fig. 4.16b). Two of these individuals are likely to come from temperate regions, but the third (articulated burial 3656) is exceptional in showing a massive strontium isotope shift between the ages of 3–6 and 9–12 years; this is the individual buried above the inner lip of the ring-ditch. The strontium shift need not imply a large geographical movement, especially given the two similar oxygen results, but the latter results do point to a childhood spent at a considerable distance from Thanet either in central to northern Scandinavia (or beyond the Baltic) or around the Alps. The latter might find a context in the cultural connections between Britain and western central Europe during the La Téne 1 period and, indeed, just a little earlier, as witnessed for example by the Weybridge bucket, Surrey, a product of Alpine metalworking schools (Hanworth 1987, 148–9). It is harder to identify definitive material culture connections at this date with Scandinavia, but a lack of material culture convergence should not in itself exclude the possible movement of people between the two regions. The other two analysed teeth (143602, 203007) are consistent with being from local individuals.

**Middle Iron Age**

This presents a very different pattern from that for the Late Bronze Age and also differs somewhat from the Early Iron Age (Fig. 4.16c). A 14–16 year-old individual (3677) may have come from an area of higher strontium isotope ratio than Thanet, but Millard is cautious about whether we have adequate strontium isotope characterisation yet for the extreme south-east of England. On the other hand, a tooth from a semi-articulated dispersed skeleton (243204) is clearly from a much warmer climatic zone, probably far to the south in Europe and comparable to that experienced by some of the Late Bronze Age incomers. Such a southern origin at this date recalls the discovery of the skull of a barbary ape during excavations at Navan, Co Armagh, Ireland. It was found in the wall-slot of a circular building re-built several times, and the skull itself is radiocarbon dated to 390 cal BC–cal AD 1 (2150±70 BP, OxA-3321) (Waddell 1998, 340, 370 note 17).

Even the individual with isotope ratios most consistent with the local signature, a female who lived into her 40s (burial 3563), was not entirely without a history of childhood movement. Her later tooth showed a potentially outward movement to a slightly 'colder' clime than Thanet; this could easily be a little further north within Britain, or a short distance into the continental mainland opposite Kent.

In contrast to the one marked 'warm-climate' individual, four of the alien isotopic results are relatively well clustered with a 'cold-climate' signature. Movements are attested both inwards and outwards. Three individuals, represented by burial remains 3651, 3662 and 3660, spent their early childhood in the colder zone or zones, while burial 3644 arrived there in later childhood, having previously been in Thanet or somewhere with similar isotopic environment. The oxygen isotope ratios of these four are not all identical and a slightly more temperate zone is indicated for burial 3644 in particular. Nevertheless, this need not indicate a great difference in geographical space and it may be significant that these four articulated burials occupy the centre of Mortuary Feature 2018 S, burial 3660 at the centre and the others disposed around it at roughly equal intervals. The central burial included a large part of a horse's skeleton. It is possible that these four constitute an orchestrated multiple burial, but of a different kind to that seen in the Late Bronze Age pit. There is a certain symmetry in the group in that two are mature females (3662, 3644) and the other two subadults, both probably males (3660, 3651; Table 4.1). The remains of the two other articulated burials flank this group to east (3563) and west (3677) and both have isotopic signatures within the 'inferred local range'.

Although there is a large area of the far north of Europe with oxygen and strontium isotope ratios matching the 'cold-climate' group (see Millard, Chapter 4), it is worth also considering the main alternative, the Alpine foreland, simply because this would fit better with known cultural connections of the period. Such an origin would give a long-distance connection of the La Téne 2 period essentially at the two ends of the Rhine – Thanet lying opposite the mouth of the great river (Fig. 6.1). It is worth noting that slightly later burials of the Aylesford tradition occasionally include fine metalwork vessels of Italian manufacture (Champion 2007, 124–7); this opens up the possibility that a special long-distance relationship reaching deep into western central Europe laid foundations that later facilitated the flow of prestigious goods northwards. Scandinavia and the Baltic are considered empirically to be an alternative source zone, but this is difficult to evaluate more fully because of poor isotope records as yet from non-Palaeozoic regions there (A Millard pers. comm.).

Although the number of samples for this phase group is small (seven), it is worth observing that the colder-climate group of four individuals also cluster on the $\delta^{13}C$ (-19.75 to -20.3‰) / $\delta^{15}N$ (9.1 to 10.5‰) plot, the three others being distributed around them. This would be consistent with the four having had similar dietary histories. Of the other three results, none match the large inferred local group established for the Yorkshire Wolds Middle Iron Age population (Jay *et al.* 2013, fig. 3): one is from a distinctly warmer environment (higher $\delta^{18}O$), one is potentially from a different strontium environment than lowland Britain (slightly higher $87^{Sr}/86^{Sr}$) and the third has higher $\delta^{15}N$ (11.5‰), higher than all but one of the Yorkshire results.

The relatively well clustered isotope results for four individuals in the Middle Iron Age data is extremely important for it could suggest that foreigners were not randomly represented on the site at this time. One possibility is that they were captives from raiding or warfare in a distant region, although it would then be necessary to explain their formal burial and the association of part of a horse with burial 3660 in terms of a ritual act with some specific intent. Alternatively, these four burials could instead suggest a more stable inter-dependence between two regions based on long-term trade agreements or some form of long-distance political alliance. In this scenario the associated horse remains could very well symbolise the travel undertaken between the two regions. Such a relationship also makes more sense of the individual represented in burial 3644 who, as a child, moved out to the 'cold-climate' zone from a temperate zone, perhaps Thanet itself, before later returning. The exchange of people in this relationship demonstrably included those of young age; the 'gift' of children, who effectively become adopted by another society, can be one way of cementing strategic alliances. Others may not have migrated until (sub-) adulthood, for example as marriage partners, and this is certainly a plausible interpretation of the 'cold-climate' adult women in particular. If burial of the four individuals took place over a short period of time, perhaps even on a single occasion, this need only mean that special circumstances required burial at this particular time – an accident or illness befalling some of a visiting group, or some special propitiatory need.

This cold-climate group should not be seen in isolation for it is remarkable that none of the buried individuals of this period totally lacked evidence for migration – all had moved place at least once in their lives! This suggests strongly that the Mortuary Feature had become a special place for the burial of foreigners and travellers who had formed ties elsewhere – perhaps outsiders more generally.

### *The Cliffs End Enclave in the 1st Millennium BC*

Drawing conclusions about the mobility of people will always be to some extent constrained where disarticulated bones are concerned. Even the articulated corpses could, theoretically, have come to Thanet as corpses. However, it is probable that most of Cliffs End's 'isotopic aliens' arrived during their lifetimes and it is proven that some had already moved between different isotopic environments during their childhood years. Even the exchange of dry bones requires the movement of people to carry them, although, as with artefacts, there is always the possibility of movement along chains of exchange.

The isotopic data from Cliffs End may show that a high proportion of the individuals analysed moved between different isotopic environments at least once in their lifetimes, but this is extremely unlikely to be representative of the whole population, even in this coastal location. For the Late Bronze Age it is suggested that there was already some bias in favour of including foreigners among the ritually manipulated bones and bodies. To a coastal community whose life style was deeply bound up with far-flung maritime skeins, this may have been a logical strategy deemed to be most effective in influencing relevant gods and spirits. By the Iron Age the proportion of articulated remains of foreigners had increased and by the Middle Iron Age the background to these human deposits may have been very different – the formal burial of certain members of society that were originally from, or connected to, other homelands; *all* eight of the Iron Age individuals buried as fully articulated corpses were either born or spent part of their childhood in a foreign territory. We cannot therefore draw any conclusions about what proportion of the population at large typically moved between regions during their lifetime, since we are looking at highly selective sub-samples.

Further afield, the pioneering study of the Iron Age burials in the Yorkshire Wolds, mainly those from Wetwang/Garton Slack, also helps put the Cliffs End results into perspective. The great majority of analysed individuals in that study conform to a combined isotopic pattern that is entirely consistent with the locality and even the significant outliers (on two or more variables) are not thought to have come from particularly far away (Jay *et al.* 2013).

Earlier in this discussion I pointed out that there was little material evidence on the site itself to suggest it had been an entrepôt; however, this may be too narrow a reading of the evidence and of the concept of entrepôt. Some years ago Dave Perkins floated the idea that the Ebbsfleet peninsula, at the head of which lies Cliffs End (Fig. 6.1), was an entrepôt within the Bronze Age cross-Channel trade system (Perkins 1992) and since then the peninsula and its immediate environs have yielded several Late Bronze Age hoards and three finds of Late Bronze Age goldwork (Lawson 1995; Andrews *et al.* 2009, 76 fig. 2.8; Andrews *et al.* forthcoming). The eight hoards now known from Ebbsfleet itself, including one of gold bracelets, are almost all from near the tip of the peninsula (A. Fitzpatrick pers. comm.), while the Cliffs End site, two kilometres to the north-east, yielded copper ingot material from four separate contexts (Leivers, Chapter 2, Mepham, Chapter 5). This is a strong concentration, even by Thanet and wider Thames Estuary standards and may indicate something special going on here. Northover observes (Chapter 5) that copper ingot-containing deposits occur almost entirely in southern coastal and estuarine locations. Given such evidence and the nodal position of Thanet in seaborne networks of exchange, it is not improbable that some local rituals would be intimately connected to fostering success on the stage of interregional exchange, as mooted above. But metalwork distributions are fickle and easily skewed by patterns of historical land use and disturbance (note that 20 years ago virtually none of these Ebbsfleet finds were known). The isotopic data from Cliffs End adds an even more compelling argument for the site and its immediate environs having had a specialised function.

Specific artefact types do tentatively suggest a connection with trading, namely the lead weight (ON 600) and the fragmentary balance (ON 257), both thought to be of Late Bronze Age date (see Schuster, Chapter 5). Both come from the fill of the Mortuary Feature, the former just a little above the sacrificial group, the latter from spit 1 probably having been re-deposited from an up-slope location at a substantially later date than the mortuary deposits. Together they suggest that the community responsible for this set of mortuary deposits was engaged in exchanges that at times required a system of weighing, although these particular pieces of equipment could only have handled lightweight material, not sacks of corn or large ingots! In fact, there is growing evidence that international or regional systems of weighing were being introduced to Britain from at least the 13th century BC (Needham *et al.* 2013, 89, 100).

Other artefacts from the site which have continental parallels do not make any special case for trade and exchange when compared with many other sites across south-eastern Britain. The vase-headed pin, for example, although undoubtedly of ultimate continental inspiration, is becoming a more familiar type on British sites and it is extremely unlikely that the Cliffs End example marks the introduction of the type to Britain. It and other artefacts, such as the ribbed bracelets (ON 174, 587) may simply be the legacies of longer running processes of cross-Channel contact. The Urnfield-like pot (Fig. 5.4, 28) might be more significant; it was one of few large portions of pottery accompanying the possible sacrificial group, amongst which one individual could possibly have come from western central Europe (the circum-Alpine zone). Its part-profile can be matched, for example, in Flanders (De Laet *et al.* 1958) just across the Channel; nevertheless, it was made in a typically local fabric (see Leivers, Chapter 5). It is worth remarking again on the more explicitly Urnfield styled pot from Sturry mentioned above.

Developing Perkins' suggestion, Cliffs End, and perhaps the whole of the small peninsula, may well have become a designated place for the necessary interactions between locals and mariners. Those interactions will undoubtedly have involved negotiations on exchanges of material goods, but it may be a mistake to see it as having had a purely mercantile function. To designate such a plot is to make it neutral, or international ground, to and from which all peaceable voyagers could pass freely and within which, conduct the business of their voyages. It is a form of guarantee against untoward aggression and in favour of regularised interactions. The imposition of a regulatory system would have been aided in this particular environment by the fact that passage along the Wantsum Channel and to some extent along the coastal waters around the northern side of Thanet could be closely controlled by the local communities (Fig. 6.1).

While this notion of entrepôt is highly speculative, it is worth considering how the phase-specific evidence might relate. While foreigners are represented in all three phases of mortuary activity, significant differences have been recognised in how they were treated. The fact that the Late Bronze Age sacrificial group in pit 3666 comprised a mixture of probable locals and people from very different backgrounds, including from climatic extremes relative to Thanet, must surely reflect the fact that Cliffs End was intimately and directly involved in the broader international socio-economic system of the later Bronze Age. This raises two possibilities. The first is whether the sacrificial act was a direct response to the foundering of that system towards the end of the 9th century BC, an attempt to avert problems. The best dating of the pit group as a whole would be earlier in that century, but we cannot know whether there was a longer process of growing instability before the final demise of the Late Bronze Age system. The alternative is to see the group instead as serving to seal some kind of pact between key representative interests within the interaction network. This might make more sense if the *in situ* deposit was just the last of a sequence of similar ones, and the fact that it was the last (barring the possibly slightly later single burial 3649) could still be an indirect consequence of the subsequent demise of the system.

By contrast, the Middle Iron Age burials seem on the surface to conform more to an established order at this particular location. Given the Early Iron Age precursors, there is already a sense of well engrained rites, even though burial itself may only have taken place occasionally because only certain individuals or certain occasions warranted conducting this ritual act. Despite the fact that small cemeteries of Iron Age date are increasingly being found in Britain, it remains probable that the vast majority of the insular population were not given any formal, or at any rate tangible treatment.

It has been suggested above that it was the specific plot of land at Cliffs End that was designated as a repository for non-local people. This in turn suggests that, while the social and economic orders had changed radically over previous centuries, Cliffs End and perhaps the whole Ebbsfleet peninsula retained some special status as the place reserved for interaction with foreigners. In this respect, it doubtless joined other designated locations along the coasts of Britain – Hengistbury Head being the most obvious and best researched.

*Conclusion*

One of the biggest problems in interpreting the Cliffs End data stems from it being in the vanguard of a new scientific application to archaeology; there are very few comparative data, making it impossible to assess how typical or otherwise this diversity of human origins might be. Cliffs End on its own cannot give firm answers to all the questions raised, but in conjunction with the few other isotopic studies undertaken thus far tremendous potential can be seen in establishing patterns of isotopic variation that can be interpreted in terms of both mobility and food intake. More such studies from regions interacting specifically with coastal Thanet and Kent should give the prospect of deepening our understanding of the mechanics, role and conduct of maritime interactions at different stages of later prehistory.

While precise origins are not possible at present, it has been possible to document the presence of 'isotopic aliens' in terms of the schematic map of strontium/oxygen-characterised environments. It transpires that quite different emphases are present in the three recognised phases of late prehistoric mortuary activity. Difference is also reflected in the respective burial practices, such that the issue of 'continuity' is reduced almost to the fact that this was a site recognisable as a suitable place for deposition of human remains whatever the precise motivation of the time and place. Potentially more important in terms of continuity than burial per se are the indications that this plot of land, because of its pivotal position, could have had long term recognition as an appropriate place for special interaction with foreigners, especially those using the north-western seaways. But even this continuity is argued to have been associated with changing objectives over the centuries.

The dominance of foreigners, some from afar, amongst the buried population, makes a link with those who travelled the north-western seaways; many arrivals at Cliffs End will have depended on safe conduct by mariners. However, I have resisted branding any group as specialist or semi-specialist mariners due partly to the current isolation of the Cliffs End evidence and partly to the apparent selection of human remains at times to serve particular politico-ritual goals. While 'isotopic aliens' are not restricted to a single environment of origin in any of the prehistoric phases, it is the Late Bronze Age group that shows most diversity and can at first sight seem to reflect an 'Atlantic Bronze Age' web. This, however, would be a misrepresentation of a more geographically determined pattern in which Thanet was *ipso facto* centre stage within a high-flux maritime interaction sphere spreading in all directions, the significance of those directions being reinforced by political manipulation in the selection process. The Atlantic Bronze Age is at best a variably defined entity comprising a chain of constantly changing cultural attributes, its main claim to coherence being its essential differences from the cultural complex occupying the heart of Europe.

Small though the sample of Iron Age burials is, there is a distinct bias towards individuals from 'colder climates' than Thanet. The sense then is of a more narrowly focused set of interactions being represented amongst the human remains, and most could have come from a relatively restricted zone or corridor. The political objective had doubtless changed over the intervening centuries, but the need to symbolise the key connections in ritual, when circumstances demanded it, may not have done. While not as explicit as the Late Bronze Age group interpreted here as a sacrificial group, the Middle Iron Age 'cemetery', especially the potentially orchestrated 'cold-climate' group, may be no less an instrument of or consequence of political aspirations and affirmations.

# Chapter 7

# Anglo-Saxon Cemetery and Settlement

*by Jacqueline I. McKinley and Nick Stoodley*

Following an extended hiatus in activity lasting almost a millennium in all except a few restricted areas, a major period of use commenced in the early 6th century AD, continuing into the 8th and probably as late as the 11th century. This Anglo-Saxon presence took two distinct forms which were largely separated both spatially and temporally.

Several small grave groups of early 6th to late 7th century AD date were distributed across the western portion of the site along or close to the summit of the low north–south ridge (*c.* 22.75 m aOD) overlooking Pegwell Bay to the south-east, and impinging on the remains of the three most westerly Early Bronze Age barrows (Barrows 1–3; Figs 2.2, 7.1). The location of the south-eastern grave group corresponded with the western extent of a large assemblage of pits and associated ditches forming a band across the southern portion of the site, which appear to have related to Middle–Late Anglo-Saxon (probably mostly 8th century) settlement activity. These latter features encroached on the remains of the three southern barrows (Barrows 1, 4 and 6) and the southern margins of the Late Bronze Age Central Enclosure.

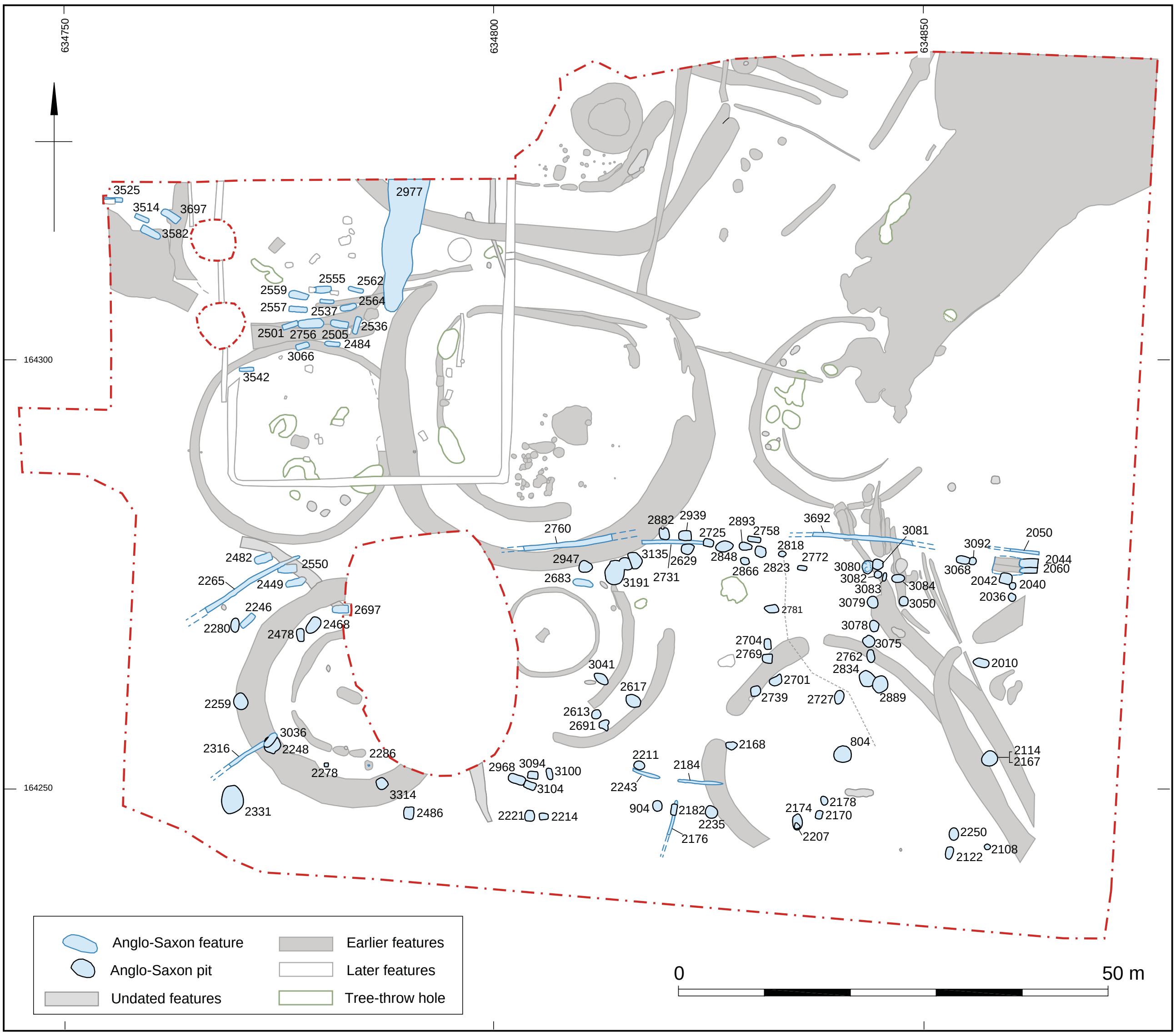



*Figure 7.1 Plan of Anglo-Saxon features*

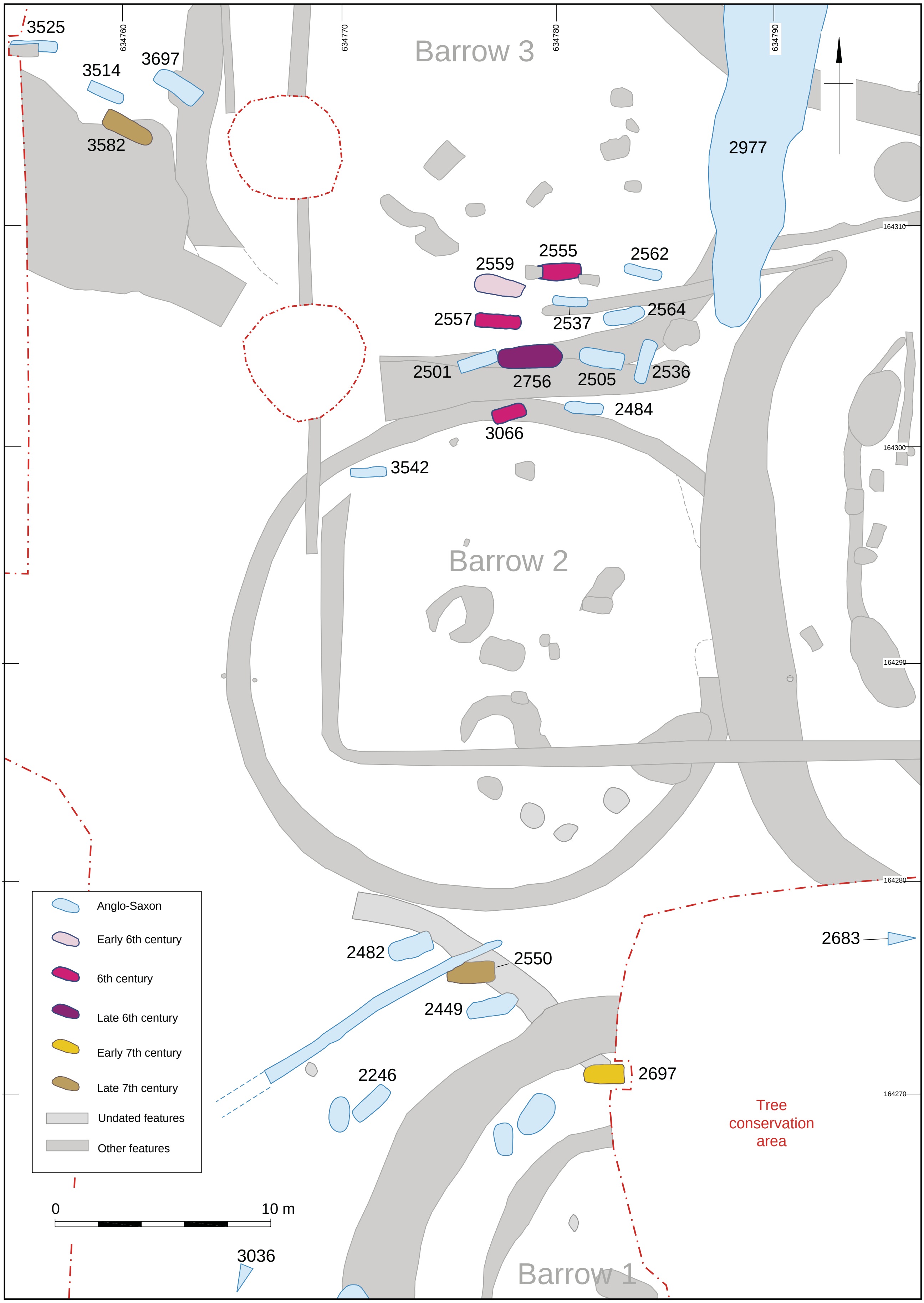



*Figure 7.2 Phased plan of Anglo-Saxon graves*

## Cemetery Features

*by Jacqueline I. McKinley*

Twenty-one graves were excavated; it is probable that one other feature (3603) and a possible second (2246) also represented the remains of graves on the basis of their form, size and location. One further feature (2683) had some grave-like characteristics but the possible interpretation is very tentative. The main group, comprising 12 cuts situated within an area of *c.* 10 m in diameter, was located across the south-east portion of Barrow 3, encroaching slightly on the northern edge of the adjacent Barrow 2 (Fig. 7.2). A singleton (3542), possibly an outlier of this group, lay *c.* 5 m to the south-west just within the confines of the Barrow 2 ditch. A small group (NW group) of four graves situated *c.* 15 m to the north-west of the main cluster also partly intruded on the in-filled ditch of Barrow 3. Given their position in the north-west corner of the site it is probable that they formed part of a more extensive cemetery group which continued to the north and west of the area excavated. A similarly small group (SW group) of three, possibly five, graves lay *c.* 25 m to the south of the main group (in an area of *c.* 13 x 9 m), mostly between Barrows 1 and 2, but with one within the confines of the former. As with the NW group, it is possible that further associated graves lay within the tree conservation area to the east. A singleton (3036) was situated *c.* 12 m to the south of the nearest grave (Figs 7.1–7.2). The grave cut a Middle Anglo-Saxon pit and ditch, which in turn were cut through the fills of the Barrow 1 ditch; this probably represents one of the latest graves in the assemblage. The tentatively interpreted possible grave 2683 lay *c.* 20 m to the east of all the others between the inner ditch of Barrow 4 and the Late Bronze Age Central Enclosure (Figs 7.1–7.2).

Details of the graves and their contents are presented in the *Grave Catalogue*. The grave plans (Figs 7.5–7.21) show the location of grave goods (Object numbers = ONs) with the items being presented in schematic form (Fig. 7.4); each figure includes scale drawings of the objects recovered from the grave. Human bone survived in only two cases (graves 2557 and 2697, main and SW groups); consequently the grave orientation presented in the catalogue (head end stated first) was largely deduced from the location of the grave goods. Where the latter were insufficiently diagnostic to assist in this process, or where no grave goods were recovered, a probable orientation has been given (prefixed '?'). Grave recognition was based on form, size and archaeological components. Most graves (73.9%) included some form of grave good, rendering their interpretation conclusive. Of the six graves devoid of finds, the form of four (2482, 2501, 2537 and 3036; from the SW and main groups, and the singleton) was sufficiently diagnostic to be confident of the interpretation. Although the size and general shape of cut 3603 in the NW group was very similar to that of its neighbours, the base was irregular and unlike those of the other graves (see *Grave Catalogue*); this may, however, have been related to the body position – all traces of which were lost – and it remains probable that this did represent a grave. In plan cut 2246 (SW group) appeared characteristic of a grave but, unlike the others from the site, the sides and particularly the base were noticeably concave; consequently, this feature has only tentatively been interpreted as a grave. Even more speculative is cut 2683, from which again no finds were recovered; the form of this feature was slightly at odds (both in plan and the base) with the other features interpreted as graves, as was its location.

There was considerable variation in the dimensions of the graves. Lengths ranged from 1.57 m to 2.85 m (3066 and 2756 respectively, both in main group) with an average of 2.02 m, and widths from 0.47 m (2537, main group) to 1.05 m (2550, SW group) with an average of 0.72 m. The surviving depths of the graves averaged 0.20 m, with a minimum of 0.08 m (2537 and 3542, main group and singleton) and a maximum of 0.40 m (2756 and 3603, main and NW groups); five graves survived to less than 0.10 m in depth and six to more than 0.20 m. The largest grave, 2756, was the only one to contain conclusive evidence for the presence of a coffin and there was a *c.* 0.50 m gap between both end of the latter and the sides of the cut. The burial remains were also the richest recovered in terms of grave goods, including several items of jewellery and other personal equipment (Fig. 7.16). It is worth noting that the dimensions of the coffin remains, 1.85 x 0.62 m, were not far removed from those of the smaller graves. The shortest grave, 3066, comprised one of the five made inclusive of one or more items of weaponry (see Figs 7.3 and 7.17). There is some correlation between the size of the grave and the surviving depth, suggesting some of the apparently smaller graves may have been so due to heavier truncation (measurements being taken from surface level), but the potential link is not consistent and the dispersed distribution of these shallower graves does not indicate greater truncation in some areas than others; ie, the variation in the depth of cuts is genuine. That some loss of grave depth has occurred, probably both in antiquity and during machine stripping of the site (cuts in the natural brickearth being difficult to distinguish particularly in the higher levels) is demonstrated by grave 2697 (SW group); the full 0.40 m depth of the cut was seen in the baulk prior to extension of the trench to allow full excavation of the grave, and extended 0.15 m above the

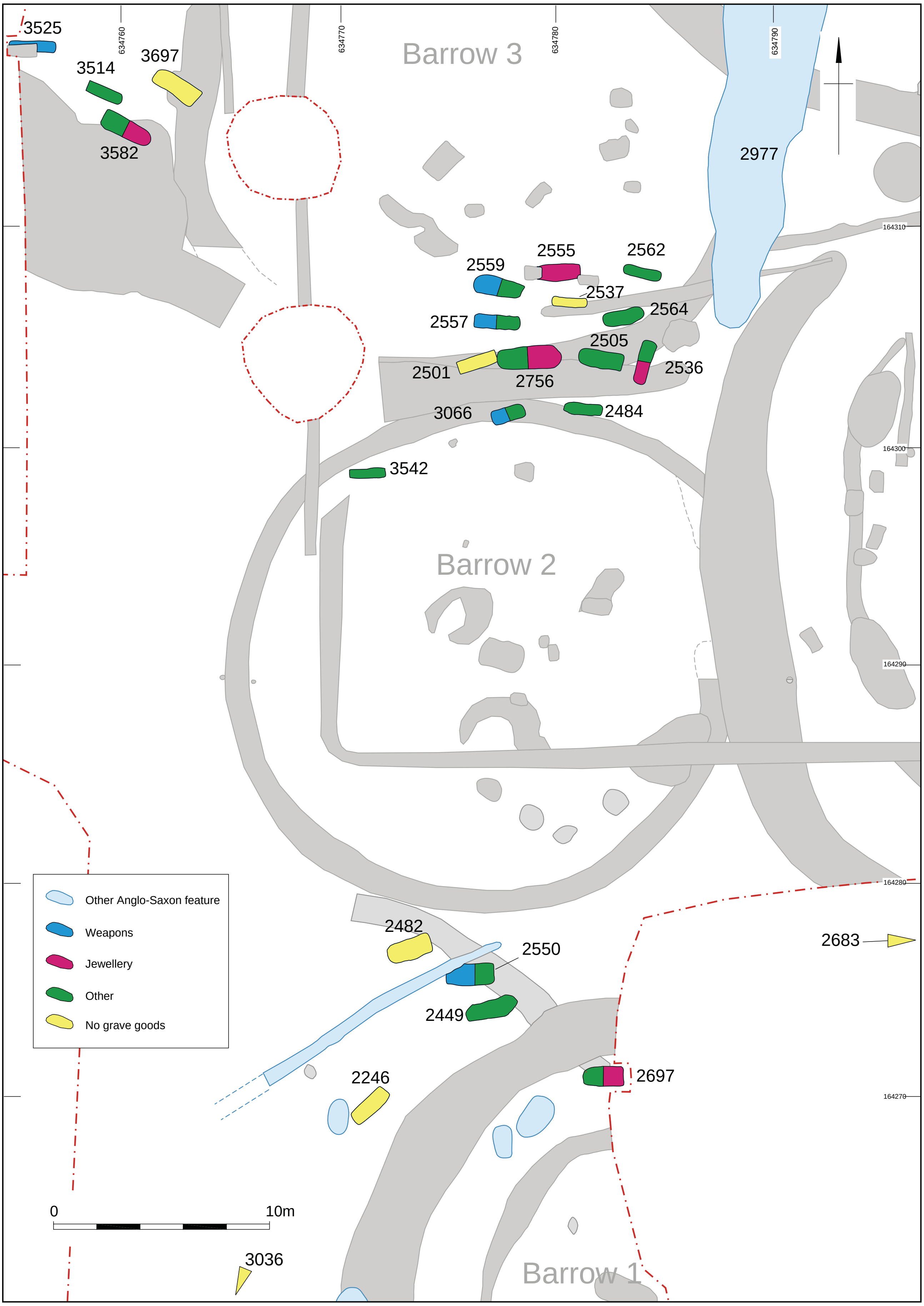



*Figure 7.3 Plan of Anglo-Saxon grave showing distribution of grave goods*

level of the machined surface. Although grave 3066 was 1.28 m shorter than 2756 and 0.73 m shorter than the largest grave without a coffin, it would be unwise to suggest this and the other seven graves in the lower range of lengths represent those of immature individuals rather than adults. Grave 3066 could have accommodated the remains of a short adult, and the inclusion of several items of weaponry suggests the grave's occupant is unlikely to have been a juvenile, although the individual may have been a subadult (ie, teenager).

Most graves (*c.* 65%) were sub-rectangular in shape, one end of five of these being apsidal (main and NW groups); four of the latter had an apsidal west end, which in three cases appeared to represent the head end, and in one case the east (foot?) end was apsidal. Five graves were sub-apsidal in shape and three rectangular. The sides were generally acute, either straight or slightly concave. Most bases were flat, but in seven graves (all except one from the main group) there was a marked slope in one direction, generally (six cases) to the east, with a fall of *c.* 0.05–0.19 m.

Only one grave, 2484, in the main group had evidence for an integral internal feature in the form of a shallow ledge at the west (?head) end of the cut, where it is likely to have functioned as a 'pillow' for the head (Fig. 7.6; Hogarth 1973, fig. 7 type 1b).

As is commonly observed (Lucy 2000, 130–1) the majority of the graves (11) lay on a W–E alignment, with a further three being angled slightly off-line WSW–ENE (deduced orientation of the burial rather than just the grave; see above); one other grave appears likely to have been on an ESE–WNW alignment (Figs 7.1–7.2). Most of the graves in the main cluster followed one of these alignments which generally equated with the line of the natural slope; the northern singleton and some graves in the NW and SW groups were similarly orientated. One grave in the main group lay almost perpendicular to the rest (NNE–SSW), aligned with the contour of the slope. Seven other graves were variously set SW–NE (four graves), NW–SE (two graves) and SE–NW (one grave). It is unclear what these graves were aligned on, being at odds with the topography, but there would have been an extensive choice of extant earthworks which may have influenced their orientation – as observed elsewhere (*ibid.*) – and at least one group was discernable in the north-west corner of the site.

Several of the graves had cut into the upper fills of Bronze Age features, and two graves in the main (2555) and NW groups (3525) had been cut by recent features (the area appears to have functioned as a pet cemetery), but there was no recorded evidence for intercutting between graves; although 2501 and 2756 in the main cluster are close and one may have cut the other at a higher level this was not recorded in excavation. The spacing of the graves, particularly those within the main cluster in which at least two N–S rows may be distinguished, suggests they were marked in some way. Stoodley (see below) has suggested a *c.* 150–200 year span for the assemblage as a whole, but there may have been a temporal distinction in spatial distribution (Fig. 7.2). The earliest graves appear to be concentrated within the main group, one of the burials made inclusive of weaponry (2559) representing the earliest dated interment. The later 6th and 7th century graves which could be dated were limited to the SW and NW groups. The southern singleton, grave 3036, had been cut through two Middle Anglo-Saxon features, indicating a late 7th century date at the earliest. Despite there undoubtedly being some overlap, this suggests the three groups had more limited individual temporal ranges, which would have assisted in minimising the potential for intercutting between unmarked graves or those from which markers were lost over time.

Most graves contained single fills of mid-brown sandy silt with slightly variable frequency of flint gravel inclusions. Only in graves 2756 and 3582 (main and NW groups) was more than one fill observed, the former related to the coffin stain (see above and *Grave Catalogue*) and the latter representing a slight colour variation in the lower fill. Varying quantities of residual burnt and struck flint and occasionally Late Bronze Age pottery were recovered from most fills. Grave goods were recovered from 17 graves (73.9%), including items of weaponry from five (21.7%), items of jewellery from another five and knives only from a further five; each of the three grave groups included the remains of at least one burial within each category (Fig. 7.3). Two other graves (main and NW groups) included other items of personnel equipment (see Stoodley below).

The N–S linear feature 2977, situated on the eastern margins of the north-west burial group, comprised a broad ditch with very shallow concave sides and base which became progressively narrower towards its southern terminal (maximum 4.0 m wide and 0.53 m deep). The single yellowish brown sandy silt fill contained sparse inclusions of flint gravel and residual worked and burnt flint. There is no conclusive dating evidence from the feature, though the recovery of an iron nail from its fill suggest a Romano-British or later date; this is supported by it having cut through ditches believed to be of Late Iron Age date. The graves ceased within *c.* 2 m of ditch 2977, and it could have been of a commensurate Early Anglo-Saxon date and have formed an eastern boundary to the mortuary area.

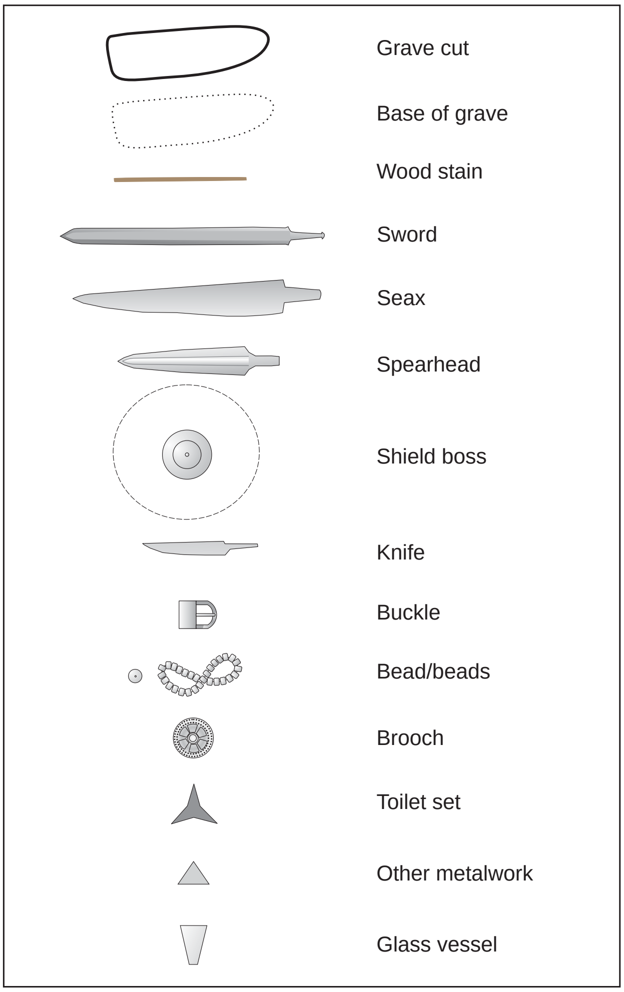



*Figure 7.4 Key for Anglo-Saxon grave plans*

## Grave Catalogue

*by Jacqueline I. McKinley, Nick Stoodley, Talla Hopper and Jörn Schuster, including identifications of mineral-replaced organic remains by Sharon Penton*

KEY: L length; W width; D diameter, T thickness

**??Grave 2246** (*not illus.*)

?SW–NE, sub-rectangular cut, shallow concave sides and base; 2.10 x 0.76 m, max. 0.17 m deep. Single fill; 2247.

*Grave goods*: None; residual flint flakes and Late Bronze Age pottery.

**Grave 2449** (Fig. 7.5)

?SW–NE, irregular sub-rectangular cut, ?steep slightly concave sides, flat base, disrupted by bioturbation (roots/animal burrow); 1.66 x 0.68 m, 0.07 m deep. Single fill: 2450.

*Grave Goods*:

ON 142: Iron knife blade, tip missing. Complete but broken rectangular-sectioned tang, central on blade; angled shoulder to back of blade, choil more curved. Curved back of blade, curves down to missing tip. Straight cutting edge. Distinct weld line visible in radiograph along entire length of blade, separating ?steel cutting edge from ?iron back of blade. Böhner Type C. L 146 mm, max. W 22 mm.

*Other inclusions*: Residual flint flakes and Late Bronze Age pottery.

**Grave 2482** (*not illus.*)

?SW–NE, sub-rectangular cut with slightly apsidal W. end, steep concave sides, flat base; 2.06 x 0.92 m, 0.19 m deep. Single fill; 2483.

*Grave goods*: None.

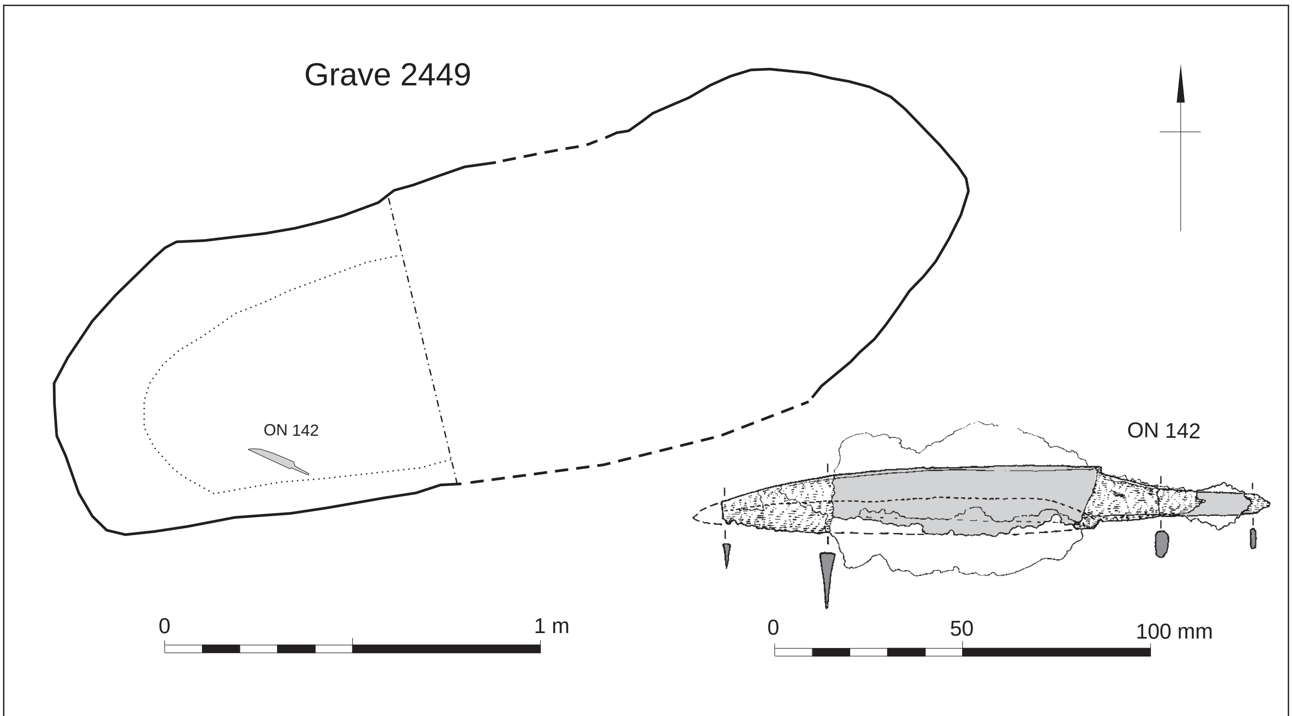



*Figure 7.5 Plan of grave 2449 and grave goods*

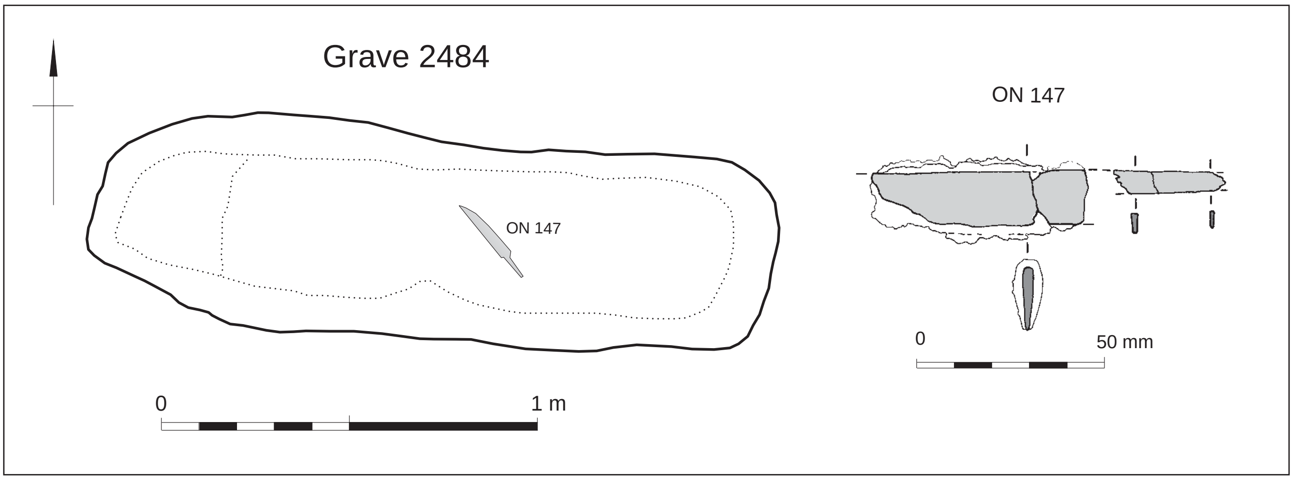



*Figure 7.6 Plan of grave 2484 and grave goods*

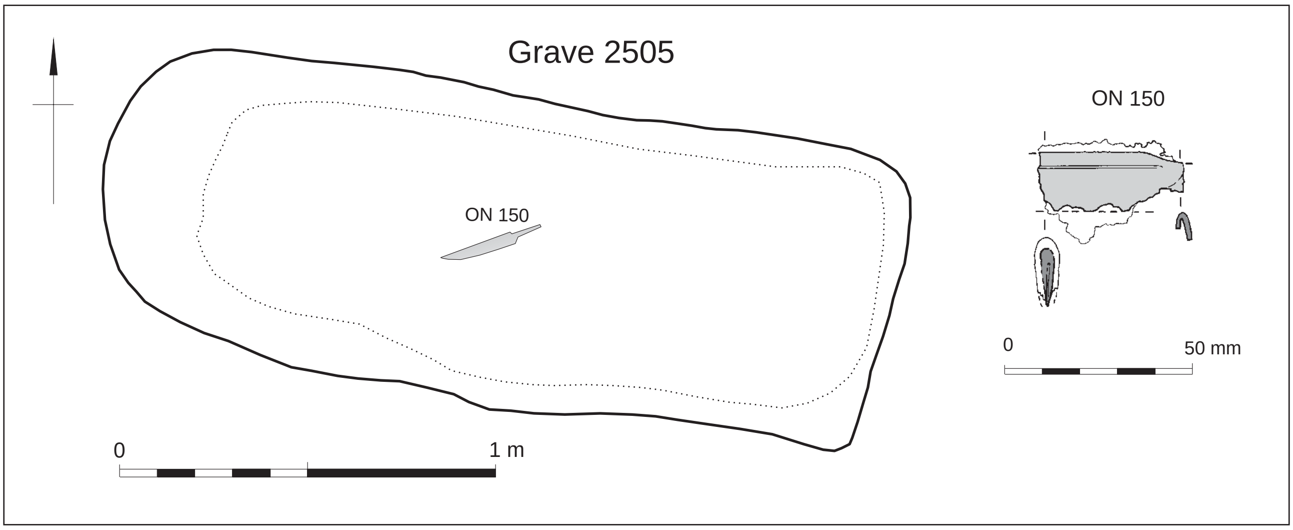



*Figure 7.7 Plan of grave 2505 and grave goods*

**Grave 2484** (Fig. 7.6)

?W–E, sub-rectangular cut, shallow concave sides, flat base; 1.82 x 0.54 m, max. depth 0.15 m. Ledge at W (head?) end; 0.22 m long, 0.07 m high. Single fill: 2485. Cuts Barrow 2 ditch.

*Grave goods*:

ON 147: Fragmented ?knife blade, L 49 mm (largest fragment). *Organic remains*: mineralised textile & fragments of wood, possible sheath.

**Grave 2501** (*not illus.*)

?WSW–ENE, rectangular cut, steep slightly concave sides, flat base sloping down slight to W (0.05 m); 1.85 x 0.62 m, max. depth 0.09 m. Single fill: 2502.

*Grave goods*: None; residual burnt and struck flint, and Late Bronze Age pottery.

**Grave 2505** (Fig. 7.7)

?W–E, sub-rectangular cut with apsidal W. end, shallow concave sides, flat base; 2.10 x 0.83 m, max. depth 0.20 m. Single fill: 2506. Cuts Barrow 3 ditch and ?Romano-British ditch 3152.

*Grave goods*:

ON 150: Fragmented knife blade, L 38 mm (largest fragment). Possible sheath.

**Grave 2536** (Fig. 7.8)

NNE–SSW, sub-apsidal cut, steep concave sides, flat base; 2.06 x 0.70 m, max. depth 0.13 m. Single fill: 2535. Cuts Barrow 3 ditch and ?Romano-British ditch 3152.

*Grave goods*:

ON 158: Knife blade missing tip & tang; cutting edge appears to curve up to point, back of blade curves down to tip. Böhner Type ?A. L 89 mm; W *c.* 16 mm; T *c.* 5 mm? Possible sheath.

ON 159: Monochrome glass bead: wound, opaque yellow, medium, thick-walled cylinder with tapering hole.

ON 161: Polychrome glass bead: wound, globular, opaque yellow with opaque red double crossing wave. Buckland type D22.

*Other inclusions*: residual Late Bronze Age pottery, flint and animal bone.

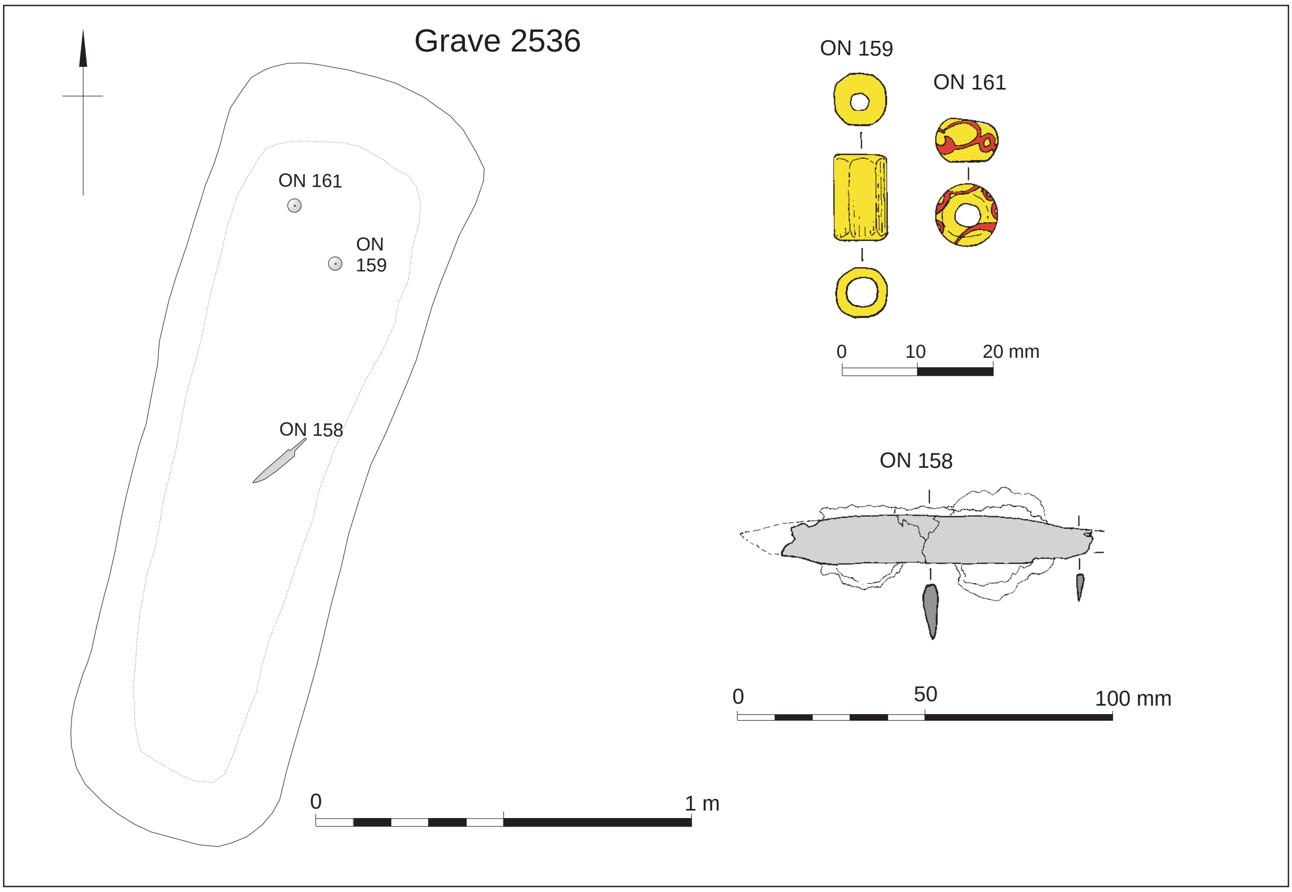



*Figure 7.8 Plan of grave 2536 and grave goods*

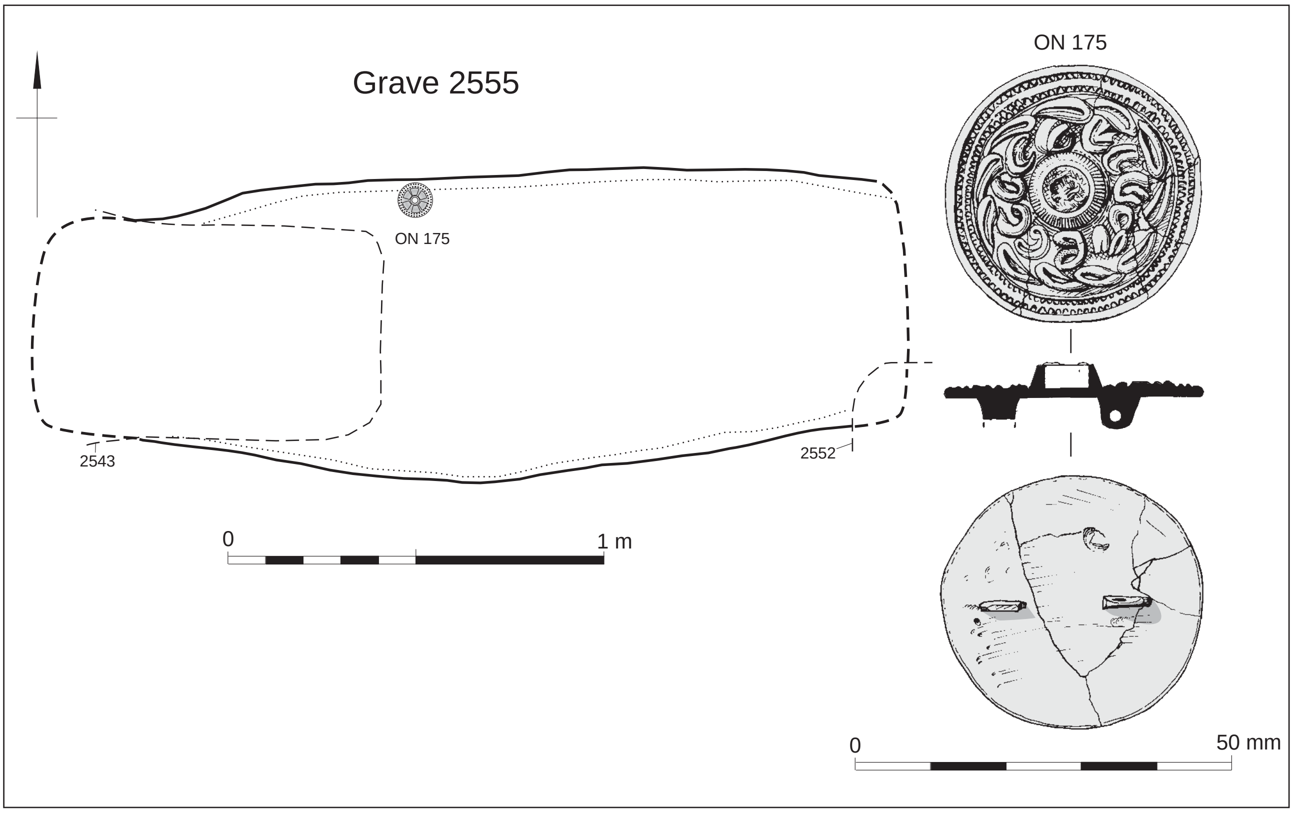



*Figure 7.9 Plan of grave 2555 and grave goods*

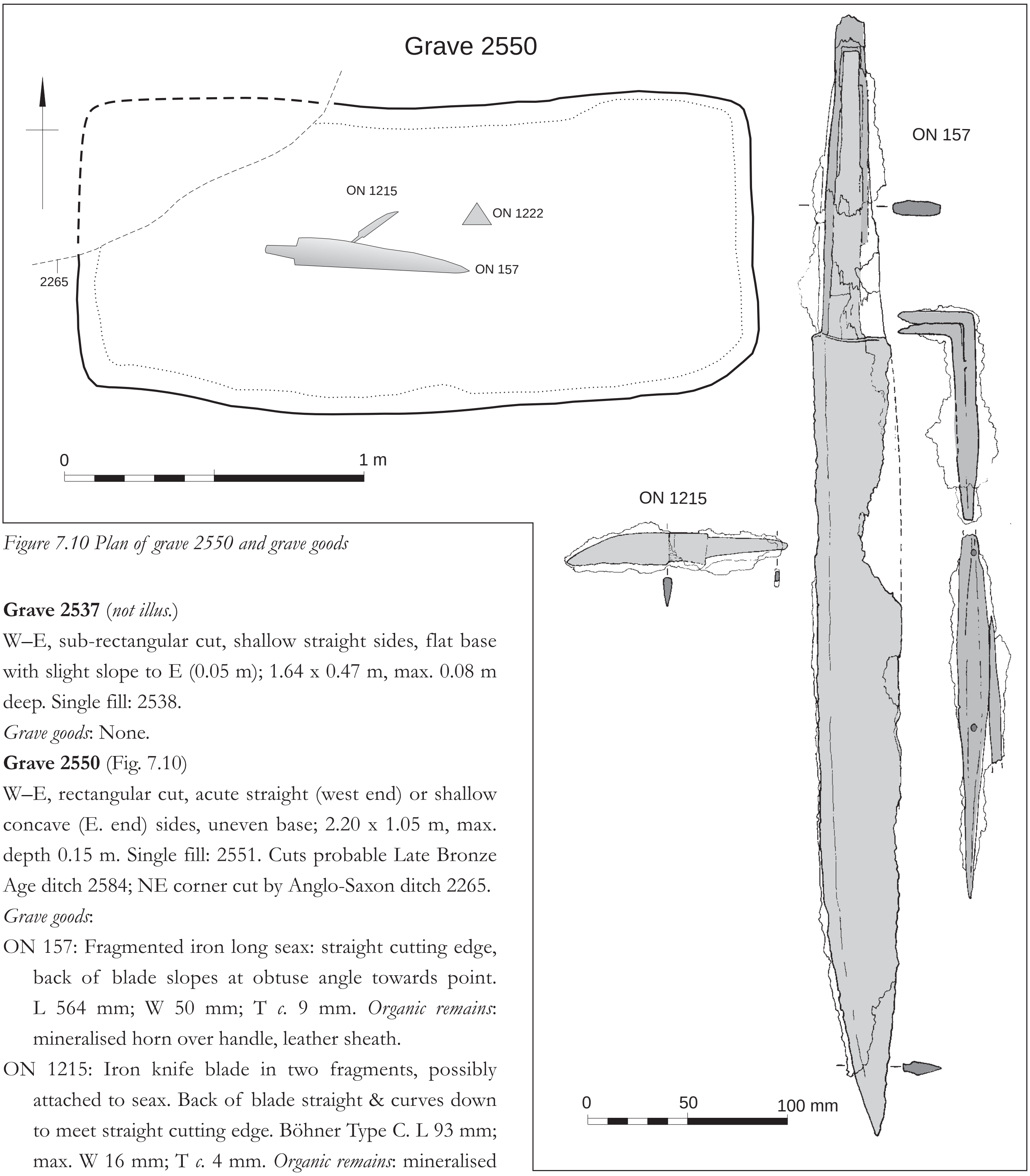



*Figure 7.10 Plan of grave 2550 and grave goods*

**Grave 2537** (*not illus.*)
W–E, sub-rectangular cut, shallow straight sides, flat base with slight slope to E (0.05 m); 1.64 x 0.47 m, max. 0.08 m deep. Single fill: 2538.
*Grave goods*: None.

**Grave 2550** (Fig. 7.10)
W–E, rectangular cut, acute straight (west end) or shallow concave (E. end) sides, uneven base; 2.20 x 1.05 m, max. depth 0.15 m. Single fill: 2551. Cuts probable Late Bronze Age ditch 2584; NE corner cut by Anglo-Saxon ditch 2265.
*Grave goods*:
ON 157: Fragmented iron long seax: straight cutting edge, back of blade slopes at obtuse angle towards point. L 564 mm; W 50 mm; T *c.* 9 mm. *Organic remains*: mineralised horn over handle, leather sheath.
ON 1215: Iron knife blade in two fragments, possibly attached to seax. Back of blade straight & curves down to meet straight cutting edge. Böhner Type C. L 93 mm; max. W 16 mm; T *c.* 4 mm. *Organic remains*: mineralised leather sheath & wood on the handle.
ON 1222: Iron nail with mineralised wood (oak) (*not illus.*); point missing. L 27 mm.
*Other inclusions*: Residual Late Bronze Age pottery, struck and burnt flint.

**Grave 2555** (Fig. 7.9)
W–E, sub-rectangular cut, acute straight sides and shallow concave ends, flat base; *c.* 2.30 x 0.74 m, maximum depth 0.18 m. Single fill: 2556. Cut at either end by two modern animal graves; 2543 (dog) and 2552 (piglet).
*Grave goods*:
ON 175: Silver circular brooch with circular raised central cell in form of a boss, almost complete. Original setting missing, replaced by grey corrosion products. Boss encircled by field of Style I animals, bordered by zig-zag line formed by two rings of punched triangles & enclosed within slightly raised rim. Reverse: catch-plate and attachment for pin (missing). D 33 mm.
*Other inclusions*: Residual Late Bronze Age pottery and burnt flint.

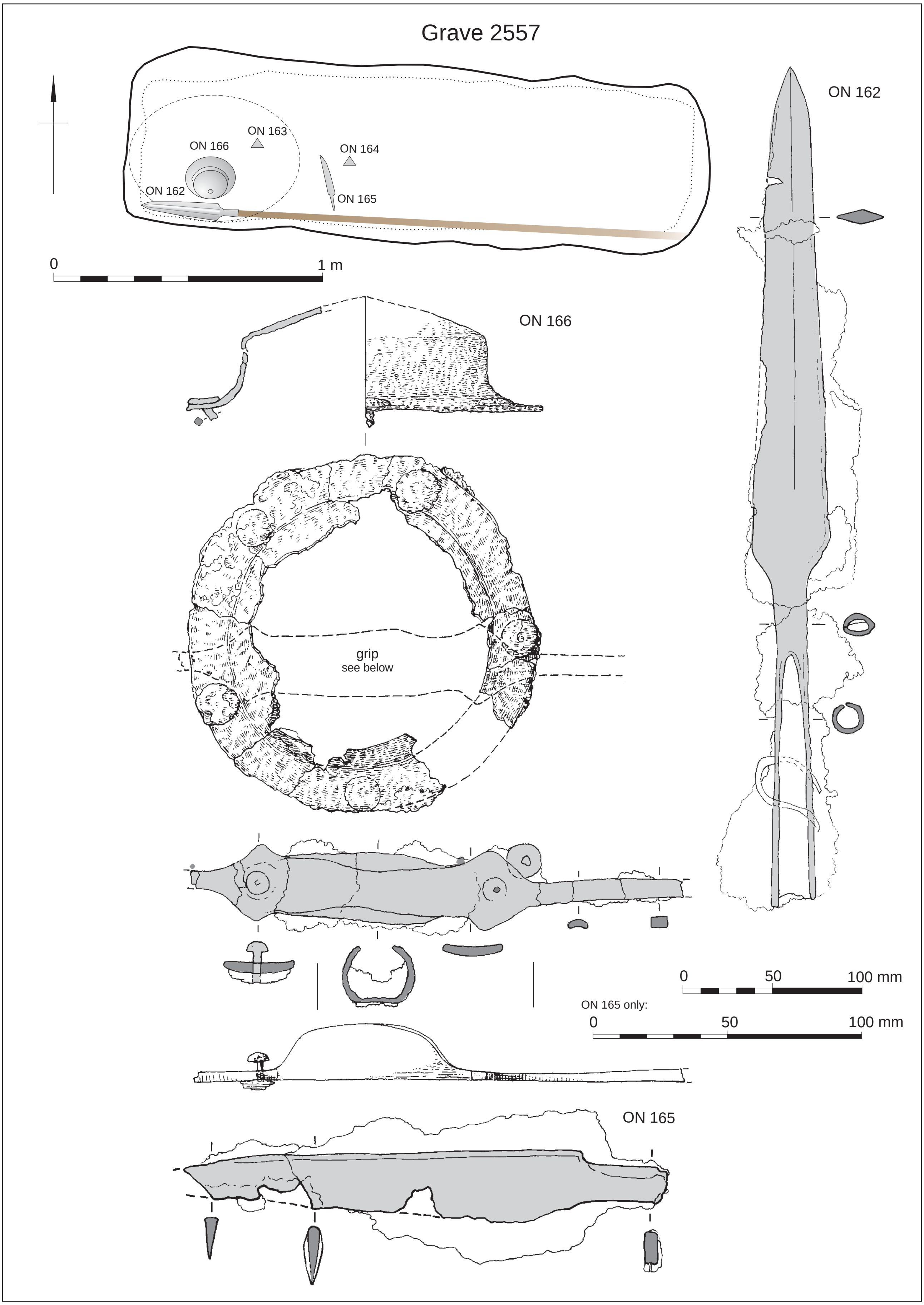



*Figure 7.11 Plan of grave 2557 and grave goods*

**Grave 2557** (Fig. 7.11, Pl. 7.1)

W–E, sub-rectangular cut, vertical sides, flat base; 2.10 x 0.62 m, max. 0.20 m deep. Single fill: 2558.

*Human Remains*: Fragments 3 tooth crowns (enamel). Adult >18 yr. Fused to underside of flange of shield boss ON 166.

*Grave goods*:

ON 162: Spearhead in four pieces, indeterminable type. L *c.* 467 mm. *Organic remains*: mineralised textile over one side; wood in socket.

ON 163: Iron rod fragments (*not illus.*); flat profile; L *c.* 145 mm (not examined by Nick Stoodley)

ON 164: Bronze object (*not illus.*); heavily corroded, form uncertain (missing; not examined by Nick Stoodley); L *c.* 15–20 mm.

ON 165: ?knife blade in three fragments. Tang broken; cutting edge curves up to point, back of blade curves down to tip. Böhner Type A. L 146 mm; W *c.* 2.6 mm; T *c.* 3 mm. *Organic remains*: possible handle.

ON 166: Fragmentary iron shield boss, ?straight walls & convex/straight cone terminating in unknown apex. D *c.* 180 mm; flange *c.* 25 mm wide; five tinned rivets. Probable Dickinson & Härke Group 3. Large diameter & uncertainty over the profile of cone suggests Group 2. Fragmentary & incomplete shield grip, Dickinson & Härke Type IIIb, flanged; central section terminated by rivet holes, a narrow bar extends on either side. L *c.* 340 mm. *Organic remains*: mineralised wood from shield & grip; remains of leather around the grip.

*Plate 7.1 Graves 2557 and 2559 under excavation viewed from the north*

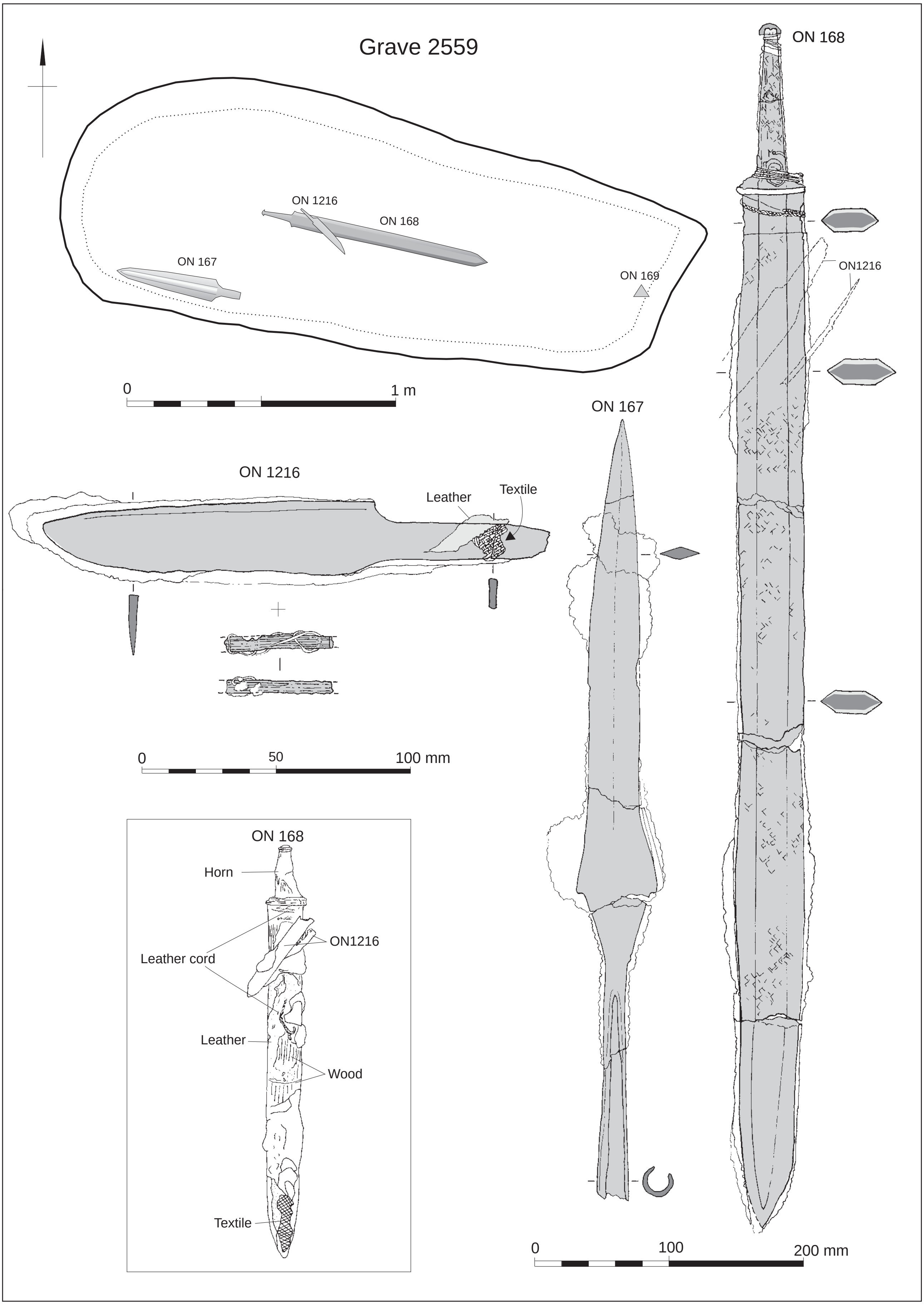



*Figure 7.12 Plan of grave 2559 and grave goods*

**Grave 2559** (Fig. 7.12, Pl. 7.1)

?W–E, sub-rectangular cut with apsidal W end, moderate straight sides, flat but slightly sloping (W–E) base; 2.23 x 0.78 m, max. depth 0.16 m. Single fill: 2560.

*Grave goods*:

ON 167: Fragmentary iron spearhead: long blade of lozengiform section; type indeterminable (neck obscured); length suggests Swanton Type H3. L *c.* 595 mm; max. W 27 mm. *Organic remains*: traces of mineral-preserved wood in socket & mineralised textile on socket.

ON 168: Iron sword in five major pieces with a knife corroded to upper section of blade. Long two-edged (parallel-sided) type with small iron pommel with curved top. *Organic remains*: hilt of four pieces of horn; the sheath an outer layer of leather, under which are wooden scabbard plates lined with fleece. Cord (mineralised leather) wrapped around the lower guard, possibly a binding around the mouth of scabbard; cord fragment lower down may be binding to attach knife or part of shoulder strap/belt. Mineralised textile over lower section of blade close to point. X-ray shows ?small buckle at base of handle. L *c.* 915 mm; W *c.* 56 mm; T *c.* 13 mm.

ON 169: three unidentified iron fragments (*not illus.*).

ON 1216: Iron knife tang attached to sword; indeterminable type. Fragment of sheath folded over an iron rod; ?'lighter.' *Organic remains*: leather sheath & unidentified mineralised organics.

*Other inclusions*: Residual burnt and unburnt flint.

**Grave 2562** (Fig. 7.13)

?ESE–WNW, sub-rectangular cut, vertical sides, flat base; 1.80 x 0.50 m, max. depth 0.25 m. Single fill: 2563.

*Grave goods*:

ON 170a: Iron buckle & trapezoid plate. Oval loop 42 mm x 30 mm, tongue resting on loop, L 16 mm. Plate of iron sheet bent over loop & tapering towards rear end; rivet at rear end with rivet hole midway along one edge, probably to secure plate to a strap. L 68 mm, max. W 39 mm. Overall L 88 mm.

ON 170b: Iron knife in two fragments. Tang broken (part is corroded to buckle 170a); cutting edge curves up to point, back of blade curves down to tip. Böhner Type A. L 181 mm; W ?; T *c.* 3 mm. *Organic remains*: possible sheath.

ON 171: Incomplete iron strap-end; tapers down to a point, secured by rivet at either end: hole broken across middle at widest end.

*Other inclusions*: residual struck and burnt flint.

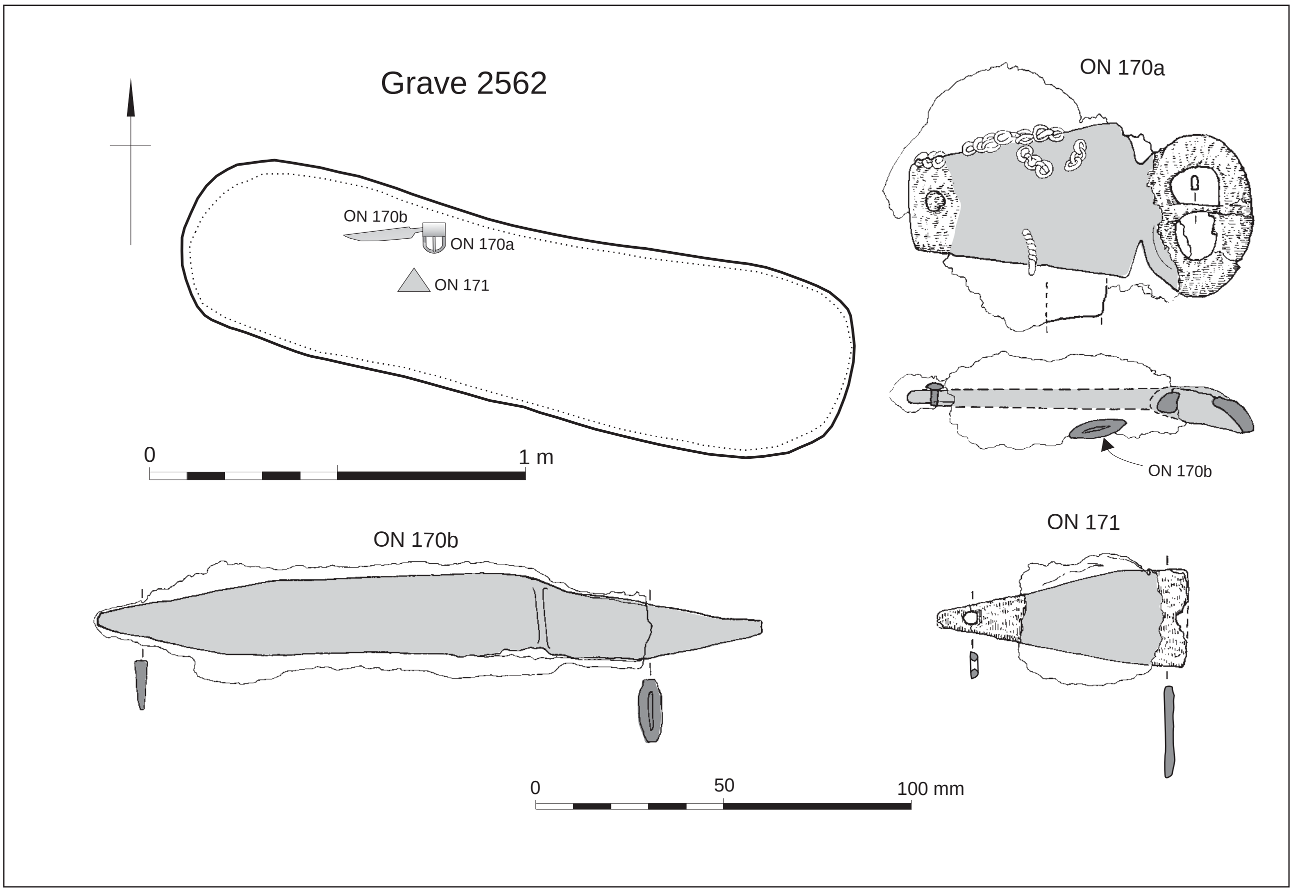



*Figure 7.13 Plan of grave 2562 and grave goods*

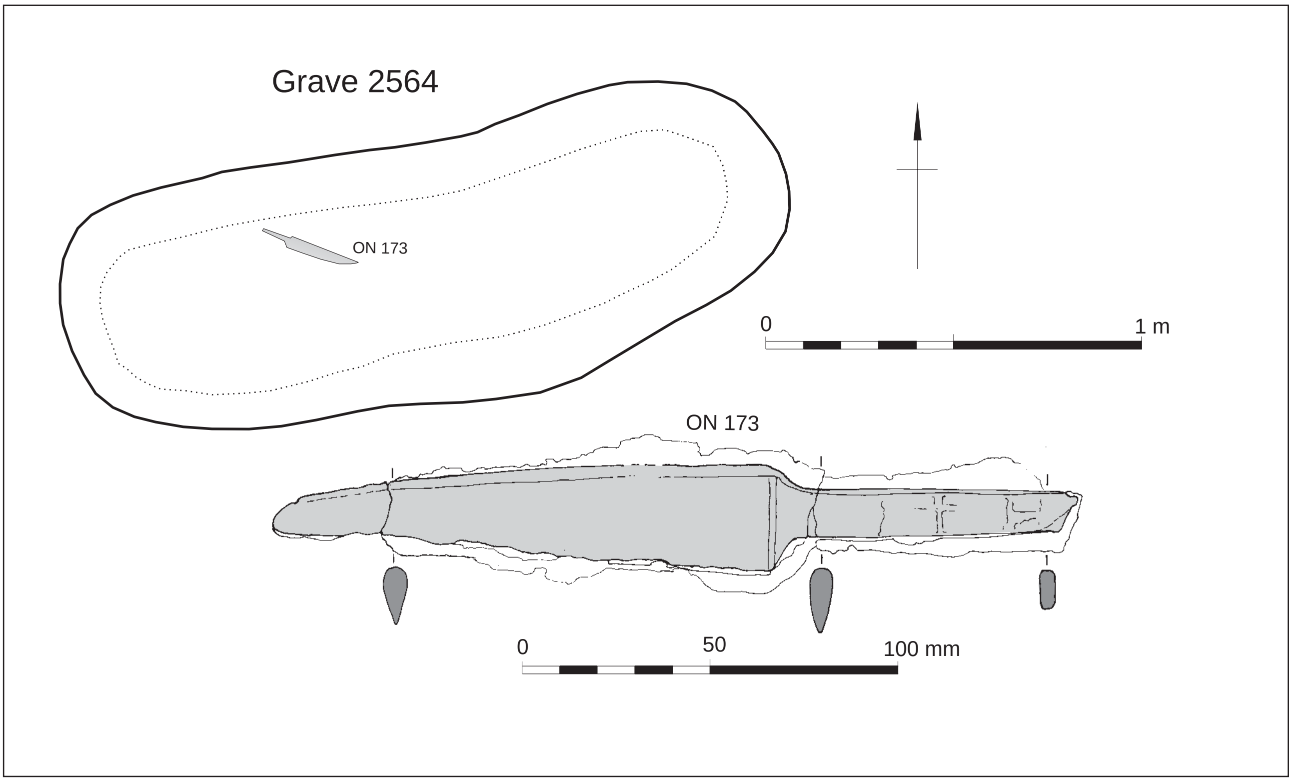



*Figure 7.14 Plan of grave 2564 and grave goods*

**Grave 2564** (Fig. 7.14)
?WSW–ENE, sub-apsidal cut, steep straight N & W sides, S & E sides shallow slightly concave sides, shallow concave base sloping slightly down to E; 1.94 x 0.67 m, max. depth 0.18 m. Single fill: 2565.
*Grave goods*:
ON 173: Fragmentary iron knife & tang. Incomplete oval-sectioned tang central on blade with distinct angle to back of blade; angled shoulder onto cutting edge; back of blade straight; blade appears to curve up to tip. Böhner Type B. L 212 mm; max. W 30 mm; T *c.* 5 mm. *Organic remains*: horn handle & leather sheath.
*Other inclusions*: residual struck flint
**??Grave 2683** (*not illus.*)
?W–E, irregular sub-apsidal cut, acute straight sides, irregular base with deeper cut in W half; 2.36 x 0.80 m, max. 0.96 m deep. Single fill: 2682.
*Grave goods*: none. Residual burnt and struck flint.
**Grave 2697** (Fig. 7.15)
W–E, sub-rectangular grave cut, steep straight sides, flat base (E end unclear due to underlying feature); *c.* 1.90 x 0.91 m, 0.35 m deep. Single fill: 2698. Cuts S terminal of ditch 2584.
*Human Remains*: 4 fragments skull vault, heavily degraded (5+). Subadult/adult >15 yr.
*Grave goods*:
ON 152: Copper alloy buckle loop & tongue. Loop heavy in construction, oval in outline & D-shaped in section. Hollow underside consisting of two recesses either side of tongue bar; one contains stamped ring & dot decoration, & other retains traces of tinning. L 39 mm; W 32 mm; T 6 mm. Tongue of 'shield-on-tongue' type; D-shaped in section with hollow shield-shaped base-plate, may have held a glass setting; small fragment iron is the remains of the anchorage. L 39 mm; max. W 20 mm; T 6 mm.
ONs 1118–1128 &1235: 48 monochrome glass beads. Forming a small concentration in NW corner of grave:
ONs 1118 (*not illus.*), 1120: 8 wound, opaque yellow, medium, globular (1 fragmented).
ON 1119: wound, opaque yellow, medium, double annular.
ON 1121: 2 wound, opaque pale blue, medium, double annular.
ON 1122, 9 wound, opaque blue, medium, globular.
ON 1123: 3 wound, opaque blue-white, medium, double annular.
ON 1124: 6 wound, opaque blue-white, medium, globular.
ON 1125: wound, opaque red, medium, double annular.
ON 1126: 10 wound, opaque red, medium, globular. (1 fragmented).
ON 1127: wound, blue, medium, double annular.
ON 1128: 6 wound, blue, medium, annular. (1 fragmented).
ON 1235 (sample find; *not illus.*): wound, opaque white, medium, globular.

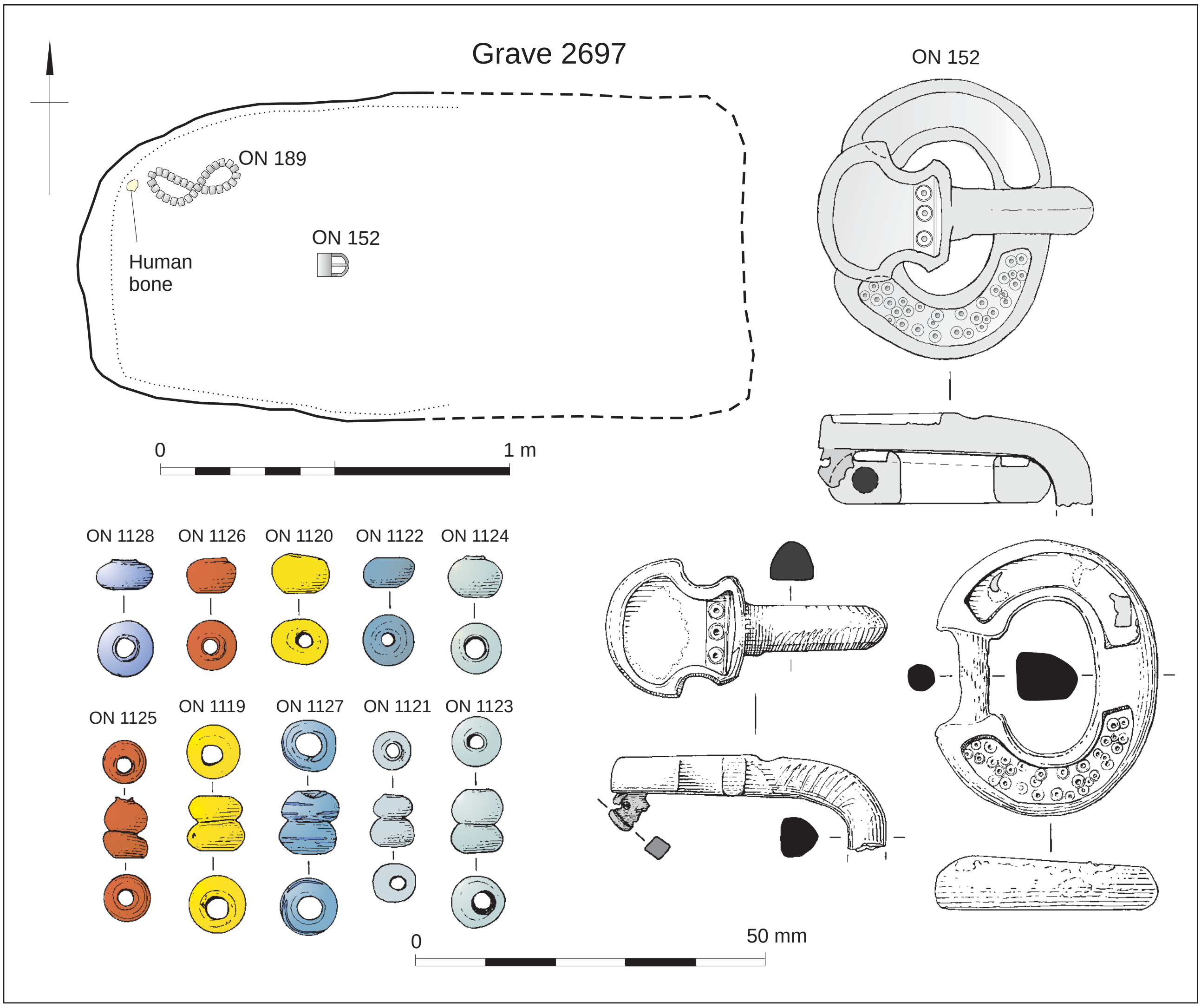



*Figure 7.15 Plan of grave 2697 and grave goods*

**Grave 2756** (Fig. 7.16)
W–E, sub-apsidal cut, acute straight sides, flat base sloping down to E (0.16 m drop W–E); 2.85 x 1.0 m, max. depth 0.40 m. Coffined remains: 2807; 10–20 mm wide dark stain describing area 1.85 x 0.62 m, 0.05–0.20 m deep. Grave fill: 2757. Cuts Late Bronze Age ditch 3215 and ?Romano-British ditch 3152; relationship with grave 2501 to W lost.

*Grave goods*:

ON 193: Copper alloy fragment (*not illus.*), L 10 mm.

ON 196: Copper alloy gilded keystone disc brooch, incomplete; Avent (1975) Class 1.1. Central circular cell; setting missing replaced with copper corrosion products. Three keystones in raised cells, trapezoid in outline: one red & two green glass with possible hatched foil backing; three ornament types trapezoid in shape within beaded borders; outer raised beaded rim. Copper alloy catch- & attachment-plate; iron spring. D 26 mm. *Organic remains*: mineral-preserved textile.

ON 197: Large collection of amber, glass, and gypsum beads distributed across a 0.30 x 0.30 m area (Pl. 7.3), comprising (Fig. 7.16):

ONs 1129, 1132, 1135–7, 1139–1143, 1150–2 & 1156–8: 77 amber beads, D 6–18 mm:

ON 1129 (*not illus.*): fragments;

ONs 1132 (*not illus.*), 1136–7 (1137 *not illus.*), 1139, 1143, 1150 (*not illus.*), 1156 & 1158 (*not illus.*): 27 Buckland A01.

ONs 1135, 1140 (*not illus.*) 1141–2 (*not illus.*), 1151–2 (*not illus.*), 1157 & 1159 (*not illus.*), 49 Buckland A02.

ONs 1130 & 1149 (*not illus.*): fragments gypsum bead.

ONs 1131, 1133–4, 1144–8, 1153–4, 1160–1180 & 1236–7: 42 glass beads plus fragments;

*26 monochrome beads*:

ONs 1133 (*not illus.*) & 1145: three wound, blue, large, annular.

ON 1146: wound & ribbed, blue, large, melon (partially fragmented)

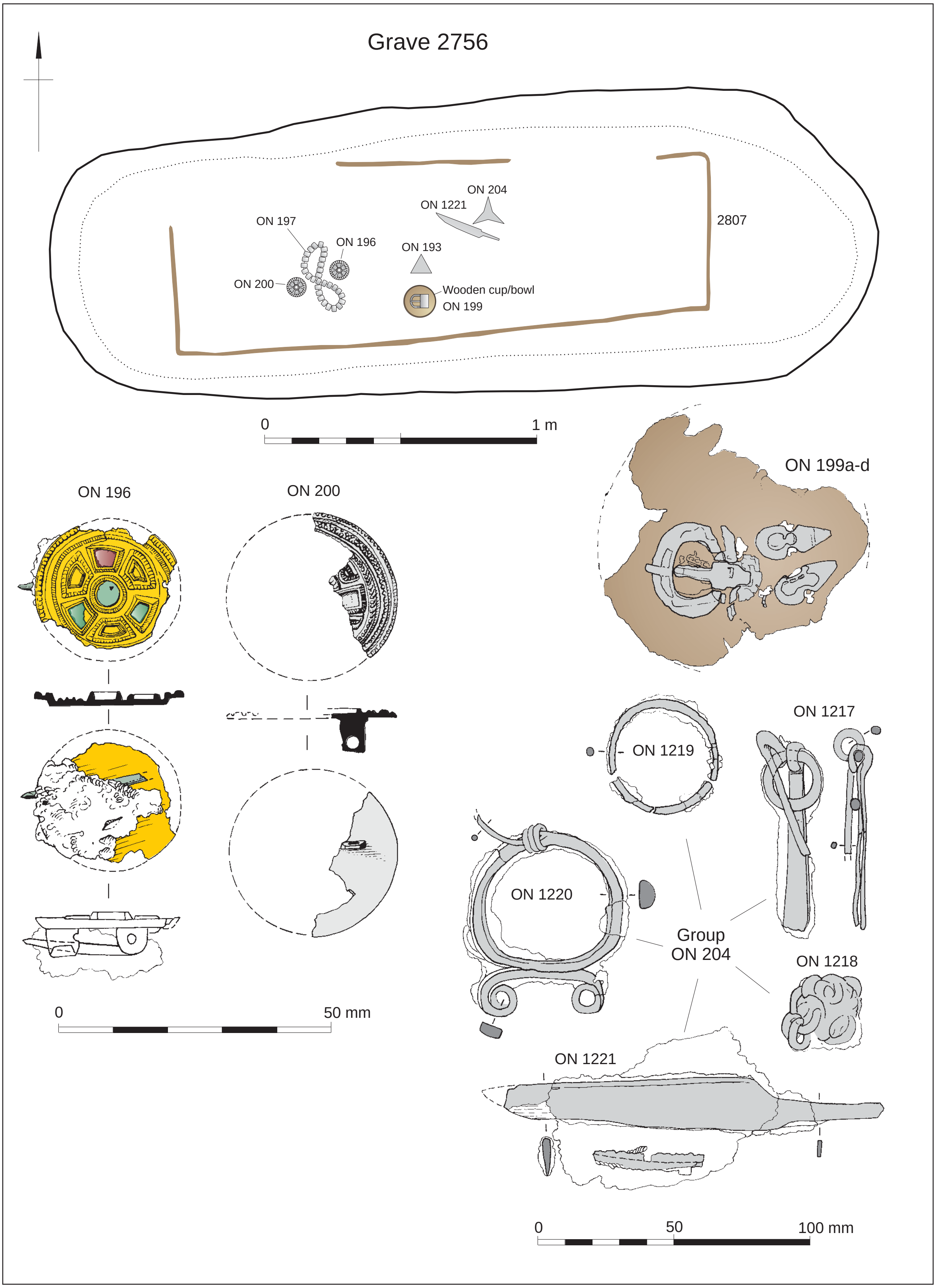



*Figure 7.16 Plan of grave 2756 and grave goods*

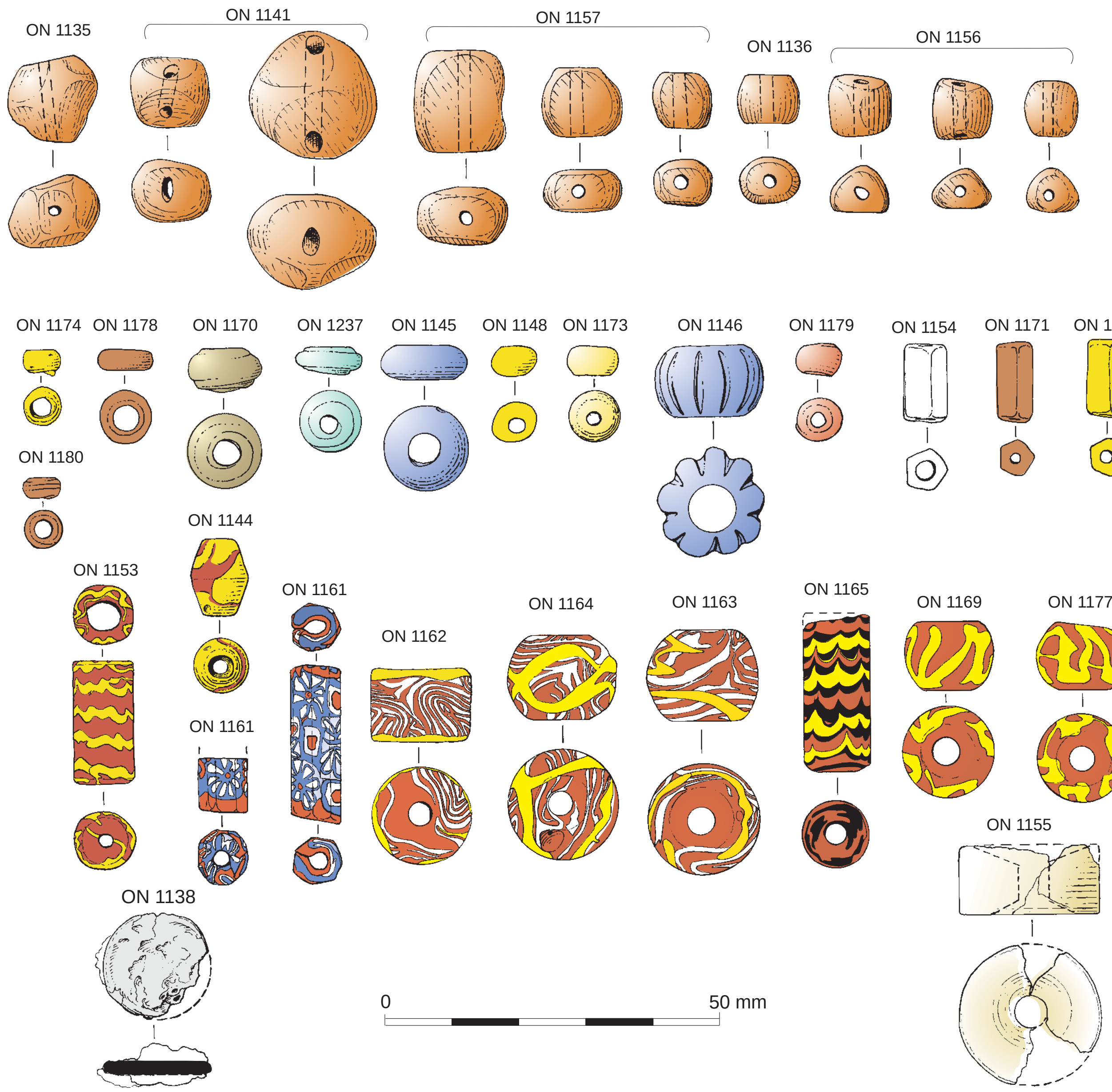



*Figure 7.16 (cont.) Grave 2756 grave goods*

ONs 1147 (*not illus.*) & 1173: three wound, opaque yellow, medium, globular.

ON 1148: five wound, opaque yellow, small, globular.

ON 1154: wound, opaque white, medium, long pentagonal section cylinder.

ON 1170: wound, green-yellow, medium, annular.

ON 1171: wound, opaque brown-red, medium, long pentagonal section cylinder.

ON 1172: wound, opaque yellow, medium, long pentagonal section cylinder.

ONs 1174, 1175, 1176 & 1236 (sample find; *last three not illus.*): four wound, opaque yellow, small.

ON 1178: wound, opaque brown-red, medium, annular.

ON 1179: wound, brown-red, medium, globular.

ON 1180: three wound, opaque brown-red, small, annular.

ON 1237 (sample find): wound, blue-green, medium, annular.

*16 polychrome beads*:

ON 1131 (*not illus.*): mosaic? blue, opaque brown-red, fragmented.

ON 1134 (*not illus.*): complex mosaic, opaque red, blue, opaque white & one other colour (degraded), red applied over white dots, blue & white flowers, red bands. Fragmented (similar to ON 1161);

ON 1144: wound, medium, biconal, opaque red-brown with black streaks & opaque yellow irregular linear trail.

ONs 1153 & 1166–7 (*not illus.*): three wound, large, opaque red with opaque yellow wire drawn single spiral, cylinder.

ON 1160 (*not illus.*): opaque red, opaque yellow, blue; fragmented.

ON 1161: two complex mosaic; one large, folded cylinder & one medium, folded cylinder. Opaque red, blue, opaque white & one other colour (degraded), red applied over white dots, blue & white flowers, red bands.

ON 1162: wound applied spiral type, large, opaque red, opaque white body with two opaque yellow applied stripes, cylinder.

ONs 1163 & 1164: two wound applied spiral type, large, opaque red, opaque white body with opaque yellow applied double crossing wave, globular.

ON 1165: wound, large, opaque red with opaque yellow & opaque black wire drawn single spiral, cylinder.

ONs 1168 (*not illus.*) & 1177: two wound, large, opaque red with opaque yellow irregular crossing waves, barrel.

ON 1169: wound, medium, opaque red with opaque yellow single wave, barrel.

ON 1138: silver disc-shaped object, D 16 mm; probable necklace fitting.

ON 1155: gypsum bead; large white cylinder fragments, Buckland A18.

ON 199 a–d: Block of organic material, covering belt buckle and fittings; situated immediately south of ON 193 (description from radiograph);

ON 199 a: Fragment of distorted wooden bowl/cup, L *c.* 95 mm, W *c.* 70 mm.

ON 199 b: Belt buckle with oval loop & fragmented, guitar-shaped shield tongue. Marzinzik Type I.2. L *c.* 42 mm, W 35 mm.

ON 199 c–d: Shoe-shaped belt fittings, with rectangular lugs visible in 'heel' areas, L *c.* 28 & 25 mm.

ON 200: Fragmentary silver Keystone garnet disc brooch; unidentified type. Part of one empty trapezoid-shaped keystone extant with one trapezoid-shaped ornament within beaded border. Keystone & ornament enclosed by inner beaded rim within a possible zig-zag line formed of two rows of punched triangles & outer beaded rim.

ON 204: Mineralised remains & dark soil stain indicate leather purse comprising five iron artefacts: purse ring (ON 1220), knife (ON 1221), girdle item/toilet set (ON 1217), iron ring (ON 1219) & chain/iron fitting (ON 1218).

ON 1217: Iron toilet set comprising rod & tweezers suspended from ring. Oval ring, D *c.* 24 mm. Rod ?incomplete, oval section, L 50 mm, D 4 mm. Tweezers L 69 mm max. W 9 mm. Tweezers possibly spatula-type object & complex is part of the girdle.

ON 1218: ?section chain or iron fitting, 29 mm x 27 mm.

ON 1219: Iron ring, circular section, D 49 mm.

ON 1220: Sub-circular purse ring with oval section. Plate (L 50 mm) attached to ring (D *c.* 60 mm, W 13 mm); two curled terminals for suspension &/or decoration. Two unidentified fragments associated with ring.

ON 1221: Knife blade missing tip & fragmentary tang. Largely complete rectangular-sectioned tang; central on blade with distinct angle to back of blade; angled shoulder onto cutting edge. Back of blade straight, appears to curve up to tip. Böhner Type B. L 135 mm, max. W 21 mm; T?. Fragmentary rod (L 37 mm) attached to knife by twisted thread, probably a 'lighter.' *Organic remains*: mineralised horn handle & leather sheath.

*Other inclusion*: residual Romano-British pottery, struck and burnt flint

**Grave 3036** (*not illus.*)

?SW–NE, sub-apsidal cut, steep straight sides, flat base; 1.88 x 0.82 m, 0.18 m deep. Single fill; 3037. Cuts ?Anglo-Saxon pit 3111 and ditch 2316, and Barrow 1 ditch.

*Grave goods*: None; residual flint flakes.

**Grave 3066** (Fig. 7.17)

WSW–ENE, sub-rectangular cut, acute straight sides, flat base sloping down slightly to E (0.07 m); 1.57 x 0.67 m, max. depth 0.09 m. Single fill: 3067. Cuts Barrow 2 ditch.

*Grave goods*:

ON 218: Fragmentary iron shield boss. Straight walls, convex cone terminating in iron apex; copper alloy rivets (number unknown). Dickinson and Härke Group 3. D *c.* 59 mm; H *c.* 68 mm. Flange W *c.* 19 mm. Short flat grip Dickinson and Härke Type I.a1; both ends perforated by single rivet. *Organic remains*: impressions of barley on top of boss possibly from lining over burial; mineralised wood under boss and leather around the grip.

ON 219: (*not illus.*) Iron fragments to the right of boss, probable board fitting. Organic remains: fragments of wood.

ON 220: (*not illus.*) Fragment iron sheet metal with one curved edge.

ON 221: Iron fragments to the left of the boss, probable board fitting.

ON 222: Fragmentary iron spearhead, lozengiform section. Type is indeterminable, possibly small leaf-shaped (Swanton C1). L *c.* 155 mm. *Organic remains*: wood (ash) in socket.

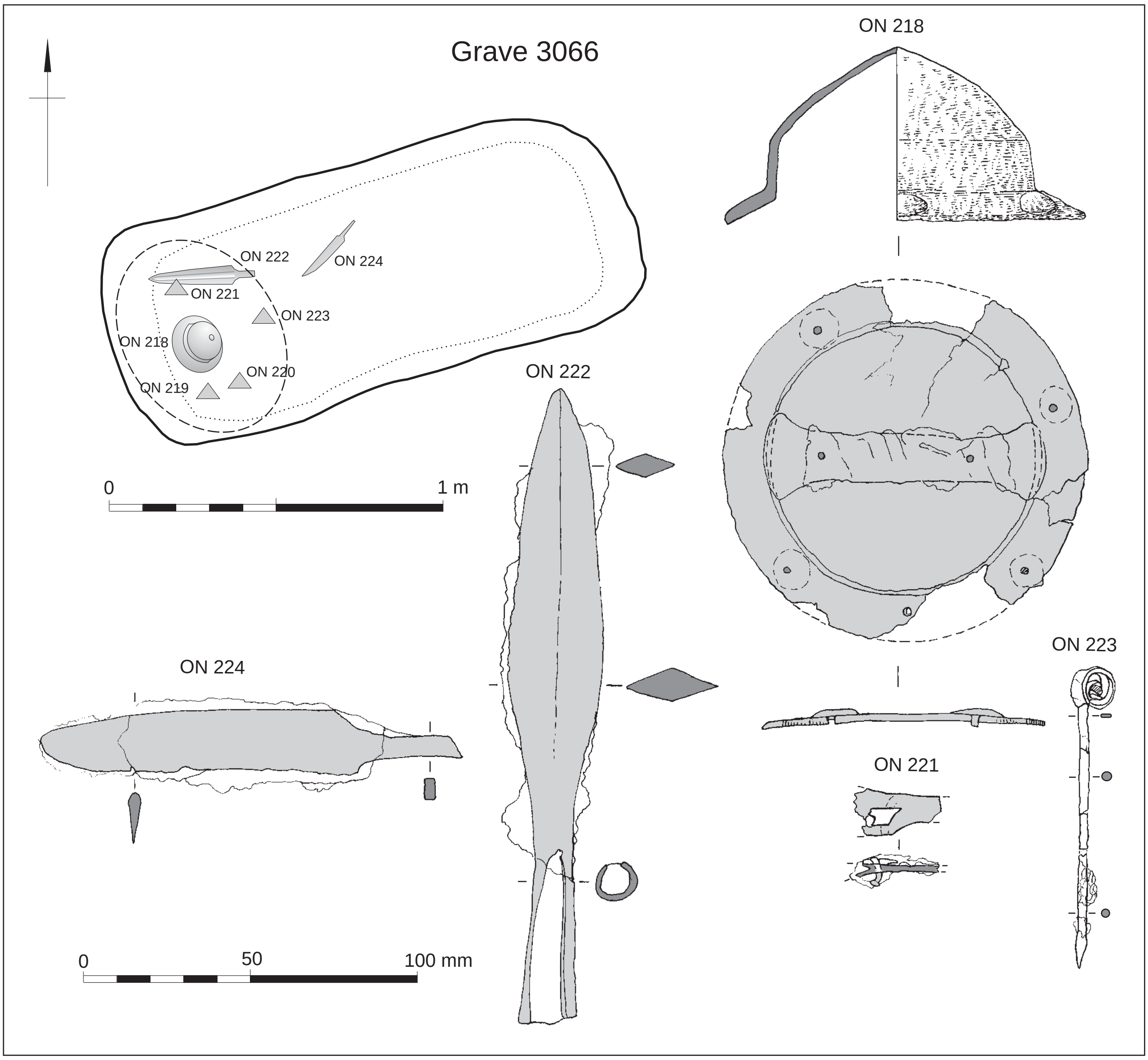



*Figure 7.17 Plan of grave 3066 and grave goods*

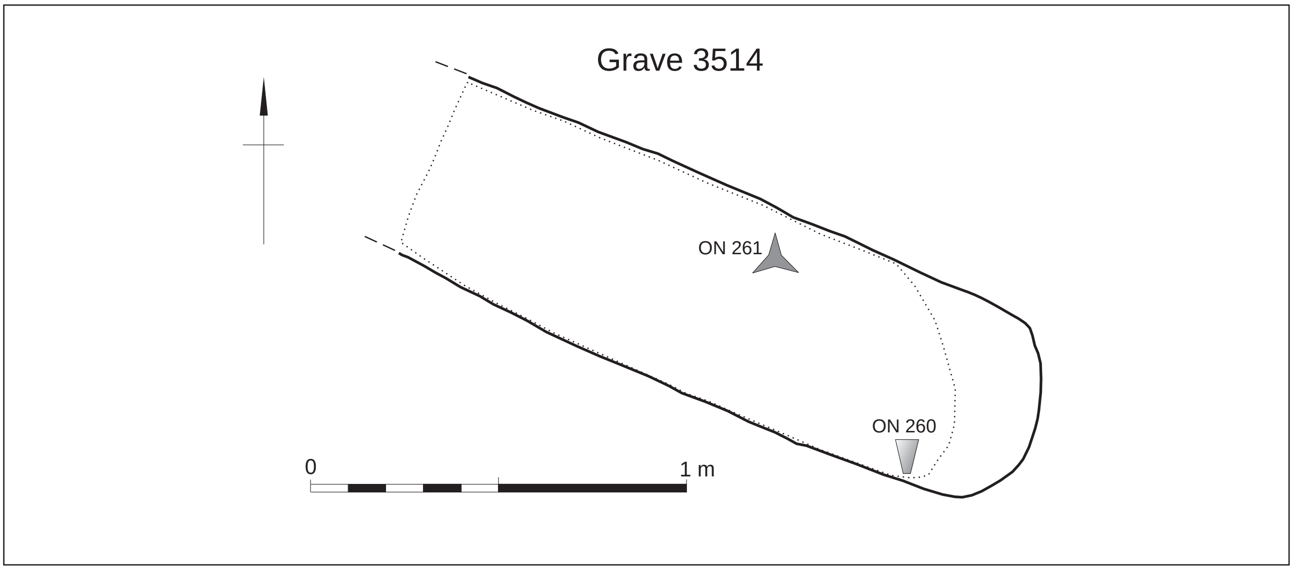
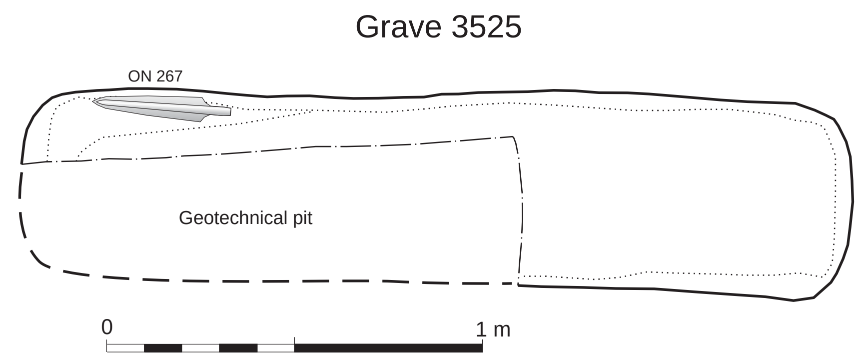



*Figure 7.18 Plan of grave 3514 showing location of grave goods*




ON 223: Fragmentary iron object in four pieces: probable pin. L *c.* 109 mm.

ON 224: Fragmentary iron knife, indeterminable type. L *c.* 135 mm, max. W *c.* 32 mm. Separate lump may be remains of a small buckle (X-ray). *Organic remains*: leather sheath & horn handle with mineralised textile near blade.

*Other inclusions*: Residual burnt and struck flint.

**Grave 3514** (Fig. 7.18)

?NW–SE, sub-apsidal (E end; W end machined away), acute straight long sides & obtuse E end; flattish base falling to E (by 0.19 m); min. 1.70 x 0.55 m, max. depth 0.19 m. Single fill: 3515.

*Grave goods*:

ON 260: (*not illus.*) fragment of pale olive-green vessel glass.

ON 261: (*not illus.*) Corroded iron objects representing remains of a chatelaine. Chain of wire rings in three/four groups; pair of linked rods with hooped ends; rod with looped end (possibly a pair); knife fragments.

**Grave 3525** (Fig. 7.19)

W–E, sub-rectangular cut, acute straight or concave sides, flat base; 2.06 x 0.52 m, max. depth 0.15 m. Single fill: 3526. Cut by recent geotechnical pit.

*Grave goods*:

ON 267: Fragmentary iron spearhead, socket cleft up to junction with blade. Blade angular straight-sided profile; lozengiform section. Swanton Type E3. L 426 mm, max. W 27 mm. *Organic remains*: wood (hazel) in socket.

**Grave 3542** (Fig. 7.20)

?W–E, rectangular cut, acute straight sides, fairly flat base; 1.68 x 0.48 m, max. depth 0.08 m. Single fill; 3543

*Grave goods*:

ON 272: Fragmentary iron knife, indeterminable type. L 118 mm, W *c.* 18 mm, T *c.* 6 mm?. *Organic remains*: possible traces ?horn on handle

*Other inclusions*: residual burnt and struck flint, marine shell.

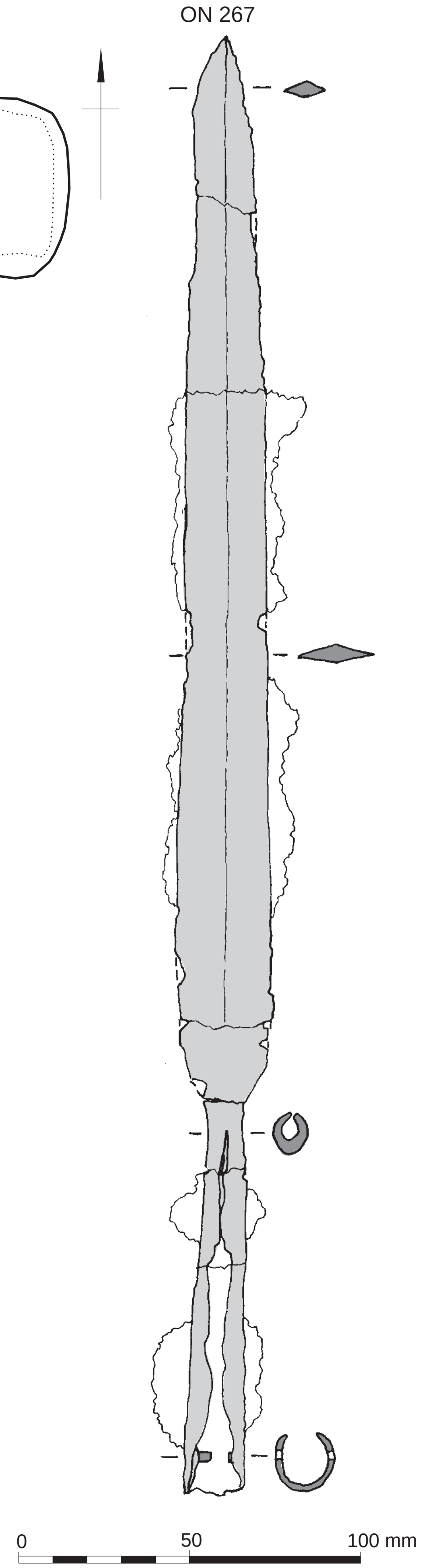



*Figure 7.19 Plan of grave 3525 and grave good*

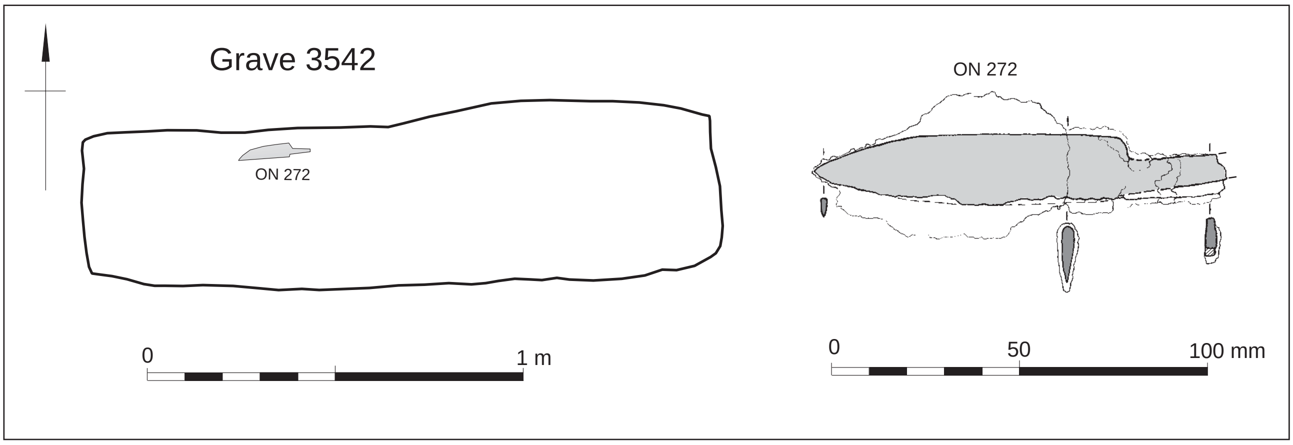



*Figure 7.20 Plan of grave 3542 and grave good*

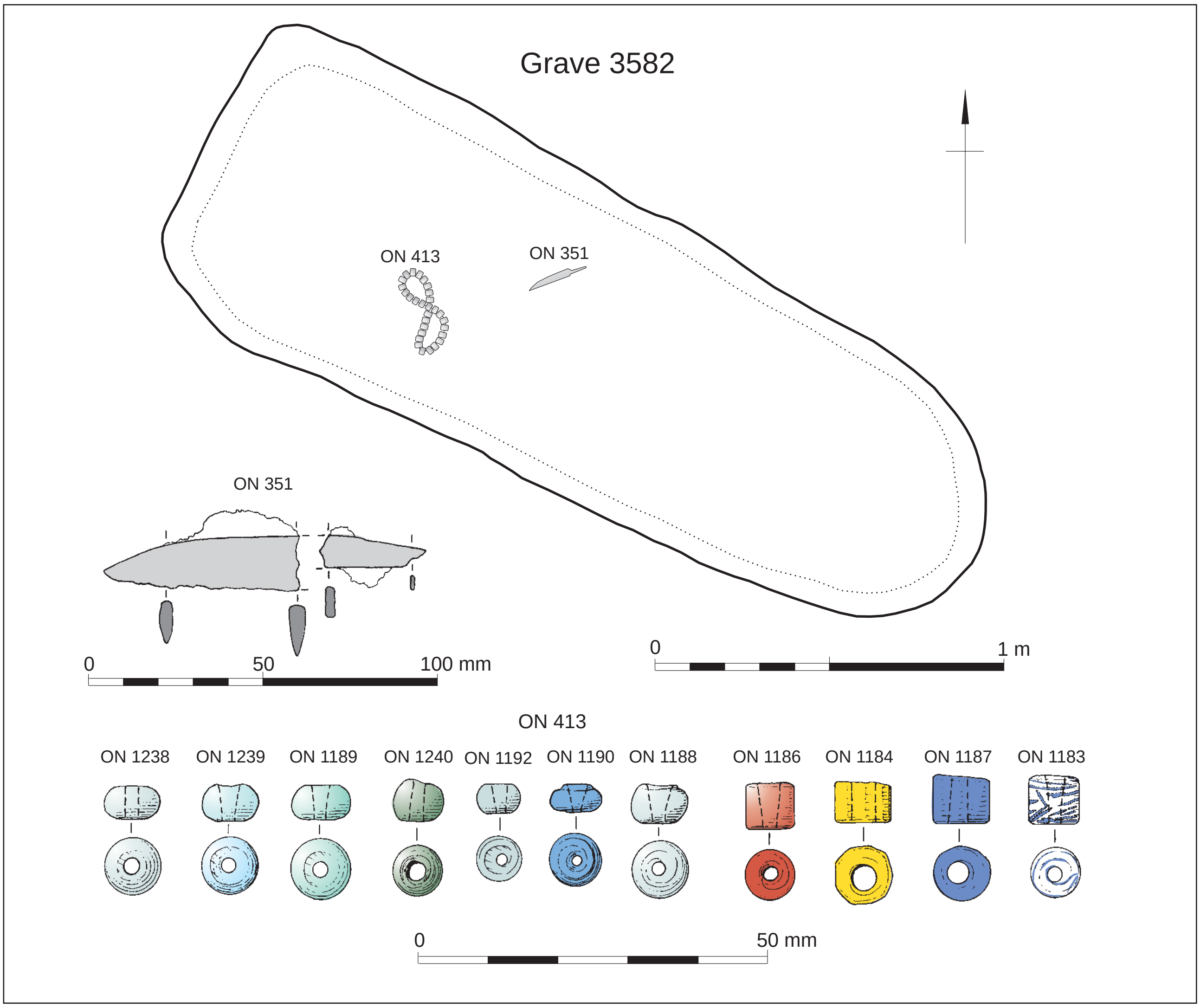



*Figure 7.21 Plan of grave 3582 and grave goods*

**Grave 3582** (Fig. 7.21)

NW–SE, sub-rectangular cut with apsidal E end, acute concave side and flat base. 2.48 x 0.92 m, 0.37 m deep. Fills 3583 & 3584; lower 0.16 m slightly darker than upper 0.24 m. Cuts ?Late Iron Age pit 3635.

*Grave goods (3583)*:

ON 351: Iron knife, blade incomplete; blade L 56 mm. Back & blade curve down to point. Böhner Type A.

ON 413: 43 monochrome glass beads & fragments recovered from an area measuring 0.26 x 0.15 m comprising

ONs 1182–1192 & 1238–1240:

ON 1182 (*not illus.*): blue, completely fragmented.

ONs 1183 & 1185 (*not illus.*): 12 wound, opaque blue-white, medium, thick-walled cylinder.

ON 1184: eight wound, opaque yellow, medium, thick-walled cylinder.

ON 1186: 12 wound, opaque red, medium, thick-walled cylinder.

ON 1187: wound, blue, medium, thick-walled cylinder.

ON 1188: wound, blue, medium, barrel.

ON 1189: wound, blue-green, medium, globular.

ONs 1190–1191 (1191 *not illus.*): two wound, blue, medium, globular.

ON 1192: wound, opaque pale blue, medium, globular.

ON 1238 (sample find): two wound, opaque pale blue, medium, annular.

ON 1239 (sample find): two wound, blue, medium, annular.

ON 1240 (sample find): wound, green/black, medium, globular.

*Other inclusions*: Residual burnt and struck flint from both fills, residual Late Bronze Age pottery in upper fill.

**?Grave 3603** (*not illus.*)

?SE–NW, sub-rectangular cut with sub-apsidal W end, steep straight sides, irregular base with uneven ledge in central portion of S side; 2.30 x 0.90 m, 0.40 m deep. Single fill: 3604. Cuts Late Bronze Age ditch 3607.

*Grave goods*: None; residual worked flint and flakes.

## Human Remains

*by Jacqueline I. McKinley*

A few fragments of *in situ* bone/tooth were recovered from two of the 23/?24 Early Anglo-Saxon graves situated along the western side of the site (graves 2557 and 2697; Figs 7.1–7.2, Pl. 7.1; see *Grave Catalogue*). In addition, single deposits of bones or bone fragments were recovered from three of the Middle Anglo-Saxon pits distributed across the southern part of the site (Fig. 7.22). A sample of cranium from the skull redeposited in pit 2834 (Pl. 7.2) was submitted for radiocarbon dating to ascertain whether the human remains were residual or contemporaneous with the feature; a Middle Anglo-Saxon date was returned (see Marshall *et al.*, Chapter 3; Table 7.1).

*Plate 7.2 Skull 2839 from Middle Anglo-Saxon pit 2834*

### Methods

Analysis followed the methods presented in Chapter 4. Tooth samples were extracted from the radiocarbon dated skull 2839 and subject to strontium/oxygen (Sr/O) and carbon/nitrogen (C/N) isotope analysis (see below, and Millard, Chapter 4).

### Results

A summary of the results is presented in the *Grave Catalogue* (*in situ* remains) and Table 7.1 (redeposited bone); full details are held in the archive.

### Taphonomy

The major factor affecting bone preservation – the nature of burial environment – is discussed in Chapter 4, and it was not unexpected, given the type of soil matrix and location of the graves, that little or no human bone survived within them (see above). The surviving depths of the cuts, although not substantial, were commensurate with those commonly encountered in archaeological investigations, having a range of 0.08–0.40 m. There was no intercutting between graves and later disturbance was limited to two graves cut by small modern features (see McKinley above; Fig. 7.2).

A few fragments of heavily degraded bone were recovered from two graves, both of which contained grave goods. In one case there is no evidence to suggest a link between the presence of goods and the survival of the bone

| Context | Location | Isotope data | Quantification | Age/sex | Pathology | Condition |
|---|---|---|---|---|---|---|
| 2232 | 2235 pit | - | l. 1st MtT | juvenile *c.* 8–10 yr. | fracture – $1^{st}$ MtT | 0–1 |
| 2615 | 2613 pit | - | frag. l. femur | subadult/adult >14yr. | - | 5+ |
| 2839* | 2834 pit | local | *c.* 10% s.u.l. | adult *c.* 30–40 yr. ??female | calculus; hypoplasia | 5 |

**KEY:** * radiocarbon dated; s. = skull, u. = upper limb, l. = lower limb (skeletal areas represented where all are not present); MtT = metatarsal

*Table 7.1 Summary of results from redeposited Anglo-Saxon human bone*

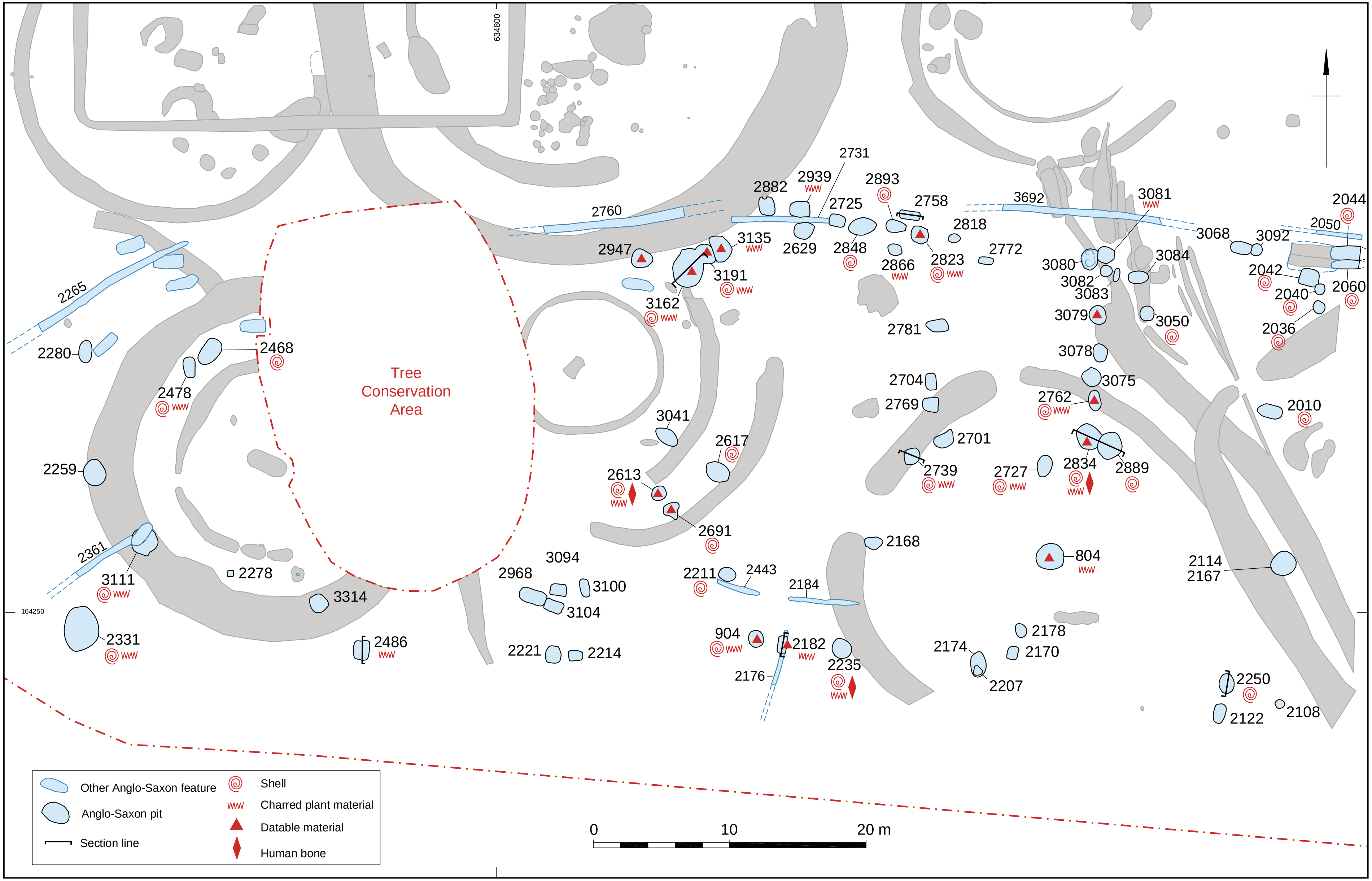



*Figure 7.22 Plan of Anglo-Saxon pits showing distribution of selected finds and environmental remains*

(grave 2697, cranium fragments, neighbouring goods comprising glass beads), but in the other (grave 2557) three tooth crowns with some degraded root were found fused by corrosion products to the underside of the flange of a shield boss, the shield obviously having been placed over the individual's face. Since artefacts were recovered from the majority of the graves (73.9%) their presence clearly had little and certainly no consistent effect on bone preservation.

The Anglo-Saxon bone – both from the graves and the later pits – was considerably more degraded than the prehistoric material (Table 7.1; Pl. 7.2; and see Chapter 4). All three of the Anglo-Saxon pits from which human bone was recovered contained organic material (marine shell and charred plant remains) and in one case a variety of artefactual materials, but unlike the human remains from the Late Bronze Age midden deposits there was no positive effect on the bone preservation. This suggests that the degradation to at least the adult bone from pits 2613 and 2834 had occurred or commenced in their original place of deposition within a more aggressive burial environment. As observed above (Chapter 4) the preservation of the disarticulated animal bone is commensurate with that of the human bone; the Anglo-Saxon material being the least well preserved (Grimm and Higbee, see below).

### Demographic data

The material recovered from the Early Anglo-Saxon cemetery is clearly so unrepresentative of the population as to warrant no further mention. The recovery of the Middle Anglo-Saxon material – representing parts of at least one adult and one juvenile (Table 7.1) – is interesting, particularly since the radiocarbon date demonstrates a contemporaneity between the individuals and the contexts in which their remains were found. The accidental disturbance of a contemporary burial and deposition of remains as obvious as an entire skull amongst what appears to represent occupation debris seems a somewhat unlikely scenario, yet 'special deposits' of human remains or incorporation of human bone with midden material is not a recognised characteristic of the period. There is, as yet no really satisfactory answer regarding the inclusion of this material in these pits.

### Pathology

The only pathological changes observed were heavy calculus deposits (the heaviest observed in the assemblage as a whole; see Chapter 4) in the one Middle Anglo-Saxon dentition recovered (Table 7.1).

## Isotopic Analysis

*by Andrew Millard*

The aims and objectives of the isotope analysis have been presented in Chapter 4 together with the methods of analysis. Only one Middle Anglo-Saxon sample was subject to analysis, the single tooth having derived from a skull (2839) redeposited in one of the Middle Anglo-Saxon pits (2834). The sample was one of two to fall outside the normal C/N atomic ratio used as a quality control on extracted collagen (see Chapter 4) and was, therefore, considered less reliable than the others. It is marked on all graphs for $\delta^{13}C$ and $\delta^{15}N$ by using open symbols, and has been omitted from statistical comparisons.

This individual has a local isotopic signal (full details in the archive).

## Grave Goods and Cemetery Discussion

*by Nick Stoodley with contributions by Talla Hopper and Jörn Schuster*

### Grave Goods

Grave goods were recovered from 73.9% of the 23/?24 (see McKinley, above) graves subject to excavation (see *Grave Catalogue*). Data pertaining to the graves themselves, their form and location, is presented in the structural report (see McKinley, above); further discussion is presented below. Metalwork forms the bulk of the artefactual evidence and is the main source for answering questions about chronology, social identity and cultural association.

### Metalwork

The majority of the pieces were recovered *in situ* from undisturbed graves. Few of the artefacts are from securely dated contexts, while the poor condition of the metalwork, especially the ironwork, also significantly limits its potential to provide accurate typological and chronological information. Of the 24 possible graves, 16 produced 40 pieces of metalwork. The majority are iron (n=31/77.5%), along with small quantities of copper alloy (n=7/17.5%) and silver (n=2/5%) objects. The cemetery is probably incompletely excavated and this corpus should be considered a sample from a much larger total. Throughout the text regional parallels are cited that provide the contextual background against which the Cliffs End material can be assessed.

## Weapons

Iron weapons were found in five graves (Table 7.2). As a proportion this is comparable to the figure produced by some of the larger and more representative Kentish sites. Because of the extremely poor preservation of the skeletal remains it is not possible to calculate the proportion of males buried with weapons. Nationally almost 50% of adult males had them, although for Kent it drops to below 40% (Härke 1989, 49–50).

Given the small sample, it is hard to say anything conclusive about the character of the assemblages, although it is intriguing that none are particularly outstanding and no more than two weapon types were combined (Table 7.3). Moreover, it is surprising that the sword (grave 2559) was only associated with a spear because they are usually found alongside spears and shields. In Richardson's (2005, table 50) study, 50% of all sword burials in Kent contained these additional weapons, while a further 6% added other types. At Cliffs End one grave contained a single spearhead, which represents the most common type of weapon burial both in Kent and nationally. A further two graves each contained a spear and shield which characterises the second most common combination of weapons recorded regionally and nationally (*ibid.*). Finally, grave 2550 had a seax which is again an artefact usually combined with additional weapons (*ibid.*).

Heavily degraded human bone survived in only two graves and could not provide corroborative evidence but it is likely that the weapons were interred with males, probably adolescents or adults (Härke 1990, 36). Single spears could accompany younger individuals (Stoodley 2000, 461), although the size of the graves at Cliffs End cautions against this idea. The shortest grave (3066) did have weapons, but with a length of 1.57 m it could have contained an adolescent, or even a short adult. The weapon burials were distributed across the grave groups (Fig. 7.3), although they are more frequent in the main cluster around Barrow 3 and occur along its westerly edge, which may indicate that this area was planned with a view to separating the weapon burials from the other interments.

| Cemetery | No. weapon burials/ total cemetery | Proportion |
|---|---|---|
| Cliffs End Farm | 5/24 | 21 |
| Bekesbourne II | 4/40 | 10 |
| Broadstairs III | 24/105 | 23 |
| Dover Buckland I | 35/172 | 20 |
| Holborough (7th century only) | 4/40 | 10 |
| Lyminge II | 6/64 | 9 |
| Sarre | 70/288 | 24 |

*Table 7.2 Proportions of weapon burials in East Kent cemeteries (from the writer's database)*

| Grave | Spear | Shield | Sword | Seax |
|---|---|---|---|---|
| 2550 | | | | • |
| 2557 | • | • | | |
| 2559 | • | | • | |
| 3066 | • | • | | |
| 3525 | • | | | |

*Table 7.3 Weapon combinations*

### *Spears*

Swanton's (1973) classification has been used, although for three examples the type was uncertain. The long spearhead from grave 3525 belongs to group E3; examples were deposited during the 6th and 7th century, but in Kent they generally belong to the later 6th and 7th century, often alongside other weapons. Grave 2559 contained a very long spearhead of uncertain form, although its length (at over 600 mm) suggests group H3 – a type popular in East Kent (Swanton 1973, 111–144). They were deposited in graves during the later 5th and 6th century, although in Kent they tend to belong to the mid- to later 6th century. The example from grave 3066 is possibly a small leaf-shaped spearhead. In each case the spearhead was against the grave edge, presumably at the top end of the cut (Figs 7.11–7.12, 7.17, 7.19). In graves 2557 and 2559 they would have been to the right of the body, while in graves 3066 and 3525 they were on the opposite side, a difference which may reflect handedness. The species of wood used for the shaft could be identified from mineralized remains in two spearheads: grave 3525 (hazel) and grave 3066 (ash).

### *Shields*

The remains of two shields were recovered, represented by bosses, grips and fittings. Dickinson and Härke's (1992) typology has been used. The boss from grave 3066 is a Group 3 – a type well-represented in Kent (Dickinson and Härke 1992, 15–16). Nationally they are a 6th-century type, but in East Kent they also occur in the following century, for example Buckland grave 93 (mid-7th century). It was held by a long flat grip (Type I.a1), while iron fragments on either side of the boss are probably board fittings. The example from grave 2557 is fragmentary and its identification is difficult, although it may be another Group 3. However, its large diameter and uncertainty over the profile of the cone leaves open the possibility that it could be a Group 2, which are contemporary with Group 3 bosses but are rare in East Kent: two examples come from Broadstairs III, graves 71 and 73. It was held by a long flanged grip of Dickinson and Härke Type IIIb.

Both bosses were found near the probable head end of the grave. In grave 3066 the boss was centrally placed (Fig. 7.17), and the presence of several human teeth corroded onto the underside of the flange confirms that the shield was laid over the face. The boss was located along the right hand side of grave 2557, and the shield was probably placed on its side against the wall of the grave (Fig. 7.11). A thin line of dark staining is probably the remains of the spear shaft.

### *Sword*

The sword from grave 2559 is of the long two-edged (parallel-sided) type, also known as the *spatha* type. The sheath survives and consists of an outer layer under which wooden scabbard plates lined with fleece can be observed (Penton 2008, 8). A simple iron pommel is visible, along with a leather cord that would have protected the scabbard mouth. A fragment of cord lower down the blade may be the remains of a strap or belt (Fig. 7.12).

Current sword typologies are based on the various metal fittings (Härke 1992, 88–9) and the lack of any in this case makes it difficult to date. It was placed centrally in the grave, probably in its lower half (Fig. 7.12).

### *Seax*

A fragmentary iron seax with a horn handle and leather sheath was excavated from grave 2550. It is a rare example of a long seax: at the time of writing only one other example is known from Kent, grave 84 at Polhill dated to the late 7th to early 8th century (Hawkes 1973, 189–90).

### *Knives*

Twelve graves included knives, and one possible blade was recovered from grave 2484. They have been classified according to Böhner's (1958) scheme, and examples of his three main groups are present (Table 7.4). Types A and B were common during the 5th and 6th century, while Type C, although found in the 6th, is more frequently encountered in the following century. The Type C knife was associated with the seax in grave 2550 and the late date of this grave is secure. Six examples could not be classified, either because of the fragmentary state of the artefact or because it was not possible to define the outline of the knife. The analysis of organic remains has shown that five knives have evidence for a leather sheath, while a horn handle was identified on the handle of at least three examples (Penton 2008; see *Grave Catalogue*).

Knives were associated with both weapons and jewellery and – as is commonly observed – did not exhibit strong gender

| Grave | Type A | Type B | Type C | unknown |
|---|---|---|---|---|
| 2505 | | | | • |
| 2536 | • | | | |
| 2550 | | | • | |
| 2557 | | | | • |
| 2562 | • | | | |
| 2564 | | • | | |
| 2559 | | | | • |
| 2756 | | • | | |
| 3066 | | | | • |
| 3514 | | | | • |
| 3542 | | | | • |
| 3582 | • | | | |

*Table 7.4 Knife types by grave*

associations (Stoodley 1999, 30–3). Without skeletal remains it is impossible to be precise about their location in relation to the body; however, in each case the knife was situated roughly halfway down the grave, often close to the edge of the cut; thus knives were probably hung from the waist or placed in the region of the lower torso. In grave 2756 (Fig. 7.16) the position of the jewellery allows the orientation of the body to be deduced, and on this basis it is clear that the knife was at the left side of the waist probably enclosed within a purse. This example also produced a lighter attached to the knife's sheath, and a similar item was associated with the knife in grave 2559 (Fig. 7.12). The tang of the knife from grave 2562 was corroded to the rear of the buckle demonstrating that it had been tucked behind the belt (Fig. 7.13).

## Personal equipment

### *Girdle items and purses*

A collection of iron objects and organic remains was recovered by block-lifting part of the fill from grave 2756. Its position in the grave, together with the mineralised textile and leather, strongly suggests that this is the remains of a purse. The mouth was kept open by a ring (ON 1220) which has a pair of curled terminals (Fig. 7.16). These terminals may have functioned as lugs from which it was attached, via a thong, to the girdle. Another ring (ON 1219) may have been attached to the girdle. An iron toilet set (ON 1217), consisting of a pair of tweezers and iron rod, was kept in the purse (an alternative interpretation would see this as a girdle hanger consisting of a rod and spatula suspended from the ring, see *Grave Catalogue*), along with a section of chain (ON 1218) and a knife (ON 1221).

A group of corroded iron objects was recovered from grave 3514 (ON 261, Fig. 7.18), which may represent the remains of a chatelaine. The X-ray reveals a chain of wire rings in three or possibly four groups, a pair of linked rods with hooped end and a rod(s) with looped end. There may also be fragments of a knife among the remains.

*Jewellery and dress fasteners*

The quantity of jewellery recovered from Cliffs End is surprising for a 6th-century East Kent cemetery. Compared to Mill Hill, Deal (Parfitt and Brugmann 1997) and the 6th-century phase at Dover Buckland II (Evison 1987), a greater quantity and range of brooches and other dress accessories would be expected. This deficit is unlikely to be a result of women being buried in a separate part of the cemetery, but may be explained by chronological factors (see below).

Eight graves produced jewellery and, despite the absence of corroborative human bone evidence, it is relatively safe to assume that these held the remains of females. One exception is grave 3066, a weapon burial from which a possible iron pin (ON 223; Fig. 7.17) was retrieved. Although pins do record a greater female association, it is not strong enough to consider them indicators of femininity (Stoodley 1999, 34); a small number of males appear to have used pins to secure clothing and soft wrappings around spearheads.

**Brooches**

A circular brooch from grave 2555 was decorated by a central boss that would have contained a garnet or glass setting surrounded by a field of Style I animals (ON 175; Fig. 7.9). It is of 6th-century date but comparable brooches are scarce; examples are known from Bifrons (grave 71 and unassociated brooch no. 86; Hawkes 2000, 51, 73), and Chessel Down, Isle of Wight, grave 69, with an S-shaped brooch (Arnold 1982, 31).

Two keystone disc brooches were found in grave 2756 (Fig. 7.16); both are incomplete but enough survives of ON 196 to identify it as belonging to Avent's (1975) Class 1.1, dated to the middle two quarters of the 6th century. The brooches were found over the area of the upper body and, on the basis of parallels from Mill Hill, Deal, would have secured a garment at the neck and lower down the chest (Parfitt and Brugmann 1997, fig. 16, burials 25B, 64, 94, 102 and 105).

**Pin**

A possible iron pin (ON 223; Fig. 7.17) was discovered in grave 3066. It was centrally placed in the upper part of the grave and may have fastened an item of clothing over the chest.

**Buckles**

*by Nick Stoodley and Jörn Schuster*

A robust copper alloy loop and tongue of a form securely dated to the 6th century was retrieved from grave 2697 (ON 152; Fig. 7.15). The loop is oval in outline and the underside is hollow and appears to have been decorated in a variety of ways. Likewise the tongue has a hollow shield-shaped base-plate which probably held a setting of some description. While this is a common form of buckle, especially in Kent, no exact parallel can be cited, although a buckle from Chessell Down (unstratified 81) also had a hollow underside (Arnold 1982, 43; fig. 28.81).

An oval copper alloy buckle with shield tongue and two shoe-shaped fittings (ON 199 b–d; Fig. 7.16) was found just south of the centre of grave 2756 and covered by the remains of what appears to be a wooden cup/bowl (ON 199 a, see Schuster, below). The buckle belongs to Marzinzik's Type I.2 and good comparisons come, for instance, from Mill Hill, Deal, graves 94 and 97 (Parfitt and Brugmann 1997, 188 fig. 51c; 190 fig. 53g). In England, where almost half the known examples come from Kent, this continental buckle type spans the 6th century, but the combination with the shoe-shaped fittings, which on the Continent are not common before the middle of the 6th century, would suggest a date in the second half of the century, also supported by the width (35 mm) of the buckle loop itself (Marzinzink 2003, 19). In contrast to the situation across the Channel, in England shield tongue buckles are much more common in female than in male graves (*ibid.*, 21).

An iron buckle and tapering plate was excavated from grave 2562 (ON 170a; Fig. 7.13). These are not closely datable and have turned up in contexts of the 5th–7th century. They are, however, exceptionally rare in Kent (Marzinzik 2003, 45) and this is an unexpected and important discovery. A triangular strap-end (ON 171) was also found in association with the buckle.

## Beads

*by Talla Hopper*

A total of 214 beads was recovered from four graves, comprising two ?gypsum, 77 amber and 135 glass beads (Pls 7. 3–7.4, and back cover). Further fragments of ?gypsum, amber and glass were also recovered and recorded. All the amber and ?gypsum beads and 42 whole glass beads came from grave 2756, while glass beads were also recovered from graves 2536 (2), 2697 (48) and 3582 (43) (Tables 7.5–7.6; see also *Grave Catalogue*).

The glass beads have been catalogued according to Hirst's (2000) classification which sets out colour, form size and decorative motif. Reference has also been made to Brugmann's (2004) classificatory system, also citing polychrome glass types defined by Koch (1977); details of manufacturing technique and proportion were also recorded. The amber and ?gypsum beads were catalogued using the forms set out by Evison (1987) for the Dover Buckland I cemetery.

**?Gypsum beads**

Although now fragmentary, there were at least two large white cylindrical beads (ONs 1130/1149 and 1155) in grave 2756. These were placed between glass beads (ONs 1163 and 1164) on one of the strings (Fig. 7.16, Pl. 7.3). Evison (1987, 60–1) describes similar cylindrical beads as being made from a variety of white materials; gypsum, magnesium carbonate, apatite and meerschaum. They are found both in eastern England and on the Continent.

| Grave | Quantity | Colour | Form | Comment | Dating |
|---|---|---|---|---|---|
| **2536** | 1 | Opaque yellow | Thick-walled cylinder | Brugmann CylRound | AD 555–650 (Brugmann 2004, 52, table 3) |
| **2697** | 6 | Blue | Annular | Translucent | - |
| | 1 | Opaque brown red | Double annular | Brugmann SegGlob | AD 580–650 (Brugmann 2004, 70, table 3) |
| | 1 | Opaque yellow | Double annular | Buckland B14; Brugmann SegGlob | AD 580–650 (Brugmann 2004, 70, table 3) |
| | 2 | Opaque pale blue | Double annular | Brugmann SegGlob | AD 580–650 (Brugmann 2004, 70, table 3) |
| | 1 | Blue | Double annular | Brugmann SegGlob | AD 580–650 (Brugmann 2004, 70, table 3) |
| | 3 | Opaque blue white | Double annular | Brugmann SegGlob | AD 580–650 (Brugmann 2004, 70, table 3) |
| | 10 | Opaque brown red | Globular | 1 fragmented | - |
| | 8 | Opaque yellow | Globular | - | - |
| | 9 | Blue | Globular | 2 translucent | - |
| | 1 | Opaque white | Globular | - | - |
| | 6 | Opaque blue white | Globular | - | - |
| **2756** | 1 | Opaque brown red | Disc | - | - |
| | 3 | Blue | Disc | Translucent; Brugmann Blue | - |
| | 1 | Opaque brown red | Annular | - | - |
| | 7 | Opaque yellow | Annular | - | - |
| | 1 | Green-yellow | Annular | Translucent | - |
| | 1 | Blue-green | Annular | - | - |
| | 8 | Opaque yellow | Globular | - | - |
| | 1 | Blue | Melon | Translucent; Brugmann Melon | *c.* AD 530–580 (Brugmann 2004, 52, 70, fig. 173) |
| | 1 | Opaque brown red | Long pentagonal cylinder | Buckland B09; Brugmann CylPen | AD 555–650 (Brugmann 2004, 44, fig. 173) |
| | 1 | Opaque yellow | Long pentagonal cylinder | Buckland B21; Brugmann CylPen | AD 555–650 (Brugmann 2004, 44, fig. 173) |
| | 1 | Opaque white | Long pentagonal cylinder | Buckland B60; Brugmann CylPen | AD 555–650 (Brugmann 2004, 44, fig. 173) |
| **3582** | 2 | Opaque pale blue | Annular | - | - |
| | 2 | Blue | Annular | Translucent | - |
| | 1 | Blue-green | Globular | Translucent | - |
| | 1 | Opaque pale blue | Globular | - | - |
| | 2 | Blue | Globular | Translucent | - |
| | 1 | Black | Globular | - | - |
| | 1 | Blue | Barrel | Translucent | - |
| | 12 | Opaque red | Thick-walled cylinder | Brugmann WoundSp | AD 650+ (Brugmann 2004, 41, fig. 173) |
| | 8 | Opaque yellow | Thick-walled cylinder | Brugmann WoundSp | AD 650+ (Brugmann 2004, 41, fig. 173) |
| | 1 | Opaque blue | Thick-walled cylinder | Brugmann WoundSp | AD 650+ (Brugmann 2004, 41, fig. 173) |
| | 12 | Opaque white | Thick-walled cylinder | - | - |
| | Frags. | Blue | Uncertain | Translucent | - |

*Table 7.5 Monochrome glass bead types*

*Plate 7.3 Beads from grave 2756 (ON 197)*

**Amber beads**

All the amber beads were recovered from grave 2756 (see back cover). None of the beads are very large and they fall roughly into the categories A01 and A02 (Evison 1987, text fig. 11). The smaller beads tend to be better shaped and finished than the larger. There was at least one string of the larger type (A02) while the smaller, better shaped amber was intermixed with the polychrome beads (Fig. 7.16, Pl. 7.3).

*Plate 7.4 Beads from grave 2697 (ON 189)*

**Monochrome and polychrome glass beads**

The monochrome bead types found in each grave are listed in Table 7.5 and selected examples shown in Plates 7.3–7.4. There is a distinct difference between the types of monochrome beads found in the graves. Grave 2697 contained six annular, eight double-annular (Brugmann's Segmented Globular) and 34 globular beads; all are classed as short. Grave 3582 contained four annular, five globular, one barrel and 33 thick-walled cylinder beads (Brugmann's Wound Spiral). Grave 2756 showed the most variety with four disc, ten annular, eight globular, one melon and three long pentagonal cylinder beads.

There are 17 polychrome glass beads (Table 7.6). One from grave 2536 (ON 161; Fig. 7.8), is an opaque yellow globular bead with an opaque red double crossing wave (Buckland type D22; Koch 20). The remaining 16 polychrome beads were found in grave 2756 (Fig. 7.16). Details of types and dating are set out in Table 7.6.

## *Date and Distribution*

The two beads from grave 2536 were both found at the northern (?head) end. Brugmann dates both to the period AD 555–650 (2004, 52, table 3). Both types have been found in Kent but their main distribution is on the Continent. All 48 monochrome glass beads from grave 2697 lay in the north-

| No. | Colours | Type and pattern | Comments | Dating |
|---|---|---|---|---|
| 1 | Opaque brown red with black streaks body with opaque yellow trail | Biconal; irregular linear trail | - | - |
| 1 | Opaque red body with yellow trail | Barrel; irregular double crossing wave | Buckland D30; Koch 20 | AD 555–650 (Brugmann 2004, 52, table 3) |
| 2 | Opaque red body with yellow trail | Barrel; irregular single wave | Koch 20 | AD 555–650 (Brugmann 2004, 52, table 3) |
| 3 | Opaque red body with opaque yellow trail | Cylinder; wire drawn single spiral (scallop) | Buckland D14; Koch 39/40 | *c.* AD 530–580 |
| 1 | Opaque red body with opaque yellow and black trail | Cylinder; wire drawn bichrome single spiral (scallop) | Buckland D14; Koch 39/40 | *c.* AD 530–580 |
| 2 | Blue translucent body with opaque brown red, opaque white and opaque yellow | Uncertain (both fragmented); probably striped mosaic | - | - |
| 2 | Opaque red body overlaid with brown-red and opaque white irregular marbling. Opaque yellow trail | Globular; applied spiral trails with overlying double-crossing spiral trail | Koch 58 | *c.* AD 555–600 (Brugmann 2004, 70, fig. 173) |
| 1 | Opaque red body overlaid with brown-red and opaque white irregular marbling. Opaque yellow trail | Cylinder; applied spiral trails with overlying trail | Koch 58 | *c.* AD 555–600 (Brugmann 2004, 70, fig. 173) |
| 3 | Opaque red body. Overlaid with mosaic red dots over white squares and blue and white flowers. Red bands at each end | One long, one medium and one fragmented folder cylinder. Complex mosaic pattern | Buckland D65; Brugmann Mosaic | AD 550–600 (Evison 1987, 65) |

*Table 7.6 Grave 2756: polychrome beads*

west corner (Fig. 7.15). Dating rests on the segmented globular beads, which Brugmann assigns to AD 580–650 (2004, 70, table 3), and again their main distribution is on the Continent. Grave 3582 contained 43 monochrome glass beads (Fig. 7.21). The wound spiral beads were mainly paired by colour which may have given a segmented or cylinder bead effect when worn. They are relatively late; Brugmann dates them to after AD 650 (2004, 41, fig. 173). The type is commonly found in England but not in continental Europe.

Grave 2756 contained by far the largest number of beads, totalling 121 (Fig. 7.16, Pl. 7.3). The suggested date range is broad (Tables 7.5–7.6). Amongst the earliest are probably the amber beads, which Brugmann dates to the early phase of Anglo-Saxon influence, *c.* AD 450–580. The long cylinder beads with the combed trails (Koch 39/40) are dated *c.* AD 530–580, as is the melon bead, a copy of an earlier Roman type. Later 6th-century types include the Koch 58 polychrome, and probably the mosaic bead. These mosaic or 'millefiori' beads are harder to date, as the type represented first appeared in the 1st century AD and is usually described as being made in Roman Alexandria. Evison (1987, 65) follows the dating proposed by Koch at Schretzheim, in ascribing a date range of AD 550–600. These beads are often described as 'heirloom' beads which may have been passed down for several generations. Potentially the latest beads from this grave are the pentagonal cylinder beads, dated by Brugmann to AD 555–650. Taken altogether, the date range is *c.* AD 450–650, which could indeed suggest that some of the beads are heirlooms; alternatively, there is a chronological overlap for all types in the third quarter of the 6th century.

Most of the polychrome beads found at Cliffs End are of types found both in England and continental Europe, which begs the question of the beads' origin, but this could only be answered by an extensive programme of chemical analysis of the composition of the glass. What the assemblage does show is that there was close contact with Mainland Europe – either the beads were traded directly or continental fashions were being copied by bead makers in England. Only grave 3582 contained beads which are insular in fashion.

## Wooden Cup/bowl

*by Jörn Schuster*

A fragment of a wooden vessel (ON 199 a), measuring *c.* 100 x 70 mm, was found just south of the centre of grave 2756 (Fig. 7.16), completely covering an oval belt buckle with shield tongue and two shoe-shaped fittings (ON 199 b–d, see above). Unfortunately, it was not possible to identify the mineral preserved wood to species (C Barnett pers. comm.) The fragment was only *c.* 2–3 mm thick, which suggests that it belongs to a lathe-turned vessel. Better preserved examples of such turned cups and bowls are known from several Alamannic and Frankish cemeteries in western Germany, among them Oberflacht, where at least nine cups and eight bowls were found in graves of either sex, often combined with other wooden vessels like flasks or coopered beakers and jugs (Paulsen 1992, 110–2). Among the finest and best preserved bowls at Oberflacht is that from grave 160 with a diameter of 108 mm, made of pear wood, which is the wood most suitable for turning (Schiek 1992, Taf. 79, 8). It is likely that the bowls and cups were employed as drinking vessels, and it has been suggested that the use of such vessels was a manifestation of Christian influence as opposed to the use of drinking horns which signified the old religion (Kjellberg 1964, 36, after Paulsen 1992, 111–2).

## Cemetery Discussion

*by Nick Stoodley*

### *Chronology of the Cemetery and Graves*

A chronological sequence can be derived from those graves with chronologically diagnostic goods. Burial probably commenced during the earlier 6th century: grave 2559 with its spearhead of Type H3. Such spearheads are found in the later 5th century but given the date of the other burials, interment during the first half of the 6th century seems more reasonable. Grave 2555, with its Style I decorated circular silver brooch, can only be given a broad 6th-century date. Grave 2756, richly equipped with jewellery, can be dated with more precision, however. The keystone garnet brooch is dated to the middle quarters of the 6th century, while the necklace contains beads that between them cover two centuries (AD 450–650), but which overlap *c.* AD 550–575. If the brooches are not heirlooms, this gives the third quarter of the 6th century as the earliest date of deposition, although a slightly wider bracket covering the second half of that century is probably more realistic. The two burials containing shields (graves 2557 and 3066) were both 6th-century depositions.

Some late beads (AD 580–650) and a fine copper alloy buckle of 6th-century form came from grave 2697. The buckle may restrict the date to the late 6th century; however, its condition suggests that it might have been an heirloom when finally interred, and an earlier 7th-century date is advocated. Grave 3525 contained a spearhead of a type (E3) which could have been deposited anytime during the 6th–7th centuries. Definite evidence for burial in the late 7th, possibly early 8th century is provided by the long seax from grave 2550, while grave 3582 had several beads that belong in the second half of the 7th century.

Overall a broad date range of about 150–200 years, covering the early 6th to late 7th century is indicated. This is a long time for so few burials, and it is probable that much of the cemetery remains unexcavated (see below). It is possible that the three groups of graves overlap chronologically. The earliest graves appear to be concentrated within the main group, while the later 6th- and 7th-century graves were discovered in the southern and northern groups (Fig. 7.2).

The unaccompanied burials were found in all three groups, and it is difficult to know where the majority of them belong in the sequence (Fig. 7.3). They could be roughly contemporary with the furnished burials in each group. Alternatively, they might belong to the 7th century – a time when the grave good rite was in decline (Geake 1992), which by implication would mean that the main group continued in use throughout this century. It is equally possible that they are impoverished 6th-century interments (see below), although their presence in the south and north-west groups would indicate an earlier date for the commencement of burial in these areas than the grave goods allow. One of the unaccompanied graves (3036) is probably 7th-century or later in date, however: it was found *c.* 12 m south of the southerly group of graves, and had been cut through a Middle Anglo-Saxon pit and ditch (see above). It is therefore one of the latest graves, yet its isolated location raises the possibility that the general area was still being used for burial after the main groups went out of use.

### *The Wider Burial Rite*

All the burials were by inhumation. This concurs generally with the situation found throughout East Kent and appears to reflect a genuine and widespread preference for a single rite in the region (Richardson 2005, 90–92). Cremation was very rare in East Kent, and only one modern excavation has produced evidence of the rite: Ringlemere where eight urned and two unurned cremation burials were recovered within a mixed-rite cemetery (McKinley 2010).

With such a small sample it is difficult to say anything conclusive about the other aspects of burial practice, and this is compounded by the lack of human remains. However, an examination of the graves and the location of the objects may afford some insight. None of the graves, except for 2756 (see below), are particularly large and probably contained the remains of single burials, although children generally do not require much additional space (Stoodley 2002). Overall there is little evidence to suggest that any grave contained the burial of a juvenile, however. The graves with the shortest lengths do not necessarily have had to have contained juveniles; they could have accommodated the remains of a short adult or teenagers (see McKinley above).

Most of the Early Anglo-Saxon dead were laid out in an extended supine position and the Cliffs End burials were probably no different. Several of the grave contexts support this notion; the jewellery in grave 2756 indicates that the 'female' was laid supine, as was the 'male' in grave 3066 with the shield covering the face/upper body (see above). The position of the other weapons and the knives (see above) appear to concur. The majority of the graves were aligned west–east, especially in the main group; those in the north-west group were north-west to south-east, while further to the south they tended to be south-west to north-east. Alignment may have been determined by the topography and the presence of the earlier earthworks and in the case of the southern group the linear features of Anglo-Saxon date (Fig. 7.2). Where available the grave goods indicate that the head was at the western end, which is very typical of East Kent (Stoodley 1999, 63–66), demonstrating that more than just local factors were influencing the direction of the grave. An exception is grave 2536: the body appears to have been aligned with the head to the north end of the cut (Fig. 7.8), which is a very unusual alignment. It could be that this person was being marked out as 'special' and it is intriguing that the two beads are types mainly found on the Continent (see above).

The graves exhibit a range of sizes, which is typical of the period, and although most were sub-rectangular, sub-apsidal and rectangular cuts were also recorded. Internal embellishments are scarce, although this could be a reflection of the poor preservation of organic remains. However, grave 2756 had a timber coffin which is befitting of the occupants relative status, while the size of a nail (with oak fragment) from grave 2550 indicates a substantial timber object, such as a coffin (Penton 2008, 4). The shield boss in grave 3066 has associated evidence for barley, interpreted as a deriving from a lining placed above the burial (Penton 2008, 18). Grave 2484 had evidence for a shallow ledge at the west (?head) end, where it probably functioned as a 'pillow' for the head. No other type of internal feature or external structure was observed, and as these embellishments are mainly a 7th-century and later phenomenon (Richardson 2005, 123–4) the evidence is in agreement with the bulk of the artefactual evidence.

### *Social Identity*

In line with the rest of south-east England, grave goods were employed to signal social identity, especially the gender of the deceased. Vertical distinctions of status may be discerned by differences in the quantity and quality of grave goods. It is difficult, however, to identify differentiation in the weapon burials (see above) and the 'female' interred in a coffin (grave 2756) and adorned with, amongst other objects, a necklace, pair of brooches and purse may be judged wealthy in this community, but compared to females from Dover Buckland and Mill Hill would only rank as average.

### *Cemetery Layout*

The graves are probably part of a much larger cemetery. Most of the (more) fully excavated cemeteries in East Kent have produced substantially larger samples (Table 7.7). The cemetery plan (Fig. 7.2) shows a small group of graves to the north-west of the main group and it is probable that these are part of a separate cluster that extends outside the limits of the excavation. Likewise it is a possibility that the southern group continued to the east under the unexcavated (tree) conservation area. Overall, it seems very probable that the excavated graves are part of a more extensive burial ground. With such a potentially small sample it is hard to say anything definite about cemetery layout. Several important features are identifiable, however. The graves are arranged into three distinct clusters similar to Dover Buckland and Mill Hill, Deal. The 6th-century burials are concentrated in the main cluster (Fig. 7.2), while the later ones are found to the north-west and south. Is there a primary 6th-century group interred around Barrow 3 with later, spatially separate, satellite clusters? This can only be tentative because of the undated burials in each cluster; in fact the unaccompanied burials might be the result of status differentials that cut across such units. In the main cluster the majority of graves were aligned west–east and had been placed in rough rows. This principle underlies the development of all the more extensively-excavated Kentish cemeteries reflecting a regional attitude to cemetery organisation. Finally, the burial with wealthy jewellery made in grave 2756 appears to be in the centre of the main group with the weapon burials in a row to the left and materially impoverished graves on the opposite side (Fig. 7.3). It seems the graves are deliberately placed in relation to this wealthy 'female' – a pattern evidenced elsewhere in Kent, for example Dover Buckland (Evison 1987, 146; Stoodley 1999, 101, 129). It is a finding that has implications for female status and authority in 6th-century East Kent.

| Cemetery | Number of graves |
|---|---|
| Broadstairs I | 119 |
| Broadstairs III | 399 |
| Deal | 76 |
| Dover Buckland | 414 |
| Finglesham | 244 |
| Lyminge II | 64 |
| Ozengell | 243 |
| Sarre | 294 |

*Table 7.7 Number of graves from East Kent cemeteries*

## Non-Cemetery Features

*by Jacqueline I. McKinley*

### *Pits*

Seventy-four pits of similar form, fill and character were scattered across the southern third of the site where they commonly cut through the fills of the various Bronze Age ditches (Figs 7.22–7.23). Relatively little direct dating evidence was recovered from these pits but that which did survive indicated a Middle–Late Anglo-Saxon date (see below Mepham, *Post-Roman pottery*, and Schuster, *Metalwork*). Fragments of residual Middle Saxon pottery were recovered from eight pits in the vicinity of Barrows 4 and 6 (804, 904, 2613, 2739, 2762, 2823, 2834 and 2947), and a fragment of human bone recovered from one of these pits (2834) was radiocarbon dated to 710–900 cal AD (OxA-18428, Table 3.6). Fragments of iron recovered from 12 pits included a few datable items such as two probably late 6th–8th-century knives (pits 2182 and 2691), a probable Late Anglo-Saxon belt fitting (pit 3162) and two Middle–Late Anglo-Saxon spade shoes (pits 3079 and 3191; see Schuster, *Metalwork*; Fig. 7.25, ONs 225 and 230). Copper alloy objects were recovered from two pits, including a Late Anglo-Saxon hooked tag from pit 3135 (Fig. 7.25, ON 228), and a bun-shaped Middle or Late Anglo-Saxon siltstone spindlewhorl (ON 227) from pit 3162.

Three pits (2182, 2725 and 3111) cut through segments of narrow ditches which are also believed to be of Anglo-Saxon date (see below), and pit 3111, situated towards the south-west margins of the site, was itself cut by one of the Anglo-Saxon graves suggesting a slight temporal overlap between the mortuary use of the site and that related to occupational activity. The majority of the pits (*c.* 77%), however, were dated on the basis of their similarity in form, fills, location and apparent nature which gave strong support to their probable contemporaneity.

Although spread across a wide area (*c.* 91 m W–E and 35 m N–S) there was very little intercutting between the pits and in three cases the upper fills of adjacent pits were observed to be contiguous (2834 and 2889, 3080 and 3081, 3162 and 3191; Fig. 7.22). Pits 2044 and 2060 (the latter cutting the former) probably also represent the most westerly in an undistinguished (not fully examined in excavation) line of pits similar to 2968 and 3104 to the south of Barrow 4. Several lines or groups of pits were evident, particularly in the eastern half of the site, the former either aligned with (W–E) or along (N–S) the slope of the land.

The majority of the pits were oval in shape (55.4%) with a substantial proportion of sub-rectangular features (24.3%); small numbers of sub-rounded (eight) and rounded (five) pits were also recorded, with one square and one irregular shaped feature. Most had very steep (*c.* 27% vertical) sides with straight or slightly concave slopes, and flat (67.6%) or slightly concave bases (Fig. 7.23). Although both basic shapes – rounded and sub-rectangular – were found across the site, some lines or groups chiefly comprised of one or the other could be discerned as, for example, with the cluster of small sub-rectangular pits to the south of Barrow 4 and the N–S line of oval/sub-rounded pits between Barrows 5 and 6 at the east end of the site.

A broad range of dimensions was recorded, from the largest pit, 2320 (3.50 x 2.70 m), situated in the north-west corner of the site, to the smallest, 2331 (0.60 x 0.40 m), represented by a recut within 2320; the smallest independent pits were 0.70 m long (2040) and 0.40 m wide (3083), both situated at the eastern end of the site. At 1.80 m, the deepest pit (3162) represented the second largest excavated (2.80 x 2.20 m) and lay in the central part of the site; pit 2320 was noticeably shallower at 1.40 m. These extremes aside, the majority of the cuts fell within a relatively close range of between 1.0–2.0 m in length and 0.50–1.50 m in width (69–73% pits respectively). Most were between 0.50–1.00 m deep (58%), with similar proportions falling above and below this bracket. Pits within several of clusters of similar shape (see above) also tended to be of commensurate size to one another.

Given the range of depths observed, a similarly broad range in the number of fills recorded is not unexpected. Between one and 11 fills were recorded in individual pits, most (56.5%) having three or less and only 10.1% having eight or more. Although there was some correlation between the depth of features and the number of fills the link was not consistent. Of those with eight or more fills most were over 1.00 m deep (804, 2060, 3080, 3111, 3162; 1.25–1.80 m), but one of the pits with the greatest number of layers (2250) was of average size at 1.40 x 1.10 x 1.00 m (Fig. 7.23), and one other feature in this group (2866) was only 0.80 m deep. Conversely, most pits with single fills were less than 0.50 m deep, but several appear anomalous. Pit 2174 (0.70 m deep) and its recut 2207 (1.00 m deep), situated within the confines of Barrow 6, are similar in shape and form, and have fills commensurate with others within the assemblage (sandy silts with occasional flint gravel, and sparse residual burnt/struck flint and animal bone), but are clearly distinguished by the depth and singularity of their fills. The same is true for pit 3100 from the small group to the south of Barrow 4.

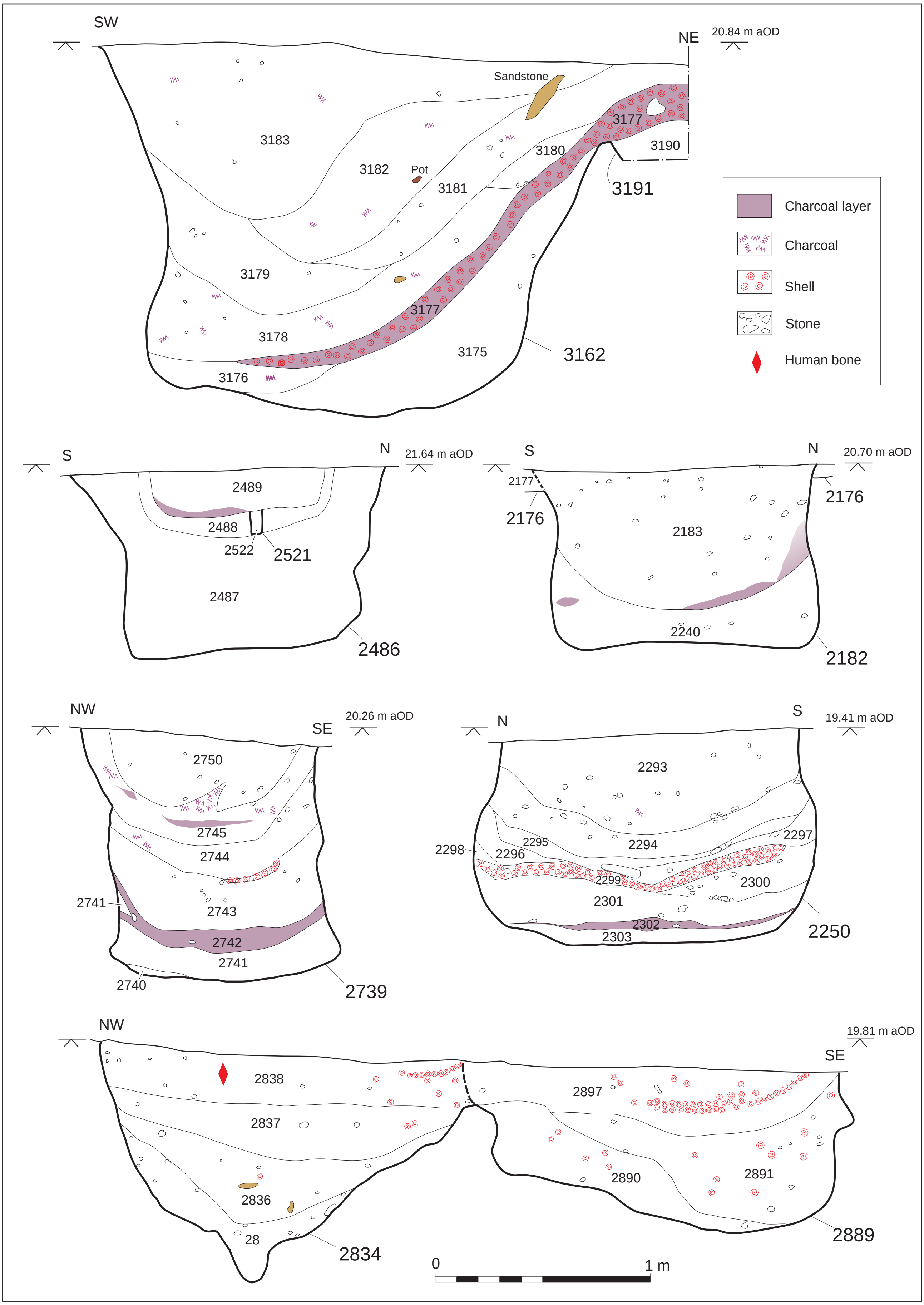



*Figure 7.23 Sections of selected Anglo-Saxon pits*

Most fills comprised silts, generally sandy silts, often incorporating sparse rounded flint gravel; ie, material derived from the natural brickearth. Slumping from the sides had clearly occurred in several cases; accumulations were sometimes clearly angled from one side or another; and central slumping of the layers betrayed a composting effect in many instances. A striking feature of many of the pits (*c.* 38%) within the assemblage was the presence of large deposits of marine shells (Figs 7.22–7.23). The largest quantity of shells from one layer (1890, from pit 3050) predominantly comprised periwinkle (1753), though six other species were also represented (Wyles, see below). A substantial proportion of the pits (*c.* 26%), both those with and without marine shell inclusions, contained major deposits of charred plant remains; cereals dominated both as charred grain and various processing waste (Stevens, see below). Animal bone was recovered from *c.* 60% of the pits; the condition of the moderately-sized assemblage indicates it is likely to have derived from contemporaneous activity rather than representing residual material. The assemblage is dominated by fish, particularly cod and herring/sprat, but cattle were clearly a major source of protein and sheep represented an important part of the economy (Grimm and Higbee, see below). Burnt flint and/or flint flakes were recovered from *c.* 75% of pits and residual Late Bronze Age pottery from *c.* 51%. In addition to the dated human skull from pit 2834 (Pl. 7.2, Fig. 7.22), fragments of single skeletal elements (a metatarsal and a femur) were recovered from two other pits (2235 and 2613 respectively). A fragment of charred textile (see Penton and Watson, below) was recovered amongst the large deposit of charcoal (predominantly hazel but inclusive of sweet chestnut; Barnett, see below) and charred plant remains from pit 2182 (Fig. 7.22).

Two pits appear in contrast to the rest within the assemblage: 2486 (Figs 7.22–7.24) and 2758. The former, situated to the south-east of Barrow 1, shares similarities in shape, size and to a degree contents with others in the assemblage, but the distribution of the latter is unusual. The upper 0.30 m of the *c.* 0.85 m deep lower fill (sandy silt, common rounded flint, sparse struck flint and residual pottery) appears to have been cut (*c.* 0.90 $m^2$ area) and lined with a slightly loamy clay, a substantial deposit of charred cereal remains (rye; Stevens, see below) subsequently accumulating in the base. The pit may have been associated with some sort of feature connected with grain processing, possibly drying. The sub-rectangular pit 2758 (1.50 x 0.60 m, 0.58 m deep) formed part of the east–west triple line to the south-east of the Central Enclosure. The fill was dominated by three large stones, fairly evenly spaced and clearly deliberately placed, on or towards the base of the cut (Fig. 7.24). The large irregular stone at the west end was placed on the base and a sterile accumulation (0.15 m deep) of sandy silt built-up around it. Two large subangular stones were subsequently placed centrally and at the east end of the pit. A small deposit of charred material including oak charcoal, residual charred cereal and weeds and some charred animal bone appears to have been deposited over the central stone. The animal bone, both burnt and unburnt, was dominated by fish remains, some of which had been digested (see Grimm and Higbee, below). The main sandy silt fill included small amounts of the same archaeological components as seen elsewhere – marine shell, burnt and unburnt flint and residual Late Bronze Age pottery, which was ubiquitous in many of the later features on the site.

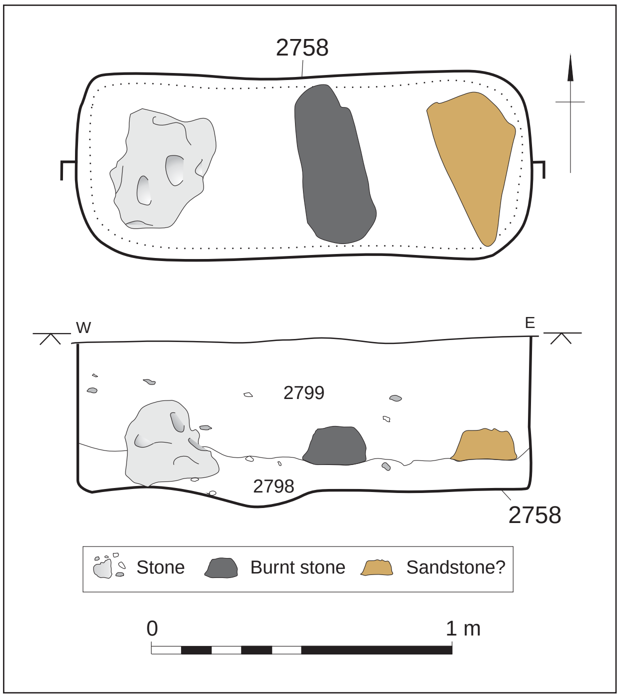



*Figure 7.24 Plan and section of Anglo-Saxon pit 2758*

## *Ditches*

Five short sections of ditch (2265, 2760, 2731, 3692 and 2050) formed a slightly curved east–west line across the site and appeared to create a northern boundary to the area of Anglo-Saxon pits (Figs 7.1, 7.22). There was some variation in width (0.40–0.80 m) and form, most having a flat base with acute straight sides though the two westerly sections were concave, but the line of these ditches clearly shows they were associated. Only one terminal could be distinguished, at the north-east end of 2265, but the surviving depth of the ditches was shallow (0.10–0.25 m), and it is probable that the line was not contiguous but segmented. Each ditch had a single fill from which no direct dating evidence was recovered. The line did cut through the Bronze Age features and, at the west end, through one of the 7th/early 8th-century AD graves. This, together with the recovery of iron fragments from two ditch sections and marine shells – a characteristic Anglo-Saxon inclusion on this site – from two others suggests an Anglo-Saxon date for the ditch alignment. The east end of ditch 2731, in the central part of the site, was cut by one of the Anglo-Saxon pits, and two others lay immediately to the north of it; this suggests that if indeed this did function as a northern boundary it ceased being followed prior to the end of this phase of land use.

Four short sections of ditch/gully, possibly of a similar date, lay towards the southern boundary of the site (2176, 2184, 2243 and 2316; Fig. 7.1). All were narrow (0.30–0.35 m) with very shallow (0.08–0.10 m) concave profiles and single fills devoid of datable finds. Cut 2316 at the western end of the site appears to follow the same alignment as ditch 2265 further north but no other segments continue the line; the feature was cut by an Anglo-Saxon pit and a grave. Three gullies, two aligned roughly east–west and the other north–south appear to be related; terminals were recorded at both ends of 2184, at the opposing east end of 2243 and the north end of 2176, 2.10 m and 2.20 m distant respectively. The possible function of these three features is unclear.

## Cliffs End in the Wider Landscape

*by Nick Stoodley*

The cemetery is located *c.* 300 m from the shore on the top of land that slopes up from Pegwell Bay and is focused around multi-period evidence extending from the Early Bronze Age to the Late Iron Age/early Romano-British period. The relationship between the Anglo-Saxon cemetery and the earlier monuments is an important topic that can help reveal the reasons why this particular spot was chosen. The decision to place the Anglo-Saxon dead around the earlier monuments has to be intentional and was probably determined by several interrelated factors.

Monument reuse is a phenomenon encountered throughout Anglo-Saxon England, although some areas record a higher incidence than others. Recent research (Williams 1997; Lucy 1998, 124–130; Semple 2003) is starting to reveal the sheer complexity of the practice: not only were a range of different types of ancient monuments and sites reused, but chronological patterning is also apparent in respect of when particular types of monuments were utilised (Lucy 2000, 124–30). Richardson's study (2005, 72–6) makes it clear that it was an important feature of mortuary behaviour in East Kent with both prehistoric and Romano-British sites being targeted, but that it also has a chronological dimension with monument reuse only becoming widespread from the late 6th century. He draws attention to Dover Buckland where the prehistoric barrow only served as a focus for burial from the late 6th century, earlier burials being sited lower down the slope (*ibid.*, 76). Cliffs End, however, belongs to a small group of Kentish sites that chose to incorporate an earlier monument in its burial strategies from the earlier 6th century, and in this respect it is similar to Mill Hill, Deal (Parfitt and Brugmann 1997). It has the potential therefore to provide important information about the origins of the practice in East Kent.

Cliffs End also affords an opportunity to undertake a contextual analysis of monument reuse as called for by Williams (2006, 185) to try to discern specific causes that influenced the location of this burial ground in the early medieval landscape. Lucy (2000, 128) argues that cemeteries were not only located around sites with funerary associations but were also associated with earlier settlements and on natural ridges and mounds in the landscape because they served as markers calling and directing people to the cemetery for ceremonies of interment and remembrance. Earlier monuments may have taken centre stage in encouraging social interaction (Williams 1997, 25). The prehistoric site at Cliffs End may have been chosen because it served as both a topographic marker and a facilitator of social relations. This might explain why the barrows higher up the slope, especially Barrow 3, were chosen, namely because they would have afforded greater visibility from the coast. Monument reuse may also have had a political function. Williams (1997, 26) argues that it was a means by which the Germanic elite could represent their dead as the rightful descendants of the ancient inhabitants of the land in order to legitimise claims to territory and resources by linking with a mythical past. It is a strategy through which local communities attempted to underpin control of territory. Furthermore during the 5th and 6th centuries monument reuse may have been employed as a tactic in a process of ethnogensis. Because monument reuse was also practised during the Romano-British period, the appropriation of ancient monuments by Germanic groups may have served to unite the two separate traditions and symbolised a political strategy aimed at imposing a common identity upon mixed indigenous and immigrant populations (Williams 1997, 26).

The Romano-British evidence from the site is not extensive, however; it amounts to just a possible ditch and several fragments of residual pottery. It is also worth adding that the mosaic beads are thought to be reused Roman types (see Hopper, above). The immediate area has produced better evidence. Within a radius of 2 km at least six Romano-British burial remains or cemeteries were discovered, including the site at Ozengell, as well as Cottington Road and Cottington Hill, while there are also the remains of at least ten probable Romano-British occupation sites (Egging Dinwiddy and Schuster 2009, 93 fig. 2.21; 96–105). With the arrival of Anglo-Saxon groups there may have been much to be gained by both indigenous and immigrant groups adopting a policy of accommodation and cooperation. A strategy that involved the reuse of earlier monuments to meld together the different ethnic groups seems plausible. In fact, the range of evidence at Cliffs End might have increased the attraction of the site and its political value.

Other interrelated factors that might have been responsible for the decision to choose this particular location are proximity to routeways, movement through the landscape and the inter-visibility of the cemetery. The inter-visibility of monuments and the viewsheds that they commanded are important because they help to explain how monuments may have been encountered by the early medieval people who inhabited the area and travelled the land. The engagement with monuments at particular points may have served to integrate the ancestors into the fabric and routine of daily life but may also have underlined the political significance of monument reuse as previously discussed. Cliffs End is positioned on the southern coast of the Isle of Thanet overlooking the entrance to the Wantsum Channel. The immediate area (see Fig. 1.1) has produced evidence of other major Early Anglo-Saxon cemeteries, especially Ramsgate from which six sites are known, most notably Ozengell, a large 5th–7th century site of 243 recorded graves that was again associated with prehistoric monuments (Richardson 205, table 18; fig. 27). The Wantsum Channel was undoubtedly an important routeway providing the main shipping route into the Thames estuary and up the East coast – a welcome alternative to the treacherous waters around the North Foreland headland (Brookes 2007, 67). Brookes' (2007, 70) analysis of landscape and mortuary practice in the area of the Wantsum Channel has revealed that many of the cemeteries were visible from the sea, and where barrows and other above ground structures were utilised the site would have been silhouetted on the skyline. This would have been especially evident at Ozengell, where the earlier monuments would have dominated the hill-top skyline for seaborne travellers approaching the Wantsum Channel from the south (*ibid.*). The same phenomenon would also have applied to Cliffs End. It can be argued that Cliffs End, and the other cemeteries along the Wantsum Channel, were deliberately placed to act as symbols of power and authority to the many travellers passing through this haven.

The topography was cleverly manipulated for effect, having significance to both local and visitor alike. They would have been able to read the meanings invested in this mortuary landscape, recognising it as a memorial to the recently departed but conscious of the fact that it signalled the ownership and authority of the territory that they were travelling through; perhaps also acknowledging that it resulted from the integration of immigrant and indigene. When necessary, it may also have served as a reference point indicating where to disembark. With regard to this last point it should not be forgotten that evidence of Middle Anglo-Saxon activity was found immediately to the south-east of the Cliffs End cemetery, and the short distance between the two, 40 m, may be indicative of ancestor worship and rituals of remembrance (Williams 2006). In fact the presence of the dead may have played a key role in the decision to visit this locale and ensured that the significance of the cemetery, and the memory of its occupants, continued after the final burials were interred. This now purely commemorative aspect being associated with Cliffs End becomes even more pertinent in light of the small late 7th–8th-century Anglo-Saxon cemetery recently discovered approximately 600 m to the north-west during the East Kent Access Road (EKAR) excavations (Zone 14, Oxford Wessex Archaeology 2011; Andrews *et al.* forthcoming), indicating a shift away from the earlier cemeteries.

## Conclusion

Cliffs End was used during both the 6th and 7th centuries AD and in many ways is a typical East Kent cemetery; the principles on which it was organised, its intimate relationship to earlier monuments and its highly visible location in the landscape, are features found throughout the burial grounds of Early Anglo-Saxon East Kent. Such uniformity may reflect the development of a regional identity that was part of the emergence of the powerful Kingdom of Kent during the later 6th century. The relative simplicity of the weapon burials and the overall lack of richly adorned females mark it out as different, however, which is even more surprising considering that the bulk of the burials were interred during the height of the accompanied rite. Overall it may indicate that less of an emphasis was accorded to the signalling of social identities through the medium of burial. Whether this is a real difference or merely an artefact of the archaeological excavation, is at the present time unknown.

## Non-cemetery Finds

### *Metalwork from Pits in the Southern Part of the Site*

*by Jörn Schuster*

Twelve pits in the southern part of the site contained metal objects, but conclusive dating evidence is provided only by two iron knives and a hooked tag.

The knives, found in pits 2182 (ON 117, Fig. 7.25, 1) and 2691 (ON 180, Fig. 7.25, 2), belong to Böhner's type C which has a straight cutting edge and a back curved or angled towards the point and dates to the later 6th to early 8th centuries (Böhner 1958, 214–5). For her analysis of the Dover Buckland knives Evison distinguished six types based on the shapes of blade backs and cutting edges (Evison 1987, 113). The almost complete knife ON 180 belongs to her type 4 with curved back and straight edge, which occurs at the beginning of the 7th century and continues into the 8th. The angled back and straight edge of the incomplete blade ON 117 corresponds to type 5, found at Dover Buckland from the late 6th to 8th centuries. Similar shaped blades do, however, still occur in Late Anglo-Saxon/Anglo-Norman context, for instance at Canterbury, Marlowe Car Park (cf. Barford 1995, 1082, fig. 471, 770–1).

The hooked tag ON 228 (Fig. 7.25, 5) with circular plate and floral motif was found in the lowest layer of 1.70 m deep pit 3135. Hooked tags have a wide date range in the Late Anglo-Saxon period, with a revival in the late medieval and Tudor periods. However, the earlier tags usually have two holes while the later examples tend to have a rectangular slot, suggesting a different mode of attachment. A number of uses have been discussed for hooked tags, for instance as hooks for garter bands or along edges of hems of clothing, comparable to modern hook-and-eye fittings (Hinton 1990a, 548). Comparisons for tags with circular plates like ON 228 are known amongst others from Eynsham Abbey, Oxfordshire (Allen 2003, 257, fig. 9.2, 10 and 13), Southampton (Hinton 1996, 10 fig. 4), London (Pritchard 1991, 149, fig. 3.31) and Norwich (Margeson 1993, 17 fig. 8, 68–70). The six-petalled floral motif of the Cliffs End tag would be easier to place in a Tudor or later context. However, considering its shape a gilt copper alloy hooked tag from

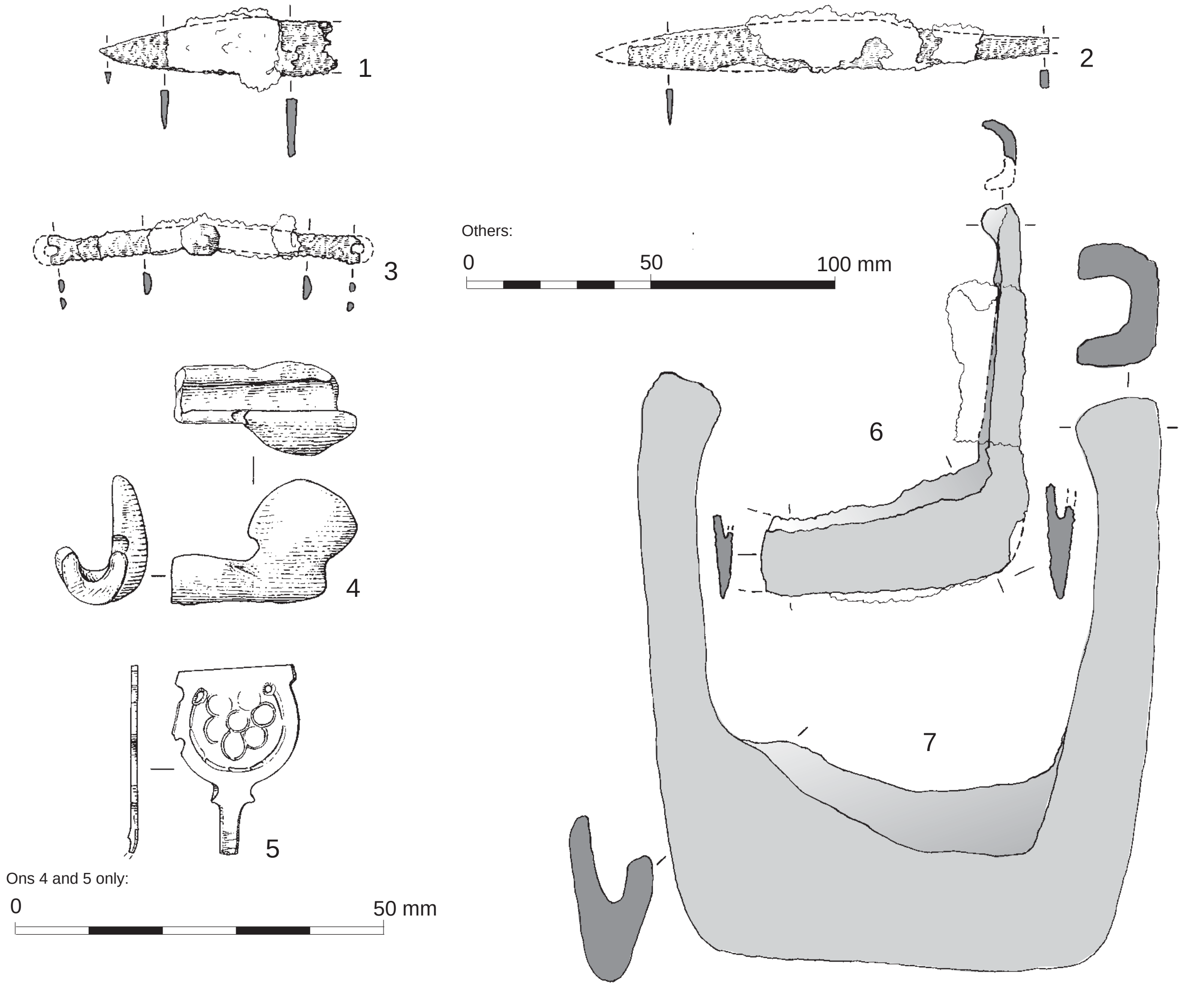



*Figure 7.25 Selected metalwork from Anglo-Saxon pits, details in catalogue*

Winchester, found in a mid- to late 11th-century context at the Old Minster and featuring a roundel with a lobed-leaf ornament reminiscent of early 11th-century illuminations, appears to provide the best parallel (Hinton 1990a, 548, 551, fig. 149, 1425).

A semi-circular sectioned iron bar with flat, slightly widened and perforated ends (ON 229; Fig. 7.25, 3) was found in pit 3162. A good comparison, although lacking a secure context dating, comes from Camerton, Somerset (Jackson 1990, pl. 31, 304). Similar but slightly larger items are also known from Roman shield-grips or strengtheners (eg, Newstead (Curle 1911, pl. 34, 1, 12) and Hod Hill (Manning 1985, pl. 71, T9–10)); alternatively, comparable bars are known as strip bindings or corner brackets on Roman wooden boxes or caskets, for instance Fishbourne (Cunliffe 1971, fig. 62, 61–2). Comparable fittings, but made of copper alloy, have also been found at Winchester in 10th to 11th-century contexts and interpreted as belt mounts or stiffeners (Hinton 1990b, 544 fig. 144, 1365–6 and 1390). A bun-shaped stone spindlewhorl (ON 227) was also found in this pit. It is likely to have been made of a fine-grained siltstone (see Hayward and Leivers, below). Such spindlewhorls are known to have been produced at *Sandtun* on the South Kent coast near West Hythe from the local Hythe Bed siltstone (Riddler 2001, 237–40). Similar whorls, but made of mudstone, are known from 10th to early 12th century contexts, for example in London (Pritchard 1991, 165 fig. 3.49).

Two square-mouthed iron spade shoes (ON 225 and 230; Fig. 7.25, 6–7) come from pits 3079 and 3191 respectively. They are similar to type 2b in Manning's classification of Romano-British spade shoes, but compared to the Cliffs End examples the type has relatively short side arms (Manning 1985, fig. 11). However, the longevity of the type is exemplified by a similar spade shoe from a period 10 (11th–14th century) context at Canterbury, Marlowe Car Park (Barford 1995, 1086 fig. 474, 805) and even later, 16th-century examples from Camber Castle (Scott 2001, 278 fig. 7.13, 206–7). A closer comparison for the two Cliffs End spade shoes comes from the Middle Anglo-Saxon village of *Sandtun* (Wilson 1971, 81 fig. 14; Riddler 2001, 249). Considering the scarcity of Roman objects from Cliffs End, a Middle or Late Anglo-Saxon date may be favoured here.

Other finds from pits in the southern part of the site include a copper alloy fitting of unknown purpose (ON 119; Fig. 7.25, 4) from pit 2182 which also contained knife blade ON 117 and a piece of lead sheet, an 86 mm long iron hook from pit 2250, a two-tined 80 mm-long iron fork from pit 2834, a 121 mm-wide semi-circular iron handle from pit 2139 and an iron nail or stud from pit 2781. Of uncertain function are a rectangular-sectioned iron rod with pointed ends, bent in half, from pit 2866, and the bent fragments of what may have been another, but lighter, iron handle from pit 2882.

To summarise, most of the datable metal objects from pits in the southern part of the site would support a date range in the Anglo-Saxon period, although some items like the iron bar ON 229 clearly could have a much wider date range. The range of items, including items of dress, tools and fittings, does not help in the identification of the function or purpose of the pits.

Scant evidence for ironworking includes a single piece of slag from pit 2235, weighing 0.717 kg and incorporating what appears to be part of a smithing hearth bottom. Smaller quantities (0.180 kg) of amorphous, non-diagnostic ironworking slag were recovered from pit 3162/3192.

**Catalogue of illustrated objects**

1. Iron knife blade, ON 117, pit 2182
2. Iron knife blade, ON 180, pit 2691
3. Iron Belt or strap mount/stiffener, ON 229, pit 3162
4. Copper alloy fitting, ON 119, pit 2182
5. Copper alloy hooked tag, ON 228, pit 3135
6. Iron spade shoe, ON 225, pit 3079
7. Iron spade shoe, ON 230, pit 3191

## Post-Roman Pottery

*by Lorraine Mepham*

A total of 31 sherds (1292 g) of Early/Middle Saxon was recovered. The pottery was recorded following the standard Wessex Archaeology recording system for pottery (Morris 1994). Fabric types were defined following the Canterbury Archaeological Trust (CAT) type series for post-Roman pottery. The definition of vessel forms follows nationally recommended nomenclature (MPRG 1998). Details of decoration, surface treatment and manufacture were also recorded. Quantification in all cases is by both number and weight of sherds. All data are held in the project archive (Access database).

### *The Assemblage*

Three fabrics were identified; totals by fabric type are given in Table 7.8 and their quantity by feature in Table 7.9. Two are local wares; the third is a regional import from East Anglia.

The most diagnostic pieces within this small collection comprise three partial vessels, all likely to be of Middle Anglo-Saxon date. Two of these were recovered during the evaluation: a rounded jar from pit 904 (Fig. 7.26, 1), and a

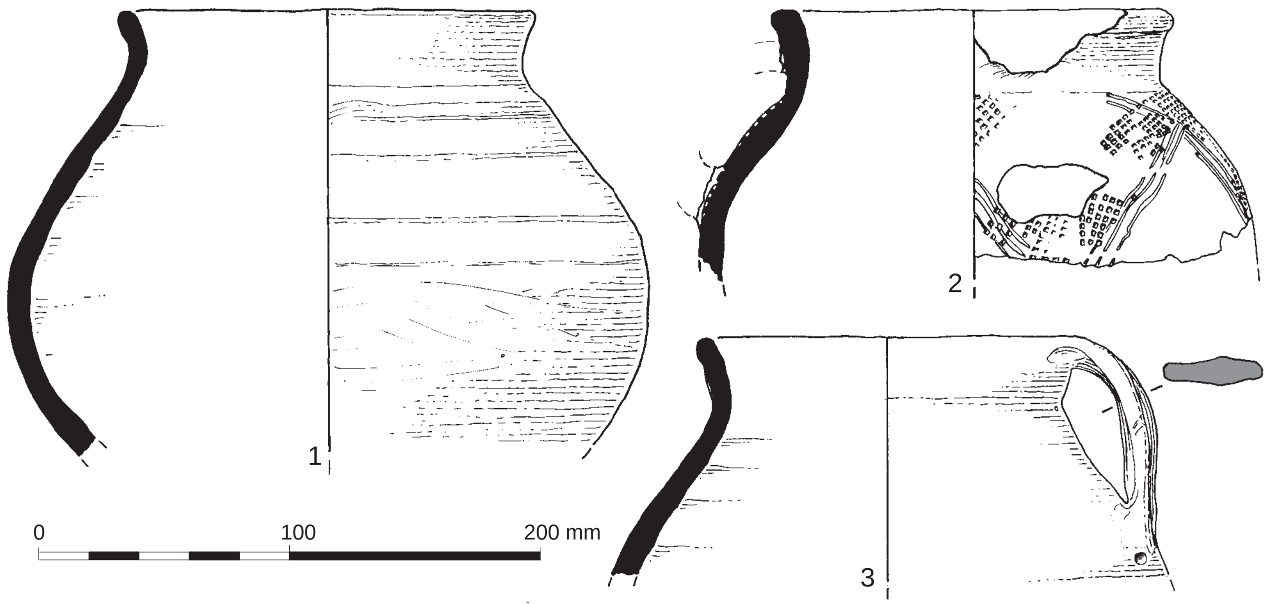



*Figure 7.26 Anglo-Saxon pottery (nos 1–3)*

| Fabric Code | Fabric Name | No. sherds | Weight (g) | Date range |
|---|---|---|---|---|
| EMS1 | Early Saxon sandy ware | 12 | 51 | *c.* 450–700 |
| MLS7 | Middle/Late Saxon Ipswich ware | 6 | 160 | *c.* 725–850 |
| MLS2 | Middle/Late Saxon Canterbury-type sandy ware | 13 | 1081 | *c.* 775–875 |
| | **Total** | **31** | **1292** | |

*Table 7.8 Post-Roman pottery fabric totals*

| Feature | EMS1 | MLS7 | MLS2 | Total |
|---|---|---|---|---|
| Ditch 505 | - | - | 3/6 | 3/6 |
| Pit 804 pit | - | - | 2/277 | 2/277 |
| Pit 904 | - | - | 6/773 | 6/773 |
| Ditch 1104 | - | - | 2/25 | 2/25 |
| Pit 2613 pit | 2/18 | - | - | 2/18 |
| Pit 2739 | 1/5 | - | - | 1/5 |
| Pit 2762 | 1/1 | - | - | 1/1 |
| Pit 2834 | 1/13 | - | - | 1/13 |
| Pit 2947 | 1/4 | - | - | 1/4 |
| Ring-ditch 2970 | 1/1 | - | - | 1/1 |
| Pit 3162 | - | 6/160 | - | 6/160 |
| Pit 3191 | 5/9 | - | - | 5/9 |
| **Total** | **12/51** | **6/160** | **13/1081** | **31/1292** |

*Table 7.9 Post-Roman pottery by feature (number/weight in grammes)*

handled jar or pitcher from pit 804 (Fig. 7.26, 2). Both are handmade in relatively fine sandy fabrics (MLS2), although the jar from 904 is slightly finer and harder fired. The vessel from 804 is decorated with a band of stamped motifs (squared grid) within incised chevron zones around the shoulder; the decoration was applied after the attachment of the handle, which is represented only by scars on rim and body. The third vessel is an Ipswich ware handled pitcher from pit 3162, with a plain, slightly everted rim and strap handle (Fig. 7.26, 3).

A further 16 sherds were identified as Anglo-Saxon, all in sandy fabrics. Three sherds from two expanded rims are sufficiently diagnostic to postulate a Middle Anglo-Saxon date (respectively, from pit 2947 and ditch 1104, identified in the evaluation = ditch 2760). Other sherds are undiagnostic, and have been assigned to the Early Saxon fabric EMS1, although the possibility exists that these, too, are of Middle Anglo-Saxon date. These sherds came from pits 2613, 2739, 2762, 2834 and 3191, and ditch 505; none of these contexts contained more than five sherds, and all sherds were small, and often abraded. One tiny sherd from Bronze Age ring-ditch 2970 is presumably intrusive in this context.

### *Discussion*

Parallels for the three Middle Anglo-Saxon vessels are not numerous within East Kent. The form of the rounded jar from pit 904 is not particularly distinctive, but there are comparable examples in similar sandy wares from Canterbury, for example two vessels from St Martin's Hill, dated to the early 9th century (Macpherson-Grant 1987, fig. 20, 5). No direct parallel has been found for the handled vessel, possibly a pitcher, from pit 804 but, although the fabric is of local type, the decorative scheme is reminiscent of pitchers in Middle Anglo-Saxon regional wares such as Ipswich ware – one example of the latter, for example, can be noted from the Marlowe Car Park (Blockley *et al.* 1995, pl. 125, 288).

The presence of Ipswich ware at Cliffs End, in the form of a second handled vessel, again probably a pitcher, is of interest. This marks an addition to a small but growing number of find-spots of Ipswich ware in Kent. The distribution of these find-spots is mainly coastal and appears to be an indicator of the hinterland of the emporia at Ipswich and London; examples have been found at Folkestone, Hythe and Dover, with the largest assemblages from sites with ecclesiastical components, such as Minster-in-Sheppey and Canterbury (Riddler 2004, 28). These findspots probably represent settlements producing goods for trade, or perhaps even small-scale local markets (Blinkhorn 1999).

## Worked Stone

*by Kevin Hayward and Matt Leivers*

Worked stone from Anglo-Saxon features included rotary querns, a bun-shaped spindlewhorl, fragments of stone with working and rubble stone. Each example was examined using a hand lens (Gowland x10) in order to identify the rock type.

Rotary querns may from Niedermendig lava were recovered from pits 2010 and 2235, and ditch 2977.

The bun-shaped spindlewhorl (ON 227), from pit 3182, is fine-grained siltstone. It is sub-biconical with flat base and flattened top (40 mm diameter, 22 mm thick; perforation 10 mm diameter). Similarly shaped spindlewhorls of chalk or shale were recovered from graves at Buckland Anglo-Saxon cemetery, Dover (Evison 1987).

Rock fragments with signs of working (generally smoothed surfaces or distinctive wear patterns) were recovered. Anglo-Saxon features contained fragments of banded glauconitic siltstone and old red sandstone.

A quantity of rubble stone of sandstones, basic diorite and banded glauconitic siltstone was also recovered from Anglo-Saxon features.

During the Anglo-Saxon occupation of the site, the material being used for rotary quernstones came from much further afield (Niedermendig lava, Rhineland) than during the prehistoric phases, in spite of the availability of more local greensands. Furthermore, although some of the material from the prehistoric occupation could have been reused, there is no evidence that this was the case. This shows a change in the source of supply during the Anglo-Saxon period. Saxon London was supplied with large quantities of German Lavastone at this time and the Pegwell Bay/North Foreland Area would have been accessible to these supply routes.

Local banded glauconitic siltstone occurs in Anglo-Saxon pits in some quantity, usually burnt and associated with large deposits of shell, suggesting some link with the preparation of this food.

## Textile

*by Sharon Penton and Jacqui Watson*

Three fragments of charred textile were recovered from pit 2182 (context 2282) during sample processing, the largest piece being 4 x 4 mm in size. The thread was Z-spun, but it was not possible to determine definitively if it was plant or animal fibre, although some of the fibres appeared to have tapering ends more consistent with animal hair.

## Animal Bone

*by Jessica M. Grimm and L. Higbee*

A total of 3425 animal bone fragments were recovered from Early and Middle Anglo-Saxon contexts. The majority of the material (3420 fragments; 99.8%) derived from Middle Anglo-Saxon pits. Four fragments of bone were recovered from ditch fills, and from the backfill of two of the Early Anglo-Saxon graves. The general character and poor condition of the bone from the graves suggests that it is residual.

The methodology followed that set out in Chapter 5.

### *Taphonomy*

The hand collected bones were less well preserved than those from the prehistoric Mortuary Feature 2018. Only 1.5% of the bones show signs of canid scavenging, however, this is likely to be an underestimation since gnawing can completely destroy bones thereby removing them from the archaeological record.

The general character of the assemblage – few loose teeth, several instances of articulated body parts and cases of loose but matching epiphyses – indicates that the material from pits is unlikely to have been reworked. It seems that bones were discarded fresh, a conclusion further supported by the absence of ancient 'dry' fractures.

The proportion of burnt (both charred and calcined) fragments is quite high (12%) and most (14%) of these are from pits. The identifiable burnt remains belonged to cattle, sheep/goat, pig, domestic fowl and cod. The evidence suggests that some bones were deliberately incinerated as part of waste disposal practices.

### *Results*

**Species proportions**

The identifiable remains were of mammals, birds, fish and amphibians (Tables 7.10–7.11). Cod and herring/sprat dominate the assemblage, which is in sharp contrast with species proportions in the prehistoric assemblages were domestic mammals were the largest group. Beef provided most of meat eaten, but sheep flocks probably dominated the local pastoral economy and it is clear that fish was of considerable dietary significance.

### Element distribution

The dataset is quite small, however, the presence of all parts of the beef, mutton and pork carcass makes it likely that the animals were slaughtered on or close to the site.

| Saxon | Hand collected | | 5.6 mm sieve | 2 mm sieve |
|---|---|---|---|---|
| **Mammal** | **No.** | **%** | **No.** | **No.** |
| Horse (*Equus caballus*) | 8 | 1.5 | - | - |
| Cattle (*Bos taurus*) | 72 | 13.9 | 5 | - |
| Sheep/Goat (*Ovis/Capra*) | 70 | 13.5 | 27 | - |
| Sheep (*Ovis aries*) | 3 | 0.6 | - | - |
| Pig (*Sus domesticus*) | 10 | 1.9 | 55 | - |
| Dog (*Canis familiaris*) | 1 | 0.2 | - | 1 |
| Cat (*Felis catus*) | 18 | 3.5 | - | - |
| House mouse (*Mus musculus*) | - | - | - | 1 |
| Mole (*Talpa europaea*) | 1 | 0.2 | - | - |
| Wood mouse (*Apodemus sylvaticus*) | - | - | - | 1 |
| Mouse (Muridae) | - | - | - | 7 |
| **Aves** | | | | |
| Crow (*Corvus corone/frugilegus*) | 2 | 0.4 | 7 | - |
| Domestic fowl (*Gallus gallus* dom.) | 6 | 1.2 | 33 | 1 |
| Goose (*Anser anser* (dom.)) | 1 | 0.2 | - | - |
| cf Mallard (*Anas platyrhynchos*) | - | - | 1 | - |
| Starling-size | - | - | 1 | - |
| **Pisces** | | | | |
| Cod (*Gadus morhua*) | 114 | 22.1 | 180 | - |
| Cod/Whiting (*Gadus morhua/ Merlangius merlangus*) | - | - | 1 | - |
| Cuckoo ray (*Leucoraja naevus*) | - | - | - | 2 |
| Eel (*Anguilla anguilla*) | - | - | 2 | 13 |
| Flatfish (Pleuronectiformes) | - | - | 4 | 1 |
| cf Flatfish (Pleuronectiformes) | - | - | 3 | - |
| Gadidae | - | - | 3 | - |
| cf Gadidae | 2 | 0.4 | 1 | - |
| Herring/Sprat (*Clupea harengus/ Sprattus sprattus*) | - | - | 1 | 765 |
| Mackerel (*Scomber scombrus*) | - | - | 4 | 1 |
| Mullet (*Mugilidae/Mullidae*) | - | - | 1 | - |
| Rajidae | - | - | - | 2 |
| Scad (Perciformes) | - | - | 1 | 4 |
| Dogfish/Shark (Elasmobranchii) | - | - | 13 | 2 |
| Spotted ray (*Raja montagui*) | - | - | - | 4 |
| Thornback Ray (*Raja clavata*) | - | - | 33 | 53 |
| Thorny skate (*Amblyraja radiate*) | - | - | - | 2 |
| Whiting (*Merlangius merlangus*) | - | - | - | 5 |
| **Amphibian** | | | | |
| Anura | 2 | 0.4 | 18 | 36 |
| Large mammal | 25 | 4.8 | 17 | - |
| Medium mammal | 42 | 8.1 | 225 | 48 |
| Aves | - | - | 11 | 16 |
| Pisces | 140 | 27.1 | 992 | 304 |
| **Total** | **517** | **100.0** | **1639** | **1269** |

*Table 7.10 Anglo-Saxon animal bone species list according to NISP and different recovery methods*

### Age and sex

Few complete mandibles were recovered therefore much of the ageing information is from epiphyseal fusion of the post-cranial skeleton. Overall, the data indicates the presence of both young and old livestock. The fact that foetal/neonate pig bones were present in the fills of pits 2036, 2762, 2823 and 2939 makes it likely that pig breeding was an onsite activity. It seems that these premature animals were discarded instead of eaten.

Apart from a cervical vertebra, all horse bones appeared to be from adult animals. The cat skeleton found in pit 2122 belonged to a subadult animal of less than a year. The six dog bones represent an adult and a juvenile dog. All of the 39 bones attributed to domestic fowl belonged to adult birds, which suggests that egg production was more important than meat.

### Phenotype

None of the bones were suitable for a height at the withers estimation. Most of the cod bones found in this assemblage were of very large fish. The many very small herring/sprat bones indicate small young fish.

### Butchery

Seven of the bones showed signs of butchery. Of these, four were seen on cattle bones, two on sheep/goat and one on the left maxilla of cod. Two marks were caused by a cleaver; the others were the result of a knife.

### Deposition

The high proportion of fish remains encountered at the site is partly a reflection of recovery methods. It does, however, show that fish played an important role in people's diets. Some of the herring/sprat vertebrae in pits 2478, 2758, 2823, 3081 and 3191 indicate that human excrement was deposited into these features. The frog remains in pits 2478, 2613, 2758, 2762, 2823, 2939, 3081, 3111, 3135 and 3191 show that these features were left open to the elements.

It is impossible to quantify from the animal bone how important fish was in the diet of the Anglo-Saxon population at Cliffs End. Several of the London sites (Rackham and Snelling 2004, 64–65; Hamilton-Dyer 2004, 84: Rielly 2004, 319) produced large fish bone assemblages, while smaller amounts were found at James Street (Armitage 2004, 33) and the National Portrait Gallery (Armitage 2004, 111). Marine species identified include cod, gurnard, herring, salmon/trout, shad, plaice/flounder, whiting and wrasse. cf. barbell, dace, eel, pike, roach and sturgeon form the fresh water species.

The evidence from sites in the London shows a mixture of marine and fresh water fish, indicating that both the Thames estuary and the North Sea were explored. Contrary, apart from eel, all fish species exploited at Cliffs End are marine. The most likely fishing areas in the local environment are Pegwell Bay, the River Stour and the North Sea.

| Saxon | BW | | MNI | |
|---|---|---|---|---|
| **Mammal** | **g** | **%** | **No.** | **%** |
| Horse (*Equus caballus*) | 1704 | 27.7 | 2 | 2.0 |
| Cattle (*Bos taurus*) | 2889 | 46.9 | 3 | 3.0 |
| Sheep/Goat (*Ovis/Capra*) | 442 | 7.3 | 6 | 6.2 |
| Sheep (*Ovis aries*) | 25 | 0.4 | - | - |
| Pig (*Sus domesticus*) | 236 | 3.8 | 3 | 3.0 |
| Dog (*Canis familiaris*) | 2 | 0.0 | 2 | 2.0 |
| Cat (*Felis catus*) | 21 | 0.3 | 1 | 1.0 |
| House mouse (*Mus musculus*) | 0 | | 1 | 1.0 |
| Mole (*Talpa europaea*) | 1 | 0.0 | 1 | 1.0 |
| Wood mouse (*Apodemus sylvaticus*) | 0 | 0.0 | 1 | 1.0 |
| Mouse (Muridae) | 0 | 0.0 | - | - |
| **Aves** | | | | |
| Crow (*Corvus corone/frugilegus*) | 3 | 0.0 | 2 | 2.0 |
| Domestic fowl (*Gallus gallus* dom.) | 20 | 0.3 | 2 | 2.0 |
| Goose (*Anser anser* (dom.)) | 2 | 0.0 | 1 | 1.0 |
| cf Mallard (*Anas platyrhynchos*) | 0 | 0.0 | 1 | 1.0 |
| Starling-size | 0 | 0.0 | 1 | 1.0 |
| **Pisces** | | | | |
| Cod (*Gadus morhua*) | 352 | 5.7 | 9 | 10.3 |
| Cod/Whiting (*Gadus morhua/ Merlangius merlangus*) | 0 | 0.0 | - | - |
| Cuckoo ray (*Leucoraja naevus*) | 0 | 0.0 | 1 | 1.0 |
| Eel (*Anguilla anguilla*) | 0 | 0.0 | 1 | 1.0 |
| Flatfish (Pleuronectiformes) | 0 | 0.0 | 1 | 1.0 |
| cf Flatfish (Pleuronectiformes) | 0 | 0.0 | - | - |
| Gadidae | 0 | 0.0 | - | - |
| cf Gadidae | 0 | 0.0 | - | - |
| Herring/Sprat (*Clupea harengus/ Sprattus sprattus*) | 0 | 0.0 | 50 | 51.5 |
| Mackerel (*Scomber scombrus*) | 0 | 0.0 | 1 | 1.0 |
| Mullet (*Mugilidae/Mullidae*) | 0 | 0.0 | 1 | 1.0 |
| Rajidae | 0 | 0.0 | - | - |
| Scad (Perciformes) | 0 | 0.0 | 1 | 1.0 |
| Shark (Elasmobranchii) | 7 | 0.1 | 1 | 1.0 |
| Spotted ray (*Raja montagui*) | 0 | 0.0 | 1 | 1.0 |
| Thornback Ray (*Raja clavata*) | 1 | 0.0 | 1 | 1.0 |
| Thorny skate (*Amblyraja radiate*) | 0 | 0.0 | 1 | 1.0 |
| Whiting (*Merlangius merlangus*) | 0 | 0.0 | 1 | 1.0 |
| **Amphibian** | | | | |
| Anura | 0 | 0.0 | - | - |
| Large mammal | 144 | 2.3 | - | - |
| Medium mammal | 91 | 1.5 | - | - |
| Aves | 1 | 0.0 | - | - |
| Pisces | 228 | 3.7 | - | - |
| **Total** | **6169** | **100** | **97** | **100** |

*Table 7.11 Anglo-Saxon animal bone species list according to BW and MNI (hand collected and sieved combined)*

The small Middle Anglo-Saxon assemblage from Cliffs End suggests that the people using the site were mainly sheep herders and fishers.

## Worked Bone

*by Jessica M. Grimm*

A single bone point (Pl. 7.5), made from a splinter of medium mammal, shaped and polished into a point (L 32 mm), possible hole, ON 1200, came from pit 2235 (context 2229).

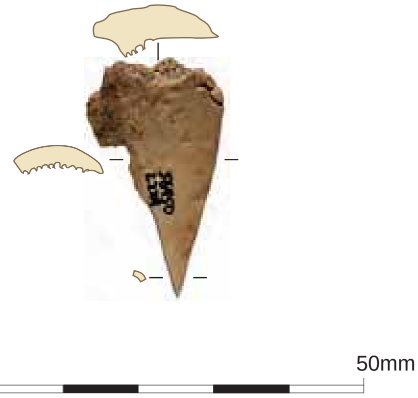



*Plate 7.5 Worked bone (ON 1200)*

## Environmental Evidence
## Charred Plant Remains

*by Chris J. Stevens*

Of the 107 bulk samples taken from archaeological features for the recovery of charred and mineralised plant remains, 50 came from Anglo-Saxon pits, ditches and graves. Of these 24 were chosen for full detailed analysis.

The processing and analysis methods are detailed in Chapter 5. Four samples from Anglo-Saxon features were sub-sampled and estimates produced. The finest 0.5 mm sample from pits 2182, 2486 and 2939 (context 2942) were 10% sub-sampled. That from 2486 had large amounts of grain and estimates were produced from a sub-sample of 10% of the grain, while oats were only counted from 10% of the 1 mm fraction from 2939. The finest 0.5 mm fraction of pit 2739 was 50% sub-sampled and the counts doubled to produce the estimated counts.

### *Results*

Twenty-three of the Anglo-Saxon samples examined came from pits, and occasionally ditches within the southern half of the site. One other sample came from grave 3542 (the singleton) (Table 7.12).

The main component of the majority of the Anglo-Saxon samples were grains of cereals, in particular barley (*Hordeum*

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Feature Type | Ditch | Ditch | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Grave |
| | Feature Number | 2060 | 2184 | 2235 | 2182 | 2320 | 2478 | 2486 | 2613 | 2727 | 2739 | 2762 | 2823 | 2834 | 3135 | 3191 | 3111 | 3111 | 2939 | 2939 | 2939 | 3081 | 3081 | 2758 | 3542 |
| | Context | 2063 | 2185 | 2229 | 2282 | 2323 | 2474 | 2489 | 2615 | 2729 | 2742 | 2764 | 2830 | 2838 | 3138 | 3193 | 3219 | 3225 | 2942 | 2943 | 2952 | 3195 | 3198 | 2799 | 3543 |
| | Sample | 002 | 005 | 006 | 007 | 009 | 013 | 014 | 017 | 025 | 026 | 031 | 032 | 033 | 049 | 050 | 052 | 058 | 068 | 069 | 070 | 071 | 073 | 028 | 081 |
| | Size Litres | 10 | 10 | 10 | 6 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 2 | 10 | 40 | 40 | 40 | 40 | 40 | 10 | 40 |
| | Flot Size ml | 40 | 180 | 500 | 80 | 450 | 200 | 150 | 250 | 375 | 140 | 30 | 350 | 30 | 225 | 70 | 40 | 150 | 350 | 120 | 200 | 10 | 30 | 40 | 130 |
| | Roots ml | 5 | 0 | 0 | 5 | 0 | 8 | 10 | 5 | 0 | 30 | 15 | 0 | 35 | 50 | 20 | 5 | 5 | 25 | 75 | 70 | 5 | 5 | 15 | 75 |
| **Cereals** | **Common Name** | | | | | | | | | | | | | | | | | | | | | | | | |
| *Hordeum vulgare* sl (grain) | hulled barley | 6 | 5 | 2 | 33 | 20 | 7 | e.450 | 28 | 12 | 37 | 11 | - | 17 | - | 46 | - | - | - | 50 | - | 2 | - | 2 | 2 |
| *Hordeum vulgare* sl (grain) | barley | 10 | 19 | 4 | 43 | 31 | 9 | - | 35 | 16 | 206 | 79 | - | 53 | 317 | - | 627 | 217 | 671 | 20 | - | 28 | - | 16 | - |
| *Hordeum vulgare* sl (6-row rachis) | barley | 2 | - | - | 16 | - | - | - | - | - | 2 | - | - | 1 | 20 | - | 11 | - | 55 | 2 | - | - | - | - | - |
| *Hordeum vulgare* sl (rachis) | barley | - | - | - | e.10 | - | - | - | - | - | 7 | - | - | - | 9 | - | 4 | - | 24 | 6 | - | - | - | - | - |
| *Hordeum vulgare* sl (basal rachis frgs) | barley | - | - | - | 10 | - | - | - | - | - | - | - | - | - | 29 | - | 3 | - | 74 | 2 | - | - | - | - | - |
| *Triticum* sp. (grains) | wheat | - | - | - | - | - | 1 | - | 3 | - | - | - | 2 | 2 | cf.1 | - | - | - | - | - | - | - | - | 1 | - |
| *Triticum dicoccum* (glume base) | emmer wheat | - | - | - | - | - | - | - | - | - | - | - | - | cf.2 | - | 1 | - | - | - | 3 | - | 5 | - | - | - |
| *Triticum dicoccum* (spikelet fork) | emmer wheat | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - |
| *Triticum spelta* (glume bases) | spelt wheat | - | - | - | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 5 | - | 3 | - | - | - |
| *Triticum dicoccum/spelta* (grain) | emmer/spelt wheat | - | - | - | - | - | - | - | - | 3 | - | - | - | - | - | - | - | - | - | 1 | - | 1 | - | - | - |
| *Triticum dicoccum/spelta* (spikelet fork) | emmer/spelt wheat | - | 2 | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | 2 | - | - | - | - | - |
| *Triticum dicoccum/spelta* (glume bases) | emmer/spelt wheat | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 16 | - | 17 | - | - | - |
| *Triticum aestivum* sl (grain) | bread wheat | - | - | 2 | 13 | 8 | 6 | - | 15 | - | 8 | 25 | 3 | 28 | 4 | 3 | 50 | 63 | 65 | 7 | - | 8 | - | 13 | 1 |
| *Triticum aestivum* sl (rachis) | bread wheat | - | - | - | - | - | - | - | - | - | e.10 | - | - | - | 1 | 5 | 21 | - | 4 | 3 | - | - | - | - | - |
| *Secale cereale* (grain) | rye | 5 | - | - | 53 | 3 | - | e.2450 | 1 | - | - | cf.4 | - | - | - | 1 | 3 | 3 | 5 | cf.1 | - | - | - | 2 | - |
| *Secale cereale* (rachis) | rye | cf.1 | - | - | e.145 | - | - | 3 | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - |
| Cereal indet. (grains) | cereal | 40 | 20 | 18 | 61 | 65 | 5 | - | 43 | 5 | 17 | 100 | 3 | 40 | - | 6 | - | 20 | - | - | - | - | - | 10 | 5 |
| Cereal frag. indet. (est. whole grains ) | cereal | - | 20 | 15 | 40 | 60 | 5 | e.1350 | 30 | 4 | 20 | 30 | 2 | 23 | - | 8 | 200 | 15 | - | 20 | - | - | - | 8 | - |
| Cereal (rachis frgs) | cereal | - | - | - | e.30 | - | - | - | - | - | - | - | - | - | - | - | 20 | 1 | - | - | - | - | - | - | - |
| Cereal (basal rachis frag) | cereal | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 58 | 3 | - | - | - | - | - |
| Cereal (culm node) | cereal | - | - | - | 40 | - | - | - | - | - | 9 | - | - | - | 9 | - | - | - | 14 | 4 | - | - | - | - | - |
| Cereal (basal culm node) | cereal | - | - | - | 4 | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| **Species** | **Common Name** | | | | | | | | | | | | | | | | | | | | | | | | |
| *Vicia faba* | broad bean | cf.2 | - | - | - | - | - | - | - | - | 1 | - | - | - | - | 3 | 1 | - | 10 | 5 | 1 | - | - | - | - |
| *Pisum sativum* | pea | 183 | - | - | 1 | - | - | - | - | - | cf.1 | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - |
| *Pisum sativum* detached hilums | pea (detached hilum) | 70 | - | - | - | - | - | - | - | - | cf.1 | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - |
| *Pisum/Lens/Vicia* | pea/lentil/vetch | - | - | - | 1 | - | 1 | - | - | - | 1 | - | - | 1 | - | - | - | - | - | 2 | 1 | 1f | - | - | - |
| **Species** | **Common Name** | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pteridium aquifolium* | bracken | - | - | - | - | - | - | - | - | - | e.10 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Ranunculus* subg. *Ranunculus* (arb) | buttercup | - | - | - | 8 | - | 1 | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | 1 | - |
| *Alnus glutinosa* (female catkins/cones) | female catkins/cones | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - |
| *Corylus avellana* | hazelnut | 1 | 3 | - | - | 1 | 4 | 3 | 1 | 2 | 2 | 4 | 4 | - | 14f | - | - | 4 | 2 | - | - | - | - | - | - |
| Chenopodiaceae indet. | goosefoot | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1+2m | - | - | - | - | - |
| *Chenopodium album* | fat-hen | 1 | - | - | e.40 | 1 | - | e.60 | - | - | e.24 | 3 | - | - | - | - | - | - | e.50 | 1 | - | 5 | - | 3 | - |
| *Atriplex* sp. | orache | - | - | - | 2 | - | 1 | - | - | - | - | 1 | - | - | - | - | - | - | 1 | - | - | - | - | 1 | - |
| *Montia fontana* subsp. *chondrosperma* | blinks | - | - | - | e.10 | - | - | - | - | - | cf.1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Stellaria media* | chickweed | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | 1 | - | - | - |
| *Agrostemma githago* | corncockle | - | - | - | 1 | - | - | 36 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Polygonaceae indet. | knotgrass | - | - | 1 | - | 2 | - | 2 | - | - | - | - | - | - | 2 | - | - | - | 1m | - | - | - | - | - | - |
| *Persicaria maculosa/lapathifolium* | redshank/pale persicaria | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - |
| *Polygonum aviculare* | knotgrass | - | - | - | 2 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - | - | - | - |
| *Fallopia convolvulus* | black bindweed | 1 | - | 1 | 1 | - | 1 | 16 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Rumex sp. | dock | 2 | cf.1 | - | 29 | 1 | 2 | - | 1 | - | 29 | 4 | - | 1 | 1 | 1 | 5 | 3 | 31 | 3 | - | - | - | 3 | - |
| *Rumex acetosella* group | sheep's sorrel | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - |
| *Rumex* cf. *crispus* | curled dock | - | - | - | 10 | - | - | - | - | - | 9 | 4 | - | - | 1 | - | 1 | - | 7 | 2 | - | 1 | - | - | - |
| *Rumex* cf. *crispus* (fruit with tepals) | curled dock | - | - | - | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

| | Feature Type | Ditch | Ditch | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Pit | Grave |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Feature Number | 2060 | 2184 | 2235 | 2182 | 2320 | 2478 | 2486 | 2613 | 2727 | 2739 | 2762 | 2823 | 2834 | 3135 | 3191 | 3111 | 3111 | 2939 | 2939 | 2939 | 3081 | 3081 | 2758 | 3542 |
| | Context | 2063 | 2185 | 2229 | 2282 | 2323 | 2474 | 2489 | 2615 | 2729 | 2742 | 2764 | 2830 | 2838 | 3138 | 3193 | 3219 | 3225 | 2942 | 2943 | 2952 | 3195 | 3198 | 2799 | 3543 |
| **Species** | **Common Name** | | | | | | | | | | | | | | | | | | | | | | | | |
| *Malva* sp. L. | mallow | - | - | - | - | - | - | - | cf.1m | - | - | - | - | - | - | - | cf.1 | - | - | - | - | - | - | - | - |
| Brassica sp. (*B. nigra/B.oleracea*) | wild mustard/cabbage | - | - | - | - | - | - | cf.16 | 4 | - | e.114+105m | | - | 6 | 2 | - | 126 | 13+18m | 13 | 7 | - | 1 | - | 7+1m | - |
| *Raphanus raphanistrum* | runch | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - |
| *Rubus/Rosa* type sp. (thorn) | bramble/rose type thorns | - | - | - | - | - | - | - | - | - | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Prunus spinosa* | sloe | - | - | - | 1 | - | - | - | - | - | - | 1 | - | - | + | - | - | - | - | - | - | - | - | - | - |
| *Prunus spinosa/C. monogyna* (thorns) | hawthorn/sloe thorns | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 | - | - | - | - | - |
| *Vicia./Lathyrus* sp. | vetch/wild pea | - | - | - | 27 | 16 | 1 | 40 | 3 | - | 5 | - | - | - | 10 | - | 2 | 2 | 131 | 11 | 2 | 1 | - | - | - |
| *Medicago lupulina* | black medick | cf.1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - |
| *Trifolium* sp. | clover | - | - | - | 1 | cf.1 | - | - | - | - | 1 | - | - | - | - | - | - | - | e.10 | - | - | - | - | - | - |
| *Linum catharticum* | fairy flax | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - |
| Scandix pecten-veneris | shepherd's-needle | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Pimpernella* sp. (2 mm) | burnet-saxifrages | - | - | - | cf.1 | - | - | - | - | - | cf.1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Apium* sp. | celery/water-cress | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - |
| *Torilis* sp. | hedge parsley | - | - | - | - | 1m | - | - | - | - | 1+1m | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Plantago lanceolata* | ribwort plantain | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | 1 | - | - | - | - | - | - | - |
| *Sherardia arvensis* | field madder | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - |
| *Galium aparine* | cleavers | - | - | - | - | - | - | 16 | - | - | 2 | 2 | - | - | 1 | - | 1 | - | 9 | - | - | - | - | - | - |
| *Sambucus nigra* | elder | - | - | - | 8 | - | 1 | - | - | - | - | - | - | - | - | - | - | - | 2 | - | - | - | - | - | - |
| *Valerianella dentata* | narrow fruited corn salad | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 1 | - | - | - | - | - |
| *Carduus/Cirsium* sp. | thistle | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | - |
| *Anthemis cotula* | stinking mayweed | 560 | - | - | e.524 | 1 | - | e.140 | 10 | 1 | e.221 | - | - | 3 | - | 1 | 22 | 21 | e.731 | 60 | - | 4 | - | 2 | - |
| *Anthemis cotula* (seedhead fragments) | stinking mayweed | - | - | - | 4 | - | - | - | - | - | 2 | - | - | - | 3 | - | - | - | 2 | - | - | - | - | - | - |
| Poaceae (mid-large indet.) | medium to large grass seed | - | - | - | - | 2 | - | - | - | - | 2 | - | - | - | - | - | - | 2 | - | - | - | 1 | - | - | - |
| Poaceae (small indet.) | small grass seed | - | - | - | - | - | - | - | - | - | - | 3 | - | - | - | - | - | - | 1 | - | - | - | - | - | - |
| POACEAE (culm node) | grass culm node | - | - | - | - | - | 3 | - | 1 | - | 2 | - | - | 1 | 2 | - | - | - | - | 1 | - | - | - | - | - |
| *Lolium perenne* L. | rye-grass | 2 | - | - | 10 | cf.1 | cf.1 | - | - | 1 | e.10 | 3 | - | - | - | - | - | 1 | 8 | - | - | - | - | - | - |
| *Poa/Phleum* sp. | meadow grass/cat's-tails | - | - | 1 | - | - | 2 | 1 | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 2 | - | 1 | - |
| *Avena* sp. L. (grain) | oat grain | 2 | - | 3 | 48 | 18 | 2 | e.40 | 14 | 3 | 44 | 4 | 3 | 2 | 97 | 2 | 80 | 33 | e.640 | 34 | - | 4 | - | - | - |
| *Avena* sp. L. (awn) | oat awn | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | 10 | - | - | - | - | - | - | - | - |
| *Avena* sp. (floret base wild indet.) | oat floret base | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Avena* sp. (floret base cultivated indet.) | oat floret base | - | - | - | - | cf.1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Avena* L./*Bromus* L. sp. | oat/brome | - | - | - | - | - | 1 | 70 | - | - | - | - | - | - | 1 | - | - | - | 2 | - | - | - | - | 1 | - |
| *Phleum* sp. | cat's-tails | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - |
| *Bromus* sp. L. | brome | - | - | 1 | - | - | 1 | e.20 | - | - | - | 1 | - | 1 | - | - | - | - | - | - | - | - | - | 1 | - |
| Seed indet. | | 4 | - | - | - | 9m | 1+1m | - | 3m | 1 | 2+2m | - | - | - | - | - | - | - | - | - | - | - | - | 2m | - |
| Parenchyma | | - | - | 1 | - | - | - | - | - | - | 1m | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Parenchyma/conglomerate | | | | | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | - |
| Tuber | | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mineralised items | | - | - | - | - | - | 15 | - | - | - | 3m | - | - | - | - | 2min | - | - | - | - | - | - | - | - | - |
| Indet. Flower? Capsule 0.8 mm | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 4 | - | - | - | - | - | - | - |
| Bud | | - | - | - | 1 | - | - | - | - | - | 1m | - | - | - | - | 2 | - | - | - | - | - | - | - | - | - |

*Table 7.12 Charred plant remains*

*vulgare*), or in the case of pit 2486, rye (*Secale cereale*). Rye was also well represented in pit 2182, but otherwise formed a minor component of the Anglo-Saxon assemblages. Grains of free-threshing wheat (Triticum *aestivum/turgidum*) were present in all of the samples, but always less dominant than barley.

Rachis fragments of barley, rye and free-threshing wheat were common in several of the samples. As with the grains, rachis fragments of barley were more common than those of free-threshing wheat, being particularly common in pits 2182 and 2939, although grains still far outnumbered them. Rachis fragments of rye were present in a few of the samples, but particularly prolific in pit 2282 where they outnumbered grains of rye. Grains of oat were common in many of the samples, but only in two instances were floret bases present that allowed the identification of cultivated (*Avena sativa*) from wild (*Avena fatua*), and these instances showed the presence of both cultivated and wild oats.

Remains of hulled wheats were recovered from several of the samples, in particular from pits 2939 and 3081. It might, however, be noted that the former lies close to the Late Bronze Age Central Enclosure, while the latter cuts through Late Bronze Age ditch 2242. Although remains of hulled wheats from Anglo-Saxon sites have been shown by radiocarbon dating to be contemporary, and probably cultivated in the period (Pelling and Robinson 2000; Smith 2011), these remains are generally rare in the Early to Middle Anglo-Saxon period; given the sheer number of hulled wheat remains from earlier activity on this site it is highly probable that most are reworked from Late Bronze Age deposits.

Other crop remains recovered from the Anglo-Saxon samples included a large number of charred peas (*Pisum sativum*) recovered from ditch 2060. It might also be noted that a large number of detached hilums of pea were recovered from this same deposit. Remains of broad bean (*Vicia faba*) were recorded within several of the samples along with a single large slender grain of a leguminous species from pit 2834 (context 2838) that moderately resembled lentil (*Lens culinaris*), although given the presence of only a single specimen this identification should be regarded as highly tentative.

Other food remains included those of hazelnut (*Corylus avellana*), which was present in several samples and sloe (*Prunus spinosa*) which was present in a few samples, including pit 3135 (context 3138) which had several fragments of stone of sloe as well as charred fragments of fruit. A few seeds of elder (*Sambucus nigra*) were also recovered from the samples.

Seeds of stinking mayweed (*Anthemis cotula*) dominated several of the samples with occasional seedhead fragments; the other very common species were seeds of oats (*Avena* sp.) and brome grass (*Bromus* sp.). A further species not recovered from the earlier samples was corncockle (*Agrostemma githago*) that is probably a Roman introduction and certainly a common medieval weed.

Other than the aforementioned two species the composition of the assemblages in terms of weed seeds was generally similar to that seen within the Late Bronze Age samples, with seeds of fat-hen (*Chenopodium album*) being fairly common in the Anglo-Saxon samples, along with occasional seeds of orache (*Atriplex* sp.) and stitchwort (*Stellaria media*). Other frequent seeds included those of common arable weeds, such as black bindweed (*Fallopia convolvulus*), redshank/pale persicaria (*Persicaria maculosa/lapathifolium*), knotgrass (*Polygonum aviculare*), dock (*Rumex* sp.), vetches/wild pea (*Vicia/Lathyrus* sp.), rye-grass (*Lolium* sp.) and cleavers (*Galium aparine*).

Seeds of Brassica (probably *B. nigra* or *oleracea*) were also common in several of the Anglo-Saxon deposits, and in the case of pits 2739 and 3111, included relatively high numbers of both charred and mineralised seeds.

Other less commonly found seeds also present in earlier samples include sheep's sorrel (*Rumex acetosella*), runch (*Raphanus raphanistrum*), black medick (*Medicago lupulina*), clover (*Trifolium* sp.), ribwort plantain (*Plantago lanceolata*), field madder (*Sherardia arvensis*), thistle (*Cirsium/Carduus* sp.), meadow grass (*Poa* sp.) and cat's-tails (*Phleum* sp.).

Other seeds not present in the Late Bronze Age samples that were represented by single seeds within this sample, included seeds of fairy flax (*Linum catharticum*) and shepherd's needle (*Scandix pectin-veneris*).

No seeds of wetland species were recovered from the samples, although occasional seeds of blinks (*Montia fontana* subsp. *chondrosperma*) and buttercup (*Ranunculus acris*, *repens bulbosus*) probably point to the cultivation of damper soils.

Other remains included a few pinnules of bracken (*Pteridium aquifolium*) from pit 2739 and a female alder catkin/cone (*Alnus glutinosa*) from pit 2939.

Pit 3135 (context 3138) also contained an amount of mineralised material including occasional fragments of straw, and several fragments of rolled bran fragments. The sample also contained some bone splinters and a single spiklelet of oats (*Avena* sp.) that had the distinctive wild type floret base.

### *Discussion*

The Anglo-Saxon assemblages reflect many of the classic changes that distinguish the late prehistoric and Romano-British periods from the Anglo-Saxon and medieval periods (see Stevens 2009b). The major change is the more frequent occurrence of rye, free-threshing wheat and oats, with the general disappearance of hulled wheats. As seen above hulled 6-row barley would, however, appear to be the main crop on Thanet during this period of time. This is seen not only at this site, but also on the Weatherlees–Margate–Broadstairs wastewater pipeline at Cottington Road (Stevens 2009a). It might be noted that even a millennium or so later barley was still regarded as the main staple cereal crop grown on Thanet (Sabin 1908, 463).

The high number of detached hilums of pea within the assemblage from ditch 2060 is of some interest and might suggest the processing of split-peas, during which the hilum is frequently detached and then removed through sieving. Additionally it would appear that hazelnuts, probably along with other wild foods, may have been occasionally collected to supplement the cereal diet.

The weed assemblage suggests the cultivation of predominately heavier clay soils, through the frequent occurrence of seeds of stinking mayweed (*Anthemis cotula*), although some lighter soils are suggested by the general range of species. Rye is often grown on lighter, poorer soils, although none of the species whose seeds are commoner in the rye rich deposit from pit 2486, for example, corncockle, black bindweed, vetch/wild pea, cleavers and brome grass, are particularly associated with such soils.

As with the Bronze Age deposits, the Anglo-Saxon deposits are indicative of general settlement activity in that they comprise mainly cereal, chaff and weed waste. While small seeds were common in the samples most were of *Anthemis cotula*, a species whose seeds often remain in the seedhead, and the seeds may therefore either remain with the grain, or be removed with coarse-sieving, although generally fine sieving is conducted after this process so that more smaller weed seeds might be expected in the samples (cf. Jones 1987; Hillman 1981).

The sample from pit 3135 is very diagnostic of general cess waste, with the straw added either deliberately for use as manure or perhaps because the deposit also contained animal stable waste.

## Wood Charcoal

*by Catherine Barnett*

Following assessment, 11 samples were chosen for analysis. These were selected to investigate aspects of Anglo-Saxon mortuary-related and domestic activities at Cliffs End (analysis methods are described in Chapter 5).

### *Results*

With a minimum of 14 species identified from Anglo-Saxon contexts (Table 7.13), the species list for the site is relatively large. A similar range occurred in Bronze Age/Early Iron Age contexts (see Barnett, Chapter 5) with a minimum of 12 species. However, *Tilia* sp. (lime), *Fagus sylvatica* (beech), *Castanea sativa* (chestnut) and *Cornus* sp. (dogwood) all made their first appearance in the Anglo-Saxon period. The assemblages are described by feature type below (Table 7.14).

Samples were analysed from one ditch (2060) and nine pits (2182, 2320, 2478, 2739, 2758, 2762, 2823, 3135, 3191) of Anglo-Saxon date. The assemblages are believed to relate to fuel used for domestic and small-scale economic activities. As with the prehistoric contexts, the charcoal assemblages were small

| Taxon | Common name | Comments |
|---|---|---|
| *Acer campestre* | Field maple | - |
| *Alnus glutinosa* | Alder | - |
| *Betula pendula/pubescens* | Silver/ downy birch | - |
| *Carpinus betulus* | Hornbeam | - |
| *Castanea sativa* | Sweet chestnut | Romano-British introduction |
| *Cornus* sp. | Dogwood | - |
| *Corylus avellana* | Hazel | - |
| *Fagus sylvatica* | Beech | - |
| *Fraxinus excelsior* | Ash | - |
| Pomoideae | Pomaceous fruits | Group of shrubs including *Cotoneaster, Sorbus, Pyrus, Crataegus* |
| Pomoideae (*Crataegus* type) | Pomaceous fruits (hawthorn type) | Sub-group of the Pomoideae includes *Pyrus, Crataegus, Malus* |
| *Prunus* sp. | Cherry-type | - |
| *Quercus* sp. | Oak | - |
| *Salix/Populus* sp. | Willow/aspen or poplar | The two taxa are anatomically indistinguishable |
| *Tilia* sp. | Lime | - |

*Table 7.13 Wood charcoal species list*

| Sample no. | Feature | Context | Description | Comments | *Acer campestre* | cf. *Acer campestre* | *Alnus glutinosa* | *Betula pendula/pubescens* | cf. *Betula pendula/pubescens* | *Carpinus betulus* | immature 2–3yr *Castenea sativa* | cf. *Castenea sativa* | *Cornus* sp. roundwood | *Corylus avellana* | *Corylus avellana* roundwood | *Corylus avellana* twigwood | cf. *Corylus avellana* | *Fagus sylvatica* | *Fraxinus excelsior* | Pomoideae | Pomoideae (*Crataegus* type) | cf. Pomoideae | Pomoideae twigwood | Twigwood cf. Pomoideae | *Prunus spinosa* | *Prunus* cf. *spinosa* type | *Prunus* sp. | *Prunus* sp. roundwood | twigwood cf. *Prunus* sp. | *Quercus* sp. | cf. *Quercus* sp. | *Quercus* roundwood | *Salix/Populus* sp. | cf. *Salix/Populus* sp. | *Tilia* sp. | Unidentifiable | Unidentifiable twigwood | Total identified | other remains (P=parenchyma) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 2060 | 2063 | Ditch | good condition | 3 | | | 2 | | | | | | 6 | 4 | | | | | 3 | 4 | | | | | | | | | | | | | | | 1 | | 23 | |
| 7 | 2182 | 2282 | Pit | large fragments, >20 >10 mm length, moderate–poor condition including some insect bored holes | | | 1 | | | 4 | 6 | 1 | | 21 | 4 | | | | | | | | 2 | | | | | 1 | 1 | 4 | | 2 | | | | 2 | 1 | 50 | |
| 9 | 2320 | 2323 | Pit | moderate sized fragments in good condition | 1 | | | | | | | | | 7 | | | 1 | | 12 | 5 | | | | | | | 8 | 1 | | | | | | | | 1 | 1 | 37 | 2 P |
| 13 | 2478 | 2474 | Pit | small sample of large fragment. *Corylus* roundwood=4 yrs | | | | | | | | | | | 1 | | | 23 | | | | | | | | | | | | | | | | | | | | 23 | 1 P |
| 26 | 2739 | 2742 | Pit | twigwood (*Corylus* 2 yrs) and roundwood (*Corylus* 4–5 yrs) dominated | 1 | | | | | | | | | 8 | 7 | 10 | | | | 1 | | | | | | | | | | | | | | | | | 9 | 36 | 5 P, 3 bark |
| 28 | 2758 | 2799 | Pit | very small sample of large fragments | | | | | | | | | | | | | | | | | | | | 1 | | | | | | 5 | | | | | | | | 6 | 2 P, 1 bark |
| 31 | 2762 | 2764 | Pit | good condition though fragmentary. *Cornus* roundwood=5 yrs | | | | | | | | | 6 | 1 | | | | | | | | | | | | 1 | 2 | | | 2 | | | | | 1 | | 2 | 15 | 1 P |
| 32 | 2823 | 2830 | Pit | tiny mineralised sample, fragments only 1–3mm, ID attempted on all | | | | | | | | | | | | | 1 | | | | | | 1 | | | | | | | | | | | | | 9 | | 11 | |
| 49 | 1315 | 3138 | Pit | Several fragments in poor condition being mineralised and friable | | | | | | | | | | 5 | 1 | 2 | | | | | | 1 | | | 1 | 7 | | | | | | | | | | | 1 | 18 | |
| 50 | 3191 | 3193 | Pit | *Corylus* roundwood=3–5yrs | | | | | | | | | | | 15 | | | | | | | | | | | | | | | | | | | | | | | 15 | |
| 52 | 3111 | 3219 | Pit | very small sample, oak vitrified | | | | | | | | | | | | | | | | | | | | | | | | | | 5 | | | | | | | | 5 | 1 P |
| 58 | 3111 | 3225 | Pit | - | | | 1 | | | | | | | 5 | | 2 | | | | | | | | 1 | | | | | | 3 | | | 2 | | | | 1 | 15 | 1 bark |

*Table 7.14 Charcoal identification and sample details*

and fragmentary with only 5–50 identifiable pieces per sample. As noted above, however, a relatively wide range of taxa were represented, with the dominant type and assemblage composition varying between contexts. *Corylus avellana* was near-ubiquitous, with mature pieces and roundwood common. The other types identified each appeared in only one to three contexts, including *Acer campestre*, *Quercus* sp. Pomoideae (including hawthorn), *Prunus* sp. (including blackthorn) and more rarely *Alnus glutinosa*, *Betula pendula/pubescens*, *Carpinus betulus* and *Tilia* sp. *Fagus sylvatica* appeared only in context 2474 but there dominated the assemblage. The only non-native type found was *Castanea sativa*, with six immature pieces recovered from context 2282. This context, from pit 2182, also proved the richest in species composition, with a minimum of seven taxa present. The assemblage from context 2742, pit 2739, is of note in that it was dominated by immature and roundwood of *Corylus avellana*, 2–5 years old when cut. The assemblage from pit 3191 is solely of *Corylus avellana* roundwood which may have come from a coppiced source. The fill of pit 2758 contained only five large pieces of mature *Quercus* sp. wood charcoal and one piece of Pomoideae twigwood; no conclusions on source, exploitation or taphonomy can be drawn from such a small assemblage.

### *Interpretation*

The charcoal assemblages from the Anglo-Saxon ditch and pits have proved varied in composition. The range and types represented indicate casual opportunistic exploitation of locally available types. The presence of very open woodland and hedgerow habitats are indicated by the use of *Corylus avellana*, *Acer campestre* Pomoideae (including hawthorn), *Prunus* sp. (including blackthorn), *Betula pendula/ pubescens* and *Carpinus betulus*. The occurrence of *Fagus sylvatica* indicates the proximity to and exploitation of chalky soils while the occasional *Alnus glutinosa* indicates minor use of wetland areas such as river channel margins. *Castanea sativa* was identified, this species is believed to have been a Romano-British introduction which may have been deliberately planted locally or become naturalised. Indeed, its rare presence at Romano-British Springhead at the head of the Ebbsfleet Valley in Kent was noted by Barnett (2011a).

The samples are too sparse to make a firm interpretation, but the dominance of *Corylus avellana* roundwood in pits 2739 and 3191 hints at the occasional exploitation of stands managed by coppicing or pollarding (see Edlin 1949; Buckley 1992).

The size, number and type of the assemblages mean the data is mainly of local significance, presence and exploitation, with the possibility of comparison with other sites somewhat limited. However, it is worth noting that a lack of focus on particular species was also noted at Anglo-Saxon Springhead and Northfleet (Barnett 2011b), with a wide range of deciduous types used, in some contrast to the Romano-British focus on managed hazel and oak for domestic fuel purposes.

A little comparable data also comes from further afield, from the charcoal analysis of six Middle Anglo-Saxon pits at Anderson's Road, Southampton (Saxon *Hamwic*). These were found to contain a range of woody taxa, dominantly native deciduous types, with alder, oak, hazel, ash, cherry types, birch and willow/aspen important (Chisham 2006). Likewise, a similar assemblage, though with somewhat less species variety, was also found at the adjacent St Mary's Stadium (Gale 2005). The scarcity of charcoal and other environmental analyses for the period increases the importance of any such charcoal assemblages in adding to current knowledge of the vegetation history and economic, industrial and domestic selection and use of wood.

## Marine Shell

*by Sarah F. Wyles*

An assemblage of 6793 marine shells, representing 5910 minimum numbers of individuals, was collected from 49 contexts within 31 features. The minimum number of individuals is recorded by feature (Table 7.15), with oysters being sub-divided into measurable and unmeasurable right and left valves (Table 7.16). Ninety percent of these shells were retrieved from 24 contexts by hand sieving through a 4 mm mesh.

### *Results*

Although the marine shell assemblage was recovered from contexts of both Late Bronze Age and Anglo-Saxon date, the majority of the shells (97%) were of Anglo-Saxon date. The small quantity of marine shell recovered from Late Bronze Age contexts may be intrusive material from Anglo-Saxon deposits rather than resulting from the collection and consumption of shellfish during the Late Bronze Age. A variety of marine shells were represented, with periwinkles (*Littorina littorea*) dominating the assemblage at 69%, and mussels (*Mytilus edulis*) the next highest at 11%. Oysters (*Ostrea edulis*), whelks (*Buccinum undatum*) and limpets (*Patella* spp.) form between 6 and 7% of the assemblage respectively. Very small numbers of cockles (*Cerastoderma edule*), carpet shells (*Veneridae*), cowries (*Trivia* spp.) and top shells (*Gibbula* spp.) were also present (Table 7.15).

Periwinkles favour the middle shore and below, on rocks and weed, mussels are particularly found on the middle shore and below in dense beds on rocky and stony shores, whelks frequent the lower shore and below on muddy gravel or sand,

| Group type | Group | Context | OYSTER | OYSTER | OYSTER | OYSTER | OYSTER | Whelk | Periwinkle | Mussel MNI | Limpet | Cockle MNI | Carpet shell MNI | Cowrie | Top shell | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | LV | UMLV | RV | UMRV | MNI | | | | | | | | | |
| **Late Bronze Age** | | | | | | | | | | | | | | | | |
| Ditch | 3602 | 1 | - | - | - | 2 | 2 | 1 | - | - | - | - | - | - | - | 3 |
| Midden pit | 2028 | 1 | - | - | 1 | - | 1 | - | - | - | - | - | - | - | - | 1 |
| Pit | 2469 | 1 | - | - | - | - | - | 1 | - | - | - | - | - | - | - | 1 |
| Mortuary feature | 2018 | 3 | - | - | 1 | - | 1 | 2 | - | - | - | - | - | - | - | 3 |
| **Anglo-Saxon** | | | | | | | | | | | | | | | | |
| Ditch | 2044 | 2 | 11 | 6 | 5 | - | 17 | 5 | 7 | - | 1 | - | - | - | - | 30 |
| Ditch | 2060 | 3 | 9 | 4 | 6 | 1 | 13 | 45 | 1625 | 181 | 25 | - | 1 | - | 1 | 1921 |
| Ditch | 2184 | 1 | 22 | 12 | 29 | 17 | 46 | - | 14 | - | - | - | - | - | - | 60 |
| Grave | 2562 | 1 | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 |
| Pit | 2036 | 1 | 6 | 2 | 6 | - | 8 | 15 | - | - | - | - | - | - | - | 23 |
| Pit | 2040 | 1 | 4 | 3 | 2 | 2 | 7 | 1 | 12 | - | 3 | - | - | - | - | 23 |
| Pit | 2042 | 1 | - | 1 | - | - | 1 | - | - | - | - | - | - | - | - | 1 |
| Pit | 2182 | 1 | - | - | - | - | - | 1 | - | - | - | - | - | - | - | 1 |
| Pit | 2235 | 3 | 6 | 13 | 7 | 14 | 16 | 26 | 12 | 21 | - | - | - | - | - | 75 |
| Pit | 2320 | 2 | 30 | 41 | 33 | 12 | 76 | 109 | 2 | 21 | 9 | 1 | - | - | - | 218 |
| Pit | 2331 | 1 | 3 | 3 | - | 4 | 6 | - | 133 | 165 | 8 | - | - | - | - | 312 |
| Pit | 2468 | 3 | 3 | 3 | 2 | 1 | 6 | 13 | 2 | - | - | - | - | - | - | 21 |
| Pit | 2478 | 1 | - | 6 | - | 4 | 6 | 9 | 1 | - | - | - | - | - | - | 16 |
| Pit | 2613 | 1 | 27 | 22 | 27 | 15 | 49 | 9 | 77 | 15 | 34 | - | 1 | - | 1 | 186 |
| Pit | 2617 | 1 | 5 | 3 | 3 | - | 8 | 1 | 5 | 215 | 73 | 1 | - | - | - | 303 |
| Pit | 2691 | 2 | 2 | 3 | - | 2 | 5 | 6 | 203 | 6 | 62 | - | - | - | - | 282 |
| Pit | 2727 | 1 | 1 | 3 | - | 3 | 4 | 12 | 7 | 6 | - | - | - | 1 | - | 30 |
| Pit | 2739 | 1 | - | - | - | - | - | 4 | - | - | - | - | - | - | - | 4 |
| Pit | 2762 | 1 | - | - | - | - | - | - | 1 | 1 | - | - | - | - | - | 2 |
| Pit | 2823 | 1 | 1 | 14 | 3 | 3 | 15 | - | 2 | - | - | - | - | - | - | 17 |
| Pit | 2834 | 1 | 1 | - | - | 1 | 1 | - | 1 | - | - | - | - | - | - | 2 |
| Pit | 2889 | 1 | 10 | 18 | 8 | 9 | 28 | 72 | 8 | 17 | 149 | 1 | 1 | - | 1 | 277 |
| Pit | 2893 | 1 | - | 2 | - | 1 | 2 | 1 | - | - | - | - | - | - | - | 3 |
| Pit | 3050 | 1 | - | 1 | - | 4 | 4 | 49 | 1753 | 20 | 62 | 1 | - | - | 1 | 1890 |
| Pit | 3111 | 4 | 1 | 1 | 3 | 2 | 5 | 6 | 11 | - | - | - | - | - | - | 22 |
| Pit | 3191 | 1 | 5 | 4 | 1 | 3 | 9 | - | 35 | 1 | - | - | - | - | - | 45 |
| Post-pit | 2010 | 2 | 2 | 4 | 1 | - | 6 | 2 | 2 | - | - | - | - | - | - | 10 |
| | | U/S | 1 | 2 | 1 | 1 | 3 | 6 | 148 | - | - | - | - | - | - | 157 |
| **Total** | **31** | **49** | **150** | **171** | **139** | **101** | **345** | **396** | **4061** | **669** | **426** | **5** | **3** | **1** | **4** | **5910** |

**KEY:** LV = left valve; RV = right valve; UMLV = unmeasurable left valve; UMRV = unmeasurable right valve; MNI = minimum number of individuals

*Table 7.15 Marine shell by feature*

while limpets are located on all rocky shores. All these species are common and widely distributed (Barrett and Yonge 1958).

In order to characterise the assemblage, the oyster shells recovered from three features, ditch 2184, pit 2320 and pit 2613, were analysed in more detail. This entailed measuring the shells and recording traces left on the shell by infesting organisms and physical attributes (see Table 7.16).

Although generally more left than right oyster valves were recovered from the site, 58 and 42% respectively, no discernable patterns of disposal could be ascertained that were indicative of different areas of preparation and consumption. The ratio of measurable to unmeasurable shells can be indicative of the rapidity with which the shells were disposed of. In this instance there is a higher percentage of unmeasurable left valves than right valves, with around half of them being broken. The condition of the measurable shells, such as whether they were worn or flaky, can also be indicative of the speed of disposal of them.

| Context | R V | L V | Average Max width (mm) | Average Max length (mm) | Average Max mea (mm) | *Polydora ciliata* | *Cliona celata* | Thin | Thick | Chambered | Chalky deposit | Worn | Flaky | Colour/stain | Irregular shape | Notches |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2184 | - | 22 | 70.6 | 66.3 | 71.7 | 8 | - | 1 | 2 | - | 9 | 10 | 2 | - | 2 | 9 |
| 2184 | 29 | - | 61.4 | 58.6 | 62.2 | - | - | 5 | 1 | - | - | 3 | 4 | - | 12 | 5 |
| 2320 | - | 30 | 67.8 | 62.9 | 69.2 | 7 | - | 7 | 2 | 1 | 8 | 12 | 3 | 1 | 9 | 18 |
| 2320 | 33 | 0 | 60.2 | 53.4 | 60.3 | 7 | - | 9 | - | - | - | 4 | 3 | - | 8 | 12 |
| 2613 | - | 27 | 66.2 | 59.8 | 66.5 | 3 | 1 | 3 | 3 | - | 3 | 8 | 2 | - | 9 | 10 |
| 2613 | 27 | - | 55.1 | 49.5 | 55.4 | 3 | 2 | 7 | 2 | - | - | 3 | 3 | - | 7 | 5 |
| **Total** | **89** | **59** | **-** | **-** | **-** | **28** | **3** | **32** | **10** | **1** | **20** | **40** | **17** | **1** | **47** | **59** |

**KEY:** RV = right valve; LV = left valve

*Table 7.16 Analysed oyster shell*

The measurable shells were generally slightly elongated in shape, which may be indicative of a softer substrate, and they have a similar average size, which is common when shells are retrieved by dredging. This is also true of hand collection. Around a third of these shells were irregular in shape, indicating that a natural bed rather than a laid bed was a more likely source.

The shells were generally healthy in appearance, with only slight traces of infestation on 15% of the shells. The predominant infesting organism was the polychaetic worm *Polydora ciliata*, which is widespread and favours hard, sandy or clay grounds particularly in warm shallow waters. A small number of shells showed infestation traces caused by the sponge *Cliona celata*, which, although it is widespread, cannot tolerate low salinity and thus flourishes on oyster beds in the open sea rather than in creeks and estuaries (Yonge 1960).

The small analysed oyster assemblage from the site indicates that the shells were likely to have been recovered from natural or unmanaged beds by dredging from an area of softer substrate in shallow open coastal waters or by hand collection from the shore. The condition of the shells may show that the waste shells were not all disposed of in discrete areas within pits and ditches immediately but that some may have been left in small temporary middens, prior to discard into pits and ditches.

## *Discussion*

The composition of this assemblage from Cliffs End is unusual in that oysters represent such a small fraction of the shells. There may be bias towards the recovery of the smaller species due to 90% of the shells being recovered by sieving. Although oyster shells are the predominant species at the Anglo-Saxon site of St Mary's Stadium, Southampton, forming 47% of the assemblage, with periwinkles being the next significant at 32%, the ratio is different when just the shells recovered by sieving are considered, with 43% of the assemblage represented by periwinkles and only 30% by oysters (Wyles 2005). Nevertheless, even taking this potential bias into consideration, oysters are still likely to have only formed a small part of the assemblage.

Unlike Cliffs End, large quantities of oyster shell were found at the Anglo-Saxon site of the Royal Opera House, London. These oysters, however, were thought to have originated from the Ipswich or Colchester areas of the east coast (Winder and Gerber-Parfitt, 2003).

The small assemblage recovered from Manston Road, Ramsgate, seems to be more typical of those recovered from other Anglo-Saxon sites, being dominated by oysters and then mussels. The relatively high numbers of limpets present is, however, more unusual (Wyles 2009), and this is also the case at Cliffs End. A large assemblage of marine shell was recovered from the East Kent Access Road, particularly from Middle Saxon pits in Zone 14 (Nicholson, forthcoming). Pegwell Bay seems to be the likely source for the EKAR material as well as the Cliffs End and Manston Road assemblages.

The marine shell assemblage from mainly medieval and later medieval deposits from the site of Land Adjacent to Lawn Cottage, East Northdown Farm, Margate, has similarities to that recovered from Cliffs End. The assemblage is dominated by limpet and winkle, representing intertidal collection of marine shell, and is believed to indicate preferential species selection (Moody and Russell 2004).

The Cliffs End assemblage size is indicative of marine shell being collected for immediate local consumption rather than being farmed for wider dispersal and trading. It has been calculated that the coastal midden at Poole, where it is believed that 'the oysters were being harvested on an almost commercial scale' in the Late Anglo-Saxon and medieval periods, may have comprised between 3,803,000 and

7,616,000 oysters (Horsey and Winder 1992), a completely different scale of assemblage size. The calorific value of the assemblage recovered from Cliffs End is also not particularly significant. A dietary website (www.eatatease.com/fish-shellfish.html, accessed 18 May 2010) gives a value of seven calories per oyster and five calories per mussel. At these rates the oysters and mussels recovered from Cliffs End would have only provided three days' worth of calories. It is likely that the consumption of marine shell augmented the diet rather than forming a large part of it.

The marine shell assemblage may indicate the exploitation of the shells present on the local shore of the Pegwell Bay area, where there appears to be an abundance of periwinkles, limpets and whelks, in particular, in the intertidal zone (J Russell pers. comm.). The bands of shells, as seen in pit 2320, appear to represent discard as single events, possibly after communal gatherings.

## Concluding Remarks

*by Jacqueline I. McKinley and Jörn Schuster*

Although no direct evidence for settlement was found, the presence of both the late 6th–7th-century cemetery and the Middle to Late Anglo-Saxon pits containing occupation debris indicate the existence of a settlement within the immediate vicinity of the site. Evidence for a dispersed Anglo-Saxon settlement was recovered *c.* 1 km to the west and north-west of the site during the 2010 excavations forming part of the East Kent Access Road project (Zones 10 and 11; Oxford Wessex Archaeology 2011; Andrews *et al.* forthcoming). These finds may be associated with the previously known settlement activity at Cottington Road *c.* 750 m to the west of Cliffs End (Fig. 1.3; Egging Dinwiddy and Schuster, 129–31; 148). Dispersed settlement of the type suggested may well be further reflected in the apparently similarly dispersed small 'rural' cemeteries recorded at Cliffs End and EKAR Zone 14 *c.* 600 m to the north-east (Oxford Wessex Archaeology 2011; Andrews *et al.* forthcoming).

The distribution of the pits shows a high level of organisation, their northern extent apparently being restricted by the narrow east–west linear features, and the pits themselves forming clear rows or clusters. Although in a few cases this organisation may be reflective of differing function, in general the finds from most rows/clusters were of commensurate type suggesting similar use, and the organisation may be indicative of minor temporal shifts in activity (as one set of pits filled up) or associated with 'household' or 'family' plots. The large quantities of marine shell recovered from about one third of the pits, whilst initially striking, are not suggestive of any particular 'special' event (see Wyles, above) but are more reflective of general processing undertaken on a regular basis in the same location. Other food debris and processing waste – from crops, fishing and related to animal husbandry – was recovered from most pits but there was relatively little pottery or other artefactual material which would more strongly indicate the close proximity of a settlement. However, the human skull found redeposited in pit 2834 should perhaps caution against a purely domestic interpretation for the use of these pits and may, instead, point to a more ritual purpose (see Stoodley, above).

The location – adjacent to a small cemetery – organisation, form and fills of these pits is intriguingly repeated at EKAR Zone 14, though here both the cemetery and the pits are Middle Anglo-Saxon (Andrews *et al.* forthcoming). In addition to the clusters of marine shell-rich pits, which also contained charred plant remains and fish as at Cliffs End, several hearths and flat burnt stone were recovered from Zone 14, adding support to the excavator's interpretation of this representing a processing area (Oxford Wessex Archaeology 2011; Andrews *et al.* forthcoming).

## Epilogue

*Since I have reached this point in the history, it is necessary for me to record a story which bears a very close resemblance to mythology, a story which did not indeed seem to me at all trustworthy, although it was constantly being published by countless persons who maintained that they had done the things with their own hands and had heard the words with their own ears, and yet it cannot be altogether passed over, lest, in writing an account of the island of Brittia, I gain a lasting reputation for ignorance of what takes place there.*

*They say, then, that the souls of men who die are always conveyed to this place. And as to the manner in which this is done, I shall presently explain, having many a time heard the people there most earnestly describe it, though I have come to the conclusion that the tales they tell are to be attributed to some power of dreams. Along the coast of the ocean which lies opposite the island of Brittia there are numerous villages. These are inhabited by men who fish with nets or till the soil or carry on a sea-trade with this island, being in other respects subject to the Franks, but never making them any payment of tribute, that burden having been remitted to them from ancient times on account, as they say, of a certain service, which will here be described by me.*

*The men of this place say that the conduct of souls is laid upon them in turn. So the men who on the following night must go to do this work relieving others in the service, as soon as darkness comes on, retire to their own houses and sleep, awaiting him who is to assemble them for the enterprise. And at a late hour of the night they are conscious of a knocking at their doors and hear an indistinct voice calling them together for their task. And they with no hesitation rise from their beds and walk to the shore, not understanding what necessity leads them to do this, but compelled nevertheless. There they see skiffs in readiness with no man at all in them, not their own skiffs, however, but a different kind, in which they embark and lay hold of the oars. And they are aware that the boats are burdened with a large number of passengers and are wet by the waves to the edge of the planks and the oarlocks, having not so much as one finger's breadth above the water; they themselves, however, see no one, but after rowing a single hour they put in at Brittia. And yet when they make the voyage in their own skiffs, not using sails but rowing, they with difficulty make this passage in a night and a day. Then when they have reached the island and have been relieved of their burden, they depart with all speed, their boats now becoming suddenly light and rising above the waves, for they sink no further in the water than the keel itself.*

*And they, for their part, neither see any man either sitting in the boat with them or departing from the boat, but they say that they hear a kind of voice from the island which seems to make announcement to those who take the souls in charge as each name is called of the passengers who have come over with them, telling over the positions of honour which they formerly held and calling out their fathers' names with their own. And if women also happen to be among those who have been ferried over, they utter the names of the men to whom they were married in life. This, then, is what the men of this country say takes place.*

Procopius of Caesarea, History of the Wars, VIII. XX. 47–58

# Appendices

| Layer (see Fig. 2.7) | Context number |
|---|---|
| 1 | 2029<br>2216<br>3230<br>3232 |
| 2 | 2217<br>3231<br>3233 |
| 3 | 2219 |
| 4 | 2218<br>3254<br>3284<br>3285<br>3302<br>3309 |
| 5 | 3384<br>3391 |
| 6 | 3255<br>3510<br>3544<br>3545 |
| 7 | 3350<br>3560<br>3561 |
| 8 | 3044<br>3310<br>3315 |
| 9 | 3511<br>3553<br>3562 |

*Appendix 1 Midden Pit 2028 layer and context number concordance*

| Fabric | Description |
|---|---|
| F1 | sparse to moderate very fine to coarse sub angular and angular calcined flint; moderate voids; sparse very fine to fine mica and well-rounded quartz sand probably natural |
| F2 | moderate very fine to fine sub angular and angular calcined flint; sparse very fine to fine mica and well-rounded quartz sand probably natural |
| F3 | moderate coarse to very coarse sub angular and angular calcined flint; sparsely micaceous |
| F4 | sparse very fine to fine calcined flint; sparse mica |
| F5 | frequent fine to very coarse angular calcined flint; sparse angular rock fragments; sparsely micaceous |
| F6 | moderate to common coarse angular calcined flint; moderate organic; rock fragments; fine micaceous clay matrix |
| F7 | common fine very well sorted calcined flint; sparse mica and iron minerals and very rare rounded rock fragments probably natural |
| F8 | moderate medium to coarse poorly-sorted angular calcined flint; sparse mica probably naturally occurring |
| F9 | moderate medium well-sorted calcined flint; sparse organics; unidentified black flecks |
| F10 | moderate coarse calcined flint, moderate grog; sparse rock fragments and mica probably naturally occurring |
| F11 | moderate coarse calcined flint, sparse organics, very sparse mica probably naturally occurring |
| G1 | moderate coarse argillaceous matter; sparse organics, calcined flint, mica and quartz sand |
| G2 | sparse grog, iron minerals, fine calcined flint |
| G3 | moderate grog; sparse organics; moderate fine to coarse calcined flint; sparse mica probably naturally occurring |
| G4 | moderate grog; moderate well-sorted medium to coarse calcined flint; sparse to moderate organic |
| G5 | moderate fine to coarse grog, mica probably naturally occurring |
| G6 | moderate medium to coarse grog, sparse coarse calcined flint, sparse voids; sparse mica probably naturally occurring |
| O1 | common voids, sparse calcined flint; mica and quartz sand probably natural |
| O2 | common linear voids; sandy matrix, sparse mica probably natural |
| Q1 | sparse fine to coarse calcined flint; sparse mica; fine quartz sand |
| Q2 | sparse voids; sparse mica and quartz sand probably natural |
| Q3 | sparse mica, fine to very coarse calcined flint and linear voids |
| Q4 | sparse to moderate coarse quartzite; sparse fine to coarse dark mineral (not ferrous); sparse mica probably naturally occurring |
| Q5 | fine silty fabric, very fine sand, moderate to common dark particles (clay? Other mineral?) probably naturally occurring |
| S1 | sparse to moderate fossil shell; silty matrix; frequently only as voids |

*Appendix 2 Prehistoric pottery fabric descriptions (by M. Leivers)*

# Bibliography


Åberg, G., Fosse, G. and Stray, H., 1998, Man, nutrition and mobility: a comparison of teeth and bone from the Medieval era and the present from Pb and Sr isotopes, *Science of the Total Environment* 224, 109–19

Adams, J.C., 1986, *Outline of Orthopaedics*, London, Churchill Livingstone

Aerts-Bijma, A.T., Meijer, H.A.J. and van der Plicht, J., 1997, AMS sample handling in Groningen, *Nuclear Instruments and Methods in Physics Research* B 123, 221–5

Aerts-Bijma, A.T., van der Plicht, J. and Meijer, H.A.J., 2001, Automatic AMS sample combustion and $CO_2$ collection, *Radiocarbon* 43, 293–8

Allen, M.J., Leivers, M.A. and Ellis, C., 2008, Neolithic Causewayed Enclosures and Later Prehistoric Farming: Duality, Imposition and the Role of Predecessors at Kingsborough, Isle of Sheppey, Kent, UK, *Proc. Prehist. Soc.* 74, 235–322

Anderson, T., 1995, The human skeletons, in K. Parfitt, *Iron Age Burials from Mill Hill, Deal*, London, Brit. Mus. Press, 114–145

Andrews, P., Egging Dinwiddy, K., Ellis, C., Hutcheson, A., Philpotts, C., Powell, A.B. and Schuster, J., 2009, *Kentish Sites and Sites of Kent, A Miscellany of Four Archaeological Excavations*, Salisbury, Wessex Archaeology Rep. 24

Andrews, P., Jones, G.P. and Schuster, J. 2009, The hoards on the Ebbsfleet Peninsula, in K. Egging Dinwiddy and J. Schuster, Thanet's longest excavation: archaeological investigations along the route of the Weatherlees–Margate–Broadstairs wastewater pipeline, in Andrews *et al.* 2009, 75–81

Andrews, P., Booth, P., Fizpatrick, A.P. and Welsh, K., forthcoming, *Digging at the Gateway: Archaeological Landscapes of South Thanet, Archaeology of the East Kent Access Phase II*, Oxford Wessex Archaeology Monogr.

Aranda-Jiménes, G., Montón-Subias, S. and Jiménes-Brobeil, S., 2009, Conflicting evidence? Weapons and skeletons in the Bronze Age of south-east Iberia, *Antiquity* 83, 1038–51

Armada, X-L., 2011, Feasting metals and the ideology of power in the Late Bronze Age of Atlantic Iberia, in G. Aranda Jiménez, S. Montón-Subías and M. Sánchez Romero (eds), *Guess Who's Coming to Dinner: Feasting Rituals in the Prehistoric Societies of Europe and the Near East*, Oxford, Oxbow, 158–83

Armada Pita, X-L., Hunt Ortiz, M.A., Tresserras, J.J., Montero Ruiz, I., Fontanals, N.R. and Ruiz de Arbulo, J., 2005, Primeros datos arqueométricos sobre la metalurgia del poblado y necropolis de Calvari del Molar (Priorat, Tarragona), *Trabajos de Prehistoria* 62, 139–55

Armitage, P., 2004, The animal bone, in Leary, 28–35 and 105–112

Armit, I., 2010, Porticos, pillars and severed heads: the display and curation of human remains in the southern French Iron Age, in K. Rebay-Salisbury, M.L. Stig Søresen and J Hughes (eds), *Body Parts and Bodies Whole: Changing Relations and Meanings*, 90–100, Oxford, Oxbow Books

Arnold, C.J., 1982, *The Anglo-Saxon Cemeteries of the Isle of Wight*, London, Brit. Mus. Publications

Audouze, F. and Courtois, J.C., 1970, *Les Epingles du Sud-Est de la France*, Prähistorische Bronzefunde XIII, 1, Munich

Aufderheide, A.C. and Rodríguez-Martín, C., 1998, *The Cambridge Encyclopaedia of Human Palaeopathology*, Cambridge, Univ. Press

Avent, R., 1975, *Anglo Saxon Disc and Composite Brooches*, Oxford, Brit. Archaeol. Rep. 11

Baden-Powell, D., 1942, Report on erratics from Stonar, Kent, *Archaeol. Cantiana* 55, 50–52

Barclay, A. and Halpin, C., 1999, *Excavations at Barrow Hills, Radley, Oxfordshire. Volume 1: the Neolithic and Bronze Age Monument Complex*, Oxford, Oxford Archaeological Unit

Barclay, A., 2002, Ceramic Lives, in A. Woodward and J.D. Hill (eds), *Prehistoric Britain The Ceramic Basis*, 85–95, Oxford, Prehistoric Ceramics Research Group Occas. Pap 3, Oxbow Books

Barclay, A.J., 2006, Late Bronze Age pottery, in Cromarty *et al.* 2006, 72–102

Barclay, A.J., Boyle, A. and Keevill, G.D., 2001, A prehistoric enclosure at Eynsham Abbey, Oxfordshire, *Oxoniensia* 66, 105–162

Barford, P.M., 1995, Objects of iron, in K. Blockley, M. Blockley, P. Blockley, S. Frere and S. Stow, *Excavations in the Marlowe Car Park and Surrounding Areas*, Canterbury, The Archaeology of Canterbury 5, 1069–97

Barnett, C., 2011a, Wood charcoal, in C. Barnett, J.I. McKinley, E. Stafford, J.M. Grimm and C.J. Stevens, *Settling the Ebbsfleet Valley: High Speed 1 Excavations at Springhead and Northfleet, Kent – the Late Iron Age, Roman, Saxon and medieval landscape Vol. 3: Late Iron Age to Roman Human Remains and Environmental Reports*, 113–116, Salisbury, Oxford Wessex Archaeology

Barnett, C., 2011b, Wood charcoal, in Andrews, A., Mepham, L., Schuster, J., and C.J., Stevens, *Settling the Ebbsfleet Valley: High Speed 1 Excavations at Springhead and Northfleet, Kent – the Late Iron Age, Roman, Saxon and medieval landscape Vol. 4: Saxon and later Finds and Environmental Reports*, 105–106, Salisbury, Oxford Wessex Archaeology

Barrett, J, and Bond, D, 1988, The pottery, in D. Bond *Excavations at the North Ring, Mucking, Essex*, 25–37, East Anglian Archaeol. 43

Barrett, J. and Yonge, C.M., 1958, *Collins Pocket Guide to the Sea Shore*. Collins

Barrett, J.C., 1980, The pottery of the later Bronze Age in lowland England, *Proc. Prehist. Soc.* 46, 297–319

Bass, W.M., 1987, *Human Osteology.* Missouri Archaeological Society, Columbia

Bayliss, A., Bronk Ramsey, C., van der Plicht, J. and Whittle, A., 2007, Bradshaw and Bayes: towards a timetable for the Neolithic, *Cambridge Archaeol. J.* 17, 1–28

Bayliss, A., Shepherd Popescu, E., Beavan-Athfield, N., Bronk Ramsey, C., Cook, G.T., and Locker, A., 2004, The potential significance of dietary offsets for the interpretation of radiocarbon dates: an archaeologically significant example from medieval Norwich, *J. Archaeol. Sci.* 431, 563–575

Beek, G.C., van, 1983, *Dental Morphology: An Illustrated Guide.* Wright PSG, Bristol, London, Boston

Bennett, K.D., Whittington, G. and Edwards, K.J., 1994, Recent plant nomenclatural changes and pollen morphology in the British Isles, *Quaternary Newsletter* 73, 1–6

Bennett, P., Clark, P., Hicks, A., Rady, J. and Riddler, I., 2008, *At the Great Crossroads. Prehistoric, Roman and medieval discoveries on the Isle of Thanet 1994–95*, Canterbury Archaeological Trust Occas. Pap 4, Canterbury. Canterbury Archaeological Trust

Bennett, P., Couldrey, P. and Macpherson-Grant, N., 2007, *Highstead near Chislet, Kent: Excavations 1975–1977*, The Archaeology of Canterbury New Ser 4, Canterbury, Canterbury Archaeological Trust

Bentley, R.A., 2003, Human mobility at the early Neolithic settlement of Vaihingen, Germany: evidence from strontium isotope analysis, *Archaeometry* 45, 471–486

Berry, A.C. and Berry, R.J. 1967, Epigenetic variation in the human cranium, *J. Anatomy* 101(2), 361–379

Biddle, M., 1990, *Object and Economy in medieval Winchester*, Winchester studies 7.ii, Oxford, Clarendon Press

Biel, J., 1994, Bronze- und Eisenzeit, in Kokabi, M. (ed.), *Knochenarbeit: Artefakte aus tierischen Rohstoffen im Wandel der Zeit*, Archäologische Informationen aus Baden-Württemberg 27. Stuttgart: Gesellschaft für Vor- und Frühgeschichte in Württemberg und Hohenzollern, 57–70

Binford, L.R., 1981, *Bones: Ancient Men and Modern Myths*, Academic Press

Bird, D., 2002, The events of AD 43: further reflections, *Britannia* 33, 257–263

Bishop, B. and Bagwell, M., 2005, *Iwade: Occupation of a North Kent village from the Mesolithic to the medieval Period*, London, PCA

Blinkhorn, P.W., 1999, Of cabbages and kings: production, trade and consumption in Middle Saxon England, 4–23, in M. Atherton (ed.), *Anglo-Saxon Trading Centres and Their Hinterlands*, Glasgow, Cruithne Press

Bloch, M. and Parry, J., 1982, Introduction: death and the regeneration of life in M. Bloch and J. Parry (eds.), *Death and the Regeneration of Life*, 1–13, Cambridge, Univ. Press

Blockley, K., Blockley, M., Blockley, P., Frere, S. and Stowe, S., 1995, *Excavations in the Marlowe Car Park and Surrounding Areas. Part II: the Finds*, The Archaeology of Canterbury 5, Canterbury, Canterbury Archaeological Trust

Boast, E. and Gibson, A., 2000, Neolithic, Beaker and Anglo-Saxon remains: Laundry Road, Minster in Thanet, *Archaeol. Cantiana* 120, 359–72

Bochenski, Z.M., Tomek, T., Tornberg, R. and Wertz, K., 2009, Distinguishing nonhuman predation on birds: pattern of damage done by the white-tailed eagle *Haliaetus albicilla*, with comments on the punctures made by the golden eagle *Aquila chrysaetos J. Archaeol. Sci.* 36, 122–129

Böhner, K., 1958, *Die Fränkischen Altertümer des Trierer Landes*, Germanische Denkmäler der Völkerwanderungszeit ser B 1, 1 and 2, Berlin

Bond, D., 1988, *Excavations at the North Ring, Mucking, Essex: a Late Bronze Age Enclosure*, Chelmsford, East Anglian Archaeol. 43

Bourdillon, J., 1990, *The animal bones from La Sagesse (The Presbytery) 1988, Romsey, Hampshire*, Anc Monum. Lab. Rep. 106/90

Bowen, G.J. and Revenaugh, J., 2003, Interpolating the isotopic composition of modern meteoric precipitation, *Water Resources Research* 39, 1299 doi:10.129/2003WR002086

Boylston, A., 2000, Evidence for weapon trauma in British archaeological examples, in M. Cox and S. Mays (eds.), *Human Osteology*, 357–380, London, Greenwich Medical Media

Boylston, A., Knüsel, C.J. and Roberts, C.A., 2000, Investigation of a Romano-British rural ritual in Bedford, England, *J. Archaeol. Sci.* 27, 241–254

Boylston, A., Norton, S. and Roberts, C., 1995, *Report on the* *human remains from Runnymede*, unpubl. rep., Calvin Wells Laboratory, Bradford Univ.

Bradley, R., 1981, Various styles of urn: cemeteries and settlement in southern England *c.* 14000–1000bc, in R. Chapman, I. Kinnes and K. Randsborg (eds.), *The Archaeology of Death*, 91–104,Cambridge, Univ. Press

Bradley, R., 1990, *The Passage of Arms: An Archaeological Analysis of Prehistoric Hoards and Votive Deposits*, Cambridge, Univ. Press

Bradley, R. and Hall, F., 1992, Context, chronology and wider associations, in J. Moore and D. Jennings, *Reading Business Park: a Bronze Age Landscape*, 71–82, Oxford, Thames Valley Landscape Monogr. 3, The Kennet Valley

Bradley, R., 2007, *The Prehistory of Britain and Ireland*, Cambridge, Univ. Press

Bradshaw, J., Caiger, N., Halpin, M., Le Gear, R., Pearce, A., Pearman, H., Reeve, T. and Sowan, P., 1991, *Kent and East Sussex Underground*, Rainham, Meresborough Books

Brandherm, D. and Moskal-del Hoyo, M., 2014, Bothsides now: the Carp's tongue Complex Revisited, *Antiquaries J.* 94, 1–47

Brettell, R., Evans, J., Marzinzik, S., Lamb, A. and Montgomery, J., 2012, 'Impious Easterners': can oxygen and strontium isotopes serve as indicators of provenance in early medieval European cemetery populations? *European Journal of Archaeology* 15, 117–45

Brickley, M., Mays, S. and Ives, R., 2005, Skeletal manifestations of vitamin D deficiency osteomalacia in documental historical collections, *International Journal Osteoarchaeology* 14, 389–403

British Geological Survey (BGS), 1980, British Geological Survey of Great Britain, 1:50000 Solid and Drift Series, sheet 274

Bronk Ramsey, C, 1995, Radiocarbon calibration and analysis of stratigraphy: the OxCal program, *Radiocarbon* 37, 425–30

Bronk Ramsey, C., 1998, Probability and dating, *Radiocarbon* 40, 461–74

Bronk Ramsey, C., 2001, Development of the radiocarbon calibration program OxCal, *Radiocarbon* 43, 355–63

Bronk Ramsey, C., 2009, Bayesian analysis of radiocarbon dates, *Radiocarbon* 51, 337–360

Bronk Ramsey, C. and Hedges, R.E.M., 1997, A gas ion source for radiocarbon dating, *Nuclear Instruments and Methods in Physics Research* B 29, 45–9

Bronk Ramsey, C., Higham, T. F. G., Bowles, A. and Hedges, R.E.M., 2004a, Improvements to the pretreatment of bone at Oxford, *Radiocarbon* 46, 155–63

Bronk Ramsey, C., Ditchfield, P. and Humm, M., 2004b, Using a gas ion source for radiocarbon AMS and GC-AMS, *Radiocarbon* 46, 25–32

Brookes, S., 2007, *Economics and Social Change in Anglo-Saxon Kent: Landscapes, Communities and Exchange*, Oxford, Brit. Archaeol. Rep. 431

Brossler, A., Early, R. and Allen, C., 2004, *Green Park (Reading Business Park): Phase 2 Excavations 1995: Neolithic and Bronze Age Sites*, Oxford, Thames Valley Landscapes Monogr. 19

Brothwell, D. and Zakrzewski, S., 2004, Metric and non-metric studies of archaeological human remains, in M. Brickley and J.I. McKinley (eds), *Guidelines to the Standards for Recording Human Remains*, British Association for Biological Anthropology and Osteoarchaeology and Institute for Field Archaeology, 24–30

Brothwell, D.R., 1972, *Digging Up Bones, the excavation, treatment and study of human skeletal remains*, London, Brit. Mus. (Nat. Hist.)

Brothwell, D.R. and Blake, M.L., 1966, The human remains from the Fussell's Lodge long barrow: their morphology, discontinuous traits and pathology, 48–62, in P. Ashbee The Fussell's Lodge long Barrow excavations 1957, *Archaeologia* 100, 1–80

Brown, N., 1988, A Late Bronze Age enclosure at Lofts Farm, Essex, *Proc. Prehist. Soc.* 54, 249–302

Brück, J., 1995, A place for the dead: the role of human remains in Late Bronze Age Britain, *Proc. Prehist. Soc.* 61, 245–277

Brück, J., 2001, Body metaphors and technologies of transformation in the English Middle and Late Bronze Age in J. Brück (ed.), B*ronze Age Landscapes, Tradition and Transformation*, 149–160, Oxford, Oxbow Books

Brudenell, M., 2008, Reclaiming the Early Iron Age in eastern England, in O. Davies, N. Sharples and K. Waddington (eds), *Changing Perspectives on the First Millennium BC*, 185–189, Oxford, Oxbow

Brugmann, B., 2004, *Glass Beads from Early Anglo-Saxon Graves: a Study of the Provenance and Chronology of Glass Beads from Early Anglo-Saxon Graves, Based on Visual Examination*, Oxford, Oxbow Books

Buck, C.E., Cavanagh, W.G. and Litton, C.D., 1996, *Bayesian Approach to Interpreting Archaeological Data*, Chichester

Buck, C.E., Litton, C.D, and Smith, A.F.M., 1992, Calibration of radiocarbon results pertaining to related archaeological events, *J. Archaeol. Sci.* 19, 497–512

Buckley, G.D. and Hedges, J.D., 1987, *The Bronze Age and Saxon Settlements at Springfield Lyons, Essex an interim report*, Chelmsford, Essex County Council

Buckley, G.P., 1992, *Ecology and Management of Coppice Woodlands*, Kluwer Academic Publishers

Budd, P., 2005, Combined O- and Sr-isotope analysis of human tooth enamel, 175–177, in I. Roberts (ed.), *Ferrybridge Henge: The Ritual Landscape Archaeological Investigations at the Site of the Holmfield Interchange of the A1 Motorway, Leeds*, Yorkshire Archaeology 10, West Yorkshire Archaeological Services

Budd, P., Millard, A., Chenery, C., Lucy, S. and Roberts, C., 2004, Investigating population movement by stable isotopes: a report from Britain, *Antiquity* 78, 127–140

Buikstra, J.E. and Ubelaker, D.H., 1994, *Standards for Data Collection from Human Skeletal Remains*, Arkansas Archaeol. Survey Res. Ser. 44

Bullock, P., Fedoroff, N., Jongerius, A., Stoops, G. and Tursina, T., 1985, *Handbook for Soil Thin Section Description*, Wolverhampton, Waine Research Publications

Burgess, C. and O'Connor, B., 2008, Iberia, the Atlantic Bronze Age and the Mediterranean, in S. Celestino, N. Rafel and X-L. Armada (eds), *Contacto Cultural Entre el Mediterráneo y el Atlántico (Siglos XII-VIII ane)*, Madrid, Consejo Superior de Investigaciones Cientificas, 41–58

Burgess, C.B. and Coombs, D.G. (ed.) 1979, *Bronze Age Hoards: Some Finds Old and New*, Oxford, Brit. Archaeol. Rep. 67

Butterfield, B.G. and Meylan, B.A., 1980, *Three-Dimensional Structure of Wood. An Ultrastructural Approach*, London and New York, Chapman and Hall

Capasso, L. and Di Tota, G., 1998, Lice buried under the ashes of Herculaneum, *The Lancet* 351 (9107), 992

Carancini, G.L., 1975, *Die Nadeln in Italien (Gli spilloni nell Italia Continentale)*, Prähistorische Bronzefunde XIII, 2, Munich

Carr, G. and Knüsel, C., 1997, The ritual framework of excarnation by exposure as the mortuary practice of the early and middle Iron Ages of central southern Britain, 167–173, in A. Gwilt and C. Haselgrove (eds.), *Reconstructing Iron Age Societies: New Approaches to the British Iron Age*, Oxford, Oxbow Monogr. 71

Carruthers, W., 2010, The plant remains, 57–61, in D. McOmish, D. Field and G. Brown, The Late Bronze Age and Early Iron Age midden site at East Chisenbury, Wiltshire, *Wiltshire Archaeol. Natur. Hist. Mag.* 103, 35–101

Carter, H. H., 1979, Animal bones 50–52, in R. Hingley, Excavations by R. A. Rutland on an Iron Age site at Wittenham Clumps, *Berkshire Archaeol. J.* 70, 21–55

Case, D.T. and Burnett, S.E. 2005, Tarsal coalition: identification and popular variation *American J Physical Anthropology* Supplement 40, 85

Chadwick, A. and Pollard, J. 2005, A Ring Cairn and Beaker Burial at Gray Hill, Llanfair Discoed, Monmouthshire, *PAST* 50, 11–14

Champion, T., 1982, The Bronze Age in Kent, in P. E. Leach (ed.) *Archaeology in Kent to AD 1500*, 31–9, London, Counc. Brit. Archaeol. Res. Rep. 48

Champion, T., 2007, Prehistoric Kent, in J.H. Williams (ed), The *Archaeology of Kent to AD 800*, 67–132, Kent County Council

Chapman, A., 2007, A Bronze Age barrow cemetery and later boundaries, pit alignments and enclosures at Gayhurst Quarry, Newport Pagnell, Buckinghamshire: reconstructing the burial rite of an Early Bronze Age lord, *Rec. Buckinghamshire* 47(2), 81–211

Charlier, P., 2008, The value of palaeoteratology and forensic pathology for the understanding of atypical burials: Two Mediterranean examples from the field, in E.M. Murphy (ed.), *Deviant Burial in the Archaeological Record*, 57–70, Oxford, Oxbow Books

Chisham, C., 2006, The charcoal, 114–6, in C. Ellis and P.A. Andrews, A Mid-Saxon site at Anderson's Road, Southampton, *Proc. Hampshire Fld Club Archaeol. Soc.* 61, 81–133

Chevillot, C. and Coffyn, A., 1991, *L'Âge du Bronze Atlantique: ses Faciés, de l'Écosse à l'Andalousie et leurs Relations avec le Bronze Continental et la Méditerranée*, Beynac, L'Association des Musées du Sarladais

Clark, J.G.D., 1934, The classification of a microlithic culture: the Tardenoisian of Horsham, *Archaeol. J.* 90, 52–77

Clark, K. M., 1995, The later prehistoric dog: the emergence of canine diversity, *ArchaeoZoologia* 7/2, 9–32

Clark, P., Shand, G. and Weekes, J., in prep. *The changing landscapes of Chalk Hill, Ramsgate; Archaeological Excavations 1997–1998*

Clarke, D. L., 1970, *Beaker Pottery of Great Britain and Ireland*, Cambridge, Univ Press

Cleal, R., 1992, The bone artefacts, 111–115 in C. Gingell (ed.), *The Marlborough Downs: A Later Bronze Age Landscape and its Origins*, Devizes, Wiltshire Archaeol. Nat. Hist. Monogr. 1

Cleal, R.M.J., 1995, Neolithic Pottery from Chalk Hill, in Hearne *et al.*, 1995, 283–6

Collis, J., 1984, *The European Iron Age*, London, Batsford

Compton, J., 1997, The bone artefacts in N. Nayling and A. Caseldine (eds), *Excavations at Caldicot, Gwent: Bronze Age Palaeochannels in the Lower Nedern Valley*, 242–243, Counc. Brit. Archaeol. Res. Rep. 108

Coombs, D., 1991, Bronze objects 132–41, in C.R. Musson with W.J. Britnell and A.G. Smith, *The Breiddin Hillfort: A Later Prehistoric Settlement in the Welsh Marches*, Counc Brit Archaeol. Res. Rep. 76

Coombs, D., 2001, Metalwork, in F. Pryor, *The Flag Fen Basin: Archaeology and Environment of a Fenland Landscape*, 255–317, English Heritage Archaeol. Rep.

Coombs, D.G. and Bradshaw, J., 1979, A Carp's Tongue hoard from Stourmouth, Kent, in Burgess and Coombs 1979, 181–196

Cooper, A. and Edmonds, M.R. 2007, *Past and Present: Excavations at Broom, Bedfordshire 1996–2005*, Cambridge, Univ. Press

Couldrey, P., 2007, The Late Bronze Age/Early Iron Age pottery, in Bennett *et al.* 2007, 101–70

Courty, M.A., 2001, Microfacies analysis assisting archaeological stratigraphy, in P. Goldberg, Holliday, V.T., and Ferring, C.R. (eds), *Earth Sciences and Archaeology*, 205–239, New York, Kluwer

Courty, M.A., Goldberg, P. and Macphail, R.I., 1989, *Soils and Micromorphology in Archaeology*, Cambridge, Univ. Press

Craddock, P.T. and Tite, M.S., 1980, Report on the scientific examination of five Late Bronze Age axes and the ingot fragments from Hertford Heath, *Hertfordshire Archaeol.* 7 [1979], 6–10

Craig, RC, Knüsel, C.J. and Carr, G.C., 2005, Fragmentation, mutilation and dismemberment: an interpretation of human remains on Iron Age sites, in Parker Pearson and Thorpe 2005, 165–80

Cromarty, A. M., Barclay, A., Lambrick, G. and Robinson, M., 2006, *Late Bronze Age Ritual and Habitation on a Thames Eyot at Whitecross Farm, Wallingford the Archaeology of the Wallingford Bypass 1986–92*, Oxford, Thames Valley Landscapes Monogr. 22

Cruse, R.J., 1985, Excavation at Pring's Quarry, Upper Halling, *Archaeol. Cantiana* 102, 129–134

Cruse, R.J. and Harrison, A.C., 1983, Excavations at Hill Road, Wouldham, *Archaeol. Cantiana* 99, 81–108

Cunliffe, B. 1983, *Danebury: Anatomy of an Iron Age Hillfort*, London, Batsford.

Cunliffe, B, 1991, *Iron Age Communities in Britain*, 3rd edition, London, Routledge

Cunliffe, B., 1992, Pits, preconceptions and propitiation in the British Iron Age, *Oxford J. Archaeol.* 11 (1), 69–87

Cunliffe, B., 2010, Celticization from the West: the contribution of archaeology, in B. Cunliffe and J.T. Koch (eds), *Celtic from the West: Alternative Perspectives from Archaeology, Genetics, Language and Literature*, 13–38, Oxford, Oxbow

Cunliffe, B.W., 1971, *Excavations at Fishbourne, 1961–1969, Vol 2: the finds*, London Res. Rep. Comm. Soc. Antiq. London 27

Cunliffe, B.W., 2001, *Facing the Ocean: the Atlantic and its Peoples 8000 BC–AD 1500*, Oxford, Univ. Press

Cunliffe, B. and Poole, C., 1991, *Danebury, an Iron Age Hillfort in Hampshire; Volume 5, the Excavations 1979–1988: the finds*, London, Counc. Brit.Archaeol. Res. Rep. 73

Cunliffe, B. and Poole, C., 2000a, Suddern Farm, Middle Wallop, Hants, 1991 and 1996, *Danebury Environs Programme. The Prehistory of a Wessex Landscape*, volume 2 part 3, Oxford, Oxford Univ. Comm. Archaeol. Monogr. 49

Cunliffe, B. and Poole, C., 2000b, *New Buildings, Longstock, Hants, 1992 and Fiveways, Longstock, Hants, 1996, Danebury Environs Programme. The Prehistory of a Wessex Landscape,* volume 2 part 4, Oxford, Oxford Univ. Comm. Archaeol. Monogr. 49

Curle, J., 1911, *A Roman frontier Post and its People: the Fort of Newstead in the Parish of Melrose*, Glasgow, James Maclehose

Darling, W.G., 2004, Hydrological factors in the interpretation of stable isotopic proxy data present and past: a European perspective, *Quaternary Science Reviews* 23, 743–770

Darling, W.G. and Talbot, J.C., 2003, The O & H stable isotopic composition of fresh waters in the British Isles. 1, rainfall, *Hydrology and Earth System Sciences* 7, 163–181

Darling, W.G., Bath, A.H. and Talbot, J.C., 2003, The O and H Stable Isotopic Content of Fresh Waters in The British Isles. 2, ground-water and surface waters, *Hydrology and Earth System Sciences* 7, 183–195

Daux, V., Lécuyer, C., Héran, M.-A., Amiot, R., Simon, L., Fourel, F., Martineau, F., Lynnerup, N., Reychler, H. and Escarguel, G., 2008, Oxygen isotope fractionation between human phosphate and water revisited, J. *Human Evolution* 55, 1138–1147

Davies, A., 2006, The charred plant remains from Cobham Golf Course, Cobham, Kent (ARC CGC98), in J. Giorgi (ed.), *Palaeoenvironmental Evidence from Section 1 of the Channel Tunnel Rail Link, Kent*, CTRL Scheme-wide Specialist Report Series, Archaeology Data Service

Davies, D.G., 1979, Hatfield Broad oak, Leigh, Rayne and Southchurch: Late Bronze Age hoards from Essex, in Burgess and Coombs 1979, 149–172

Davis, S. J. M. and Payne, S., 1993, A barrowful of cattle skulls, *Antiquity* 67, 12–22

Davis, S. J. M., 2008, 'Thou shalt take of the ram…the right thigh; for it is a ram of consecration…', some zooarchaeological examples of body part preferences, in F. A'Andria, J. De Grossi Mazzorin and G. Fiorentino (eds), *Uomini, Piante E Animali Nella Dimensione Del Sacro.* Beni Archeologici – Conoscenza E Tecnologie No. 6, 63–70

Deighton, K., and Halstead, P., 2007, The cattle bone from Barrow 2, in Chapman 2007, 152–156, 173–175

Delgado Huertas, A., Iacumin, P., Stenni, B., Chillon, B.S. and Longinelli, A., 1995, Oxygen-isotope variations of phosphate in mammalian bone and tooth enamel, *Geochimica Et Cosmochimica Acta* 59, 4299–4305

DeNiro, M.J., 1985, Postmortem preservation and alteration of *in vivo* bone collagen isotope ratios in relation to palaeodietary reconstruction, *Nature* 317, 806–809

Dent, J.S., 1983, Weapons, wounds and war in the Iron Age, *Archaeol. J.* 140, 120–128

Dettman, D.L., Kohn, M.J., Quade, J., Ryerson, F.J., Ojha, T.P. and Hamidullah, S., 2001, Seasonal stable isotope evidence for a strong Asian monsoon throughout the past 10.7 m.y, *Geology* 29, 31–34

Dickinson, T.M. and Härke, H., 1992, *Early Anglo-Saxon Shields*, London

Done, G., 1980, The animal bone, in D. Longley, Runnymede Bridge 1976: excavations on the site of a Late Bronze Age settlement, Guildford, 74–79, *Surrey Archaeological Society*

Done, G., 1991, The animal bones, in S. Needham and D. Longley, *Excavation and Salvage at Runnymede Bridge 1978: the Late Bronze Age waterfront site*, 327–344, London, Brit. Mus. Press

Done, G., 1993, Animal bone from Anglo-Saxon contexts, in H. Hamerow, *Excavations at Mucking. Volume 2: the Anglo-Saxon settlement*, 74–79, London, English Heritage

Driesch, A. von den and Boessneck, J., 1974, Kritische Anmerkungen zur Widerristhöhenberechnung aus Langenmaßen vor- und frühgeschichtlicher Tierknochen, *Säugetierkundliche Mitteilungen* 22, 325–48

Driesch, A. von den, 1976, *A Guide to the Measurement of Animal Bones from Archaeological Sites*, Cambridge, Massachusetts, Peabody Museum of Archaeology and Ethnology, Bulletin 1

Dyson, L., Shand, G. and Simons, S., 2000, Causewayed enclosures, *Current Archaeology* 168, 470–472

Edlin, H.L., 1949, *Woodland Crafts in Britain. An Account of the Traditional Uses of Trees and Timbers in the British Countryside*, London, BT Batsford

Egging Dinwiddy, K. and Schuster, J., 2009, Thanet's longest excavation. Archaeological investigations along the route of the Weatherlees–Margate–Broadstairs wastewater pipeline, in Andrews *et al.* 2009, 57–174

Ellis, C. and Powell, A.B., 2008, *An Iron Age Settlement Outside Battlesbury Hillfort, Warminster and Sites along the Southern Range Road*, Wessex Archaeol. Rep. 22

Evison, V.I., 1987, *Dover: the Buckland Anglo-Saxon Cemetery*, Historic Buildings and Monuments Commission for England Archaeological Report 3, London, HBMCE

Farley, M., and Jones, G., 2012, *Iron Age Ritual, a Hillfort and Evidence for a Minster at Aylesbury, Buckinghamshire*, Oxford, Oxbow Books

Finnegan, M. 1978 Non-metric variations of the infracranial skeleton. *J. Anatomy* 125(1), 23–37

Fitzpatrick, A.P., 2011, *The Amesbury Archer and the Boscombe Bowmen: Bell Beaker burials at Boscombe Down, Amesbury, Wiltshire*, Wessex Archaeology Rep. 27

Ford, S., Bradley, R., Hawkes, J. and Fisher, P., 1984, Flint-working in the metal age, *Oxford J. Archaeol.* 3(1), 155–74

Frere, S.S. and Fulford, M., 2001, The Roman Invasion of AD 43, *Britannia* 32, 45–55

Fuller, B.T., Richards, M.P. and Mays, S.A., 2003, Stable carbon and nitrogen isotope variations in tooth dentine serial sections from Wharram Percy, *J. Archaeol. Sci.* 30, 1673–1684

Gale, R. and Cutler, D., 2000, *Plants in Archaeology*, Westbury and Royal Botanic Gardens Kew

Gale, R., 2005, Charcoal, in V. Birbeck with R.J.C. Smith, P. Andrews and N. Stoodley, *The Origins of Mid-Saxon Southampton: Excavations at the Friends Provident St Mary's Stadium 1998–2000*, 154–6, Salisbury, Wessex Archaeology

Gallois, R.W., 1965, *The Wealden District (British Regional Geology)* London, HMSO for British Geological Survey

Geake, H., 1992, Burial practices in seventh- and eighth-century England, in M. Carver (ed.), *The Age of Sutton Hoo*, 83–94, Woodbridge, The Boydell Press

Gennep, A. van. 1977, *The Rites of Passage* (Transl. M.B. Vizedom and G.L. Caffee)

Gibson, A.M., 2000, The pottery, in Boast and Gibson 2000, 368–370

Gibson, A.M., 2006, *The Neolithic and Early Bronze Age pottery from the causewayed enclosure at Chalk Hill, Ramsgate*, Kent, Unpubl. Rep. 96, for Canterbury Archaeological Trust

Gilchrist, R. and Sloane, B., 2005, *Requiem: the Medieval Monastic Cemetery in Britain*, London, Museum of London Archaeological Services

Gingell, C.G., 2000, Copper alloy objects, in Lawson 2000, 186–93

Gittins, E., Leivers, M., Seager Smith, R.H., and Barclay, A.J., in prep., Margetts Pit, Burnham, Kent: A later prehistoric shale-working site, *Archaeologia Cantiana*

Goldberg, P., and Macphail, R.I., 2006, *Practical and Theoretical Geoarchaeology*, Oxford, Blackwell Publishing

Grant, A., 1991, Economic or symbolic? Animals and ritual behaviour, in P. Garwood, D. Jennings, R. Skeates and J. Thoms (eds), *Sacred and Profane: Proceedings of a Conference on Archaeology, Ritual and Religion*, 109–114, Oxford, Oxbow Books

Grant, A., 1982, The use of tooth wear as a guide to the age of domestic ungulates, in B. Wilson, C. Grigson and S. Payne (eds), *Ageing and Sexing Animal Bone from Archaeological Sites*, 91–108, Oxford, Brit. Archaeol. Rep. 109

Greatorex, C., 2003, Living on the margins? The Late Bronze Age landscape of the Willingdon levels, in D. Rudling (ed), *The Archaeology of Sussex to AD 2000*, 89–100, Great Dunham, Heritage Marketing and Publications

Green, S., 1984, Flint Arrowheads: typology and interpretation, *Lithics* 5, 19–39

Grimes, W.F., 1960, Neolithic pits at Heathrow, Harmondsworth, Middlesex, in W. F. Grimes *Excavations on Defence Sites, 1939–1945 1: mainly Neolithic–Bronze Age*, 186–97, London, HMSO (Ministry of Works Archaeol. Rep. 3)

Grimm, J.M., 2003, Untersuchungen an Tierknochen aus der jungbronzezeitlichen Flachsiedlung Rodenkirchen-Hahnenknooper Mühle, Ldkr. Wesermarsch, *Probleme der Küstenforschung im südlichen Nordseegebiet* 28, 185–234, Oldenburg, Niedersächsische Institut für historische Küstenforschung

Grimm, J.M., 2010, *Animal keeping and the use of animal products in medieval Emden (Lower Saxony, Germany)*, PhD-thesis, Univ. Groningen

Grinsell, L.V., 1992, The Bronze Age round barrows of Kent, *Proc. Prehist. Soc.* 58, 355–84

Grootes, P. M., Nadeau, M-J. and Rieck, A., 2004, $^{14}$C-AMS at the Leibniz-Labor: radiometric dating and isotope research, *Nuclear Instruments and Methods in Physics Research Section B* 223–224, 55–61

Guttmann, E.B.A. and Last, J., 2000, A Late Bronze Age Landscape at South Hornchurch, Essex, *Proc. Prehist. Soc.* 66, 319–59

Habermehl, K.H., 1975, *Die Altersbestimmung bei Haus- und Labortieren 2. vollständig neubearbeitete Auflage*, Berlin and Hamburg, Paul Parey

Hambleton, E., 1999, *Animal Husbandry Regimes in Iron Age Britain: a Comparative Study of Faunal Assemblages from British Iron Age Sites*, Oxford, Brit. Archaeol. Rep. 282

Hambleton, E., 2009, *A Review of Animal Bone Evidence from Southern England*, Available at http://ads.ahds.ac.uk/catalogue/archive/animalbone_eh_2009/index.cfm (accessed 28.6.2010)

Hamilton-Dyer, S., 2004, The animal bone, in Leary 2004, 84–85

Hammer, Ø., Harper, D.A.T. and Ryan, P.D., 2001, PAST: palaeontological statistics software for education and data analysis, *Palaeontologica Electronica* 4, article 4

Hammerton, J.A. (ed.), 1922, *Peoples of all Nations. Volume I Abyssinia to the British Empire*, London, Educational Book Co.

Hanworth, R., 1987, The Iron Age in Surrey, in J. Bird and D.G. Bird (eds), *The Archaeology of Surrey to 1540*, 139–64, Guildford, Surrey Archaeological Society

Harcourt, R.A., 1974, The dog in prehistoric and early historic Britain, *J. Archaeol. Sci.* 1, 151–175

Harding, P., 1995, Worked flint, in Hearne *et al.* 1995, 281–2

Harding, P., forthcoming, Worked flint, in Andrews *et al.* forthcoming

Hardman, F.W. and Stebbing, W.P.D., 1940–42, Stonar and the Wantsum Channel. Pt. 1. *Archaeol. Cantiana* 53, 62–80, Pt.2 *Archaeol. Cantiana* 54, 41–55. Pt. 3 *Archaeol. Cantiana* 55, 37–49

Härke, H., 1989, Early Saxon weapon burials: frequencies, distributions and weapon combinations, in S.C. Hawkes (ed.), *Weapons and Warfare in Anglo Saxon England*, 49–61, Oxford, Oxford Univ. Comm. Archaeol. Monogr. 21

Härke, H 1990, Warrior graves? The background of the Anglo-Saxon weapon burial rite, *Past and Present* 126, 22–43

Härke, H., 1992, *Angelsächsische Waffengräber des 5.7. Jahrhunderts*. Cologne and Bonn, Rheinland-Verlag, Beihefte der Zeitschrift für Archäologie des Mittelalters 6

Hawkes, C.F.C., 1942, The Deverel Urn and the Picardy pin: a phase of Bronze Age settlement in Kent, *Proc. Prehist. Soc.* 8, 26–47

Hawkes, S.C., 1973, The dating and social significance of the burials in the Polhill cemetery, in B. Philp, *Excavations in West Kent 1960–1970*, 186–201, Dover, Research Reports in the Kent Series, 2

Hawkes, S.C., 2000, The Anglo-Saxon cemetery of Bifrons, in the parish of Patrixbourne, East Kent, *Anglo-Saxon Studies in Archaeology and History* 11, 1–93

Hayman, G., Jones, P. and Poulton, R., 2012, *Settlement Sites and Sacred Offerings: Prehistoric and later Archaeology in the Thames Valley, near Chertsey*, Woking, Surrey County Archaeological Unit, Spoilheap Monogr. 4

Haynes, G., 1980, Prey bones and predators: potential ecological information from analysis of bone sites, *Ossa* 7, 75–97

Healey, E., 1994, The lithic artefacts, in Perkins *et al.* 1994, 297–304

Hearne, C.M, Perkins, D.J. and Andrews, P., 1995, The Sandwich Bay Wastewater Treatment Scheme archaeological project, 1992–1994, *Archaeol. Cantiana*, 115, 239–354

Henderson, J., 1987, Factors determining the state of preservation of human remains 43–54, in A. Boddington, A.N Garland and R.C. Janaway (eds), *Death, Decay and Reconstruction*, Manchester, Univ. Press

Hey, G., Bayliss, A. and Boyle, A., 1999, Iron Age inhumation burials at Yarnton, Oxfordshire, *Antiquity* 73, 551–62

Hill, J.D., 1995, *Ritual and Rubbish in the Iron Age of Wessex; A Study on the Formation of a Specific Archaeological Record*, Brit. Archaeol. Rep. 242

Hillman, G.C., 1981, Reconstructing crop husbandry practices from charred remains of crops, in R.J. Mercer, (ed.), *Farming Practice in British Prehistory*, 123–162, Edinburgh, Univ. Press,

Hillson, S.W., 1979, Diet and dental disease, *World Archaeology* II (2), 147–162

Hillson, S.W., 1986, *Teeth*, Cambridge, Univ. Press

Hind, J.G.F., 2007, A. Plautius' campaign in Britain: an alternative reading of the narrative of Casssius Dio (60.19.5–21.2), *Britannia* 38, 93–106

Hinton, D.A., 1990a, Hooked tags, in Biddle 1990, 548–52

Hinton, D.A., 1990b, Belt- and strap-mounts, in Biddle 1990, 542–5

Hinton, D.A., 1996, *Southampton Finds Vol. 2: the Gold, Silver and Other Non-ferrous Alloy Objects from Hamwic, and the Non-ferrous Metalworking Evidence*, Southampton Archaeology Monogr. 6, Stroud, Sutton in association with Southampton City Council

Hirst, S., 2000, An approach to the study of glass beads, in J. Price (ed.), *Glass in Britain and Ireland AD 350–1100*, 121–9, London, Brit. Mus. Occas. Pap 127

Hogarth, A.C., 1973, Structural features in Anglo-Saxon graves, *Archaeol. J.* 130, 104–19

Holden, J.L., Phakley, P.P. and Clement, J.G. 1995, Scanning electron microscope observations of heat-treated human bone, *Forensic Science International* 74, 29–45

Hooper, B., 1984, Anatomical considerations, in B. Cunliffe *Danebury, an Iron Age Hillfort in Hampshire; Vol. 2 The Excavations 1969–1978: the Finds*, 463–474, London, Counc. Brit. Archaeol. Res. Rep. 52

Hooper, B., 1991 Anatomical considerations, in B. Cunliffe and C. Poole, *Danebury, an Iron Age Hillfort in Hampshire; Vol. 5 The Excavations 1979–1988: the Finds*, 425–431, London Counc. Brit. Archaeol. Res. Rep. 73

Horsey, I.P and Winder J.M., 1992, The Late-Saxon and Conquest-period oyster middens in I.P. Horsey, *Excavations in Poole 1973–1983*, 60–62, Dorset Natur. Hist. Archael. Soc. Monogr. 10

Horwitz, L.K., 1987, Animal offerings from two Middle Bronze Age tombs, *Israel Exploration Journal* 37, 251–255

Horwitz, L.K. and Smith, P., 1988, The effects of striped hyæna activity on human remains, *J. Archaeol. Sci.* 15, 471–84

Hutcheson, A. and Andrews, P., 2009, A Late Bronze Age, Anglo-Saxon, and medieval settlement at Manston Road, Ramsgate, in Andrews *et al.* 2009, 199–248

IJzereef, G.F., 1981, *Bronze Age Animal Bones from Bovenkarspel*, Nederlandse Oudheden 10. ROB, Amersfoort

Jackson, R., 1990, *Camerton: the Late Iron Age and Early Roman Metalwork*, London, Brit. Mus. Publications

Jacobi, R., 1978, The Mesolithic of Sussex, in P. L. Drewett (ed.), *Archaeology in Sussex to AD 1500*, 15–22, London, Counc. Brit. Archaeol. Res. Rep. 29

Jarvis, M.G., Allen, R.H., Fordham, S.J., Hazleden, J., Moffat, A.J. and Sturdy, R.G., 1983, *Soils of England and Wales. Sheet 6. South East England*, Southampton, Ordnance Survey

Jarvis, M.G., Allen, R.H., Fordham, S.J., Hazleden, J., Moffat, A.J. and Sturdy, R.G., 1984, *Soils and Their Use in South-East England*, Harpenden, Soil Survey of England and Wales

Jay, M. and Richards, M.P., 2006, Diet in the Iron Age cemetery population at Wetwang Slack, East Yorkshire, UK: carbon and nitrogen stable isotope evidence, *J. Archaeol. Sci.* 33, 653–662

Jay, M., Parker Pearson, M., Richards, M., Nehlich, O., Montgomery, J., Chamberlain, A. and Sheridan, A., 2012, in M.J. Allen, J. Gardiner and A. Sheridan (eds), *Is there a British Chalcolithic? People, Place and Polity in the late Third Millennium*, Oxford, Oxbow, Prehistoric Society Research Pap 4, 226–36

Jay, M., Montgomery, J., Nehlich, O., Towers, J. and Evans, J., 2013, British Iron Age chariot burials of the Arras culture: a multiple isotope approach to investigating mobility levels and subsistence practices, *World Archaeology* 45, 473–91

Jones, G. G., 2006, Tooth eruption and wear observed in live sheep from Butser Hill, the Cotswold Farm Park and Five Farms in the Pentland Hills, UK, in D. Ruscillo (ed.), *Recent Advances in Ageing and Sexing Animal Bones*, 155–178, Oxford, Oxbow Books

Jones, G.E.M., 1987, A statistical approach to the archaeological identification of crop processing, *J. Archaeol. Sci.* 14, 311–323

Jorge, S.O. (ed) 1998, *Existe uma Idade do Bronze Atlântico?* Lisbon, Instituto Português de Arquelogia

Karkanas, P. and Goldberg, P., 2010, Phosphatic features, in G. Stoops, V. Marcelino and F. Mees (eds.), *Interpretation of Micromorphological Features of Soils and Regoliths*, 521–541, Amsterdam, Elsevier

Kerney, M.P., 1965, Weichselian deposits in the Isle of Thanet, East Kent, *Proc. Geologists' Assoc.* 76(3), 269–274

Khan, S., 2006, An assessment of avian and other scavenging of an animal carcass at Katerniaghat Wildlife Sanctuary, District Bahraich, Utter Pradesh, India, and its forensic implications, unpubl. dissert., Univ. Bournemouth http://www.geradts.com/anil/ij/vol_007_no_001/others/thesis/roma.html

Kent Highway Services (KHS), 2008, *East Kent Access Phase 2, Vol. 2f Archaeology (3rd revision, 27 February 2009)*, unpubl. report, Maidstone, Kent County Council

Kiesewalter L., 1988, *Skelettmessungen an Pferden*, unpubl. thesis, Univ. Leipzig

King, A.C., 2007, Mammal and bird bones, in Bennett *et al.* 2007, 279–281

Kinnes, I., 1992, *Non-megalithic Long Barrows and Allied Structures in the British Neolithic*, London, Brit. Mus. Occas. Pap 52

Kjellberg, S.T., 1964, *Ölets karil*, Kulturen, Lund

Klinken, G.-J. van, Richards, M.P., Hedges R.E.M., 2000, An overview of causes for stable isotopic variations in past European human populations: environmental, ecophysiological and cultural effects, in S.H. Ambrose and M.A. Katzenberg (eds), *Biogeochemical Approaches to Paleodietary Analysis*, 39–6, New York, Kluwer Academic/Plenum

Koch, J.T., 2010, Paradigm shift? Interpreting Tartessian as Celtic, in B. Cunliffe and J.T. Koch (eds), *Celtic from the West: Alternative Perspectives from Archaeology, Genetics, Language and Literature*, Oxford, Oxbow, 185–301

Koch, U., 1977, *Das Reihengräberfeld bei Schretzheim*, Germanische Denkmäler der Völkerwanderungszeit A 13, Berlin

Kristiansen, K., 2002, The tale of the sword – swords and swordfighters in Bronze Age Europe, *Oxford J. Archaeol.* 21(4), 319–332

Kristiansen, K. and Larsson, T.B., 2005, *The Rise of Bronze Age Society. Travels, Transmissions and Transformations*, Cambridge, Univ. Press

Kubach, W., 1977, *Die Nadeln in Hessen und Rheinhessen*, PBF XIII, 3. Munich

Lally, M., 2008, Bodies of difference in Iron Age southern England, in O. Davies, N. Sharples and K. Waddington (eds), *Changing Perspectives on the First Millennium BC*, Oxford, Oxbow, 119–38

Lambrick, G., 2009, Attitudes to life and death, in Lambrick with Robinson 2009, 283–327

Lambrick, G., with Robinson, M., 2009, *Thames Through Time. The Archaeology of the Gravel Terraces of the Upper and Middle Thames. The Thames Valley Late Prehistory: 1500 BC – AD 50*, Oxford, Thames Valley Landscapes Monogr. 29

Landuydt, C.J., 1990, Micromorphology of iron minerals from bog ores of the Belgian Campine Area, in L.A. Douglas (ed.), *Soil Micromorphology: a Basic and Applied Science*, 289–301, Amsterdam, Elsevier

Lauwerier, R.C.G.M., 1988, *Animals in Roman Times in the Dutch Eastern River Area*, Amersfoort, ROB

Law, I.A., and Hedges, R.E.M., 1989, A semi-automated bone pretreatment system and the preatreatment of older and contaminated samples, *Radiocarbon* 31, 247–53

Lawson, A.J., 1995, Bronze Age metalwork, in Hearne *et al.*, 274–7

Lawson, A.J., 2000, *Potterne 1982–5: Animal Husbandry in Later Prehistoric Wiltshire*, Wessex Archaeol. Rep.17

Lawson, T. and Killingray, D., (eds), 2004, *A Historical Atlas of Kent*, Chichester, Phillimore

Leach, S., 2008, Odd one out? Early Neolithic deposition of human remains in caves and rock shelters in the Yorkshire dales in E.M. Murphy (ed.), *Deviant Burial in the Archaeological Record*, 35–56, Oxford, Oxbow Books

Leary, J., 2004, *Tatberht's* Lundenwic*: archaeological excavations in Middle Saxon London*, London, Pre-Construct Archaeology Limited Monogr. 2

Lécuyer, C., Fourel, F., Martineau, F., Amiot, R., Bernard, A., Daux, V., Escarguel, G. and Morrison, J., 2007, High-precision determination of O-18/O-16 ratios of silver phosphate by EA-pyrolysis-IRMS continuous flow technique, *J. Mass Spectrometry* 42, 36–41

Leivers, M., 2009, Pottery, in Egging Dinwiddy and Schuster 2009, 67–8

Leivers, M., forthcoming, Prehistoric pottery (Volume 2 Finds, Environmental and Dating Specialist reports), in Andrews *et al.* forthcoming

Leney, L. and Casteel, R.W., 1975, Simplified procedure for examining charcoal specimens for Identification, *J. Archaeol. Sci.* 2, 153–9

Levitan, B., 1990, The vertebrate remains, in M. Bell, *Brean Down Excavations 1983–1987*, 220–238, London, English Heritage Archaeol. Rep. 15

Lewis, M.E., 2004, Endocranial lesions in non-adult skeletons: understanding their aetiology, *Int. J. Osteoarchaeology* 14, 82–97

Lewis, M.E., 2007, *The Bioarchaeology of Children. Perspectives from Biological and Forensic Anthropology*, Cambridge, Univ. Press

Locker, A., 2000, Animal bone, in Lawson 2000, 101–19

Longin, R., 1971, New method of collagen extraction for radiocarbon dating, *Nature* 230, 241–2

Longinelli, A., 1984, Oxygen isotopes in mammal bone phosphate: a new tool for paleohydrological and paleoclimatological research?, *Geochimica et Cosmochimica*

*Acta* 48, 385–90

Louwe Kooijmans, L.P., 2005, Bronze Age war: a collective burial at Wassenaar, in L.P. Louwe Kooijmans (ed.), *The Prehistory of the Netherlands Volume. 1*, 459–62, Amsterdam Univ. Press

Lucy, S., 1998, *The Early Anglo-Saxon Cemeteries of East Yorkshire*, Oxford, Brit. Archaeol. Rep. 272

Lucy, S., 2000, *The Anglo-Saxon Way of Death: Burial Rites in Early England*, Stroud, Sutton

Lykoudis, S.P. and Argiriou, A.A., 2007, Gridded data set of the stable isotopic composition of precipitation over the eastern and central Mediterranean, *J. Geophys. Res.* 112, D18107, doi:10.1029/2007JD008472

Macphail, R.I., 2000, Soils and microstratigraphy: a soil micromorphological and micro-chemical approach, in Lawson 2000, 47–70

Macphail, R.I., 2006, *Llanmaes 2006: Soil Micromorphology Assessment II*, Cardiff, National Museums and Galleries of Wales, 10

Macphail, R.I., 2010, Soil micromorphology, 53–7, in D. McOmish, D. Field and G. Brown, The Late Bronze Age and Early Iron Age Midden Site at East Chisenbury, Wiltshire, *Wiltshire Archaeol. Natur. Hist. Soc.* 103, 35–101

Macphail, R.I., and Crowther, J., 2002, *Battlesbury, Hampshire: soil micromorphology and chemistry (W4896)*, unpubl. rep.

Macphail, R.I., and Crowther, J., 2008, *Soil micromorphology and chemistry*, in Ellis and Powell 2008, 125–32

Macphail, R.I. and Crowther, J., 2006, *Broadstairs Retail Park, Kent (BRRP05): soil micromorphology, chemistry and magnetic susceptibility*, unpubl. rep. Oxford, Oxford Archaeology

Macphail, R.I. and Cruise, G.M., 2001, The soil micromorphologist as team player: a multianalytical approach to the study of European microstratigraphy, in P. Goldberg, V. Holliday and R. Ferring (eds), *Earth Science and Archaeology*, 241–267, New York, Kluwer Academic/ Plenum Publishers

Macphail, R.I. and Linderholm, J., 2004, Neolithic land use in south-east England: a brief review of the soil evidence, in J. Cotton and D. Field (eds), *Towards a New Stone Age*, 29–37, York, Counc. Brit. Archaeol. Res. Rep. 137

Macphail, R.I., Crowther, J. and Cruise, G.M., 2007, Micromorphology and post-Roman town research: the examples of London and Magdeburg, in J. Henning (ed.), *Post-Roman Towns and Trade in Europe, Byzantium and the Near-East. New methods of structural, comparative and scientific methods in archaeology*, 303–317, Berlin, Walter de Gruyter & Co. KG

Macpherson-Grant, N. and Mainman, A., 1995, Early to Late Saxon in Blockley *et. al.* 1995, 818–97

Macpherson-Grant, N., 1968, A Beaker from Cliffsend, Ramsgate, *Archaeol. Cantiana* 83, 269–71

Macpherson-Grant, N., 1980, Lord of the Manor – Site 2, in *Isle of Thanet Archaeological Unit Interim Excavation Reports 1977–1980*, 5–11, Thanet, Thanet Archaeol. Soc.

Macpherson-Grant, N., 1987, The pottery 177–82, in J. Rady, Excavations at St Martin's Hill, Canterbury 1984–5, *Archaeol. Cantiana* 104, 123–219

Macpherson-Grant, N., 1990, The pottery from the 1987–1989 Channel Tunnel Excavations, in P. Bennett, *Canterbury's Archaeology 1988–1989*, 60–3

Macpherson-Grant, N., 1991, Pottery research, *Canterbury's Archaeology 1989–1990*, 44–5.

Macpherson-Grant, N., 1994, The pottery 248–88, in Perkins *et al.* 1994, 237–316

Maltby, M., 1992, The animal bone 137–142, in C. Gingell, *The Marlborough Downs: a late Bronze Age Landscape and its Origins*, Wiltshire Archaeol. Nat. Hist. Soc. Monogr. 1

Manchester, K., 1983, *The Archaeology of Disease*, Bradford, Univ. Press

Manning, W.H., 1985, *Catalogue of the Romano-British Iron Tools, Fittings and Weapons in the British Museum*, London, Brit. Mus.

Margeson, S., 1993, *Norwich Households. Medieval and post-medieval finds from Norwich Survey Excavations 1971–78*, Norwich, East Anglian Archaeol. 58

Martin, J., Schuster, J., and Barclay, A.J., 2012, Evidence of an Early Bronze Age field system and spelt wheat growing, together with an Anglo-Saxon sunken featured building, at Monkton Road, Minster in Thanet, *Archaeol. Cantiana* 132, 43–52

Marzinzik, S., 2003, *Early Anglo-Saxon Belt Buckles (late fifth to early eighth centuries A.D.)*, Oxford, Brit. Archaeol. Rep. 357

Masters, P.M., 1987, Preferential preservation of non-collagenous protein during bone diagenesis: implications for chronometric and stable isotope measurements, *Geochimica et Cosmochimica Acta*, 51, 3209–14

Matolcsi, J., 1970, Historische Erforschung der Körpergröße des Rindes auf Grund von ungarischem Knochenmaterial, *Zeitschrift für Tierzüchtung und Züchtungsbiologie* 87/2, 89–137

May, E., 1985, Widerristhöhe und Langenknochenmaβe bei Pferden – ein immer noch aktuelles Problem. *Zeitschrift für Säugetierkunde* 50, 368–82

Mays, S.A. and Anderson, T., 1995, Archaeological research priorities for human remains from South-West England (Kent, East and West Sussex and Surrey), *Archaeol. Cantiana* 115, 355–388

McArthur, J.M. and Howarth, R.J., 2004, Strontium isotope stratigraphy, in F.M. Gradstein, J.G. Ogg and A.G. Smith (eds.), *A Geologic Timescale*, Cambridge, Univ. Press

McKinley, J.I., 1998, Excavations at Ham Hill, Montacute, Somerset 1994 and 1998, *Somerset Archaeol. Nat. Hist.* 142, 77–137

McKinley, J.I., 1999, Human remains from Saxon's Field [Enham Lane], Charlton, Andover, unpubl. rep. for Wessex Archaeology

McKinley, J.I., 2000a, The analysis of cremated bone, in M. Cox, and S. Mays (eds), *Human Osteology*, 403–421, London, Greenwich Medical Media

McKinley J.I., 2000b, Human bone and funerary deposits, in K.E. Walker and D.E. Farwell, *Twyford Down, Hampshire Archaeological Investigations on the M3 Motorway from Bar End to Compton, 1990–93*, 85–119, Hampshire Field Club Monogr. 9

McKinley, J.I., 2000c, Human bone, in Lawson 2000, 95–102

McKinley, J.I., 2004a, Compiling a skeletal inventory: disarticulated and co-mingled remains in M. Brickley and J.I. McKinley (eds), *Guidelines to the Standards for Recording Human Remains*, 13–16, British Association for Biological Anthropology and Osteoarchaeology and Institute for Field Archaeology

McKinley, J.I., 2004b, Archaeological investigations at The Bostle, Bronze Age and Anglo-Saxon barrow cemeteries, Balsdean, East Sussex, 1997, *Sussex Archaeol. Collect.* 142, 25–44

McKinley, J.I., 2006a (published 2009), Human remains from Section 1 of the Channel Tunnel Rail Link, Kent. *CTRL Scheme wide Specialist Report Series*, Archaeological Data Service

McKinley, J.I., 2006b, (published 2009), Human remains from Little Stock Farm, Kent *CTRL Specialist Report Series*, Archaeological Data Service

McKinley, J.I., 2007, Report on the human bone from the Ramsgate Harbour approach road investigations, Kent, unpubl. rep. for Canterbury Archaeological Trust (Clark *et al.* in prep.)

McKinley, J.I., 2008a, Human remains, in R. Mercer and F. Healy 2008, 477–521

McKinley, J.I., 2008b, Human remains, in Ellis and Powell 2008, 71–83

McKinley, J.I., 2009a, Human Bone, in Egging Dinwiddy and Schuster 2009, 69

McKinley, J.I., 2009b, Human bone from Barton-Stacey Pipeline, Hampshire, Wessex Archaeology report in prep for *Hants. Field Club*

McKinley, J.I., 2010, Human bone from Ringlemere, Kent, unpubl. rep. for British Museum

McKinley, J.I., 2011a, The human bone, in Barnett *et al.* 2011, 1–14

McKinley, J.I., 2011b, Human Bone from Springhead, in P. Andrews, L. Mepham, J. Schuster and C.J. Stevens, *Settling the Ebbsfleet Valley; High Speed I Excavations at Springhead and Northfleet, Kent. The Late Iron Age, Roman, Saxon and Medieval Landscape. Vol. 4: Saxon and later finds and environmental reports*, 47–49, Oxford Wessex Archaeology Monogr.

McKinley, J.I., forthcoming, Human bone (Volume 2), in Andrews *et al.* forthcoming

Mederos Martín, A., 2006, Fenecios en Huelva, en el siglo X AC, durante el reinado de Hîram I de Tiro, *SPAL* 15, 167–88

Mercer, R., and Healy, F., 2008, *Hambledon Hill, Dorset, England. Excavation and Survey of a Neolithic Monument Complex and its Surrounding Landscape*, Swindon, English Heritage

Metcalf, P. and Huntington, E., 1991, *Celebrations of Death: The Anthropology of Mortuary Ritual* (2nd edition), Cambridge, Univ. Press

Miles, A.E.W., 1962, Assessment of the Ages of a Population of Anglo-Saxons from their Dentition, *Proc. Royal Society of Medicine* 55 (10), 881–886

Millard, A., 2001, The deterioration of bone in D.R. Brothwell and A.M. Pollard, *Handbook of Archaeological Science*, 637–648, Wiley, Chichester

Millard, A.R. and Schroeder, H., 2009, True British sailors: a comment on the origin of the men of the Mary Rose, *J. Archaeol. Sci.* 37(4), 680–682

Miller, T.E., 1987, Systematics and evolution, in F.G.H. Lupton (ed), *Wheat Breading: its Scientific Basis*, 1–30, London, Chapman and Hall

Millett, M., 2007, Roman Kent, in J.H. Williams (ed.), *The Archaeology of Kent to AD 800*, Kent history project 8, 135–84, Woodbridge, Boydell Press

Molleson, T.I., 1993, The human remains, in D.E. Farwell and T.I. Molleson, *Poundbury Volume 2: the Cemeteries*, 142–214, Dorset Nat. Hist. Arch. Soc. Monogr. 11

Montgomery, J., Evans, J.A. and Wildman, G., 2006, 87Sr/86Sr isotope composition of bottled British mineral waters for environmental and forensic purposes, *Applied Geochemistry* 21, 1626–1634

Moody, G., 2008, *The Isle of Thanet: from Prehistory to the Norman Conquest*, Stroud, The History Press

Moody, G.A. and Russell, J.W., 2004, Land Adjacent to Lawn Cottage, East Northdown Farm, Margate, Kent, Archaeological Assessment Report TH/03/0720 Trust for Thanet Archaeology

Mook, W.G., 1986, Business Meeting: recommendations/resolutions adopted by the twelfth international radiocarbon conference, *Radiocarbon* 28, 799

Mook, W. G. and Waterbolk, H.T., 1985, *Radiocarbon Dating. Handbooks for Archaeologists 3*, Strasbourg, European Science Foundation

Moore, C.N. and Rowlands, M., 1972, *Bronze Age Metalwork in Salisbury Museum*, Salisbury, Salisbury & South Wiltshire Museum Occas. Publication

Moore, P.D. and Webb, J.A., 1978, *An Illustrated Guide to Pollen Analysis*, London, Hodder and Stoughton

Moore, P.D., Webb, J.A. and Collinson, M.E., 1991, *Pollen Analysis* (second edition). Oxford, Blackwell Scientific

Moorrees, C.F.A., Fanning, E.A. and Hunt, E.E., 1963a, Age variation of formation stages for ten permanent teeth, *J. Dental Research* 42, 1490–1502

Moorrees, C.F.A., Fanning, E.A. and Hunt, E.E., 1963b, Formation and resorption of three deciduous teeth in children, *American J. Physical Anthropology* 21, 205–213

Morris, E.L., 1994, *The Analysis of Pottery*, Salisbury, Wessex Archaeology Guideline 4

Morris, E.L., 2006, Later prehistoric pottery assemblages, in P. Booth (ed.), *Ceramics from Section 1 of the Channel Tunnel Rail Link, Kent*, 34–120, CTRL Specialist Report Series

MPRG (Medieval Pottery Research Group), 1998, *A Guide to the Classification of Medieval Ceramic Forms*, Medieval Pottery Research Group Occas. Pap 1

Müller, W., Fricke, H.C., Halliday, A.N., McCulloch, M.T. and Wartho, J.-A., 2003, Origin and migration of the Alpine iceman, *Science* 302, 862–866

Murphy, C.P., 1986, *Thin Section Preparation of Soils and Sediments*, Berkhamsted, A B Academic Publishers

Murphy, E.M., 2005, Animal palaeopathology in prehistoric Ireland: a review of the evidence, in J. Davies, M. Fabiš, I. Mainland, M. Richards and R. Thomas (eds.), *Diet and Health in Past Animal Populations*, 8–23, Oxford, Oxbow

Musgrave, J., 1985, The skull of Philip II of Macedon, in S.J.W. Lisney and B. Matthews (eds.), *Current Topics in Oral Biology*, 1–16, Bristol Univ. Press

Nadeau, M-J., Schleicher, M., Grootes, P.M., Erlenkeuser, H., Gottdang, A., Mous, D.J.W., Sarnthein, J.M. and Willkomm, H., 1997, The Leibniz-Labor AMS facility at the Christian-Albrechts University, Kiel, Germany, *Nuclear Instruments and Methods in Physics Research Section B* 123, 22–30

Needham, S.P., 1990, *The Petters Late Bronze Age Metalwork: an analytical study of Thames Valley metalworking in its settlement context*, London, Brit. Mus. Occas. Pap 70

Needham, S., 1991, *Excavation and Salvage at Runnymede Bridge 1978: the Late Bronze Age Waterfront Site*, London, Brit. Mus. Press

Needham, S.P., 1993, The structure of settlement and ritual in Late Bronze Age south-eastern Britain, in C. Mordant and A. Richard (eds), *L'habitat et l'occupation du sol a l'Age du Bronze en Europe*, 49–69, Paris, Documents Prehistoriques 4

Needham, S. 1995, (with a contribution from Janice Conheeney). A bowl from Maidscross, Suffolk: burials with pottery in the post Deverel-Rimbury period, in I.A. Kinnes and G.Varndell (eds.), *'Unbaked Urns of Rudely Shape': Essays on British and Irish Pottery for Ian Longworth*, 159–171, Oxford, Oxbow Monogr. 55

Needham, S.P, 1996a, Chronology and Periodisation in the British Later Bronze Age, *Acta Archaeologica* 67, 121–40

Needham, S. 1996b, Catalogue of copper and lead alloy artefacts, in Needham and Spence 1996, 187–8

Needham, S.P., 2002, Treasure report 2002, T278

Needham, S P, 2005, Transforming Beaker Culture in north-west Europe: processes of fusion and fission, *Proc. Prehist. Soc.* 71, 171–217

Needham, S.P., 2006, Precious cups of the Early Bronze Age, in Needham *et al.* 2006, 53–67

Needham, S.P., 2007a, 800 BC, The Great Divide, in C. Haselgrove and R. Pope (eds), *The Earlier Iron Age in Britain and the near Continent*, 39–63, Oxford, Oxbow Books

Needham, S., 2007b, Mould fragments, in Bennett *et al.* 2007, 258–65

Needham, S.P. and Ambers, J., 1994, Redating Ram's Hill and reconsidering Bronze Age enclosure, *Proc. Prehist. Soc.* 60, 225–243

Needham, S.P. and Hook, D.R., 1988, Lead and lead alloys in the Bronze Age – recent finds from Runnymede Bridge, in E.A. Slater and J.O. Tate (eds), *Science and Archaeology Glasgow 1987: proceedings of a conference on the application of scientific techniques to archaeology, Glasgow, September 1987*, 259–274, Oxford, Brit. Archaeol. Rep. 196

Needham, S.P., Parfitt, K. and Varndell, G., (eds), 2006, *The Ringlemere Cup: precious cups and the beginning of the channel Bronze Age*, London, Brit. Mus.

Needham, S., Parham, D. and Frieman, C.J. (eds), 2013, *Claimed by the Sea: Salcombe, Langdon Bay and Other Marine Finds of the Bronze Age*, York, Counc. Brit. Archaeol. Res. Rep. 173

Needham, S.P. and Spence, T., 1996, *Refuse and Disposal at Area 16 East, Runnymede*, London, Brit. Mus. Press

Nickel, R., Schummer, A. and Seiferle, E., 2004, *Lehrbuch der Anatomie der Haustiere. Band 1 Bewegungsapparat*, 8th edition, Stuttgart: Parey

Nicholson, R., Forthcoming, Marine shell (Volume 2 Finds, Environmental and Dating Specialist reports), in Andrews *et al.* forthcoming

Nielsen-Marsh, C., Gernaey, A., Turner-Walker, G., Hedges, R., Pike, A. and Collins, M. 2000, The chemical degradation of bone, in M. Cox and S. Mays (eds.), *Human Osteology in Archaeology and Forensic Science*, 439–454, London GMM

Northover, J.P., 2008, *Copper and copper alloy debris from Truro College (TCF 05)*, unpubl. rep. for Cornwall County Council

O'Connell, M., 1986, *Petters Sport Field, Egham: excavation of a Late Bronze Age/Early Iron Age site*, Surrey Archaeol. Soc. Res. Vol. 10, Guildford

O'Connor, B. 1980, *Cross-channel Relations in the Later Bronze Age*, Oxford, Brit. Archaeol. Rep. S91

O'Connor, T., 1975, *Bridge By-pass, Canterbury; Cremation report*, Anc. Monum. Lab. Rep. 1921

Ogden, A.R., 2005, *Identifying and Scoring Periodontal Disease in Skeletal Material*, Biological Anthropology Research Centre, Univ. Bradford

Ogden, A.R., 2008, Periapical voids in human jaw bones in M. Brickley and M. Smith (eds), *Proceedings of the eight annual conference of the British Assiociation for Biological Anthropology and Osteoarchaeology*, 51–56, Oxford, Brit. Archaeol. Rep. 1743

Oleson, J.P., 2008, Testing the waters: the role of sounding weights in ancient mediterranean navigation, in R.L. Hohlfelder (ed), *The Maritime World of Ancient Rome*, Memoirs of the American Academy in Rome, Suppl. 6, 117–74, Ann Arbor, Univ. Michigan Press

Osgood, R., 1999, The unknown warrior? The re-evaluation of a skeleton from a Bell Barrow at Sutton Veny, Wiltshire, *Wiltshire Archaeol. Natur. Hist. Mag.* 92, 120–123

Osgood, R., 2005, The dead of Tormarton – Middle Bronze Age combat victims, in Parker Pearson and Thorpe 2005, 139–144

Osgood, R. and Monks, S. 2000 *Bronze Age Warfare*, Stroud, Sutton

Oxford Wessex Archaeology, 2011, *East Kent Access (Phase II), Thanet, Kent, Post-excavation assessment*, Oxford Wessex Archaeology, unpubl. rep.

Pare, C.F.E., 1999, Weights and weighing in Bronze Age Central Europe, in Römisch-Germanisches Zentralmuseum Mainz (ed), *Eliten in der Bronzezeit: Ergebnisse zweier Kolloquien in Mainz und Athen, Teil 2*, Monographien des RGZM 43. Mainz, 421–514

Parfitt, K. and Brugmann, B., 1997, *The Anglo-Saxon Cemetery on Mill Hill, Deal, Kent*, London, Society for Medieval Archaeology Monogr. Series, 14

Parfitt, K., 1995, *Iron Age Burials from Mill Hill, Deal*, London, Brit. Mus. Press

Parfitt, K., 2004a, The Iron Age *c.* 700 BC–AD 43, in Lawson and Killingray 2004, 16–18

Parfitt, K. 2004b, A search for the prehistoric harbours of Kent, in P. Clark (ed), *The Dover Bronze Age Boat in Context: Society and Water Transport in Prehistoric Europe*, 99–105, Oxford, Oxbow Books

Parfitt, K., 2006, Ringlemere and ritual and burial landscapes of Kent, in Needham *et al.* 2006, 47–52

Parker Pearson, M., 1996, Food, Fertility and Front Doors in the First Millennium BC, in T.C. Champion and J.R. Collis (eds.), *The Iron Age in Britain and Ireland: Recent Trends*, 117–132, Sheffield, Sheffield Academic Press

Parker Pearson, M., 2005, Warfare, violence and slavery in later prehistory: an introduction, in Parker Pearson and Thorpe 2005, 19–33

Parker Pearson, M. and Thorpe, I.J.N., (eds), 2005, *Warfare, Violence and Slavery in Prehistory*, Oxford, Brit. Archaeol. Rep. 1374

Paulsen. P., 1992, *Die Holzfunde aus dem Gräberfeld bei Oberflacht*, Forschungen und Berichte zur Vor- und Frühgeschichte in Baden-Württemberg 41/2, Stuttgart, Konrad Theiss Verlag

Payne, G., 1897, Researches and discoveries, *Archaeol. Cantiana* 22, xlix–lxii

Peacock, D.P.S., 1987, Iron Age and Roman quern production at Lodsworth, West Sussex, *Antiq. J.* 67, 61–85

Peake, R., Séguier, J.-M. and Gomez de Soto, J., 1999, Trois exemples de fléaux de balances en os de l'Age du Bronze, *Bulletin de la Société préhistorique française* 96 (4), 643–644. doi:10.3406/bspf.1999.11220, Accessed 24 May 2010

Pelling, R. and Robinson, M., 2000, Saxon emmer wheat from the upper and middle Thames valley, England, *Environ. Archaeol.* 5, 117–119

Pelling, R., 2003, Charred plant remains 73–76, in P. Hutchings, Ritual and riverside settlement: a multi-period site at Princes Road, Dartford, *Archaeol. Cantiana* 123, 41–79

Penton, S., 2008, *Cliffs End Farm, Ramsgate, Kent. Investigative Conservation of Early Anglo-Saxon Grave Finds*, English Heritage, Res. Dep. Rep. Ser. 07/2008

Perkins, D.R.J., 1980a, Site 3 – Lord of the Manor (Ozengell) Ramsgate, in *Isle of Thanet Archaeological Unit Interim Excavation Reports 1977–1980*, 13–17, Thanet, Thanet Archaeological Society

Perkins, D.R.J., 1980b, Site 4 – Lord of the Manor (Ozengell) Ramsgate, in *Isle of Thanet Archaeological Unit Interim Excavation Reports 1977–1980*, 19–20, Thanet, Thanet

Archaeological Society

Perkins, D.R.J., 1985, The Monkton gas pipeline: phases III and IV, 1983–84, *Archaeol. Cantiana* 102, 43–69

Perkins, D.R.J., 1991, A Late Bronze Age hoard found at Monkton Court Farm, Thanet, *Archaeol. Cantiana* 109, 247–264

Perkins, D.R.J., 1992, Archaeological evaluations at Ebbsfleet in the Isle of Thanet, *Archaeol. Cantiana* 110, 269–311

Perkins, D.R.J., 1995a, Assessment/Research Design; South Dumpton Down, Broadstairs, 1994 Thanet Archaeological Trust unpubl. client rep.

Perkins, D.R.J., 1995b, Site 5, North Foreland Avenue, Broadstairs in D.R.J. Perkins and N. Macpherson-Grant, *The Isle of Thanet Archaeological Unit; interim excavation reports 1977–1980*, 21–24

Perkins, D.R.J., 1997, An Island Gateway: the ancient history of maritime Thanet, in M. Cates and D. Chamberlain, *The Maritime Heritage of Thanet*, East Kent Maritime Trust, 4–17

Perkins, D.R.J., 1998, Oaklands Nursery site, Cottington Road, Cliffsend, Ramsgate, *Archaeol. Cantiana* 118, 356–7

Perkins, D.R.J., 2003, A Flint dagger from the Foreness-Kingsgate Area, Thanet, *Archaeol. Cantiana* 123, 392–3

Perkins, D.R.J., 2004, Oval barrows on Thanet, in Cotton and Field 2004, 76–81

Perkins, D.R.J., 2007, The long demise of the Wantsum Channel: a recapitulation based on the data, *Archaeol. Cantiana* 127, 249–59

Perkins, D.R.J. and Gibson, A., 1990, A Beaker burial from Manston, near Ramsgate, *Archaeol. Cantiana* 108, 11–27

Perkins, D.R.J., Macpherson-Grant, N. and Healey, E., 1994, Monkton Court Farm Evaluation, 1992, *Archaeol. Cantiana* 114, 237–316

Phillipson, D.W., 1968, The animal bone 226–229, in B.W. Cunliffe and D.W. Phillipson, Excavations at Eldon's Seat, Encombe, Dorset, *Proc. Prehist. Soc.* 34, 191–237

Piggott, S., 1962, *The West Kennet Long Barrow. Excavations 1955–56*, London, HMSO Rep. 4

Plicht, van der, J., Wijma, S., Aerts, A. T., Pertuisot, M. H. and Meijer, H.A.J., 2000, Status report: the Groningen AMS facility, *Nuclear Instruments and Methods in Physics Research B* 172, 58–65

Pollard, J., 1999, Flint, in A. Whittle, J., Pollard and C. Grigson, *The Harmony of Symbols the Windmill Hill Causewayed Enclosure, Wiltshire*, 318–37, Oxford, Oxbow Books

Pollard, J., 2006, A community of beings: animals and people in the Neolithic of Southern Britain, in D. Serjeantson and D. Field (eds.), *Animals in the Neolithic of Britain and Europe*, Neolithic Studies Group seminar papers 7, 135–48, Oxford, Oxbow Books

Powell, A., Barclay, A., Mepham, L. and Stevens, C. in prep. *Imperial College Sports Ground and RMC Land, Harlington. The Development of Prehistoric and Later Communities in the Colne Valley*, Salisbury, Wessex Archaeology Rep. 33

Powell, A., in prep., Bronze Age and Early Iron Age burial grounds and later landscape development, outside Little Woodbury, Salisbury, Wiltshire, Wiltshire, *Wiltshire Archaeol. Natur. Hist. Mag.*

PCRG (Prehistoric Ceramics Research Group), 2010, *The Study of Later Prehistoric Pottery: General Policies and Guidelines for Analysis and Publication*, (3rd edition revised), Prehistoric Ceramic Research Group Occas. Pap 1/2

Price, T.D., Knipper, C., Grupe, G. and Smrcka, V., 2004, Strontium isotopes and prehistoric human migration: the Bell Beaker period in Central Europe, *European J. Archaeol.* 7, 9–40

Pritchard, A., 1991, Small finds, in A. Vince, *Aspects of Saxo-Norman London: 2 Finds and Environmental Evidence*, London and Middlesex Archaeol. Soc. Special Paper 12. London, 120–278

Prummel, W. and Frisch, H.-J., 1986, A guide for the distinction of species, sex and body side in bones of sheep and goat, *J. Archaeol. Sci.* 13, 567–577

Prummel, W., 1987, Atlas for identification of foetal skeletal elements of cattle, horse, sheep and pig part 2, *ArchaeoZoologia* 12, 11–42

Pryor, F., 1998 *Etton; Excavations at a Neolithic Causewayed Enclosure near Maxey, Cambridgeshire, 1982–7*, English Heritage Archaeol. Rep. 18

Rackham, J. and Snelling, A., 2004, The environmental archaeology, in Leary 2004, 61–72

Rainbird, P. 2007, *The Archaeology of Islands*, Cambridge, Univ. Press

Redfern, R., 2008, New evidence for Iron Age secondary burial practice and bone modification from Gussage All Saints and Maiden Castle (Dorset, England), *Oxford J. Archaeol.* 27(3), 281–301

Redfern, R.C., Hamlin, C. and Beavan Athfield, N., 2010, Temporal changes in diet: a stable isotope analysis of late Iron Age and Roman Dorset, Britain, *J. Archaeol. Sci.* 37, 1149–60

Redfern, R.C., 2011, A re-appraisal of the evidence for violence in the Late Iron Age human remains from Maiden Castle hillfort, Dorset, England, *Proc. Prehist. Soc.* 77, 111–38

Reilly, S., 2003, Processing the dead in Neolithic Orkney, *Oxford J. Archaeol.* 22, 133–54

Reimer, P.J., Baillie, M.G.L., Bard, E., Bayliss, A., Beck, J.W., Blackwell, P.G., Bronk Ramsey, C., Buck, C.E., Burr, G., Edwards, R.L., Friedrich, M., Grootes, P.M., Guilderson, T.P., Hajdas, I., Heaton, T.J., Hogg, A.G., Hughen, K.A., Kaiser, K.F., Kromer, B., McCormac, F.G., Manning, S.W., Reimer, R.W., Richards, D.A., Southon, J.R., Talamo, S., Turney, C.S.M., van der Plicht, J. and Weyhenmeyer, C.E., 2009, IntCal09 and Marine09 radiocarbon age calibration curves, 0–50,000 years cal BP, *Radiocarbon* 51, 1111–1150

Reynolds, A., 2009, *Anglo-Saxon Deviant Burial Customs*, Oxford

Richardson, A.F., 2005, *The Anglo-Saxon Cemeteries of Kent*, Oxford, Brit. Archaeol. Rep. 391

Riddler, I., 2001, The small finds, 228–52, in M. Gardiner, R. Cross, N. Macpherson-Grant and I. Riddler, Continental trade and non-urban ports in Mid-Anglo-Saxon England: excavations at *Sandtun*, West Hythe, Kent, *Archaeol. J.* 158, 161–290

Riddler, I., 2004, Anglo-Saxon Kent: early development *c.* 450 – *c.* 800, in Lawson and Killingray 2004, 25–28

Rielly, K., 2003, The animal and fish bone, in G. Malcolm and D. Browsher, *Middle Saxon London. Excavations at the Royal Opera House 1989–99*, MoLAS Monogr. 15, 315–324

Riley, H., 1990, The scraper assemblages and petit tranchet derivative arrowheads, in J. Richards, *The Stonehenge Environs Project*, 225–8, London, Historic Buildings and Monuments Commission for England, English Heritage Archaeol. Rep.16

Robert, I. and Vigne, J-D., 2002, Bearded vulture *gypaetus barbatus* contributes to the constitution of two different bone assemblages: modern reference data and an archaeological example in Corsica, *Acta zoologica cracoviensia* 45, 319–329

Roberts, C. and Cox, M., 2003, *Health and Disease in Britain from Prehistory to the Present Day*, Stroud, Sutton

Roberts, C. and Manchester, K., 1997, *The Archaeology of Disease*, Stroud, Sutton

Robertson-Mackay, M.E., 1980, A 'Head and Hooves' burial beneath a round barrow, with other Neolithic and Bronze Age sites, on Hemp Knoll, near Avebury, Wiltshire, *Proc. Prehist. Soc.* 46, 123–76

Robinson, E., 1994, The Geology and Building Stones of the Canterbury Area, in N.J.G. Pounds (ed.), *The Canterbury Area*, supplement to the Archaeological Journal Volume 151 for 1994, London, Royal Archaeological Institute, 9–14

Robledo, B., Trancho, G.J., and Brothwell, D., 1995, *Cribra Orbitalia*: health indicator in the late Roman population of Cannington (Sommerset [sic.], Great Britain), *J. Palaeopathology* 7(3), 185–193

Rogers, J., Waldron, T., Dieppe, P. and Watt, I., 1987, Arthropathies in Palaeopathology: the basis of classification according to most probable cause, *J. Archaeol. Sci.* 14, 179–193

Rogers, J. and Waldron, T., 1995, *A Field Guide to Joint Disease in Archaeology*, Chichester, Wiley

Rohl, B.M. and Needham, S.P., 1998, *The Circulation of Metal in the British Bronze Age: the Application of Lead Isotope Analysis*, London, British Museum Occas. Pap 102

Ross, A. 1962, Severed heads in wells: an aspect of the well cult, *Scottish Studies* 6, 31–48

Ross, A. 1967, *Pagan Celtic Britain: studies in iconography and tradition*, London, Routledge & Kegan Paul

Sabin, C. W., 1908, Agriculture in W. Page (ed), *Victorian History of the County of Kent, Volume 1*, 457–469, London, Archibald Constable

Salway. P., 1981, *Roman Britain*, Oxford, Clarendon Press

Sauer, E., 2002, The Roman invasion of Britain (AD 43) in imperial perspective: a response to Frere and Fulford, *Oxford J. Archaeol.* 21(4), 333–363

Saville, A., 1990, *Hazleton North, Gloucestershire, 1979–82: the Excavations of a Neolithic Long Cairn of the Cotswold–Severn Group, London*, English Heritage Archaeol. Rep. 13

Scheuer, L. and Black, S., 2000, *Developmental Juvenile Osteology*, London, Academic Press

Schiek, S., 1992, *Das Gräberfeld der Merowingerzeit bei Oberflacht*, Forschungen und Berichte zur Vor- und Frühgeschichte in Baden-Württemberg 41/1, Stuttgart, Konrad Theiss Verlag

Schoeninger, M.J. and DeNiro, M.J., 1984, Nitrogen and carbon isotopic composition of bone collagen from marine and terrestrial animals, *Geochimica et Cosmochimica Acta* 48, 625–639

Schweingruber, F.H., 1990, *Microscopic Wood Anatomy*, 3rd edition, Birmensdorf, Swiss Federal Institute for Forest, Snow and Landscape Research

Scott, E.M., 2003, The third international radiocarbon intercomparison (TIRI) and the fourth international radiocarbon intercomparison (FIRI) 1990–2002: results, analyses, and conclusions, *Radiocarbon* 45, 135–408

Scott, I., 2001, Metalwork and organic materials, in M. Biddle, J. Hiller, I. Scott and A. Streeten, *Henry VIII's Coastal Artillery Fort at Camber Castle, Rye, East Sussex: an Archaeological, Structural and Historical Investigation*, 257–82, Oxford, Oxford Archaeological Unit for English Heritage

Scott, J.G., 1992, Mortuary structures and Megaliths, in N. Sharples and A. Sheridan (eds.), *Vessels for the Ancestors*, 104–19, Edinburgh Univ. Press

Seager Smith, R., 2000, Worked bone and antler, in Lawson 2000, 222–240

Semple, S., 2003, Burials and political boundaries in the Avebury Region, North Wiltshire, in D. Griffiths, A. Reynolds and S.J. Semple (eds), *Anglo-Saxon Studies in Archaeology and History* 12, 72–91, Oxford, Oxbow Books

Serjeantson, D., 1996, The animal bones, in Needham and Spence, 194–223

Serjeantson, D., 2006, Food or feast at Neolithic Runnymede?, in D. Serjeantson and D. Field (eds.), *Animals in the Neolithic of Britain and Europe, Neolithic Studies Group seminar papers* 7, 113–34, Oxford, Oxbow Books

Serjeantson, D., 2007. Intensification of animal husbandry in the Late Bronze Age? The contribution of sheep and pigs, in C. Haselgrove and R. Pope (eds.), *The Earlier Iron Age in Britain and the Near Continent*, 80–93, Oxford, Oxbow

Serjeantson, D., 2011, *Review of animal remains from the Neolithic and Early Bronze Age of southern Britain (4000 BC – 1500 BC)*, English Heritage Res. Rep. 29

Shaffrey, R., 2003, The rotary querns from the Society of Antiquaries excavations at Silchester, 1890–1909, *Britannia*, 34, 143–174

Shand, G., 2005, *Archaeological Excavations At Chalk Hill, Ramsgate Harbour Approach Road 1997/8 The Stratigraphic Report*, Canterbury Archaeological Trust unpubl. rep.

Sharples, N.M., 2010, *Social relationships in later prehistory: Wessex in the 1st Millennium BC*, Oxford, Univ. Press

Shephard-Thorn, E.R., 1988, Geology of the country around Ramsgate and Dover, *Mem. Geol. Surv. G.B.*, Sheets 274 and 290 (England and Wales) HMSO

Sjøgren, K.G., Price, T.D. and Ahlstrom, T., 2009, Megaliths and mobility in south-western Sweden. Investigating relationships between a local society and its neighbours using strontium isotopes, *J. Anthropological Archaeol.* 28, 85–101

Slota, Jr P.J., Jull, A.J.T., Linick, T.W., and Toolin, L.J., 1987, Preparation of small samples for $^{14}$C accelerator targets by catalytic reduction of CO, *Radiocarbon* 29, 303–6

Smart, J.G.O., Bisson, G. and Worssam, B.C., 1966, *Geology of the Country around Canterbury and Folkestone*, London, HMSO

Smith, G., 1987, A Beaker (?) burial monument and a Late Bronze Age assemblage from East Northdown, Margate, *Archaeol. Cantiana* 104, 237–290

Smith, I.F., 1965, *Windmill Hill and Avebury: excavations by Alexander Keiller 1925–1939*, Oxford, Clarendon Press

Smith, I.F., 1973, The prehistoric pottery 9–14, in B. Philp, *Excavations in West Kent 1960–1970*, Dover, Research Reports in the Kent Series 2

Smith, M., 2006, Bones chewed by canids as evidence for human excarnation: a British case study, *Antiquity* 80, 671–685

Smith, W., 2011, Charred plant remains 100–105, in A. Andrews, L. Mepham, J. Schuster and C.J., Stevens, *Settling the Ebbsfleet Valley: High Speed 1 Excavations at Springhead and Northfleet, Kent – the Late Iron Age, Roman, Saxon and medieval landscape Vol. 4: Saxon and later Finds and Environmental Reports*, Salisbury, Oxford Wessex Archaeology

Stace, C., 1992, *New flora of the British Isles*, 2nd edition, Cambridge, Univ. Press

Stace, C., 1997, *New flora of the British Isles*, 2nd edition, Cambridge, Univ. Press

Stenhouse, M.J. and Baxter, M.S., 1983, $^{14}$C dating reproducibility: evidence from routine dating of archaeological samples, *PACT*, 8, 147–61

Stenton, F.M., 1971, *Anglo-Saxon England*, 3rd. edition, Oxford History of England 2. Oxford, Clarendon Press

Stevens, C.J., 2003, An investigation of agricultural consumption and production models for prehistoric and Roman Britain, *Environ. Archaeol.* 8, 61–76.

Stevens, C.J., 2006a, Charred plant remains from Little Stock Farm, Mersham, Kent, CTRL specialist report series, ADS 2006 CTRL digital archive, Archaeology Data Service: http://archaeologydataservice.ac.uk/archives/view/ctrl/downloads.cfm

Stevens, C.J., 2006b, Charred plant remains from Saltwood Tunnel, in J. Giorgi (ed.), *Palaeoenvironmental Evidence from Section 1 of the Channel Tunnel Rail Link, Kent*, CTRL Scheme-wide Specialist Report Series, ADS 2006 http://archaeologydataservice.ac.uk/archives/view/ctrl/downloads.cfm

Stevens, C.J., 2008, Cereal Agriculture and cremation activities, 296–9, in M.J. Allen, M. Leivers and C. Ellis, Neolithic Causewayed Enclosures and Later Prehistoric Farming: Duality, Imposition and the Role of Predecessors at Kingsborough, Isle of Sheppey, Kent, UK, *Proc. Prehist. Soc.* 74, 235–322

Stevens, C.J., 2009a, Environmental evidence, in Andrews *et al.* 2009, 91–92, 125–127, 133–134

Stevens, C.J., 2009b, The agricultural perspective, in Andrews *et al.* 2009, 148–149

Stockmarr, J., 1971, Tablets with spores used in absolute pollen analysis, *Pollen et Spores* 13, 614–21

Stoodley, N., 1999, *The Spindle and the Spear: a critical enquiry into the construction and meaning of gender in the Early Anglo-Saxon inhumation burial rite*, Oxford, Brit. Archaeol. Rep. 288

Stoodley, N., 2000, From the cradle to the grave: age organisation and the early Anglo-Saxon burial rite, *World*

*Archaeology* 31.3 456–72

Stoodley, N., 2002, Multiple burials, multiple meanings? Interpreting the early Anglo-Saxon multiple interment, in S. Lucy and A. Reynolds (eds), *Burial in Early Medieval England and Wales*, Society for Mediaeval Archaeology Monogr.

Stoops, G., 2003, *Guidelines for Analysis and Description of Soil and Regolith Thin Sections*, Madison, Wisconsin, Soil Science Society of America, Inc.

Straker, V., 2000, Charred cereals and weed seeds, in Lawson 2000, 84–91

Stuiver, M. and Kra, R.S., 1986, Editorial comment, *Radiocarbon* 28(2B), ii

Stuiver, M. and Polach, H.A., 1977, Reporting of $^{14}$C data, *Radiocarbon*, 19, 355–63

Stuiver, M. and Reimer, P.J., 1986, A computer program for radiocarbon age calculation, *Radiocarbon* 28, 1022–30

Stuiver, M. and Reimer, P.J., 1993, Extended $^{14}$C data base and revised CALIB 3.0 $^{14}$C age calibration program *Radiocarbon*, 35, 215–30

Swanton, M.J., 1973, *The Spearheads of the Anglo-Saxon Settlements*, London

Sykes, N.J., White, J., Hayes, T.E. and Palmer, M.R., 2006, Tracking animals using strontium isotopes in teeth: the role of fallow deer (*Dama dama*) in Roman Britain, *Antiquity* 80, 948–959

Teegen, W.-R. and Wussow, J., 2001, Tierkrankheiten im römischen Ladenburg – dargestellt an ausgewählten Fällen, *Beiträge zur Archäologie und prähistorischen Anthropologie* III, 75–80

Teichert, M., 1975, Osteometrische Untersuchungen zur Berechnung der Widerristhöhe bei Schafen, in A.T. Clason (ed.), *Archaeozoological studies*, 51–69, Amsterdam, North-Holland Publishing Company/Elsevier

Thanet Archaeological Trust, n.d, *Thanet: a prehistoric focus?* Broadstairs, Thanet Archaeological Trust

Thanet District Council, 1987, *The Gateway Island: archaeological discoveries in Thanet 1630–1987*, Thanet District Council

Trickett, M.A., Budd, P., Montgomery, J. and Evans J., 2003, An assessment of solubility profiling as a decontamination procedure for the 87Sr/86Sr analysis of archaeological skeletal tissue, *Applied Geochemistry* 18(5), 653–658

Trotter, M. and Gleser, G.C., 1952, Estimation of stature from long bones of American whites and Negroes, *American J. Physical Anthropology* 10(4), 463–514

Trotter, M. and Gleser, G.C., 1958, A re-evaluation of estimation of stature bases on measurements of stature taken during life and of long bones after death, *American J. Physical Anthropology* 16(1), 79–123

Tuross, N, Fogel, M L, and Hare, P E, 1988, Variability in the preservation of the isotopic composition of collagen from fossil bone, *Geochimica Cosmochimica Acta* 52, 929–35

Tylecote, R.F., 1979, The effect of soil conditions on the long term corrosion of buried tin bronzes and copper, *J. Archaeol. Sci.* 6, 345–68

Tyrrell, A., 2000, Skeletal non-metric traits and the assessment of inter- and intra-population diversity: past problems and future potential, in M. Cox and S. Mays (eds.), *Human Osteology in Archaeology and Forensic Science*, London, GMM

Ubelaker, D.H. and Willey, P., 1978, Complexity in Arikara mortuary practice, *Plains Anthropology* 23, 69–75

Vandeputte, K, Moens, L, Dams, R, 1996, Improved sealed-tube combustion of organic samples to $CO_2$ for stable isotopic analysis, radiocarbon dating and percent carbon determinations, *Analytical Letters* 29, 2761–2774

Vitt, V.O., 1952, The horses of the kurgans of Pazyryk, *J. Soviet Archaeol.* 16, 163–206

Waddell, J. 1998, *The Prehistoric Archaeology of Ireland*, Galway Univ. Press

Wahl, J., 1981, Beobachtungen zur Verbrennung menschlicher Leichname. Über die Vergleichbarkeit moderner Kremationen mit prähistorischem Leichenbränden, *Archäologisches Korrespondenzblatt* 11, 271–279

Wait, G.A., 1985, *Ritual and Religion in Iron Age Britain*, Oxford, Brit. Archaeol. Rep. 149

Walker, L., 1984, The deposition of the human remains 442–463, in B. Cunliffe, Danebury; *An Iron Age Hillfort in Hampshire Vol. 2. The excavations, 1966–1978: the Finds*, Counc. Brit. Archael. Res. Rep. 52

Ward, G.K. and Wilson, S.R., 1978, Procedures for comparing and combining radiocarbon age determinations: a critique, *Archaeometry* 20, 19–31

Weir, A.H., Catt, J.A. and Madgett, P.A., 1971, Postglacial soil formation in the loess of Pegwell Bay, Kent (England), *Geoderma* 5/2, 131–49

Wells, L.H., 1962, Report on the inhumation burials from the West Kennet Barrow 79–89, in S. Piggott, *The West Kennet Long Barrow; Excavations 1955–56*, HMSO

Wessex Archaeology, 1992, *Weatherlees Hill WTW, Nr Ramsgate, Kent. Archaeological evaluation*, unpubl. client report, ref. W516/34986

Wessex Archaeology, 1998, *Technical report: Margate and Broadstairs WTW Enhancement Scheme (revision)*, unpubl. client report, ref. 42992.03

Wessex Archaeology, 2004a, *Cliffs End Farm, Ramsgate, Kent.*

*Evaluation report*, unpubl. client report ref. 56330.02

Wessex Archaeology, 2004b, *Cliffs End Farm, Ramsgate, Kent. Project design for an archaeological excavation*, unpubl. client report ref. 56950.01

Wessex Archaeology, 2004c, *Cliffs End Farm, Ramsgate, Kent. Method statement for archaeological excavation of an apparently unique mortuary feature*, unpubl. client report ref. 56950.02

Wessex Archaeology, 2004d, *Weatherlees Wastewater Treatment Works, Ebbsfleet, Kent: archaeological evaluation report*, unpubl. client report ref. 54746.05

Wessex Archaeology, 2006a, *Cliffs End Farm, Ramsgate, Kent. Archaeological assessment report*, unpubl. client report ref. 56950.04

Wessex Archaeology, 2006b, *Margate and Broadstairs Urban Wastewater Treatment Scheme, archaeological assessment report and updated project design for analysis and publication*, unpubl. client rep. ref. 59481.02

Wessex Archaeology, 2006c, *Reports on 1) radiocarbon results and 2) charred plant remains, from the excavations at Westwood Cross, Broadstairs, Thanet*, unpubl. client rep. ref. 64040.1

Wessex Archaeology, 2007, *Cliffs End Farm, Ramsgate, Kent. Archaeological assessment report – additional information and updated project design,* unpubl. client rep. ref. 56950.05

Whimster, R., 1981, *Burial Practices in Iron Age Britain a Discussion and Gazetteer of the Evidence* c. *700 B.C. – A.D. 43, Oxford*, Brit. Archaeol. Rep. 90 (i and ii)

Whitcher Kansa, S. and Campbell S., 2004, Feasting with the dead? – a ritual bone deposit at Domuztepe, south eastern Turkey (*c.* 5550 cal BC), in S. Jones O'Day, W. van Neer and A. Ervynck (eds), *Behaviour behind bones*, 2–13, Oxford, Oxbow Books

White, C., Longstaffe, F.J. and Law, K.R., 2004, Exploring the effects of environment, physiology and diet on oxygen isotope ratios in ancient Nubian bones and teeth, *J. Archaeol. Sci.* 31, 233–250

Whittle, A. and Wysocki, M., 1998, Parc le Breos Cwm Transepted Long Cairn, Gower, West Glamorgan: Date, Contents, and Context, *Proc. Prehist. Soc.* 64, 139–182

Williams, H., 2006, *Death and Memory in early Medieval Britain*, Cambridge

Williams, H.M.R., 1997, Ancient landscapes and the dead: the reuse of Roman and prehistoric monuments as early Anglo-Saxon burial sites, *Medieval Archaeology* 41, 1–32

Willson, J., 1984, A prehistoric site near Foads Lane, Cliffsend, *Kent Archaeol. Rev.* 78, 181–85

Wilson, C.E., 1981, Burials within settlements in southern Britain during the Pre-Roman Iron Age, *Bulletin* (18), Institute of Archaeology, London

Wilson, D.M., 1971, *The Anglo-Saxons*, Harmondsworth, Penguin

Wilson, T., 1998, Appendix 2: the lithics, in D.R.J. Perkins, E. Boast, T. Wilson and N. Macpherson-Grant Kent International Business Park, Manston: excavations and evaluations 1994–1997, report 1, *Archaeol. Cantiana* 117, 240–3

Winder, J.M., with Gerber-Parfitt, S., 2003, The oyster shells, in G. Malcolm and D. Bowsher, with R. Cowie, *Middle Saxon London, Excavation at the Royal Opera House 1989–94*, 325–332, MoLAS Monog. 15

Windl, H., (ed.) 1996, *Rätsel um Gewalt und Tod vor 7000 Jahren: eine Spurensicherung; Ausstellung im Museum für Urgeschichte Asparn a. d. Zaya*, Katalog des Niederösterreichischen Landesmuseums N.F. 393. Wien: Amt der NÖ Landesregierung, Kulturabteilung

Witkin, A., 2006, Human remains from White Horse Stone, Kent *CTRL Specialist Report Series*, ADS 2006 http://archaeologydataservice.ac.uk/archives/view/ctrl/downloads.cfm

Worsfold, F.H., 1943, A report on the Late Bronze Age site excavated at Minnis Bay, Birchington, Kent, 1938–40, *Proc. Prehist. Soc.* 9, 28–47

Wright, L.E. and Schwarcz, H.P., 1998, Stable carbon and oxygen isotopes in human tooth enamel: identifying breastfeeding and weaning in prehistory, *American J. Physical Anthropology* 106, 1–18

Wyles S.F., 2005, Marine Shells, 154, in V. Birbeck with R.J.C. Smith, P. Andrews and N. Stoodley, *The Origins of Mid-Saxon Southampton, Excavations at the Friends Provident St Mary's Stadium 1998–2000*, Wessex Archaeology Rep. 20

Wyles, S.F., 2009, Marine shell 237–8, in A. Hutcheson and P. Andrews, A Late Bronze Age, Anglo-Saxon, and Medieval Settlement Site at Manston Road, Ramsgate, in Andrews *et al.* 2009

Xu, S, Anderson, R, Bryant, C, Cook, G T, Dougans, A, Freeman, S, Naysmith, P, Schnabel, C, and Scott, E M, 2004, Capabilities of the new SUERC 5MV AMS facility for $^{14}$C dating, *Radiocarbon* 46, 59–64

Yates, D., 2004, Kent in the Bronze Age: land, power and prestige *c.* 1500 – *c.* 700 BC, in Lawson and Killingray, 2004, 13–15

Yonge, C.M., 1960, *Oysters*, Collins New Naturalist Series Collins

York, J., 2002, The life cycle of Bronze Age metal work from the Thames, *Oxford J. Archaeol.* 21(1), 77–92

Young, R. and Humphrey, J., 1999, Flint use in England after the Bronze Age: time for a re-evaluation? *Proc. Prehist. Soc.* 65, 231–42

# Index

**Compiled by** *Susan M. Vaughan*

Illustrations are indicated by page numbers in italics or by illus where figures are scattered throughout the text.

Excavations at Cliffs End Farm, Thanet, Kent, undertaken in 2004/5 uncovered a dense area of archaeological remains including Bronze Age barrows and enclosures, and a large prehistoric mortuary feature, as well as a small early 6th to late 7th century Anglo-Saxon inhumation cemetery. An extraordinary series of human and animal remains were recovered from the Late Bronze Age–Middle Iron Age mortuary feature, revealing a wealth of evidence for mortuary rites including exposure, excarnation and curation.

The site seems to have been largely abandoned in the later Iron Age and very little Romano-British activity was identified. In the early 6th century a small inhumation cemetery was established. Very little human bone survived within the 21 graves, where the burial environment differed from that within the prehistoric mortuary feature, but grave goods indicate 'females' and 'males' were buried here. Richly furnished graves included that of a 'female' buried with a necklace, a pair of brooches and a purse, as well as a 'male' with a shield covering his face, a knife and spearhead. In the Middle Saxon period lines of pits, possibly delineating boundaries, were dug, some of which contained large deposits of marine shells.

English Heritage funded an extensive programme of radiocarbon and isotope analyses, which have produced some surprising results that shed new light on long distance contacts, mobility and mortuary rites during later prehistory.

This volume presents the results of the investigations together with the scientific analyses, human bone,

ENGLISH HERITAGE

MILLWOOD
DESIGNER HOMES LIMITED

wessex archaeology

WA Report 31