

Settlement and Community in the Fir Tulach Kingdom

Archaeological excavation on the M6 & N52 road schemes

Paul Stevens & John Channing

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With contributions by
Anne Connon, Margaret Murphy, Aidan O'Sullivan,
Pat Randolf-Quinney & Tim Young

Academic editor
Niall Brady

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Map of Leix and Offaly c. 1563 showing the adjacent territory of Fartullagh, in Westmeath. (Courtesy of the British Library Board. Cotton:Augustus, I, ii. 40. A map of some interior parts of Ireland [King's and Queen's counties] on canvas)
Experimental reconstruction of an early medieval handbell by Tim Young, based on research into the metallurgical remains from Clonfad.

Back Cover Illustrations:
10th century decorated ring pin from Rochfort Demesne enclosure (John Sunderland)







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E2798 Vol 1.pdf E2798 Vol 2.pdf E2798 Vol 3.pdf	Channing, J '*N6 Kinnegad to Kilbeggan Dual Carriageway: Archaeological resolution (A001/032; E2798), Site Ballykilmore 6, Ballykilmore Townland, Co. Westmeath*' (3 Volumes). Final report for Westmeath County Council. Valerie J Keeley Ltd.
E3315.pdf	Channing, J '*N52 Mullingar Belvedere Road Improvement Scheme: Archaeological resolution (A006/003; E3315), Rochfort Demesne Townland, Co. Westmeath*'. Final report for Westmeath County Council. Valerie J Keeley Ltd.
Geophysics.pdf	Nicholls, J '*N6 Kinnegad–Kilbeggan Road Scheme: Geophysical survey adjacent to Clonfad Monastic Site (WM032:089: 09R121), Clonfad Townland, Co. Westmeath*'. Survey report for Valerie J Keeley Ltd. TARGET Geophysics.
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FOREWORD

It is with great pleasure that I introduce *Settlement and Community in the Fir Tulach Kingdom*, the first major archaeological publication to be published by Westmeath County Council through the auspices of the National Roads Authority. This book presents the long awaited results of three of the most significant archaeological excavations on the N6 Kinnegad to Kilbeggan and the N52 Mullingar to Belvedere road schemes in County Westmeath.

The N6 Kinnegad to Kilbeggan scheme was one of the first major sections of high quality dual carriageway constructed along the N6 route as part of the major inter-urban route from Galway to Dublin. The scheme was completed in July 2007 and was upgraded to motorway status (M6) in September 2008. The N52 Mullingar to Belvedere scheme, a continuation of the N52 Mullingar Bypass was constructed as a standard single dual carriageway and opened in May 2007. Both projects were constructed under the Government's Transport 21 programme and National Development Plan.

This publication focuses on three archaeological sites—Rochfort Demesne, Ballykilmore and Clonfad—all of which share their origins in the early medieval period within the ancient kingdom of *Fir Tulach* in central Westmeath. The sites provide a rich and varied picture of settlement activity set within a wider early medieval landscape.

Rochfort Demesne is presented as a secular defensive site with intriguing finds such as a rare Iron Age pin, interpreted as an heirloom object ritually deposited at the entrance to mark the opening or closing of the site. Ballykilmore, a previously unknown burial and settlement site, sheds light on how a community's inhabitants lived, worked and died. The excavations at the early monastic site at Clonfad acquaint us with life in an early monastery. The unique and unparalleled metalworking evidence for the production of handbells found on this site is probably one of the most recent and exciting discoveries relating to the early Irish Church.

This book represents the fruition of many years of archaeological work on the M6 and N52. The accumulated efforts of the archaeologists have resulted in the composition of this unique and significant contribution to Westmeath's rich archaeological and historical heritage. In addition to this book, Westmeath County Council in partnership with the National Roads Authority and Valerie J Keeley Ltd have also had the opportunity to communicate these findings to the public by hosting the very successful archaeological exhibition 'Hidden Landscape: Searching for the Lost Kingdom of Mide', which was held at various locations throughout the county in 2008 and 2009. A local schools outreach programme also allowed children to experience at first-hand archaeological excavation by providing them with access to the archaeological teams and specialists at the forefront of these excavations.

I would like to congratulate and thank all those who were involved in these projects, particularly Valerie J Keeley Ltd, the staff of the Westmeath National Road Design Office and the National Roads Authority archaeologists. Finally I would like to acknowledge the National Roads Authority for providing the funding for both schemes.

Daniel McLoughlin
Westmeath County Manager



Experimental reconstruction of an early medieval handbell by Tim Young of GeoArch. The reconstruction is based on research on the metallurgical evidence from Clonfad monastic site which included vitrified clay fragments interpreted as debris from the brazing of handbells. This experimental project was jointly commissioned by the National Roads Authority and the National Museum of Wales.

PREFACE

The central midlands of Ireland are perhaps best known to medieval archaeologists for the number of Viking Age silver hoards that have been associated with Lough Ennell, when the lake was a place of central importance to the Clann Cholmáin kings of early Mide. In the 1980s, the National Museum of Ireland and Cornell University investigated the lake through extensive survey and limited excavation. While the research emphasised the potential of underwater archaeology more generally, it helped to demonstrate further the complex history associated with Lough Ennell and its surrounding landscape. The historic landscape has provided the frame of reference for each of the three early medieval site excavations reported in this book, and the authors were encouraged to understand the setting of these sites 'within' their wider context. As readers will discover, the lands east and south of the lake lay within the territory of the Fir Tulach, who were subjects of the Clann Cholmáin, and we are now able to get a clear insight to the extent of this early territory and a sense of its wealth and resources. The volume shows activity at the highest levels of early Irish society, and the nature of the metalworking observed at the monastic site of Clonfad reveals the importance of this almost forgotten monastery which has gone unnoticed until now. The excavations at Ballykilmore in turn help to reveal much about ordinary life. The recovery of a cemetery that was in use by a small community for over a millennium has provided a most interesting population of individuals, whose skeletal analysis reveals much that is of interest to those who are curious about population movement and the ardour of work and labour in medieval Ireland.

Westmeath County Council and the National Roads Authority are to be congratulated for working so closely with the archaeological consultancy to ensure a most impressive presentation of information relating to the early medieval landscape of central Westmeath.

Niall Brady FSA
Academic Editor

OVERVIEW OF FINDINGS

The unprecedented economic growth of the last two decades has resulted in a major acceleration in the national roads programme, under the direction of the National Roads Authority. From an archaeological perspective an invaluable consequence of these large-scale developments has been the wealth, range and scope of the archaeological heritage uncovered. During this time, I have witnessed both a series of major changes, with respect to the scale of road projects and a broad spectrum of attitudes towards archaeology and its perceived place within these projects. These changes extend to the public, our engineering and design team colleagues, but also very significantly to shifts within Irish archaeology itself.

I am particularly pleased that archaeological consultants are now consistently engaged with other professionals, including engineers, architects and planners, to ensure that in any development our past and heritage are respected, properly recorded and preserved.

The publication of the archaeological findings on the M6 and the N52 represents the culmination of several years work, commencing with the environmental impact assessment, followed by an intensive series of topographical, aerial and geophysical surveys, extensive excavation and, finally, post-excavation analyses and reporting. The decision by Westmeath County Council to improve the existing road network south of Mullingar created the opportunity to investigate a section of the landscape of central Westmeath that has lain outside the reach of modern scholarship. The three sites which are presented in this volume form one part of the archaeology associated with the overall road schemes. A series of other excavations were also conducted but these are not included as part of this book.

Despite the fact that road schemes have an inherent bias with regard to their linear nature, we are fortunate that the M6 and N52 road schemes produced three sites which were more or less contemporary with each other during the early medieval period and which are important new additions to the archaeological record.

Although much is already known about the early history of Westmeath, the archaeological narrative is based on relatively few excavations and even fewer large-scale projects. This book provides fresh insight and forms a solid foundation to any landscape study in the future.

We generally think of early medieval enclosures as being either ringforts or monastic sites. This simple classification is based mainly on cartography and field survey. Excavation reveals a much more varied picture, as represented by Rochfort Demesne, Ballykilmore and Clonfad. In the present case, Rochfort Demesne was a secular defensive site and the traditional explanation as a ringfort now seems to be too simplistic. John Channing's excavation prompts the profession to rethink its nomenclature and this is a positive outcome of the ongoing process of synthesis. One of the recurring themes of current infrastructural scheme archaeological projects is the realisation of how constrained

archaeologists are by existing paradigms. The models of cultural development that explained how society developed in Ireland are no longer as valid today as they were even ten years ago, and we all share the responsibility of defining new histories.

The excavation at Ballykilmore is a further example of 'new potential', where a 'lost' cemetery of very Early Christian date was rediscovered in the course of the modern roadworks. The fact that Ballykilmore continued in use as a cemetery throughout the later medieval period and was still forgotten should provoke archaeologists to wonder at how many other sites remain unknown, and the implications this has for our understanding of medieval population levels.

The monastic site at Clonfad is associated in the annals with Finnian and abbot Librán. Until very recently it was viewed as little out of the ordinary and was not ranked with the greater midland foundations like Durrow or Rahan, near Tullamore. Paul Stevens' excavations here have changed this view significantly. In addition to the multiple enclosures discovered at the site, Clonfad will undoubtedly enter the archaeological literature because of the metalworking evidence discovered, and in particular, because of the production of monastic handbells on the site. This observation has international implications since handbells are a symbol of early Irish/Celtic Christianity across Ireland and northern Britain. Bells had a central function in Church ritual. That this was particularly true in Ireland is shown by representations of clerics with handbells of Irish form on high crosses and decorated slabs like Killadeas in Fermanagh. Of the four known handbells from Westmeath, two were found near Mullingar. Could these have been manufactured at the Clonfad workshop?

Another mechanism whereby the results of excavation can be made accessible to the public is that of exhibition. In 2008, Valerie J Keeley Ltd was afforded the opportunity to develop such an exhibition, in association with Westmeath County Council and administered by the National Roads Authority, entitled 'Hidden Landscape: Searching for the Lost Kingdom of Mide'; using audio-visual presentations, reconstructed artefacts and graphic design, the exhibition described an emerging picture of this landscape and the archaeological and scientific methods used to reconstruct the past. The exhibition opened at Belvedere House near Mullingar on 16 April 2008 for six months and has since moved to a series of locations throughout Westmeath, allowing a wonderful opportunity to display the findings within the locality in which they were excavated.

In bringing this project of excavations to its conclusion, in the form of excavation reports and this monograph, we have been very fortunate in being able to assemble a strong international team of archaeologists, assistants and specialists. I wish to express my thanks for their work, enthusiasm and commitment. I am very pleased to have had the opportunity to support this contribution to the study of early medieval sites and landscapes, and I would like to acknowledge fully the assistance of Westmeath County Council, the National Roads Authority and our regulatory authorities of the National Monuments Service, and the National Museum of Ireland for their assistance and support throughout.

Valerie J Keeley
Managing Director
Valerie J Keeley Ltd

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Valerie J Keeley Ltd would like to acknowledge and thank Westmeath County Council, Westmeath National Road Design Office staff, particularly John Ahern and Michael Kelly, and the National Roads Authority, Rónán Swan (NRA Head of Archaeology), Orlaith Egan and Jerry O'Sullivan (NRA Archaeologists), for their assistance in this publication. We also wish to acknowledge the consulting engineers; Roughan O' Donovan/Ryan Hanley WSP JV, on the N6 Kinnegad to Kilbeggan Dual Carriageway scheme, especially Morgan Hart (Project Engineer), and J B Halcrow Barry & Partners, on the N52 Mullingar to Belevedere road scheme.

Thanks are also due to the staff of the National Monuments Service and the National Museum of Ireland. Both archaeological resolution contracts for the N6 Kinnegad to Kilbeggan and N52 Mullingar to Belvedere road schemes were project managed by Valerie J Keeley Ltd Senior Archaeologists, Ros Ó Maoldúin (N6) and John Channing (N52). The excavations presented in this book are only part of a much larger campaign of archaeological mitigation of both road schemes, and we wish to acknowledge the work of the various other directors and staff on both schemes not otherwise presented here.

The three archaeological excavations detailed in the present volume were directed by John Channing (Rochfort Desmesne, Ballykilmore), and Paul Stevens (Clonfad), with the assistance of a large team of archaeologists: the Supervisors were Stephen Balfe, Jim Crane, Damien Maguire, Jason Marchant, Eileen McKenna and Tomás Petervery (Rochfort); Rob Brown, Ken Curran, Maeve Grant, Niall Fitzpatrick, Damien Maguire, Niall O'Neill and Tomás Petervery (Ballykilmore); Graeme Laidlaw, Rex Bangerter, Mohammad Al Friahat, and Joanne Ó Meardhra-Elder (Clonfad). Site Assistants were Noel Aherne, Mark Andrews, Catherine Balck, Gary Barber, Ellen-Maeve Bergh, Roisín Burke, Graeme Butterfield, Julian Charbennier, Johan Claeys, Tom Connell, Grace Corbet, B Crossan, Sylvain Dubogney, Anna Dunphy, Niall FitzPatrick, Maria Golpe-Varela, Pat Flavin, Ann Foley, Deirdre Forde, Leah McCullough, David Glynn, Marc Guernon, Lisa Hartznell, Anna Henry, Michael Keaveney, Peter Larson, Jerry Lenehan, Susan Lynch, Aileen McKerr, Jack McLoughney, Martin McGowan, Fiona McAuliffe, Ríona McMorrow, Catherine McNamara, Andre Meredith, Emma Miller, Nabil Montasser, Lee Moran, Robert Murphy, Jerry O'Dwyer, Maria Olander, Kristina Olli, Liam O'Rourke, Sara Porteus, Pat Reid, Brigitta Péterváry-Szanyi, Sean Rooney, Aideen Stevens, Karin Svensson, Giza Szollisi. Lands Surveyors were Cormac Bruton, Sinead Donnelly. Post-excavation Supervisors were Joanne Ó Meardhra-Elder, Suzanne Ní hAodha and Jason Marchant. Technical illustrations were by Noel Aherne, Aideen Stevens, Catherine McNamara, Ger Wallace, Lisa Wilson, Jenny Breslin, and David Rooney.

Specialists analysis was carried out by Katharina Becker, Jason Bolton, David Brown, Anne Carey, Cecily Cropper, Joseph Crowther, Mary Dillon, Nyree Finlay, Susannah Kelly, Jackeline Mac Dermott, Stephen Mandal, Clare McCutcheon, Emma Miller, John Nicholl, John Nicholls, Joe

Norton, Ellen O Carroll, Aidan O'Sullivan, Pat Randolph-Quinney, Eileen Reilly, Ian Riddler, Órla Scully, Lena Strid, Karin Svennson, Nichola Trzaska-Nartowski, Richard Unitt, Alys Vaughan-Williams, Tim Young. Landowners were William and Mary Kelly (Rochfort), Thomas Fox (Ballykilmore) and Peter Fagan (Clonfad).

Thanks also to Cormac Bourke, Niall Carlin, Niall Brady, Matt Seaver, Angela Wallace, Cóilín Ó Drisceoil and Aidan O'Sullivan, for use of their unpublished material; and the Irish Research Council for Humanities and Social Sciences (IRCHSS) senior research scholar and the Irish National Strategic Archaeological Research (INSTAR) programme-funded Early Medieval Archaeology Project (EMAP) for research and assistance in completing Chapters 2 and 3. Also to Nikolah Gilligan for her comments on Chapter 9. All photographs and illustrations used in this volume that are not otherwise attributed are copyright of Valerie J Keeley Ltd.

Finally, thanks to the publication team, especially the external academic editor, Niall Brady, project co-ordinator, Paul Stevens, and illustrator, Lisa Wilson. Copy-editing was carried out by Editorial Solutions (Ireland) Ltd and typesetting, design and printing by Artwerk Ltd and Brunswick Press Ltd.

1

INTRODUCTION

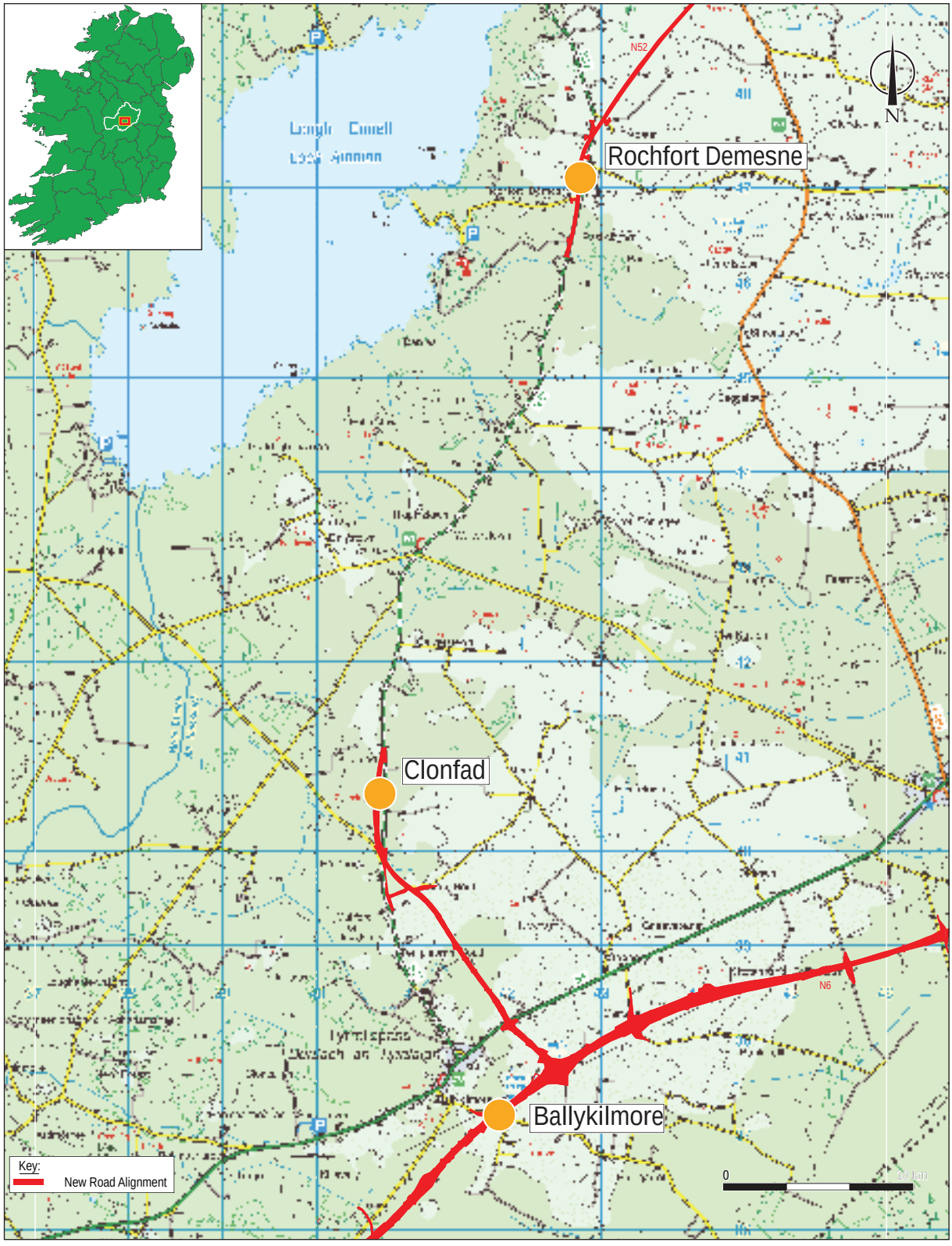
Paul Stevens and John Channing

Archaeological excavation along the M6 and N52 south and east of Lough Ennell, Co. Westmeath, has uncovered a series of three early medieval sites within the former territory of the *Fir Tulach* ('men of the hillocks') on the east side of the lake, and form the basis for a study of the landscape associated with these people who were subject to the ruling Clann Cholmáin kings of early Mide (Illus. 1.1). In presenting the results of the excavations at each of the three sites, the volume follows a logical order that moves from the secular earthwork site at Rochfort Demesne, to the previously unknown enclosed graveyard at Ballykilmore, to the multi-vallated monastic enclosure of Clonfad, which contemporary sources note as being founded in the sixth century and abandoned after a catastrophic fire in AD 891.

The book begins, however, with a series of background chapters to introduce the reader to the wider landscape of the central midlands of Ireland, by describing the physical landscape as well as the development of settlement across this area of lakes and low-lying ground. Chapters 4 and 5 present what is known of the historical events associated with the early medieval and the later medieval periods respectively. An account of each of the excavations follows. The volume concludes with a short discussion of the principal observations.

Aidan O'Sullivan begins the first section by describing the physical landscape that defines the study area, and the nature of the underlying bedrock, Quaternary geology, soils and topography that form the distinct and varied landscape that is County Westmeath. The same author provides an overview of the existing level of archaeological enquiry in Westmeath with particular reference to the early medieval period in Chapter 3. Despite a rich and varied archaeological heritage, defined by ringforts, crannogs and church sites that populate a county of lakes, bogs and natural routeways provided by glacial features in the landscape, there has been little excavation conducted. In contrast, surveys have been carried out in what he describes as the political hub of central Ireland in this period. The association between royal sites, ringforts and crannogs, in and around Lough Ennell, is of particular significance to the three sites in this volume, and remains a theme throughout the volume.

Anne Connon takes the known archaeological narrative a step further in Chapter 4, by charting the early territories and lordships within the study area. This chapter highlights the early historical wealth and position of the ancient territory of the Fir Tulach, in which the three excavated sites lie. It considers the relationship of the Fir Tulach to the Clann Cholmáin overlords and the ruling kings of Tara who put the wider midlands region to the forefront of Irish politics in the early medieval period, and also addresses the role of the Church. Margaret Murphy completes the background chapters of the book by providing in Chapter 5 an overview of what is known from the sources relating to the high and late medieval periods; namely, after c. AD 1170 with the coming of the Anglo-Normans. The chapter provides an important context in which to set archaeological horizons recorded at both Ballykilmore and Clonfad from this later period.



Illus. 1.1 *Location map, showing three sites described in this volume (based on Ordnance Survey Ireland Discovery Series 1:50,000).*

The second section presents the results of the archaeological excavations of the three early medieval enclosure sites. Beginning with Rochfort Demesne enclosure, John Channing describes the excavation of an upstanding field monument that was identified prior to the scheme variously as a ringfort, a folly and a post-medieval landscape feature. Channing notes how the results of the excavations revealed it was all three and much more. The chapter presents the site's several phases of early medieval activity commencing as a small univallate enclosure, later remodelled and expanded. In the 18th century, a small quarry was excavated through the site and, as part of landscaping works associated with the wider demesne, including the construction of an enclosure around the top of the mound. More importantly, the association of this site with the surrounding hinterland and archaeological monuments on Lough Ennell generates a series of possible conclusions relating to status and affiliations with the Clann Cholmáin, adding further to the associated archaeology and early history surrounding the Lough. In the second of the excavation narratives, a very different type of activity is discussed by John Channing. Ballykilmore was unknown prior to work on the road scheme, and excavations revealed the origins of the site as an early fifth-century settlement enclosure, which was quickly transformed into a burial ground. Burial was concentrated in one half of the site, while occupation activity involving iron-working and pits was seen throughout the site. Burial, however, formed the overarching use of the enclosure at Ballykilmore, continuing as a *cillín* well into the post-medieval period. The site has produced an important collection of human remains and this has provided the opportunity for a detailed study of the buried population represented in the assemblage (Appendix 2.pdf). The excavation of the Clonfad monastic site is reported in Chapter 8 by Paul Stevens. The site was excavated where the road sought to avoid impacting on the ruined church and graveyard that still exist today. The excavation exposed very extensive remains of the larger site area, which was enclosed by two (possibly three) oval ditches, covering an area of over 180 m in diameter. The extensive earthworks, traced with the help of geophysical survey, encompass the natural hillock and join the stream. Three phases of early medieval occupation were established, dating from the sixth to the 10th centuries. The Clonfad excavations have revealed a much larger monastic footprint than was thought to have existed on this site. The excavations have also revealed clear and extensive evidence that the site served as a production centre for the manufacture of ecclesiastical handbells, throughout the seventh to ninth centuries. A very large-scale operation is seen at Clonfad, with smithing hearths producing large amounts of waste and some of the largest slag cakes seen in this period. The skill and knowledge required for this process would have been among the most highly prized and technologically advanced in the early medieval world at the time. The iron-working suggests an equivalency in craftsmanship with other masterpieces of ecclesiastical workshops, and suggests that Clonfad would have been regarded as an important centre.

Chapter 9 presents a director's overview of the main dietary and environmental evidence derived from all three sites. The synthesis reviews the primary analysis of specialists who have provided detailed site-specific reports in the accompanying CD-Rom. Significant comparisons between the three very different settlements are made that reveal both management and acquisition of food as well as indications of environmental conditions, at all three early medieval sites. A broadly similar dietary preference was observed at all three sites.

The importance of the results from the excavations completed at Rochfort Demesne, Ballykilmore and Clonfad goes far beyond their individual contexts. The present volume is concerned with the presentation of the results in a manner that will both interest and excite the readers, whether they are archaeologists or not. The success of the volume will ultimately be determined, however, by the impact it may have on the interpretations of other excavations and on research projects over the next decade, and beyond. Through the occasion of the M6 and N52 road schemes, the archaeological



Illus. 1.2 Clonfad excavations from the air, showing the new road alignments passing the graveyard.

narrative of central Westmeath has become greatly enriched and ensures that scholarly interest in this midlands region endures and flourishes.

A CD-Rom accompanies the printed volume. It contains bonus material, including two additional chapters and a survey report, specifically commissioned for this volume and presented as separate files on the disc.

Appendix 1 (which appears as a pdf on the CD-Rom and is also included at the rear of the printed volume) details the calibrated radiocarbon dates for all three sites. Appendix 2.pdf (CD-Rom) is Pat Randolph-Quinney's analysis of the human bones recovered during the excavations of the cemetery at Ballykilmore, and presents an opportunity to study a community population from the early medieval period through to the 18th or 19th centuries. Quinney takes the reader through the various aspects of the human condition—from the fragility of labour and childbirth, through infant mortality, physical pain and stress, disease and genetic pathologies, to old age (mid-40s) and the palliative care administered. The assemblage represents a small stable population over the course of some 1,000 years, and this stability helps to sharpen our perspective of the nature of change and social transformations that we generally associate with the course of medieval history.

In Appendix 3.pdf (CD-Rom), Tim Young discusses the metallurgical evidence from all three excavations. Taken as a whole, it provides the full range of the iron-working process, with iron ore smelting observed at Ballykilmore, localised smithing at Ballykilmore, manufacture of objects at Rochfort, and the highly specialised production at Clonfad. The appendix, which is a marker for future research, provides a comparative analysis with early medieval iron-working in Ireland, based largely on recent work carried out, notably from road scheme projects.



Illus. 1.3 Ballykilmore, excavation in progress.

The accompanying CD-Rom also contains the full archival reports associated with each excavation, as submitted to the Department of the Arts, Heritage and the Gaeltacht in fulfilment of the licensing requirement for the excavations. Reports are listed by registration and volume number (e.g. E3315 Vol 1.pdf). Throughout the printed volume, reference is made to the CD-Rom using the specialist author's surname and file name (.pdf), and readers are encouraged to read those more detailed reports for additional information.

2

PHYSICAL LANDSCAPE AND ENVIRONMENT IN WESTMEATH

Aidan O'Sullivan

Physical topography, rivers and lakes

Westmeath is a low-lying geographical space that is in keeping with most of the midlands of Ireland (Illus. 1.1). It has only a few low hills, mostly located in the northern end of the county, within the barony of Fore (e.g. The Hill of Moat at 251 m, Knockeyon at 215 m, the Hill of Fore at 187 m), as well as in the adjoining baronies of Corkaree and Farbill. The rest of the county is generally level, broken here and there by gently rolling glacially derived kame and kettle hills and sandy esker ridges. There are some raised bogs, particularly in the south and east on the borders with Offaly and Meath.

Most of the county is drained by the River Shannon drainage basin. The north-west district is drained by the River Inny which flows south-westwards into the Shannon at Lough Ree. The Inny forms the county boundary with County Longford to the north and was traditionally the political boundary between the early medieval territories of Mide and Tethbae. To the south-west, the landscape is drained largely by various rivers emptying into the River Shannon, particularly the River Brosna, which flows out of Lough Ennell and southwards through County Offaly before flowing into the River Shannon. To the east, the county is drained by several tributaries of the River Boyne, including the Rivers Blackwater and Adeel.

Westmeath has long been known by travellers, artists and poets for its lakelands (Illus. 2.1; Piers 1981, 3–19). It has a range of lakes, varying in location, size, depth and overall appearance, notable examples being Lough Ree, Lough Derravaragh, Lough Owel and Lough Ennell (WCC 1997). Situated on the River Brosna, c. 4 km south of Mullingar, Lough Ennell frames the western side of the present study area. The lake measures 7 km long by 4 km wide and covers an area of 1,300 ha. It has a huge area of shallow water, and almost half of the lake is less than 3 m in depth. It has several natural islands, including Dysart Island, Inchcrone and Cherry Island, some of which have become attached to the land following land drainage schemes in the 1950s. There are at least 22 known crannogs on the lake, and it is surrounded by a rich early medieval secular and ecclesiastical landscape, some of which has now been revealed by this study.

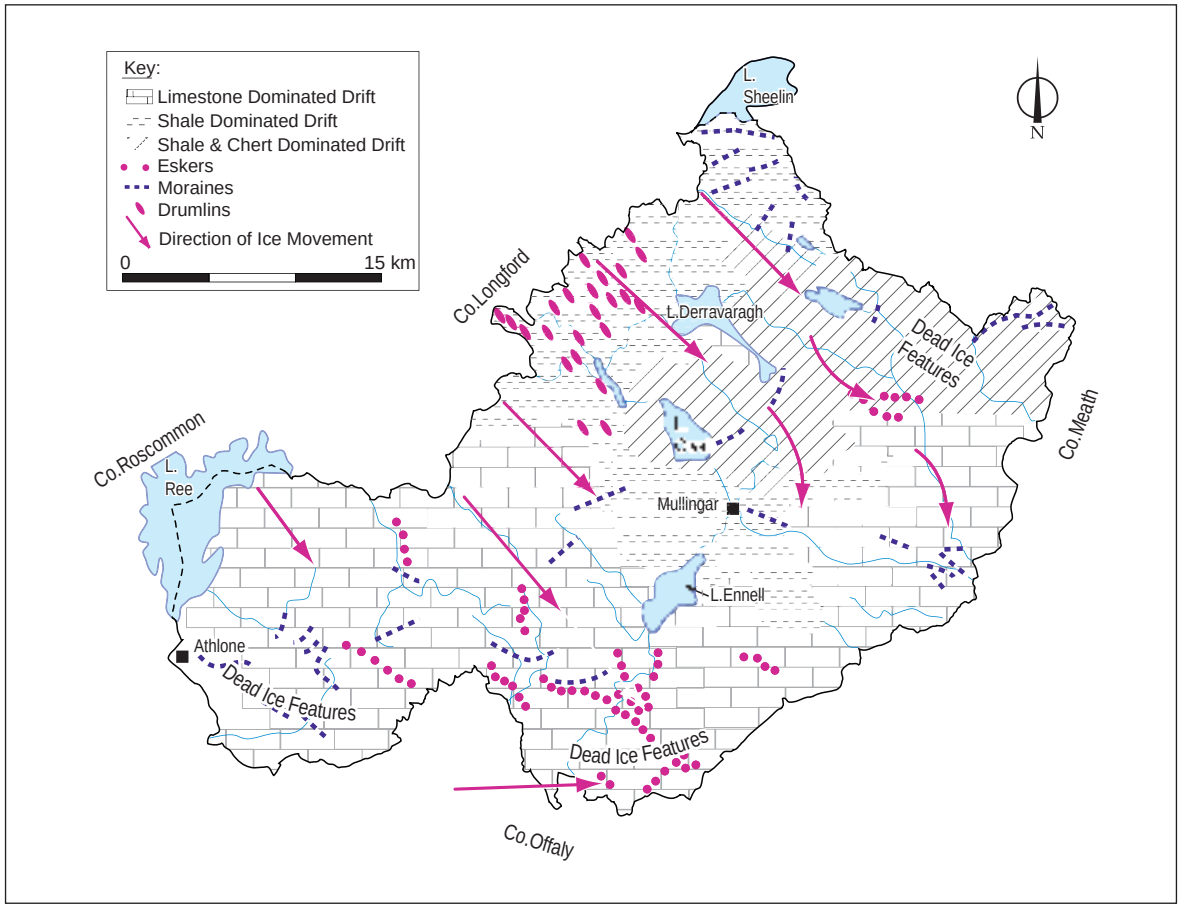
Bedrock geology

The bedrock geology—and thus both the soils and environment—of the region is dominated by Carboniferous limestone which is mostly overlain by an undulating topography of glacial deposits (Illus. 2.1; Delaney 1997a, 7–9; Geraghty et al., 1999). The deposits of glacial drift are deep and bedrock only occasionally protrudes above the surface, either as limestone or chert reefs on hilltops

or as bedrock outcrops around lakeshores. The oldest rocks are in the north of the county, where a series of inliers of Ordovician and Silurian rocks (slates and greywackes) protrude through the more recent Carboniferous strata. These are overlain by Old Red Sandstone (ORS) of Lower Carboniferous age, mostly of sandstones and conglomerates with quartz cobbles. The ORS rocks are overlain by Lower Carboniferous Dinantian limestones. In the north, they are sandy, while southwards they are succeeded by Waulsortian Complex limestones. Upper Carboniferous (Namurian) succession limestones outcrop in the east, underlying the lakeland zone from Lough Ennell to Lough Sheelin. Particularly prevalent across this zone are Visean Lucan formation (dark limestones and shale) and Derravarragh cherts (cherty limestone, minor shale) limestones.

Quaternary geology

The topography of Westmeath is dominated by undulating sands and gravels that were deposited towards the end of the last stage of the Late Midlandian glaciation (c. 24,000–20,000 BP [before present i.e. 1950]; Delaney 1997b, 10–11). The Quaternary geology comprises an extensive suite of glacial and glaciofluvial depositional landforms, varying from north to south (Illus. 2.1). The readvance of the Midlandian glaciation covered the north of the county, pushing as far south-east as a moraine at Athlone and ran north-east by the Hill of Uisnech to Bunbrosna.



Illus. 2.1 *Quaternary geology, drumlins, eskers and glacial drifts of County Westmeath (source: Finch 1977, fig. 4).*

In the north-west of the county are some drumlins and elongated hills, oriented north-west/south-east, indicating ice flow to the south-east. The narrow, shallow valleys in which Lough Derravaragh, Lough Glore and Lough Lene lie also appear to be ice-gouged valleys between the harder cherty hills on either side and seem to have been sculpted by this ice flow. Throughout this area are a number of meltwater channels, all trending south and south-eastwards.

To the south lies an area of mixed fluvio-glacial and till deposits left by disintegrating ice. As the ice withdrew northwards, hummocky end moraines developed creating small, isolated recessional moraines usually less than a kilometre in length. These small moraines (typically oriented north-west/south-east) indicate water transport south-eastwards and today are often used for local roads and lanes.

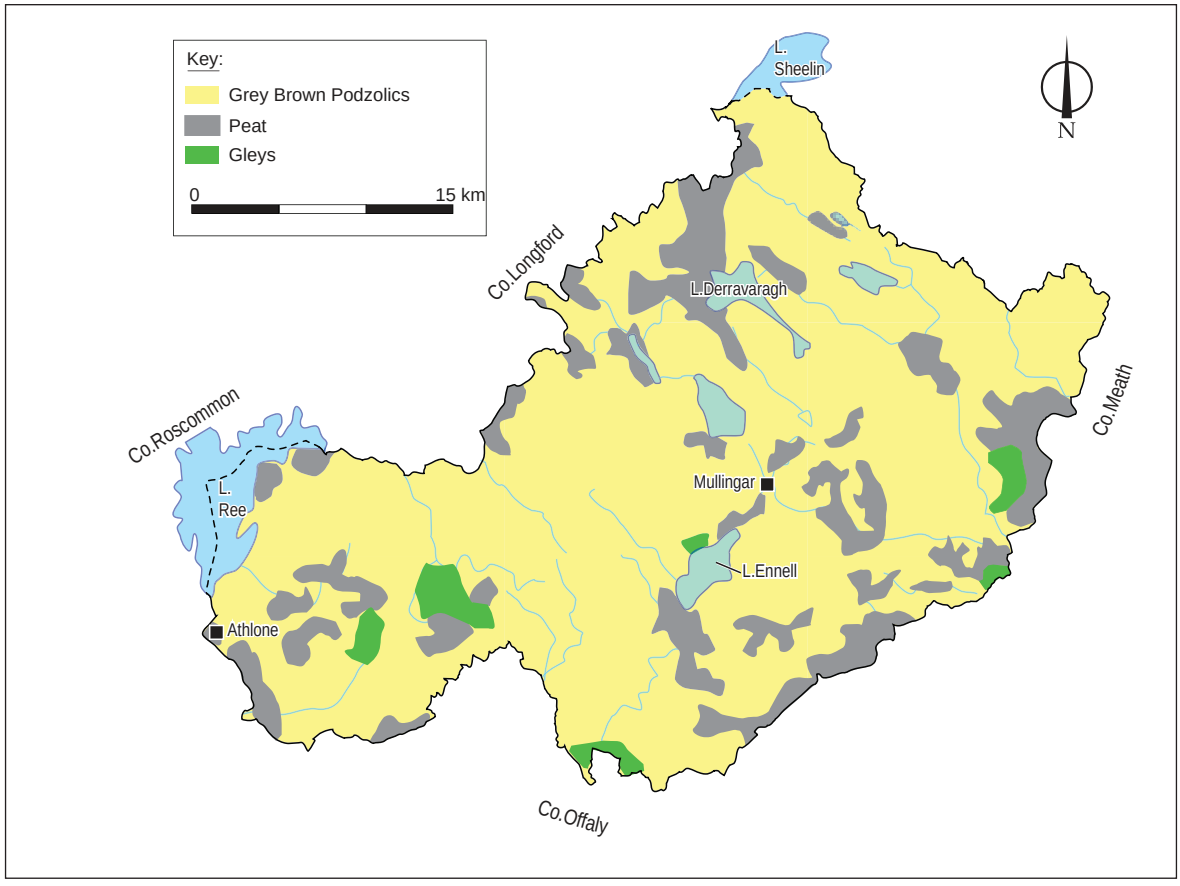
Along the south of the county is a region of larger eskers and kame and kettle hills, frequently lying within raised bogs and alluvial deposits. The eskers originally formed in meltwater tunnels within or under the glacier, which emerged as sand and gravel running across the land when the ice disappeared, and bearing no relation to local topography. In general, the eskers are orientated north/south, while to the south-west of Lough Ennell, they are generally trending north-west/south-east or east/west. These eskers were significant topographical features in the settlement landscape of Westmeath, often providing the basis for locally and regionally significant routeways, the most important being the early medieval Eiscir Riada on the Offaly/Westmeath border, while smaller, bifurcated eskers in the region of Tyrrellspass, Kilbeggan and Moate also provided routeways for roads, lanes and pathways through the county's raised bogs and hummocky wetlands.

Glacial drifts across the county include shale-dominated drifts in the middle and north around Lough Sheelin. The ice that overran the hills around Lough Derravaragh and Lough Lene (e.g. Hill of Fore, Knockeyon, etc) became charged with cherty limestone debris. The cherty till deposited by this ice reaches south-east of these lakes as far as the east shore of Lough Ennell. The limestone areas north of Athlone and east across the county are uniform in lithology, so that limestone drift predominates (Finch 1977, 7–9).

Soils

In Westmeath, the bedrock geology of limestone, the presence of a limestone-rich glacial till and the generally good drainage has led to the formation of good agricultural soils across most of the county (Illus. 2.2; Finch 1977, 15–38). Grey-brown podzolic soils predominate (covering 50.4% of the county). These are generally a good all-purpose soil, typically being a moderately well-draining, 'heavy' soil with significant clay content. Across the north, middle and north-east of the county (around the lakes of Lough Owel, Lough Iron, Lough Derravaragh and Lough Lene), the grey-brown podzols are typically of the Rathowen Cherty phase. These are good agricultural soils when properly manured and managed, but they have a weak structure and a high water-holding clay content. If they are grazed when wet, they tend to break up and compact (a process known as poaching). Such soils are generally used today for cattle and sheep pasture—and in the past would have been good grazing for livestock. Across the southern half of the county, including the present study area, the grey-brown podzolic soils are predominantly of the Patrickswell series, which is the most common soil in the county (occupying 30.4% of the land area), and is suitable for both tillage and pasture, although the soils need to be well managed. In brief, the potential for early medieval agriculture, livestock management and crop cultivation would have been quite good.

Westmeath has relatively large areas of peat deposits (14.3% of total area). These are mostly raised bogs that have formed over the last 10,000 years, following local and regional sequences of



Illus. 2.2 Soils, peat and drainage of County Westmeath (source: Fay et al. 2009).

fens, basin peats and raised bogs. They are acidic, very waterlogged and low in nutrients and have very limited land-use potential in terms of agriculture. In the prehistoric and early medieval periods, such bogs would have provided some wetlands resources (e.g. some grazing, peat for fuel, possibly bog iron ore), but would have been generally considered to be waste ground by early medieval farmers. Raised bogs, many of which have been cut over by traditional methods and modern peat production, are found extensively along the north-west county boundary (adjacent to County Longford), running northwards from Lough Derravaragh towards Lough Kinale. There are also large areas of bog along the southern boundary of the county fringing County Offaly and eastwards towards County Meath. Around most of the lakes, there are also extensive fen peats, many reclaimed and used today as rough pasture. The obstacle that these bogs and fens posed to travel across the region can be seen in particular at Lough Ennell, where there were once large raised bogs and fens at both ends of the lake stretching north and south from the lake. On the other hand, the open water of the lake provided a ready alternative routeway for communications. On other occasions, natural routes through bogs were facilitated by the presence of the glacially derived eskers which were often elevated above the surrounding bog.

Palaeoecological history

There has been relatively little attempt to investigate the post-glacial palaeoecological history of the region despite the abundance of waterlogged deposits in the midland's lakelands, fens and bogs—

possibly because the tradition of university academic scholarship on botanical history has tended to be in the north-east or west of the island. Previous pollen studies of the vegetational history of the midlands include Mitchell's pioneering work at Ballynakill, Co. Offaly (Mitchell 1951, 111–206), and Michael O'Connell's study at Scragh Bog, a small basin fen between Lough Owel and Lough Ennell, and analyses of the palaeoecology of prehistoric trackways at Corlea, Co. Longford, north of the Westmeath/Longford border (O'Connell 1980, 301–19; Caseldine et al. 1996, 379–94). The Westmeath lakelands region itself is poorly covered by the early Scragh Bog study, as it was not radiocarbon-dated and was largely focused on the evidence from the early prehistoric levels. It did have some evidence for probable historic woodland clearance and the introduction of rye crops at the onset of the early medieval period (Hall 2000, 359, 368). Recent studies carried out in the Department of Botany, Trinity College, have included preliminary palaeoecological investigations at Cornaher Lough, Co. Westmeath (to the south of Lough Ennell) and Clara Bog, Co. Offaly (Mitchell 1997, 15–18).

In regional terms, the various studies broadly agree, and indicate tantalising hints of human activity in the Mesolithic period (i.e. expansion of hazel cover and charcoal production). There is a slow, gradual increase in human activity across early prehistory following an elm decline after c. 4000 BC, with woodland clearance particularly noticeable in the Middle to Late Bronze Age, followed by an ubiquitous Iron Age 'lull', to be succeeded by increased woodland clearance and farming activity after c. AD 400. Despite brief periods of woodland regrowth (for example, at about AD 1000), the prevailing image is of a landscape that was progressively cleared of woodlands throughout the historic period in particular, with almost complete deforestation in the 16th and 17th centuries. In the 17th and 18th centuries, the introduction of new, exotic tree species, such as beech and lime, and reintroduction of Scots pine, indicate the plantation of woodlands on new Anglo-Irish estates.

At Cornaher Lough, Co. Westmeath, a pollen study conducted by Alyson Heery is particularly important to this study, as it was carried out within the Westmeath lakelands, in a location known to be rich in early medieval settlement evidence (Heery 1998; O'Sullivan E3315.pdf, CD-Rom). The site was a small kettle-lake adjacent to the Long Hill esker and was located 2.2 km south-east of the early medieval crannog of Newtownlow, Co. Westmeath (itself located by the esker). Heery's study was mostly focused on prehistory, but it does provide useful insights into local vegetation history in the medieval period. At Cornaher Lough, there was an elm decline in the Neolithic with a coincident expansion in hazel, oak, ash and yew as other species invaded gaps in the woodland. There was a pine decline at 4208–3770 cal BC, marking this species' extinction. Neolithic anthropogenic indicators include a rise in cereal and cultivated ground indicators (e.g. *Plantago lanceolata*) corresponding with a peak in macroscopic charcoal (indicating fires in the woodlands) and macrofossil indicators of soil inwash into the lake (possibly due to agricultural activity on the esker). However, it is not until the Middle/Late Bronze Age that there is a sustained clearance of woodland, with oak, elm, yew and alder diminishing and a rise in plant indicators of soil cultivation such as grasses (*Poaceae*), dock (*Rumex*), wormwood (*Artemisia*) and plantain (*Plantago lanceolata*). There is also macrofossil plant evidence for a climatic deterioration at end of the Late Bronze Age, with wetter conditions prevailing around the lake. As elsewhere, there is palynological evidence for a marked decline in human activity and a recovery of woodland in the Iron Age (between c. 300 BC and AD 350) (Heery 1998; O'Sullivan E3315.pdf, CD-Rom).

At the onset of the early medieval period (after c. AD 400), the tree and non-arboreal pollen evidence, charcoal levels and macrofossil plant indicators from Cornaher Lough all show an explosion in the clearance of woodland (of hazel in particular, while oak, birch, elm, ash, yew and alder all decrease too). At the same time, there is a contemporary increase in *Poaceae* and *Cyperaceae*, suggesting an increase in grasses, ribwort plantain (*Plantago Lanceolata*), bracken and cereal type

pollens. There is also evidence for soils inwashing into the lake and an increase in fen conditions, possibly due to water eutrophication caused by the soil inwash. Thereafter, woodlands are in continuous decline around Cornaher Lough throughout the historic period, apart from a brief period of regeneration at c. AD 1100 (perhaps contemporary with a first phase of abandonment of Newtownlow crannog) and through the 13th or 14th century (perhaps suggesting a decline in the Anglo-Norman colony at Newtownlow). The early medieval clearance does not approach the massive impact on the woodlands in the 16th and 17th century (possibly for local ironworks).

A number of points emerge from this brief palaeoecological history of Westmeath lakelands. Parts of the lakeland zone were only being settled intensively in the Middle/Late Bronze Age, while some parts of the midlands lakelands zone (particularly the lakes, woods and marshes) may have been a largely uninhabited or abandoned landscape in the Iron Age, or prior to the fifth century. A second period of intensive settlement occurs in the early medieval period after c. AD 400 and develops thereafter.

Other Irish palaeoecological studies from the early medieval period confirm this general image of increased agricultural activity in the midlands after c. AD 400, with a pronounced surge in the seventh century and again in the early 13th century. Perhaps, the fifth-century agricultural expansion into boggy and watery ground can be explained by the emerging political hegemony of the Southern Uí Néill in Mide at this time, which may have forced earlier Late Iron Age tribal groups into marginal areas. On the other hand, it fits well with a wider picture of agricultural expansion, and may be a local expression of island-wide changes. There are occasional regenerations of woodland (at c. AD 1100 or 1350), but even then arable and pastoral agricultural indicators continue at high values through the early medieval period. This appears at some sites to indicate an interest in livestock rather than tillage, but it is also clear that wheat, barley, oat and sometimes rye was being grown through the first millennium (Mitchell 1997, 248–51, 281–8; Stout 1997, 39–47; Ryan 2000, 30–6). In summary, there is every reason to believe that the geology, soils, environment and ecology of the midlands, though distinctive and occasionally dominated by water, would have been attractive and useful to early medieval communities. This landscape with its rich potential for livestock management and crop cultivation may have also contributed in the long run to the wealth, power and island-wide influence of the region's early medieval population groups—and its churches—by the seventh and eighth centuries.

3

THE ARCHAEOLOGY OF EARLY MEDIEVAL SETTLEMENT AND LANDSCAPE IN WESTMEATH

Aidan O'Sullivan

Background to early medieval archaeology in Westmeath

The early medieval archaeology of Westmeath is potentially amongst the richest and yet most poorly understood on this island, despite the fact that this region is of key importance in Ireland's political and cultural history. The county corresponds roughly to the original location of the early medieval kingdom of Mide, and its location was effectively the political cockpit of Ireland, particularly between the sixth and the 10th centuries (Swan 1988). As is discussed in detail below by Anne Connon, early medieval Mide is richly provided for in a long-standing tradition of research on its politics and history (see also Byrne 1973, 87–105; Walsh 1957; Mac Shamhradháin 1999, 83–97; Karkov & Ruffing 1997, 336–58; Charles-Edwards 2002, 396–418). Most studies have concentrated on the emergence and political activities of the Clann Cholmáin, one of the dominant ruling lineages amongst the dynasties of the Southern Uí Néill between the eighth and the 11th centuries, whose residences centred on Lough Ennell, the western edge of the present study area; while the early 12th-century saint's *Life*, *Betha Colmáin maic Luacháin*, for example, describes much of the early medieval settlement landscape around the same lake (Meyer 1911; Walsh 1912, 568–82).

However, although archaeological surveys in Westmeath have produced evidence for a rich early medieval archaeological landscape, particularly in terms of surviving ringforts, crannogs, churches, monastic islands, holy wells and other sites, there have been surprisingly few publications on the early medieval archaeology of Westmeath. The pattern fits with a lack of attention to the early medieval archaeology of the north midlands more generally. There have been few published overviews, and until recent NRA routeway projects, even fewer publications of archaeological excavations of early medieval sites in Westmeath. The archaeological excavations of an early medieval ringfort at Rochfort Demesne, an early medieval church at Ballykilmore and an early medieval monastic settlement at Clonfad, described in this study, therefore present key opportunities to advance our understanding of settlement and landscape in the region.

Early medieval settlement enclosures in Westmeath

Early medieval settlement in Westmeath can generally be reconstructed from the distribution of ringforts or raths; the classic enclosed settlements of the period, defined by a perimeter earthen bank and ditch, or a series of these elements. The enclosed area—known as the *lios* in Old Irish—was the



Illus. 3.1 *Aerial photograph of a typical univallate ringfort, at Clonfad townland (RMP WM0033:039). Ringforts are the most numerous monuments of the period that survive above ground, and are regarded as the typical residences of the nobility and freemen of early Irish society.*

location for houses, workshops, stores, as well as such farmyard or industrial features as middens, pathways and cobbling, pits, furnaces and open-air hearths. Early medieval ringforts are generally regarded as the typical residences of the nobility and freemen of early Irish society, although they were undoubtedly also occasionally the dwelling spaces for other social classes such as less prosperous commoners. Slaves and dependent labourers can also be expected to have lived within such sites as part of the larger household populations (Illus. 3.1; Stout 1997, 57, fig. 13). Some 1,326 ringfort sites are known from Westmeath alone. Only seven or eight of these sites have been excavated and this low number of investigations is common across Ireland. The excavations at Rochfort Demesne therefore represent an important new opportunity to examine this common settlement form in detail.

In general terms, ringforts in Westmeath, as elsewhere, were located with the practical realities of agricultural production in mind, as they are predominantly located on good, well-drained soils, usually over the 100 m contour, close to a water source (Illus. 1.1). They avoid the county's low-lying lake marshes, bogs and hilltops. They are also clearly influenced in their siting by routeways, as they are often located in proximity to the ridge-lines, moraines and eskers that are, as we have seen in the previous chapter, common in the region. Ringforts are not uniform in size and they vary



Illus. 3.2 View of Dún na Sciath and Cró Inis, from the south (photo: Aidan O'Sullivan).

in morphology, from simple univallate, or single-banked, enclosures that might enclose an area some 30 m in diameter, to bivallate and trivallate sites in strategic locations. Raised raths or platform ringforts, such as the bivallated raised rath at Dún na Sciath on the west shore of Lough Ennell, may have been lordly sites towards the end of the period in the 10th and 11th centuries (Illus. 3.2).

It has been recognised that ringfort densities across the county are high, with a distribution of 0.81 per km^2 (Stout 1997, 77–8). They are focused in the centre of the county, particularly in the barony of Corkaree (1.67 per km^2), and there are also relatively high densities in the baronies of Rathconrath (1.21 km per km^2), Moyashel and Mageradernon (0.8 per km^2) (Stout 1997, fig.15). The distributions in these baronies probably relate to diverse social, political and environmental factors (Chapter 4). There is a concentration of ringforts in the south-east end of the barony of Corkaree, in the hilly country between Lough Owel and Lough Derravaragh. This was within the early medieval political territory of the *Corco Roíde*. It is also good agricultural land, with grey-brown podzolics over a limestone geology.

A dense linear distribution runs across the southern part of the barony of Rathconrath, to the west of Lough Ennell and to the south of the Hill of Uisneach, the prehistoric and early historic symbolic and ritual centre of Mide. Rathconrath was originally within the territories of the Cenél Fiachach and Cenél nÉndai, but after the sixth century was within the heartlands of the Clann Cholmáin dynasty of the Southern Uí Néill. It is likely that Uisnech was a significant Late Bronze Age and Iron Age 'royal site', like Tara in County Meath, Rathcroghan in County Roscommon and Emain Macha in County Armagh. In the early medieval period, beginning as early as the fourth or fifth century, Uisnech was clearly of some significance to local tribal groups (Schot 2006). By the sixth century, the power of the hill appears to have been appropriated by the Southern Uí Néill, and

their kings were frequently termed the 'king of Uisnech'. A large, early medieval, trivallate ringfort (which has produced houses, souterrains and a range of early medieval finds) was placed directly on top of an Iron Age enclosure, deliberately creating continuity with the pagan past. Similar connections between early medieval ringforts and prehistoric ceremonial monuments have also been identified at Rath of the Synods (Tara) and at Knowth, Co. Meath, so it is likely that this was a deliberate act, perhaps carried out by an incoming population to establish a link with the hill's mythical past.

In the present study area of the barony of Fartullagh (the kingdom of Fir Tulach), through which the M6/N52 runs, there is a medium density of ringforts. Elsewhere and around the borders of the county, ringforts are slightly less densely distributed in the baronies of Kilkenny West, Brawny, Clonlonan, Moycashel, Fartullagh, Farbill, Delvin, Fore and Moygoish (all 0.4 per km^2).

There are also regions within the county where there are very few ringforts. Occasionally, this is explicable in terms of the presence of low-lying, wetland soils of raised bogs, fens and gleys. There is also a markedly low distribution to the south-east of Westmeath, in the barony of Farbill. This can also be explained by the prevalence of raised bog on the border with County Meath. Although environmental factors are important, it is clear that the densest areas of ringfort distributions are within the significant political territories of the seventh to ninth centuries, reflecting the power and wealth particularly of the Clann Cholmáin and their vassal peoples (Chapter 6, this volume).

Prior to the excavation at Rochfort Demesne, only a handful of ringforts had been excavated in recent years in Westmeath and only one of these has produced good occupation evidence (Keeley 1991, 55; 1992, 46). At Marlinstown, near Mullingar, an oval, univallate ringfort was enclosed within a bank and ditch, with a simple entrance leading into an internal space where there was a metalworking area (with a bowl furnace), with finds including crucible fragments, iron slag, bronze rings and pins and animal bone. The Marlinstown ringfort was also used for human burial, with at least 14 skeletons recovered from its ditches and surface, possibly after the digging of an internal ditch on the site. In recent years, other early medieval enclosures in Ireland have produced similar settlement and burial evidence, suggesting that dwelling enclosures could have had a range of roles, both agricultural and ritualistic—and these settlement/cemeteries seem occasionally to have been the location for significant agricultural and industrial (i.e. iron-working) production.

There is other evidence for early medieval settlement in the region, including souterrains, a type of underground construction with a passage and chamber that is frequently the only surviving remains of former settlements that may have been unenclosed (Clinton 2001). There are at least 37 souterrains in Westmeath, but there are no known examples from the current study area. Souterrains in Westmeath are particularly concentrated in the barony of Rathconrath, where they essentially mirror the concentrations of ringforts found in that barony, but with clusters around Moyvore and the Hill of Uisneach, again within the traditional heartlands of the Clann Cholmáin (Buckley 1989). Some early medieval souterrains have been found associated with ringforts, as at Lackan (overlooking Lough Derravaragh at Multyfarnham), Gorteen, Rathnew (Uisnech), Togherstown and Coyne, Co. Westmeath, and with early medieval churches, as at Knockmant and Fore, Co. Westmeath (Kelly 1982; Prendergast 1959; MacAlister and Praeger 1929–31; Glasscock 1975). Others, such as the souterrains at Reynella and Banagher, Co. Westmeath appear to have been associated with open or unenclosed settlements, similar to the sites that have been located in Louth and north Meath (Murray 1932; Stout & Stout 1997). It is possible that these souterrains also reflect the emergence of unenclosed settlements in the 10th and 11th century, but this is not possible to establish without further investigation.

Early medieval crannogs in Westmeath: a case study of Lough Ennell and its environs

Early medieval crannogs are also common in Westmeath and the county is the location for some key sites. The early medieval crannog is comparable to the ringfort except that it was a dwelling place constructed on water and principally in lakes (Fredengren 2002; O'Sullivan 1998; Wood-Martin 1886). It is hardly surprising that Westmeath's lakelands preserve large numbers of crannog sites, and 64 are known from the county, of which at least 19 have produced scientific or artefactual evidence for the date of their use or occupation (Brady 2007; Farrell & Buckley 1984, 281–5; Karkov & Ruffing 1997, 336–58; Kelly 1991, 81–98). In almost all cases—although there are later prehistoric crannogs in the region—this evidence is firmly of the early medieval period, dating to between the seventh and the 11th century (O'Sullivan 2004; Brady 2007). No crannogs were investigated as part of the present scheme, but the fact that Lough Ennell lies so close to the route of the M6/N52 necessitates some observations to be made of the conspicuous lake settlements associated with the Clann Cholmáin control of the lake and associated land areas in the early medieval period.

In the early Middle Ages, crannogs were often used as power centres serving as royal residences, craft production and redistribution centres, places of refuge at times of danger and as defensive or military sites at the boundaries of political territories. Oddly, however, there has been little attempt to explore how this was achieved, in both a practical and a symbolic sense, within the landscapes that people inhabited. It is evident from the annals, saints' *Lives* and narrative literature that kings were occasionally symbolically linked to particular lakes and islands. Indeed, the building of a crannog on a particular well-known lake may have served to link the king with the territory, as it denoted and established his physical presence on a significant topographical feature within the *túath* (petty kingdom), the lake being potentially a sacred place, a historically well-known placename synonymous with the territory itself. It is also clear that the lake may have served occasionally as a physical and political boundary between early medieval *túath*, so that the king would have been representing the *túath* to outsiders (another one of his roles) as well as projecting his power across into a rival territory. It could be suggested that in ideological or symbolic terms, the king's crannog on a lake was placed on a critically important symbolic boundary or liminal space between this world and the otherworld (possibly signifying the king's role in mediating between the community and nature).

In the early medieval period, and particularly in the ninth and 10th century, the crannogs of Lough Ennell were obviously of some political, strategic and prestige importance to the Clann Cholmáin and Fir Tulach dynasties, with the political boundary between them running down the centre of the lake, and to the early medieval monastery of Lynn on the north-east shoreline, all being used as strongholds, royal residences and as storehouses of wealth. There are frequent annalistic references to military raids 'as far as Lough Aininn' (Lough Ennell), while the *Annals of the Four Masters* state that in AD 961, Domhnall, son of Muircheartach brought fleets over the Dabhall, and across Sliabh Fuaid, to Lough Ennell and plundered the islands of the lake (AFM 961.7). There is interesting evidence for the use of crannogs at both the inlet and outlet of the river into the lake. At the north end, the crannogs of School Boy Island and Rushy Island (both of which have produced ninth- and 10th-century artefacts) are located opposite the inlet of the river. At the south end of the lake, the undated crannogs of Bog Island and Nure Island also sit as a pair of sites either side of the main navigable routeway. It is conceivable that these crannogs were deliberately sited as small, garrisoned islets, watching and controlling movement from the distant River Shannon.

In the 12th-century *Life* of Colmán mac Lúacháin, there are various references to the island stronghold or royal site of the Fir Tulach kings, *Dún na Cairrge* ('fort of the rock'), which was situated on an island known in the early medieval period as *Inis na Cairrge* ('island of the rock') and was also associated with a harbour known as *Port Innsi na Cairrge*, 'the harbour of the island of the rock', the

latter apparently located on the shore (Meyer 1911, 39, §41; 47–53, §§48–51; O'Sullivan 1998, 131). Dún na Cairrge has traditionally been identified as being the stone fort found on Cherry Island (Walsh 1957, 166), which is situated off the shore of the townland of Robinstown on the east shore of Lough Ennell (Brady 1993; Karkov & Ruffing 1997, 339–40; O'Sullivan 1998, 131). Anne Connon (Chapter 4, this volume) has suggested that Dún na Cairrge should be situated closer to Carrick townland and may instead be an, as yet, unidentified archaeological site on an unnamed island close to Inchacrone Island, off to the north of Cherry Island.

However, to support the traditional ascription of the site of Dún na Cairrge to the rocky island of Cherry Island, we can provide the following support. Firstly, there is little problem with an island being situated well away from its mainland, not withstanding Connon's contrary view (Chapter 4, this volume)—islands as unique pieces of land were often included in land grants and could thus be connected to distant territories. Secondly, there is already a known probable early medieval stone cashel on Cherry Island (and stone cashels are usually referred to in Irish placenames as a *dún*, as in '*Dún na Cairrge*') and it is one of the most impressive and distinctive archaeological monuments on Lough Ennell, as might be expected of a royal seat. There is also a large ringfort overlooking the island (Karkov & Ruffing 1997, 33), which would fit with the frequent pairing of ringforts/crannogs within royal complexes. Thirdly, it is situated beside a small natural harbour or landing place on the dry land—potentially the *Port Innsi na Cairrge* or 'the harbour of the island of the rock'? Most dramatically, however, on the north side of the cashel's defences, there is a substantial, rectangular stone-lined harbour, which intrudes into the interior of the enclosure. If this harbour is of early medieval date—perhaps being the port of the placename—it would have enabled a warship of some size to be resident on the lake. Such a warship could have been used by the Fir Tulach—in service of their overlords, the Clann Cholmáin—to defend the lake's crannogs and the local landscape, as well as to project power anywhere along the course of the River Brosna (and by extension, the River Shannon, into Connacht and Munster).

The early medieval crannog at Cró Inis on the west shore of Lough Ennell is easier to identify and it is one of the historically attested royal residences of the Clann Cholmáin dynasty of the Southern Uí Néill, who controlled the early medieval kingdom of Mide between the eighth and the 11th century (see Chapter 4, this volume, for discussion of politics and peoples). It has a large stone cairn, measuring c. 50 m in diameter and c. 3–4 m in height, and lies in relatively deep water in an inaccessible but highly visible location. The Crannóg Archaeology Project in the 1990s identified evidence for building activity on the site in the mid ninth century (c. AD 850), while an inner oak plank palisade was constructed in the early 12th century (AD 1107 ± 9 years or later) (Brady 2007). Stray finds from its surface include bronze pins of 11th- to 12th-century date (ibid.). The Clann Cholmáin kings controlled the midlands and plundered Viking Dublin on occasion. There were also several raids by rival dynasties on Lough Ennell and its environs throughout the 10th century (i.e. in AD 961, 985, 989, 991), all clearly aimed at the power centres of the Clann Cholmáin. Máel Sechnaill maic Domnaill, then high-king of Ireland, died on Cró Inis in AD 1022.

Cró Inis is part of an early medieval settlement complex (Illus. 1.1, 3.2; O'Sullivan 2004; O'Sullivan 2007, 71, fig. 5). It is overlooked by Dún na Sciath, an impressive bivallate, raised ringfort on the nearby land. The ringfort is the historically attested 'fort of the shields', which was probably a principal royal residence of the Clann Cholmáin kings. Both ringfort and crannog—and the lakeshore in this area—would have served as a royal dwelling complex, to be used for public assemblies and other gatherings. Four low cairn crannogs have been noted nearby (Dysart 2, 3, 4 and 5; Brady 2007). There is a dense concentration of early medieval metalwork in the vicinity of the crannog, particularly of ninth- and early 10th-century silver. At least three hoards (Dysart hoards 1, 3, 4) of silver ingots, coins and other objects have been recovered from the eastern and western shores

of Dysart Island (a large natural island to the north). The early 10th-century Dysart 4 hoard in particular was an enormous collection of silver ingots, ingot fragments, pieces of cut silver ornament, Kufic coins, and Northumbrian and East Anglian Viking coins, making it amongst the largest found in western Europe (Ryan et al. 1984). It is likely that this silver was collected from Viking Dublin, possibly as loot after the sack of Dublin in AD 902. Smaller hoards of silver ingots have also been found on the eastern shore of the island, at Dysart 1 and 3, while a hoard of three ingots were found in 1966 on a small, rocky crannog at Dysart Island 1 (also known as Rocky Island). A hoard of silver ingots was also found on the lakeshore at Nure, to the west of Cró Inis.

The silver could be indicative of a royal presence, as ingots are mentioned amongst the lists of tributes due to an overking from his subjects in the 10th-century *Book of Rights* (Doherty 1980). Silver ingots were also apparently used to pay ransoms, as the *Annals of Ulster* state that the king of Brega was paid 60 ounces of gold and 60 ounces of silver to release Olaf, son of Sitric, king of Dublin as recorded in the *Annals of Ulster* for AD 1029. However they were obtained, these hoards of early medieval ingots and coins scattered around the islands and the lakeshore at Dún na Sciath and Cró Inis indicate the political and economic influence of the Clann Cholmáin dynasty.

Dún na Sciath and Cró Inis are also strategically placed within the wider early medieval settlement landscape. In regional political terms, they are probably on or near the borders between the early medieval territories of the Clann Cholmáin, the Cenél Fiachach and the Fir Tulach, although the latter two were probably sub-kingdoms or subjects of the former. The crannog is situated at some remove from neighbouring early medieval ringforts and churches. In Dysart townland, c. 1.5 km to the north-west, there is a surprising number of ringforts (at least 10 sites). The ringforts are typically quite small univallate sites, suggesting that they were the residences of the king's clients and tenants. There is also an important early medieval church at Dysart, 2 km to the north. It has a church (in ruins), a decorated cross base, a burial ground and a circular earthen enclosure (Swan 1988). The church is known in the early medieval sources as *Dísert Máile Tuile*. Máel Tuile was an eighth-century saint who was closely associated with Máel Ruain of Tallaght and his connection with him is a clear indication that this *dísert* by Lough Ennell was a Céli Dé church, of the reform movement that emerged in the eighth and ninth century (Bhreathnach 2005). Other possible early medieval sites include a holy well, earthworks and field-systems. Ash Island, to the north of Dysart Island, is also a probable early medieval crannog, as it has produced some early medieval objects.

The empty space between the dense concentration of early medieval sites at Dysart and the lakeshore royal settlement complex at Dún na Sciath/Cró Inis may be socially and ideologically significant. It is possible that the open ground was the *faithche* ('green', 'infield') or mensal lands of the king granted to him by nobles of the *túath* upon his accession to the throne. Early Irish literary sources mention a *faithche* at such royal sites at Tara, Navan and Crúachain as the location of public assemblies, the tribe's sacred tree, as well as being a location for cattle, tillage, horse-racing and ball-games (Kelly 2000, 89). It may also have been deliberately intended to maintain a social distance from the surrounding community. There may have been a customary exclusion zone between the king's royal residences and the other dwellings (in that ordinary people were not originally permitted to build dwelling enclosures close to the king's residence). It is also clear that Dún na Sciath and Cró Inis are effectively located at the end of a promontory or ridge that is surrounded on two sides by fens and bogs, and to the south by the lake itself. The physical landscape itself could therefore be used to manipulate, enforce and control how people approached the site.

On Lough Ennell, when one walks southwards along the ridge towards the early medieval settlement complex, the ringfort of Dún na Sciath first gradually emerges above the skyline. Indeed, on a summer's day, its raised platform and steeply sloping sides are cast dramatically against the sunlit skyline to the south. Walking towards the ringfort, one is impressed by its scale and size and it

dominates the view. However, it is only when one arrives at the ridge top, quite close to the ringfort, that the crannog of Cró Inis in the lake suddenly appears. It emerges from behind and beyond the ringfort, appearing as a distant island out on the dark, choppy water of the lake. In fact, the crannog then becomes the more dramatic of the two sites along the lakeshore. However, it is here that the traveller must literally stop, standing on the shores of the lake, looking out at the crannog. There may well have been a jetty, harbour or mooring place where the traveller was meant to stand and wait for access to be granted. Undoubtedly, the king may have often resided on the ringfort, but on the occasions when he was on his crannog, he was literally *out of view*. During public assemblies on the shores of Lough Ennell, when we might imagine people living in tents and busily moving around the *faithche* surrounding Dún na Sciath, the king, his wife, retinue and bodyguard could have been out on the crannog—present at the assembly, and yet also absent from the events of lesser importance.

This manipulation of perception and control of access is an occasional motif in early medieval saints' *Lives*, where a person must wait on the shoreline before he is invited out to the king's island (O'Sullivan 2004; 2009, 81). In the *Life* of Colmán mac Lúacháin, which focuses much of its text on the environs of Lough Ennell, the saint goes one day to remonstrate with the king, but has to wait on the shoreline (as Colmán was on his island fortress off Port na hInse on Lough Ennell) and the king refused to send out a boat to collect him. The saint blesses the lake and walks across it dryshod, in the manner of Moses on the Red Sea (Meyer 1911, §64). Similarly, in the Irish *Life* of Mochua of Balla, the saint is kept waiting on the shores of Lough Cime by Cennfaelad, son of Colcu, king of Connaught at a time when he was resident on his crannog. In this case, Mochua raises the waters of the lake so that the island is submerged, whereupon the penitent king gives him the island free from tribute. On another occasion, Mochua was refused entry onto the island of Inis Amalgaid, when again a boat was not brought out to him (Stokes 1890, §4823, 287). There is also a similar episode in the eighth-century Latin *Life* of Áed mac Bricc, when the king of the Uí Néill refuses to let Áed come onto his island, whereupon the saint walks across the water to free a prisoner (O'Sullivan 2009, 82)

In both the saints' *Lives* and the narrative literature, there is a distinct place on the mainland, a harbour or jetty, where the visitor was expected to wait. In the early medieval prose tale, *The death of the three sons of Diarmait mac Cerrbeóil*, the hero waits at a 'port' on the shoreline where the boats are kept before he goes out to Lagore, the royal crannog of the Síl nÁeda Sláine. Similarly, in the ninth-century tale, *Tochmarc Becfhola*, people wait at a 'port' on the mainland and call out to the inhabitants of the island. In other words, access to the island was managed from the surrounding landscape, and any movement to the king's crannog was controlled from the shoreline first. At both Cró Inis and at Coolure Demesne to the north on Lough Derravaragh, there are small crannogs at the lake's edge and these may well have been the 'front gate' of the royal crannog, where boats were laid up.

Smaller crannogs on Lough Ennell—living beside the lord's house

The presence of other social classes is indicated around the shores of Lough Ennell. At various locations, there are smaller crannogs situated in shallower water, often associated with larger crannogs, local monastic sites (e.g. Lynn) and possibly some ringforts or cashels. These crannogs, which may have been occupied by lower social classes, can be identified as small cairns (often enhanced natural platforms or islets) measuring 10–15 m in diameter and 1 m in height, situated down at the water's edge (rather than in open water) on modern Lough Ennell (though they were probably in ankle- or thigh-deep water before modern drainage). They appear to be situated close to the high-status sites, occasionally clustering along shorelines to provide good views across to them. Only one such small site or 'stone platform' has been excavated, by Niall Brady, at Robinstown, on the south-east shore of Lough Ennell, close to the early medieval cashel on Cherry Island. The site was an ovoid cairn of

stone (13 m by 16 m in diameter), with a flat upper surface. Excavations revealed that it was built on a natural core of limestone drift, the glacial till of the region. A rough stone surface was laid across this, with larger stones forming a kerb or revetment around its perimeter. There was some evidence for small stone-built circular structures (5 m and 3 m in external diameter) in the centre, with a 'metalled surface' of large stones at the northern side (towards the lake), which merges into a rougher scattering of rounded stones at the southern edge of the site. Intriguingly, there was no evidence for occupation material, bone, artefacts of even charcoal (although this may have been eroded away by the lake; Brady 1992, 1993). Despite the fact that these small crannogs or 'stone platforms' will probably be impossible to date, the absence of finds and their local landscape settings provide some clues. It is suggested here that some are indeed early medieval sites, probably occupied by people working on the lord's estates and perhaps really only used when the lord or king was present on his crannog. Indeed, Fredengren's excavations at Shroove, on Lough Gara, Co. Sligo have confirmed that some small crannogs can be firmly dated to the early medieval period (Fredengren 2002; 2007).

Close to the early medieval crannog of Cró Inis, Lough Ennell, there is at least one low-cairn crannog (Dysart 2) and three 'stone platforms' (Dysart 3–5) on the land beside the lake. The Dysart 2 crannog is quite similar in morphology, size and appearance to the early medieval crannog at Shroove, Co. Sligo. The other sites are lower in profile, barely enhanced natural mounds (indeed the presence of large glacial erratics on Dysart 5 suggests it was originally a geomorphological feature). At the early medieval crannog of Goose Island in Rochfort Bay, on the opposite shore of Lough Ennell and close to the excavated ringfort in Rochfort Demesne (Illus. 3.3; Chapter 6, this volume), there are at least nine rock platforms scattered around the shoreline. These small platforms certainly appear to be focused on the Goose Island crannog out in the lake, which has produced radiocarbon dating evidence from the ninth century (Brady 2007).

What was the role of these smaller crannogs in the early medieval topographies of power? In the *Life* of Colmán mac Lúacháin, there are various descriptions of the movement and taxation policies of the 11th-century king of Mide, implying that as the king travelled around on his royal circuit collecting taxes, food renders, tribute and troops for his retinue and hostings, he would stay at his residences, including his ringfort at Ruba Conaill and his crannog at Cró Inis:

> And neither the Uí Gusan nor the Uí Thigernan are obliged to provision the King of Meath in Cró Inis, but only in Ruba Conaill; nor yet should troops be billeted upon them in Cró Inis, except what..out from Ruba Conaill
>
> (Meyer 1911, §62).

Power in the Middles Ages was something that moved in both directions, from the top down and from the bottom up. Essentially, people of all social grades were actively involved in networks of power, as people lived out their social roles and expressed them through dress, food, labour and other activities. Intriguingly, what made a king's or lord's crannog or rath significant were the loyalty, kinship and agreement offered by other social classes, including his clients, labourers and slaves. He was there to meet his subjects, to bestow gifts, to dispense justice and receive tribute, while also feasting on food offered by clients and subjects. In other words, what might have made Cró Inis significant was the presence of other people along the shoreline who contributed in some way to the life of the community at that particular place and time (by their labour, presence or approval). It might be suggested then that the 'poor people's crannogs' on the lakeshore served to create a theatre upon which power relationships were constructed, negotiated and even resisted. Indeed, the entire lake itself could be seen as just such a theatre of performance in the surrounding early medieval landscape and, as Channing suggests in this volume, the newly excavated ringfort at Rochfort Demesne may have served as a component of that wider landscape.



Illus. 3.3 *Aerial photograph of the early medieval crannog (ninth-century date from palisade) of Goose Island in its local landscape at Rochfort Demesne, on the east shore of Lough Ennell, Co. Westmeath, in 1968. The crannog is surrounded by several, small, low-cairn and platform crannogs all along this shoreline (Rochfort Demesne 1–9). These were probably the lake dwellings of ordinary people living and working on their lords' estates (Reproduced with permission of the Cambridge University Collection of Aerial Photography © copyright reserved [AVH 13]).*

Early medieval ecclesiastical settlement in County Westmeath

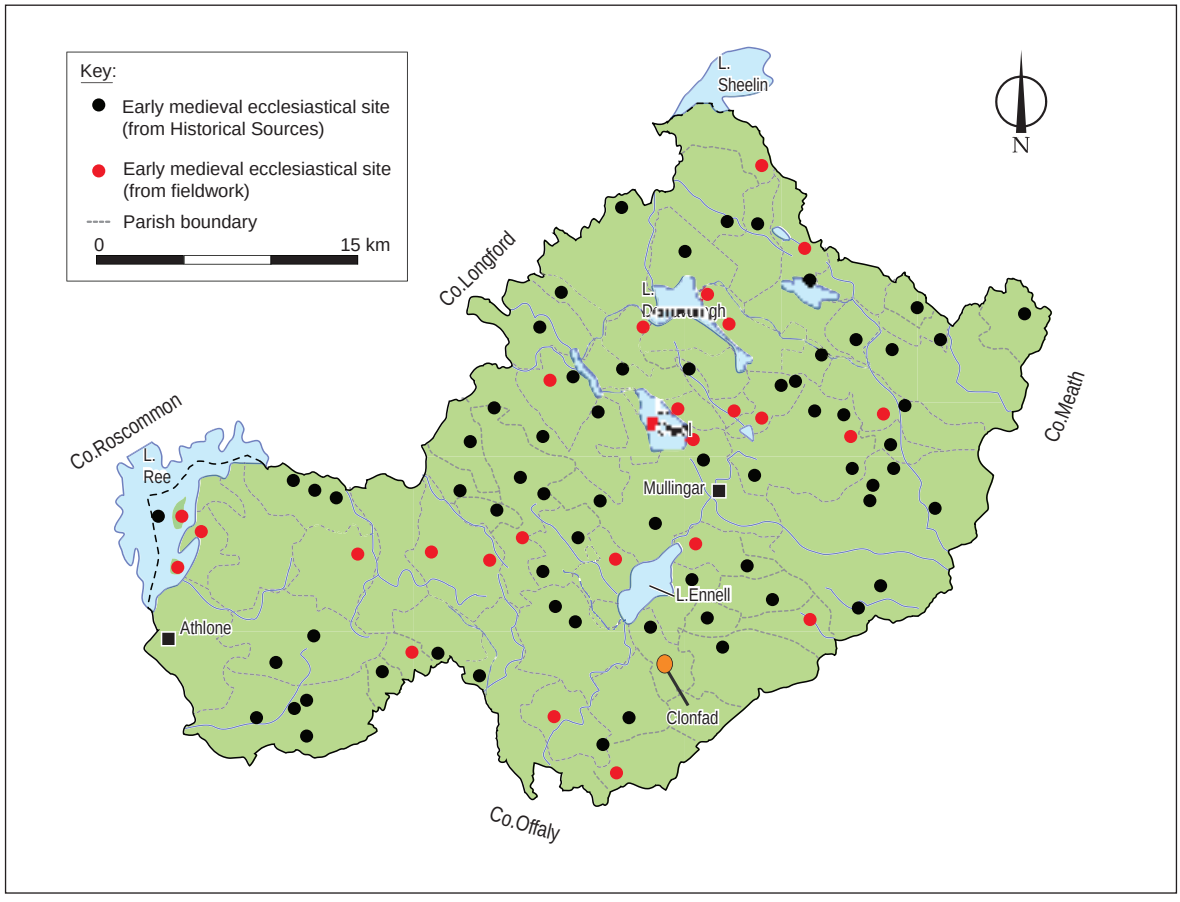
The other major element in the social archaeology of early medieval Westmeath was the Church, and there is good evidence for ecclesiastical settlement from the period in the region, particularly in terms of church and enclosure sites and their associated features. There are 78 churches listed in the Register of Monuments and Places (RMP) for Westmeath, 27 church and graveyard sites, eight sites of ecclesiastical remains, 39 holy wells, nine bullaun stones, 22 crosses and four cross-slabs (Fanning & Ó hÉailidhe 1980). Early medieval ecclesiastical sites with souterrains, pillar stones, founder's tombs or burials are occasional, but rarer. The excavations at Ballykilmore and Clonfad represent important opportunities to add significant insight to the archaeological record.

Early medieval settlements associated with the Church would tend to be defined by a large oval, circular or rectilinear bank and ditch or stone enclosure enclosing an area c. 90–120 m in diameter, often preserved in outline in townland boundaries, field walls or roadways (Swan 1988, 4). Swan's studies of early medieval ecclesiastical settlement have provided our best understanding to date of their form in the region. He employed early historical sources, cartographic sources, archaeological survey and aerial photography and suggested that 95 ecclesiastical sites in Westmeath are likely to be early medieval in date. Previously, 29 early medieval ecclesiastical sites had been

identified from historical sources, but he showed that archaeological fieldwork could increase this figure three-fold. His research also revealed that a significant proportion of the county's modern parishes had only one early medieval church, suggesting that their boundaries originated in the early medieval period (ibid., 3–32).

How might these church settlements be interpreted? Traditionally, it has been thought that the early Church in Ireland was organised into widely dispersed and overlapping monastic federations or *paruchiae*, but this model has now been largely undermined. Recent studies suggest that the Church was organised along local territorial lines, as elsewhere in Europe. Churches, particularly the most important ones, controlled considerable estates and territories in their immediate vicinity and were affiliated with other smaller churches in the same secular kingdom as themselves. In other words, churches should be studied in the context of their local settlement landscapes (Ó Carragain 2003, 130).

In general, it has been suggested that early medieval churches and ecclesiastical enclosures tend to be found on low-lying ground, often close to roads and rivers (which served both as routeways and boundaries), avoiding uplands (rarely being above the 120 m contour). Stout has argued from the saints' *Lives* that the Church's economy was largely based on ploughlands and tillage, although this has not received complete acceptance (Swan 1983; Stout 1997; Ryan 1997). It has been suggested that churches in other parts of the midlands (i.e. Offaly) are found at the periphery of densest ringfort



Illus. 3.4 *Early medieval churches in County Westmeath. Most of the county's parishes have one early church site suggesting that parish boundaries have their origins in the early Middle Ages (source: Swan 1988, fig. 1.1, this image after Aalen et al. 1997, 52).*

distributions, suggesting that they were being established on political boundaries and in poor agricultural lands (perhaps being granted lands by local secular elites in precisely these locations; Stout 1997, 35–6; see also Chapter 4, this volume).

Early medieval church sites in Westmeath are quite widely distributed across the county and there is little evidence for dense concentrations. There are slightly more churches within the baronies of Rathconrath, Corkaree and Fartullagh, but this mirrors the dense early medieval settlement already represented by the ringforts and souterrains in those baronies. The churches are also often, though by no means always, found close to parish and barony boundaries (Illus. 3.4; Aalen et al. 1997, 52; Swan 1988, fig. 1.1). Several early medieval ecclesiastical sites (with churches, graveyards and crosses) have also been found on, or close to lakeshores, places that might be considered to be on significant boundaries. Early medieval churches found close to lakes include those at Lackan, Kiltoom and Faughalstown (on Lough Derravaragh), Church Island (on an island on Lough Owel), Tristernagh (on Lough Iron), Kilnahinch (at Ballinderry Lough), as well as Hare Island, Inchmore, Nun's Island and Inchbofin (all monastic islands on Lough Ree), and Lynn and Dysart (on Lough Ennell; Swan 1983). The early 12th-century *Life* of Colmán mac Luacháin reveals lands owned by the church of Lynn, a monastery on the north-east shore of Lough Ennell, and this text and its implications for understanding the historical development of the wider landscape is described in some detail below by Anne Connon (Chapter 4, this volume; Meyer 1911, 568–82; AU 1122.2).

Prior to the excavations at Ballykilmore and Clonfad for the M6/N52 road realignment, only a few early medieval church sites had been investigated in Westmeath; the most important excavations being those by Leo Swan at Kilpatrick (Corbettstown, barony of Farbill, in south-east Westmeath) (Swan 1976, 89–96). His work revealed something of the daily life and work of a small church settlement. A church building and graveyard were set within an oval enclosure (90 m by 80 m), defined by a stone-faced bank and a deep ditch. There was some evidence for an inner enclosure, circular houses, hearths, pits and other structures within this enclosure. Finds from within and around the circular house included a pennanular brooch, crucible fragments, a mould for casting rings and evidence for antler working and iron-working. The site had probably been occupied from the eighth century to the 13th century (Swan 1976; 1995a, 75–80; 1995b, 1–21).

Conclusions

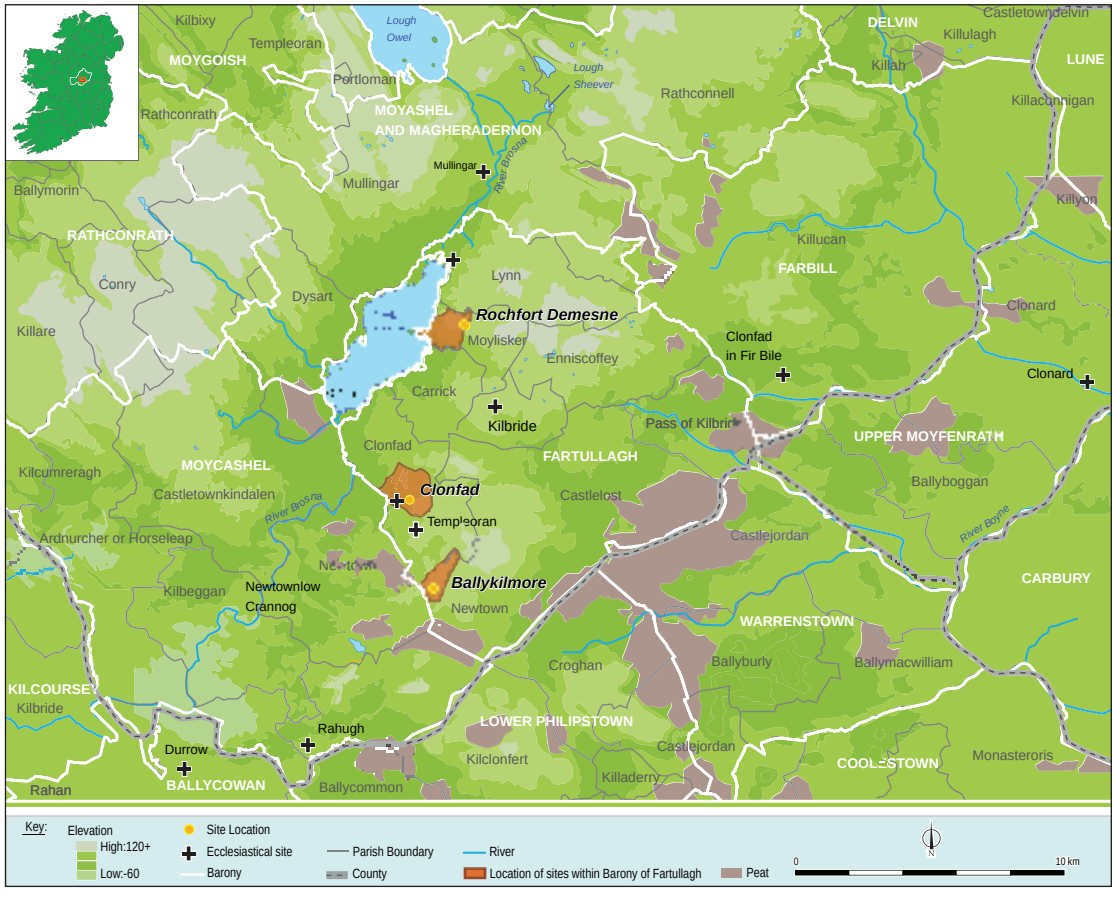
This brief introduction to the known archaeological landscape of early medieval Westmeath has provided some sense of how little is understood of how this landscape was organised and inhabited, and how the politics of the region played out against a background of daily life and practice, of dwellings, settlements and landscapes. The archaeological work conducted for the M6/N52 road realignment provides tangible new insights into this world, and should allow the discussion to advance beyond a reliance on survey data alone, so that our knowledge can be informed by substantive information produced by detailed excavation.

4

HISTORY OF THE EARLY MEDIEVAL KINGDOM OF FIR TULACH

Anne Connon

In the early medieval period, the three sites at the centre of this study—a high status dwelling at Rochfort Demesne, an ecclesiastical site at Ballykilmore, and the monastery of Clonfad—were part of the kingdom of Fir Tulach. Fir Tulach was in turn part of the over-kingdom of Mide, ruled for most of the early medieval period by the Southern Uí Néill dynasty of the Clann Cholmáin. Roughly speaking, Mide encompassed the modern county of Westmeath, along with a section of north-western County Offaly and parts of eastern County Meath (Illus. 4.1, 4.2 and 4.3). 'Mide' translates simply



Illus. 4.1 *Topographical map of Fir Tulach and surrounding area.*

as 'the middle', a designation that reflects the physical centrality of its position within Ireland. *Fir Tulach* translates as 'the men of the hillocks', taking its name from the contours that are particularly characteristic of the uplands in the northern half of the region. The kingdom's name has been preserved in that of the modern barony of Fartullagh, Co. Westmeath, whose boundaries serve as an approximate guide to the limits of Fir Tulach's original territory.

Boundaries of Fir Tulach

A strong continuity between modern and medieval Irish territorial units (see especially MacCotter 2008) permits the use of baronial borders as a tool for generating a general picture of the borders of early medieval kingdoms. That said, they are not always a precise instrument, and there can be differences that may be significant when trying to understand the historical context of an archaeological landscape. Taking the extent of the modern barony of Fartullagh as a starting point, the opening section of this chapter will attempt to mine pre-Norman Irish as well as later English historical records for evidence that will allow for a closer delineation of the borders of early medieval Fir Tulach. As will become evident, topographical features such as rivers, lakes, and bogland played a very significant role in defining this territory (Illus. 4.1).

The western border

The civil parish of Clonfad, home to the monastery studied in this volume, is the most westerly parish in the modern barony of Fartullagh. The current border between Fartullagh and the barony of Moycashel runs for most of its length along the western edge of Clonfad and then cuts through the civil parish of Newtown, bisecting it so that the eastern half of Newtown is in the barony of Fartullagh and the western half is in the barony of Moycashel (Illus. 4.1). The two halves of Newtown, mostly separated by a large stretch of bog, are linked by the passage now known as Tyrrellspass. This pass would have been the route taken in early medieval times by the *Slige Mór*, 'the great way', the major routeway connecting Tara and Clonmacnoise. The Slige Mór ran through Fir Tulach, just north of the bog that marked the kingdom's southern border (Smyth 1982, 29, 154–5).

The large pockets of bogland in the centre of Newtown that mark the modern border between the baronies of Fartullagh and Moycashel would have been an effective natural boundary delimiting the western edge of the kingdom (Smyth 1982, 85). This correlation between bogland and Fartullagh's borders (Illus. 4.1) is particularly obvious from an early modern map of the area (Illus. 4.2). That said, it seems likely that the western boundary of early medieval Fir Tulach may have extended past the bog, enclosing territory west of the current baronial border. Although the western half of the civil parish of Newtown is now part of the barony of Moycashel, there is evidence to suggest that in the later medieval period the whole of Newtown—then referred to as Newtown 'de Feraib Tulach' (Costello 1912, 81, 85, 94; Walsh 1957, 284)—may have lain within Fartullagh territory (Nicholls 1984, 555). If so, then it is very probable that the entire Newtown area was similarly part of early medieval Fir Tulach. The western border of the Moycashel half of Newtown is now delineated by the southern arm of the River Brosna.[1] Perhaps even more so than the bogland of Clonfad, the Brosna would have represented an obvious natural boundary to Fir Tulach's western limits.[2]

The north-western border

The north-western border of Fir Tulach was fixed by Lough Ennell, the most southerly of the four lakes lying at the heart of Mide. Known in the early medieval period as *Loch Aininn*, Lough Ennell



Illus. 4.2 *A detail from William Petty's baronial map of Westmeath in Hiberniae Delineatio (1685, map 8) showing the early modern barony of Fartullagh (Courtesy of the British Library Board, C.11.a.3).*

was one of the boundary points delimiting the eastern and western halves of the over-kingdom of Mide (AClon 1140, AFM 1144). Positioned alongside Lough Ennell's south-eastern shore, Fir Tulach was probably the westernmost part of *Airther Mide*, 'East Mide', although it is not impossible that it was the easternmost part of *Iarthar Mide*, 'West Mide'. Such divisions were to become particularly important in the 12th century when the decline of the Clann Cholmáin, Mide's leading dynasty, led on multiple occasions to the dismembering of the over-kingdom and subsequent parcelling out of Mide amongst competing powers (ATig [1125]; ATig [1144], AClon 1140[=1144], AFM 1144; AFM 1150). Not merely geographic categories, during this period, and possibly earlier, the eastern and western halves of Mide became distinct political entities.[3]

The north-eastern border

The north-eastern border of the modern barony of Fartullagh currently runs along the top of the civil parish of Lynn, and then cuts across the southern tip of the civil parish of Mullingar. The remainder of Mullingar parish lies today in the barony of Moyashel and Magheradernon (Illus. 4.1). Evidence from the *Life* of Colmán mac Luacháin, however, suggests that Fir Tulach originally encompassed a bigger section of Mullingar parish than at present. As the main focus of the *Life* is upon the landholdings and economic rights of Colmán's chief church, the monastery of *Lann* or Lynn, the text is extraordinarily rich in onomastic detail relevant to the Fir Tulach region. When enumerating Lynn's possessions, the *Life* indicates that two of the monastery's holdings—Clúain Gamna and Senráith Lis an Daire—now located north of the Fartullagh border, were considered at that time to be in Fir Tulach proper (Meyer 1911, 79, §74).[4] Their position suggests that just as the southern Brosna marked much of Fir Tulach's western border, so the branch of the Brosna running between Lough Ennell and Lough Sheever may have marked the northern boundary of the early medieval kingdom.

The eastern border

Lying on the eastern flank of Fartullagh is the barony of Farbill. Farbill takes its name from the early medieval kingdom of *Fir Bile*, 'the men of the sacred tree', and it is likely that the Farbill/Fartullagh border represents the original territorial division between the two kingdoms, or at least a very close approximation of it. Certainly, Fir Tulach did not seem to have extended any further east than the modern barony of Fartullagh: there is evidence indicating that two of the townlands immediately abutting the Farbill side of the baronial divide were similarly in early medieval Fir Bile.[5] Considerable pockets of bogland to the immediate west of these townlands would have been instrumental in defining the boundary points between the two kingdoms. The Slige Mór was routed through the high ground at one of the few breaks in the bog here, now known as the Pass of Kilbride. This passage would have been one of the only access points between the two kingdoms.

Unlike their Mide neighbours to the north and west, neither Fir Tulach nor Fir Bile were originally Southern Uí Néill kingdoms, but instead were more ancient territories that became absorbed into the Southern Uí Néill polity (Smyth 1975, 505; Ó Cróinín 2005, 207). The two, together with the territory of An Brédach—the region between Farbill and Clonard (Walsh 1957, 259)—are grouped as a single entity in a 12th-century list of pre-Norman *trícha cét*s, or 'cantreds' that made up the over-kingdom of Mide (Walsh 2003, 65; MacCotter 2008, 199). This coupling suggests that, in the 12th century at least, the three may have been administered as one kingdom.



Illus. 4.3 Map of early medieval sub-kingdoms of Mide in Fir Tulach region.

The southern border

The southern border of the barony of Fartullagh is also the border between counties Westmeath and Offaly. For much of the pre-Norman period, it would have similarly represented the border between the over-kingdoms of Mide and *Laigin*, or 'Leinster', as well as the border between the Mide sub-kingdom of Fir Tulach and the Leinster sub-kingdom of Uí Fhailgi. Once again, the low-lying bogland so characteristic of southern Fartullagh and north-east Offaly acted as the boundary between them, as did large expanses of woodland (Smyth 1982, 69). The Slíge Mór, which ran along the Mide side of the bog, helped further define the two over-kingdoms (ibid., 29).

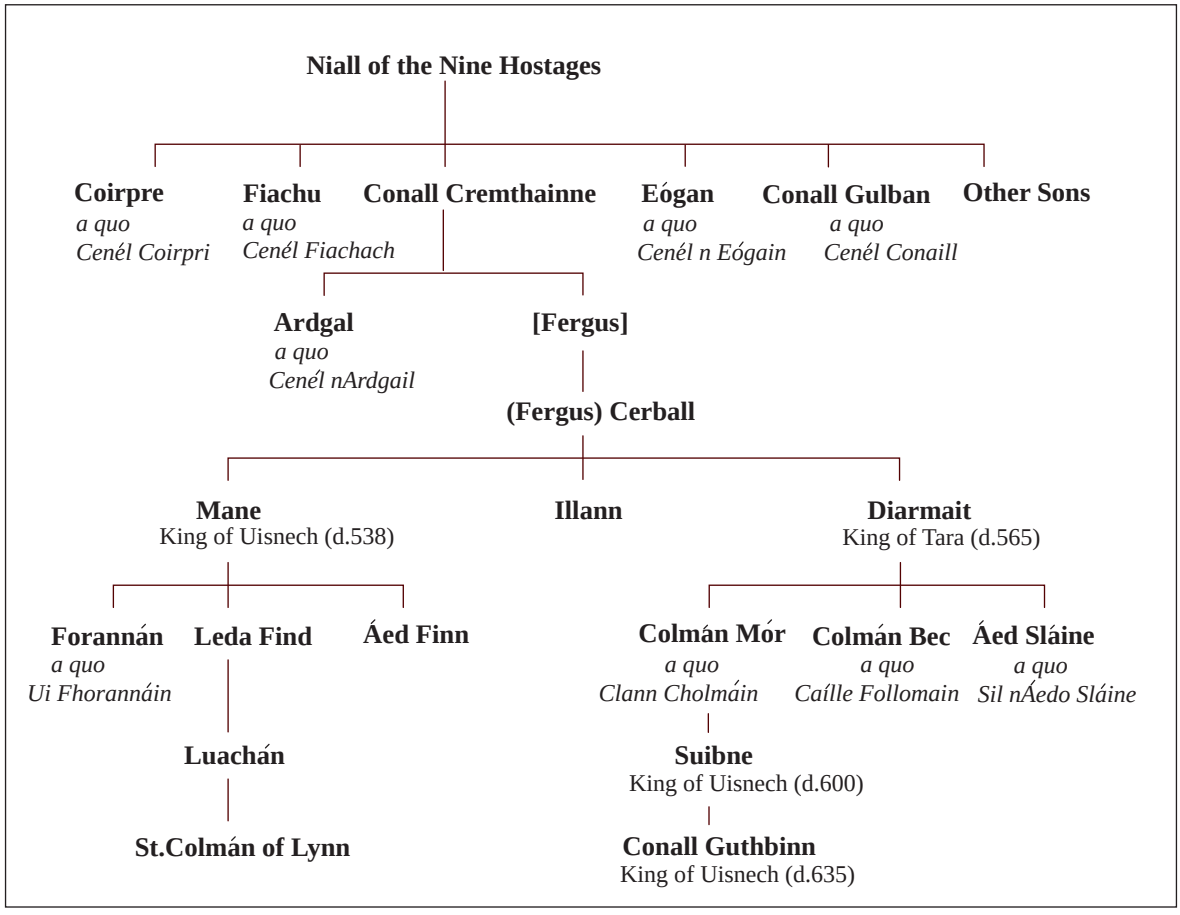
Having defined the borders of Fir Tulach, the rest of the chapter will examine the kingdom's secular and ecclesiastical settlement history, reflecting the nature of the textual sources available for early medieval Fir Tulach. The archaeological record will inform a deeper understanding of the kingdom's social history.

Secular settlement in Fir Tulach

The Ua Dublaich kings of Fir Tulach and the location of Inis na Cairrge

A useful place to begin the discussion of secular settlement in Fir Tulach is with an overview of its ruling line (Illus. 4.4). From at least the 10th century, and probably as early as the seventh century (see endnotes 8 and 19), the kings of Fir Tulach were drawn from the Ua Dublaich (O'Dooley) family. The following discussion will investigate the location of their *caput* and introduce the thorny problem of the conflicting accounts of the family's descent.

According to the *Life* of Colmán mac Luacháin, the O'Dooley royal seat was *An Charraig*, 'The Rock'. This complex included *Dún na Cairrge*, 'the fort of the rock', located on the island known as *Inis na Cairrge*, 'the island of the rock', with an associated site, *Port Innsi na Cairrge*, 'the harbour of the island of the rock', on the shore (Meyer 1911, 39, §41; 47–53, §§48–51; O'Sullivan 1998, 131).



Illus. 4.4 Genealogical chart showing pedigree of various Southern Uí Néill branches.

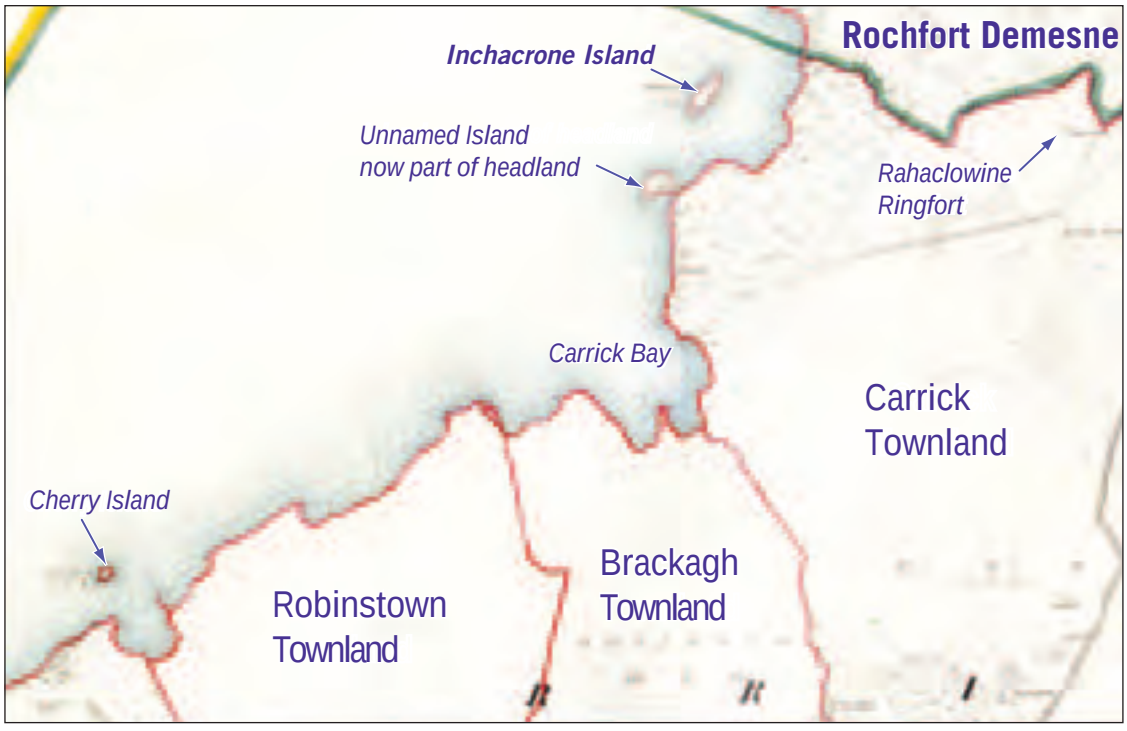
One suggested location of An Charraig is Cherry Island, formerly known as Ballyrobin Island (Walsh 1957, 166), situated off the shore of the townland of Robinstown in the civil parish of Carrick, barony of Fartullagh (Karkov & Ruffing 1997, 339–40; O'Sullivan 1998, 131). As O'Sullivan discusses in Chapter 3 of this volume, the identification is made on the strength of the impressive archaeological remains associated with Cherry Island, which comprise a large stone cashel that is built on top of the natural island, a stone-lined harbour or breakwater to the north side of the cashel, and a large ringfort overlooking the island from Robinstown's shore (Karkov & Ruffing 1997, 33).

The difficulty with the Cherry Island proposition, however, is that it does not fit easily with the toponymic evidence. Cherry Island and the Robinstown mainland are located in the civil parish of 'Carrick', a placename that derives from the same *carraig* element found in *Dún na Cairrge*, *Port na Cairrge* and *Inis na Cairrge*; however, the parish in turn takes its name from the townland of Carrick, roughly two km north-east of Cherry Island. From a placename perspective, one would almost certainly expect Inis na Cairrge to be associated not with Robinstown but either with Carrick townland itself or with Carrick Bay, which was framed by Carrick townland on the east side and Brackagh townland on the west. Such a location would also be in line with a suggestion that the large hoard of silver ingots discovered on Carrick's shoreline in 1979 may have been associated with Dún na Cairrge (Ryan et al. 1984, 363).

In discussing the potential conflict of evidence, O'Sullivan is not convinced that the placename issue is problematic, correctly pointing out that it would not be uncommon for a mainland territorial unit to possess an island situated some distance away from its shoreline. Certainly, the possibility that 'Townland A' might own an island located off the shore of 'Townland B' poses no difficulty. Nor would it be problematic if 'Townland A' consequently lent its name to this island so that it came to be known as 'Island A', despite its location off the shore of 'Townland B'. Where the difficulty arises is that the dynamic is reversed in this case. The primary toponymic element here—*An Charraig*, 'The Rock'—is the island itself, which is lending its name to the townland, not *vice versa*. In this situation, it seems hard to understand why Carrick mainland would have been called after the royal island if it were not integrally connected to the function or location of the royal *caput*.

If Inis na Cairrge were indeed located in the immediate vicinity of Carrick townland, then 19th-century cartography might provide the key to its location. The first edition Ordnance Survey map indicates the presence of two islands off the shoreline of Carrick townland (Ordnance Survey 1838, Sheet 26) (Illus. 4.5). The relatively large island of Inchacrone lay outside a smaller unnamed island to the south-west of Inchacrone. Ecclesiastical sources indicate that Inchacrone, at one time home to St Crón of Muin Taplain, was known in the early medieval period as Inis Chróine (Ó Riain 1985, 112, §670.13). Inchacrone is thus unlikely to be identical to Inis na Cairrge. A more suitable candidate is the smaller unnamed island, now part of the mainland. An early 19th-century map of Rochfort Demesne and its environs indicates the presence of 'ruins' near the unnamed island's south-west shore, close to a causeway linking the island to the mainland. From a placename point of view, it is tempting to see these as the site of Dún na Cairrge (National Library of Ireland, MS 21 F 48, 'Larkin Maps', map 1).

From an archaeological perspective, however, the case is not nearly as convincing. In contrast to the very strong archaeological evidence associated with Cherry Island, the Sites and Monuments Record indicates the presence of no upstanding archaeology on this former island, not even the 'ruins' indicated on the Rochfort Demesne map. This is an instance where the historical and archaeological indicators seem to be at odds with one another, an impasse that will require detailed archaeological work to resolve. In the meantime, one can at least say that the Fir Tulach *caput* lay along the shoreline of Carrick parish. Such a location would bring Inis na Cairrge into close proximity with the enclosed earthwork at Rochfort Demesne excavated as part of the M6/N52 road scheme (Chapter 6, this



Illus. 4.5 *Detail from first edition Ordnance Survey map (surveyed 1838), showing islands off the shore of Carrick townland.*

volume). It is therefore possible that the occupants of the enclosure site had ties to the Ua Dublaich dynasty. Other possible dynastic associations of the Rochfort Demesne dwelling will be considered later in this chapter.

The location of Inis na Cairrge is not the only mystery associated with the Ua Dublaich line. The other area of great obscurity connected to the family is the question of their origin. The collections of Irish genealogies contain two contradictory Ua Dublaich pedigrees that provide two very different dynastic backgrounds for the family. The main genealogical tradition links the Ua Dublaich line to Uí Cheinnselaig, one of the chief powers in Leinster in the early medieval period (Mac Fhirbhisigh 1645–66, Vol. 2, 280, §474.6; Vol. 3, 572, §1240.4; Pender 1951, 132, §§1772–3). The tradition traces Ua Dublaich descent from the first Uí Cheinnselaig king to rule all of Leinster, Brandub son of Eochu (d. AD 605). A secondary genealogical tradition has been used to link Uí Dublaich to Uí Máel Sechlainn, the ruling branch of the Clann Cholmáin over-kings of Mide (Mac Fhirbhisigh 1645–66, Vol. 1, 364, §162.3; Vol. 3, 442, §1114.3). More in-depth analysis of the Ua Dublaich genealogies will take place in later sections of this chapter. For now, suffice it to say that the contradictory backgrounds attributed to the Ua Dublaich line reflect Fir Tulach's liminal position, located physically and politically between the two great over-kingdoms of Leinster and Mide. The following discussion will use Fir Tulach's relationships with these two over-kingdoms as the lens through which to examine its secular history.

Fir Tulach and Leinster

While Fir Tulach appears to have always been considered part of Mide, Mide was not always considered to be distinct from Leinster. Instead, at the dawn of the historical period in the fifth

century, Mide—originally a term denoting a strictly geographical area rather than a political unit—belonged to the Leinstermen (Smyth 1974, 138). It was not until at least the late fifth and early sixth centuries that *Campus Mide*, 'the plain of Mide', was wrested from Leinster by the Southern Uí Néill (ibid.), with Leinster influence perhaps lasting into the seventh century (Mac Shamhráin 1996, 61). Fir Tulach, along with the adjacent Mide sub-kingdoms of Fir Bile and Fir Chell, was part of the region that subsequently passed from Leinster over-lordship to that of the Southern Uí Néill (Smyth 1974, 140).

The main Leinster opposition to the late fifth- and early sixth-century Uí Néill conquests in Mide were Dál Messin Corb, a division of the Laigin whose early prominence was obscured by the rise of the later dynastic powerhouses of Uí Dúnlainge in north Leinster and Uí Cheinnselaig in the south (Smyth 1982, 51). It is thus probable that Dál Messin Corb were the overlords of the Fir Tulach region prior to its takeover by the Southern Uí Néill. Echoing Dál Messin Corb's political sway in the region at the start of the early medieval period was their strong ecclesiastical presence in the Fir Tulach area.[6] The Leinster provenance that the main genealogical tradition attributes to Fir Tulach's ruling dynasty is thus broadly in line with Fir Tulach's early history as part of Leinster. The specific claim that the Ua Dublaich kings of Fir Tulach descended from the Uí Cheinnselaig king of Leinster, Brandub son of Eochu, however, is more problematic, and may have been fabricated.

Fir Tulach and Uí Cheinnselaig

Brandub son of Eochu belonged to a branch of Uí Cheinnselaig known as Uí Fhelmeda, who were rulers of two petty kingdoms in South Leinster; namely, Northern Uí Fhelmeda, based around Tullow, Co. Carlow, and Southern Uí Fhelmeda, based in the area represented by the modern barony of Ballaghkeen, Co. Wexford (Flanagan 1981, 5). According to their own pedigree, the Ua Dublaich line was still based in Uí Fhelmeda during the lifetime of Brandub's great-grandson, Ailill son of Domnall.[7] Since Brandub died in AD 605, Ailill likely lived in the second half of the seventh century. Consequently, the sept's move to Fir Tulach probably would not have taken place before then. Historians who doubt the authenticity of the Uí Cheinnselaig version of the Ua Dublaich genealogy have pointed out that Brandub's late sixth-/early seventh-century career as king of Leinster took place almost a hundred years after the traditional date given for the passing of the Plain of Mide from the Leinstermen into the hands of the Uí Néill (Smyth 1974, 505; Ó Cróinín 2005, 207). If, however, the claim that the Ua Dublaich line were still in Uí Fhelmeda during Ailill's lifetime is accurate, the lapse of time between the loss of the Plain of Mide by the Leinstermen and the earliest probable date at which the Ua Dublaich line could have taken power in the Fir Tulach region becomes closer to 200 years, which is an enormous gap. Furthermore, glaring inconsistencies between the Ua Dublaich genealogy on the one hand and records of Ua Dublaich dynasts in both the annals and the 12th-century *Life* of Colmán mac Luacháin on the other indicate that at least part of the pedigree was probably contrived.[8]

Creating further grounds for suspicion is the claim that a branch of the Ua Dublaich line ruled the Uí Cheinnselaig sub-kingdom of Benntraige in the barony of Bantry, Co. Wexford (Mac Fhirbhisigh 1645–66, Vol. 2, 280, § 474.7; Vol. 3, 574, §1243.2; Pender 1951, 133, §1775). Were this claim true, one would have a situation where a branch of Uí Cheinnselaig moved from Wexford to Mide to take control of Fir Tulach in the late sixth/early seventh century, and then, centuries later, a branch of that same Fir Tulach offshoot moved back to Wexford in order to rule Benntraige. Given the inherent unlikelihood of such a scenario, it seems plausible that claims of Uí Cheinnselaig origins for the Ua Dublaich line may have been born not out of true ancestry but out of genealogical manipulation.

That said, there is independent evidence from a number of different sources that points to a tradition of Uí Cheinnselsaig ecclesiastical influence in the Fir Tulach region. Saints with Uí Cheinnselaig ancestry are associated with the monastery of Lynn in Fir Tulach and with the neighbouring monastery of Clonfad in Fir Bile (not to be confused with the monastery of Clonfad in Fir Tulach, the excavated ecclesiastical site featuring in this monograph).[9] The Fir Tulach Clonfad also had Uí Cheinnselaig connections. As will be discussed in greater detail in the final section of this paper, Clonfad in Fir Tulach was probably a daughter house of the powerful monastery of *Clúain Iraird*, 'Clonard', in County Meath. From at least the end of the eighth century onwards, Clonard was a royal monastery of the Clann Cholmáin over-kings of Mide (Hughes 1954, 359; Murray 2004, 43, 60, §46). At the beginning of its history, however, Clonard's political affiliations—much like those of Fir Tulach—were with Leinster (Hughes 1954, 359). Clonard was founded by a Leinster saint, Finnian moccu Tellduib (d. AD 549) of Uí Luascán (Heist 1965, 96; Byrne 1985, 158), who had strong connections with Uí Cheinnselaig in general and with the father and grandfather of Brandub son of Eochu in particular (Stokes 1890, 75–7, 222–4). Although the emphasis in the *Lives* on Finnian's Uí Cheinnselaig associations probably arose primarily because of Clonard's connections to her network, or *paruchia*, of affiliated monastic houses in Leinster, it is nonetheless interesting to note yet another link between Brandub son of Eochu and a church in the Fir Tulach region.

Uí Cheinnselaig's links to Lynn, Clonfad in Fir Bile, Clonfad in Fir Tulach, and Clonard thus suggest that the Uí Cheinnselaig had an ecclesiastical presence in south-east Mide that continued, or perhaps even began, after Leinster's surmised early sixth-century loss of the Plain. Accordingly, it is not impossible that Uí Cheinnselaig had some sort of corresponding secular power base in the Fir Tulach region, and thus one cannot dismiss out-of-hand the possibility that a kernel of truth may underly the tradition that Brandub son of Eochu was ancestor of the Ua Dublaich line. A more plausible explanation, however, for the links between the Ua Dublaich pedigree and Uí Cheinnselaig ecclesiastical influence in the Fir Tulach region is that one of the monasteries in Fir Tulach may itself have been responsible for creating the tradition of Ua Dublaich descent from Brandub.[10]

Fir Tulach and Uí Fhailgi

The third Leinster kingdom associated with Fir Tulach in the historical record is its immediate neighbour to the south, Uí Fhailgi. The kingdom of Uí Fhailgi encompassed the eastern half of modern-day County Offaly (Offaly is an anglicisation of *Ua Failgi*), as well as north County Laois and north-west County Kildare (Smyth 1982, 69). Uí Fhailgi's recorded links to Fir Tulach are mainly ecclesiastical in nature, connecting the Leinster sub-kingdom to the two major Fir Tulach monasteries of Lynn and Clonfad. According to the *Life* of Colmán mac Luacháin, the kings of Uí Fhailgi owed tribute to the abbot of Lynn. The *Life* also represents St Colmán as the *anmchara*, or confessor, of an Uí Fhailgi princess married to the eighth-century Clann Cholmáin king of Tara, Domnall Midi (d. AD 763) (Meyer 1911, 93, §89).

An Uí Fhailgi link with the Fir Tulach monastery of Clonfad is indicated by a record of the violent death there of Conchobar son of Flanncán, king of Uí Fhailgi, in 891. Conchobar, who at the time of the attack was said to have been coming from a parley with Flann Sinna, the Clann Cholmáin king of Tara, was burnt to death at the church in Clonfad. At the same time, the *minna*—'halidoms' or venerated objects—of either 'Finnia' or 'Finnian' were also profaned and burnt at Clonard (AU 891.2; AFM 887[=891]; Bergin et al. 1954, Vol. 1, 187). According to the *Annals of the Four Masters*, it was the Fir Tulach who were responsible for the sacrilege (AFM 887[=891]). Unfortunately, the annalistic record does not document any more interactions between Fir Tulach and Uí Fhailgi so it is not known if Fir Tulach's involvement in the murder of the Uí Fhailgi king

was a reflection of, or a violent anomaly in, the general tenor of relationship between the two kingdoms.[11] The episode will be examined in more detail at the end of the chapter in the section dealing specifically with Clonfad.

In the above discussion, the known links between Fir Tulach and the various Leinster kingdoms were mainly ecclesiastical. That characteristic could perhaps be a function of the hagiographic nature of the available sources. It could also reflect the general tendency of early medieval Irish dynasties to retain an enduring grip on their ecclesiastical links to kingdoms in which they no longer held power in political terms (Ó Corráin 1981, 328). Much more secular in nature were the known links between Fir Tulach and the Southern Uí Néill, as discussed in the next section.

Fir Tulach and the Southern Uí Néill over-kingdom of Mide

From the early sixth to early 11th centuries, the Uí Néill dynasty held the kingship of Tara, the most powerful kingship in Ireland. The various dynasties within the Uí Néill federation traced their common descent from the fifth-century Niall Noígíallach son of Eochu Mugmedóin, more commonly known as Niall of the Nine Hostages. According to a genealogical schema devised, perhaps, in the eighth century, the ultimate ancestors of the various Uí Néill dynasties were all portrayed as brothers, the sons of Niall. In at least some cases, however, the claims to brotherhood appear to have been more a metaphor for political links between the dynasties in question than a reflection of biological reality (Byrne 1973, 92–3; Charles-Edwards 2000, 458–9; Bhreathnach 2005, 373; Lacey 2006, 145–66). A blatant example of this phenomenon is the attempt to reflect Fir Tulach's position as a sub-kingdom within the Southern Uí Néill over-kingship of Mide by deriving their descent from an altogether fictitious son of Niall of the Nine Hostages by the name of 'Fer Tulach' (Lec 53vb–54ra; Walsh 1957, 165). False though it may be, this bit of genealogical chicanery does serve the purpose of underlining the degree to which the history of Fir Tulach was intertwined with that of the Uí Néill in the early medieval period. The aim of the following section is to try to tease out some of the complexities of that relationship.

The Southern Uí Néill descendants of Cerball son of Conall Cremthainne son of Niall

The sons of Niall on record as winning the Plain of Mide from the Leinstermen were Coirpre and Fiachu, from whom the Uí Néill dynasties of Cenél Coirpri and Cenél Fiachach derived their names (AU 485.1, 486.1, CS [484], AFM 476; AU 494.1, 496.4; AU 499.3; AFM 501[=504]; AU 516.1, 517.3, ATig [516], AFM 507[=516]). Illus. 4.4 shows the genealogical relationships of the dynasts involved in this discussion. Coirpre's descendants continued to be significant players in the seventh-century struggle for authority amidst the Southern Uí Néill (Bieler 1979, 133; Connolly 1989, 31, §64). However, by century's end, it was the descendants of Coirpre's reputed brother, Conall Cremthainne, who ultimately were to triumph, controlling much of Mide and Brega (Brega roughly corresponds to modern day County Meath, southern County Louth, and northern County Dublin). Chief among Conall's line were the descendants of his son Cerball (also known as Fergus Cerrbél).

One of Cerball's sons was Mane, king of Uisnech—that is to say, king of Mide—who died in 538. His descendants are the members of Southern Uí Néill who are most significant to the very early history of Fir Tulach, since Mane's line controlled territory both in Fir Tulach and in the kingdom of Uí Fhorannáin to the immediate north. The sixth-century founder of the monastery of

Lynn, Colmán son of Luachán son of Leda Find, was said to have been Mane's great-grandson, and his *Life* describes the holdings of his relatives in that region (Meyer 1911, 8). Although difficulties with identifying all of the placenames listed in the *Life* leave the full extent of the lands of the sons of Leda Find uncertain, their holdings seem to have included territory in the very north of Fir Tulach (the Mullingar section), as well perhaps as in the south-east of the kingdom, near Rochfort Bridge.[12] According to Colmán's *Life*, Mane's descendants would have controlled their territories in Fir Tulach at least as early as the saint's late sixth-century/early seventh-century *floruit*. Although the internal chronology of the *Life* can be unreliable, the notion that the sons of Leda Find held land in Fir Tulach by that date is consistent with what is known about the movements of Cerball's descendants in the general area.

While the descendants of Mane son of Cerball were significant to the early history of Fir Tulach, even more significant to the kingdom's overall history were the descendants of Mane's brother, Diarmait, king of Tara (d. AD 565). According to genealogical tradition, Diarmait mac Cerbaill had three sons: Áed Sláine, Colmán Bec and Colmán Mór (Best & Bergin 1929, 133). These three were the respective ancestors of the Southern Uí Néill dynasties of the Síl nÁedo Sláine, the Caille Follomáin, and the Clann Cholmáin Móir.[13] Both in their role as over-kings of Mide, and—for at least a period in the ninth century—in their role as kings of Fir Tulach itself (see below), the influence of the Clann Cholmáin Móir upon Fir Tulach was the most marked of all the Southern Uí Néill dynasties.

Clann Cholmáin

According to the regnal lists, the Clann Cholmáin Móir—usually referred to as simply Clann Cholmáin—controlled the kingship of Mide from the mid sixth century until the coming of the Anglo-Normans. In the middle of the eighth century, Domnall Midi (d. AD 763), son of Murchad Midi, became the first Clann Cholmáin king of Tara, that is to say the first Clann Cholmáin overlord of the Uí Néill dynasties. Despite the claims of some contemporary writers, as well as of the later synthetic historians of the 11th and 12th centuries, the kingship of Tara was not yet tantamount at this time to the kingship of Ireland. It would be another 100 years before a king of Tara—Máel Sechnaill (d. AD 842) son of Máel Ruanaid of the Clann Cholmáin—would exert anything approximating to power over most of the country (Byrne 1973, 114, 257).

Domnall Midi's reign inaugurated a period of 250 years in which the kingship of Tara alternated between the Clann Cholmáin dynasty of Southern Uí Néill and the Cenél nÉogain dynasty of Northern Uí Néill. Their monopoly effectively shut out the previously dominant Uí Néill dynasties of Síl nÁedo Sláine and Cenél Conaill from the kingship of Tara, save for a brief period in the mid tenth century when Congalach Cnogba (d. AD 956) of Síl nÁedo Sláine came to power. In AD 1002, the alternating succession finally came to an end when Brian Bóruma of the Munster dynasty of Dál Cais deposed the last Clann Cholmáin king of Ireland, Máel Sechnaill Mór son of Domnall. After Brian's death in AD 1014, Máel Sechnaill Mór was to resume the kingship of Ireland until he died in AD 1022 on the crannog of Cró Inis on Lough Ennell, Co. Westmeath (ATig [1022]), near to his house at Dún na Scíath (AClon 1022). Thereafter, no Clann Cholmáin king was strong enough to take the kingship of Ireland. The dynasty did, however, maintain a firm grip on their own kingdom throughout the 11th century, and even extended their power over the neighbouring kingdom of Brega to such a degree that, by the end of the 11th century, Brega came to be referred to as *Airther Mide*, 'East Mide' (Byrne 1987, 19). The geographical sway of Mide was now defined as 'from the Shannon to the Sea' (ATig [1143], [1155]; AFM 1153).

In contrast, the 12th century saw a great decline in Clann Cholmáin fortunes, to the extent that on multiple occasions their kingdom was divided between neighbouring powers eager to take advantage of the power vacuum in the once mighty Mide (ATig [1125]; AClon 1140[=1144]; AFM 1144; AFM 1150). Nonetheless, the idea that the over-kingdom of Mide encompassed both Mide and Brega still remained. When the final blow to Clann Cholmáin power came with the coming of the Anglo-Normans in the late 12th century, the extent of the 'Liberty of Meath'—granted by Henry II to his vassal Hugh de Lacy in AD 1172—was once again described as 'from the Shannon to the Sea' (ALC 1186). After the advent of the Anglo-Normans, the Clann Cholmáin were able to claim just the 'Shannon' part of their old dominion, and only a small section of the Shannon at that, being relegated to territory in the barony of Clonlonan, Co. Westmeath, at the western edges of their former kingdom (Walsh 1957, xxxiii).

The Clann Cholmáin and Fir Tulach

As overlords of Mide, the Clann Cholmáin had likely been over-kings of Fir Tulach since the mid sixth century. Around the middle of the eighth century, however, the nature of their control over Fir Tulach appears to have changed. During the reign of the Clann Cholmáin king of Tara, Donnchad Midi (764–97), the dynasty's rule over Fir Tulach seems to have become much more direct. Already by the reign of Donnchad's father, Domnall Midi (d. AD 763), the Clann Cholmáin had strong links to the monastery of Durrow, less than 10 km from Fir Tulach's western border (AU 753.4; AFM 758; AU 764.6; Herbert 1988, 64–5). Domnall was himself buried at the monastery, and the community of Durrow took sides in the succession struggle that ensued following Domnall's death. Donnchad Midi eventually emerged as his father's successor and in AD 764, the first year of Donnchad's reign, he defeated Fir Tulach at *Dún Bile*, 'the fort of the sacred tree' (AU 764.12).[14] The battle was the first of several events involving Donnchad and his sons in the immediate vicinity of Fir Tulach (AU 775.6; AU 799.3; AU 803.5), and it may have been at this point that the Clann Cholmáin established direct control over the defeated sub-kingdom.

The *Life* of Colmán mac Luacháin lists a site known as *Ráith Donnchada*, 'The Rath of Donnchad', as one of the many Fir Tulach holdings donated to Lynn by the Clann Cholmáin (Meyer 1911, 76, §74). Although we cannot know for certain who the 'Donnchad' in question was, it is tempting to view the *ráith* (exact location unknown) as the Fir Tulach residence of Donnchad Midi. Much more conclusive proof of the Clann Cholmáin's active presence in the sub-kingdom at this time, though, is the description of Donnchad Midi's son, Óengus, as *Rex Telach Mide*, 'the king of [Fir] Tulach of Mide', upon his death in AD 830 (AU 830.5).[15] Óengus' reign as king of Fir Tulach provides valuable insight into the mechanisms by which the Clann Cholmáin governed their over-kingdom. In the case of Óengus, at least, it is clear that the Clann Cholmáin exercised their over-lordsip of Fir Tulach by directly installing one of their own dynasts as its king. The question is whether this form of direct rule by the Clann Cholmáin continued throughout Fir Tulach's history, or whether Óengus' rule over the sub-kingdom was a one-off phenomenon followed by a reversion to native governance. The following section will explore this question by investigating what, if any, genealogical links existed between the Clann Cholmáin and the ruling families of Fir Tulach.

Genealogical links between the Clann Cholmáin and the Ua Dublaich kings of Fir Tulach

Complicating the attempt to investigate continuing genealogical links between the Clann Cholmáin and the rulers of Fir Tulach is the fact that Óengus is the only king of Fir Tulach to be mentioned

by the annals before the late 10th century. It is thus not known whom Óengus displaced when he became king, nor who immediately succeeded him. When the annals resume mention of Fir Tulach in AD 980, they name its rulers as Fiachra and Cú Duilig, 'two sons of Dublach, two kings of Fir Tulach' (ATig [980]). Here, Dublach is almost certainly the eponymous ancestor of the royal Ua Dublaich line to which all known 11th- and 12th-century kings of Fir Tulach belonged (AClon 1008[=1015], AFM 1014[=1015]; ATig [1021]; ATig [1040]; ATig [1144], CS [1144], AClon 1140, MCB 1143.2, AFM 1144; O'Donovan 1862, 8–9; Carney 1943, 3). Who, though, were the Uí Dublaich? As noted near the beginning of this chapter, one of several conflicting views of the origins of the Ua Dublaich dynasty is that the family was a branch of the Clann Cholmáin. The following discussion will investigate this view, concluding that the Ua Dublaich was probably not a Clann Cholmáin offshoot.

The Clann Cholmáin interpretation of Ua Dublaich ancestry stems from a claim that the identically named Ua Dublaich dynasty of the kingdom of *Éile* (Ely in south Offaly and north Tipperary) was a branch of the family of Ua Máel Sechlainn, the ruling line of the Clann Cholmáin (Mac Fhirbhisigh 1645–66, Vol. 1, 364–5, §162.3; Vol. 3, 442, §1114.3). This claim is made by several passages in the 17th-century genealogical collection of Duabhaltach Mac Fhirbhisigh. The main passage explains that Uí Dublaich came to Éile after they were banished—it does not say from where—for their role in the killing of an unnamed high king of Ireland. Once in Éile, according to the genealogies, the exiled Ua Dublaich family was given land and a lordship by the local king. The passage states that the Ua Dublaich dynast responsible for the murder was a certain Árchú son of Domnall, ninth in descent from one Brian Mór son of Máel Sechnaill.[16] While the annals contain no record of the participation of Árchú, or indeed of any other Fir Tulach dynast, in the murder of a high king, it is interesting to note that the annals do record the involvement of an Ua Dublaich king of Fir Tulach in the mid 12th-century assassination of the son of a high king, Conchobar son of Toirdelbach Mór Ua Conchobair (ATig [1143]).

The passage claiming Clann Cholmáin descent for the Ua Dublaich family of Éile has been interpreted in different ways. The great 19th-century scholar, John O'Donovan, felt that the Ua Dublaich dynasty of Fir Tulach was identical with the Ua Dublaich dynasty of Éile, and used this passage as evidence to argue that the sept had been expelled from Fir Tulach into Éile before the coming of the Anglo-Normans (O'Donovan 1862, vii, note 25; lxxxv, note 767; Ordnance Survey of Ireland 1839, 54, §141; AFM 1367, note k). If correct, O'Donovan's interpretation would mean that the Ua Dublaich dynasty of Fir Tulach was likewise a branch of the Clann Cholmáin, and that direct Clann Cholmáin control of Fir Tulach had thus extended from the ninth-century reign of Óengus son of Donnchad Midi until well into the 12th century.

Walsh, on the other hand, took the passage as evidence that the Ua Dublaich line of Fir Tulach was not the same as the Ua Dublaich line of Éile. By counting the generations named in Árchú's pedigree, Walsh calculated that the alleged assassin would have been a contemporary of Clann Cholmáin dynasts living in the second half of the 11th century. Since annalistic references to Ua Dublaich kings of Fir Tulach continued into the mid 12th century—decades later, that is, than the purported murder and subsequent expulsion of the dynasty—Walsh reasoned that the Ua Dublaich family of Fir Tulach and the Ua Dublaich family of Éile could not be one and the same (Walsh 2003, 255–6). His conclusions are in line with other, independent evidence that indicates the Ua Dublaich line of Éile was established as an important sept within Éile by at least the mid 11th century.[17] Despite the intriguing parallels between Ua Dublaich involvement in the 12th-century assassination of the high king's son and Ua Dublaich involvement in the murder cited in the genealogical passage, Walsh's interpretation is thus more likely to be the correct one: in short, the Ua Dublaich family of Fir Tulach appear to have been a different family from the Ua Dublaich family of Éile and thus cannot

be accredited with descent from the Clann Cholmáin. Accordingly, there seems to be no genealogical continuity between the rule of Óengus son of Donnchad Midi and later Ua Dublaich rule.

To return to the question posed at the beginning of this section, who, then, were the Uí Dublaich? There is some evidence to suggest that they descended from the royal line that was in place in Fir Tulach prior to the Clann Cholmáin's imposition of Óengus as king.[18] The ancestry of this earlier line is uncertain. As discussed in the Leinster segment of the section on secular settlement, the Ua Dublaich claim to Uí Cheinnselaig origins is problematic. Instead, the sept may represent a native Fir Tulach dynasty, or perhaps an earlier wave of Southern Uí Néill expansion, such as the descendants of Mane son of Cerball.

Genealogical links between the Clann Cholmáin and the Ua Domnalláin

However, if the Ua Dublaich line did not represent a branch of the Clann Cholmáin within Fir Tulach, there was another local sept that did. According to several of the later genealogical collections, Fir Tulach was home to a branch of Clann Cholmáin that took the surname of Ua Domnalláin (Pender 1951, §766–7; Mac Fhirbhisigh 1645–66, Vol. 1, 363, §161.3). The reference to the Ua Domnalláin family occurs in a brief passage in the genealogies that gives the whereabouts of a number of different branches of the Clann Cholmáin scattered throughout the over-kingdom of Mide. Accounting for the diffuse distribution of the dynasty, the passage states that the dispersal of the Clann Cholmáin occurred so that the dynasty 'would have power in every *túatha* in which they were and that they would wield overlordship always' (ibid.). The implication would seem to be that the Ua Domnalláin family were the agents of Clann Cholmáin over-lordship within Fir Tulach.

Other than noting their origin within the Clann Cholmáin, a more detailed account of the Ua Domnalláin pedigree is absent from the genealogies. Perhaps they were the descendants of Óengus, the eighth-century Clann Cholmáin king of Fir Tulach. The annals do not mention the Uí Domnalláin, although the *Life* of Colmán mac Luacháin does contain some limited information about the family. According to that text, the Uí Domnalláin were charged with 'protecting' (*cúlchoméd*) the king of Fir Tulach (Meyer 1911, 53, §50).[19] A possible interpretation of this characterisation is that Uí Domnalláin were acting in the role of overlord protecting a client king; however, given the context in which the claim is made in the *Life*—a passage briefly enumerating the official duties of several noble Fir Tulach families with regard to their king—it may be the case that the relationship was perceived as that of noble subject defending a superior. The uncertainty of the hierarchy underscores the complexity of the relationship between the Clann Cholmáin and the Ua Dublaich kings of Fir Tulach. What is clear, however, is that through the Uí Domnalláin the Clann Cholmáin maintained some sort of direct presence within Fir Tulach even after the death of Óengus son of Donnchad Mide.

The second piece of information that the *Life* of Colmán mac Luacháin provides concerning the Ua Domnalláin line is that they were the people of the 'western *baile*' or 'western land-holding' (Meyer 1911, 52, §50). If the 'western *baile*' could be identified, then a more nuanced understanding of Fir Tulach's political geography might be reached in which some of the physical manifestations of the interplay between the Clann Cholmáin and Fir Tulach could be mapped. However, a certain identification of the location of the 'western *baile*' has not been possible. One of the chief obstacles in this endeavour has been to understand exactly what it was considered to be in a western relationship with. Did the Ua Domnalláin family live in the 'western *baile*' of the area of northern Fir Tulach in which the landholdings of Lynn—almost certainly the site at which the *Life* was composed—were concentrated? Or did the Ua Domnalláin family live in the most westerly *baile* of

the kingdom of Fir Tulach as a whole, which would put them in southern Fir Tulach near the southern tip of Lough Ennell? Although no answer to these questions can be categorically reached, it is nonetheless worth reviewing the most likely candidates, particularly since some of the possibilities include locations at, or very near, several of the excavated sites studied in this volume. The following section will examine three possible locations for the 'western *baile*', and will suggest that the most likely site of the Ua Domnalláin centre was a location near the southern arm of the River Brosna.

The 'western *baile*' of Uí Domnalláin

If the Ua Domnalláin family had lived in the westernmost *baile* of the area around Lynn, then two possible locations for their *caput* present themselves. The first candidate is the townland of Lynn itself, which forms the most westerly part of the parish of Lynn. The townland contains the remains of the monastery of Lynn, a ruined church with a graveyard, and a castle, all of which lie in the eastern half of the townland. The western half of the townland consists of a large stretch of bog bordering the River Brosna. According to the *Life*, *Cnoc Domnalláin*, 'The Hill of [Uí] Domnalláin', was one of the properties which the monastery of Lynn held in Uí Tigernáin, the kingdom directly across the northern arm of the Brosna from Fir Tulach (Meyer 1911, 64, §62). If we are to hypothesise that Ua Domnalláin holdings may have been close to one another, then the proximity of the townland of Lynn to Uí Tigernáin would be a factor in favour of its being the 'western *baile*'. Standing against this proposition, however, is the likelihood that the monastery of Lynn itself would have owned the *baile* in which its main church was situated. Had the Ua Domnalláin family been in possession of what was to become Lynn townland, it is likely that the property-obsessed *Life* would have made some mention of them in this capacity.

The second candidate in the Lynn region for the 'western *baile*' is the area around the very pronounced promontory of land known as Rinn (or Wren) Point, which extends out into Lough Ennell from the Fartullagh shore. Rinn Point is part of the townland of Rochfort Demesne in the civil parish of Moylisker. That Rochfort Demesne is home to the enclosure excavated as part of the N6/N52 road scheme makes this suggestion particularly intriguing. Like most of the placenames in Moylisker parish, the name 'Rochfort Demesne' is English in origin. Fortunately, though, early modern sources indicate that the previous name for Rochfort Demesne was either Ballybrack or Boolybrack (Books of Survey and Distribution, Co. Westmeath, 24; Petty 1685, map 8; Walsh 1957, 194) (Illus. 4.2). 'Boolybrack' would likely have derived from *buaile brec*, 'the speckled cattle-fold'; 'Ballybrack' would be derived from *baile brec*, 'the speckled town'. The use of cattle-folds in this area is signalled by the *Life* of Colmán mac Luacháin, which claims that the cows of Máel Sechnaill, the Clann Cholmáin king of Tara, were maintained at Port Innsi na Cairrge (Meyer 1911, 38, §41). As discussed previously, Port Innsi na Cairrge—part of the Ua Dublaich royal *caput*—was almost certainly within Carrick, the civil parish to the immediate south of Rochfort Demesne.

The proximity of the Rochfort Demesne dwelling to the Carrick area may suggest that its occupants had links to the Ua Dublaich dynasty. Alternatively, if the Rinn Point region is indeed to be identified with the 'western *baile*', then the excavated site could plausibly have been associated with the sept of Ua Domnalláin. If Rinn Point was the Ua Domnalláin base, this would mean that both the Ua Dublaich and Clann Cholmáin centres in Fir Tulach were concentrated in the same general area. However, while Carrick Bay has yielded a large hoard of silver ingots consistent with the nearby presence of the Fir Tulach royal centre, there have been no similar finds discovered along the Rinn Point shoreline consistent with the wealth one might expect of a Clann Cholmáin base.[20] This fact tells against its identification with the 'western *baile*'.

A third candidate for the location of the 'western *baile*' arises from the possibility that the phrase was intended to designate the most westerly part of Fir Tulach as a whole, rather than just the most westerly point of the Lynn locality. In this context, the Ua Domnalláin base would have been near the southern arm of the River Brosna in south-western Fir Tulach. The Brosna marks the western limits of the civil parishes of Clonfad and Newtown (Illus. 4.1), and although there is some uncertainty about the precise western border of Fir Tulach (see above), it is clear that the river defined at least part, and perhaps all, of the kingdom's western border. Adding weight to this particular suggestion for the location of the 'western *baile*' is the presence of a high-status crannog at Newtownlow in the western half of the parish of Newtown (Bourke 1985; 1986; 1987; O'Sullivan 1998, 126). Occupied from at least as early as the 10th century, the importance of Newtownlow continued into the 13th century when it became an early centre of the Tyrells, the chief Anglo-Norman family in Fartullagh (Chapter 5, this volume). Yielding a number of artefacts indicative of considerable wealth—including a mid 10th-century hoard of Anglo-Saxon coins (Ryan et al. 1984)—the profile of the crannog seems consistent with what one might expect of the residence not of kings *per se* but of the chief representatives of the Clann Cholmáin within Fir Tulach (O'Sullivan, pers. comm.).

A location near the southern arm of the Brosna would have brought the Ua Domnalláin base into close proximity to the monastery of Clonfad. Given that Clonfad was likely a daughter house of Clonard, such a potential location for Ua Domnalláin territory is very interesting in light of the connection between Clonard and Ua Domnalláin's parent dynasty, the Clann Cholmáin. During the eighth-century reign of Donnchad Midi—that is to say, precisely at the same time when the Clann Cholmáin began to exercise direct control over Fir Tulach—Clonard appears to have become one of several royal monasteries associated with the Clann Cholmáin (Murray 2004, 43, 60, §46). In this scenario, the possibilities suggest a relationship between Clonfad and Uí Domnalláin that mirrored the relationship between Clonard and the ruling line of the Clann Cholmáin on a more local scale.

All three possible locations for the Ua Domnalláin base in 'the western *baile*' would thus have been very close to a major centre of power, ecclesiastical in the cases of Lynn and Clonfad, and secular in the case of Inis na Cairrge. It is impossible to say with any certainty which, if any, of the three suggested locations is the correct one. The hypothesis that the Ua Domnalláin centre lay near the southern arm of the Brosna is probably the strongest contender as it combines what is arguably the most western location in Fir Tulach proper with suitable archaeological remains. As illustrated by the topographical map (Illus. 4.1), lowlands and bog separated Fir Tulach into two physically distinct parts. If the Ua Domnalláin centre was indeed near the southern arm of the Brosna, its proximity to Clonard might suggest two distinct regions and spheres of influence within the kingdom, each with their own centres of power, with the Uí Domnalláin and Clonfad in the southern half of the kingdom, and the Uí Dublaich and Lynn in the northern half.

Interactions between the Ua Dublaich kings of Fir Tulach and the ruling line of the Clann Cholmáin

Beyond the assertion that it was the Uí Domnalláin's responsibility to protect the king of Fir Tulach (Meyer 1911, 53, §50) there is no further information regarding their interaction with the Ua Dublaich royal line. However, if the records concerning Ua Dublaich interaction with the Fir Tulach branch of the Clann Cholmáin are limited, those concerning Ua Dublaich interaction with the ruling line of the Clann Cholmáin, the Uí Máel Sechlainn, are comparatively richer. The political

history of Fir Tulach was heavily intertwined with that of the Clann Cholmáin, such that the great majority of Fir Tulach activity reported in the annals (simple obits excluded) involves the Clann Cholmáin to some degree. Ua Dublaich reactions to Ua Máel Sechlainn hegemony seem to have been mixed. In AD 980, two kings of Fir Tulach, Fiachra and Cú Duilig, sons of Dublach, were killed at the Battle of Tara fighting alongside Máel Sechnaill Mór, the Clann Cholmáin king of Tara, against the Vikings (ATig [980]). Thirty-four years later, that same Máel Sechnaill Mór was responsible for the killing of Gilla Chríst úa Dublaich (AFM 1014[=1015]; AClon 1008[=1015]), possibly the first cousin of Fiachra and Cú Duilig.

The most striking witness to the degree of Clann Cholmáin authority over Fir Tulach is an episode in the *Life* of Colmán mac Luacháin that describes how the kingdom's royal *caput* was taken from the Ua Dublaich kings and given to the queen of Mide. According to the *Life*, *An Charraig*, 'The Rock', the royal seat of Fir Tulach, was taken out of Ua Dublaich hands and bestowed upon Mór, daughter of the king of Uí Fhailgi and wife of the Clann Cholmáin king of Mide, Conchobar son of Domnall Ua Máel Sechlainn (d. AD 1073) (Meyer 1911, 52, §50).[21] Mór and Conchobar's married life together had begun explosively when he seized her from Diarmait mac Máel na mBó, king of Leinster, in AD 1053 (AFM 1053; ATig [1053]). Conchobar's granting to Mór of An Charraig—her very own version of Cró Inis, the Ua Máel Sechlainn crannog just across the lake—may have been a dramatic gesture intended to show his subsequent good faith. Certainly the *Life* considers his actions to have been unprecedented and quite outrageous (although the author's indignation did not stop him from insisting nonetheless that the tithes of An Charraig were owed to Lynn, regardless of who occupied it). The *Life* indicates that this situation was intended to be permanent, such that An Charraig was not just the property of Mór but thereafter became part of the official demesne lands held by the queen of Mide (ibid.). In addition to the desire to impress his new bride, the desire to underline his power over the Fir Tulach royal line may have been another of Conchobar's motives in seizing An Charraig.

Despite the indignity of having their *caput* taken away from them, the Ua Dublaich line are not on record as giving any further trouble to the Clann Cholmáin. In fact, quite the opposite is true. As noted in the discussion on Ua Dublaich's genealogical links to the Clann Cholmáin, in AD 1144 an unnamed Ua Dublaich king of Fir Tulach was involved in the murder of Conchobar, son of the high king of Ireland, Toirdelbach Mór Ua Conchobair. The circumstances leading up to the murder were that six months earlier Toirdelbach had deposed the existing Clann Cholmáin overking, Murchad Ua Máel Sechlainn, and imposed his son Conchobar in his place (ATig [1143]). Refusing to accept this 'stranger-in-sovereignty' as their over-king, Ua Dublaich led the men of Mide in a secret conspiracy to assassinate the interloper (ATig [1144]; CS [11424]; AClon 1140; MCB 1143.2; AFM 1144). The Uí Dublaich thus appear to have been accepting enough of Ua Máel Sechlainn over-kingship that they took active measures to challenge the attempt to end it. After experiencing centuries of their politics being intertwined with those of the Clann Cholmáin, having the Uí Domnalláin sept of the Clann Cholmáin resident within their own borders, and even being subjected to direct control by a Clann Cholmáin dynast in the early ninth century, the kings of Fir Tulach had apparently come to see the Uí Máel Sechlainn as 'the devil you know'.

Following the murder of his supplanter, Murchad Ua Máel Sechlainn eventually resumed control of his over-kingdom of Mide (ATig [1145]), but there is no record of what became of the Ua Dublaich line of Fir Tulach. The annalistic account of Conchobar's death stresses that Toirdelbach Mór's revenge on Mide for his son's death was swift and terrible, likening it to 'the day of judgement' (ATig [1144]); perhaps the high king put an end to Ua Dublaich rule. Were that the case, it is not known who replaced the Uí Dublaich, for nothing more is heard of a ruling line in

Fir Tulach until the rise of the Tyrell lordship with the coming of the Anglo-Normans (Chapter 5, this volume).

Ecclesiastical settlement in Fir Tulach

Throughout this chapter, discussion has drawn heavily on the *Life* of Colmán mac Luacháin to trace political developments and secular settlement in Fir Tulach. This final section of the study will now turn to the evidence which the *Life* and other hagiographical documents bring to bear upon ecclesiastical settlement in the kingdom.

Patrician and Brigidine churches

The earliest reference to a church in Fir Tulach is found in the late seventh-century *Life* of St Patrick by Tírechán. This *Life*, which is really more of an itinerary of Patrick's alleged travels reflecting the political geography of seventh-century Ireland, brings the saint on a journey from Tara to Uisnech. Taking a route whose latter part seems to follow the path of the Slige Mór, the saint was said to found a number of churches along the way. At his penultimate stop, he founded *Caput Carmelli in campo Teloch* ('"Carmellus Head" on the plain of Tulach'). Tírechán adds that it was at this church that St Brigit was to later receive the veil from Bishop Mel (Bieler 1979, 137). The site of the church at Cenn Carmelli has been identified as Dunboden Hill in the townland of Kilbride—'the church of Brigit', in the civil parish of Kilbride, in Fartullagh (Walsh 1957, 180, 184).

The Brigidine associations of this early ecclesiastical foundation clearly surpassed its Patrician ones. Such a dynamic is typical of the strong influence of Brigit's cult in Fir Tulach and its immediate vicinity. The monasteries of Lynn and of Clonfad in Fir Bile both had Brigidine links (Colgan 1645, 304; Ó Riain 1985, 114, §670.33; AFM 929[=931]); however, the most striking witness to the power of the Brigidine cult in the region is that modern-day Fartullagh contains two civil parishes named after the saint: the aforementioned Kilbride in central Fartullagh and the 'Pass of Kilbride' on the barony's eastern edge.[22] As indicated by Petty's 17th-century map of Westmeath (Illus. 4.2), the two parishes are both connected and separated by a great stretch of bog, known today as Boughna bog and in the early medieval period as Móin Faechnig (Walsh 1957, 181–4). This bog provided the backdrop for one of the miracle stories associated with Brigit wherein she had to make her way into Uí Néill territory from *Cruachan Brí Éle* (Croghan Hill, Warrenstown, Co. Offaly) to meet Bishop Mel. Since her route involved crossing the treacherous Móin Faechnig, God was said to have miraculously transformed the bog on her behalf into a smooth, flowering plain (Stokes 1905, 67; Stokes & Strachan 1903, Vol. 2, 329–30; Walsh 1957, 182–3). Another Brigidine miracle set in Fir Tulach is a loaves-and-fishes type episode preserved in the ninth-century *Life* of Brigit known as *Bethu Brígte*. In this story, Brigit created the equivalent of 18 vats of beer from a single sack of mash and only one brewing vessel. Such a large amount of alcohol was required as she wanted to provision the local ecclesiastical establishments over Easter, and Bethu Brígte claims there were no less than 17 churches in Fir Tulach (Ó hÁedha 1978, 24). As will be seen, a sizeable proportion of the reputed 17 churches was associated with the monastery of Lynn.

Lynn

The monastery of Lynn was the chief ecclesiastical foundation in the northern half of Fir Tulach, and perhaps in Fir Tulach as a whole. The *Life* of its founding saint, Colmán son of Luachán, referred to so often in this chapter, was written in its current form in the 12th century, but probably

incorporated earlier material (Meyer 1911, vi). It has been suggested that the *Life* was written in reaction to the rediscovery of the relics of Colmán, dug up on Spy Wednesday (the Wednesday before Easter) of AD 1122 (AU 1122.2) (Meyer 1911, vii); however, one cannot rule out the notion that instead of having a cause-and-effect relationship, the rediscovery of Colmán's shrine and the composition of the *Life* were part of the same impetus to promote the monastery. Although the *Life* takes great pains to establish Lynn as a key Clann Cholmáin church, the truth of the matter was that Lynn did not rank among the chief Clann Cholmáin ecclesiastical sites of Durrow, Clonard, and Clonmacnoise. Nor were the larger monasteries Lynn's only competition for Clann Cholmáin patronage. It has been suggested that Colmán's *Life* was partly written in reaction to the potential threat posed to Lynn by the new ecclesiastical orders coming into Ireland in the 12th century as part of the Church reform movement. Both the Augustinians and the Cistercians, for example, were to be heavily patronised by the Clann Cholmáin king Murchad Ua Máel Sechlainn (d. AD 1156) (Bhreathnach 2005, 378). From this perspective, the timing of the 'rediscovery' of Colmán's shrine seems less than coincidental.

A note attached to the end of the *Life* explictly discusses the rediscovery of the relics, relating that a new shrine was made for Colmán's relics by the goldsmith Gilla Críst Ua Mochain.[23] There are also several references to smiths within the *Life* itself, including the information that the blacksmiths of Lynn were the hereditary stewards of Colmán's churches in the neighbouring kingdom of Uí Fhorannáin (Meyer 1911, 44, §45). The *Life* further includes an episode where 'a famous goldsmith [*cerd*] of the community of *Tech Conan*' (the house of the abbot of Lynn) travels to Uí Fhailgi to hand over a gold and silver bridle. The bridle, which was said to have been worth 12 cows, had been commissioned by the king of Uí Fhailgi (Meyer 1911, 38, §40). Such an emphasis on metalworking within the *Life* is very much in line with the archaeological evidence for iron-working and bell-making discovered in the course of the excavation at Clonfad (Appendix 3.pdf, CD-Rom). The claim that the monastic metalworkers also undertook secular commissions is particularly interesting.

The reference to the goldsmith being part of the community of *Tech Conain*, the abbot's house, underlines the size of Lynn and the multiplicity of buildings within it. The evidence of Colmán's *Life* indicates that in addition to Tech Conain, Lynn controlled five other churches in Fir Tulach as well as a local hermitage.[24] In addition, Lynn controlled a *paruchia* of churches outside Fir Tulach that included three churches in Uí Fhorannáin, and two in Uí Tigernáin, kingdoms that bordered on Fir Tulach. Lynn also controlled one much farther flung establishment in Munster (Meyer 1911, 14, note 1). The Munster link derives from Lynn's own position as a daughter house of Lismore, Co. Waterford (ibid., 86, §85), a relationship that presumably pre-dated the flight of Lismore's founding saint, Mo-Chuta, from the Mide monastery of Rahan (Rahan Demesne, civil parish of Rahan, barony of Ballycown, Co. Offaly) (Hogan 1910, 571).

The evidence of the *Life* also indicates formal relationships between Lynn and a host of other Mide churches outside Fir Tulach, several of them major monastic sites. These include Clonfad in Fir Bile (Meyer 1911, 6, §11; 42, §42); *Tech Lommáin* (Portloman, civil parish of Portloman, barony of Corkaree, Co. Westmeath) (ibid., 6, §11); the church of Colmán *Comraire* (ibid., 30–4, §31–35; 42, §40); Lynally (Lynally Glebe, civil parish of Lynally, Co. Offaly) (ibid., 30–4, §31–35); Durrow (Durrow Demesne, civil parish of Durrow, barony of Ballycowan, Co. Offaly) (ibid., 54, §52; 104, §104); *Dísert Maoil Tuile* (Dysart, civil parish of Dysart, barony of Moyashel and Magheradernon, Co. Westmeath) (ibid., 104, §104); Clonard (Clonard Old, civil parish of Clonard, barony of Upper Moyfenrath, Co. Meath); and possibly *Lecan Midi* (Lackan, civil parish of Lackan, barony of Corkaree) (ibid., 40–2, §42; 96–8, §97–8).[25] Finally, as noted in the discussion of Fir Tulach's links to Leinster, Lynn seems to have had some sort of relationship with the County Wexford monastery

of Ferns (ibid., 43, §42; 75, §71). Notably missing from this list is the other significant monastery in Fir Tulach, Clonfad.

Clonfad

Just as Lynn was the chief monastery in the northern half of Fir Tulach, so was Clonfad the chief monastery in the southern half. The Fir Tulach Clonfad was known by several different names in the Middle Ages: *Clúain fota fíne* or *Clúain fota meic Finna*, 'the long meadow of (the son) of Finna'; *Clúain fota Libráin*, 'the long meadow of Librán'; and, in later English sources, 'Clonfad foran' (Walsh 1957, 173). A certain Librán or Librén, identified by a gloss as 'belonging to Clonfad', is commemorated in the *Martyrology of Gorman* under 11th March (Stokes 1895, 52). He is possibly the same Librán included in the saints' genealogies in a list of those holding the office of *sacerdos*, 'priest' (Ó Riain 1985, §705.46). Librán was probably Clonfad's founder. He may be identical to the Saint Librén who was son of Áed son of Colgu (d. 610), king of the Airthir (a branch of the Airgíalla situated near Armagh) (Ó Riain 2011, 397; 1985, §54). Alternatively, it is possible that Librán was one and the same person as 'the son of Finna'. In the naming patterns of early Irish monastic foundations, there is an occasional tendency to refer to the founding saint as 'son of X' rather than by his first name, as in *Lann mic Luacháin*.

The meaning of the 'foran' element attached to the monastery's name in later English sources is uncertain. It would, however, appear to be the same element found in 'Templeoran north' and 'Templeoran south', the name of townlands directly south of Clonfad: a 17th-century episcopal visitation of the Deanery of Mullingar refers to the chapel at Templeoran as 'Foran alias Templeoran' (Ellison 1974, 100). It could also be the same element found in the name of Templeoran parish, located north of Lough Ennell (barony of Moygoish, Co. Westmeath), and in that of Mullinoran bridge near Lough Owel (civil parish of Multyfarnham, barony of Corkaree, Co. Westmeath) (Walsh 1957, 147; Walsh 2003, 307).[26] It has been suggested that 'foran' is either a translation of *fuarán*, 'spring', or of *Fuarrán*, a personal name (Walsh 1957, 173). Since excavations at Clonfad show that the southern border of the site's early monastic phase was marked by a stream (Chapter 8, this volume), the interpretation of *fuarán* as 'spring' is quite plausible. That said, the marked concentration of '(f)oran' names in this particular part of Mide suggests that a peculiarly local element—such as a saint's cult—could underly the naming pattern. If, however, an individual named Fuarrán did lend his name to the monastery, almost nothing more is known of him. No Fuarrán appears in the saints' genealogies or hagiographical collections, although the 17th-century historian Brother Míchael Ó Cléirigh suggested that Ceall Fhuarráin, a church said to be in the vicinity of Mullinoran bridge, might translate as 'the church of Fuar[r]án' (Todd & Reeves 1864, 422; Walsh 2003, 307–8).[27]

With just two exceptions, the mystery surrounding 'foran' is typical of the anonymity that characterises most of the community at Clonfad. The mid ninth-century ecclesiast Fiachra, son of Dub Dá Chrích, is the sole abbot of Clonfad to have his obit noted in the annals (AFM 835). The only other figure associated with the monastery to appear in the historical record is the sixth-century bishop, Senach, who is described in the martyrologies as 'a bishop from Clonfad of the son of Fina in Fir Tulach and abbot of Clonard' (*epscop ó Clúain fota mac Fine hi Feraib telach, 7 abb Cluana hIraird hé*) (Stokes 1905, 188). Senach, whose obit identifies him only as 'bishop of Clonard' (AU 588.2), was the first abbot to succeed St Finian of Clonard. His links to both Fir Tulach and Clonard are referenced in the Latin *Life* of St Finian which relates that a group of raiders from Fir Tulach passed by Finnian's church of Ard Relic (near Clonard) and abandoned a young boy from their party there. Snatching up his shaving equipment, Finnian went to the boy, tonsured him, ordained him into holy

orders, and, realising that he was destined to succeed him, diligently tutored him (Heist 1965, 101, §17). That boy was Senach.

This romantic story of Senach's rescue from a future of thievery and night-raiding into a life of religion is somewhat at odds with the martyrologies' description of him as a bishop of Clonfad as well as an abbot of Clonard; that description suggests that Senach may already have had an established religious career in Clonfad by the time he came to Finnian's monastery. It is unclear whether Senach was bishop of Clonfad as well of Clonard, or simply a bishop of Clonard who came from Clonfad (ibid.). Regardless, given that Senach succeeded Finnian as abbot of Clonard at Finnian's death in AD 549 (AU 549.3), there must already have been an ecclesiastical establishment at Clonfad by the first half of the sixth century. This date is in line with the foundation date range of AD 427 x 538 indicated by radiocarbon testing at the site (Chapter 8, this volume).

Clonfad and Clonard

The link between Clonfad and Clonard represented by Senach's abbacy suggests that Clonfad was part of Clonard's paruchia. Accordingly, a reference made by the 17th-century Visitation Book of Bishop Dopping to a certain 'St Sinan' as the patron saint of Clonfad (Ellison 1974, 100) might be understood as a garbled reference to Finnian. The previously mentioned record of the burning of the king of Uí Fhailgi at Clonfad, on his return from a meeting with Flann Sinna, the Clann Cholmáin king of Tara, provides further evidence in support of the idea that Clonfad belonged to Clonard's network. During the attack on the king of Uí Fhailgi, says the *Annals of Ulster*, the *minna*—'halidoms' or venerated objects—of a certain 'Finnia' were profaned and burnt at Clonfad (AU 891.2). Versions of this same incident in 12th- and 17th-century sources claim that the desecrated objects were those of 'Finnian', rather than of 'Finnia' (Bergin et al. 1954, Vol. 1, 187; AFM 887[=891]). According to the *Annals of the Four Masters*, Finnian's gospel was one of the profaned sacred objects, and it was the Fir Tulach themselves who were responsible for the sacrilege (AFM 887[=891]). The links between Clonfad and Clonard suggest that the later sources' identification of the halidoms with Finnian, rather than with 'Finnia', is correct.

The question of what is meant by the desecration of the halidoms is an intriguing one. One interpretation might simply be that the sacrilege refers to their burning: the outright destruction of a holy object could certainly be understood as profanity. The murder of a man within the sacred space of a church would also have been considered to constitute an outrage against its founding saint. It is likely, however, that there was a less literal level to the desecration. In the political system of early medieval Ireland, venerated objects were frequently used as pledges to guarantee a treaty or agreement between individuals or kingdoms (Kelly 1988, 199). Indeed, they were used in this context so often that the word for a sacred object, *mind* (singular of *minna*), came to mean oath (ibid.). Political treachery and broken pacts are frequently described in the annals in terms of the *sárugad*, 'violating', of the sacred objects used to guarantee this agreement, while the subsequent ill fortune or death of the violators is sometimes portrayed as the revenge of the outraged saint.[28]

In light of the assertion that Fir Tulach were responsible for the sacrilege, it is possible that the *minna* of Finnian had been used to guarantee a general peace treaty between Uí Fhailgi and Fir Tulach, or perhaps to more specifically guarantee safe passage to the king of Uí Fhailgi as he passed through Fir Tulach on his way to meet the Clann Cholmáin high king. If there are any grounds to the supposition that the base of the Fir Tulach branch of the Clann Cholmáin—the 'western *baile*' of the Ua Domnalláin family—was near Clonfad (see section on 'The western *baile* of Uí Domnalláin'), then Clonfad may have formed part of Clann Cholmáin's power base within Fir

Tulach. The royal meeting might even have been held at Clonfad itself. Since those responsible for the desecration at Clonfad were the men of Fir Tulach, perhaps their attack on an establishment that was within their own kingdom but had links to their overlords was meant in part to be directed against the Clann Cholmáin.

Clonfad's relationship with churches within Fir Tulach

As for a more local network of churches over which Clonfad might have had control, in the absence of documentary evidence akin to Colmán's *Life*, it is hard to know for certain with which ecclesiastical sites it was linked. That said, 17th-century English ecclesiastical records indicate that the church at Templeoran was considered to be a chapel of ease belonging to Clonfad (Ellison 1974, 100). Given the proximity of Templeoran to Clonfad, as well as the shared '(f)oran' element in their names, it is likely that this shared connection was true of the medieval period as well. The townlands of 'Kilbrennan' and 'Kiltotan and Collinstown', both in the parish of Clonlost are also close to Clonfad. If the 'kil' element in their names derives from *cell*, 'church', then both townlands had probably been the site of an ecclesiastical establishment (*Ordnance Survey Name Book* Westmeath, Vol. 1, 145, §§12–13). Located less than 3 km from Clonfad, these putative churches might have been part of the monastery's paruchia.

At first glance, the name of 'Ballykilmore' townland also looks like it might indicate the presence of a local ecclesiastical site, *Cell mór*, 'the great church', particularly given the presence there of the large cemetery investigated in this volume. Upon closer investigation, however, 17th-century sources indicate that the medieval name of the townland seems to have been a variation on 'Balligillimore', suggesting an original of *Baile an Ghiolla Mhóir* ('Gilmore's town') (Walsh 1957, 195). If this derivation is correct, then there is no placename evidence to tie Ballykilmore to an early church site. However, given the discovery not only of the cemetery but also of a pre-Norman church at the site (Chapter 7, this volume), one must ask whether 'Kilmore' might not have derived from *Cell mór* after all, despite the evidence of the early modern placenames to the contrary.

As remarked earlier, the one local church that Clonfad explicitly did *not* appear to have any ties with was the monastery of Lynn. Although their mutual tie with Clonard gave the two chief monasteries of Fir Tulach something in common, Clonfad makes no appearance in the long list of Mide churches invoked by the *Life* of Colmán mac Luacháin. As discussed, the circumstances of the burning of Clonfad in 891 suggest that Clonfad had ties to both the Clann Cholmáin kings of Mide and the Uí Chonchobair Fhailgi kings of Uí Fhailgi. Both were dynasties whose support Lynn had actively sought. Very possibly, competition for religious prestige and secular patronage had led to unfriendly rivalry between the two principal monasteries in the kingdom. More than bog may have separated the chief churches of northern and southern Fir Tulach.

Clonfad seems to have been established by the middle of the sixth century, but the *floruit* of Colmán son of Luachán, the founder of Lynn, appears to have been in the late sixth or early seventh century. Clonfad was thus probably the older of the two foundations. It is hard to say for certain which was the more important. Based on the *Life* of Colmán mac Luacháin, Lynn would seem to be pre-eminent, but the perspective of that text is obviously partisan. Were a similar document to exist celebrating Clonfad, our view of the relative significance of the monasteries might be quite different. All the same, as the monastery apparently most strongly linked to the ruling Ua Dublaich dynasty of Fir Tulach, Lynn probably had the edge over Clonfad. Even allowing for the possibility that Clonfad was associated with the Clann Cholmáin sept of Ua Domnalláin, it would not have been the chief focus of Clann Cholmáin patronage in south-western Mide. That honour would have gone

to the nearby Columban monastery of Durrow, one of the three royal monasteries associated with the Clann Cholmáin's ruling line, Uí Máel Sechlainn. Clonfad may have had to content itself with influence in southern Fir Tulach only.

Summary

The early medieval kingdom of Fir Tulach was originally a sub-kingdom of Leinster and maintained ecclesiastical ties with that province even after the kingdom passed into the control of the Southern Uí Néill. That transition had occurred by the early sixth century, when Fir Tulach became a sub-kingdom of Mide. The Clann Cholmáin overlords of Mide exerted considerable control over Fir Tulach, positioning one of their own septs—the family of Ua Domnalláin—within the kingdom. The Ua Domnalláin line was based at the 'western *baile*' in Fir Tulach, perhaps near the southern arm of the River Brosna. If so, such a location would have brought them into close proximity to one of the exacavated sites studied in this volume, the monastery of Clonfad. Clonfad was very likely a daughter house of Clonard, itself a Clann Cholmáin royal monastery.

For a period in the early ninth century, a Clann Cholmáin dynast, Óengus son of Donnchad Midi, ruled directly over Fir Tulach. At some point after Óengus' reign, the Fir Tulach kingship became the preserve of the Ua Dublaich dynasty, possibly the same sept who had controlled the kingship prior to Óengus' imposition. The claim that the Ua Dublaich line was itself a branch of the Clann Cholmáin seems to have no basis, while claims that they were a branch of Uí Cheinnselaig of South Leinster may have arisen out of deliberate genealogical manipulation and fabrication. Their true descent is unknown. The Ua Dublaich *caput*, Dún na Cairrge, appears to have been situated in the civil parish of Carrick in Fartullagh, possibly at Cherry Island off the shoreline of Robinstown townland, or perhaps on an island off the coastline of Carrick townland itself. Given the proximity of Carrick parish to Rochfort Demesne, home to an excavated enclosure (Chapter 6, this volume), it is possible that the enclosure's occupants may have been connected to the Ua Dublaich line. In AD 1144, the Ua Dublaich king of Fir Tulach was involved in the assassination of the son of the high king Toirdelbach Ua Conchobair. Nothing more is heard of the family, and it is not known if they remained in power up until the rise of the Tyrell lordship of Fartullagh with the coming of the Anglo-Normans.

5

THE LATER MEDIEVAL PERIOD

Margaret Murphy

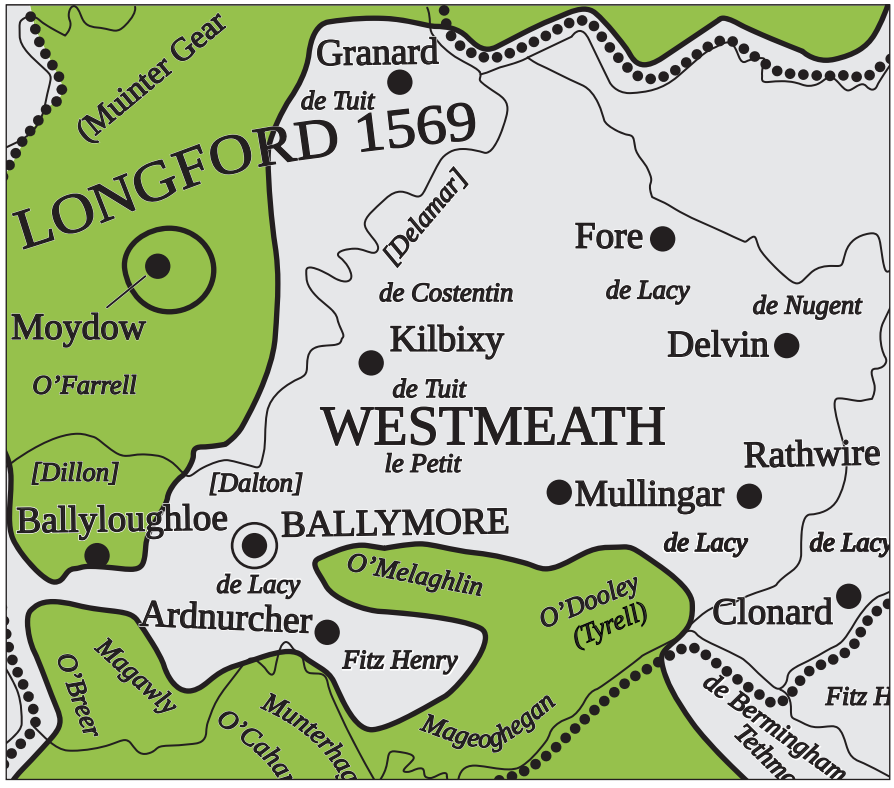
The arrival of the Anglo-Normans

The Anglo-Normans first entered the kingdom of Meath in AD 1170 in the company of Diarmait Mac Murchada, following their successful capture of Dublin. The *Annals of Inisfallen* reported that 'all Mide, both church and lay property was also plundered and burned by the oversea men' while the *Annals of Tigernach* stated that Mac Murchada plundered many churches, including Clonard and Kells (AI 1170; ATig [1170]). This hosting was undoubtedly a show of strength by Mac Murchada but his plans to control Mide and perhaps Ireland were abruptly ended by his death in the spring of AD 1171. Diarmait's nominated heir as king of Leinster was Richard de Clare (Strongbow), but any intentions that Strongbow had with regard to Mide vanished with the arrival in Ireland of the Angevin King Henry II. Before Henry left Ireland in April 1172 he had granted to Hugh de Lacy, one of his loyal followers, 'the land of Mide with all its appurtenances as Murchada Ua Máel Sechlainn held it' (Mills & McEnery 1916, 177). The boundaries of Mide were thus defined as they had been in 1153 on the death of Murchad Ua Máel Sechlainn, the last king to hold Mide intact. Henry II chose to ignore the subsequent dismemberment of the ancient kingdom and as a result de Lacy found himself in possession of a vast and strategic lordship which extended to almost 325,000 hectares, and included the modern counties of Meath, Westmeath and parts of Longford and Offaly.

Henry II's grant to de Lacy was speculative in the sense that the area granted had not yet been brought under Anglo-Norman control. De Lacy, however, presented himself as the ideal candidate for the job of securing his new possession. He was well used to defending and securing his English lands, which were situated along the Welsh marches, and had also served in several royal military campaigns. Starting in 1172 de Lacy and his representatives successfully conquered this territory so that when he died in 1186 the annals reported that the lordship of Meath 'from the Shannon to the sea was full of castles and of foreigners' (ALC 1186).

De Lacy's settlement policy was to retain a number of strategic areas under his own control, organising them into seigneurial manors, while granting out the remaining lands to his barons to hold by military service (Illus. 5.1). In Westmeath, he initially built a castle at Killare within sight of the hill of Uisnech to serve as the principal seat of his lordship in that area (Orpen 2005, 182–6). This castle was destroyed by the Irish in 1187 and thereafter Ballymore/Lough Sewdy became the most important seigneurial centre in Westmeath. Another castle was built at Fore, close to the early monastery of St Fechin. De Lacy also retained in his own hand the 'lake and vill of Dissert', i.e. Lough Ennell and Dysart on its western shore, but there does not appear to have been a manor or early castle here.

De Lacy made a number of large grants of lands in Westmeath to his principal barons and followers (Mullally 2002, 133). William le Petit was granted the barony of Magheradernon and



Illus. 5.1 *Westmeath c. 1200 showing centres of Anglo-Norman settlement and green areas that continued in the control of the Gaelic Irish. The indications are that the Tyrells were established in Fartullagh and had ousted the O'Dooleys by the 1230s, if not earlier (source: Smyth 1982, Plate X).*

established his *caput* at Mullingar. Delvin was granted to Gilbert de Nugent where the motte at Castletown Delvin marks his manorial centre. This barony later passed into the ownership of the Tuits. Kilbixy in the barony of Moygoish was settled by Geoffrey de Costentin, while Ardnurcher (now Horseleap) in the barony of Moycashel was granted to Meiler Fitz Henry. Robert de Lacy, whose precise relationship to Hugh is unclear, gained possession of Rathwire in the barony of Farbill and part or all of neighbouring Fartullagh was granted to Hugh Tyrell.

Hugh Tyrell was one of de Lacy's most trusted barons and according to the chronicle poem *The Song of Dermot and the Earl*, he loved him greatly (Mullally 2002, 133). The Tyrells held land in Herefordshire from de Lacy and members of the family accompanied him to Ireland (Brooks 1933, 206–20; 1946, 151–4). Castleknock, the largest lay-holding in County Dublin, was granted to Hugh Tyrell between AD 1172 and 1177. He was also the first constable of Trim castle and was acting in this capacity in AD 1174 when he had to abandon the castle in the face of an invading army led by O'Connor of Connaught (Potterton 2005, 413). He subsequently returned to Trim and refortified the castle, guarding it 'with great honour until his lord came back' (Mullally 2002, 138).

The Tyrells were established in the barony of Fartullagh by AD 1232 when Hugh Tyrell, grandson of the original Hugh, was granted the right to hold a yearly fair at his manor of Newtown 'in Fertelagh' (Sweetman 1875, 289, no. 1951). They may have received this land at the same time as Castleknock, as de Lacy frequently enfeoffed his barons in several different parts of his kingdom, typically combining a grant in a secure area with one in a more frontier region (Orpen 2005, 185). Fartullagh could certainly be regarded as such a frontier region with Gaelic families continuing to

control the nearby territories of Moycashel (the Mageoghegans) and Clonlolan (the O'Melaghlins, descendants of the Uí Máel Sechlainn) while to the south, in modern County Offaly, lay the largely unconquered lands of the O'Connor Faly (Illus. 5.1).

Anglo-Norman settlement

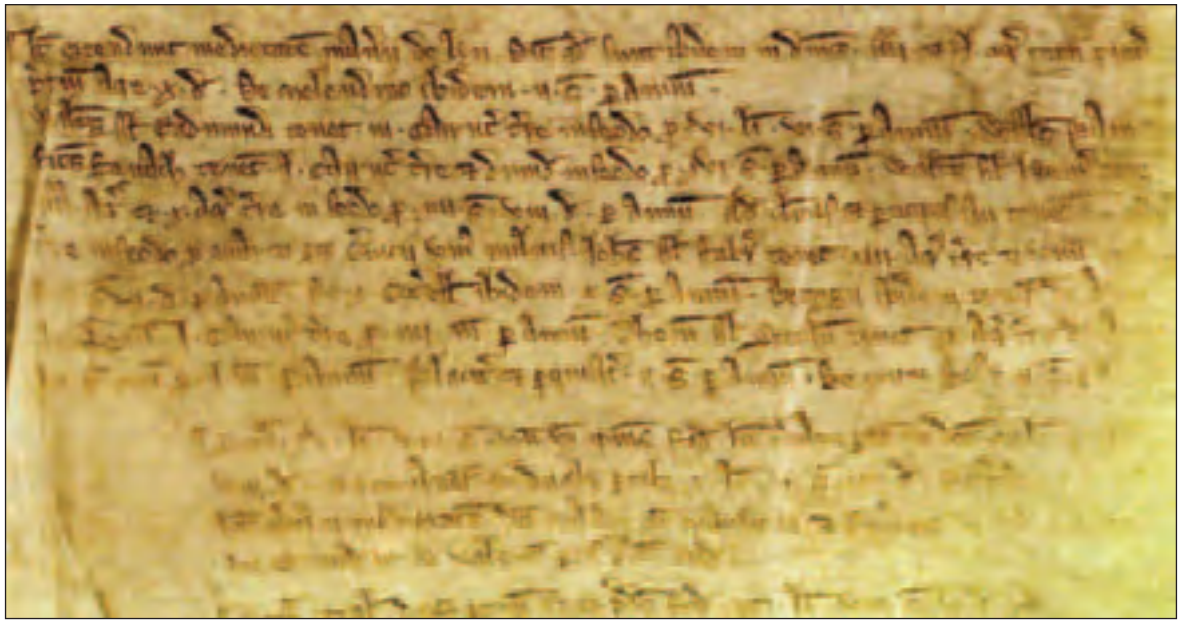
Fartullagh was protected on its western frontier by a line of mottes running from Rathconnel and Mullingar in the north down the east side of Lough Ennell to Castletown Geoghegan and Ardnurcher to the south (Graham 1980, 52–3). Ardnurcher was built in AD 1192, the others probably slightly earlier. Anglo-Norman settlement in Fartullagh doubtless followed the construction of this protective line. The Tyrells established themselves at Newtown (now Newtownlow) where a motte survives close to a medieval parish church. The area was strategically and politically significant and by placing their motte close to the abandoned, early medieval crannog of Newtownlow, the Tyrells were repeating an Anglo-Norman pattern of association with earlier religious or secular power centres (Chapter 3, this volume).

The Tyrells are also attributed with building the motte at Castlelost, just outside Rochfortbridge. Within the same parish of Castlelost, a motte was constructed at Gallstown, possibly for a free tenant of the Tyrells and further to the north another motte survives in the townland of Pass of Kilbride, in the parish of the same name. The bogs and lake provided sufficient protection to the north and west and no further mottes are found in the barony. From their strongholds in the south and east the Tyrell's influence spread out to the north and west and can be seen in the presence of placenames, such as the townland of Tyrellstown, in Moylisker, in the north of Fartullagh.

Under the protection of these mottes, Anglo-Norman settlement got underway in the 13th century and agricultural production was sufficiently developed by the 1230s to encourage the Tyrells to petition the king for the right to hold an annual fair at Newtown. There were no recorded boroughs in the barony of Fartullagh but manorial villages at locations such as Newtown, Castlelost and Lynn, on the northern shores of Lough Ennell, offered some opportunities for nucleated settlement. Graham found that the manorial village was rarer in Westmeath than Eastmeath. He lists four 'small peasant towns' in Westmeath at Athlone, Ballymore, Fore and Mullingar, two rural boroughs at Ardnurcher and Kilbixy, and three 'villae mercatoriae' at Lynn, Kinclare and Rathwire (Graham 1988, 20–32). This last category should also include Newtown by virtue of its annual fair.

Unfortunately, little is known about the arrangement of the manorial lands in the south of the barony. More is known about the northern part of the area due to the survival of an 'extent' for half of the manor of Lynn (Dryburgh & Smith 2007, 9) (Illus. 5.2). An extent was a document which provided a description and, most importantly, a valuation of a land-holding and its appurtenances. In the 13th century the manor of Lynn, which comprised 20 carucates (2,400 medieval acres) was jointly held by Ralph de Pitchford and his wife. De Pitchford also held the manor of Dowth in County Meath and when he died in AD 1253 both manors were described and valued by officials of the English Crown.

The buildings on the manor of Lynn comprised a manse, or dwelling house, with a garden and a mill. The lord's lands or demesne comprised about 160 acres of arable land and meadow, each acre of which was valued at 10 pence (d.) per annum. There was also a quantity of woodland which yielded 2 shillings (s.) per annum. On the half of the manor that was described there were six English free tenants, most of whom held large tracts of land. There were two other English tenants with smaller holdings of 13 and 20 medieval acres as well as a group of unnamed cottiers, each of whom held a cottage with a small plot for which they communally paid 10 s. per annum. Cottiers were required to perform labour services for their lord, at whose will they held their cottages and meagre land; they



Illus. 5.2 *Extent or description of the Manor of Lynn made by officials of the English Crown in 1253. The document describes the lands held by the manorial lord Ralph de Pitchford and by his tenants (reproduced with permission from National Archives [UK]: PRO C132/15/1).*

were, however, personally free. There may have been some Irish tenants among the cottiers but most would have belonged to the group of *betaghs* who held a carucate (120 medieval acres) between them. These *betaghs* were unfree tenants, bound to the land and required to work the lord's demesne in addition to their own communal holding.

The value of the demesne land, the mill, the rents of the tenants and the profits of the manorial court of de Pitchford's half-manor of Lynn was £15 8s. The other half of the manor, held by de Pitchford's wife, was estimated at the same value, giving a total value of over £30. This was a substantial amount at a time when labourers had an average annual income of £1 to £2 and educated clerks and administrators might hope to earn between £5 and £10 each year (Murphy & Potterton 2005, 228–33). It suggests that farming in the area was profitable, that the land was well settled, and that marketing opportunities were present.

The sparse nature of the surviving sources makes it impossible to do more than speculate on the inhabitants and settlement features of the specific sites under consideration. During the 13th century, the areas in which the sites were located would have been incorporated into one of the Anglo-Norman manors organised by the Tyrells and their chief free tenants. Situated just to the south of Lynn, Rochfort Demesne may have been in the hands of one of the free tenants of that manor. Ballykilmore, in the parish of Newtown, was probably associated with the manor of the same name and may have been a sub-manor or holding associated with a tenant or tenants of the Tyrells. It does not appear in the sources before the 16th century and there is no mention of a church or chapel there. The parish of Newtown was a large one and there may well have been an additional chapel to serve the needs of far-flung parishioners. Clonfad was the location of a parish church in the later medieval period (see below) but there is no specific reference to its association with a manor or settlement.

There was clearly a substantial Anglo-Norman presence at the upper levels of lordship, but it is unlikely that the area saw significant settlement by English peasant cultivators, particularly outside

the two or three manorial villages. There is one recorded moated site in the barony at Dunboden demesne, but it cannot be assumed that this was the home of an English manorial tenant. It is likely that in Fartullagh, as in most of Westmeath, the unfree Irish *betagh* tenants formed a significant proportion of the manorial workforce (Otway-Ruthven 1980, 114).

Gaelic revival and Gaelicisation

In the 1240s the lordship of Meath was divided between two powerful families, the de Genevilles and the de Verduns. Fartullagh was assigned to the portion of the de Genevilles who also retained the castle and lordship of Trim (Otway-Ruthven 1980, 410). The barony was recorded as owing three 'services' to the de Genevilles in the second half of the 13th century (Mills & McEnery 1916, 11). This meant that rents equivalent to the cost of providing three armed knights were due to the overlord for this holding, although whether reality matched expectation is not explicit.

De Geneville held the lordship of Trim until AD 1308. It was a period of relative stability in Eastmeath but, from the 1270s, there was growing unrest in Westmeath with a resurgence of warfare by the Irish. In c. AD 1290 de Geneville took measures to ensure that his tenants were armed appropriately, issuing an order by which property holders of different status were to be equipped with weapons and armour (ibid., 10, 182). In AD 1308 the lordship of Trim passed to Roger Mortimer, who had married de Geneville's granddaughter Joan. In 1315 he had to contend with the invasion of Edward Bruce, brother of the Scottish King, on top of one of the worst famines of the medieval period. Bruce was joined by many of the gentry of Westmeath, including the de Lacys of Rathwire, as well as Irish families such as the O'Melaghlins. Together they defeated Roger de Mortimer at Kells in December 1315 and although Trim was held for de Mortimer, Bruce's army went on to waste and burn Westmeath (Otway-Ruthven 1980, 228). The invaders were eventually defeated but the long-term repercussions were serious for the English colony. Gaelic families such as the O'Melaghlins, Mageoghegans, O'Conors, O'Farrells and O'Reillys grew in power and potency while many Anglo-Norman families, including the Tyrells of Fartullagh became increasingly Gaelicised (Brady 1961, 41) (Illus. 5.3).

In AD 1366 the *Annals of the Four Masters* reported that Hugh Tyrell 'lord of Fer-Tulach' was slain by the Berminghams (AFM 1366). This was clearly an episode in the inter-family feuding that was common in frontier areas, but it indicates that the Tyrells were still in a position of power in Fartullagh. Ten years earlier a Gaelic lord, Maurice Schynnach, was described as 'king of Fertewac and Monthyrcagan' (Fartullagh and Muinter Thadhgain, now the barony of Kilcoursey, Co. Offaly) (MacNiocaill 1964, 154–5). The description occurred in an agreement by which Maurice became the man of the earl of Kildare for the term of his life. These indentures were common among the Anglo-Irish but Kildare sought to extend them to Gaelic lords as well. The so-called 'king of Fartullagh' undertook to follow Kildare's banner throughout Ireland and accompany him on voyages and wars at his own expense. He would give Kildare counsel and aid against all except the king and Mortimer, Lord of Trim. The mention of Mortimer suggests that he had a prior claim to the loyalty of Maurice as a tenant of part of his lordship. In the 15th century the ascendancy of the O'Connors of Offaly brought further disruption to the region. In AD 1405 the annals reported a great war between O'Connor of Offaly and the 'Galls' (foreigners), during which O'Connor went on a hosting into Fartullagh and burnt most of the country (Ó hInnse 1947, 174–5). The successful reign of An Calbhach O'Connor (1421–58) saw increased raiding into Meath, with Calbhach at the head of a coalition of 'Irish enemies' and 'English rebels', including the Berminghams and the Tyrells (Cosgrove 1987, 571). In 1427, with the connivance of Hubert Tyrell, he burned and robbed the town of Mullingar.



Illus. 5.3 *Map of Leix and Offaly c. 1563 showing the adjacent territory of Fartullagh, in Westmeath. The Gaelicised 'Tirells' retained their lands surrounded by Irish neighbours (**Courtesy of the British Library Board**. Cotton: Augustus, I, ii. 40. A map of some interior parts of Ireland [King's and Queen's counties] on canvas).*

At some stage in the later medieval period, the earls of Kildare acquired landed interests in the barony of Fartullagh including Ballykilmore. In AD 1541 an extent drawn up for the English king recorded that Gerald Earl of Kildare held the manor or vill of Robertston (Robinstown in Carrick parish) where there was a ruined stone castle, two cottages, 240 acres of arable land and a fishing weir (MacNiocaill 1992, 126). Other possessions included a carucate of arable land with appurtenances in Ballegylmore (Ballykilmore). The lands were leased to Richard Tuit. In AD 1517, according to the Kildare Rental, the lands of Ballyngalmor in Fertullagh were leased to Thomas Albenagh for a term of eight years at a yearly rent of 46*s* 8*d* (ibid., 249) .

By the end of the 15th century the Tyrells, like many Westmeath marcher families, had become completely Gaelicised (Nicholls 1972, 177). They may, at this time, have moved their *caput* from Newtown to the Tyrrellspass area where they are attributed with building the 15th- or 16th-century castle. The excavated evidence from Ballykilmore cemetery suggests that the area remained a settlement focus throughout the medieval period (Chapter 7, this volume). Richard Tyrell (AD 1545–c. 1632) is particularly associated with the castle. He was active during the Nine Years' War when he held the position of commander of the Leinster rebel forces for Hugh O'Neill. He apparently played a leading role in the battle of Tyrell's Pass in AD 1597 where up to 1,000 Crown forces were ambushed and routed.

The Church

In the later medieval period the parishes within the barony of Fartullagh formed part of the rural deanery of Mullingar within the diocese of Meath. Diocesan organisation in Meath was not complete until the second decade of the 13th century when a number of smaller dioceses—including Clonard, Duleek and Kells—were united to form one ecclesiastical jurisdiction (Brady 1949, 1–13). While some parochial organisation may have been underway before the arrival of the Anglo-Normans, most parishes came into being during the early years of Anglo-Norman manor formation and territorial delineation. The new parishes were frequently centred on older monastic *foci* and this was the case in Fartullagh, where Clonfad and Lynn both emerged as parish centres.

The earliest reference to an individual parish is frequently the granting by a manorial lord of the tithes (i.e. the ecclesiastical dues of the parishioners) to a religious house (Otway-Ruthven 1964, 111–22). In the barony of Fartullagh the earliest definite reference to a parish church occurs in the late 12th or early 13th century when either the first or second Hugh Tyrell granted the Benedictine priory of Little Malvern in Worcester the church of his manor of Castlelost along with lands in the area (Gilbert 1884, Vol. 2, xxii, 17–18). The priory held Castlelost, with the chapel of Ballymolan, and five carucates of land in the vill of Kylsolking in Fartullagh until 1486 when it sold all its Irish possessions to the Abbot of St Mary's Abbey, Dublin. In the same year Maurice Tyrell, Lord of Castlelost, confirmed to St Mary's the revenues of the parish church of Castlelost. At the Dissolution of the religious houses in AD 1540 it was found that the Abbey of St Mary's leased the rectory of Castlelost for a rent of 28 'fat and proper cows' worth £14 (White 1943, 22). Other religious houses that owned property in the region included the Priory of St Peter, Newtown by Trim, which held the rectory of Enniscoffey along with four 'messuages' (house and garden plots), 120 acres of arable and 12 acres of pasture, and the priory of Mullingar, which held 1½ carucates of arable land in 'Raduff, Walterstown and Rathwogan in Fertullagh' (ibid., 287, 293, 295).

A listing and valuation of Irish parishes was made in the early 14th century to assess churches and religious houses for taxation (Sweetman 1886, 258, 267). In the barony of Fartullagh the parishes of Castlelost, Carrick, Clonfad, Lynn, Enniscoffey, Kilbride and Moylisker are all named, with values ranging from 14*s* for the small parish of Clonfad to £6 6s. 8d. for Castlelost with the chapel of Balimolan. The parish of Newtown does not appear in the taxation unless it is there under a different name.

Newtown was certainly functioning as a parish in AD 1414 when John Omigaid (O'Miadhaigh?), described as a scholar in his 23rd year, was appointed to the parish church of 'Newtown de Feartulach' on the death of the previous incumbent, Odo Ocarraich (Bliss & Twemlow 1904, Vol. VI, 481). The value of the rectory was assessed at six marks (£4) 'to a non-resident'. Shortly afterwards the same John O'Miadhaigh was appointed to hold the rectory of nearby Clonfad, worth four marks (£2 13s. 4d.) (ibid., 478–9). Clonfad was vacant following the death of Richard Ochallam.

There was a problem with O'Miadhaigh's appointment to Newtown as there was another claimant to the rectory, one John Gynga, who appealed to the Roman curia concerning his rival's appointment (Smith 2003, 267–8). While his appeal was pending, the Archbishop of Armagh warned the parishioners of Newtown-in-Fartullagh to be attentive to him as the rector and pay their tithes to him. The principal parishioners were named as 'Fergal Mageoghegan, captain of his nation, Odo Flavus Mageoghegan, Cornelius son of Bernard Mageoghegan, Macrobus Oboechan, [O'Beaghan], and Constantine the younger Mckegan'. From the names of the rival claimants this would appear to have been a dispute between Irish and English clerics and given the ethnic make-up of the parish, it is hardly surprising that the Irish cleric was eventually successful. John O'Miadhaigh died as rector

of Newtown-in-Fartullagh in AD 1429. He was replaced by Dermit Macruarye who had received papal dispensation for being the son of a priest (Bliss & Twemlow 1909, Vol. VII, 99).

Inter-ethnic difficulties were also encountered in the north of the barony, in the parish of Lynn, where in AD 1400 the rector, Thomas Carpenter, resigned because 'he did not understand well the tongue of his parishioners' (Bliss 1904, Vol. V, 284). He was replaced by Odo Ocallan, presumably an Irishman.

Summary

While we can chart the general history of the area through the later medieval period, there is a lack of specific detail for the three sites under consideration in this volume. The barony of Fartullagh was colonised by the Anglo-Normans in the late 12th and 13th centuries. Manors and parishes were organised by the Tyrells and their tenants in chief but no substantial boroughs or villages emerged in the region. There was significant reuse of settlement *foci* that had been important in the pre-invasion period. Clonfad survived as a parish centre throughout the medieval period and Ballykilmore appears as a distinct territorial unit in the 16th century. Valuations of manorial lands and parish churches indicate that the area was relatively prosperous and that there was a significant level of agrarian exploitation.

During the 14th and 15th centuries the Tyrells and other Anglo-Norman lords became progressively Gaelicised, ultimately rejecting the authority of the Dublin government. There may never have been a large number of English smallholders in the area but certainly by the 15th century the dominant culture and language was Gaelic.

6

ROCHFORT DEMESNE ENCLOSURE—POWER AND EXPANSION, FAMILY FARMSTEAD?

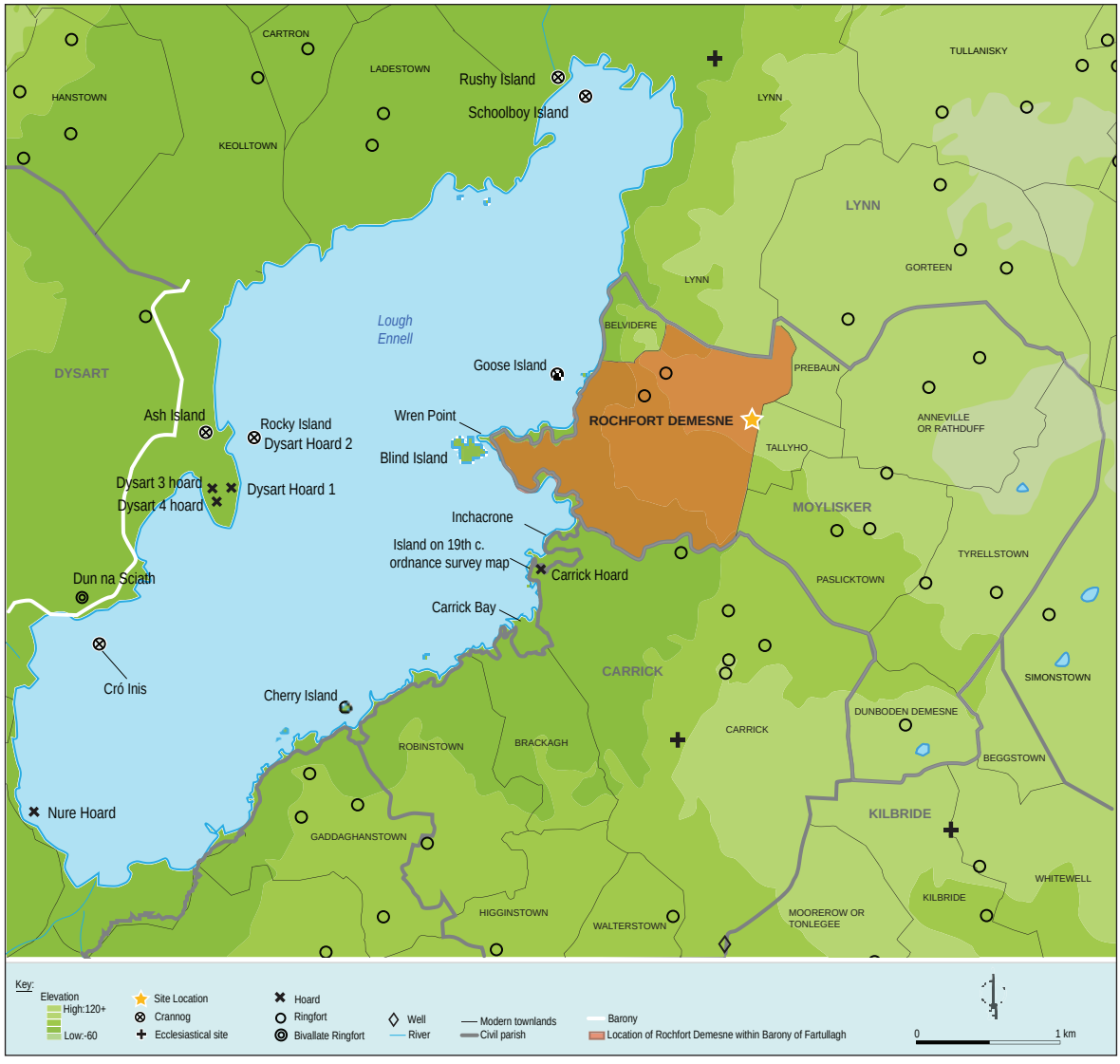
John Channing

Excavation at Rochfort Demesne recorded the complete remains of a multi-period earthwork enclosure. Beginning in the seventh century as a small simple bank-and-ditch settlement enclosure, or ringfort, the site was soon developed into a larger enclosure revealing an evolving attitude to defence and status during the seventh to 10th centuries. The excavation contributes insight to the development of early medieval enclosures and how field archaeologists may approach the interpretation of unexcavated sites. The status of the site is considered against the backdrop of political change and proximity to contemporary power bases.

Site description and location

The excavation lay within the demesne lands of the Rochfort estate, 1 km east of the current Lough Ennell shoreline and some 6.5 km south of Mullingar town, in the townland of Rochfort Demesne, Co. Westmeath (NGR 242772E, 247101N; Ordnance Survey six-inch map sheet 26 Co. Westmeath; Illus. 6.1 and 6.2). Other excavated sites described in this volume at Clonfad and Ballykilmore, lie 5.5 km and 9 km to the south. The site is listed by the archaeological survey of Ireland in the Sites and Monuments Record as a ringfort (RMP WM 026:051). It was located on a low glacial hillock amid gently undulating ground to the west, flat pasture to the south and east, and a small bog directly to the north. The surrounding landscape reflects estate management in the 18th and 19th centuries.

The enclosure is depicted on both the first edition six-inch Ordnance Survey map, surveyed in 1837, and the estate maps of Charles Brinsley Marlay. The Ordnance Survey map depicts an unbroken sub-circular bank containing a stand of trees (Illus. 6.3). According to the *Parliamentary Gazetteer of Ireland*, 1844–5 '[t]he extent and beauty of the undulating grounds which stretch along the lake, the profusion of fine trees everywhere through them, and the situation and style of the whole place, render Rochfort one of the finest residences in this position in the country' (Fullarton 1846, 154–5). The excavation site was described in the Sites and Monuments Record as, 'a large broad oval uneven enclosure bounded by a high steep scarp with slight remains of earthen bank on upper edge' (Tierney & Elder 2004, 2). The Crannóg Archaeology Project of the late 1980s–90s described the site in its wider study of Lough Ennell and its immediate hinterland as a ringfort with two banks that retained a possible entrance area in the north-west quadrant of the outer bank. A series of later features was identified, including a group of lazybeds on the west side, between the banks, and a quarry that occupied much of the interior, which also retained an Ordnance Survey



Illus. 6.1 *Map of early medieval field monuments within the vicinity of the excavation at Rochfort Demesne townland.*

datum point. Two circular features, each c. 3.2 m in diameter, lay to the south in between the banks, and two large tree stumps were observed on the internal bank in the north-east quadrant. In addition, the landowner noted that "they had occasion to send a local metal-detectorist on his way", indicating that the site may have been subjected to illegal treasure hunting in the recent past (Brady 2007, 95).

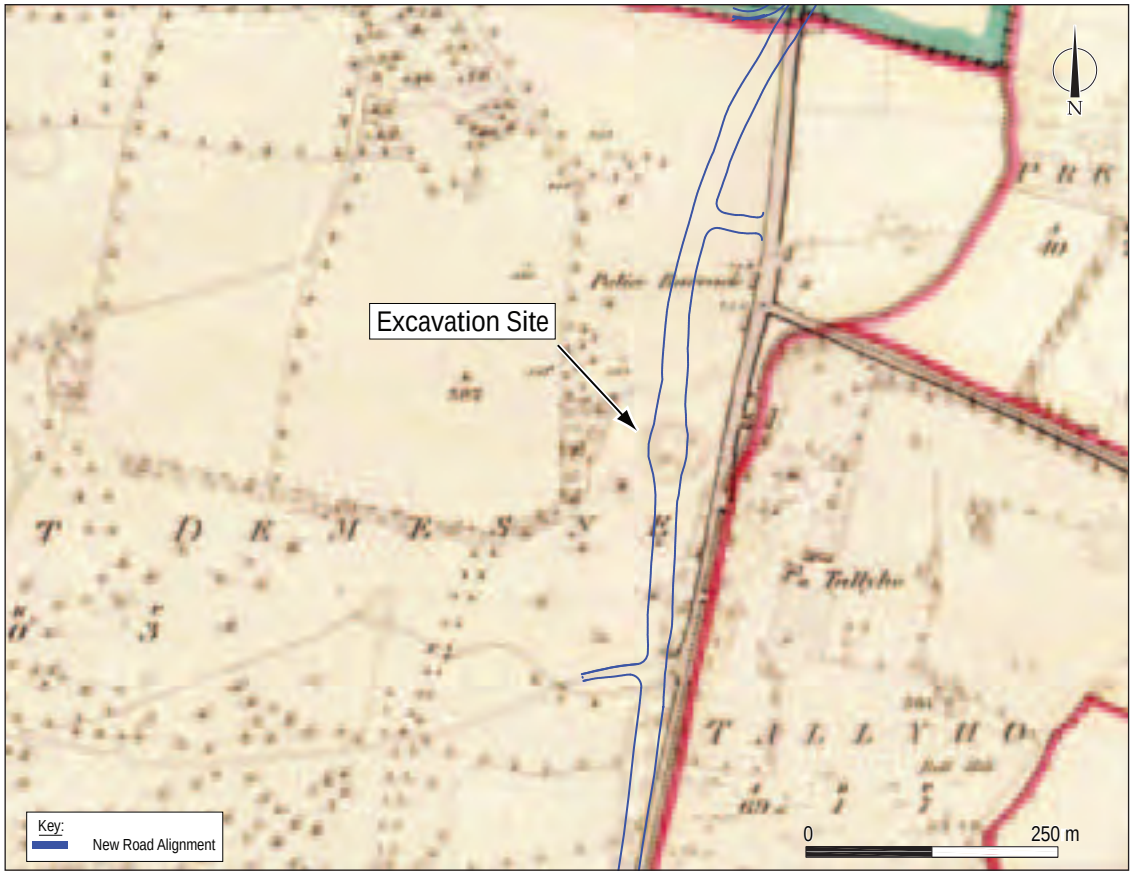
The shoreline of Lough Ennell has changed considerably since the early medieval period, and water levels have been reduced by 20th-century drainage works. Because the lake is shallow, the fall in water levels resulted in a disproportionate reduction in surface area and hence a contracting shoreline. Some islands have now disappeared by merging with the new shoreline, and a few areas are renamed, further complicating the identification of historically referenced locations (Chapter 4, this volume). It is possible that this has led to some sites being missed or delisted from the Record of Monuments and Places. The Crannóg Archaeology Project, for instance, identified a cluster of low stone platforms north and south of Wren Point, which forms the western limit of Rochfort Demesne



Illus. 6.2 *Aerial view of the excavation at Rochfort Demesne, showing Lough Ennell, Blind Island and Goose Island in background, looking west.*

(Brady 2007, 32–3), and O'Sullivan (Chapter 3, this volume) suggests that such sites may have served as part of a wider landscape of early medieval settlement that was focused on lordly sites. Reconstruction of the medieval shoreline from existing contours suggests that the Rochfort Demesne enclosure lay comfortably within a dryland environment, at the eastern end of a low ridge, which extended westwards towards the wetlands associated with the lake area. Goose Island, a high cairn crannog with an associated submerged timber palisade, is located 1.4 km to the north, while the find spot of the Carrick silver hoard lies some distance to the south-west. The micro-landscape complexity of early medieval remains in this part of Fir Tulach territory compares in part with the lordly landscape on the western shores of Lough Ennell, where the Clann Cholmáin dynasty retained its residences of Cró Inis crannog and Dún na Sciath enclosure (Farrell 1990; 1991, 90–110; Chapter 2, this volume).

The 18th century saw the development of a demesne landscape over much of the area along the north-eastern shore of Lough Ennell and had a direct impact on the excavation site. The primary demesne is that of Belvedere, built in 1740 by Richard Castle as a retreat for Robert Rochfort, Earl of Belvedere. The building was designed as a villa, and is thought to have inspired a slightly more modest design by George Pentland at Dysart in 1757 (Casey & Rowan 1993, 46, 168–71, 397–9). The grounds include a series of follies that look back to a medieval past and perhaps the most significant example is a 'Jealous Wall', built to the south-west of the villa. It is one of the largest follies in Ireland and resembles the ruins of a gothic palace. The earl had the wall erected to block out any view of his brother's house, Tudenham Park, which was built by George Rochfort c. AD 1743, and before the two brothers embarked on a lengthy and disagreeable quarrel. The 'Jealous Wall' was possibly built to designs by Thomas Wright of Durham, who is attributed with the designs of a number of the other follies in the grounds of Belvedere, such as the Gothic octagonal gazebo and

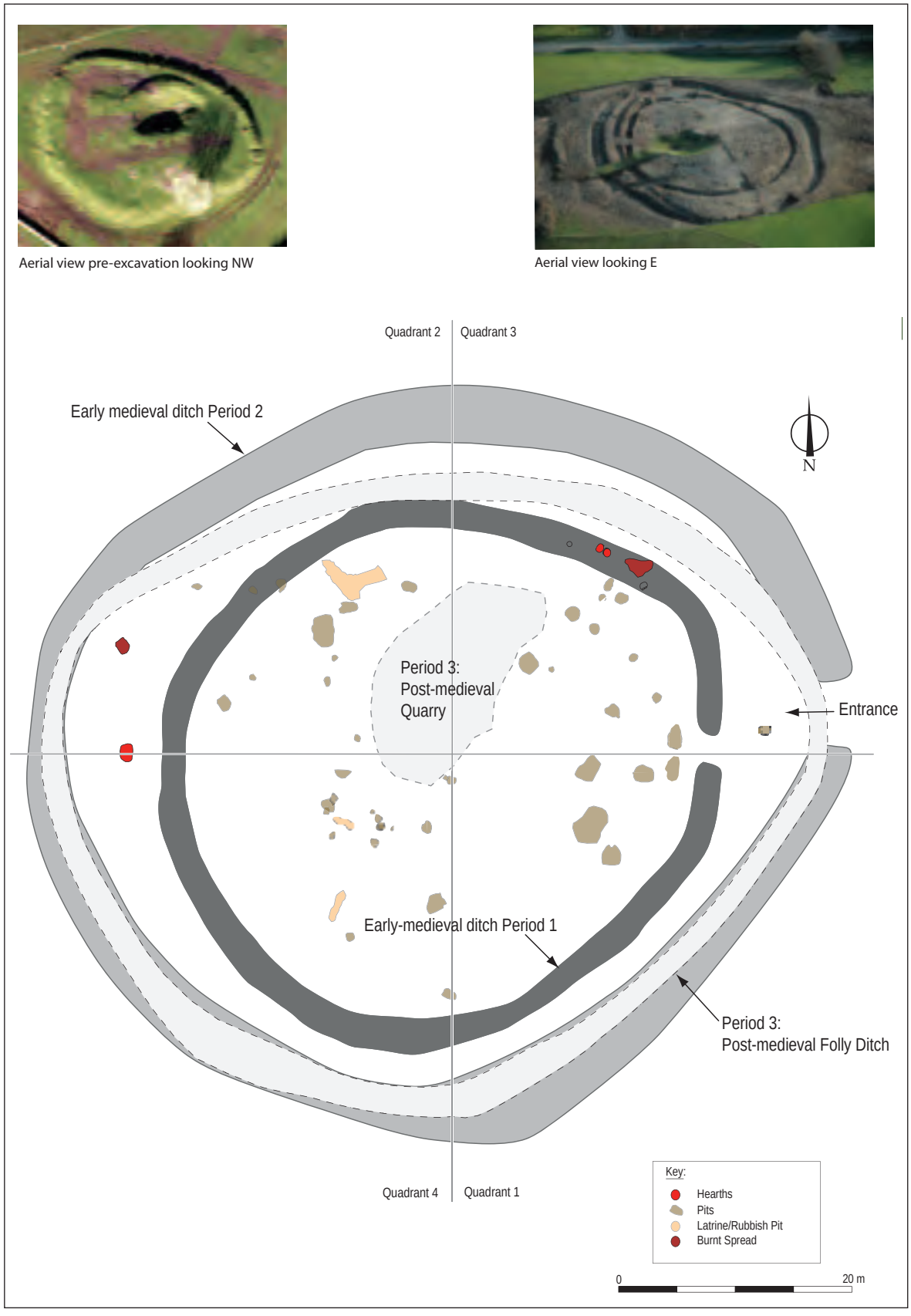


Illus. 6.3 *Extract of Ordnance Survey map of Westmeath (six-inch first edition sheet 26, surveyed 1838) with the excavation site and new road realignment indicated.*

the Gothic arch. The follies at Belvedere are among the earliest examples of the Gothic Revival style in Ireland, which was to become mainstream during the 19th century. It appears that such landscaping was not restricted to newly created monuments, as the edging stones of the high cairn crannog at Goose Island are distinctly designed and well-fitting on those aspects of the site that fall within the viewshed of the principal residences from shore and may reflect 18th-century improvement (Niall Brady, pers. comm.). It is therefore hardly surprising to observe the hand of the 18th-century landscape architect at work on land sites also, and this can be demonstrated on the excavated enclosure site. Perhaps the creation of a mock enclosure over a partly levelled medieval enclosure site provided ironic amusement. Alternatively, it may have been considered as a useful piece of manicuring work, to conceal the quarrying activity that took place within its interior.

Survey and assessment

As part of the preparatory works associated with the N52 road realignment, the site was assessed in greater detail through topographic and geophysical survey together with machine-assisted archaeological test-trenching (Illus. 6.4) (Tierney & Elder 2004, 9–13). The geophysical survey confirmed the presence of a bank and ditch and suggested a series of internal features, indicative of fired features or large pits, with cultivation furrows to the north. The test-trenching did not reveal material of archaeological significance.



Illus. 6.4 *Phased site plan of excavations at Rochfort Demesne.*

Excavation

Full excavation of the enclosure was required as the site lay directly on the path of the realigned N52 road (Illus. 6.3). The site presented itself as a sub-circular raised platform encompassing an area of some 2,248 m^2 and measuring 57 m east-west by 50 m north/south (Illus. 6.4). There were no surface indications of a ditch. A low bank defined the northern perimeter of the site, petering out to the east and west. The northern bank merged with another low curvilinear bank, which surrounded a small quarry pit that was cut into bedrock inside the enclosure. The eastern and western boundaries of the site were not well defined when viewed from ground level, while a sharp natural slope suggested a boundary to the south and south-east. A low, ill-defined bank occupied the upper lip of this natural slope to the south-west. The bank was shorter than the northern example and was less elliptical in plan.

The excavation proceeded by dividing the enclosure into four quarters or quadrants (quadrant 1–4), with two main dividing baulks running north/south and east/west, meeting at the approximate centre point (Illus. 6.4). The site was excavated sequentially by quadrant, commencing in the south-east. Initially topsoil was removed by machine; however, this was subsequently restricted with intensive manual stripping taking place in quadrants 3 and 4. The excavations were completed in a 16-week period, ending on 13 January 2005.

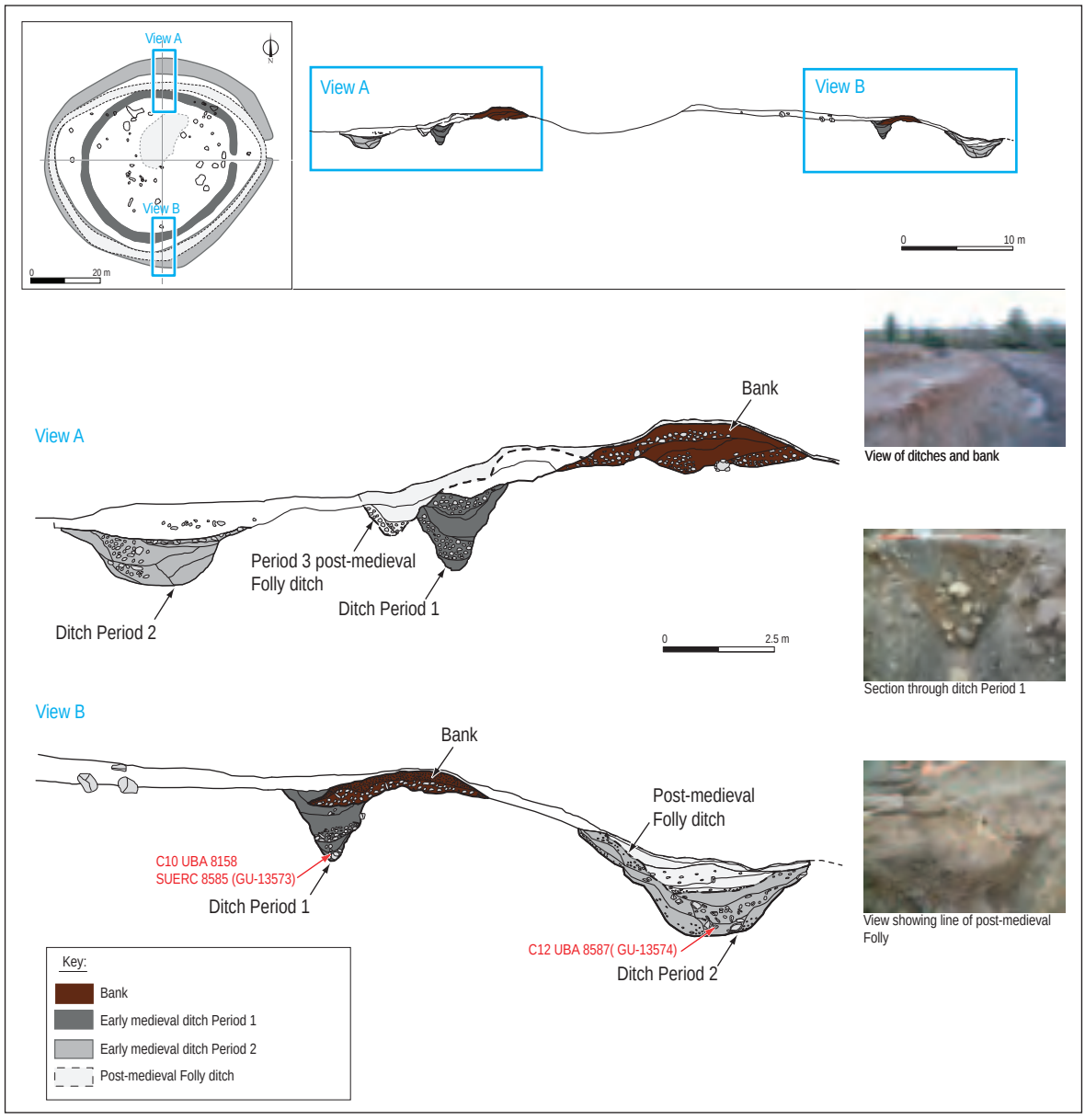
The excavation revealed an early modern folly ditch/enclosure and quarry (Period 3), superimposed over and truncating two periods of early medieval enclosure ditches, with entrances to the east (Periods 1 and 2).

Period 1: early medieval univallate enclosure

Some 1,000 years before the quarrying events took place on the site, the hillock served as the location for an early medieval settlement. Excavation revealed two distinct periods of early medieval enclosure ditches, representing the continued development and expansion of a single site. The earliest phase of enclosure activity was represented by a sub-circular ditch, referred to as Period 1 (Illus. 6.5). The ditch (C10) was cut into mixed glacial gravels and boulder clay with occasional bedrock outcrops. The line of the ditch curved in an even manner around the upper contours of the glacial rise, with a perceptible kink some 7 m either side of a causewayed entrance that faced east. The internal diameter of the enclosed area ranged between 36 m and 41 m, while the ditch cut had a maximum width of 2.4 m and depth of 1.55 m. The U-shaped profile with a relatively wide, flat base, was characteristic of the ditch along its eastern segment around the entrance causeway, while a V-shaped profile was characteristic of the remaining circuit.

The entrance feature associated with this first phase of enclosure consisted of a simple gap in the ditch cut, 2.75 m wide, providing a natural causeway into the interior. Both terminals of the ditch exhibited similar morphology, with relatively straight segments of ditch ending in rounded terminals (Illus. 6.6). The east-facing entrance is typical of many ringfort sites (Stout 1997, 18–19) and was also seen at Ballykilmore (Chapter 7, this volume).

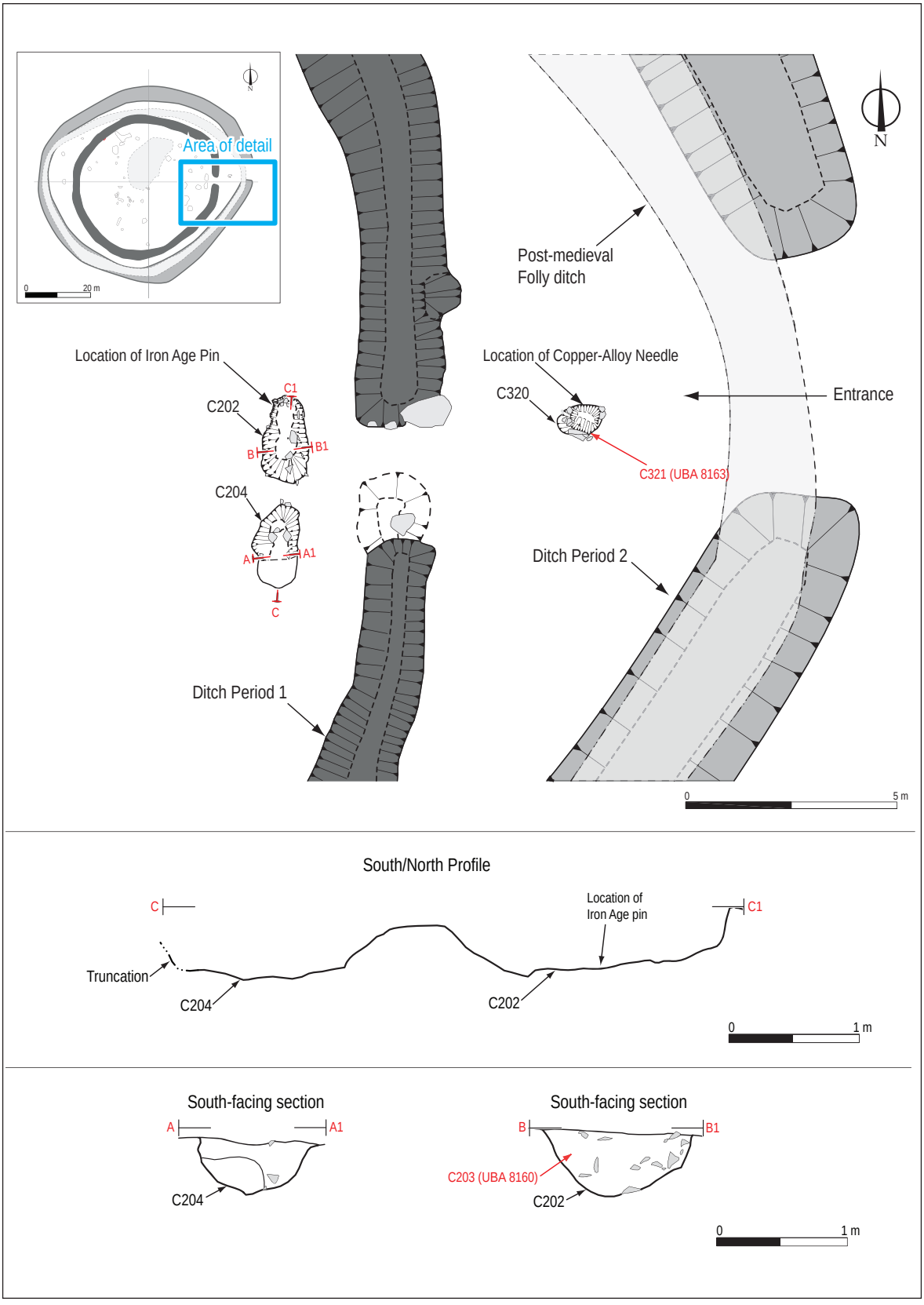
Much of the evidence arising from the excavation at Rochfort was recovered from the ditch fills. This is perhaps not unsurprising given that the interior was partly quarried and subsequently reworked over a larger area. Some 59 layers were identified within the fill of the Period 1 ditch. The sequence of these deposits was fairly consistent throughout its circuit, with some minor variations. Three sub-phases or levels were identified within the fill. The basal layers, sub-group 1, corresponded with the lifespan of the first enclosure and consisted of 14 deposits. Two main processes are represented in these deposits, including erosion of the ditch cut and the accumulation of organic waste deposits, which presumably composted *in situ*. The wastes represent domestic refuse and include disarticulated animal bone, charcoal flecks and the blade of an iron knife (Find E3315:102). Two



Illus. 6.5 *Schematic sections through enclosure ditches.*

animal bone samples from the base of the ditch in quadrants 1 and 4 were radiocarbon-dated, yielding determinations of cal AD 610–770 and cal AD 655–769 respectively (SUERC-8586 & UBA-8158 [all dates are shown as calibrated to two sigma]).

Sediments deposited through erosion levels formed a thin deposit, 0.02–0.10 m in thickness, of grey-brown loose silty sand, with inclusions of grit and stones, along the base of the ditch cut. The composition was similar to that of the surrounding natural subsoil. The remaining deposits within this sub-group became more organic away from the base of the ditch and were thickest (0.10–0.50 m) along the interior side of the ditch cut, with greater inclusions of silt, charcoal flecks, animal bone fragments and mollusc shell. The deposits are interpreted as mixed primary silting with limited deposition/slippage of waste material from the interior of the enclosure and contain the greatest concentration of animal bone within the ditch fill. There were no surviving remains of a bank associated with the ditch.



Illus. 6.6 *Detailed plan of entrance causeway and associated pits, showing location of Iron Age ring-headed pin.*

Period 2: early medieval expansion

Decommissioning of the original enclosure

The upper fills within the Period 1 ditch preserved evidence for the construction of an outer second enclosure ditch and bank (Period 2). These Period 2 deposits within the Period 1 ditch cut can be divided into those exhibiting a direct relationship with the Period 2 bank and those that preserved more general backfilling, probably by levelling the Period 1 bank. The former extended from within the Period 1 ditch cut up into the preserved portions of Period 2 bank, forming a direct stratigraphic link. These layers tended to be sterile with a high stone content. Thus some deposits (C420 and C277) occur in both ditch and bank, as the footprint of the original enclosure ditch was partly surmounted by the Period 2 enclosure bank. A surface dressing of crude cobbling was laid over the northern segment of the infilled Period 1 ditch to level and make good the interior of the Period 2 enclosure.

Expanded univallate enclosure

Construction of a second ditch/bank and simultaneous infilling and levelling of the first ditch/bank enlarged the site. The expanded site now enclosed some 2,271 m^2, representing a substantial increase over the Period 1 enclosure that enclosed some 1,189.88 m^2 (Illus. 6.4, 6.5). The new ditch encircled the original ditch and shared a similar shape in plan. The gap between the two was greatest to the west. The new bank, where it survived, tracked the inner edge of the new ditch. However, it also followed the natural break of slope above the ditch to the south of the site, resulting in a slight gap between the two.

The cut for the second ditch presented a sharp break of slope on the subsoil surface with a gradual break at its base; the sides were concave and the bottom generally flat, giving a U-shaped profile. Occasional bedrock outcrops formed an uneven base on the east side of the site. The ditch fill was different to that within the first ditch, being more mixed, with little consistency to suggest phasing. Animal bone and charcoal flecks were present throughout. A sample of bone from the base of the cut yielded a radiocarbon date of cal AD 690–950 (SUERC-8587). Natural subsoil slippage had accumulated along the sides and base. One deposit (C109/C97) was consistent throughout the feature; it occupied the bottom centre area of the fill and contained the highest concentration of animal bone and charcoal flecks.

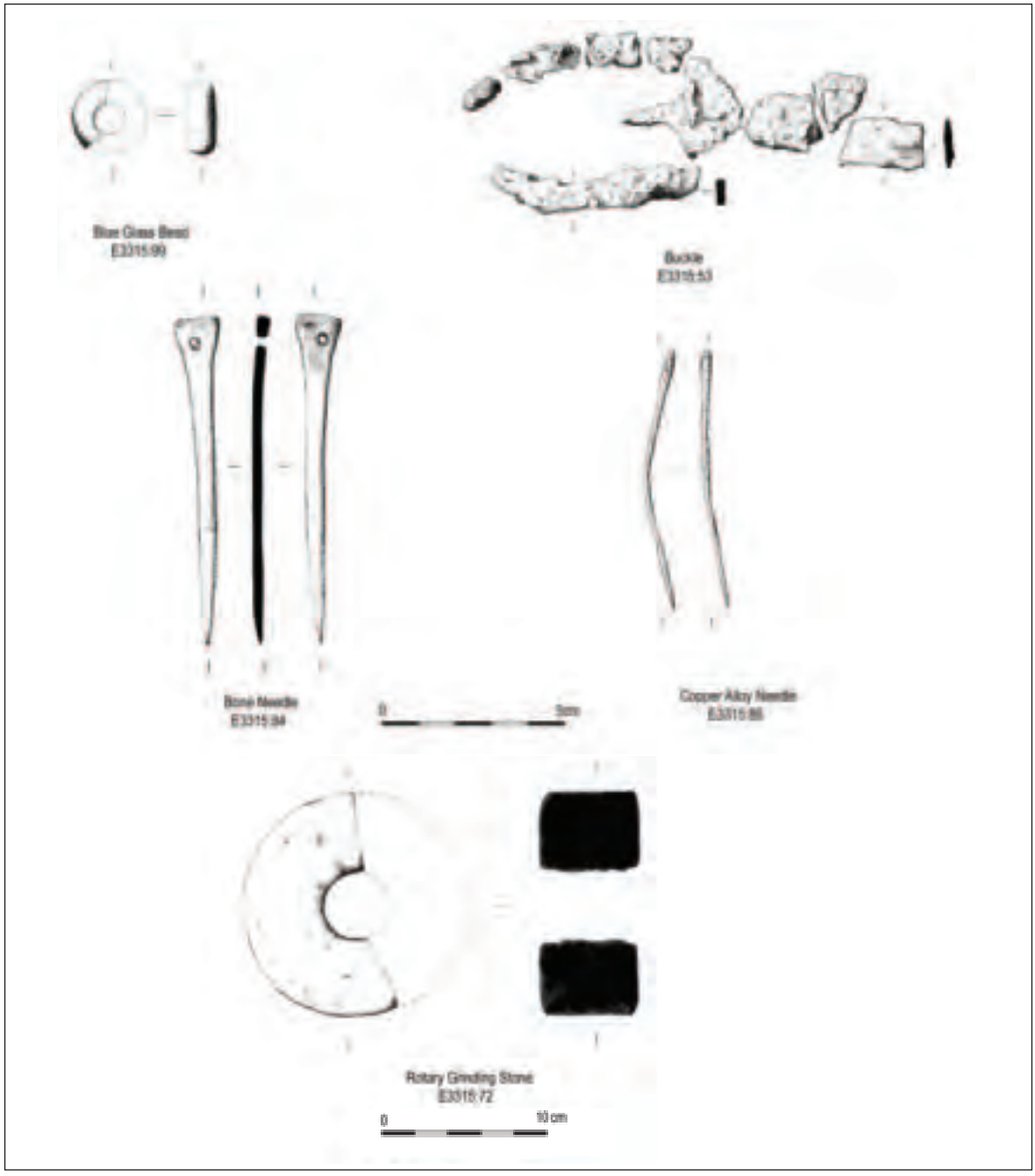
Three levels were identified within the ditch backfill, representing initial accumulation of occupation debris and silting followed by infilling and finally closure. The base layer, 0.30–0.50 m thick, ran the circuit of the ditch and contained inclusions of occupational deposits contemporary with the second enclosure period. Occasional snail shells were present together with very occasional slag fragments and a piece of a rotary grinding stone (Find E3315:72; Illus. 6.7).

The bulk of the ditch fill consisted of mixed material with an average depth of 0.50 m. These deposits consisted of loose, brown, silty clays with inclusions of randomly spaced, small to medium-sized, rounded and angular stones. All deposits contained inclusions of occupational debris in the form of charcoal flecks and animal bone. The deposition may have occurred over time given the inclusions of snail shell and the mixed matrix soils.

The upper ditch fills belong to the post medieval or early modern phase (Period 3) and preparation for construction of the 18th-century folly, which surmounted the early medieval enclosure along two thirds of its circuit.

Remnant bank

There were no remains of an interior bank associated with the original Period 1 enclosure. However, a portion of the Period 2 enclosure bank and associated features was preserved. The southern portion



Illus. 6.7 Selected early medieval artefacts from Rochfort Demesne.

of the site resembled a raised platform, created by cutting the second ditch into the foot of the natural slope. The ditch cut the lower side of this slope, creating a natural bank effect against its inner edge. This was enhanced by the construction of an inner bank along the crest of this natural slope (Illus. 6.8). The natural rise was on average 1.25 m in height which, when combined with the artificial bank (0.6 m surviving height), produced a composite inner bank height of 1.85 m. This was extended further to over 3 m when measured from the bottom of the ditch.

The Period 2 early medieval bank extended for 35 m and was 4.6–5.4 m in width, with an average height of 0.6 m; it ran between the two early medieval ditches. Variations in the fill of the

inner original enclosure ditch correlated with the proximity of the superseding bank. Four deposits formed both part of the bank and extended into the original inner Period 1 ditch. This created a direct stratigraphic sequence where both bank and ditch were in closest proximity. There were no finds or occupational evidence within the bank. The sands and gravels which formed the bank were similar to the natural subsoil into which the original adjacent ditch was cut.

Periods 1 and 2: indeterminate early medieval activity

Entrances

Both enclosure ditches shared an eastern entrance alignment, with both causeways adjacent to each other. The original entrance was 2.75 m wide. The later entrance, located some 9.5 m further east, measured 5.75 m wide. The separation between the two entrances mirrored that between the ditches on both the east and west sides of the site and does not reflect particular topographical features (Illus. 6.6).

The original (Period 1) entrance was disturbed; the southern terminal lip was irregular. The disturbance did not resemble a later pit but was contemporary with the ditch cut and is interpreted as a socket for a stone, removed prior to the backfilling of the ditch. Thus while the causeway gap is constant, the original entrance width may once have been reduced by a boulder on the south side. A smaller stone was present at the northern terminal (Illus. 6.6). This appeared to be naturally occurring and did not extend above ground level. A slightly reduced entrance width would compare with that at Ballykilmore (Chapter 7, this volume). The later (Period 2) entrance was slightly larger overall, and the gap between the ditch terminals and the width of the ditch itself was greater. The inner corners of both terminals were slightly truncated by the later folly.

Three pits were present in the area immediately inside the entrances, two within the Period 1 ditch and one in the entranceway between the Period 1 and 2 ditches (Illus. 6.6). The pair of features inside the earlier entrance shared similar morphology and fill. Their close proximity to the Period 1 entrance would have obstructed traffic. The outer pit would have hindered both entrances. All of the pits shared a compact stony fill. The northern of the inner pair contained a ring-headed pin of an Iron Age type (Find E3315:59; Illus. 6.8), and a bone sample yielded a radiocarbon date range of cal AD 778–949 (UBA-8160). The pit located between the ditches contained a bronze needle (Find E3315:86; Illus. 6.8), and a bone sample yielded a radiocarbon date of cal AD 780–967 (UBA-8163).

The three pits may post-date the construction of the initial ditch, as suggested by the radiocarbon determinations, and could reflect use of the expanded Period 2 site. The southern pit within the original enclosure might interact with an original internal bank, while a second pit feature (C320) lay directly in line with the later entranceway. The presence of an Iron Age ring-headed pin within the fill of a pit (C202) is at odds with the radiocarbon date. It suggests either residual deposition or, given the location of the pit across the threshold entrance to the enclosure, the ritual burial of an heirloom. The Period 1 ditch was backfilled and made good with surface dressing along its northern segment during Period 2; a similar process might account for the compact stony nature of the pit fills. The dated animal bone within the pits represented a backfill *terminus post quem*.

Entrance features have been observed elsewhere. At Ballyhenry, Co. Antrim, a stone-footed structure with post-holes was noted immediately within and to one side of the entrance (Lynn & Heslip 1983, 69–70). At Carrigaline Middle, Co. Cork, a pair of posts, possibly forming a gateway feature, was noted at the entrance inside the inner edge of the ditch terminals of the eastern ringfort (Sherlock 2006, 246). A further example has been noted at Killalane, Co. Tipperary (Long 2007, 483–4). The two innermost pits at Rochfort may relate to the inner terminals of a possible Period 1 bank and their recorded dimensions relate to removal disturbance. The third pit (C320) may have



Illus. 6.8 Iron Age ring-headed pin (Find E3315:59) (photo: John Sunderland).

formed part of a projecting entrance corridor. The area between the ditches was extensively investigated but no further cut features were discovered. However, it seems unlikely that the two innermost pits, within the Period 1 entrance, would have allowed a sufficient gap for traffic to pass through, while their depth would seem at odds with any substantial gateway structure. The circumstances raise the possibility of an opening or closing ritual, perhaps involving a ritualised artefact or heirloom.

Undated internal features

The interior was disturbed by later quarrying, which was centrally located to the north-west of the entrance, and occupied c. 224 m^2, or some 20% of the area enclosed in Period 1 and 10% in Period 2 (Table 6.1). Early 19th-century mapping depicted trees across the site and it is likely that their roots had a preference for soft organic cultural deposits over the surrounding stony subsoil leading to disturbance of the underlying archaeological features.

Table 6.1—Enclosure morphology

Feature	Diameter	Depth	Width	Area
Early medieval				
Period 1 ditch (C10)	38.90 m	1.5 m	2.2 m	1,189.88 m^2
Period 2 ditch (C12)	53.70 m	1.55 m	4.4 m	2,271.84 m^2
Post medieval				
Period 3 ditch (C6)	49.80 m	0.75 m	0.75 m	1,966.07 m^2

There were no surviving structures or internal divisions within the enclosure complex. A total of 68 cut features were uncovered. Of these, 22 are interpreted as early medieval archaeological features, 31 as disturbed archaeological features, with the remaining 15 as non-archaeological and natural features. A stratigraphic association with a specific period of early medieval ditch was not generally preserved for any group of these features. The majority of the internal features retained simple topsoil–subsoil stratigraphic relationships only, which made the process of lateral association very problematic. However, artefact and dating evidence clearly associate these features with the early medieval period and thus it is possible to propose associations with particular ditch periods.



Illus. 6.9 *Eleventh-century composite double sided bone comb (Find E3315:1) (photo: John Sunderland).*

Latrine pits

Three pit complexes located within the enclosed areas were interpreted as possible latrines or rubbish pits (C322, C11/C149/C152 and C423/C412; Illus. 6.4). The pits comprised a short gully/teardrop shape cut into the gentle slope of the enclosure interior. Phosphate levels were measured from the first two complexes and indicated enriched levels when compared to background levels, suggesting organic input (Crowther E3315.pdf, CD-Rom). A sample of insect remains from the second complex is provisionally identified as *Heleomyza ustulata* which may be found in putrefying matter (Reilly E3315.pdf, CD-Rom). The inner, Period 1 ditch fill adjacent to one of these features in the north-west quadrant differed from the surrounding

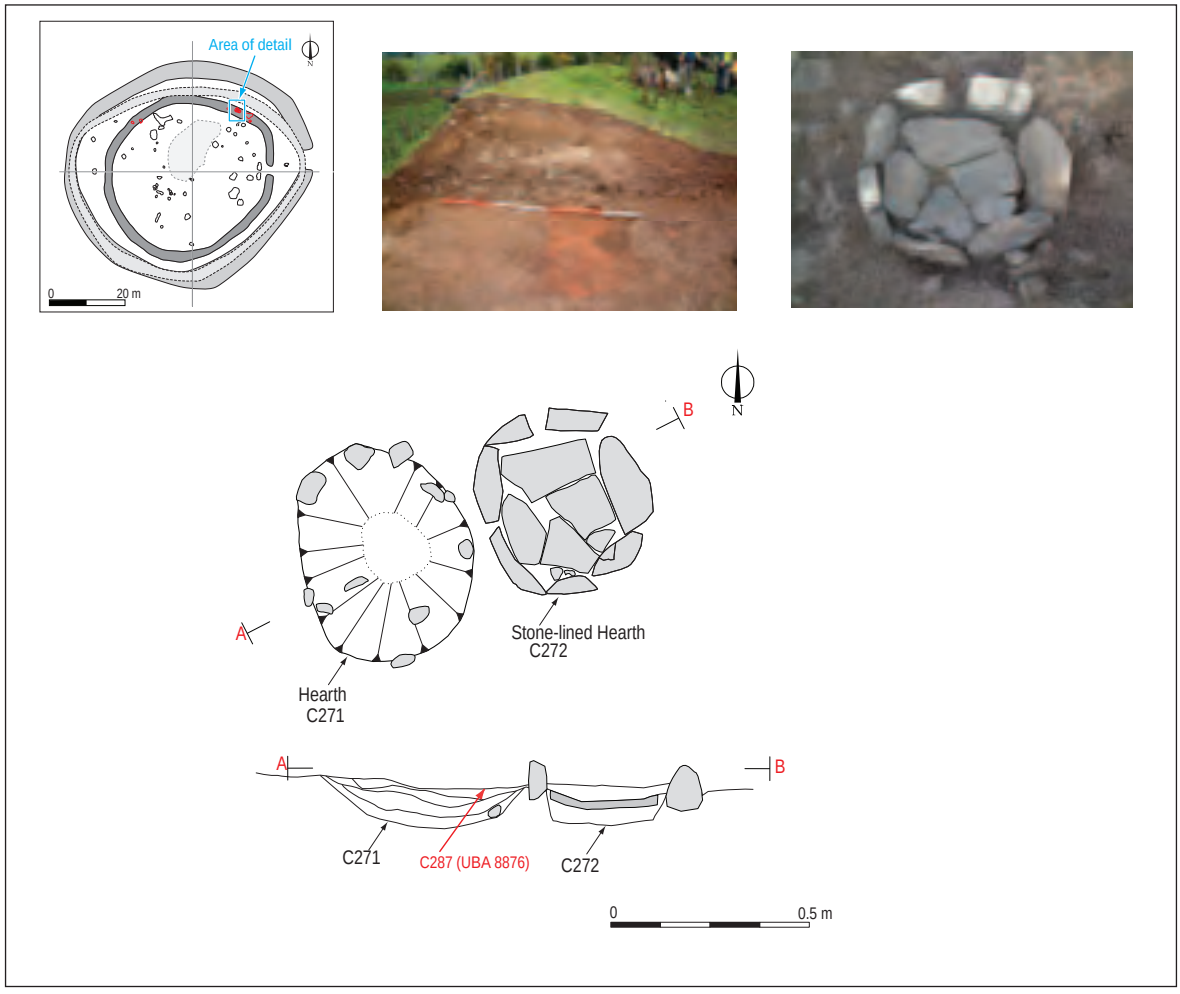
fill, by being less stony and having more organic content, possibly representing natural flow from the feature into the open ditch. The same pit/latrine feature (C11) contained the remains of an 11th-century composite double-sided bone comb (Illus. 6.9).

A radiocarbon date was obtained from animal bone within one of the features (C323), located to the south-west of the site's interior. The feature contained two mixed deposits with animal bone, including flecks of burnt bone, charcoal and unidentified ceramic/burnt clay fragments. The animal bone fragment provided a radiocarbon date of cal AD 607–675 (UBA-9228); the earliest radiocarbon date from the site. The clay fragments have been discounted as pottery (Anna Brindley, pers. comm.), but may have formed part of a clay mould. The fragments are generally concave with apparent heat discoloration on the inner surface. One fragment (Find E3315:98) may preserve the indented outline of a raised boss.

Hearths

Three hearths were located on the dressed and backfilled surface of the Period 1 ditch, along its northern circuit and are probably associated with the Period 2 enclosure.

Two phases of hearth activity were discerned; the first consisted of two circular, abutting hearths (C271 and C272; Illus. 6.10), one of these was a simple hearth with no evidence of reuse, alongside a more substantial hearth constructed from carefully chosen unworked stones that provided



Illus. 6.10 Details of pit of adjacent hearths.

a more permanent workspace, which could be reused as required. The second phase represented evidence for reuse as suggested by the burnt deposits immediately adjacent (C282 and C315). The hearths measured 0.50 m and 0.55 m in diameter. Both hearths post-dated the original enclosure and were set into the upper backfilled surface of the Period 1 ditch. They were subsequently sealed by a layer of redeposited subsoil (C210). Charcoal from the simple hearth yielded a radiocarbon date of cal AD 723–943 (UBA-8876).

A third hearth (C242) was cut into the redeposited subsoil (C210). The hearth consisted of a rough, circular kerb with a diameter of 0.40 m; an adjacent ashy deposit indicated that it may have been cleaned out for reuse. Carbonised seeds within the feature provided a radiocarbon date of cal AD 895–1020 (UBA-8875). The hearths are located inside and adjacent to the Period 2 bank, and overlie the backfilled Period 1 ditch. Their location, stratigraphy and radiocarbon date all clearly indicate that they are associated with the second univallate enclosure.

Several deposits of burnt material, ash and charcoal, were present across the site and all appear to be associated with Period 2. One such deposit, located between the ditches in quadrant 4, contained fragments of probable smithing slag lumps (C341), suggesting small-scale industrial activity. Analysis of metallurgical residues across the site supports the operation of a smithy (Appendix 3.pdf, CD-Rom).

Pits general

The remaining 13 pits were sub-circular in plan with average dimensions of 0.50 m in length by 0.75 m in width and depths of 0.30 m. Single fills were predominant, consisting of mid to dark brown coloured silty clays with charcoal and animal bone inclusions. They are interpreted as general domestic refuse pits.

The material within one pit (C236) is curious. The feature was located in the north-east quadrant, just inside the original enclosure ditch (Illus. 6.11). The pit had a diameter of 0.50 m and depth of 0.25 m with vertical sides breaking sharply at the base to a flat bottom. The single fill of dark brown, silty sand contained occasional flecks of charcoal and animal bone. Articulated leg bones from a goat/pig were sitting on the base of the pit. The faunal reports indicate slaughter/processing of animals on site (Svensson E3315.pdf, CD-Rom; Miller E3315.pdf, CD-Rom). The presence of unprocessed animal remains suggests a lack of nutritional stress and may reflect ritualised activity such as feasting, where access to and waste of various meats may be linked to status. While no conclusive proof of feasting was present it may be difficult to find within the record so that absence of evidence is by no means evidence of absence.

Period 3—post medieval truncation and landscaping

The post medieval or early modern period may be divided into two phases of separate activity; a quarry within the enclosure and a folly bank and ditch that lay over the Period 1 and 2 enclosures.

Quarry

The hillock on which the site was located was quarried for bedrock. The quarry was located in the northern part of the enclosed space, and was defined by an irregular sub-circular cut into the underlying limestone (Illus. 6.4). The cut measured up to 2 m in depth, 22 m north/south and 13 m east/west, suggesting that the quarry may have produced some 572 m^3 of rock. The base and sides were irregular with both rounded and jagged bedrock outcrops lying beneath a thin topsoil/grass cover. The feature did not retain water and finds from the base suggested an early modern *terminus*



Illus. 6.11 Rubbish pit containing in situ *sheep legs.*

ante quem. The quarry fully truncated extant archaeology within its footprint. A rounded bank ran along the circumference of the quarry lip and appears to be associated with the upcast from its excavation. The bank consisted of mixed irregular gravels and small stones, with lenses of redeposited subsoil and topsoil. The bank achieved a maximum height of 1.0 m and width of 4 m along its northern arc, being more diminutive at 0.5 m in height and 1.5 m in width to the south. Two clay-pipe stems located beneath the bank confirm an early modern *terminus post quem*. A narrow gap in the bank to the north-east aligned with an irregular ramp leading from the quarry base, presumably to facilitate quarry operations.

Folly

A low bank was present to the north and west of the site, and excavation revealed a ditch outside this bank; both extended continuously around the site and probably represent the earthwork recorded by the first edition Ordnance Survey six-inch map (Illus. 6.3). The bank rose to a height of 1–1.25 m with a footprint of 3–4 m in width and presented a rounded inverted V-shape profile. The ditch profile was a rounded U-shape some 2 m in width and 1.25 m in depth. It truncated the two underlying early medieval ditches, with some 60% of the feature being cut into the upper fills of the second early medieval ditch (Illus. 6.5).

Twenty-two deposits were revealed within the early modern ditch. The fill was made up of loose, brown, silty clays mixed with occasional small to medium-sized rounded and angular stones. The basal layer along the northern part of the site within quadrant 3 differed in that it consisted of loose, brown-grey, sandy clay with occasional snail shells and pebbles. The finds from the ditch fill are of 18th- to 19th-century date, and include clay-pipe stems (for example, Find E3315:18; C65),

creamware (Find E3315:70; C255), and glazed red earthenware (Find E3315:73; C255). A revetment wall lined the inner face of the ditch along its west and southern arc; elsewhere the inner lip of the ditch merged into the natural rise. The revetment measured 75 m in length, 0.25 m in width and 0.17–0.58 m in height. It was constructed with rounded and squared limestone field stones that were set into three surviving courses. There was no evidence of bonding or render apart from an accumulation of soft brown, silty clay between the stones.

Two deposits (C262) along eastern arc and (C436) along the western arc, were noted within the foundation cut for the revetment wall. Both were used to support an irregular inner wall face in order to provide a smooth outer wall face. In the better preserved sections, the bottom course consisted of larger more rectangular stones with their long axes in line with the wall. The remaining two courses were more rounded and irregular with their long axis orientated for maximum height. While the southern portion of the wall might initially be mistaken for part of a medieval defence, it clearly occupied the cut of the folly ditch to the north and was part of that structure.

Skeletal remains of one individual were found at the base of the Period 3 ditch. The fragmentary skeleton (SK649, C91) represented a long-term foetus or perinate, with death occurring at or near birth (Randolph-Quinney E3315.pdf, CD-Rom). There was no evidence of a burial capsule or grave cut. The remains are interpreted as an informal burial or *cillín* type event occurring sometime after the infilling of the early medieval ditch and prior to or contemporary with construction of the folly.

The late ditch, revetment wall and bank are elements of a single continuous enclosure/folly. The stratigraphic relationship between the enclosure/folly bank and the bank surrounding the quarry indicates that the quarry pre-dated the bank, while artefactual evidence suggests a broadly contemporary date. Once the quarrying was completed, it seems, only a little time expired before the former visual appeal of the site as a romantic enclosure of antiquity was restored, and improved, by the construction of a tree-ring bank and ditch. The first edition Ordnance Survey six-inch map (surveyed 1838; Illus. 6.3) shows mature trees standing within the enclosure. Neither the cartographic nor stratigraphic evidence indicated that these were planted on the bank, as sometimes occurred in parkland landscaping of the period and yet these features should probably be termed a 'tree-ring'. Since the trees had evidently matured by the 1830s, the tree-ring cannot have been planted much after c. 1800 and the folly itself probably dates to that time also. These activities of the 18th and 19th century were quite considerable and represent a significant negative impact on the archaeological levels. Yet, as was evident from the account of the early medieval features (Periods 1 and 2 above), the destructive nature of such events did not entirely remove the pre-existing site. As seems so often to be the case, such recent works often leave levels of the past intact, and significant information can be recovered despite all outward appearances to the contrary. At Rochfort Demesne, the survival of the earlier deposits helps to inform a landscape that was otherwise known almost exclusively from survey data alone.

Artefacts

A range of metal, glass, clay, stone, and bone artefacts were recovered. The range and quality of the finds suggest occupants of some wealth.

Metal artefacts

Analysis by Orla Scully

The metal artefact assemblage consisted of 47 finds. A needle and two pins were of particular interest with two of these objects recovered in pits associated with the entrance features of the site. The third object was found in topsoil.

The copper-alloy needle (E3315:86; Illus. 6.7) is well preserved, measures 69 mm in length and has a punched eye. The artefact was retrieved from a simple pit located between the Period 1 and 2 causewayed entrances (C320; Illus. 6.6). Animal bone from the pit yielded a radiocarbon date of cal AD 780–967 (UBA-8163), and this date compares favourably with dates achieved for similar pins from Viking Age deposits in Dublin and Waterford (Scully 1997, 451; Scully E3315.pdf, CD-Rom). The settlement at Rochfort Demesne was not isolated either within the domain of the Fir Tulach or Mide, rather it appears to share fashions with the Viking centres of Dublin and Waterford more generally.

An adjacent pit some 3 m to the west (C202) contained the Iron Age ring-headed pin. The pit, as described above, is located immediately within the second Period 2 enclosure entrance causeway. The cast bronze pin (Find E3315:59; Illus. 6.8) has a teardrop-shaped ring head on an S-shaped neck with projecting circular disk decoration. The end of the shank is decorated on its outer side with two sets of parallel transversal grooves. The pin form is a characteristic Irish type, referred to as Becker's Type 7 (2000), and probably dates to between the third century BC and first century AD (Becker & Channing 2007; Becker E3315.pdf, CD-Rom). The context of the pin, as discussed above, suggests that it was an heirloom deposited at a later date, in some protective ritual at the entrance. Although the needle associated with the centrally located pit (C320) seems contemporary with the pit fill and the second phase of enclosure, it may still be possible to consider the needle in the same manner as the Iron Age pin but representing an item that was 'of its time'. The careful burial of the two artefacts may represent totems to both an inherited past as well as to the present at what was a critical point of entry and exit from the household.



Illus. 6.12 *Tenth-century ring pin (Find E3315:78) (photo: John Sunderland).*

A second pin from the site was unstratified, recovered during manual turf stripping within the south-west quadrant (Find E3315:78; Illus. 6.12). Typologically the pin fits the Period 2 enclosure date range and is of the polyhedral or polygonal variety (Fanning 1994, 8). The pin-head has a saltire on the front and top. A St Andrew's cross design is engraved on lozenge-shaped facets. Two dots or punch marks are placed on the central

lozenge-shaped facet of the pin-head, like two eyes. The back of the pin-head has a cross, which has a simple linear form, but it is not exactly equal-armed. The shaft is 4 mm long and the arms are 5 mm long and it tends towards a Latin cross. The front of the lower shank has a step: a pattern formed of straight lines making successive angular bends to form a series of interlocking steps flanked by straight lines. The sides have chevron designs, but straight lines do not flank the running zigzag pattern. The back has what looks like a step motif, but it is not formed of straight lines. The upper shank has pendant triangles in a panel. According to Fanning's sequencing of such pins from the Dublin city excavations, the dating bracket for the group centres on the period c. AD 920–1050, with the majority dating to the periods c. AD 925–50 and c. AD 950–75 (Fanning 1994, 27).

Similar pins from Ballinderry Crannog no. 1, Co. Westmeath, provide good comparative dating evidence for their Dublin counterparts. One example was discovered among the timber of house I and related to the late 10th century. The Ballinderry pin also has the saltire pattern on its polyhedral head. Another broken example is associated with the remains of houses II and III and dated to the 11th century. The three pins from Ballinderry I are regarded as local products, though it is clear from a number of the other finds that the inhabitants of this crannog had contacts with Viking centres such as Dublin (Hencken 1936, 134).

The remaining metal finds include two knives; a buckle probably associated with horse tack; a selection of nails; and a jaw or mouth/Jew's harp. The small musical instrument was found in the upper levels of the second Period 2 enclosure ditch and is likely to be related to the later folly works. A similar instrument was discovered at the post-medieval hearth (C5) at Clonfad (Mac Dermot E2723_Vol_1.pdf, CD-Rom).

Glass artefacts

Analysis by Cecily Cropper

A fragment of a blue glass annular bead (Find E3315:99; Illus. 6.7) was found beneath the Period 2 enclosure bank, associated with the second early medieval ditch. The bead is comparable with similar early medieval examples. The remaining glass artefacts were from later contexts and consist of post-medieval bottle/vessel fragments (Cropper E3315.pdf, CD-Rom).

Lithic artefacts

Analysis by Nyree Finlay

A small assemblage of stone tools was recovered from topsoil, comprising three probable convex scrapers, two possible strike-a-lights and a possible gunflint. The recovery of prehistoric lithics is not uncommon on ringforts and generally implies the presence of a prehistoric stratum, but the identification of such was not made at Rochfort. The gun flint is necessarily a late find and may represent a casual hunting party, who might have used the enclosing banks and trees as cover.

Stone artefacts

Petrological identification by Richard Unitt

A fragment of a rotary grinding stone (Find E3315:72; Illus. 6.7) was found within the basal fill of the second early medieval ditch. The artefact was made of grey-green, fine-grained, quartz-rich sandstone. The central perforation is circular and is slightly offset. A maximum diameter of 122 mm compares favourably with similar artefacts from rural Irish sites (Channing E3315.pdf, CD-Rom) and though smaller than those found at Clonfad, it is larger than that found at Cappakeel, Co. Laois (Ó'Maoldúin 2009). The grindstone from Cappakeel, Find 69 (ibid.) had a diameter of some 90 mm and a central perforation that tended to the square. The artefact may date from the early 11th century

on the basis of an associated ring-pin from the same context, which is typologically dated to this period. The Rochfort stone appears, however, to be earlier. A radiocarbon date of cal AD 690–950 (SUERC-8587) from animal bone within the same deposit indicates an eighth- to 10th-century date range, which would fit the argument for a ninth-century Irish origin for the artefact type (Trzaska-Nartowski & Riddler E2723_Vol_1.pdf, CD-Rom). While rotary grindstones have been associated with metal production sites at Killickaweeney, Co. Kildare (Walsh 2008, 136) and York (Maiman & Rogers 2001, 2484), the metallurgical evidence at Rochfort suggests only small-scale manufacture and servicing of tools.

Worked bone

Analysis by Clare McCutcheon

The worked bone assemblage comprises a complete comb dating typologically to the 11th century, a comb fragment from the 13th century, and two pig fibulae, one of which was complete and both probably used as pin beaters (McCutcheon E3315.pdf, CD-Rom). The complete comb was in poor condition and had been repaired in antiquity. A combination of bone and metal rivets was used to hold the comb together and it is likely that the metal rivets represent repair. Corrosion of the metal rivets led to expansion and subsequent cracking of the receiving plates. The classification and terminology for combs is based on Dunlevy (1988). The semi-complete comb is of Class D3 while the tooth-plate is from a Class G comb.

Archaeometallurgical residues

Analysis by Tim Young

The presence of archaeometallurgical residues in the form of smithing hearth cakes and fines—small fragments of waste created by mechanical or thermal shock e.g. hammerscale, or by small droplets of liquid slag expelled during hot metalworking process—suggests the operation of a smithy on the site during Periods 1 and 2 (Appendix 3.pdf, CD-Rom). The assemblage is small, weighing a mere 8.5 kg, and is likely to represent only occasional activity. Macroscopic slags were present within both early medieval ditches, with fines present in the interior. This matches the anticipated but rarely observed disposal pattern on an enclosure site (Appendix 3.pdf, CD-Rom).

Ceramic and clay artefacts

Analysis by Joe Norton & Clare McCutcheon

The ceramic assemblage reflects the later use of the site as a quarry and folly. The clay pipe fragments mostly date from the 17th or 18th centuries with one bowl from beneath the low bank surrounding the quarry dated to 1700–1740 (Norton E3315.pdf, CD-Rom). The remaining ceramic assemblage of 63 sherds also reflects a 17th- or 18th-century date, apart from two sherds assigned to the medieval period (McCutcheon E3315.pdf, CD-Rom). The two sherds came from topsoil. Two pieces of clay may represent fragments of a fine metalworking mould (Finds E3315:97-98) (Anna Brindley, pers. comm.). There is evidence for blackening and possible slash marks for keying on the artefact that would have been produced by the mould. A radiocarbon date from bone in the same deposit as the possible mould fragments yielded a seventh-century date or cal AD 607–675 (UBA-9228).

Artefact discussion

The small assemblage of prehistoric lithics and the two sherds of medieval ceramic should not be unexpected from a site that presents a natural elevation in a rural area. The majority of the small finds, however, confirm clearly the early medieval horizons that form the archaeological heart of the

site. Certain artefacts stand out in their own right. The ring-headed pin most clearly suggests a relationship with 10th-century Dublin, and calls to mind the existing Viking Age hoards that are known from Lough Ennell (Ryan et al. 1984), as well as the sequence of entries in the annals to the plundering of Lough Ennell in the 10th century (Chapter 4, this volume). The role that the Rochfort Demesne settlement played in this political theatre can only be surmised, but the range of small finds and its location close to the complex of sites associated with Goose Island crannog and the attendant shoreline of Wren Point indicate that Rochfort Demesne has claims to having been a noble site. The occurrence of the Iron Age pin has been discussed as a possible heirloom, ritually deposited to mark the opening or closing of the site. It is unlikely that the piece is simply a residual find and the fact that it is associated with the similar context of the copper-alloy needle, which was deposited in another pit occupying the entranceway to the site, supports this observation. Both artefacts provide a glimpse of a social belief system that is not recorded in written sources of the time, and suggests the continuation of long-held beliefs that reach back into the prehistoric past.

Chronology

The main construction sequence of the enclosure can be demonstrated through direct stratigraphic relationships. While a ditch makes a current archaeological impact, it is likely that a bank made a larger contemporary impression. The Rochfort Demesne construction sequence acknowledges the bank's importance. Radiocarbon dating of 16 samples supports and refines the sequence (Appendix 1). The dates returned are supported by the artefactual evidence and, as such, the Rochfort Demesne sequence may ultimately assist in refining typological sequences in their own right. The context of finds such as the Iron Age pin runs counter to this and raises the question of residual or ritual deposition.

Initial deposits within the original Period 1 ditch indicate that the enclosure was in use during the seventh century to late eighth century cal AD 610–770 (SUERC-8586, UBA-8158). A bank was associated with this primary earthwork but was levelled when the site was expanded. The bulk of the original ditch was backfilled with a combination of spoil/upcast from construction of the second early medieval enclosure and levelling of the original bank. The arrangement of these fills suggested a construction sequence designed to maintain a functioning bank and ditch throughout the reconstruction.

Tip lines indicate that spoil/upcast from the new Period 2 ditch, was used to form both an inner bank and to fill the earlier ditch. However, where the Period 2 ditch was separated, by more than c. 3 m, from the Period 1 ditch the earlier Period 1 bank was pushed into the earlier ditch. Where the ditch footprints were closer the spoil/upcast from new ditch went into the old ditch, allowing a temporary arrangement where the new, Period 2 ditch was in this instance contemporary with the old Period 1 bank. This sequence is validated by tip lines in the upper fill of the Period 1 ditch, and particularly the presence of shared deposits in both Period 1 ditch cut and Period 2 bank (see above). The earlier bank was perhaps only fully levelled when a new bank was in place. In this way, it is possible to suggest that the site retained a functioning bank and ditch during the remodelling.

Radiocarbon dated deposits at the base of the second ditch suggest that the site was most probably extended by the seventh or 10th centuries or cal AD 690–950 (SUERC-8587). Since the calibrated date ranges for both early medieval ditches overlap, it is likely that the original enclosure persisted for a short period, probably 50–100 years but possibly weeks before being remodelled. Hearth activity on the backfilled surface of the original ditch was radiocarbon-dated to a period in the eighth to 11th centuries; cal AD 895–1020 (UBA-8875), cal AD 723–943 (UBA-8876). It is difficult to

associate features from the interior of the Period 1 enclosure with either early medieval enclosure directly, given the lack of stratigraphic relationships and the uncertainties in the interpretation of radiocarbon dating. As at Ballykilmore (Chapter 7, this volume), the earliest probable date is from the interior of the site rather than from the base of the ditch, cal AD 638–666 (UBA-9228).

A commencement date of c. 1700–40 is proposed for the quarry, which coincides with construction of Belvedere House, its follies and the demesne landscape. The date is based upon a clay-pipe bowl fragment located beneath the spoil lip surrounding the quarry (Find E3315:108; Norton E3315.pdf, CD-Rom). The folly ditch and revetment wall were constructed after the quarry, based on the stratigraphic relationship of the folly bank and quarry lip, but broadly during the same period, based on the artefactual evidence.

Discussion

The second phase of early medieval enclosure occupied an area that was 91% greater than the first phase of enclosure, based on the dispositions of the two ditches. The nature of the remodelling was particularly notable during the excavation. The original enclosure ditch tracked the upper edge of a natural rise, a strategy that did not maximise the natural topography. The later ditch followed the base of the same natural rise while the new bank occupied the upper lip of the rise. Thus, the bank and ditch were vertically separated by a natural slope. This effected an increase in bank height by up to 3 m along the southern half of the site. There was a less pronounced rise on the northern part of the site; however, the new ditch lay closer to boggy ground to the immediate north. Overall, the second enclosure exploited opportunities in the natural topography to the maximum visual and defensive effect.

The eighth-century legal poem, *Críth Gablach*, describes the size of a king's fort: 'It is then that he is a king, when ramparts of vassalage surround him' (Binchy 1941, 96). Analysis of microfloral remains from Rochfort Demesne confirms the presence of wheat, which is relatively rare on other early medieval sites (Chapter 9, this volume; Dillion E3315.pdf, CD-Rom). It recalls the eighth-century law text, *Brethá Déin Chécht*, which lists seven cereal types in order of social importance, with bread wheat recognised as the most important (Binchy 1966, 1–66; Kelly 2000, 219–20). Across the site at Rochfort Demesne, there is a consistency among the archaeological indicators that identify significant and rising status. During the lifetime of the site its patrons extended the area enclosed and in so doing effected a remodelling of the site that enhanced its visual stature.

There was little in the excavated evidence to confirm that the site functioned as a residence. Despite the destructive impact of the later quarry and folly ditch, there was extensive opportunity within the interior spaces to identify buildings and activity areas associated with agricultural and residential activities. However, there were only very slight indications of such horizons. There was no suggestion of internal division. Only one of the latrine pits retained a well-defined gully that could be interpreted as a denuded wall footing, or the result of erosion/rodent activity at the base of a post-and-wattle wall. Two discolorations in subsoil, noted in the north-east and north-west quadrants, may preserve the circular images or footprints of two roundhouses with diameters of 4.7 m and 5 m. The faint discoloration may, however, merely reflect differential water movement in the subsoil. Portions of the interior surfaces at Rochfort Demesne were dressed or metalled to make hard surfaces over backfilled features, but there was no indication of cobbling around the entrance causeways, presumably an area of intensive traffic. There was an absence of stratigraphic layering in the interior, despite the fact that the artefacts, radiocarbon dates, remodelling and smithing debris all combine to suggest occupation over at least several generations in the early medieval period.

Despite the negative impacts on the site from the quarry and later folly, as well as those arising from the remodelling of the site in the eighth or ninth century, it is clear that what is enduring is the absence of permanent structures and souterrain. Ballykilmore, as will become evident, presents mixed functional evidence within its interior, underlining the variety of ways in which an enclosure might serve its community. Could it be that Rochfort Demesne was not fully occupied but mainly used on occasion, when the Fir Tulach king was in residence nearby, possibly at Dún na Cairrge, in support of the royal retinue?

The animal bone remains recovered at Rochfort may support this hypothesis in a small way; the presence of articulated sheep forelegs within pit C236 (Illus. 6.11) may suggest feasting, since full butchering and processing of the carcass would seemingly have separated the bones (Chapter 9, this volume; Svensson E3315.pdf, CD-Rom; Miller E3315.pdf, CD-Rom). More generally, the faunal assemblage was small. The distribution of animal bone waste within the two early medieval ditches, such as it was, suggests a gradual move away from sheep and hunting (red deer) to dairying. However, sheep, cattle and pig are present in both ditches. Domestic animals, cat and dog, are also present in both ditches. While the presence of wild fowl is to be expected, one example of a white-tailed eagle exhibited cut marks for wing removal that suggests use of the feathers as fletching for arrows (Chapter 9, this volume; Strid E3315.pdf, CD-Rom).

A traditional view of status based upon the the relatively small size and simple univallate design of the Rochfort Demesne enclosure does not immediately suggest that this site may have served in a royal capacity. The nature and range of excavated features and artefacts, however, suggest a different view. It is clear that our understanding of the early medieval landscape is changing in the light of recent archaeological work conducted in large measure as a result of the large-scale infrastructural project. Looking ahead, archaeologists in Ireland will have to consider an increasingly more complex early medieval landscape than we have been accustomed to, where site types and chronologies are more varied. The many open-ended questions associated with the Rochfort Demesne excavation is a case in point.

The precise location of the Fir Tulach power base at Dun na Cairrge is unknown. Connon (Chapter 4, this volume) presents a case for the location on an island south-west of Rochfort Demesne, now part of the shoreline, while O'Sullivan suggests Cherry Island, further to the south, as the likely candidate. Both acknowledge the interrelationship between land and lake-based sites. The importance of Goose Island crannog must be taken into account in any discussion of the immediate early medieval landscape associated with the Rochfort Demesne excavations. The island was surveyed by the Crannóg Archaeology Project and an outer ring of 149 palisade posts was identified, substantially increasing the footprint of the site, in much the same way as the project's underwater survey expanded our knowledge of Cró Inis crannog on the western side of the lake (Brady 2007, 339). A timber from the palisade was dated to the ninth century and establishes a broadly contemporary horizon with the second phase of activity at Rochfort Demesne, suggesting a relationship that may have been direct, as has been argued for the crannog of Cró Inis and Dún na Sciath ringfort, even if the topographical separation is somewhat more extended. This may be related to the different topographies encountered on both sides of the lake, or it may simply be a factor of the terrestrial lordly landscape extending beyond a single site to include a range of ringforts in proximity to a main lake-based residence, as may be the case here.

The reasons for the expansion of the site in Period 2 may be teased from Connon's chapter, where she describes changes in the lineage of Fir Tulach kings coupled with a sometimes rancorous relationship with their Clann Cholmáin overlords in the ninth century. The proximity of contemporary early medieval sites, forming clusters focusing on Lough Ennell, suggests that a search for the royal nucleate site may overlook the transience of the royal presence at any such residence

(Chapter 3, this volume), and perhaps the complex of secondary or supporting sites records a multi-nucleate pattern to royal authority.

There are some 45,000 ringforts distributed across Ireland (Stout 1997, 53) and by 2007 a mere 243 excavations were recorded by the annual excavations bulletin of licensed work. With less than 0.005% of sites excavated, the sample size is too small to allow accurate statistical analysis derived from the excavation data to be applied to the much greater number of enclosures more generally. The misinterpretation of a few residual finds would skew the date range considerably. The simple interpretation of ringforts as early medieval farmsteads, albeit largely for the noble classes and free elements in society, does not allow for the wide range of dates and morphologies present. It is in this context of a changing understanding of the early medieval landscape that the results of excavations at Rochfort Demesne are probably most suitably considered.

Conclusion

The Rochfort Demesne excavation revealed a univallate enclosure with two periods of ditch that probably represent continuous use from the seventh to the 12th centuries. Without excavation, the remodelling of earthworks and expansion of enclosed space would not have been known. This raises questions about standard perceptions of the ringfort as a settlement type and adds a further aspect to Stout's (1997) paradigm of enclosure status based on size and concentration. Rochfort Demesne highlights a dynamic situation that can only be fully understood by a consideration of the excavated sites within an early medieval landscape setting.

The site meets some criteria for an elevated status classification, it was in the right place at the right time, and was built to impress. The Iron Age pin and associated early medieval needle, in neighbouring pits at the entranceway, may simply be chance survivals, but equally invite a more complex interpretation relating to the protection of a settlement area by ritual acts. The evidence overall suggests a role beyond that of family farmstead, probably in support of a nearby royal site. An association with Goose Island crannog 1.4 km to the west, is suggested from chronological association and topographic proximity. Rochfort Demesne and the surrounding early medieval settlements may have formed a backdrop or arena for a minor royal seat of local Fir Tulach power that was ultimately ceded to the Clann Cholmáin. Historical sources indicate the presence of such a site, recorded as Dún na Cairrge, which has yet to be located.

7

BALLYKILMORE—LIVING WITH THE DEAD, THE DEVELOPMENT AND CONTINUITY OF AN EARLY MEDIEVAL GRAVEYARD

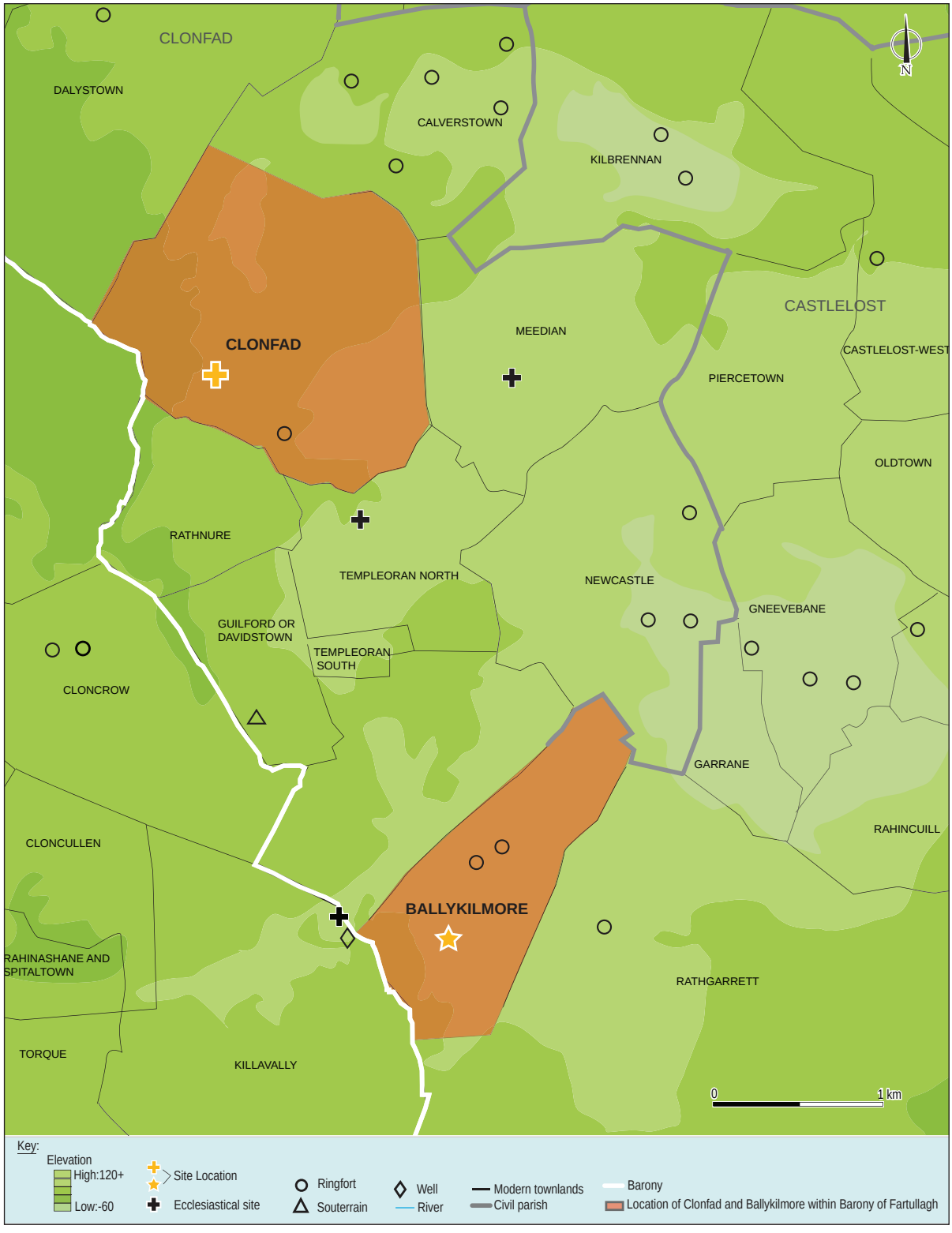
John Channing

This chapter describes an unrecorded enclosed early medieval cemetery that was active for more than a millennium. Burials occur from the fifth century until the Georgian period, with greatest intensity of use seen during the early and later medieval periods. The foundation of a rectangular stone structure thought to be the remains of a church were uncovered, possibly dating to the 10th to 12th century. Though much disturbed by repeated grave digging, both industrial and domestic activity contemporary with the burials demonstrate the close medieval relationship between the living and the dead. Spatial division within the interior is suggested by the burial pattern. The longevity of the site may build upon a pre-existing tradition and the embanked enclosure that defined the burial ground appears to be broadly contemporary with its first use for burial. The cemetery records the general health and mortality of a stable, rural population. Strong adherence to a standard burial rite creates a backdrop for occasional deviant or atypical burial. Post mortem movement of body parts is evident, together with possible necrophobic response. Final burials, consisting of informal *cillín* events, persisted after the surrounding ditch and internal structures had fallen into disuse.

Site location and description

The site is located in Ballykilmore townland, 3.5 km and 9 km south of Clonfad and Rochfort Demesne respectively (Illus. 1.1, 7.1, 7.2; NGR 24182E, 237245N; height 113 m OD; Discovery series sheet 48, 1:50,000 and six-inch map series, County Westmeath, sheet 39). It was crossed by the Tyrrellspass/Croghan road 0.8 km south-east of Tyrrellspass. Positioned on a natural glacial ridge, the site has good views to both north and south. It does not occupy the highest part of the ridge but rather straddles a lower rise closer to Tyrrellspass. The surrounding area consists of limestone bedrock with raised peat and brown earths (Chapter 2, this volume). Areas of undulating raised ground, occasioned by glacial deposits, are used for rearing domestic stock. Reclaimed bog lies to the south while low-lying pasture to the north is flooded by a seasonal lake. The shared location of the site and the Tyrrellspass/Croghan road illustrates a preference for dry ground and the dichotomy of land-use between raised dry lands and surrounding bog.

The site is not marked on the first edition six-inch Ordnance Survey map compiled in 1838, and the circuit of the enclosure is not reflected in the field boundary pattern (Illus. 7.3). Instead, the site is cut by both boundary and road, suggesting that its official status as a burial ground had passed by the time of the first survey, though informal *cillín* activity may have persisted.



Illus. 7.1 Map of early medieval archaeology within the vicinity of the excavation at Ballykilmore townland.



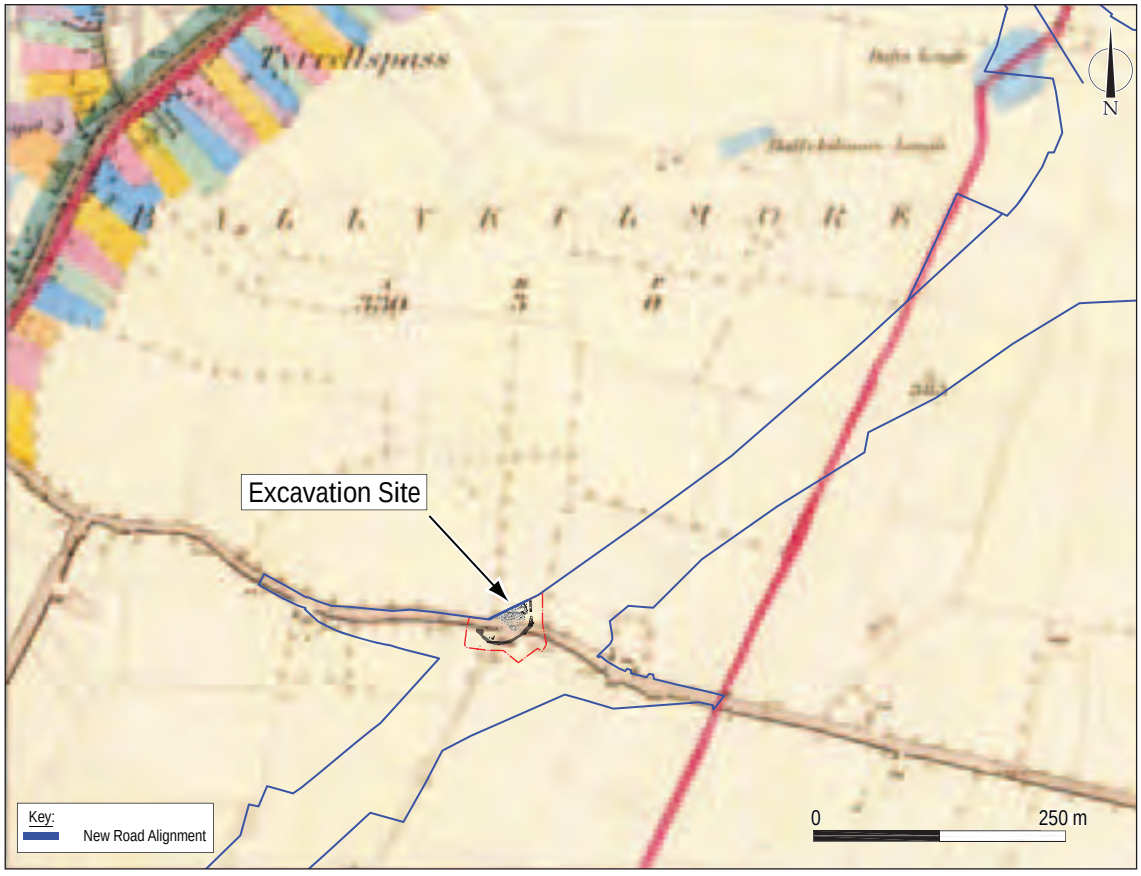
Illus. 7.2 *Aerial view of Ballykilmore, showing excavation either side of the existing road—later removed—looking east.*

The surrounding landscape, prior to industrial peat extraction and drainage works, is preserved by the 1838 survey, which shows a marshy area with two small lakes c. 200–400 m north of the site (Illus. 7.3). The nearer of the lakes, Ballykilmore Lough, lies within 150 m of the second lake, Daly's Lough, which is crossed by the boundary with Rathgarret townland. The ridge occupied by the site forms a natural promontory off the ancient routeway of the Slige Mór, extending towards Croghan Hill 7 km south-east. Croghan, a natural curiosity, is of archaeological importance at least since the Iron Age and is associated with St Brigid (Chapter 5, this volume). Reaching an elevation of some 234 m, the extinct volcano that forms the hill is both prominent and isolated. Correspondence between fieldworkers and the Ordnance Survey Office in Dublin during the 1838 compilation captures an impression of this isolated prominence. John O'Donovan observed, "I never enjoyed a finer prospect than that commanded by this hill …. one standing on the Moat of Croghan could, when excited by the sublimity of the prospect, imagine himself like Fin Mac Cool, able to leap across to the Mountain of Bladma, so much is the eye deceived by the flatness of the interjacent plain!" (Herity 2008). The road crossing the Ballykilmore site uses a natural linear elevation that undoubtedly served as a routeway in antiquity through this otherwise large wetland area.

The townland name, Ballykilmore, does not refer to a church but rather to Balligillimore (Chapter 4, this volume) and is recorded as such in the 17th-century Down Survey map (William Petty's baronial map 1685, Illus. 4.2). The first documented reference to the townland name occurs in 1517, where the rental level suggests a profitable farming enterprise (Chapter 5, this volume).

Two ringforts (RMP WM39:002 and 003) and a holy well (RMP WM39:004) located close to the site may be contemporary with Ballykilmore (Chapter 4, this volume) and possibly form part of an early medieval enclave supplying the cemetery with a settled rural population, living within well-defined geographic boundaries (Illus. 7.1).

Prior to excavation, the site was under mature pasture with no surface indication of archaeological significance, though the tradition of a cemetery was known locally. Confirmation of



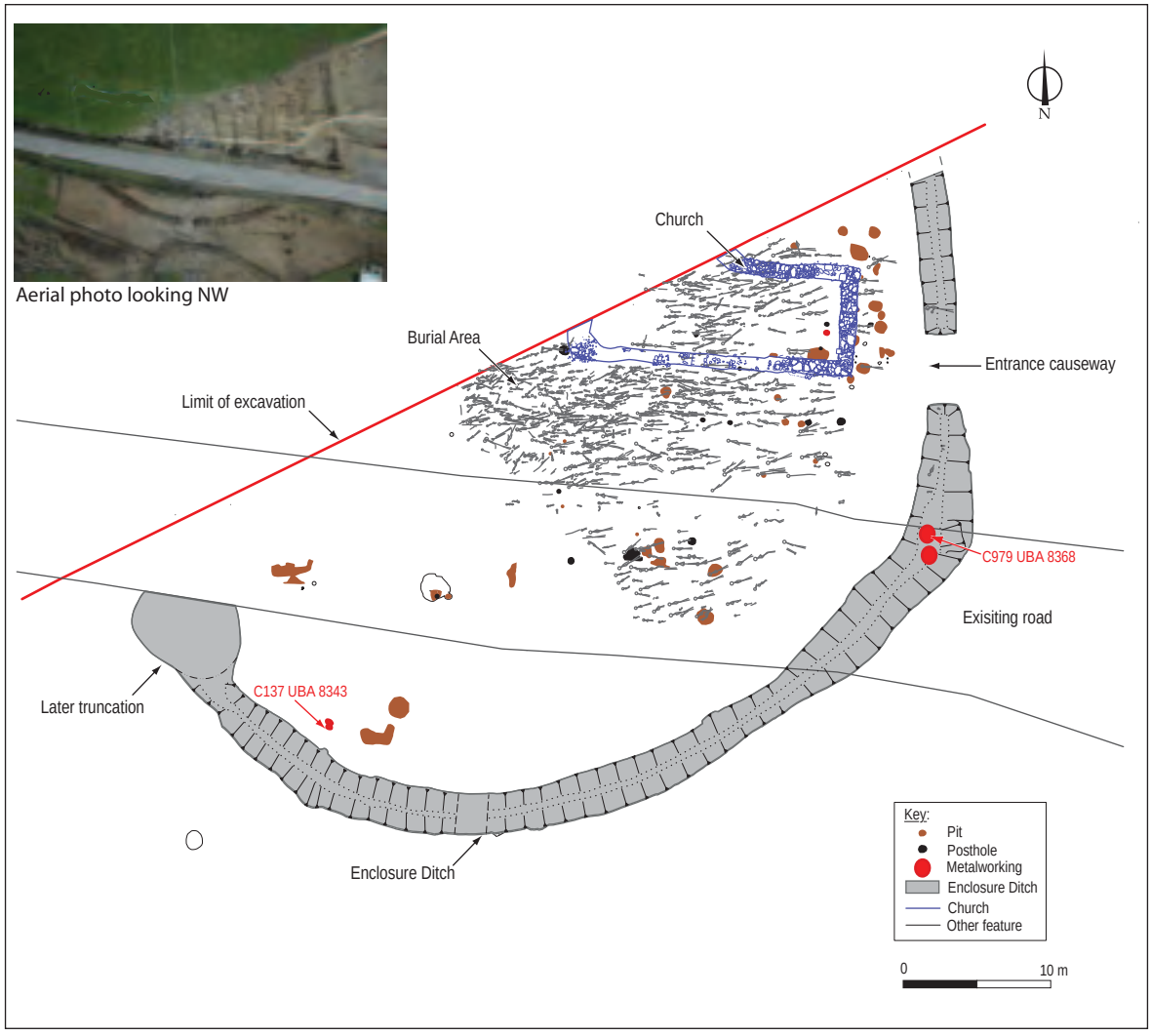
Illus. 7.3 *Extract of Ordnance Survey map of Westmeath (six-inch first edition sheet 39, surveyed 1838) with the excavation site and new road realignment indicated.*

the cemetery's existence was made by archaeological centreline test-trenching, which identified the presence of skeletal remains directly beneath topsoil together with a hearth feature in the adjacent field to the south, across the existing road. The observations were recorded as sites Ballykilmore 1, 4, 6; features F31, F36, F38 and F79 in the testing report (McDermott & Stanley 2004, 53–64; McDermott 2004, 232–3; Potter 2004, 234–8, figs 5.12, 5.14, 5.17 and 5.18).

Excavation

Excavation was restricted to a 70 m-wide area that represented the wayleave for the road improvements works (Illus. 1.1, 7.2). The excavated area represents a wide transect though the site and elements of the larger area were observed extending beyond the excavation cutting to the north. The southern and eastern limits of the site were exposed within the excavated area and it is estimated that this work might have uncovered fully one third of the actual site area that is enclosed within a boundary ditch.

The site comprised a large, circular ditch, enclosing an interior space that was divided into two parts by the presence and absence respectively of inhumations. Inhumation burials were dug in a tight cluster and in some cases truncated earlier burials, with one plot reused up to 10 times. The burial activity occurred in the eastern half of the enclosure, and surrounded a rectangular stone building interpreted as a former church. The remainder of the interior space consisted of pits, metalworking features and a small cluster of post-/stake-holes.



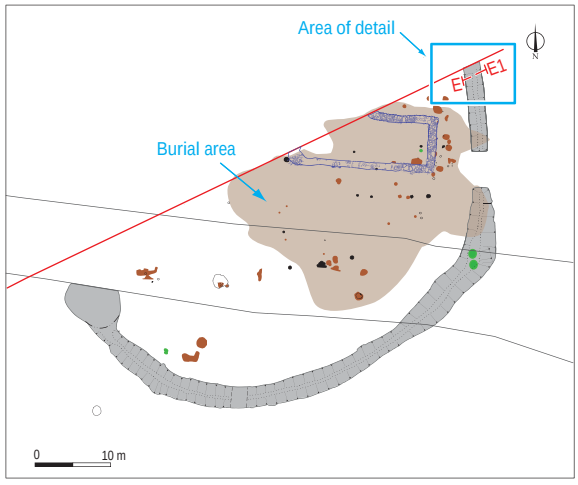
Illus. 7.4 Site plan of excavations at Ballykilmore.

Early medieval enclosing ditch

A ditch curving around a natural rise marked the southern and eastern site extents, and continued beyond the excavated area to the north (Illus. 7.2 to 7.6). The full extent of the enclosure can only be estimated because the presence of high tension electricity cables running over the north of the site prevented the use of available remote sensing techniques to test the assumption. The exposed portion of the ditch suggests that the full enclosure would, if projected, form a sub-circular or slightly oval enclosure, with a maximum internal diameter of c. 70 m.

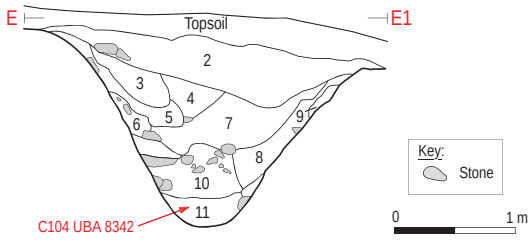
The enclosure ditch was V-shaped in section with a slightly rounded base (Illus. 7.5). The cut ranged in width between 2.43 m and 3.30 m, gradually decreasing towards the terminals at the entrance causeway. The overall depth varied between 1.47 m and 1.61 m.

Thirty-one separate deposits filled the ditch and can be divided into three phases. The earliest horizon, phase A, consisted of silty clay basal fills lining the base of the ditch and ranging in depth from 0.18–0.60 m. The proportion of gravels within these deposits reflected the surrounding subsoil which had a higher stone content along the raised, northern, portions of the site. A slightly higher stone content was noted against the inner face of the cut. The deposits contained occasional animal







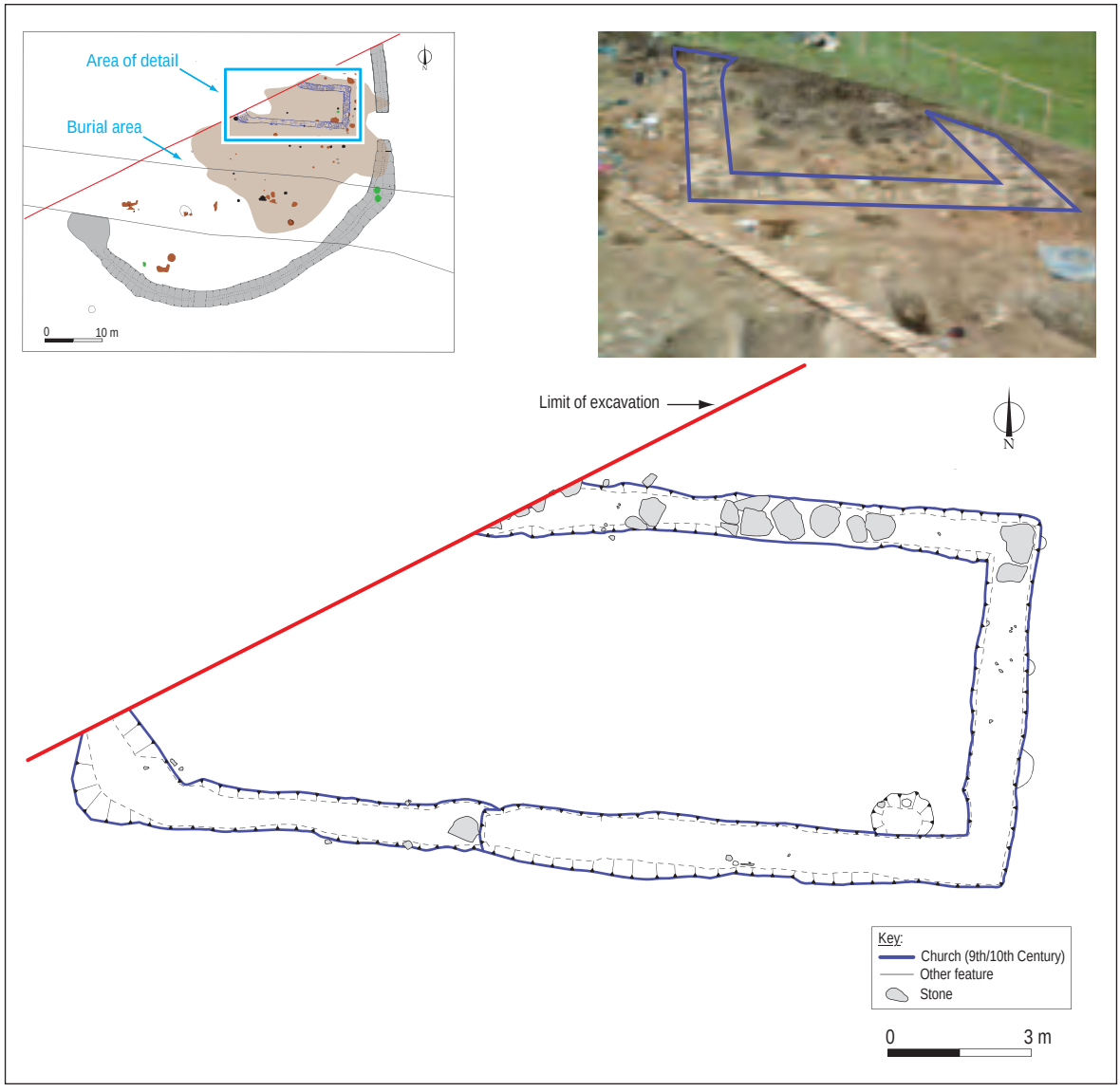


2- Loose silty clay containing bone/industrial waste/metal strap
3- Gravel silt containing needle
4- Loose silt
5- Soft silt
6- Gravel silt
7- Soft silt
8- Silty sandy clay
9- Gravel silt containing buzz bone/toggle
10- Stone and silt
11-Silt deposit containing worked stone/counter

Illus. 7.5 Detail of enclosure ditch.

bone, charcoal flecks and waste metalworking materials, and one sample returned a radiocarbon determination of cal AD 540–679, indicating the early use of the ditch in the sixth to seventh century (UBA-8342). The bone within these deposits was exclusively animal in contrast to later bands of deposit which also contained disarticulated human bone (Randolph-Quinney E2798_Vol_2.pdf, CD-Rom).

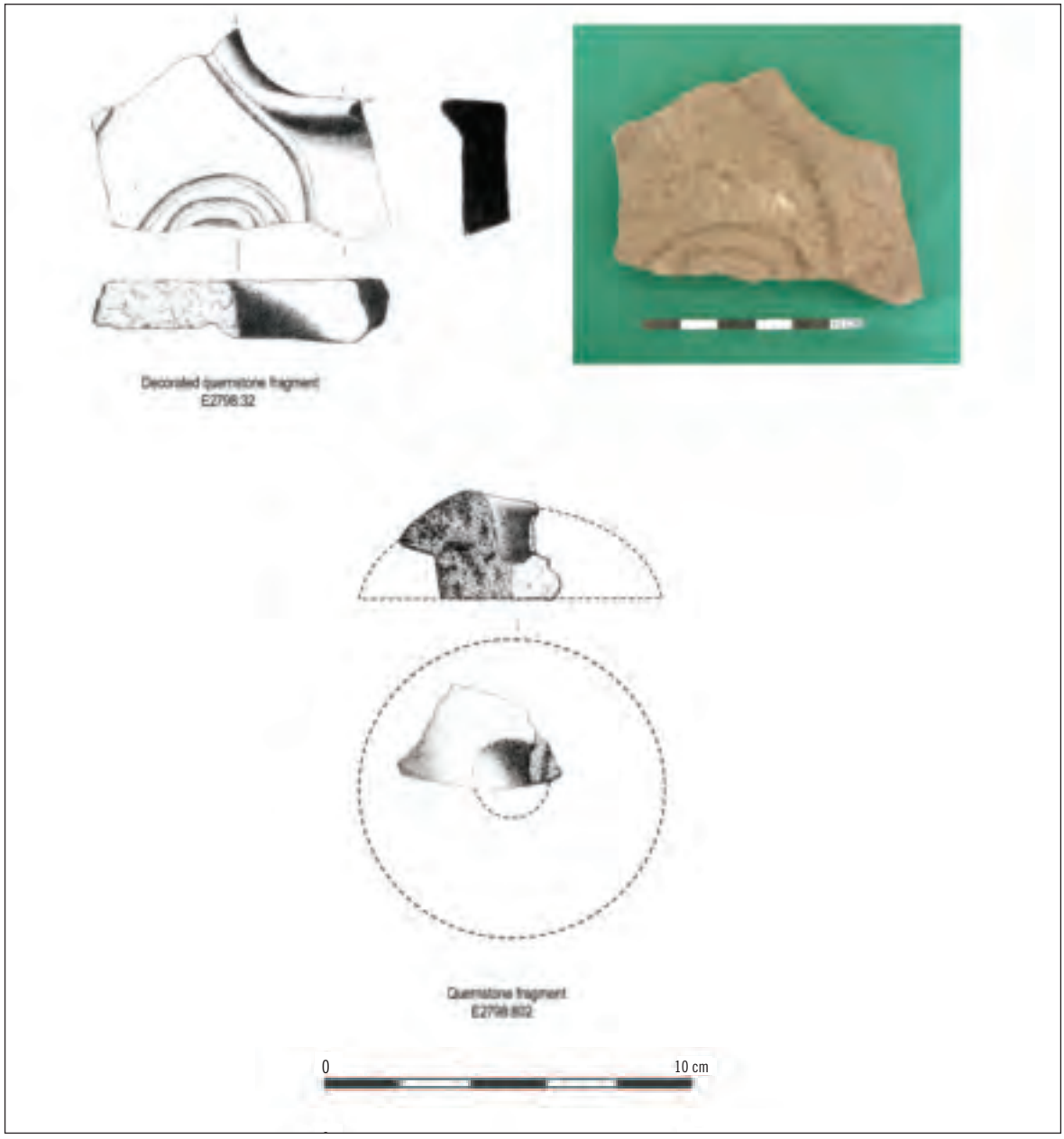
The bulk of the ditch fill occurred in subsequent mixed bands of deposit above the basal fills (phase B/C). These were similar to the bottom fills but were better defined, possessed inclusions of larger stones and were cut by several later features. Two small slag pit furnaces (C979 and C1183) and associated charcoal spreads were present at the south-eastern part of the ditch circuit (Appendix 3.pdf, CD-Rom; Young E2798_Vol_2.pdf, CD-Rom). These were set into a partially infilled ditch. The final infilling of the ditch was with silty clay deposits, probably reflecting a mixture of topsoil and silt rather than any levelling of an associated bank. A later pit, to the south-west of the site, was wider than the ditch and cut the ditch sides. The feature was cylindrical with a flat base and cut through the upper ditch fill down to the base. The pit extended outside the excavation area and contained smithing waste, tuyère (clay air nozzle) fragments, and a quern fragment (Find E2798:802;



Illus. 7.6 *Detailed plan of possible church.*

Illus. 7.7). The uppermost ditch fills were similar to topsoil and included early modern period artefacts. The deposits reflect a levelling of the ditch and include a cobbled laneway running over the southern part of the ditch, parallel to the existing boundary and recorded on the first edition Ordnance Survey map (Illus. 7.3).

Ten burials were located in the ditch, five within the upper deposits and five in the middle layers. The majority of the remains were neonate or newborn which also formed all of the upper, phase D, burials. Three adult inhumations were uncovered, one of which was a female (C827) with an associated pre-natal foetus (C946) (see below), located at the north causeway terminal in the middle ditch levels. A radiocarbon determination was obtained from the female suggesting a ninth- or 10th-century date, cal AD 890–1026 (UBA-8358). A later furnace (C979) located c. 10 m south of the female and foetus was also present in the same ditch deposits, but appeared to be cut into the deposit from a slightly higher level than the two burials. Bone from this furnace returned a 13th- or 14th-century radiocarbon date of cal AD 1298–1407 (UBA-8368), suggesting a date range of the



Illus. 7.7 Quern-stone fragments (Finds E2798:32, E2798:802).

upper ditch fills. Chronologically the ditch fill spans the period from the mid sixth to late seventh century up to the post medieval/early modern period.

Early medieval entrance

A single simple site entrance was uncovered, facing east. The entrance gap in the ditch compares favourably with the earliest entrance feature at Rochfort Demesne in both morphology and orientation (Chapter 6, this volume). The later road, which crosses the site several metres to the south of the entrance feature, is orientated east/west and may suggest a continuation of access across this site in the direction of Croghan Hill.

Early medieval enclosing bank

There was little direct evidence of a bank associated with the ditch apart from an irregular layer of redeposited subsoil (C235) forming a band inside the inner cut of the ditch. This sterile deposit was not consistent but was particularly noticeable in the north-east and south-west of the site, varying in depth from 0.02–0.25 m and lying over natural subsoil. The deposit may represent the disturbed base of an internal bank. While the ditch was allowed to fill and activity continued on site, the boundary line of the enclosure continued, suggesting the presence of a bank or fence. Later internal burials post-date the upper ditch fill. The concentration of burials within the line of an inner bank together with an atypical adult burial within the ditch, in a liminal location outside the cemetery, underlines this continuing demarcation. The existing road which bisects the site was largely built over made-up ground consisting of redeposited subsoil, up to 1.8 m thick along the southern portion of the road. Any bank remains would have been a readily available source of fill for this made-up ground level, which pre-dates the 1838 Ordnance Survey in the area (Illus. 7.3).

Internal pits

The excavation uncovered 47 pit and hearth features within the excavated interior of the site. These were mostly located within the possible line or toe of an inner bank in two loose clusters, inside the entrance and to the south of the interior (Illus. 7.4).

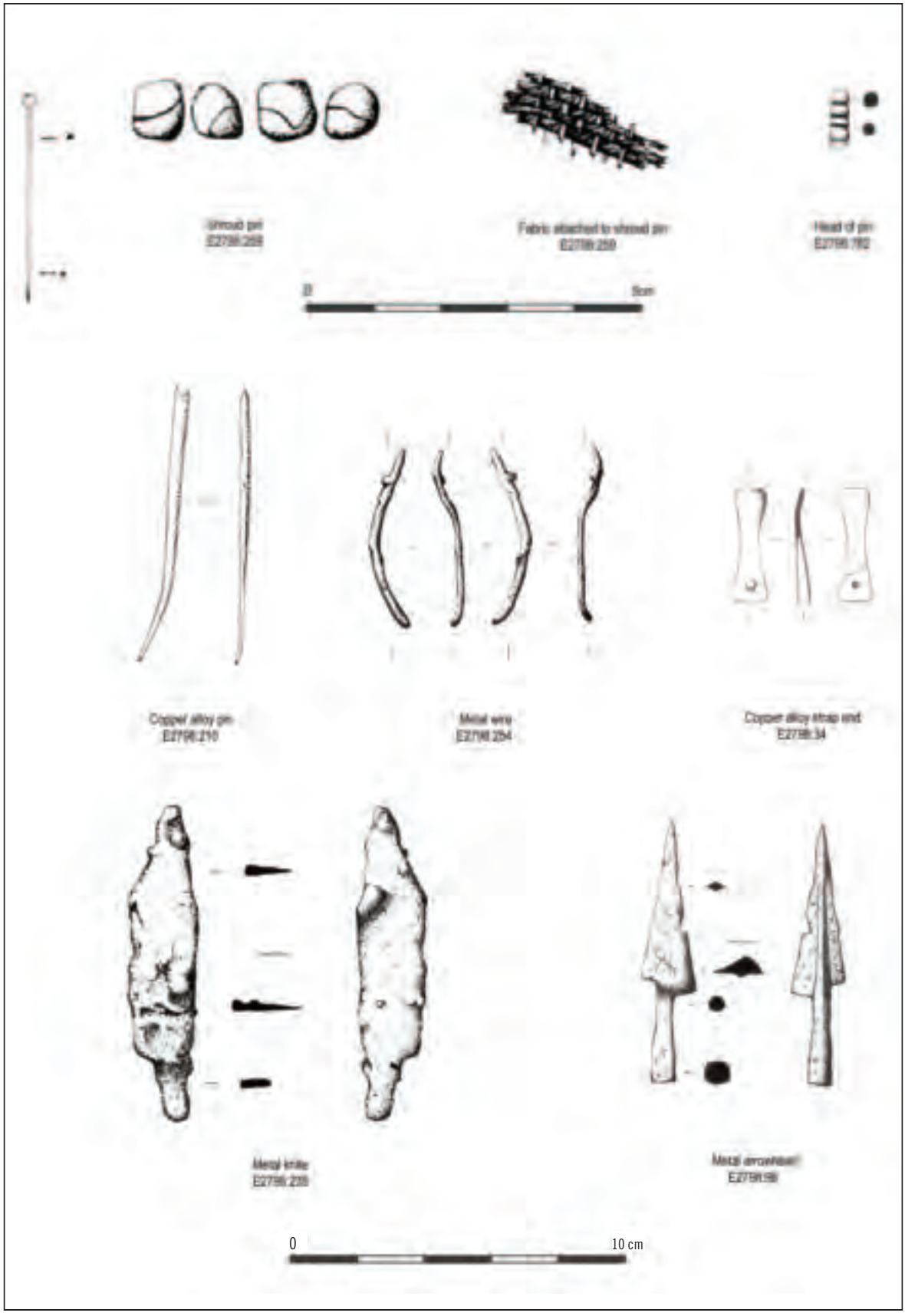
The fills were not diagnostic of original function and show how the practice of interpretation on the basis of fill alone can be skewed by residual activity. Many of the graves included metallurgical waste such as slag and tuyère fragments while human bone was present in all feature types. This mixing probably reflects the longevity and intensive use of the cemetery, with the inevitable mixing of deposits. The pits tended to have single homogenous fills with little variation between the individual features. Charcoal was a most common inclusion followed by human bone, then animal bone and waste metal residues. Archaeobotanical analysis did not highlight any unusual activity, with small amounts of barley, oat, wheat and rye present (Chapter 9, this volume; Vaughan-Williams E2798_Vol_2.pdf CD-Rom). Few identifiable artefacts were present in the pit features, but those that were recovered include a quern fragment (Find E2798:802; Illus. 7.7), copper-alloy pin (Find E2798:210; Illus. 7.8), bone handle (Find E2798:804; Illus. 7.9) and a residual chert flake (Find E2978:830). The artefact types were not diagnostic but are indicative of waste or rubbish across a broad date range.

Three pits were dated, (Appendix 1). Both northern and southern pit concentrations returned similarly early dates. The northern group contained both round- and flat-bottomed examples. A round-bottomed pit (C963) cut by the building yielded a date in the mid fifth to mid sixth century (cal AD 434–631, UBA-8360). However, the church also truncated an inhumation (C1015), which was dated to the eighth–mid 10th century, cal AD 711–942 (UBA-8364), suggesting that the building was significantly later than the dated pit.

An association may be present for the flat-bottomed pits and the church. These circular pits were concentrated immediately outside the building. The locations of the pits suggest an association with the building's construction, possibly concerned with lime mortar or similar activity. The round-bottomed pits may have had a final function for general waste, pre-dating both the church and its construction. The remaining two dates were from metalworking pits within the southern group.

Metalworking

There was evidence of metal extraction from ore, smelting, and smithing for the manufacture or repair of metal objects. Additional indirect evidence was present in the form of residues within grave



Illus. 7.8 *Selected metal artefacts from Ballykilmore.*



Illus. 7.9 Bone handle and fragment (Finds E2798:37, E2798:846); antler handle (Find E2798:804).

fills, for example slag and hammerscale. Two adjacent smithing hearth pits survive on the south-western side of site within the line of the enclosing ditch (Illus. 7.4: C139 and C137). Their location, in close proximity to the enclosure ditch, suggests that they would have been sheltered by an inner bank, possibly cut into the inner face of the bank. The hearths are likely to be contemporary with the fully open ditch. A radiocarbon determination from one hearth yielded a probable fifth- to mid seventh-century date (cal AD 435–655, UBA-8342) which correlates well with both the base fill of the ditch and particularly with a pit cut by the church structure (C963) and the first burials.

Direct metalworking evidence is evident again half a millennium later with two small smelting furnaces operating in the upper ditch fills. Unusually large fragments of tuyères were found in association with the furnaces (Appendix 3.pdf, CD-Rom). Bone from one of these furnaces was radiocarbon-dated to the 13th to 15th century, cal AD 1298–1407 (UBA-8368).

The presence of waste materials from metalworking throughout the burial and pit record emphasises the disturbance caused by ongoing interment. Repeated digging of the site for burial removed most of the direct evidence for metalworking and other activities. The distribution of metal waste deposits is mostly restricted to the enclosure ditch fill and parts of the interior, a pattern also observed at Rochfort Demesne (Chapter 6, this volume).

Internal structures

Two forms of structural evidence were present. The principal evidence lay in the remains of a rectangular stone building generally orientated east/west and interpreted as a church (Illus. 7.6). It was located in the eastern half of the enclosure and simultaneously cut through burials while also appearing contemporary with others. Other structural remains are suggested by an incoherent pattern of 20 post-holes and 13 stake-holes, located in the eastern half of the enclosure. The distribution hints at the presence of structure, the original pattern being removed by burials. The church helped distinguish the ecclesiastical nature of the later phase of the enclosure site.

The church survived as a wall footing located at the eastern edge of the enclosure's interior on gently sloping ground, slightly south-east of the local high point (Illus. 7.2, 7.4 and 7.6), some 5 m from the inner lip of the ditch and partially in the line of the entrance causeway. It was aligned on an east/west axis, and extended beyond the road corridor at its north-west corner, where it remains unexcavated. The structure measured 19 m by 7.45 m externally, representing a simple rectangular form. The foundation trench was generally straight-cut and flat-bottomed. A pronounced step in the base of the foundation trench was present towards the centre of the south wall. This variation suggested a remodelling or extension to the structure, however, it was not corroborated by matching evidence of a cross foundation. The trench at the south-west corner was not well defined, though the wall return was clear. The width of the cut varied between 0.98 m and 1.25 m, the eastern wall being the wider, while cut depth varied between 0.09 m and 0.37 m, being deepest at the east. The wall remnants were not bonded and had been partially robbed out. Surviving stones at the base of the foundation trench were large, occupying the full width of the trench. Smaller stones formed the wall base above these foundation stones.

The building compares in size to the surviving church remains at Clonfad (Chapter 8, this volume; Illus. 8.5), which measures 20.75 m by 6.70 m. However, there is no record of a church at Ballykilmore, just as the site of the graveyard is also unrecorded. The exposed foundation trench of the Ballykilmore church cut 20 inhumations, four pits and a stake-hole, so it was clearly not a primary feature of the site's function as a graveyard. The burials cut by the building were orientated between 240º and 259º, while the church building and burials associated with it fell between 260º and 279º.

Radiocarbon dating of a burial that stratigraphically pre-dated the church produced an eighth- to mid 10th-century date, and suggests a *terminus post quem* for the church. The date of cal AD 711–942 (UBA-8364) came from a skeleton (C1015) that had been disturbed by excavation of the wall foundations. A *terminus ante quem* for the church is tentatively provided by a layer of collapse that was subsequently cut through by the grave cut for skeleton C99, which returned a date of cal AD 1026–1251 (UBA-8340). A burial (C490), placed directly against the inner face of the north wall and contemporary with the wall footing, was dated to between the early 11th and the early 13th century, cal AD 1017–1206 (UBA-8351). Since the wall footing survived, it is possible for burials to be contemporary with the footing yet post-date general collapse of the structure.

Despite the presence of a later building, there was no clear indication from the ground plans of any structure consistent with an earlier church building. It may be anticipated that the remains of

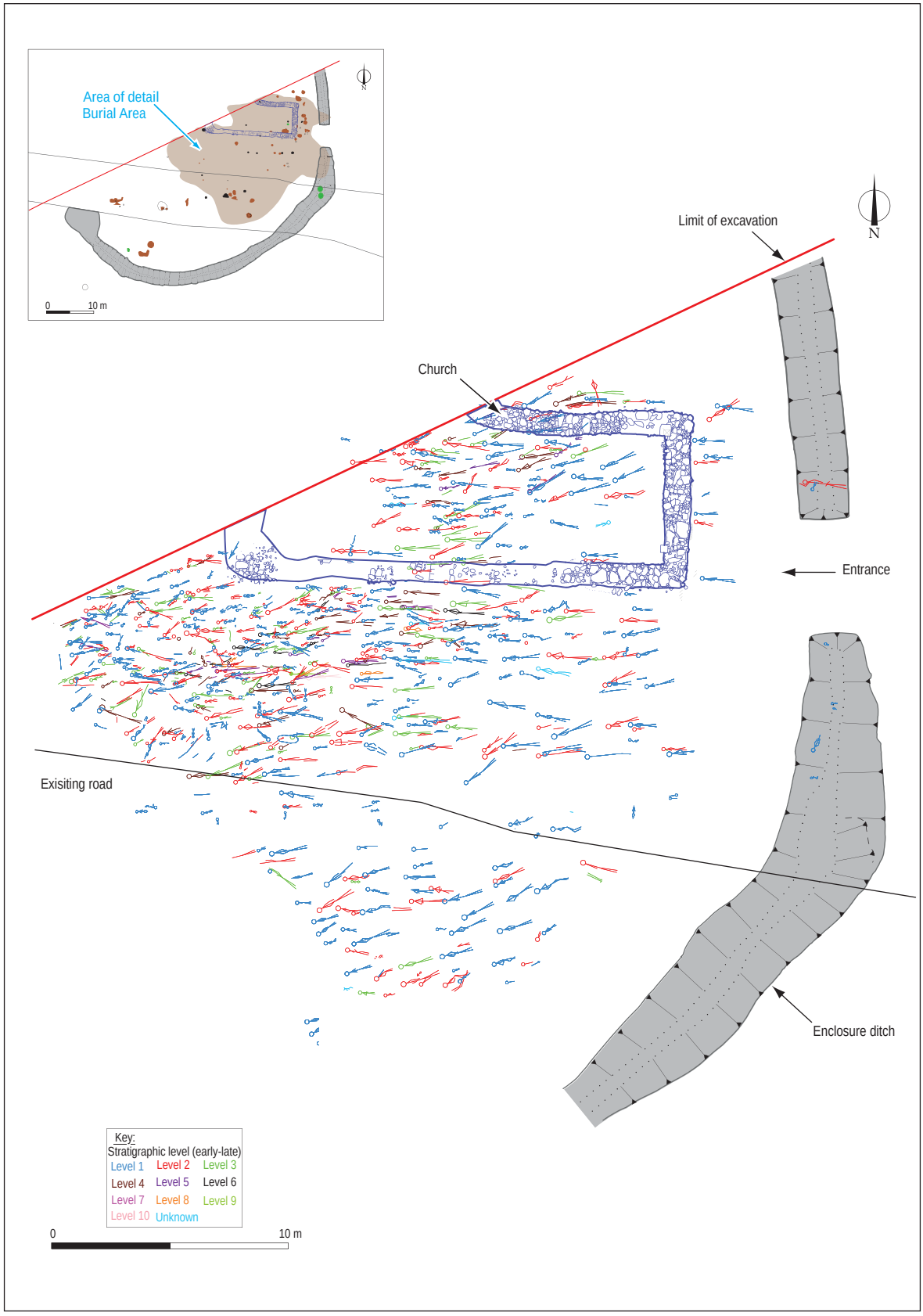
a smaller timber structure could have pre-dated the stone building, which seem to proliferate from the eighth to 10th centuries becoming widespread by the 11th and 12th centuries (Edwards 1990, 112; O'Brien 1992, 137). Mindful of the fact that the excavations were restricted to the southern portion of a larger enclosure, it remains possible that the unexcavated portion beyond the roadtake retains such evidence.

The burials

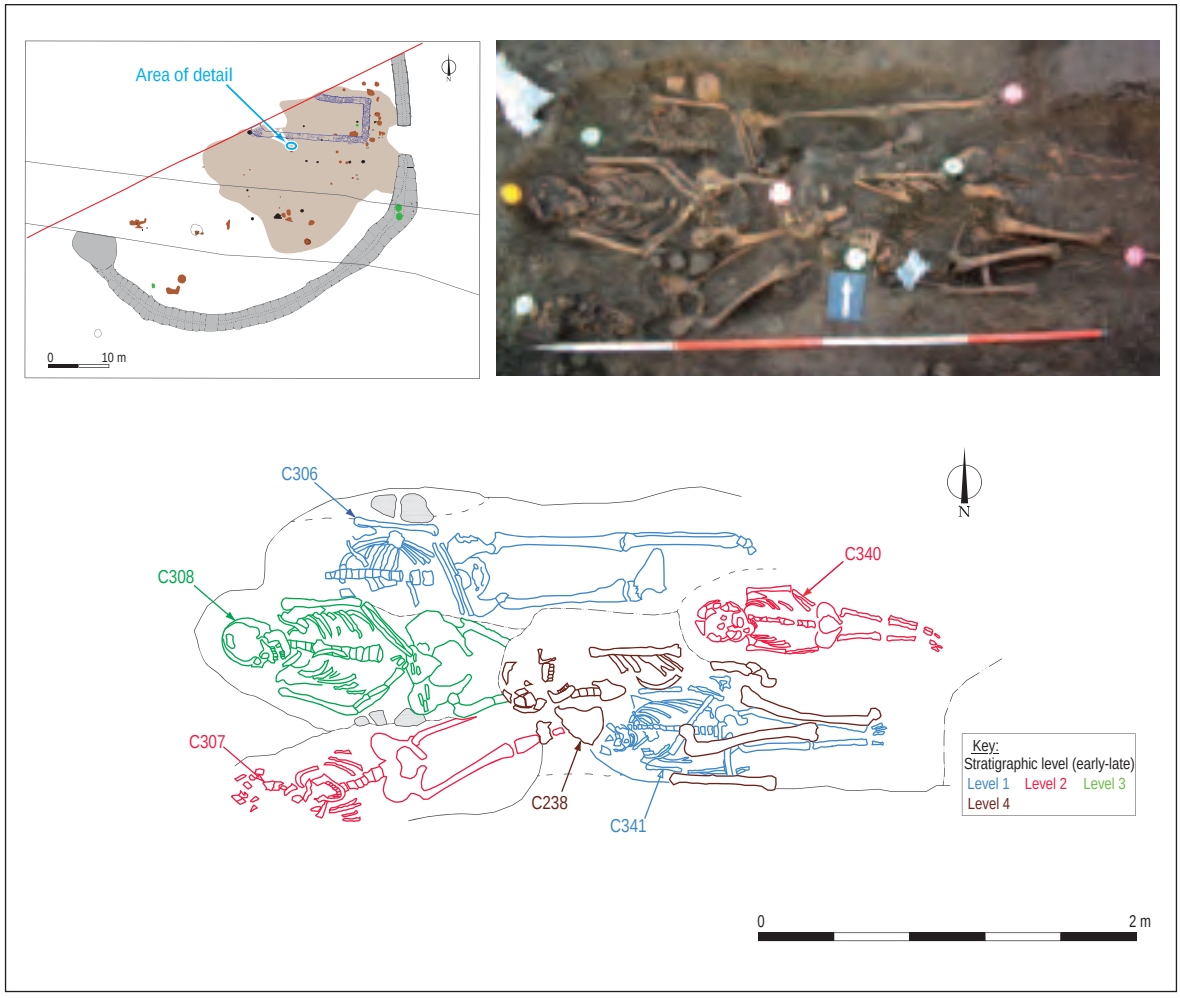
The enclosure was divided into two halves, with the eastern half accommodating the majority of burials and representing a cemetery feature in its own right. Formal and informal burial remains were recovered, along with atypical or deviant forms that may indicate a social response to individual circumstances. A total of 817 burials, including 85 redeposited bone clusters were excavated, and the burials preserved a total of 797 reasonably intact skeletons. The full count of burials is likely to be greater due to both burial disturbance and continuation of the cemetery outside the excavation, to the north. The southern, eastern and western extent of the burials was more clearly defined. To the south and east, the distribution of formal burials respected the enclosing ditch, and indeed stopped short of the ditch to indicate the former presence of an inner enclosure bank that would have been contemporary with the burials (Illus. 7.10). To the west, the limit of the burials coincided with a defined north/south centreline that separated the enclosed interior into its two respective halves. While the centreline clearly defined the westward extent of burial, the nature of activity in the western half was less clear because the deposits were compromised by later gullies and the later roadway. Furthermore, this division appears to have related only to burial activity, non-burial feature types being present throughout the enclosure's interior. Within the cemetery area, there was no obvious evidence for spatial patterning or chronological development. Radiocarbon dates from the western and eastern burials indicate similar 10th- to 11th-century date ranges (UBA-8349, UBA-8361 and UBA-8358) with the southern extent returning 11th- to 13th-century dates (UBA-8367) (Appendix 1; E2798_Vol_2.pdf, CD-Rom).

Continual burial activity led to multiple interments sharing the same space and the formation of an accretion layer, where ground level was raised over time by grave soil deposited onto the ground surface. Individual deposits or stratigraphic events within this layer were difficult to distinguish, as the layer comprised multiple grave fills, into which additional graves were cut (Illus. 7.10). The ground surface became indistinguishable from the accretion matrix developing on it; and while such interfaces have to logically exist and be accounted for in any stratigraphic sequence (*sensu* Harris), they could not be readily resolved at Ballykilmore. A more sensible interpretation is of one of a mixed layer that accumulated over time through the action of interment. The final burials were present at the base of topsoil, with no cut into subsoil.

Few graves were undisturbed, and the majority were cut by later burials, leaving stray clusters of bone (Illus. 7.11). Raising ground level and continued burial activity resulted in grave cuts being re-excavated and intact skeletons laid over each other within grave cuts; grave cuts were truncated by the later grave re-cuts. This led to an internal stratigraphy within the excavation where the various skeletons were categorised according to their level in a sequence. Skeletons categorised as Level 1 refer to burials that were not covered by a later inhumation. Level 2 refers to an individual with one inhumation above, etc (Illus. 7.10). Relative sequencing of interments could be derived but since these were generally truncated cut events there were no strata to link adjacent sequences; depth therefore was no indicator of chronology in this instance. The maximum surviving number of overlying burials was 10 (Level 10) and this was present in one example at the centre of the cemetery (C701).



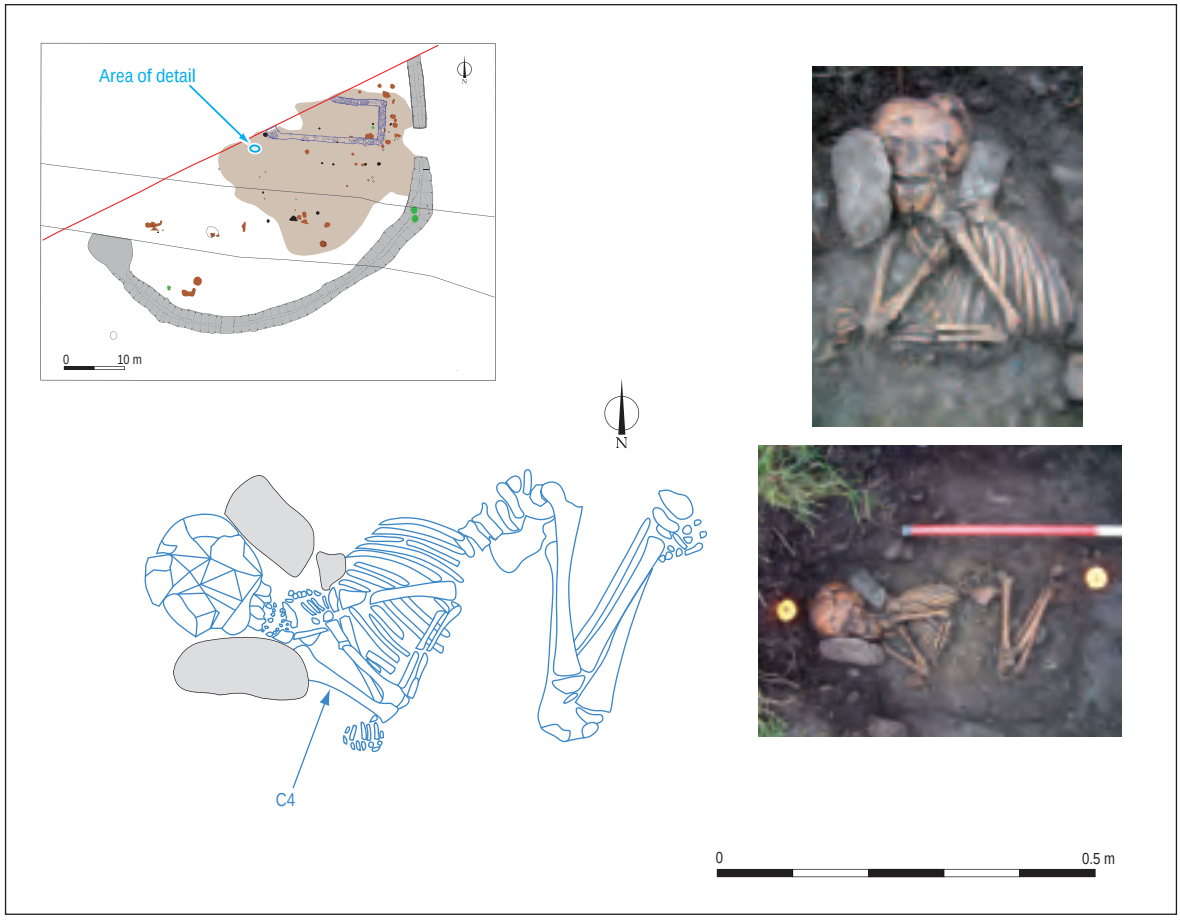
Illus. 7.10 *Distribution map of multiple superimposed burials at Ballykilmore (stratigraphic levels 1–9: indicates burial sequence within one plot).*



Illus. 7.11 Example of multiple superimposed burials within same plot.

Analysis of burial fashion and limb positioning did not reveal any discernable chronological or spatial pattern (Channing E2798_Vol_1.pdf, CD-Rom; Randolph-Quinney E2798_Vol_2.pdf, CD-Rom). The majority of individuals were supine (95%), and where limb positioning was discernable, most were placed in a simple extended position (56%). Extended burials with flexion of the upper extremities were apparent for 18% of individuals, with either or both hands placed on the body (upper limb flexion), 9% had lower limb flexion and 6% were fully flexed. There was no significant difference between age groups and gender in the proportion of bodies displaying a particular disposition, and no significant correlation between burial location or grave pattern and burial variables (Tables 3.17 to 3.21 in Channing, E2798_Vol_1.pdf, CD-Rom). The cemetery was open over a long period of time, retaining a remarkable consistency of formal burial. A slight variation around the standard 270º west/east burial was noted, most evidently in a distinction between the pre-church and post-church burials.

Some form of cranial lining was noted in 18.5% of skeletons. The majority of these were head side supports or 'ear-muffs', which were present in 15% of burials (Illus. 7.12). Radiocarbon dating of bone shows that results from two such individuals range from the early 11th to late 14th century, cal AD 1026–1251 (UBA-8340) and cal AD 1166–1379 (UBA-8339) (Illus. 7.13; Appendix 1). The supports consisted of two carefully placed side stones but in some instances disarticulated skulls



Illus. 7.12 Articulated burial with stone head supports dated AD 1166–1379.

were used to steady the head. Coffin nails were not associated with this grave type while shroud pins, though well represented on the site, were not usually found in position, but rather in disturbed grave fill. Head supports have been noted on other early medieval graveyards (O'Sullivan et al. 2008, 158).

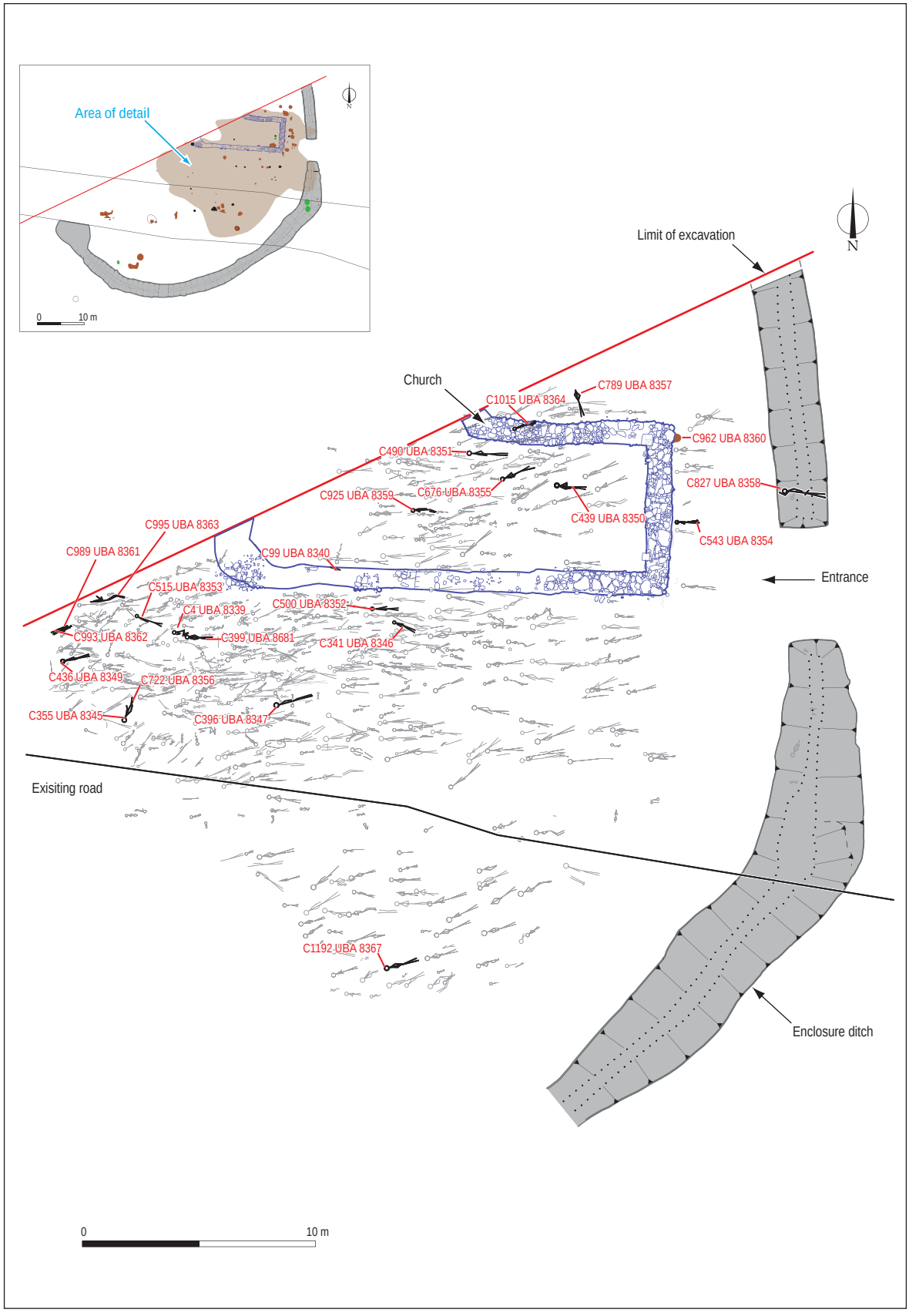
Several burials contrasted sharply from the norm. Such atypical or deviant burials are noted. elsewhere across medieval Europe and may be interpreted as a manifestation of necrophobia (Tsaliki 2008). The presence of dismembered human remains, where body parts have been removed from decomposing bodies to make way for new burials, contrasts with today's sanitised experience of the dead. The grave-diggers at Ballykilmore would have encountered soft tissue, strange odours, venting of decomposing gas, bloated and perhaps subtly moving bodies (Appendix 2.pdf, CD-Rom). Displacement of previous burials by the decomposing processes may have been considered evidence of a 'live burial' and possibly even viewed in medieval times as a 'rising from the grave'. It is in this light that post-mortem decapitation, face-down prone burial and the placing of stones over the body can be understood as a real fear of observed phenomena that would have been enhanced by the medieval psyche. While the fear of revenants, or ghosts, is considered to be based on the time lag between death and the arrival of the spirit at its final destination, it may also stem from observed movement of the dead (Barber 1988, 1–4; Tsaliki 2008, 5–8). In a superstitious world, death might not offer security from a wrongdoer, survivors might be harassed by a ghost or animated corpse, as chronicled in contemporary medieval texts by Thomas Map and William of Newbury (*Historia Rerum Anglicarum*, Book V, Chaper 24; Summers 1996, 78–82).

Prone burial

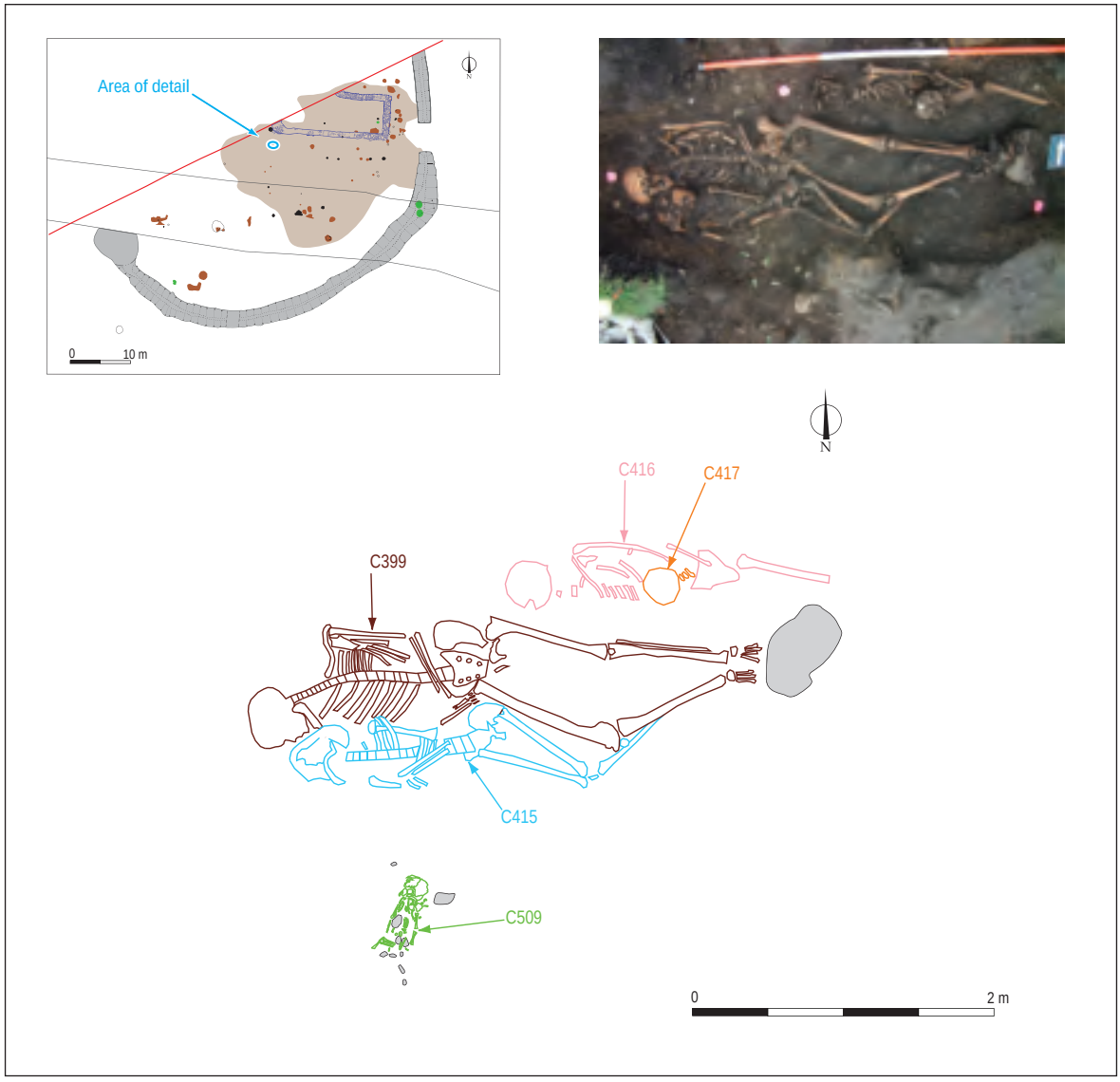
Two individuals in the sample were deliberately buried face-down in the prone position, (C995 and C331). Five other examples seem accidental and were comprised of neonates, either lying prone on the maternal pelvis or deposited as informal *cillín* events. One of the deliberately placed individuals, an adult (C995), was located at the northern limit of the excavation area, while the second, a juvenile, was located slightly south of the northern limit. The juvenile burial was partially truncated and the complete limb position could not be determined. The adult skeleton deserves further comment. It lay on its left side in a recumbent or prone 'sleeping' position; in this configuration the burial occupied a significant surface area compared to the economy of cuts observed elsewhere on the site. The skeleton was determined to be a middle-aged female (35–49 years of age), measuring 160 ± 4.0 cm in stature. It was oriented south-west/north-east, with the head directed towards the south-west. The cranium and the first two cervical vertebrae (atlas and axis) were truncated post-deposition, and a head-sized, rounded stone rested where the skull should have been. This may have been an attempt to replace the skull by the individuals responsible for the skull's removal; whether the removal was deliberate or accidental remains unclear. The mandible was present and in near correct anatomical position. The left arm was highly flexed with the hand positioned as though the (missing) skull would have been resting or cradled upon it. The right arm was flexed with the hand underlying the left elbow. Both legs were flexed, with the right directly overlying the left. From the lack of truncation of the closely underlying burial (C1000) and the wide area the burial occupied it is possible that (C995) was deposited or dumped into a shallow depression or pre-existing hollow, rather than into a formal grave cut. The lack of cutmarks or defleshing marks on the remaining vertebrae and presence of the mandible, (which tends to remain articulated to the skull at the tough temporomandibular joint for some time during decomposition), suggest that removal of the skull occurred after decomposition, rather than at the time of interment, i.e. the skull was removed some years after the initial burial took place. Burials in a prone position have variously been interpreted as deviant burials, reserved for wrongdoers or individuals considered dangerous to the community (Daniell 1997, 118–20; Lucy 2000, 80). While prone burial has a low incidence, representing less than 0.02% of medieval burials, it appears to be commonly present. A contemporary cemetery 35 km to the east of Ballykilmore at Johnstown 1, Co. Meath, also contained a single prone adult out of a total burial count of 461 individuals (Clarke 2010, 461). It has been noted that females comprise the majority of Anglo-Saxon prone burial (Harmon, Molleson & Price 1981, 187–8; Sherlock & Welch 1992, 26). This pattern, together with associated grave goods, has led to a suggestion that the individuals represent 'cunning women' (Meaney 1981, 249–62). The substitution of a stone head for the female at Ballykilmore is intriguing and may indicate an added fear of ghostly activity, but it seems extreme if substitution occurred some time after interment, necessitating an opening of the grave, unless the grave was discovered to be open. The situation might be explained by grave robbing. Possible evidence for grave probing may be present and appears to be recorded in various bone breaks (Appendix 2.pdf, CD-Rom).

Double burial

Two examples of horizontal double burial were encountered. Multiple vertical burial occurred across the site but in these examples, simultaneous interment could not be proven and use as a familial plot seems more likely (Illus. 7.11). Both simultaneous burials comprise a middle-aged adult male with a juvenile male in an extended supine position. The unusual burial arrangement can be explained in one case where a series of fine blade cuts was apparent (C399 and C415; Illus. 7.14). The cuts were delivered at, or close to, the time of death and some of these blows may have been delivered in a



Illus. 7.13 Distribution map of articulated burial showing location of radiocarbon dating sample.

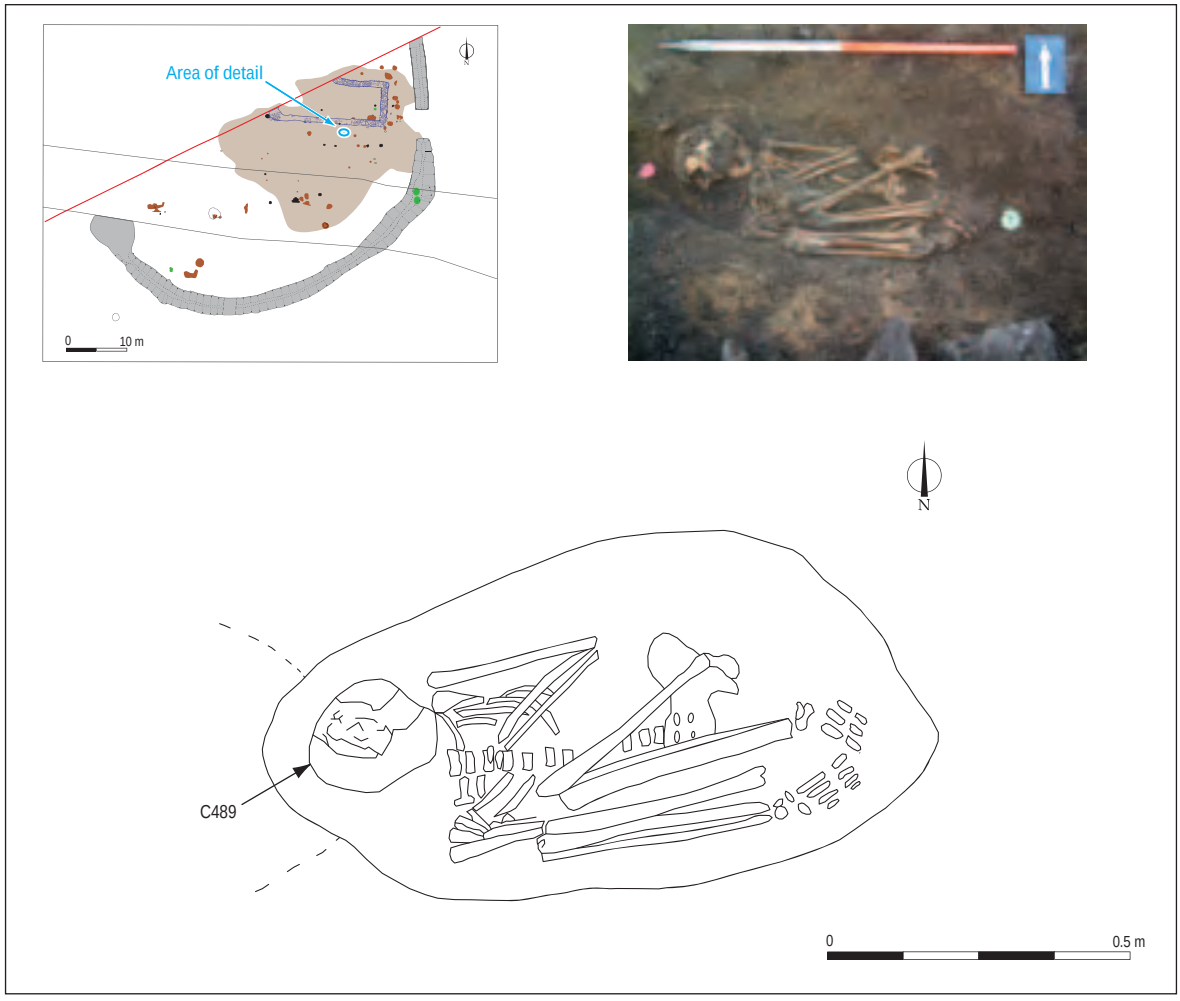


Illus. 7.14 *Example of double male burial of adult and juvenile exhibiting fine blade trauma.*

combative situation, as at least one of the blows constitutes a defensive wound; the remainder are suggestive of ritual dismemberment or execution with the victims splayed or extended in order to provide access to the neck and shoulder joints (Appendix 2.pdf, CD-Rom). Radiocarbon dating of the adult bone yielded a date range in the mid 12th to the mid 13th century, cal AD 1160–1258 (UBA-8681). Simultaneous death is more likely to be occasioned by a traumatic event such as execution. In such cases, same-sex interment could potentially indicate an offending relationship. Ballykilmore provides evidence for a double killing in the mid 13th century but the motive remains conjecture. Both double burials were afforded traditional burial positioning and none appears to be bound.

Tightly flexed

Although 11 semi-crouched burials were present only one lay in a tightly flexed fetal position. The individual (C489; Illus. 7.15) may have been bound prior to interment and no shroud pin or coffin



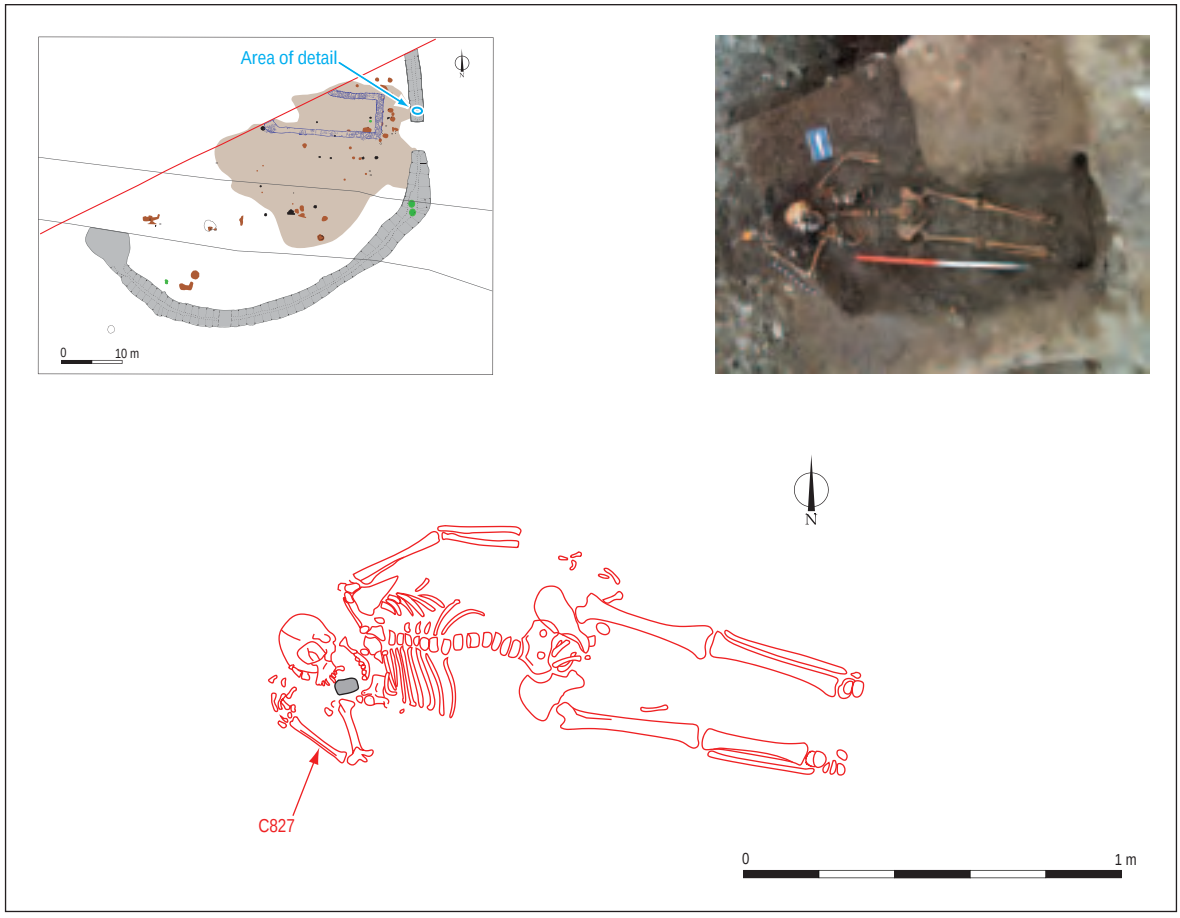
Illus. 7.15 Atypical tightly flexed burial.

nail was present to indicate a restrictive burial capsule. The inhumation truncated existing burials and is unlikely to be residual. The individual was probably female aged 16–19 years (Randolph-Quinney E2798_Vol_2.pdf, CD-Rom). Both the atypical burial method and possible binding suggest a social response to possible perceived miscreant activity. The grave was cut through a stony deposit so whether the stony grave fill is incidental or reflects a deliberate attempt to hold the body down remains conjecture.

Liminal burial

Post-medieval *cillín* cemeteries have been well documented and Ballykilmore is a further example of informal burial continuing after formal burial had ceased in the graveyard. The use of a boundary ditch to determine liminal or marginal location may reconcile the concept of a *cillín* both as a marginal space (Finlay 2000, 407), and as contemporary or continued use of the same site for formal mainstream burial. Both can be true if a physical or chronological boundary is created.

Ballykilmore differs from other sites in preserving liminal activity from medieval times. An adult female (C827; Illus. 7.16, Appendix 2.pdf, Illus. A2.3) with a stone seemingly placed in her



Illus. 7.16 Liminal atypical female burial within enclosure ditch.

mouth together with an associated foetus (C946) were deposited in the ditch fill. The inhumation lies outside, on the edge of the cemetery but is contemporary with its formal use and is broadly dated to the 10th century. The grave cut was uneven, and the limbs were unusually positioned, suggesting expedient burial. This burial artefact is reminiscent of European vampire folklore that is recorded from Roman times. Philostratus, in the second-century *Life* of Apollonius refers to such entities: '[b]ut Apollonius [of Tanya] insisted and would not let her off, and then she admitted that she was a vampire, and was fattening up Menippus with pleasures before devouring his body, for it was her habit to feed upon young and beautiful bodies, because their blood is pure and strong', (Book IV, Chapter 25 translated by Jones 2005). Similar entities are described in Irish myth; one such lady, known as Dearg-due or red blood sucker, returned from the grave to suck blood from the living by employing a variety of seductive techniques to lure men to the grave. She is reputedly buried under Strongbow's tree in Waterford. A further Irish example lies in the legend of Abhartach, one of the walking dead (Curran 2005, 65).

Such fear of revenants, of a ghost or animated corpse harassing the living, was very real in the medieval mindset and is documented in English medieval literature. The 12th-century English historian and Augustinian Cannon, William of Newbury notes that, "[i]t would not be easy to believe that the corpses of the dead should sally (I know not by what agency) from their graves, and should wander about to the terror or destruction of the living, and again return to the tomb, which of its

own accord spontaneously opened to receive them, did not frequent examples, occurring in our own times, suffice to establish this fact, to the truth of which there is abundant testimony" (William of Newburgh: Book V, Chapter 24; Stevenson 1861).

Ballykilmore offers a more prosaic basis for the fear and the cultural response to it. The intensity of burial coupled with good preservation of soft tissue would have occasioned frequent interaction between the living and decomposing corpses. The decomposing process can cause bloating with putrefaction products reminiscent of oozing from the mouth, an unnerving sight, possibly interpreted as a vampire (for additional discussion see Appendix 2.pdf, CD-Rom). The placing of a stone in the mouth may have been thought to starve the creature. The example at Ballykilmore did not record evidence of any reopening of the grave of the female placed in the ditch; it is unlikely that this would be visible in the stratigraphic evidence. Thus it is not certain whether the stone was placed in the mouth at the time of burial or at some later date. The unusual limb positioning is interpreted as an example of expedient burial and it is possible that this expediency is the result of reburial in the ditch after initial burial within the enclosure but before soft tissue decomposition.

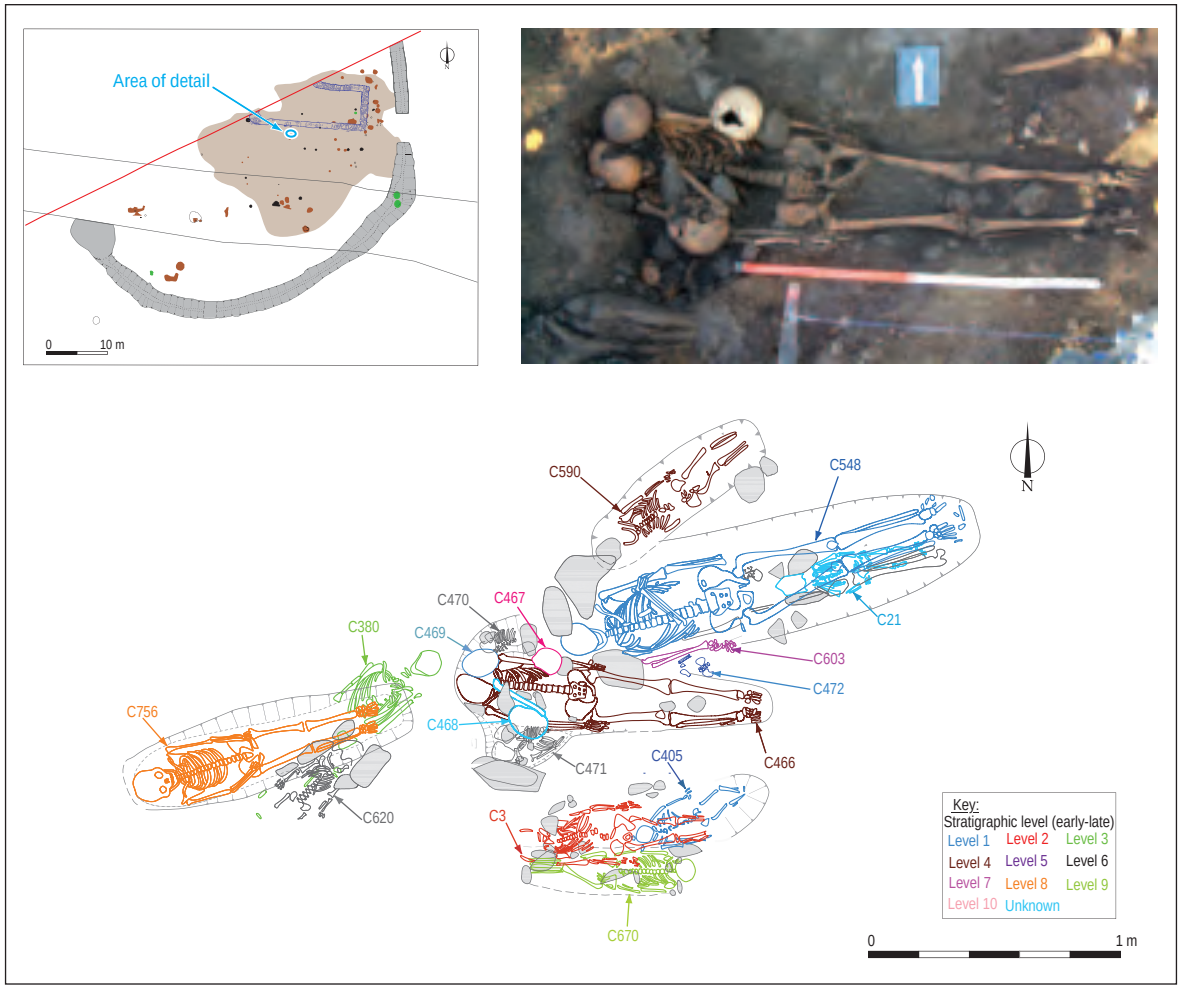
Post-mortem movement

States of preservation varied but in general the human remains were moderately well preserved. Some remains were unusually well preserved; fragments of head hair and connective tissue were present on one inhumation (C295), located at the topsoil base, and radiocarbon-dated to cal AD 1495–1795 within the early modern period (UBA-8359). Soft tissue would have been frequently encountered by Ballykilmore grave-diggers, though at a much earlier stage of decomposition. While there is evidence of respect for existing burials, there are also examples where decomposing bodies were dismembered. Portions of skeletons, in anatomically correct positions, were relocated. Some connective tissue was present to retain correct anatomical positioning as was the case with a skull (C88) together with five articulated cervical vertebrae, arranged vertically, which were moved and placed over an articulated left elbow and wrist joint, probably derived from the same individual (Appendix 2.pdf, CD-Rom). The articulated nature of these remains suggests that they were derived from a primary deposit whilst still bearing flesh, muscle, or connective tissue, and were probably disinterred shortly after burial. The degree of connectivity may have been limited, as no cut marks were noted on the bone to enable separation.

Frequent reworking of skeletonised burials is apparent in the amount of disarticulated human bone, especially in clusters of bone, found within grave fill. In some cases spare skulls were used as head supports for later interment (C466; Illus. 7.17). Avoidance of underlying inhumations is also apparent. In one case, the grave cut for a perinatal burial (C402) encountered the legs of an earlier adult inhumation (C396). The spade marks of the grave-digger are clearly evidenced just above the knee joints of the adult; the digger did not penetrate the earlier burial, and deposited the infant remains directly onto the skeletonised legs of the adult.

Shroud pins and nails were occasionally present, but the majority of burials (87%) recorded no evidence of a burial capsule. Only occasional finds were present to suggest interment in clothing rather than a shroud or coffin. A metal buckle, for example (Find E2798:113), was associated with burial, but such associations were rare.

Few artefacts were found in association with the skeletons. Ninety seven per cent of the artefacts found in direct association with a skeleton consisted of shroud pins and coffin nails. The remaining artefacts suggest residual deposition as evidenced by the inclusion of slag within grave fill. Similar patterns can be observed at contemporary cemeteries, for example at Johnstown 1, Co. Meath (Clarke 2010, 65).



Illus. 7.17 Multiple articulated burial using disarticulated cranium as head support.

Post-medieval

The site was truncated by a road. Two layers of cobbled surface were present beneath the modern tarmac surface with a stone kerb surviving on the southern side. The kerb remains occasionally visible along the roadside to the east. The road was cut into the natural slope. The northern side was cut into the site with the southern side running over formed ground. Gullies and services associated with the road truncated burials. A series of linear features to the south of the site marks the remnants of a Georgian farm, partially recorded on the 1838 six-inch map. Gully features to the north of and parallel to the road cut several burials but also had subsequent burials set into their fills. These infant inhumations occur late in the site and may be as late as the 18th or 19th century as artefacts from this period also occur in the gullies.

Artefacts

Metal artefacts

Analysis by Jacqueline Mac Dermott

The 324 coffin nails and 105 shroud pins form the majority of metal objects present on the site. The coffin nails were generally found in close association with an inhumation; this was the case with 284

of them. The nails consisted of both square and rectangular heads, but the distinction was often tenuous. What was more apparent was the broadness and narrowness of the heads in relation to the shafts, and the nail size, which produced quite noticeable variation. Due to this, they were separated into four broad types, within which they were further categorised by head and shaft type, (Mac Dermott E2798_Vol_1.pdf, CD-Rom).

The shroud pins had round shafts with wire wound heads and, where complete, range in length from 19.8 mm to 31.1 mm; they appear to date from the 13th to 19th centuries. While the assemblage could be divided into two typological variations based their size, there was no matching variation in their distribution (Mac Dermott E2798_Vol_1.pdf, CD-Rom). The remaining assemblage of 100 artefacts represent tools, leather and metalworking, together with domestic and dress items, three arrow heads and multi-functional items such as knives (Illus. 7.8). The identifiable finds are from mixed contexts such as grave fills or topsoil which, together with the length of time during which the artefact types were fashionable, makes it difficult to phase the associated site activities (Mac Dermott E2798_Vol_1.pdf, CD-Rom).

Three arrowheads were discovered; one in topsoil (Find E2798:75), one in a pit within the church (Find E2798:98), and the third in the grave fill of an infant (Find E2798:245). All are triangular-bladed and socketed with small narrow blades and a rounded midrib, with one (Find E2798:245) bearing the remains of barbs. Although they resemble the medieval arrowheads found at Waterford and Dublin (all but one of the 11 Waterford examples dated from the 12th–early 13th centuries), triangular- bladed types are known from a variety of sites ranging from the 10th to the 15th centuries (Halpin 1997, 540–3, fig. 15:26; Mac Dermott E2798_Vol_1.pdf, CD-Rom). Barbed varieties are usually considered to be hunting weapons. However, Halpin (1997, 541) argues that narrow triangular blades would be effective in combat against an unprotected enemy, and suggests that the majority of this type of arrowhead found at Waterford could have been used for military purposes. While either function would fit the Ballykilmore evidence, as wild animals are represented in the faunal record and possible combat trauma is present in the burial record, the incidence of both activities is low and perhaps commensurate with the count of arrowheads.

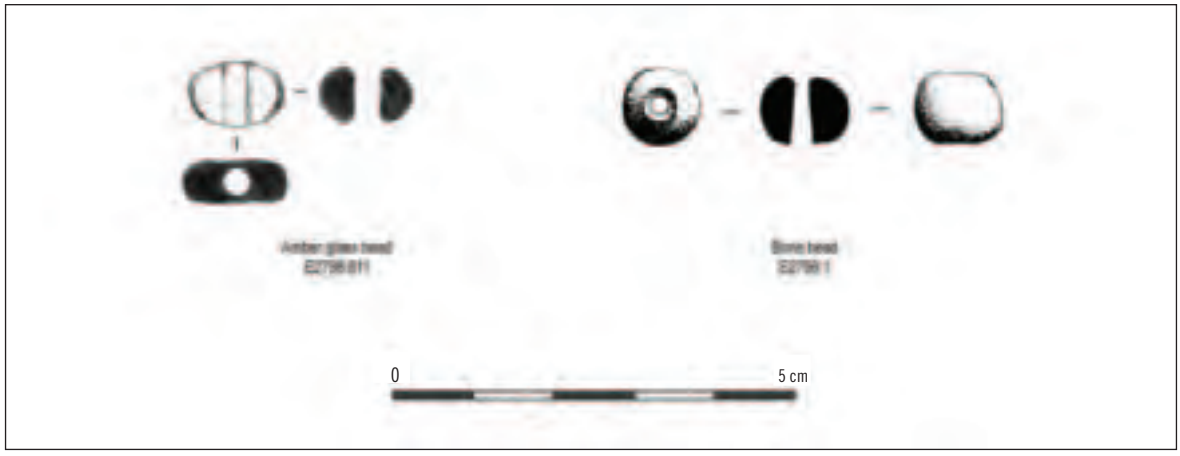
One curious object, recovered from the same deposit within the church building (C206) as one of the arrowheads, can be interpreted as a split-end strap end (Find E2798:34; Mac Dermott E2798_Vol_1.pdf, CD-Rom). It is a plain copper-alloy strap end that tapers from a straight-edged base with rounded corners, before expanding out again to the split terminal secured with a rivet. The shape resembles that of an iron version from Cheddar, thought to date from the early 10th–11th centuries (Goodall 1979, 271). The exact function of these strap ends is unclear with suggestions ranging from an association with clothing to bookmarkers, because of their abundance on ecclesiastical sites (Hinton 1990, 500).

The remaining metal artefact assemblage can find parallels at Clonfad and Rochfort Demesne, featuring seven knives including both whittle and scale-tanged examples, two buckles, four awls or tanged punches and two needles (Mac Dermott E2798_Vol_1.pdf, CD-Rom).

Glass

Analysis by Cecily Cropper

Glass finds consist mainly of early modern bottle fragments. However, 14 glass beads were uncovered, two of which may be medieval in date (Illus. 7.18). The remaining beads were found in association with each other, are amber in colour, and are considered to be early modern (Cropper E2798_Vol_1.pdf, CD-Rom). The beads may represent a tallying device used in prayer, though in the early medieval period this would more likely consist of 150 beads representing the psalms in the bible



Illus. 7.18 Amber glass and bone beads (Finds E2798:811, E2798:1).

and refrained in 'divine office'. The small number of beads might suggest Rosary beads, and perhaps a post 12th-century date based on the traditional association with St Dominic, though tallying prayers pre-date this legend (Beebam 1996; Miller 2002, 87). Since the count of beads does not fit with either a full or short single-decade bead set, it seems most likely that the beads are from a simple necklace.

Stone artefacts

Analysis by Ian Riddler & Nicola Trzaska-Nartowski

Two quern stone fragments were present at Ballykilmore (Illus. 7.7). One undecorated fragment (Find E2798:802) was present in a late pit (C1235) cut through the enclosure ditch. The second comprised a decorated upper rotary quern-stone (Find E2798:32) featuring a raised rim and an upper surface embellished with two curved lines and a concentric circle pattern, found within a collapse layer inside the church structure (C206). The closest parallel for the decoration on the Ballykilmore quern comes from a beehive quern from County Galway (Caulfield 1977, fig. 28B). It is unlikely that any direct connection should be made but the Ballykilmore fragment is further indication of the complex designs that were applied to rotary querns in the medieval period.

Worked bone

Analysis by Clare McCutcheon, Nichola Trzaska-Nartowski and Ian Riddler

Bone was used as a base material for three composite combs, two handles, pins, a bead and a possible toggle, while two items are off-cuts from bone working (Illus. 7.9; McCutcheon E2798_Vol_1.pdf, CD-Rom). Typologically the combs conform to Dunlevy's Class G, with metal rivets holding the side plates to form single-edged composite combs (Dunlevy 1988). They are broadly dated to between the 12th and 14th centuries. The Ballykilmore comb fragments were found within disturbed contexts, either unstratified topsoil (Find E2798:64) or grave fill associated with a disturbed skeleton (C869, Find E2798:357). Similar artefacts are present at Clonfad (Chapter 8, this volume) with fragments of five combs present within the Clonfad outer enclosure ditch. The Clonfad pieces appear to pre-date the Ballykilmore examples, fitting typologically into Class D, using bone rivets and probably dating to the fifth to the 10th centuries. Excavations at Rochfort Demesne (Chapter 6, this volume) also uncovered the remains of two combs that fit classes D3 and G. Curiously, the base material for all these combs was cattle bone which contrasts with the predominance of red deer/antler used at other sites. Antler bone is considered to be a superior material for comb-making (Antler&bone.pdf, CD-Rom). Red deer is present in the faunal remains recovered from Ballykilmore, Clonfad and

Rochfort Demesne, though in small quantities, and provided the antler material for two handles at Ballykilmore, both of which are unfinished (Finds E2798:37 and E2798:804). Further evidence of antler working was apparent at Ballykilmore with a part of a red deer antler tine, partially sawn and then broken off the rest of the tine found in grave fill (Find E2798:604, from grave fill around skeleton C1001). Further evidence of bone working, a simple shaving of bone (Find E2798:44), is comparable to similar finds at Clonfad (Antler&bone.pdf, CD-Rom).

Artefact discussion

The range of artefacts includes parallels from both Rochfort Demesne and Clonfad. While motif comparison can be suggested with Iron Age parallels for the decorated quern-stone and possibly one of the iron knives, the majority of the finds fit comfortably into the early medieval and later periods. Their distribution extended across the site but they were more concentrated in the eastern part. Although many of the objects were present within grave fill they are not grave goods, in the sense that they were not in close contact with the skeletal remains. It is more likely that they represent residual or waste items deposited on the site. A range of activities is represented including leather and bone working, hunting/combat, personal dress/hygiene and general domestic activity, suggesting a combined function of space for both living and dead.

Discussion

From its inception, domestic and burial activities were intermixed at Ballykilmore, but more definite evidence for settlement was not proven. Two disconnected internal pits were dated and both yielded a remarkably similar range of dates centring on the sixth century (UBA-8360 and 8343). The earliest dated inhumation, probably fifth century, is radiocarbon-dated to cal AD 395–578 (UBA-8352) and was the second earliest burial in a sequence of seven overlying burials; it is consequently not the first burial on the site. While the earliest burial appears to marginally pre-date both the basal deposits within the enclosing ditch (references UBA-8352 and 8342 respectively) and the earliest pit activity, the statistical translation of radiocarbon dates to calendar years means that it is possible that all were contemporary. The ditch date represents a *terminus ante quem* and the first burials may be contemporary with the excavation of the ditch. The latest dated burial, 15th to 18th century, cal AD 1495–1795 (UBA-8359), confirms use of the formal graveyard for over 1,000 years and is post-dated by final informal *cillín*-type interments.

The early dates for this site place the origins of Ballykilmore in the fourth to sixth century, during the Conversion period. It may help to explain the two examples of possible Iron Age motifs observed in the small finds assemblage. The presence of Iron Age activity in the landscape was noted within 100 m of the excavation, at an adjacent site also excavated by this road scheme, which produced a date of cal AD 1–125 (UBA-8335, E2711, Hardy 2009). The Iron Age pin from Rochfort Demesne, as well as a fibula from Clonshingle (NMI 1984:12) to the south of Lough Ennell, helps to broaden the background (Chapter 6, this volume). Our understanding of the Iron Age and its chronologies continues to develop, and our insight into the archaeology of the Conversion period is still quite narrow. The sequence of dates and the range of activity witnessed from the very early stages at Ballykilmore provide a useful insight. The radiocarbon sequence indicates the contemporary nature of the enclosure, with its pits and metalworking, and burial activity from its beginnings. The site was enclosed relatively simply, and while the stratigraphic sequences in the western part of the enclosure were in part compromised by later works, there remains a consistent observation of formal burial remains from the eastern half only, suggesting strongly that it represents a spatial distinction within the site.

The deposition of archaeological strata through burial across the site has conversely had a severe impact on much of the underlying record, leaving only short chains of intelligible stratigraphy. Any settlement was eventually subsumed in the eastern part of the site by the cemetery, probably by the 10th century, when the ditch had been largely filled in, and possibly much earlier. The church was constructed after the eighth to 10th century and was probably in use during the 11th or 12th century, although the *terminus post quem* is less certain. The stone building is not necessarily the first church building. The cemetery had been established for many generations by the time it was built and the slightly varying burial orientations suggest alignment to earlier structures. Though the formal site fell into disuse in the early modern period it retained an aura of sanctity explaining its continuation as an informal cemetery or *cillín*.

The cemetery population, as described by Randolph-Quinney (Appendix 2.pdf, CD-Rom; E2798.pdf, CD-Rom), suggests a stable, rural population, interring the dead regularly over many centuries. This was predominantly an agricultural community, with many skeletons showing evidence for a life of hard manual labour. However, towards the later phase of the cemetery, during the post-medieval period, a pattern of informal and young burials was observed. Occasional unusual treatment of the dead was also encountered within the burial record. Exclusion from the main cemetery population was evident in the 10th century. The nature of the adult female (C827) interred in the enclosure ditch suggests some possible causes. She was heavily pregnant and exhibited an abnormality to the rear of the skull, probably the result of craniostenosis (Randolph-Quinney E2798_Vol_2.pdf, CD-Rom). Did a pregnancy outside contemporary social mores exclude her from the formal cemetery? While the archaeological record of *cillíní* sites indicates an early modern date (Donnelly et al. 1999, 109–13), Ballykilmore shows that liminal burial was present in medieval Ireland as well.

Ballykilmore reflects the commonplace, where people died young but not usually in gruesome circumstances. Deliberate skeletal trauma and burial response to special circumstances are both extremely rare. Skeletal indicators of hard physical work are common and death was probably occasioned by illness such as flu (Appendix 2.pdf, CD-Rom). Compassion for the individual dead at Ballykilmore was important. Repeated use of single graves was evidenced with superimposition of later burials within the same or similar cut, possibly indicating familial ties. Many of the graves show the time and effort invested in their construction, with deliberate placement of the bodies within, whether coffin-contained, shroud-wrapped, or unenclosed. Ballykilmore provides a burial record stretching over a millennium. During this time the burial rite remains remarkably consistent apart from a relatively brief fashion for head supports. For the most part, the burials exhibit little evidence for status distinctions.

The final chapter in the history of Ballykilmore is in its disappearance. One of the exciting aspects of the NRA-administered archaeological programmes in recent years has been the observation of new site types, which emerge because the roads are deflected away from known archaeological sites. The information that is now coming to the surface is helping to change our perspectives of former landscapes. Recent excavations occasioned by large infrastructural projects and which avoid known archaeological sites, have begun to show burial and settlement sites where there was no evidence previously. The same is true at Ballykilmore. The presence of the early medieval burial and settlement site was unknown. The osteological analysis clearly supports the archaeological discoveries of an extended burial ground in use throughout the Middle Ages by a persistent group of local agriculturally based people. Yet the narrative of this community had been lost. It begs the question of how many other burial grounds exist that remain to be discovered. It also raises questions concerning the social dimensions that may have existed between burial grounds; between those who were buried in monastic and parish centres, and those who were buried in community graveyards that have long since been deserted and forgotten.

8

CLONFAD — AN INDUSTRIOUS MONASTERY

Paul Stevens

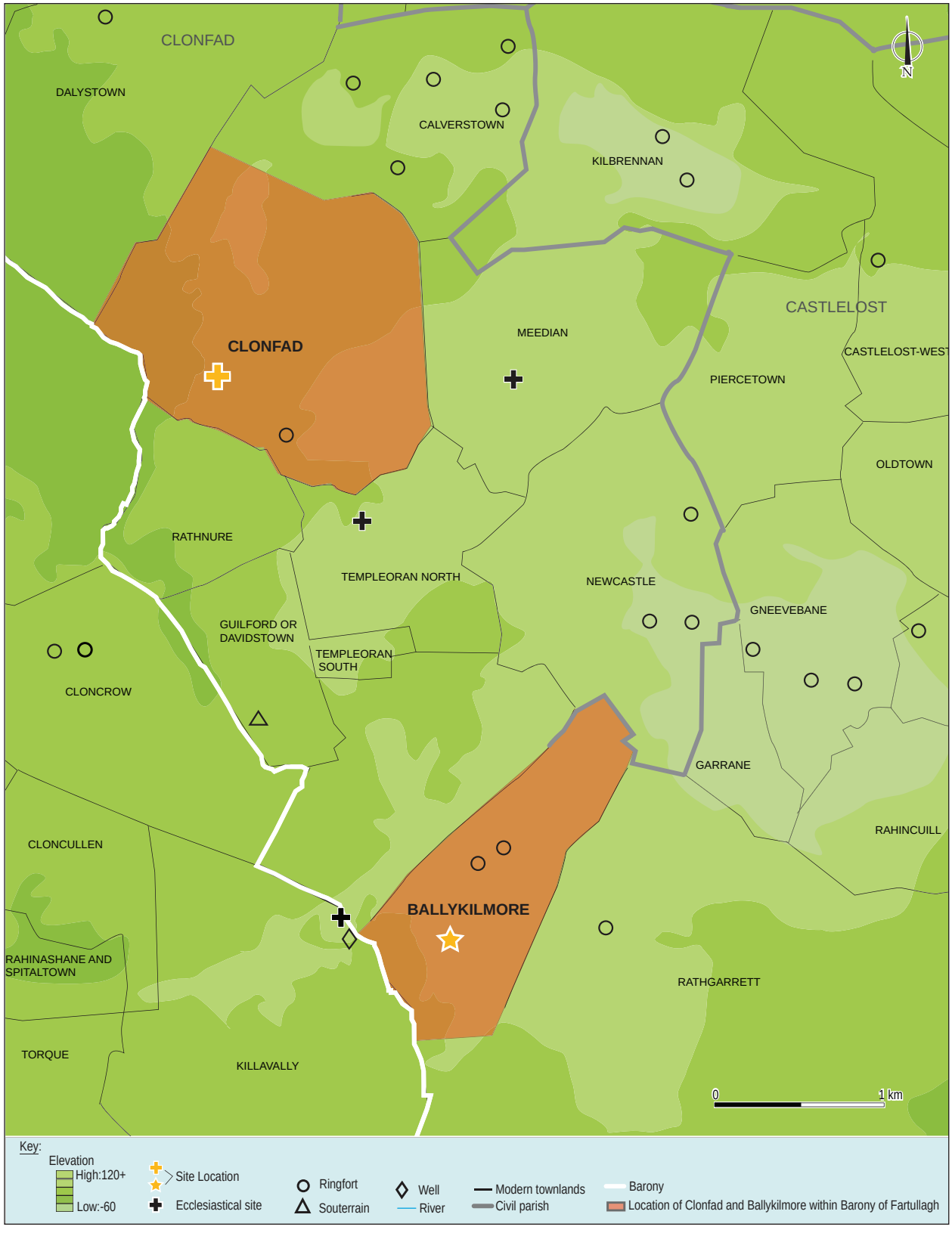
Realignment of the improved N52 link road sought to avoid a known rural church and graveyard at Clonfad. In sweeping east and south of the church site however, the new route encountered a previously unknown series of earthwork enclosures that formed part of a large monastic *vallum*. It is now clear that the church and graveyard represent the core of an early medieval monastery, which lay within a large monastic trivallate enclosure. Evidence has shown that the site dates to between the sixth and ninth centuries and was situated beside a small brook, expanding over time to enclose an area of 4.54 ha. A number of significant features and artefacts were recorded at the site, including unique evidence for monastic handbell production from one of the largest collections of iron-working assemblages found in Ireland to date. The discoveries at Clonfad provide the first direct evidence of brazing as the technique used for handbell manufacture, and also provide the earliest date for their development and use in Ireland.

Location, topography and placename

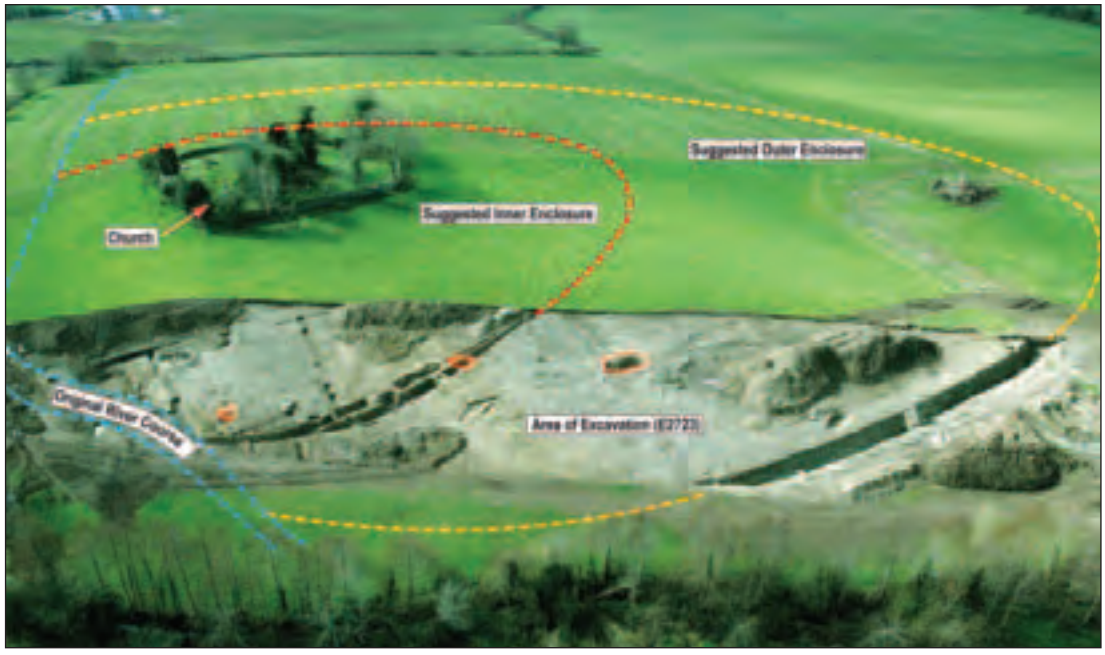
Clonfad is located in undulating countryside that is dominated by eskers and covered with a mantle of fertile soil. The monastery is located to the south of Lough Ennell and east of the River Brosna, some 3.5 km north of Ballykilmore, and is in an area that Connon (Chapter 4, this volume) has argued formed the western border region of the Fir Tulach territory (Illus. 4.1). The site sits on a slight elevation (c. 100 m OD) that forms a low elongated esker or hillock, which is aligned north/south. The topography is remembered in the placename *Clúain fóta fine*, 'long meadow', which gives its name to both townland and parish (ibid.). In this way, Clonfad shares a pattern of naming in early monastic sites, such as those of Clonmacnoise, Clonfert or Clonard. Here, the use of a promontory of high or dry ground is often bounded by rivers or, as in the case at Clonfad, bogland.

Clonfad was originally bounded by low-lying bog or marshland to the west and north-east. Proximity to such wet ground was important to the activities conducted at the site, as will become apparent. The drier ground on the Esker Ridge provided ready access to the ancient routeways such as the Slíge Mór (ibid.), thereby connecting Clonfad with Clonmacnoise and Clonard, and more locally with Ballykilmore, Meedine, and Templeroan (Illus. 8.1). The site was therefore positioned to take advantage of the topographic variables in the area.

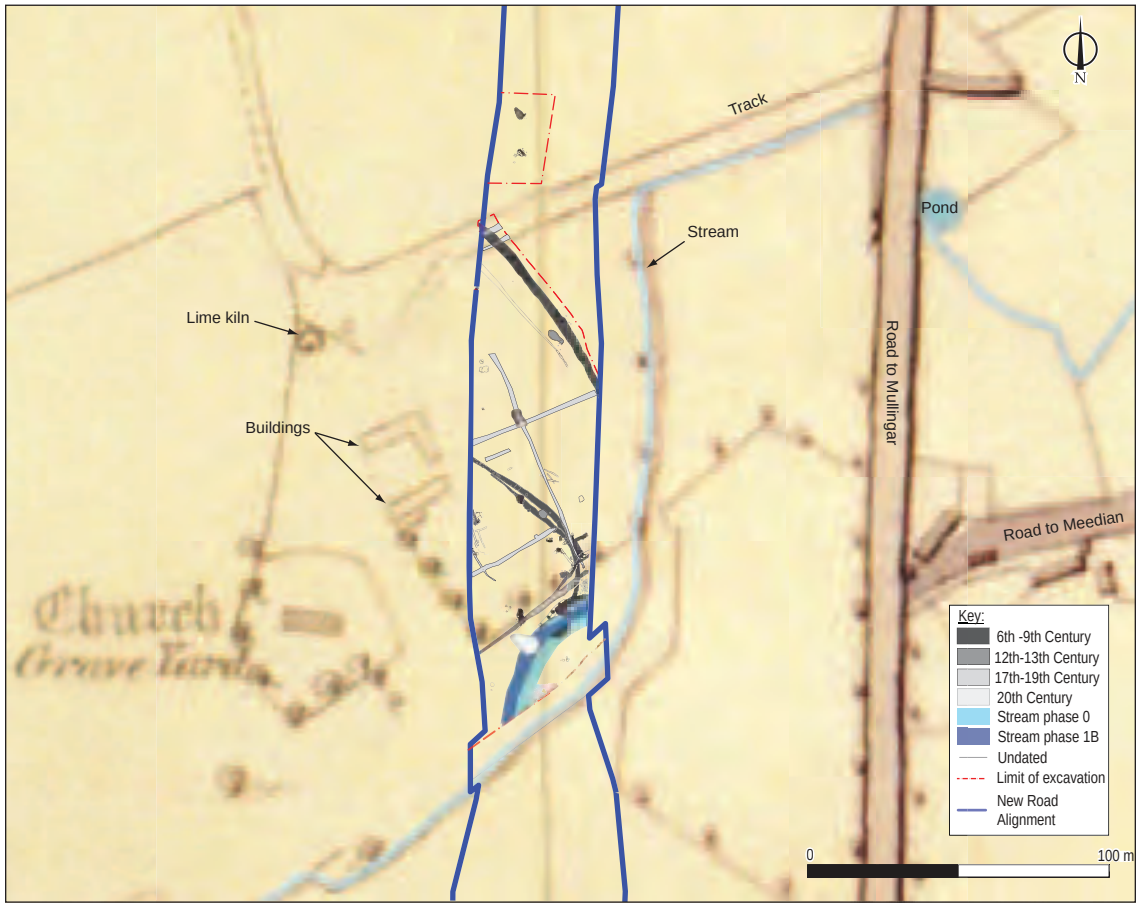
Excavation at Clonfad took place on the south-eastern slopes of the esker (Illus. 8.1, 8.2, 8.3, 8.4). Prior to excavation in 2004, the site was in use as pastureland and located within a single large



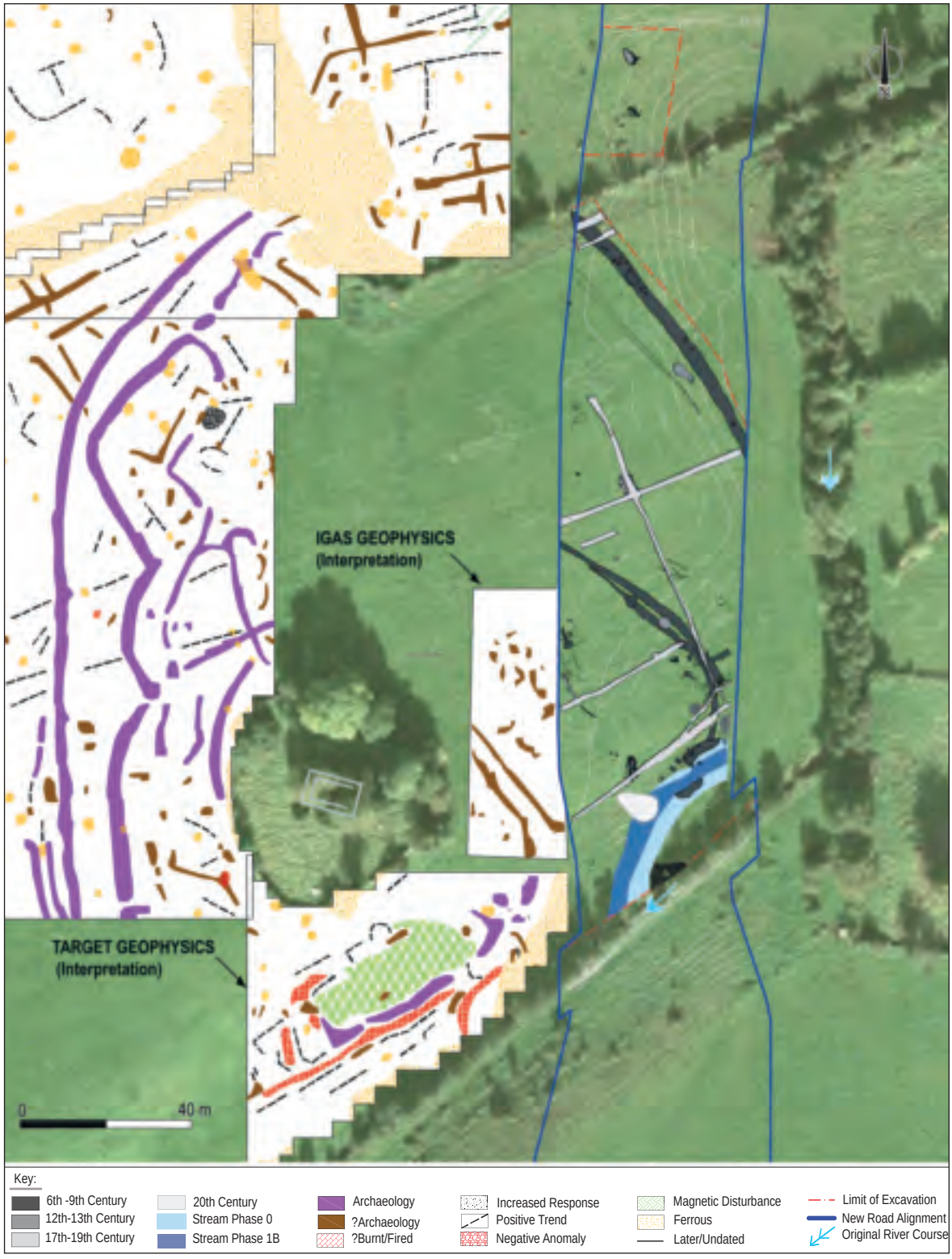
Illus. 8.1 *Map showing early medieval sites and monuments in vicinity of Clonfad.*



Illus. 8.2 *Aerial photograph of Clonfad looking west, showing the suggested lines of early medieval monastic enclosures ditches exposed from excavation, original line of the river, church and graveyard.*



Illus. 8.3 *Extract from Ordnance Survey map of Westmeath (six-inch first edition sheets 32/33, surveyed 1838), showing excavation cuttings and adjacent range of buildings.*



Illus. 8.4 *Vertical aerial view, showing excavation, pre-excavation ground contour and geophysical survey results.*

modern field. To the east were several modern bungalows and house plots, fronting the existing N52 Mullingar-Tyrrellspass road, which was approximately 2 m below the ground level of the excavations. A shallow drainage ditch and field boundary hedge flows east to west around these houses, and curved east and south around the excavation area. However, this ditch was a small stream or brook in antiquity, having been diverted in relatively recent times. The former course of the stream was identified as a deep channel now located on dry land to the west of the present-day stream. A steep scarped slope was preserved along the right (north) bank of the former stream course, forming the southern terminus of the hillock. A steep-sided bank on the left side also rose sharply to match the height of the hillock (Illus. 8.4). The small stream rises from a peat bog in Meedian townland to the north-east and continued west of Clonfad, and flows directly into the River Brosna, at Clonyhague (Illus. 1.1, 8.2, 8.3).

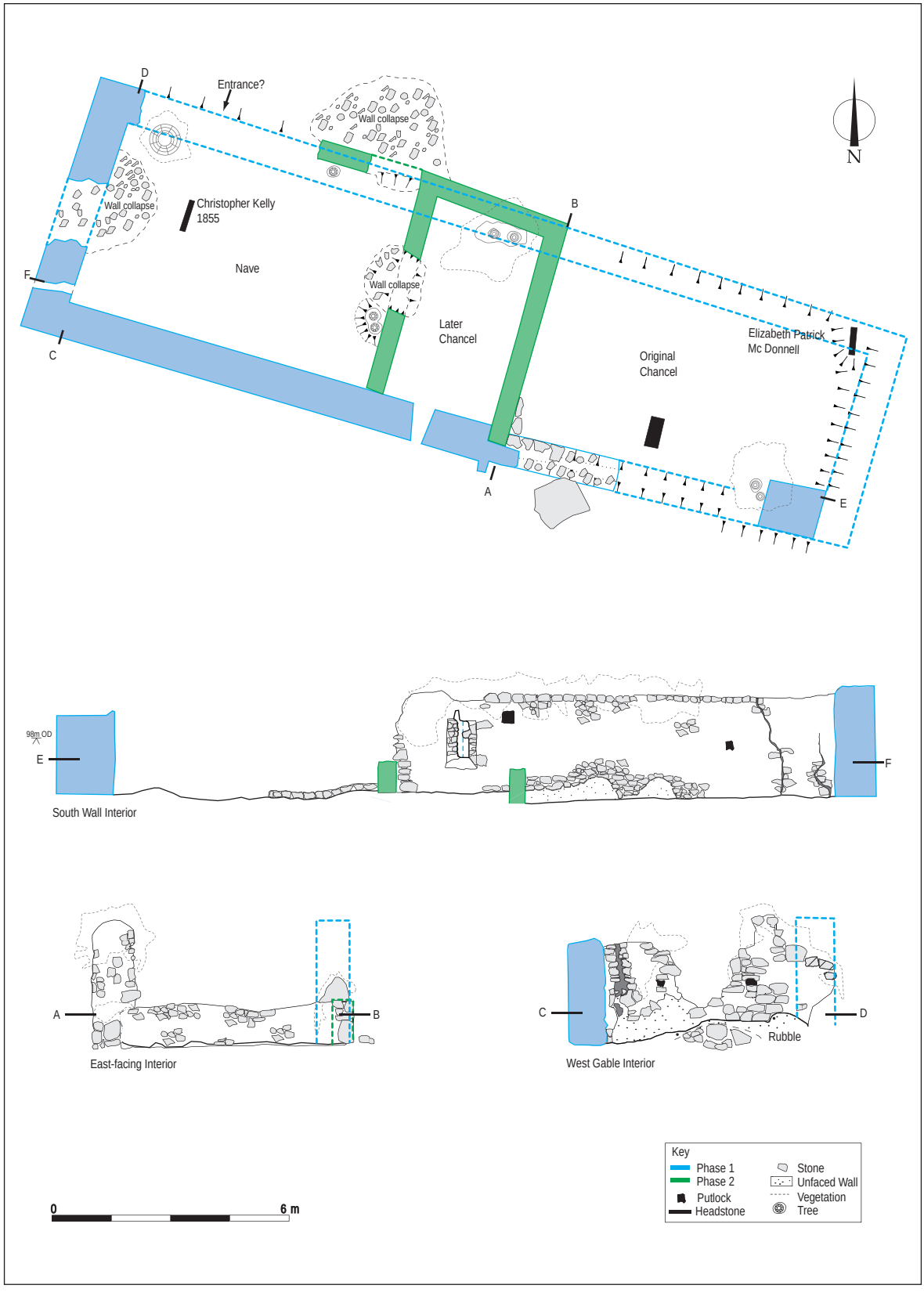
The ruined church of Clonfad

Prior to this study, the site of Clonfad was marked by a ruined stone church and graveyard, enclosed by a sub-circular stone walled enclosure (RMP WM 032:089). Architectural survey of the church shows it is aligned north-west/south-east, and has two phases of build, which proved difficult to date stylistically because of a lack of surviving architectural detail on doorway or window features (Illus. 8.5, 8.6).

The earlier phase is rectangular in plan, aligned ESE/WSW (nave to the west), measures 22.7 m long by 6.7–6.9 m wide externally, and 20.4 m long by 4–4.95 m wide internally, and constructed of 1 m-thick mortared-limestone walls. The church building was undifferentiated in plan in this phase. No evidence of a doorway or window survives in the west wall, as this is partially collapsed. One surviving splayed slit window is located midway along the south wall, and the chancel and north wall are almost completely collapsed. Based on its proportions and floor plan, this phase is likely to date to the later medieval period, which would support an historical assessment of Clonfad as a relatively prosperous but small parish, returning a value of 14 shillings in the early 14th century (Chapter 5, this volume). The walled graveyard also contains an upturned stone mortar of 13th-century date (Illus. 8.6; NMI topographic files, 1940). However, this was moved to the site recently for protection (local information).

The later phase of construction consists of a contraction in the floor plan to a length of 11.6 m, and the addition of a blocking wall to form a small chancel 3 m wide at the east end. The chancel wall was moved west and a new crossing and north wall, 0.45 m thick, was constructed. The new wall contained two residual architectural fragments of sandstone, possibly representing reused original, medieval, sandstone door or window jambs. The scar or remains of an abutting wall, 0.2 m thick, was also noted on the external north wall, adjacent to the new chancel wall. This may have been a lean-to structure or a sacristy building. The later phase is likely to be early modern in date and presumably represents a contraction in the parish at this time (Illus. 8.5).

Tombstones date from 1792–1969, and are scattered throughout the church interior and graveyard. The graveyard is enclosed by a mortared-limestone wall measuring 50 m in diameter, which displays several phases of repair and rebuild. The wall may originally have been circular in plan but now has two straight sides to the south and east. The church and graveyard both appear on the first edition Ordnance Survey six-inch map of 1838, and have remained largely unchanged since (Illus. 8.3).



Illus. 8.5 *Phased plan and elevations of the ruined medieval stone church, outside the excavation (RMP WM 032: 039).*



Illus. 8.6 View of medieval mortar adjacent to the ruined church, looking south-west.

Archaeological setting

The wider archaeological landscape shows a low level of known settlement in the early medieval period. Two other church sites are located close by in Templeroan, 1.2 km to the south-east, and Meedian 1.5 km to the east; the latter was accessed from Clonfad by a road marked on early Ordnance Survey maps (Illus. 8.1, 8.3). Ringforts and enclosures are more common. A univallate or single bank-and-ditch ringfort is located 500 m to the south-east of Clonfad, and five examples lie in Calverstown and Kilbrennan townlands 1.5–2 km to the north-east. Four other univallate ringforts are located within a 3 km radius of Clonfad in Dalystown, Cloonagh, and Cloncrow townlands. A souterrain or underground cellar structure is also recorded from Guilford (or Davidstown) townland, 2 km south of Clonfad (Illus. 8.1).

Clonfad overlooks marginal low-lying marshland to the west that constitutes the floodplain of the Brosna (Illus. 1.1). Low ground and localised bog lie to the north, extending ultimately to the shores of Lough Ennell, where the royal settlements associated with Cró Inis crannog and the monastic sites of Lynn, Kilpatrick and Dysart are located (Chapter 3, this volume; Brady 2007, 23–5, 58–71, 81–2, fig. 18; Illus. 1.1). The Brosna, via the River Shannon, also provides access to the ecclesiastical town or *civitas* of Clonmacnoise, Co. Offaly. Other powerful ecclesiastical centres nearby included Clonard, Inchbofin and Fore, Co. Westmeath, and Durrow, Co. Offaly, all located within a 20–30 km radius of Clonfad. The main monastic settlements may have been accessed by ancient overland routes such as the Slige Mór or the (Esker Ridge) Eiscir Riada (Chapter 4, this volume). The Slige Mór was one of the five major early medieval roads recorded by early historical sources, and ran from east to west along the linear glacial esker ridges that criss-crossed the midlands, passing through Tyrrellspass, only 2 km south of Clonfad (ibid.; Illus. 2.1). The importance of such natural features as routeways was recognised in antiquity by the early medieval inhabitants of the midlands (Chapter 3, this volume).

Aerial photography shows the more immediate topography surrounding Clonfad, which defines the physical limits of the site, notably the steep-sided valley of the small watercourse, which is clearly visible to the south (Illus. 8.2, 8.4). Two phases of geophysical survey were conducted at Clonfad, one before and the other after the excavation phase (Illus. 8.4; Geophysics.pdf, CD-Rom). The early survey sought to inform a programme of machine-assisted test-trenching that preceded the excavation (Elliot 2004, 25–7, figs 3.3, 3.6, 3.9, 3.12 and 3.12). The second survey was commissioned to confirm the possibility that enclosing elements associated with the former monastic site survived to the north, south, east and west of the ruined stone church and graveyard (Geophysics.pdf, CD-Rom). The later survey avoided known areas of disturbance, the graveyard area, and the lands to the NNE of the church (Illus. 8.3). The results reveal a large, elongated, oval enclosure ditch surrounding the graveyard area. The enclosure measures 200 m in length (north/south) by 180 m in width, and curves around the 91 m contour, encompassing the summit of the low elongated hillock and terminating at the stream to the south (Illus. 8.4).

Roughly parallel to this enclosure there is a substantial but more complex enclosing feature that follows a zig-zag line, measuring 140–160 m in diameter. The detail suggests terracing events or several episodes of activity, located 10–15 m inside the outer enclosure. Within this second enclosed area, numerous pit features and ill-defined linear and possible enclosure anomalies are indicated in the data (Illus. 8.4).

A third, small, circular enclosure is also suggested in the geophysical survey, encircling the present walled graveyard and measuring 75 m in diameter. An element of this inner enclosure was shown in the small pre-excavation geophysical survey but the second survey shows this anomaly more clearly (Illus. 8.4).

The southern extent of the geophysical surveys identified very high magnetic ferrous responses (Geophysics.pdf, CD-Rom). Excavation of the adjacent area to the north had exposed large sub-surface remains of iron-working residues within the former streambed, and the geophysical survey suggests a continuation of these residues southwards (Illus. 8.4).

Assessment

Previous assessment identified the high archaeological potential of this site (McDermott & Stanley 2004, 68, 70–3, pl. 5.7, 5.8, fig. 5.21–2; McGowan 2004, 145–50, fig. 6.15, 6.17, pl. 6.2–5; O'Connor et al. 2004). Archaeological testing revealed an inhumation burial, stone-lined kiln, a series of linear features, a field boundary (possibly early modern in date) and furrows, several pits, and a possible pit furnace. In addition, geophysical survey suggested the presence of structural debris and *fulacht fiadh* or burned mound type material (Elliot 2004, 25–7, fig. 3.3, 3.6, 3.9, 3.12 and 3.12).

Excavation

Excavation was carried out between November 2004 and March 2005 following mechanical removal of topsoil (Director P Stevens, under Ministerial direction A001/036; Excavation No. E2723). The area to the west and east of the excavation remained under pasture. Two large open-area cuttings were opened and subdivided into five working areas. The main cutting extended across the full width of the proposed road, and measured 170 m in length and 45–50 m in width. The second cutting lay to the north-west, measuring 30 m by 20 m. Archaeological features were excavated by hand following their stratigraphic sequence, and larger features were sampled vertically using slot-trenches before being completely excavated. All features, deposits and structures identified were fully resolved,

and samples of stone, slag, bone and soil were recovered in bulk. Spoil heaps were metal-detected to maximise artefact recovery (Detection device licence 04R106).

Overview

The narrative that emerged from the excavation identifies a detailed sequence of events that extend over three distinct periods of activity, from the early medieval to the early modern periods, including three phases of early medieval monastic activity which largely form the subject of the present chapter (Stevens E2723_Vol_1.pdf and E2723_Vol_2.pdf, CD-Rom). The results reveal the outer precincts of what served as the monastic vallum, and the richness of the record indicates that much of the monastic site lies undisturbed outside the excavation area for the present project. The early monastic origins of Clonfad historically appear to stretch back to the sixth century. Clonfad is thought to have been founded by St Finnian of Clonard, who died in AD 549 (AU 549.3; Gwynn & Hadcock 1970, 376), although Librán, the son of Finna, may have been the real founder (Chapter 4, this volume). Evidence from the excavation suggested the monastery lasted into the middle to late ninth century, which is echoed in historical references to the site being burned in AD 891 (AU 891.2; AFM 887; Chapter 4, this volume).

The earliest monastic settlement (Phase 1A) saw limited indications for an organised settlement, mostly concentrated close to the stream (and possibly the site of the present church), which subsequently expanded into a large trivallate enclosed settlement. The trivallate monastery was sub-circular in shape measuring 200 m in length (north/south), 180 m in width (east/west), enclosing an area of 4.54 ha. The absence of contemporary burials or evidence of habitation within the excavation assemblage was balanced by substantial iron-working debris and several contemporary hearths and pits. The information suggests strongly that the excavated part of the monastery was within an industrial sector, and that burial, habitation and craft/industry were compartmentalised within different parts of the larger monastic enclosures at Clonfad. The range of iron-working debris showed the presence of highly specialised iron smithing and brazing; an activity that appears to have been conducted throughout the life of the monastery. It gives a strong indication of the underlying specialist activities being conducted at Clonfad.

A second stratum of activity revealed by excavation, Phase 2, consisted of agricultural activity during the 12th–13th centuries, and included two corn-drying kilns. The ruined stone church on the site may date to this phase.

Phase 3 represented a third phase of evidence and related to agricultural reorganisation and small-scale iron smithing in the 17th to 18th centuries which was associated with an adjacent vernacular dwelling. Several linear drainage ditches, two stone-lined corn-drying kilns, smithing hearths, tree-planting pits and field-boundary ditches are associated with this later activity. Undated features include a juvenile burial, pits, ditches and hearths.

More generally, a church continued in use at Clonfad throughout the later medieval and post medieval periods, into the 19th century, and a burial ground that lay outside the excavation area was used up to 1969.

Phase 1A: early medieval origins and foundation

Both the townland and its parish take the placename of Clonfad from the site, although several variations on the spelling and full names exist in the historical records (Chapters 4 and 5, this volume). The records confirm a monastery here that appears to stretch back to the sixth century, and associates the site with St Finnian of Clonard (d. AD 549, AU 549.3; Chapter 4, this volume),

Senach, bishop of Clonard and Clonfad (d. AD 588, AU 588.2), and Librán of Clonfad, abbot or priest and probably son of Aid (d. 606, AU 606; Gwynn & Hadcock 1970, 376). The earliest phase of archaeological activity is associated with this period. The remains are limited in nature and scale, but several important precedents are present from the start, including evidence for large-scale iron smithing, and in particular brazing. Linear ditches and pits provide (secondary) evidence of more permanent settlement close by. Charred cereal grains show that agriculture was an important part of the local contemporary economy.

Linear ditch

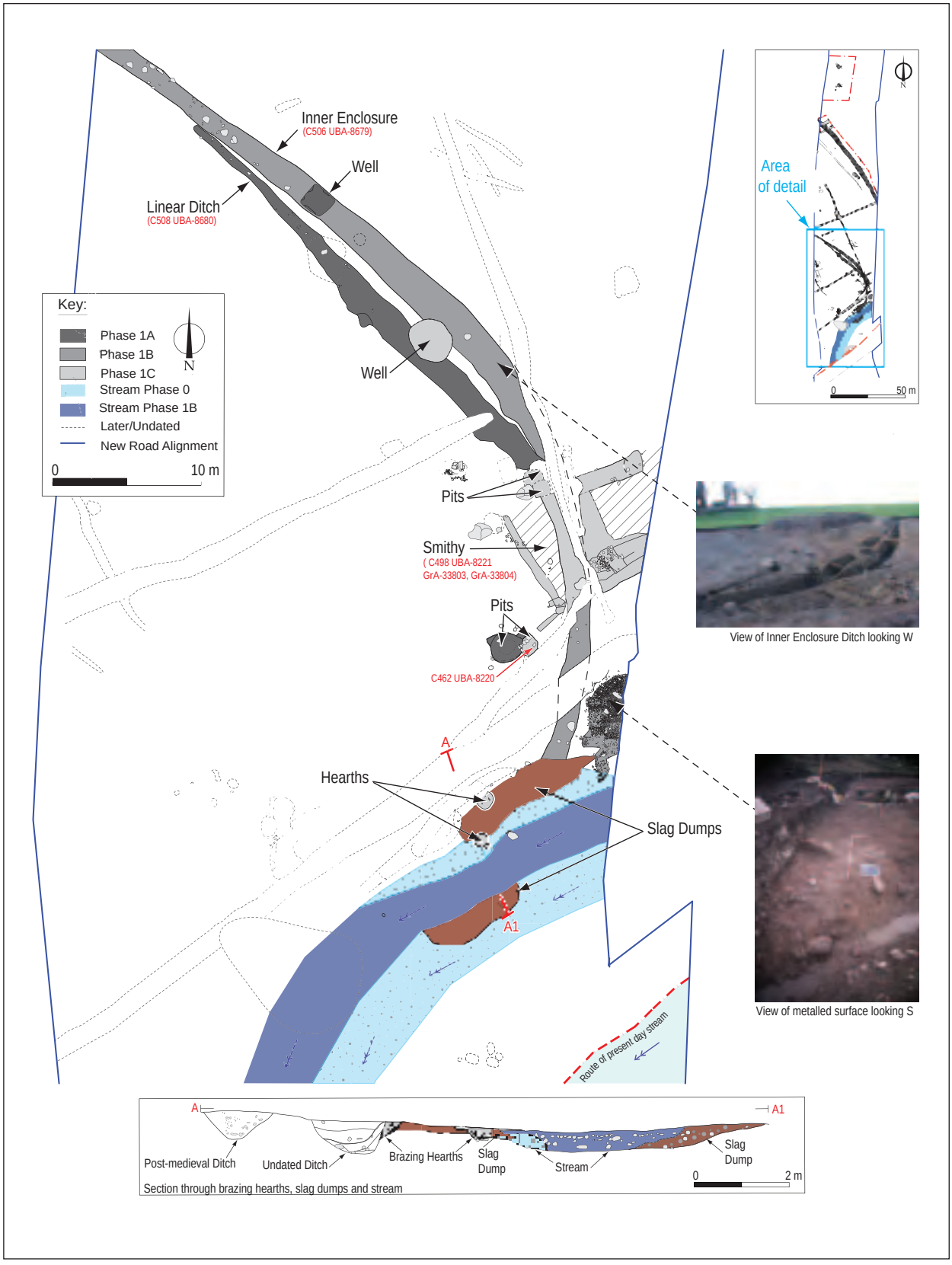
The earliest feature to be dated at Clonfad is a straight linear ditch (C508) of unknown function (Illus. 8.7). The ditch was cut through natural boulder clay into the east-facing slope of the hillside. It commenced in the north-west with a small narrow concave terminus, and extended south-east towards the stream, but was subsequently truncated at this point by later events, making it impossible to determine whether the ditch flowed into the stream originally. The ditch had steep, straight sides and a concave base, occasionally lined with large boulders and stone to the west, reflecting the very stony nature of the natural boulder clays at this point. It followed the topographic contour, increasing in depth as it descended, with an overall gradient of 7.8%. The ditch measured 1.2–1.8 m wide and 0.95 m deep (Illus. 8.7). It was backfilled with stony silt, containing an iron chisel (Find E2723:315), nails and also iron-working waste, including 80 smithing-hearth cake fragments, and tuyère fragments. The silt layer was sealed by a slag-rich dump containing oak charcoal, which produced a radiocarbon determination of cal AD 427–538 (UBA-8680). Finally, this level was capped by redeposited boulder clay.

The ditch may have been open for a considerable time and re-cleaned regularly throughout its use. The original function of the ditch was not immediately apparent as it appeared to drain into the stream, but this could not be confirmed. It may also have provided a partial delineation to the monastery, or served as an early outer enclosing boundary. The oak charcoal sample that was dated by radiocarbon provides an approximate date for the ultimate backfill and decommissioning of the ditch. However, it also indicates that iron-working was an important function of the site from the start.

Iron slag dump

A massive body of iron slag and other metalworking waste was systematically deposited in a dump on either side of the former course of the stream bed, to the south of the site. The dump measured over 13 m long by 1.25 m wide and was up to 0.6 m deep within the excavation area (Illus. 8.7). The total weight of metallurgical residue was 1,467 kg, representing 80% of the total residues recovered in the excavation. The dating of this event(s) was difficult to pin down accurately and it probably happened over several years or even decades. However, the metallurgical assemblage is one of the three largest collections of iron-working residue to be recovered from an early medieval site in Ireland (Clarke & Carlin 2008, 73–5; Gillespie 2008; Wallace 2010, 75–80; Wallace & Anguilano 2010, 69–84; Gillespie & Kerrigan 2010; Appendix 3.pdf, CD-Rom).

During the following phase (1B) of the early medieval period at Clonfad, the large slag dump caused a bottleneck to the flow of the stream. Subsequently, and possibly after a flood or heavy rain or several such events, the stream cut a narrower and deeper channel, partly truncating the slag deposit (Illus. 8.7). Due to the ferrous nature of the slag, this deposit trebled in size, apparently through natural oxidation processes (Appendix 3.pdf, CD-Rom; Young E2723_Vol_2.pdf, CD-Rom).



Illus. 8.7 *Phased plan and sections of site (southern area), showing early medieval linear and enclosure ditch, stream with iron waste dump, and cobbled surface.*

Phase 1B: early medieval expansion and enclosure

During the seventh and eighth centuries, with increasing power struggles between rival power bases such as we have seen with the Clann Cholmáin and Fir Tulach (Chapters 3 and 4, this volume), the early monastery appears to have been reorganised, and the process of defining monastic precincts took place by means of a series of enclosing earthwork ditches or banks (Illus. 8.2). In this period in Ireland monastic ditches were often enclosed large areas, circular in plan, and comprised two or three concentric enclosures. Churches were typically located in the central enclosure or in separate enclosures around the site (Edwards 1990, 106–7). Clonfad was no exception, with a reorganisation into zones or areas that were bordered by large enclosure ditches. While the excavation necessarily focused on c. 14% of the total area enclosed, geophysical survey, as noted above, confirmed the continuation of these enclosing elements around the larger site area (Illus. 8.2, 8.4).

Outer enclosure ditch

A most impressive feature on the site was the large, outer enclosing ditch. This was an elongated oval shape in plan (C101). Geophysical survey shows that the ditch encloses the entire hillside, following the 91 m contour. The ditch has a diameter of 180–200 m, and terminates at the stream in the south and south-east quadrant. This compares with other medium-sized and large monastic sites of the period, and shows remarkable similarities with Nendrum, Co. Down, which is the same size (Lawlor 1925; McErlean 2007, 324–36, fig. 12.8; Chapter 10, this volume). Excavation of a 66 m section of this ditch that extended north-west/south-east, curving SSE, showed it cut through natural boulder clay and glacial sands. It had a V-shaped profile with a narrow but flat base, falling south-east by a gradient of 1.3%, and measuring 2.8–3.4 m wide and 1.8–2.5 m deep (Illus. 8.8).

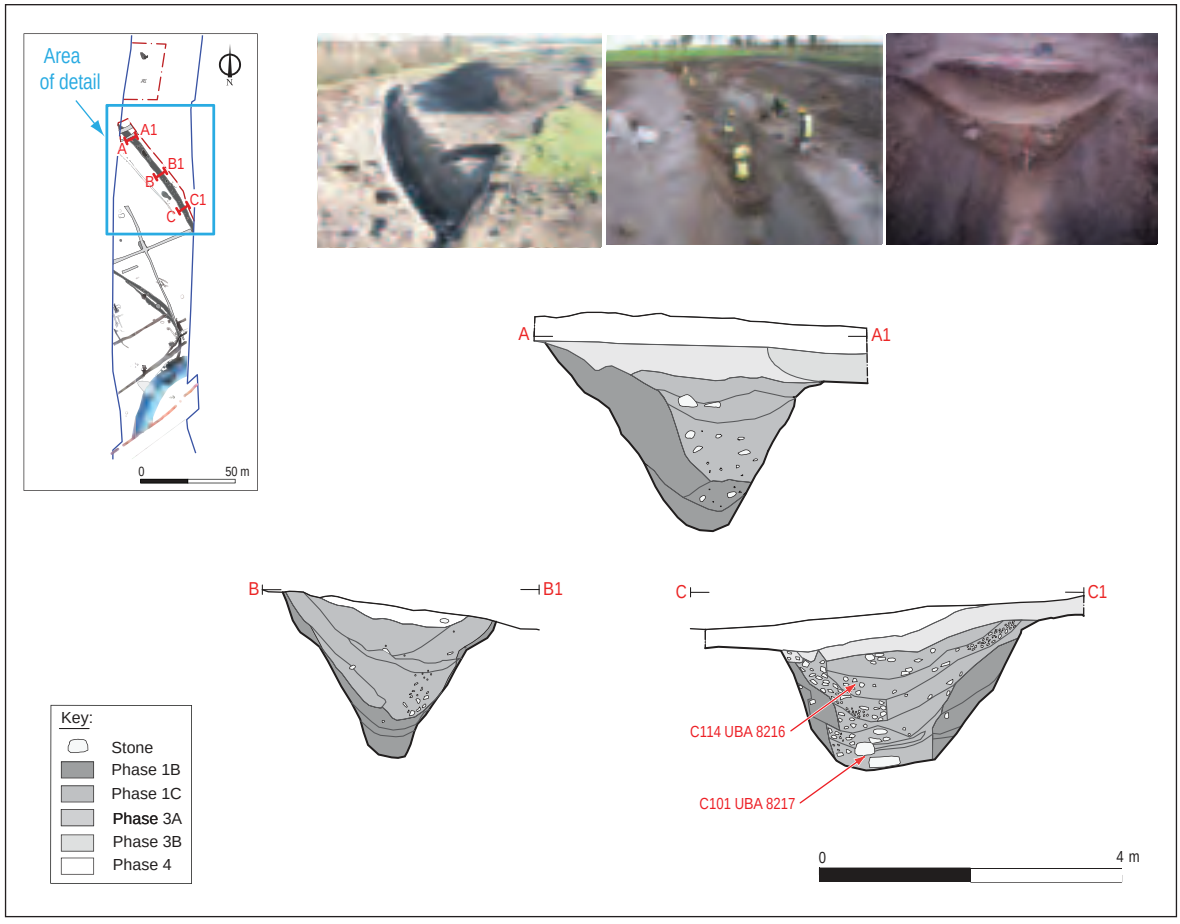
The ditch showed occasional signs of collapse, as a result of unstable fine sandy subsoil, and this required repair/reinforcement in antiquity. It appeared that the ditch was left open and was dry. Much of the lower fills were slumps or in-washed sands and gravels that contained smithing waste and also bone needles. No evidence of a bank was noted from excavation. However, a line of very large boulders was the first element of backfilling in the base of this ditch, suggestive of a possible former revetting feature associated with a bank. Furthermore, later levels suggest the ditch was backfilled as a single event, from both sides, with some very limited suggestions of an internal bank.

Inner enclosure

An internal enclosing ditch (C506) was identified in the central area of the site and appears to have been part of an oval inner enclosure. The circuit of the curved linear ditch commenced at the stream to the south and extended north, curving gently for a radius of c. 60 m, and extending beyond the limit of excavation (Illus. 8.2, 8.4, 8.7).

Several terrace-like enclosures and possible structures were indicated by geophysical survey in the western quarter of the site, and this also shows similarities with the ground plan of Nendrum, Co. Down (Illus. 8.4; Lawlor 1925; McErlean 2007, 372, fig, 12.18A).

Excavation revealed that the inner enclosure followed the topographic contour of the site, increasing in depth midway along its circuit. Its dimension varied from 1.2–2.8 m wide and 0.72–1.3 m deep, with a shallow gradient of 11%, becoming much wider closer to the stream. The ditch was shallowest in the north-west where it was U-shaped in profile, and occasionally lined with large boulders. However, it deepened as it progressed south-east and descended towards the stream, achieving a broader, V-shaped profile. A sample of oak charcoal from a basal fill returned a radiocarbon determination of cal AD 688–878 (UBA-8679). This feature may have been cleaned out several times before finally going out of use and was subsequently sealed in the mid ninth century,

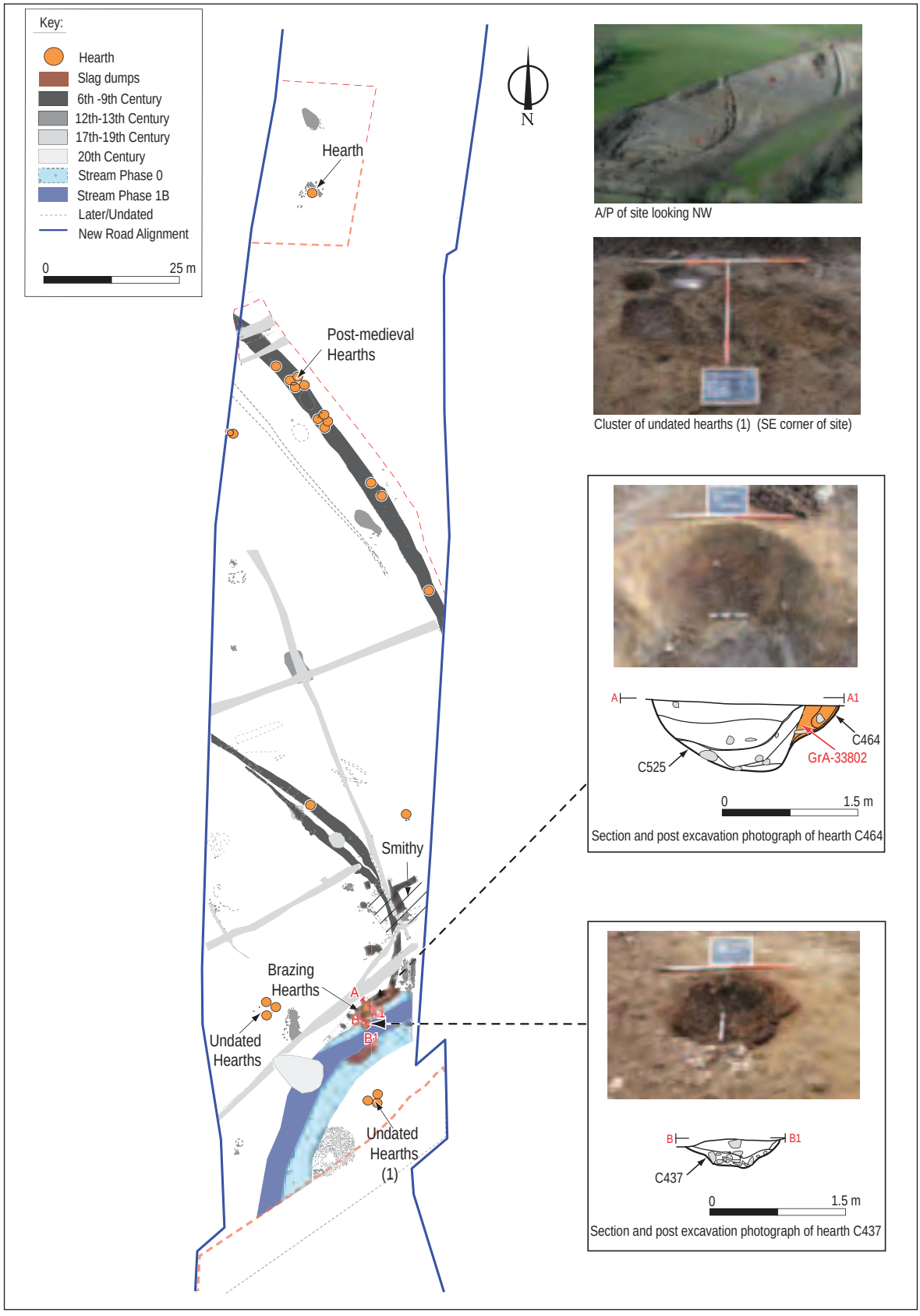


Illus. 8.8 *Phased plan and sections through early medieval outer enclosure ditch (northern area). This ditch formed the outer limit of the monastic precinct in the seventh to ninth centuries.*

with the construction of a blacksmith's forge over it (see below). By way of comparison, the middle enclosures of both monasteries at Nendrum, Co. Down and Portnahomack, Invernesshire, were also discontinued in the early medieval lifetime of the monastery (Lawlor 1925; McErlean & Crothers 2007, 335; Carver 2008, 51). This was also a feature observed at the secular enclosure at Rochfort Demesne and presents an alternative interpretation of many so-called multi-vallate enclosures in the landscape (Chapter 6, this volume).

Interior features

Between the enclosure ditches, excavation showed the outer enclosure area was mostly devoid of archaeological features, except for some undated plough furrows, a series of undated hearths, and a small metalled surface (C510) beside the inner ditch that led down to the stream (Illus. 8.7). The surface may indicate a pathway, jetty or even fording place for wheeled traffic. However, no evidence was observed for a continuation of the cobbling on the south side of the stream, and no wheel rutting was noted (Illus. 8.7). In contrast, the space between the stream and the inner enclosure contained a series of wells, pits and smithing hearths (Illus. 8.9). The activity was focused on the right/northern bank of the stream and this was echoed further west, outside the excavated area, by anomalies detected by the geophysical survey (Illus. 8.4).



Illus. 8.9 Site plan, showing location of iron-working hearth (all periods).

Spatial differentiation within monastic sites has long been argued (Edwards 1990, 106; Bradley 1998, 43–6), where buildings were mostly located in the western middle enclosure, adjacent to the church, and large void areas were present throughout the outer enclosure—presumably to allow for tillage or grazing. At Illaunloughan Island, Co. Kerry, the limited space of the island still saw the metalworking activity take place away from the cells and burials (White-Marshall & Walsh 2005, 202–3). At Armagh, Bradley (Bradley 1998, 44) argues for 'zones' or enclosed precincts. The middle enclosure measured 200 m in diameter, and was defined as 'Zone 2' to house the 'students, shrine keepers, clerics and crafts workers of the monastery'. This was itself composed of three 'trians' or sub-divisions, delineated by partitions, a feature noted in other Irish monasteries with industrial quarters such as Clonmacnoise, and Armagh, but also a feature of Pictish monasteries such as Portnahomack, Invernesshire, Scotland, and Anglo-Saxon monasteries, such as at Hoddom, Hexham, Whithorn, Jarrow and Lindisfarne (ibid., 44; Gaskell-Brown & Harper 1984, 157–9; Carver 2008, 118–42; Lowe 2006, 187–90, 195). No internal partitions were noted from excavation at Clonfad, and it is likely that the area between the inner and outer enclosure in Phase 1B is within Bradley's 'Zone 2'. The tasks conducted in this location may have been deliberately positioned along the banks of the stream, perhaps for ease of access to water needed for quenching in the smithing process. One factor, although lacking any evidence, may be the requirement for a water-powered hammer for use in the smithing process to produce the large uniform iron sheets required for the manufacture of handbells (Appendix 3.pdf, CD-Rom).

Phase 1C: early medieval reorientation

The monastic enclosure at Clonfad saw a dramatic reorgan-isation in the eighth–ninth centuries, and this may have been associated with a contraction of the site. One or perhaps both enclosures were completely filled in, and the outer enclosure left unused. However, the core area adjacent to the stream continued in use with evidence of iron-working and perhaps other activity. This later phase of activity produced much of the artefactual and environmental evidence for this site, represented by dumps of material as refuse in the ditches from the period immediately preceding it.

Levelling the inner enclosure

As part of the works associated with Phase 1C, the inner enclosure ditch was deliberately and completely backfilled, probably as a single event. The ditch contained two or three deliberately placed stony sandy-silt/silty-clay backfills and was sealed with a boulder clay capping. Large boulders were deposited in the base of the ditch, possibly collapsed revetment of the ditch face. It is likely that this ditch had been cleaned out regularly, and there was some evidence for lower and upper levels of backfill, suggesting that it may have become partly silted over time and used as a dump for slag and other waste material. There was a distinct lack of artefactual evidence from this ditch apart from quantities of smithing waste throughout, plus quantities of slag, tuyère fragments and also a single antler stamp (Illus. 8.10; Find E2723:440; Antler&bone.pdf, CD-Rom). In addition, three fragments of 'brazing shroud' were recovered, which functioned as part of a coating used in the process of brazing wrought-iron handbells. These details are discussed in detail below (Appendix 3.pdf, CD-Rom). Occasional animal bone, grass seed and oak charcoal were also present. A sample of oak charcoal from a basal ditch-fill returned a radiocarbon determination of cal AD 688–878 (UBA-8679). A *terminus post quem* was provided by a charcoal-rich layer sealing the clay-capped, backfilled ditch, dated by a sample of animal bone and charcoal which produced radiocarbon dates of cal AD 775–971, cal AD 689–891 and cal AD 774–933 (GrA-33803–33804, bone; UBA-8221, oak/ash charcoal).

Levelling the outer enclosure

The levelling of the inner enclosure was matched by similar activity on the outer enclosure, at roughly a similar time. Radiocarbon dates from both ditches support the stratigraphic record and suggest that levelling of the enclosures occurred in the same century and possibly simultaneously. If one combines and overlaps the evidence of several radiocarbon results then the date range is narrowed to between cal AD 713 and cal AD 800, and this is echoed in the relative dating of the artefacts, which are mostly attributed to the eighth century (Stevens, E2723_Vol_1.pdf CD-Rom; Appendix 1; GrA-33803–4; UBA-8216–9, UBA-8221).

Initially, large boulders were placed at the base of the ditch at roughly regular intervals. The limestone boulders were sub-rounded in shape and between 0.8 m and 1.1 m in diameter. It was unclear, however, whether they were a preliminary attempt at backfilling, contemporary with the lining/shoring of the ditch, or were rolled into the ditch from an unmortared drystone bank, although no other evidence for a bank was revealed.

The ditch was subsequently backfilled by a complex series of intermixed less compact soil dumps, which happened in one episode. Bone artefacts recovered from the lower, middle and upper layers of this backfilled ditch were noted to fit together, confirming that the levelling occurred in a single event (Illus. 8.11; McCutcheon E2723_Vol_1.pdf, CD-Rom). This was further supported by the suite of four radiocarbon determinations from the levels of backfill which, when combined, range from cal AD 662–937 and overlapped cal AD 689–800 (Appendix 1; GrA-33803–4; UBA-8216–9, UBA-8221). Deposits within the backfill also produced charred seeds of barley, wheat and grasses, and lentils (Vaughan-Williams E2723_Vol_2.pdf, CD-Rom). Several silty, clay and charcoal backfill deposits filled the length of this ditch. These contained copper-alloy artefacts, scrap and ingots, ceramic crucible fragments, worked bone objects and manufacture waste, iron smithing cakes, tuyère fragments and many ferrous metal objects/tools including nails, a knife blade, a buckle and pin, a possible stone lamp, human bone and skull fragments, and animal bone refuse (Stevens E2723_Vol_1.pdf CD-Rom).



Illus. 8.10 *Bone and antler stamps. Finds E2723:440, E2723:600. Examples of this type of artefact are rare in Ireland and may have been used to decorate leather (photo: John Sunderland).*

The ditch produced evidence for iron-working, and for other manufacturing, including antler and bone combs, bone beads, wood-working and leather-working (Illus. 8.11; Antler&bone.pdf, CD-Rom). Copper-alloy working may also have been practised. The rich deposition possibly represented the discarded refuse from one or several workshops. The high numbers of artefacts deposited as refuse in this ditch is in stark contrast to the inner enclosure ditch.



Illus. 8.11 *Bone artefacts and bead manufacturing waste, including a complete unfinished piece. Much of this came from the outer enclosure (photos: John Sunderland [top]; Valerie J Keeley Ltd [bottom]).*

Destruction, decline or disuse: the historical view

Clonfad is again mentioned in the annals in AD 891, but for the last time: '*Conchobhar, son of Flannagan*, lord of *Ui Failghe*, is destroyed by fire at *Clúain-fóta-Fine*, in the church; and the relics of Finnian were violated by the *Fear Tulach*' (AFM 887; AU 891.2; Gwynn & Hadcock 1970, 376). Connon argues that the desecration of relics may represent a violation of an oath, usually sworn on or associated with relics (Chapter 4, this volume). The reference provides an indication of the site's high status, being worthy of royal progress by Conchobar.

While there is an inherent danger in trying to marry complex and fragmentary historical references to equally complex archaeological evidence, there is a complete lack of archaeological or artefactual evidence for occupation activity at the site after the ninth century. Therefore, it appears that this area of the monastery at least was no longer occupied after this period. Whether the church was burned down, or the monastery completely destroyed in this violent action, cannot be confirmed or denied by the limited archaeological evidence available from this excavation.

Iron smithing, handbell brazing and manufacture

Metallurgical residues

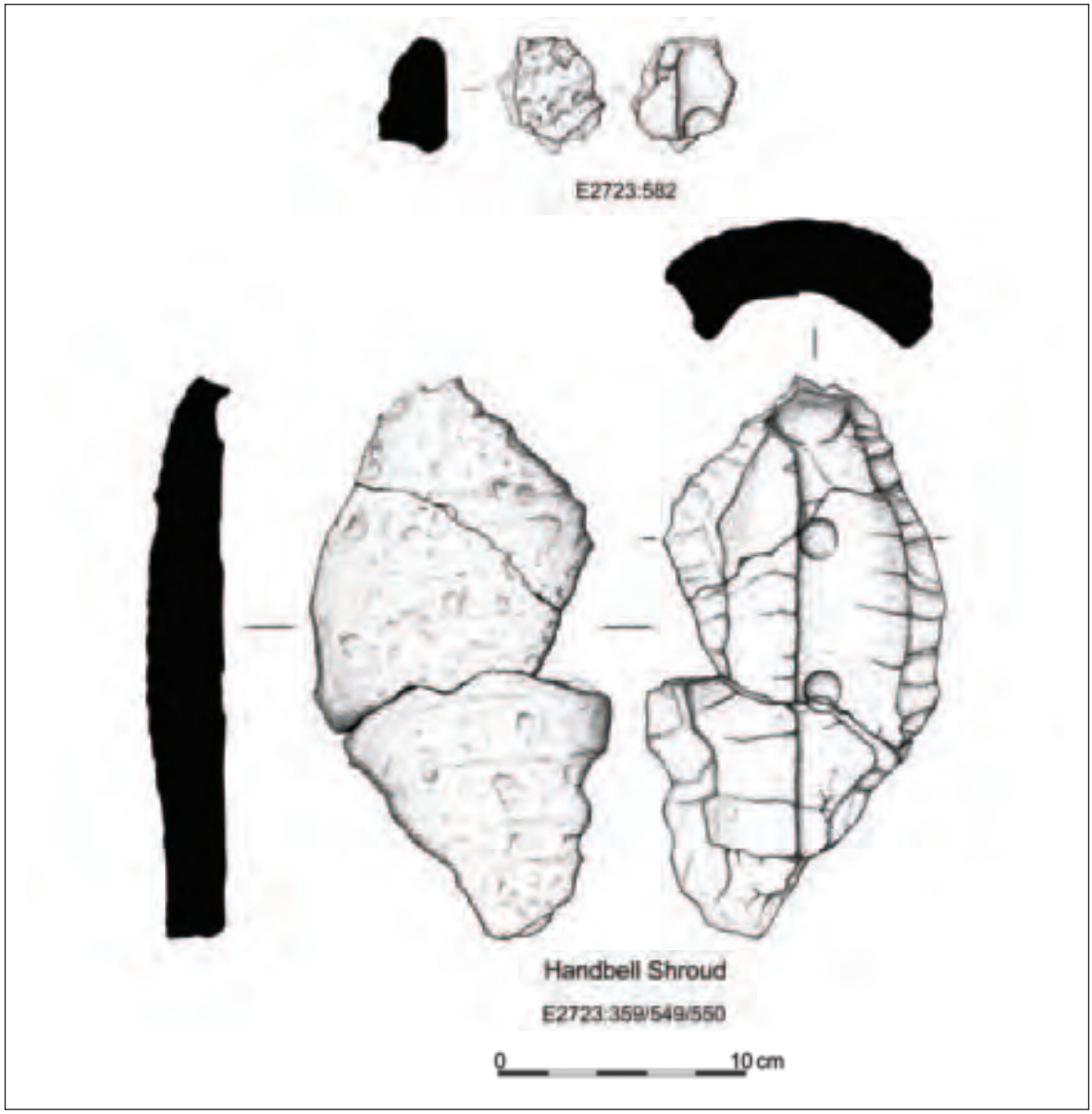
The most prolific craft activity at Clonfad was iron-working, with 1.5 tonnes of metalworking residues recovered from this excavation alone. This establishes Clonfad as one of the largest find-sites yet identified in Ireland. The majority of the iron-working activity related to primary and secondary smithing, with evidence of smelting being almost completely absent from the site. Smelting the raw iron ore must have been carried out elsewhere, and possibly using local bog iron as the raw material. Evidence for smelting was recovered at Ballykilmore, while Rochfort Demesne produced evidence of small-scale secondary smithing (Appendix 3.pdf, CD-Rom).

Iron-working residues (slag) are common on early medieval sites in smaller quantities. Tuyères and smithing hearths and furnaces were found at Ballykilmore and to a lesser extent in Rochfort Desmesne, and are known from many early ecclesiastical sites such as Nendrum, Co. Down (Lawlor 1925, 136, 140; Bourke 2007, 407), Armagh (Gaskell & Harper 1984, 149–51), New Graveyard, Clonmacnoise, Co. Offaly (Murphy 2003, 1–34), Illaunloughan Island, Co. Kerry (White-Marshall & Walsh 2005, 202–7), Reask, Co. Kerry (Fanning 1981, 105–8; Edwards 1990, 86–7) and Hoddom, Dumfriesshire, Scotland (Lowe 2006, 137–42). Recent excavations at secular enclosure sites have produced large assemblages of iron-working waste as well, equivalent to the range of material discovered at Clonfad. At Johnstown 1, Co. Meath, 2 tonnes of iron-working residues were recovered (Clarke & Carlin 2008, 73), while 1.3 tonnes were produced from Lowpark, Co. Mayo (Wallace 2008; Wallace & Anguilano 2010, 75; Gillespie 2008; Gillespie & Kerrigan 2010). The largest assemblage, prior to Clonfad, from a monastic site was 380 kg, recovered from the New Graveyard excavations at Clonmacnoise, Co. Offaly (Murphy 2003, 1–34).

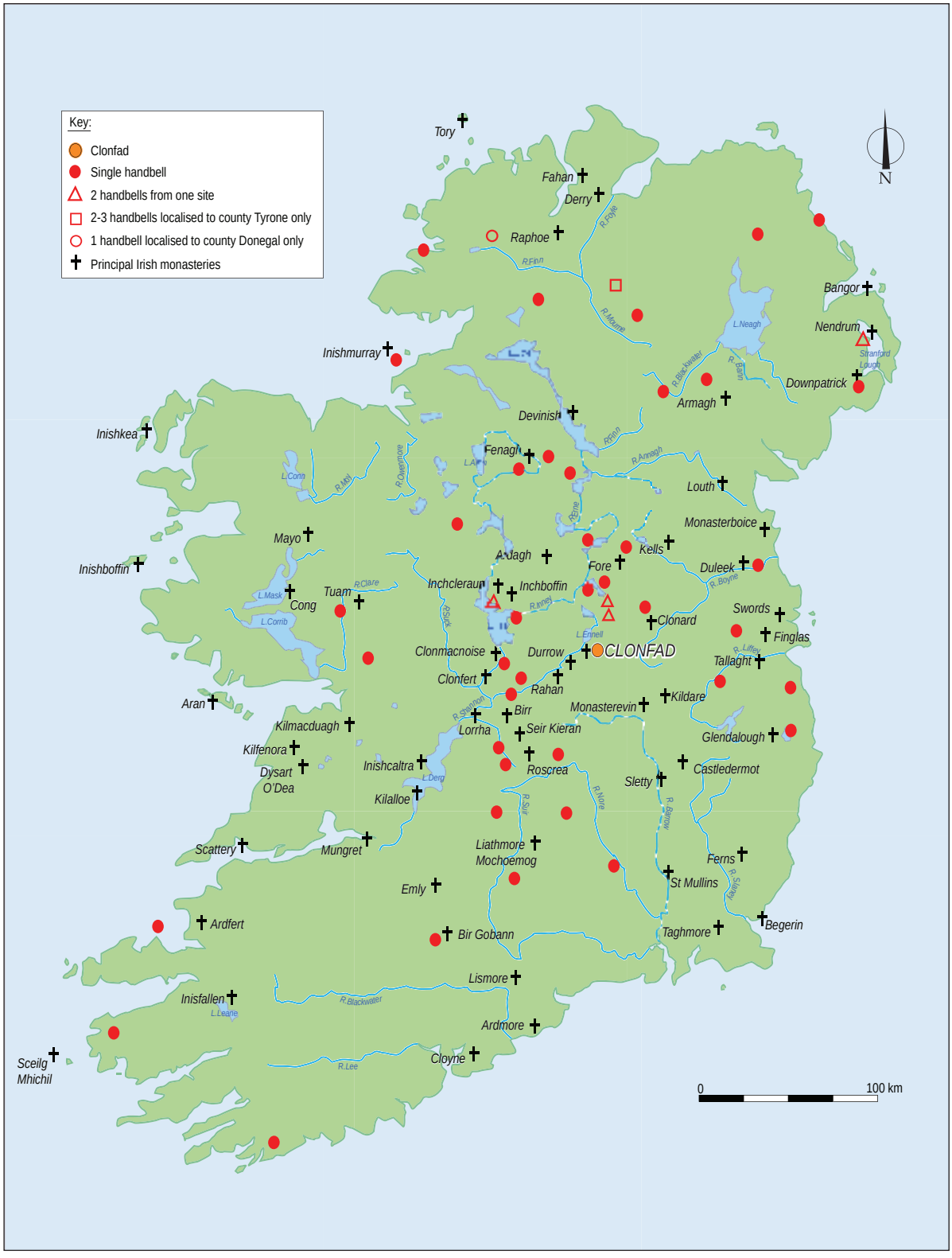
Handbell manufacture

The archaeological evidence at Clonfad is dominated by large-scale and highly specialised iron-working. The most important activity evidenced in the excavated area of the monastery was the manufacture of iron handbells. The presence of shroud fragments, or clay coating, from the brazing process used to coat handbells is absolute evidence for handbell production at the site (Illus. 8.12). Shrouds were found throughout the early medieval phases of the monastery, where handbell production was focused in the southern quadrants (Illus.8.9).

Quadrangular iron handbells are more commonly found in Ireland than Britain, with 50 examples from Ireland (Illus. 8.13), 12 from Scotland, two from England and one from Wales (Bourke 2008, 22). Handbells have consequently been a characteristic aspect of the early Irish Church. However, Bourke has argued that they are not indigenous to Ireland, and instead originate from Roman Britain and the Roman world more generally (Bourke 2008, 22). The bells were imported from earlier devotional and domestic traditions along with the chalice, paten and strainer to become an essential part of Christian liturgical equipment. The earliest handbell mentioned in an ecclesiastical context is cited in a clerical letter from Carthage, dating from AD 535. Within a century handbells had turned up in County Westmeath. Six examples of handbells are depicted on High Crosses in Ireland between the eighth and 10th centuries. Production of the bells appears to cease by the 10th century, but individual examples were then enshrined as saints' relics and in this way continued to be of significance (Bourke 1980, 59; 2008, 22–8).



Illus. 8.12 Brazing shroud fragments for handbell manufacture.



Illus. 8.13 *Distribution map of Class 1 handbells in Ireland, showing principal monasteries and Clonfad (source: Bourke 1980; 2008).*

The metallurgical process used to produce these wrought-iron handbells is well known, and the manufacturing process required advanced technology at the time. As none of the surviving bells shows evidence for the welding together of more than one bloom in manufacture, the process required production of a single very large sheet of wrought iron for each bell. This required the production of large billets or blooms—the primary material of the blacksmith, a block of processed iron ore used to produce a finished object. Constant repeated hammering in the blacksmith's forge then took place to transform the blooms into thin iron sheets (Bourke 1980, 52–4; Appendix 3.pdf, CD-Rom). The techniques used to add the bronze coating to the iron bell were not previously known.

A number of very large smithing hearth-cakes, each weighing over 110 kg, as well as large smithing hearths in the southern half of the site, provide evidence of complex bloom and black smithing techniques that were both highly specialised and advanced. As Young describes, the smithing technology represents the complex and skilled production of the iron sheets required for the bodies of iron handbells (Appendix 3.pdf, CD-Rom).

The information recovered at Clonfad proves to be most important in both identifying the technology used in the manufacturing process and in generating the earliest date so far recorded for the manufacture of this important piece of liturgical furniture in Europe (Bourke 2008, 22).

The identification of possible brazing-shroud fragments have since been made at Gortnahown 2, Co. Cork (J Tierney & T Young pers. comm.), and it is likely that further finds will appear in due course. Nevertheless, the scale of handbell manufacturing at Clonfad remains unsurpassed in the record. It is not the case that only a single bell was made at this site; the extent of the metallurgical remains indicates mass-production of handbells over several centuries. In the way that certain monasteries, such as Iona, are known today for their *scriptoria*, Clonfad may have a comparable reputation for its ability to manufacture handbells.

Hearths

A number of hearths were excavated at Clonfad; the only dateable example (C464) was a truncated circular/oval hearth, 1.21 m long and 1.1 m in estimated width (Illus. 8.7, 8.9). This cut the amorphous slag dump on the north side of the river, and contained a silty deposit, rich in slag with smithing hearth cakes and 52 fragments of a large clay coat or brazing shroud (Illus. 8.12). Animal bone from the hearth produced a radiocarbon date of cal AD 643–771 (GrA-33802).

Less than 2 m south of the brazing hearth (C464) was a second oval hearth, on the north side of the river. This second hearth was circular in plan, concave in profile and measured 0.98 m long, 0.9 m wide and 0.33 m deep. It conjoined a small semicircular and heavily-scorched depression to the south-east. This was interpreted as the impression from a free-standing tuyère, and contained a dark purple, slag-rich deposit (Illus. 8.9).

A total of 25 hearths in four clusters were excavated across the whole site (Illus. 8.9). Most were undated, and as evidence of iron smithing was produced throughout all archaeological phases, these may relate to several phases of activity. At least two clusters had associated post-holes, suggesting a covered area or structure. Clusters of hearths were located in the north, east, south and south-east of the site, and two were adjacent to the stream, one located on the opposite bank (Illus. 8.9).

Blacksmith's forge

The most elusive archaeological element of the iron-working process is generally the workshop or forge. Evidence for a floor surface and artefacts were recovered that suggest a rectangular or square-shaped building, possibly blacksmith's forge or smithy (Illus. 8.7, 8.9). It is possible that this building was built on sill beams or had clay walls of 'cob' or other material that left little or no archaeological

trace, but still provided an excellent structure that could have survived a long time. The early Irish law tracts occasionally refer to iron-working being undertaken in the open beneath a structure (the forge) that might provide shelter from the worst of the weather. The blacksmith also usually preferred to work in the dark, to be able to judge the temperature of the metal from the colour of the forge (Scott 1990, 61). The possible structure at Clonfad appeared to be composed of mud or light timber walls, with internal partitions resulting in differential floor deposits of charcoal and slag. The north, west and southern sides survived as narrow slots or drip gullies, possibly drains, containing much of the waste from this structure. It was orientated north-east/south-west and measured over 9.5 m in length by 7.5 m in width. The interior contained partial evidence of a drystone footing for an anvil or chimney base. Stratigraphically, this building sealed the inner enclosure ditch and also a kiln, so therefore related to the later early medieval phase (1C) of the monastery (Illus. 8.7).

The northern drip gully extended beyond the eastern limit of excavation, and contained two charcoal-rich fills, with 0.082 kg of smithing waste—both hammerscale and droplets, plus clay brazing-shroud fragments. Over part of the interior there was a rectangular spread of charcoal-rich soil, measuring 4.1 m long by 3.5 m wide that contained slag, smithing hearth fragments, tuyère fragments, a worked bone needle, perforated circular rotary grinding stone and animal bone. Within the footprint of the workshop was an irregular sub-rectangular pit that contained a single stony fill, animal bone and a second perforated rotary grinding stone (Illus. 8.14). The charcoal included oak and ash twig charcoal, and these produced three radiocarbon dates of cal AD 775–971, cal AD 689–891 and cal AD 774–933 (GrA-33803, GrA-33804, UBA-8221). However, this floor deposit was built over the internal ditch (C506), backfilled by cal AD 688–878 (UBA-8679). Thus, the date of this forge is estimated to be between the late eighth and late 10th century.

Excavations inside the inner ditch at Armagh monastic site produced evidence of a rectangular clay-floored workshop, with glass, enamel and ornamental precious metalworking (Gaskell & Harper 1984, 117–19). At Kilpatrick, Co. Westmeath, a small (1.35m long) semicircular open workshop was identified within the monastic enclosure (Swan 1995, 7). A more formal structure was identified at the Pictish monastery of Portmahomack in north-east Scotland, where a large industrial quarter



Illus. 8.14 Two early medieval rotary grinding stones recovered from the blacksmith's area (Finds E2723:410, E2723:429) (photo: John Sunderland).

was created in the eighth century, with a metalled road and water management, that included a large, trapezoidal smith's building measuring 14.4 m in length (S1, Carver 2008, 127–42, figs 6.7, 7.4). Smithy structures have also been excavated on secular Irish enclosure sites; such as the three sunken, rectangular, metalworking areas at Lowpark, Co. Mayo (Areas 2, 3 and 4, Wallace & Anguilano 2010, 73–6, illus. 2–4). A square forge area, 2.7 m by 2 m, was also excavated at Killickaweeny, Co. Kildare (Area A, Walsh 2008, 39–42). A large, rectangular building, associated with adjacent smithing hearths and trough pits, at Camlin 3, Co. Tipperary, may have also been a metalworking workshop (Flynn 2009). Although the early Irish law tracts refer to metalworking being conducted in the open, beneath an informal shelter (Scott 1990, 61), the rectangular forge at Clonfad would appear to be a larger and more substantial structure.

Phase 1–2: Undated medieval features

Undated burial activity

Scattered disarticulated human bone was found in a variety of contexts across the excavation site, but only one complete *in situ* burial was recorded. This was an inhumation of a juvenile roughly seven years old, with some signs of malnutrition and a diet rich in carbohydrates (Appendix 2.pdf, CD-Rom). The child's grave was orientated east/west in the Christian tradition, but was unlikely to have been associated with the early medieval monastery. The burial occurred in a part of the site that was possibly not consecrated ground at the time of interment.

Miscellaneous undated earth-cut features

In addition, several smaller earth-cut features were revealed and these were mostly concentrated in the south-east corner of the excavation (Illus. 8.7). These include crude, earth-cut wells or cisterns, a stone-lined pit or trough and several miscellaneous pits.

The first of the two deep pits or possible wells pre-dated the inner enclosure ditch. It was squared in shape with rounded edges, measuring 1.5 m square and up to 2 m deep, and was cut into natural boulder clay. The feature was not particularly deep and was initially lined with a combination of stone and quarried boulder clay. The function of this pit may have been a cistern or a well, although the precise height of the water table at this time is unknown. Conversely, as the lower levels contained charred emmer/bread wheat, barley and oat grains, it may have represented a dry pit for grain storage (Vaughan-Williams E2723_Vol_2.pdf, CD-Rom).

The second pit was much larger and much later in time, cut into the backfilled inner enclosure ditch. It measured 3.2 m in diameter and 1.5 m in depth, and contained a number of significant finds within its backfills, including a broken crucible fragment, grinding stone fragment, scrap metal, smithing hearth cakes and amorphous slag, but also contained burnt human/animal remains. Charred seeds of mustard and cabbage were also recovered from the lower levels and a similar storage function is implied for this pit (Vaughan-Williams E2723_Vol_2.pdf, CD-Rom). This waste represented the nature of activities conducted at the site in the eighth/ninth century following the backfilling of the middle enclosure ditch.

Other earth-cut features dated to this early phase included a cluster of pits located in the south-east of the site, centred around a large, partly truncated oval pit that measured 1.8 m long by 1.3 m wide, and 0.95 m deep. This was itself surrounded by a number of associated stake-holes, possibly for a structure or covering. The pit contained fragments of smelting slag, but this appears to have been used in bloom-smithing slag baths rather than smelting (Appendix 3.pdf, CD-Rom), and a fragment of a lignite bracelet. An adjacent post-hole contained fragments of human neonate hand bones.

Finally, a rectangular stone-lined pit was found truncating an earlier circular pit. This pit had a rough cobble lining and backfills, which contained animal bone, occasional charred grains of barley and grass seeds, oak, willow and blackthorn charcoal. A sample of oak charcoal returned a radiocarbon date of cal AD 723–889 (UBA-8220). A red deer antler tine shaving, possibly a waste product of antler object manufacture, was also found here; significantly, bone-working evidence was also recovered in the outer ditch. Recent excavations at Camlin 3, Co. Tipperary and Borris, Site AR 33, Co. Tipperary, have produced stone-lined water troughs close to iron-working hearths (Flynn 2009, 139; Ó Droma 2008, 57). The need for water in the smithing process is well understood, and this may have been a function of the pit at Clonfad, despite the proximity to the stream.

Artefacts

The religious community at Clonfad was also engaged in manufacturing objects of bone, antler, and possibly wood and leather. These activities were largely supplemental to the iron-working activity in the southern quarter, and were focused in the northern enclosure ditch.

Artefact comparisons are possible with ecclesiastical sites such as Armagh (Gaskell-Brown & Harper 1984, 109, 123–51; Lynn 1988, 69–84; Swift 2000, 117), Kilpatrick, Co. Westmeath (Swan 1995), Nendrum, Co. Down (Lawlor 1925; Bourke 2007, 405–18), Illaunloughan Island, Co. Kerry (White-Marshall & Walsh 2005, 175–207) and Clonmacnoise, Co. Offaly (King 1998; Ó Floinn 1998, 124–5; Murphy 2003). Some comparison is also possible with Rochfort Demesne and Ballykilmore (Chapters 6 and 7, this volume). Similar assemblages have been noted also at contemporary secular enclosure sites such as Roestown, Co. Meath (O'Hara 2007, 141–51; 2009, 57–82), Lowpark, Co. Mayo (Gillespie & Kerrigan 2010), Raystown, Co. Meath (Seaver 2005, 2006, 73–87), and Kilwickaweeny, Co. Kildare (Walsh 2008, 43–51).

The artefacts from Clonfad were recovered by hand excavation, sieving of bulk samples and metal detecting of spoil heaps. Artefacts came from the outer enclosure ditch area to the north of the excavation. Metal represented the largest category of finds—a possible bias resulting from the metal detector, followed by worked bone, ceramics and stone artefacts. A majority of dateable objects fell into a date range between the fifth and 10th centuries.

Metal artefacts

Analysis by Jacqueline Mac Dermott

The metal finds from Clonfad are typical of an early medieval site, with parallels in Ireland and Britain (Mac Dermott E2723_Vol_1.pdf, CD-Rom). A small number of recognisable tools were recovered, such as wood-chisels and wedges. A few personal items also survived, including one complete early medieval ringed pin and the grooved shaft of another (Illus. 8.15), with possibly the broken pin of a third, plus a small riveted strap end and small iron annular buckles, all of which date to the early medieval period. Six domestic knives, with whittle tang and wedge-shape section, were recovered from the site, again typical of early medieval sites. The remains of what may be a 'socketed and pronged tool', an item known from many early medieval sites, came from the outer ditch. A horseshoe fragment of possibly early to mid-medieval date was also recovered. The blade of a set of shears retrieved from the outer ditch probably represents domestic rather than heavy industrial or agricultural use due to its small size and similar objects have been linked to both haircutting and cloth-cutting. A large iron needle was possibly used for sewing sacking or other rough material.



Illus. 8.15 *Early medieval ringed pins from outer enclosure (Finds E2723:128, E2723: 231) (photos: John Sunderland).*

Worked bone and antler

Analysis by Nicola Trzaska-Nartowski & Ian Riddler

Clonfad produced an interesting assemblage of over 50 pieces of worked, polished and carved bone and two pieces of antler, notably from the outer enclosure (Illus. 8.11; Antler&bone.pdf, CD-Rom). The range of worked objects is typical of early medieval rural assemblages across Ireland, with disc-shaped beads, combs, pins, weaving implements and other objects occurring only in small quantities, including stamps, spearheads and handles (Illus. 8.10). The antler and bone stamps are, as yet, the only examples to have been found in Ireland and may have been used as a leather stamp tool. The Clonfad disc waste lies close to the beginning of a long tradition in bone bead manufacture occurring across northern Europe (Antler&bone.pdf, CD-Rom).

Most objects were manufactured between the eighth and ninth centuries. Disc or bead manufacture was particularly well represented, although only one unfinished bead was retrieved, multiple cow-bone blanks were retrieved for the manufacture of circular perforated disc beads, in various stages of production, with blanks measuring 9–13 mm in diameter (mean 10.59 mm; see Appendix 1; Illus. 8.10, 8.11). Bone combs, using bone rivets, included a complete antler comb and five bone comb clasps, all recovered from the outer ditch. Polished pig-bone needles, bone points, a bone spearhead and an antler blank plate were also found.

Bone and antler manufacture is very common from early medieval sites (Edwards 1990, 83; Mytum 1992, 242). Large collections of bone pins are known from Lagore, Co. Meath (Hencken 1950), Ballinderry, Co. Offaly (Hencken 1936), and Cahercommaun, Co. Clare (Hencken 1938;

Mytum 1992, 242–3). At the monastic site of Illaunloughan Island, Co. Kerry, six perforated disc beads, very similar to those manufactured at Clonfad were revealed in a midden (White-Marshall & Walsh 2005, 185–9, fig. 96). Other craft working at Clonfad included wood working, weaving and possibly leather working. However, iron-working was, by far, the most represented activity at Clonfad.

Stone

Analysis by Nicola Trzaska-Nartowski & Ian Riddler

A limestone mortar with lugs, of 12th- to 13th-century date, now lies upturned within the grounds of the graveyard, and was found in 1940 during demolition of a stone bridge to the site (NMI Topographic Files 1940; Illus. 8.6). The excavation at Clonfad produced a small, significant collection of stone objects. Two complete rotary grinding stones and one fragment were testament to its industrial activity (Illus. 8.14). These tools were lathe turned mounted on an iron axle with a smoothed outer surface, which shows evidence of heating. Both had a circular, off-centre perforation, which would have made them harder to rotate and more difficult to use. There is growing evidence to suggest that the earliest examples go back to the ninth century and are of Irish origin (Riddler & Trzaska-Nartowski 2008, 7; Trzaska-Nartowski & Riddler E2723_Vol 1.pfd, CD-Rom).

An early medieval lignite lathe-turned bracelet fragment, deliberately broken in antiquity, stands out for its beauty. Two stone ingot bar mould fragments were recovered from the outer enclosure, for use with bronze or silver. Finally, a possible stone lamp was also recovered, which resembles an example from Reask, Co. Kerry (Trzaska-Nartowski & Riddler E2723_Vol_1.pdf, CD-Rom).

Ceramics

Analysis by Clare McCutcheon & Tim Young

A small ceramic assemblage was recovered from Clonfad, which comprised 26 early medieval 'pyramidal'-shaped crucible fragments, intended for bronze/copper-alloy working. There were two distinct fabric types identified, the majority recovered from a single layer within the outer enclosure, suggesting the refuse from a single workshop. Curiously, these were not used for the purpose intended and, although heat affected, it appears the assemblage (or at least part of it) was in fact faulty and discarded. Only one example, from a pit backfill, showed signs of copper residue (Chapter 9, this volume). Evidence for copper working is inconclusive, aside from that carried out for the handbell brazing process, which may possibly be associated with both complete and composite copper-alloy objects, ingots and scrap metal. This material may have been collected entirely for recycling in the brazing process or even possibly used in conjunction with the ingot moulds. Alternatively, crucibles may have been manufactured on site, accounting for this waste or faulty product. However, there is insufficient evidence to say for certain.

Dating and chronology

Clonfad produced a suite of 17 radiocarbon determined dates ranging from 1579 BP ± 20 years to 117 BP ± 25 years (Appendix 1). These were from nine key features selected for their archaeological significance and stratigraphical position within the site. Significantly, oak charcoal produced a very early fifth- or sixth-century date— cal AD 427–538 (UBA-8680) was returned for the pre-enclosure phase (1A). Finian of Clonard, the figure historically credited with the foundation of a monastery at Clonfad, died in AD 549, although the foundation may have been by his son, Librán (AU 549.3; Chapter 4, this volume). Irrespective of this, either party could have established Clonfad in the early

to mid sixth century, as indicated by this early radiocarbon date. This date provided a *terminus post quem* for the earliest ditch (C508) on the site, which contained charcoal associated with iron-working debris. It suggests the monastery was used for iron-working from its earliest origins. The eighth- to 10th-century radiocarbon dates for the abandonment of Clonfad in the later occupation phase (1C), cal AD 775–971, 689–891 and 774–933 (GrA-33803, GrA-33804, UBA-8221), in turn compare favourably with the historical record of a raid and fire in the church at Clonfad in cal AD 891 (AU 891.2; AFM 887; Chapter 4, this volume). This suggests the event may have triggered a decline in the status and size of its clerical community.

Medieval Clonfad

The demise of the monastic settlement at Clonfad was wholesale but not complete, as the placename and the parish survived well into modern times. However, the history of the medieval church at Clonfad, following the Anglo-Norman invasion, is vague. As outlined above by Murphy (Chapter 5, this volume), the existence of a parish church at Clonfad is confirmed in the medieval period, from the early 14th century and again in the early 15th century. Archaeological evidence from the medieval period from excavations at Clonfad was sparse and only a small assemblage of later medieval artefacts and limited dated archaeological structures, which included two corn-drying kilns, was recovered.

A building at Clonfad was probably continually in use as the parish church throughout the medieval period. The stone church, now in ruins at the centre of the site, is probably medieval in date (Illus. 8.5). Medieval artefacts recovered from Clonfad included two rotary quern-stone fragments, an iron, single looped, annular belt-buckle and several sherds of glazed pottery of Leinster Cooking Ware (Young, McCutcheon & Stevens E2723_Vol_1.pdf, CD-Rom). As described above, a 13th-century stone mortar lies within the graveyard (NMI Topographic Files 1940).

Two medieval corn-drying kilns were located at opposite ends of the site. One example was located on the right or north bank of the stream, cut into the side of the scarp. This was a keyhole-shaped, stone-lined kiln, with a circular bowl and long rectangular flue opening to the south. The kiln measured over 5.2 m long, 0.5–1.7 m wide and 0.6–0.7 m deep and the lining consisted of 26 large limestone slabs, coursed to a height of 0.65 m. The kiln was regularly cleaned out but contained willow, oak and ash brushwood charcoal fuel and burnt seeds dominated by hulled barley grains, but emmer/wheat grains and grass seeds, occasional rye and cultivated oat grains and florets also survived. A sample of charred seeds produced a radiocarbon date of cal AD 1211–1376 (UBA-8117). A charcoal-rich, gritty clay layer that represented a backfilling event sealed the kiln. Charcoal of willow brushwood was also recovered in this layer that was possibly used in the roof's superstructure. It indicated the last use was unsuccessful with the contents of the kiln being completely burnt.

The second medieval kiln was located in the far north of the excavation, and beyond the earlier outer monastic limit of enclosure. This kiln was earth-cut, unlined, oval in plan and facing south-east. The kiln measured 4.2 m long, 1.8 m wide and c. 0.7 m deep. The unstable nature of the sandy subsoil resulted in only partial survival. The kiln contained a 60 mm-thick, basal deposit of charred seeds of 50% barley with some occasional wheat, rye, grass seeds, legumes, lentil, garden pea, parsnip, wild turnip, reeds, curled dock and common hemp nettle (Vaughan-Williams E2723_Vol_2.pdf, CD-Rom). This layer also contained charcoal of hazel, ash and cherrywood, which was used as the fuel. The rare preservation of the remains of a superstructure, that evidently collapsed, survived as oak charcoal and burnt daub. Daub was generally used in a kiln plastered over a superstructure of timber rods to form the dome and was made of a coarse mixture of mud, straw and

sometimes manure. The daub at this kiln contained numerous straw holes or voids, and circular impressions left by brushwood, measuring up to 30 mm in diameter. Excavation of this kiln also produced Leinster Cooking Ware pottery sherds, animal bone and adult skull fragments.

Post-medieval/early modern Clonfad

Clonfad remained in use as a parish church until AD 1792, when a new church was built in the nearby village of Tyrrellspass. The earliest grave slabs date from AD 1793 and the site continued as a burial ground until 1969 (local information). However, throughout the 17th and 18th centuries a significant settlement presence was noted from both the archaeological evidence and cartographical evidence of the 1838 Ordnance Survey map (Illus. 8.3). Post-medieval artefacts such as pottery, wine bottles and a sprinkling of tools, horseshoes, buckles, coins, buttons, a key and even a musical instrument (so called 'Jew's harp') were found at Clonfad. Some iron smithing was also carried out in this period, with small smithing hearths scattered across the site. A large range of buildings, probably a farmstead of a tenant farmer, was recorded on the 1838 Ordnance Survey map and the plot is recorded as 124 acres in the Griffith's Valuation as rented to John Somers, by the Lord Bishop of Meath, annual valued at £54 10s. 0d. (Griffith's Valuation 1854, 29; Illus. 8.3). It is likely the western section of the graveyard wall was altered and rebuilt at this time. Linear ditches and field boundaries were cut to alter the layout and orientation of the fields, and the stream was also diverted to its present course, with a small bridge constructed across it.

9

DIET AND ENVIRONMENT IN THE EARLY MEDIEVAL PERIOD

Paul Stevens

Throughout the printed volume, the focus has shifted from the macro to micro scale, in terms of the political and social narratives, and in terms of labour and manufacture. Now it is time to consider what the excavations have revealed about the diet of the people who lived and died in the Fir Tulach territory, as revealed in the environmental indicators recovered from the soils.

Environmental evidence of food waste covers a broad spectrum that incorporates secondary and tertiary material left by human occupation or other anthropogenic activity. Valuable information can be retrieved from the analysis and interpretation of this material. The production, processing, consumption, and ultimate disposal of food from the three excavated sites in this study reflect the wider contemporary agrarian economy of the early medieval period.

Food waste can take the form of animal, bird and/or fish bone, insect and mollusc remains, charred or carbonised seed, chaff or grains, pollen, and chemical residue analysis for trace human/animal signatures. The analysis presented here is a summary of the main findings by multiple specialists, from the three excavated sites and should be viewed in the context of an evolving debate.

The full texts of all individual technical specialist reports are presented within the body of each site archival excavation report on the accompanying CD-Rom (see Table 9.1).

Methodology

Samples are taken during excavation with the aim of assisting in the micro- and macro-scopic interpretation of the individual feature, structure, phase and/or overall site. Environmental samples can provide important information on diet, environment and husbandry practices, and selective sampling with dateable material can help to chart variation and comparison for the emerging body of data being collected from other contemporary archaeological excavated sites. The success of the analysis varies significantly between sites, and occasionally between features, periods or phases within a site. The variation can be the result of differing soil conditions. During the excavation of the three sites in this study, soil conditions were perfect for the preservation of bone, charred grains and charcoal, but were not satisfactory for the preservation and recovery of organic deposits or pollen. Large bulk soil samples (up to 5 litres) were recovered during excavation from all archaeological layers, deposits and features from the three sites (Table 9.2). The process was undertaken to reduce the possible bias in the archaeological assemblages arising from hand excavation and retrieval methods that favoured the recovery of larger ecofacts such as cattle bone over smaller items such as bird or fish bones. The number and quality of bulk soil samples recovered reflect the nature and composition of the individual sites. The majority of early medieval samples taken from Ballykilmore were taken from the fills of the

enclosure ditch, while ditch fills and pits dominated the Rochfort Demesne and Clonfad assemblages, with hearths also well represented at Clonfad (Table 9.2). The samples were processed post-excavation, which entailed separation and washing of the larger ecofacts, such as the large mammal-bone assemblages, and processing the smaller ecofacts and microscopic evidence, using wet-sieving or flotation of the bulk soil samples in a flotation tank, followed by manual sorting and separation of the *retent* material into specific samples for analysis by the various specialists. Analysis was prioritised by quality and security of context and the potential for return. Accidental additional discoveries of ecofactual material were also made from samples recovered for other purposes, such as heavily soiled artefacts or archaeobotanical soil samples. These were also sent for analysis and in some cases included as an addendum to the main analysis (Svensson E3315.pdf, CD-Rom).

For the purposes of direct comparison between sites in this chapter, only the data from stratified early medieval levels and features have been used here. This has resulted in a relatively small early medieval assemblage from Ballykilmore since only data from the enclosure ditch could be used in this comparison, because of a level of disturbance across the site from later inter-cutting burials.

Table 9.1 Specialist analysis by site, category and authors

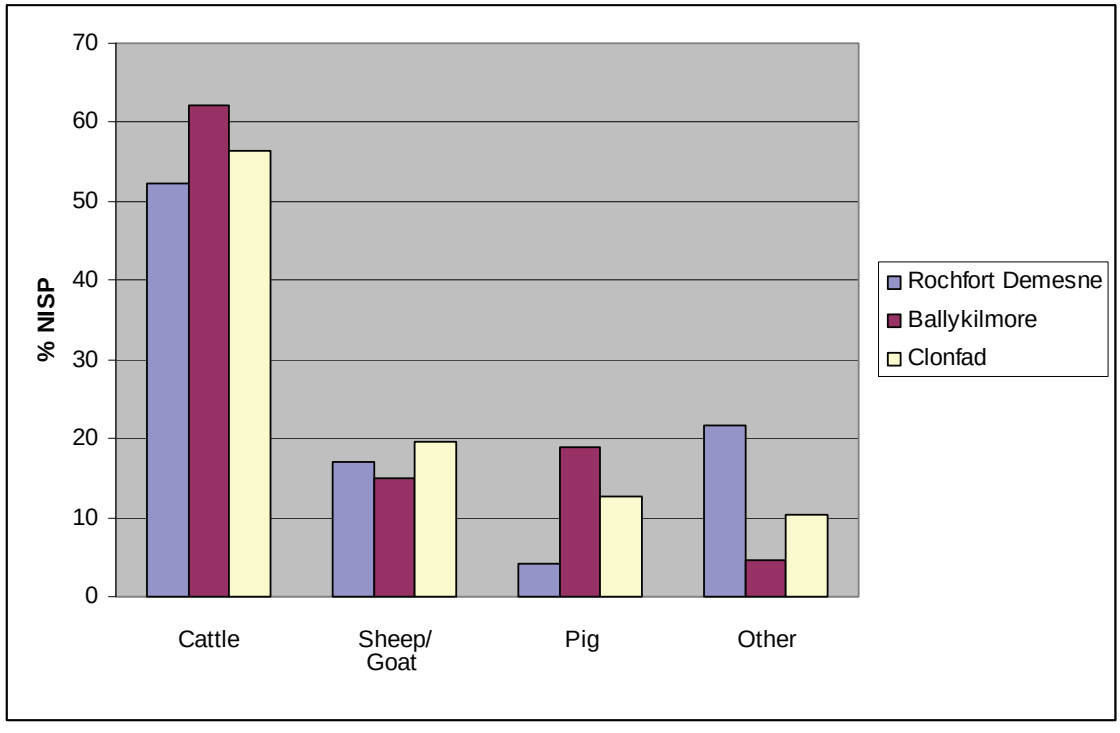
Site name (file name on CD-Rom)	***Specialist analysis***	***Author***
Ballykilmore (E2798_Vol_2.pdf)	Faunal	Patrick Randolph-Quinney
	Archaeobotany	Alys Vaughan-Williams
	Insect remains	Eileen Reilly
	Charcoal identifications	Ellen O'Carroll
Clonfad (E2723_Vol_2.pdf)	Faunal analysis	Emma Miller
	Bird bone analysis	Lena Strid
	Archaeobotany	Alys Vaughan-Williams
	Charcoal identifications	Ellen O'Carroll
Rochfort Demesne (E3315.pdf)	Bird bone	Lena Strid
	Faunal	Emma Miller
	Additional faunal	Karin Svensson
	Insect remains	Eileen Reilly
	Charcoal identifications	Mary Dillon
	Phosphate	Joe Crowther
	Archaeobotany	Mary Dillon

Table 9.2 Breakdown of early medieval features sampled by site

Feature type sampled	Rochfort Demesne		Ballykilmore		Clonfad	
	No.	%	No.	%	No.	%
Ditch fill	2	*28.6*	30	*100*	48	*68.6*
Pit	3	*43*	0	*0*	14	*20*
Surface/layer/spread	0	*0*	0	*0*	3	*4.3*
Linear/gully	1	*14.2*	0	*0*	0	*0*
Hearth/metallurgical	1	*14.2*	0	*0*	3	*4.3*
Misc.	0	*0*	0	*0*	2	*2.8*
Total	7	*100*	30	*100*	70	*100*

Meat, poultry and game

The combined faunal assemblages from the early medieval levels of all three sites are summarised in Table 9.3. A dependence on a limited number of domestic species was noted, where cattle was the dominant animal represented at all three sites, followed by sheep/goat (*Ovis*) or domestic pig in significant numbers. Recent faunal studies of early medieval sites affirms the importance of cattle husbandry in early medieval Ireland (Murray & McCormick 2005; McCormick & Murray 2007;



Illus. 9.1 Comparison of early medieval faunal assemblages for the three sites.

Fibiger et al. 2008; Miller E3315.pdf, E2723_Vol_2.pdf, CD-Rom; Svensson E3315.pdf, CD-Rom). Other domesticated species present included domestic fowl, goose, horse, cat and dog (Table 9.3).

Beef

The largest faunal assemblage of the three excavated sites is from the early medieval monastery of Clonfad (Illus. 9.1; Table 9.3; Miller E3315.pdf, CD-Rom). A total assemblage of 9,677 identifiable fragments to species (NISP) was recovered, equating to a minimum number of individuals (MNI) of 223; where cattle bone represents roughly half (% NISP 56.3) of the total assemblage, and approximately a third of the number of individuals (% MNI 31.8). The difference in the two basic units of analysis shows a possible bias in the former towards larger bones that are more likely to survive fragmentation. Therefore, the latter measure of MNI is more representative in this case. At Rochfort Demesne, the total count for cattle from early medieval levels was an even higher proportion, equating to roughly 40% (% MNI 40.6). The smaller assemblage from the enclosure ditch at Ballykilmore (NISP 1,096) produced cattle bone at roughly one third of the total assemblage (% NISP 62.1; % MNI 34), (Table 9.3).

Table 9.3 Comparison of frequency of mammal bones from early medieval levels of Rochfort Demesne, Ballykilmore & Clonfad

Site	Count	Cattle	Sheep/ Goat	Pig	Horse	Dog	Cat	Deer (red)	Rat	Rabbit/ Hare	Total
Rochfort Demesne	MNI	28	14	10	2	6	4	1	0	2 (1/1)	69
	% MNI	40.6	20.2	14.5	2.9	8.7	5.8	1.4	0	2.8	100
	NISP	1359	445	106	108	398	57	1	0	6	2,595
	% NISP	52.37	17.1	4.08	4.08	15.3	2.1	0.01	0	0.2	100
Ballykilmore (Enclosure ditch)	MNI	22	13	16	6	4	2	1*	2	1	70
	% MNI	31.4	18.6	22.9	8.6	5.7	2.9	2.9	2.9	1.4	100
	NISP	681	164	206	26	9	3	1*	2	1	1,096
	% NISP	62.1	15	18.8	3	0.82	0.3	0.1	0.2	0.1	100
Clonfad	MNI	71	53	41	22	27	4	5 (2*)	0	0	223
	% MNI	31.8	23.8	18.4	9.9	12.1	1.8	2.2	0	0	100
	NISP	1898	657	430	130	203	13	10(2*)	0	0	9,677
	% NISP	56.3	19.5	12.6	3.9	6.02	0.4	0.1	0	0	100

* Red deer antler represented

Various butchery techniques exhibited by the assemblage at Clonfad suggest the selection of joints for boiling rather than roasting, which appeared to be the preferred method of cooking. Miller states the Clonfad assemblage displayed negligible evidence for charring and the highly fragmented state of the bone is possibly a result of this particular cooking process (Miller E3315.pdf, CD-Rom). It may therefore be significant that an amorphous fragment of a pot or cauldron (Find E2723:310) was recovered from the early medieval outer enclosure ditch fills and two large rim fragments of a similar iron vessel were also recorded from later deposits (Find E2723:95 [two fragments]; Mac Dermott E2723_Vol_1.pdf, CD-Rom).

A majority of the cattle specimens at Clonfad were older animals, at optimum age for beef production rather than milk production, with a majority aged between two and four years at time of death (ibid.). Despite the much smaller size of the data-set from Ballykilmore, a high incidence of mature animals was also noted there (Randolph-Quinney E2798_Vol_2.pdf, CD-Rom).

Dairying

Rochfort Demesne shows two main age groups of cattle with 41.7% of the animals slaughtered between two and three years of age and 50.1% slaughtered at a relatively old age of over 40 months. The pattern suggests that cattle were kept mainly for dairying. The cows were probably kept to an older age for milk production, while bulls (when not kept for breeding or traction) were slaughtered in their second and third years, at their meat-bearing optimum (Svensson E3315.pdf, CD-Rom). The faunal remains did not reveal any distinct changes in the dominance and quantity of cattle over time. This contrasts with the pattern identified at Knowth, Co. Meath, where a decrease in the importance of cattle husbandry towards the end of the first millennium was noted (McCormick & Murray 2007, 108–9). At Johnstown 1, Co. Meath, the faunal remains indicated a move away from dairying to beef production in the same time period (Fibiger et al. 2008, 113–14).

Mutton

Sheep/goat was the second most prevalent species observed at Clonfad and Rochfort Demesne, representing between 20% and 23% of the assemblages (Table 9.3). It may, however, be underrepresented at Ballykilmore, where only the enclosure ditch can be assigned to this period and thus represents a smaller data set for the early medieval period (% NISP 15.0; % MNI 18.6; Table 9.3). No diagnostic elements survived to categorically indicate the presence of goat, but the presence of sheep was attested (Randolph-Quinney E2798_Vol_2.pdf, CD-Rom). Goats are commonly associated with the rise of urbanisation in the later medieval period (McCormick 1991; Kyle et al. 2009, 115). The animals at Ballykilmore were slaughtered between the ages of two and three years, suggesting the optimal economic yield both for wool and meat. Sheep generally produce their optimal meat yield after the first fleece yield and by the age of 30 months. Evidence suggests that sheep were not bred on site but were imported for their meat, wool and skins and this is in keeping with the shepherding of sheep away from the farmsteads (Payne 1973; Miller E3315.pdf, CD-Rom; Randolph-Quinney E2798_Vol_2.pdf, CD-Rom).

Rochfort Demesne saw an increase in sheep (% NISP 13.5 to 20.6; % MNI 15.8 to 25.8) between Period 1 and Period 2 (Miller E3315.pdf, CD-Rom; Chapter 6, this volume).

Pig

Pig meat is also represented in the diet of the early inhabitants in the study area. The percentage levels of domestic pig from the enclosure ditch at Ballykilmore are higher (% NISP 18.8; % MNI 22.9; Table 9.3) compared to both Rochfort Demesne (% NISP 4.08; % MNI 14.5; Table 9.3) and

Clonfad (% NISP 12.6; % MNI 18.4; Table 9.3), and to other early medieval assemblages (McCormick & Murray 2007, 104; Kyle et al. 2009, 80). A higher concentration is noted in the basal fills of the enclosure ditch at Ballykilmore, but not in the upper levels (Randolph-Quinney E2798_Vol_2.pdf, CD-Rom). Though less common at Clonfad, pig was only present in small numbers at Rochfort Desmesne, where a 50% decrease was observed between Period 1 and Period 2 (Svensson E3315.pdf, CD-Rom). At Johnstown 1, Co. Meath, a similar age profile in the early medieval period changed in the later medieval phases to a pattern of slaughter before 10 months, which was interpreted as a sign of food shortage (Fibiger et al. 2008, 114).

Slaughter at one–two years is consistent with meat production; pre-winter kills after fattening is a common strategy to reduce the need for animals to be kept over winter (McCormick 1987). Only 3% of pig bones at Ballykilmore exhibited any evidence of butchery marks, suggesting that the meat was imported to the site already cut.

Poultry

The bird bone from Clonfad consists of 30 identifiable specimens (% NISP 85.7), and is dominated by domestic fowl (or chicken) (% MNI 33.3) with one example of goose; although it is uncertain whether this is domestic or greylag goose (Table 9.4). Butchery marks are present on a fowl femur and humerus, with cut marks at the distal joints, indicating that jointing occurred as a normal part of preparation, either before or after cooking. Goose is also solely represented in the early medieval ditch at Ballykilmore (NISP 3; Table 9.4).

Table 9.4 Comparison of bird bone assemblage from Rochfort Demesne, Ballykilmore and Clonfad

Site	Count	Domestic fowl	Goose (Graylag/ domestic)	Corn-crake	Crane	Buzzard	Eagle (white tailed)	Crow	Corvid	Med passerine	Thrush	Small passerine	Total
Rochfort Demesne	MNI	0	0	1	0	0	1+	0	1	0	0	1	4+
	% MNI	0	0	25	0	0	25	0	25	0	0	25	100
	NISP	0	0	3	0	0	1+	0	2	5	0	2	13
	% NISP	0	0	14	0	0	5	0	10	24	0	10	100
Ballykilmore (Enclosure ditch)	MNI	0	3	0	0	0	0	0	0	0	0	0	3
	% MNI	0	100	0	0	0	0	0	0	0	0	0	100
	NISP	0	3	0	0	0	0	0	0	0	0	0	3
	% NISP	0	100	0	0	0	0	0	0	0	0	0	100
Clonfad	MNI	3	1	1+	1	1	0	1	0	0	1	0	11
	% MNI	33.3	11	11	11	11	0	11	0	0	11	0	100
	NISP	20	1	1+	4	1	0	1	0	0	2	0	30
	% NISP	66.6	3.33	3.33	13	3.33	0	3.33	0	0	6.66	0	100

The comparative contemporary assemblages are dominated by domestic fowl. The Fishamble Street, Dublin, assemblage is far larger (NISP 1,065) and contains the most species. This is almost certainly due to the urban/coastal nature of the site: sea birds were common at Fishamble Street, as were domesticated birds and scavengers. The inland sites of Clonfad and Knowth (NISP 41) lack the coastal birds, which Fishamble Street has in abundance; they also contain far fewer scavengers, such as crows and ravens. Despite the small assemblage sizes there are striking similarities between the environments indicated by the birds represented at Clonfad and Knowth; corncrake was identified at both sites, while water rail, heron, plover and snipe, recorded only in the Knowth assemblage, represent wetland and open grassy environments. At both sites it would appear likely that a range of wild birds were exploited, probably for food, alongside ducks, geese and domestic fowl (Strid E3315.pdf, E2723_Vol_2.pdf, CD-Rom; McCormick & Murray 2007).

Game

Wild species formed part of the diet in each of the three sites in this study, albeit in limited numbers, and included hare and wild birds such as water birds. Previous studies have suggested a lack of exploitation of wild animals noted from early medieval sites in general, and this would be borne out by the relatively low proportion of wild species in the assemblage, although clearly wild game was consumed when available (McCormick & Murray 2007, 104; Kyle et al. 2009). Wild game was represented at both ecclesiastic sites, but was mostly absent from Rochfort Demesne with the exception of a single butchered deer/red deer bone (Table 9.3). In addition, a small number of rat and hare/rabbit specimens were recorded at both Ballykilmore and Rochfort Demesne, but both are likely to be intrusive as both are burrowing animals. Furthermore, rabbits are indistinguishable from hare but were not introduced to Ireland until Anglo-Norman times (McCormick & Murray 2007, 41).

Rochfort Demesne has bones from a range of wild birds typical for an Irish early medieval site, with the exception of a single bone (plus five possible fragments) from a white-tailed eagle (Table 9.4). However, although cut marks are present on the wing of the eagle, this is not thought to represent butchery for consumption as food and perhaps may have been for extracting the feathers (Strid E3315.pdf, CD-Rom). Eagle feathers have historically been used variously for arrow fletching, fans and even brooms (Strid E3315.pdf, CD-Rom; Fishel 1997, 546; Clarke 1989, 130–1; Petruzelli & Hanson 1998, 5). A possible eagle bone was also recovered from the eighth- or ninth-century midden levels at Illaunloughan Island, Co. Kerry (White-Marshall & Walsh 2005, 69–73).

Wild birds are also found at Clonfad, including a juvenile (waterfowl) crane. Corncrake, crow/corvid, medium-sized passerines (e.g. blackbird) and small-sized passerines (e.g. blue tit), all considered to be fit for human consumption, were found at both Rochfort Demesne and Clonfad (Table 9.4). Cut marks were absent, but smaller and medium-sized birds can be torn apart at the joints, without damage to the bones, however there is no evidence for burning (or cooking) on these smaller birds.

Many wild species, especially birds and insects, are habitat-specific to a high degree. Their presence on excavations may be taken as an indication of local/immediate environmental conditions. The comparative assemblages of Rochfort Demesne and Clonfad are significant in their differences; birds such as crane and corncrake at Clonfad reflect a mixed wetland environment nearby, whereas the Rochfort Demesne assemblage is devoid of the remains of waterbirds, except the wing of a white-tailed eagle, a bird that lives in coastal areas or inland wetlands and only became extinct in Ireland in the early 20th century (Strid E3315.pdf, CD-Rom). The noticeable absence of waterfowl at Rochfort Demesne is especially unusual given the proximity to Lough Ennell. The bird

remains here are largely from species of the fields and woodlands (Strid E3315.pdf, E2723_Vol_2.pdf, CD-Rom).

At Clonfad, glimpses of the contemporary landscape can be seen in the resident wild birds: buzzards and thrushes are usually found in or around fields and woodland, corncrakes prefer open areas, such as meadows, crows can live in a variety of environments, while cranes prefer marshes and bogs, as well as open areas close to wetlands. The crane only became extinct in Ireland in the 14th century. The presence of a juvenile crane suggests a breeding ground in the area as cranes are migratory, and it most probably died during late summer/autumn (Strid E3315.pdf, CD-Rom).

Despite the small assemblages, there are similarities between the environments represented by the birds found in the early medieval deposits at Rochfort Demesne, Clonfad and those from Knowth 3, and Johnstown 1, where corncrake was identified at both sites (Strid E3315.pdf, CD-Rom; Hamilton-Dyer 2007, 71–2).

Fish

No evidence for fish bone was present on any site in this study. This is an unexpected observation given the requirement for fish in the monastic diet, and especially at Clonfad, where a stream and the River Brosna are within easy access. Reinterpretation of an artefact type from Clonfad (Find E2373:114) has also suggested use as a spearhead for hunting or fishing (Antler&bone.pdf, CD-Rom). It is made of pig fibula and possibly was once attached to a wooden shaft. Objects of this type are commonly found in late prehistoric deposits but also occur within early medieval contexts both in Ireland and on the European mainland (ibid.).

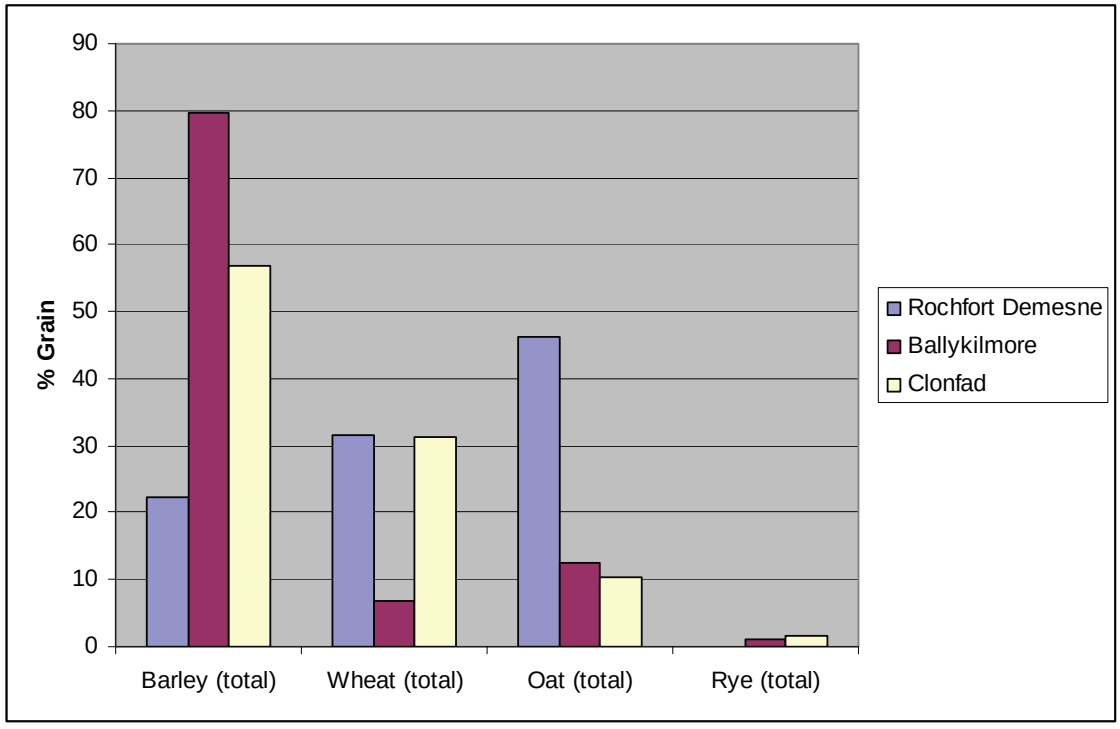
Cereals and vegetables

All three sites produced small assemblages of charred plant remains but a number of differences were noted. The archaeobotanical samples from Clonfad revealed evidence of cereal and vegetable cultivation (Tables 9.5, 9.6). At Clonfad samples from a sixth- or seventh-century pit produced emmer/bread wheat, barley and oat grains, and also lentils. It was unclear whether oat was from the cultivated or wild species. Later levels, dated to the eighth–ninth centuries, also reveal hulled barley, wheat grains and large grasses, plus lentils. An eighth- or ninth-century pit also contained a cabbage/mustard seed (Vaughan-Williams E2723_Vol_2.pdf, CD-Rom). Ballykilmore shows a similar, but smaller, assemblage of hulled barley, oat, rye and wheat grains, and also included garden pea (Vaughan Williams E2798_Vol_2.pdf, CD-Rom). The Rochfort Demesne assemblage consists solely of cereals dominated by oat, followed by wheat and barley (Dillon E3315.pdf, CD-Rom). Grasses were also found on both ecclesiastical sites, suggesting open areas perhaps indicative of grazing. Furthermore, vegetables such as lentils, peas and cabbage were being grown at these sites, indicative of a self-sufficient community (Vaughan-Williams E2723_Vol_2.pdf, CD-Rom; Vaughan-Williams E2798_Vol_2.pdf, CD-Rom).

Cereals

In general, cereals have a higher chance of preservation in the archaeological record than other plant material as cereals come into contact with fire during preparation for storing and cooking (Monk 1991). This presents a bias in the archaeological record and much of the recent debate has focused on the dominance of oat (*Avena* sp.) versus barley (*Hordeum* sp.) on early medieval sites (Kyle et al. 2009; Monk & Sheehan 1998, 72; Dillon 2007).

For the early medieval period, oat is the dominant cereal over both wheat (*Triticum* sp.) and



Illus. 9.2 Relative proportions of identified cereals from the early medieval period.

barley at Rochfort Demesne (Illus. 9.2). Oat frequently occurs in samples from the early medieval period and on several other sites across the country it is the most frequent cereal along with barley (Monk & Sheehan 1998, 72; Dillon 2007). Conversely, barley is significantly more prevalent at both the ecclesiastical sites of Clonfad and Ballykilmore, where oat occurs in only small numbers, possibly suggesting a distinction between secular and ecclesiastical (Table 9.5, Illus. 9.2).

Clonfad and Rochfort both have significant levels of wheat, where it is the second best represented grain at both sites, but in each case falls well behind the more popular cereal (barley at Clonfad; oat at Rochfort). The incidence of wheat from the early medieval levels at both sites is nonetheless considered to be relatively high and contrasts with assemblages from other early medieval sites across the country, where wheat is less common. Overall, the assemblage recovered from Rochfort Demesne was small (17 grains; Table 9.5) but amounts to 31% of the total assemblage, which is also the figure at Clonfad (39 grains; Table 9.5). A preference for cultivating bread wheat is often associated with wealth and status, and may help to support Channing's interpretation that Rochfort Demesne served as a higher status ringfort within the lord's retinue (Kelly 2000, 219; Chapter 6, this volume). Rye (*Secale cereale*) is also present in trace amounts at the two ecclesiastical sites but is absent from Rochfort Demesne.

Quern-stones were recovered from the early medieval deposits at all three sites. This provides direct evidence for food processing on site, with the manual grinding of flour and meal, and perhaps provides incidental evidence for cereal tillage and milling present or close to the site. A water-powered mill may have been located close to the monastic precinct at Clonfad, as was the case at Nendrum, Co. Down (McErlean & Crothers 2007), although no direct evidence was found for one at Clonfad.

Table 9.5 Comparison of cereal assemblage from the early medieval period

Taxa	Common name	Rochfort Demesne	Ballykilmore	Clonfad
Avena sp.*cf. Avena* sp.	Oat	25	0	12
	Oat	0	13	1
	Oat (total)	25	13	13
Hordeum sp.	Hulled barley	12	67	49
Hordeum sp.	Barley	0	7	22
Hordeum sp.	Straight hulled barley	0	8	0
	Barley (total)	12	82	71
Secale cereale	Rye	0	1	2
	Rye (total)	0	1	2
Triticum sp.	Free-threshing wheat	17	0	0
Triticum dicoccum / aestivum	Emmer/bread wheat	0	2	17
Triticum cf. aestivum	Bread wheat	0	4	0
Triticum sp.	Wheat	0	1	22
	Wheat (total)	17	7	39
Hordeum/Triticum sp.	Barley/wheat	0	8	36
Cereale indet.	Unidentified	12	0	0

Charred cereal grains dominated the archaeobotanical assemblage, however at the two ecclesiastical sites wild taxa, weeds and grasses were also recorded from the samples (Table 9.6). Within this assemblage were traces of edible plant seeds, such as lentils (*Lens culinaris)* and cabbage or mustard (*Brassica/Sinapsis* sp.) at Clonfad and garden pea (*Pisum sativum)* at Ballykilmore. These cultivated species were recorded in very small numbers, but originated from ditches and pits, indicating they were accidentally part of domestic detritus and hearth rakings. Domestic dwellings or activities were therefore situated in the immediate vicinity.

Higher incidences of wild taxa and other open-area indicators, such as grasses (*Poaceae* indet.) notably at Clonfad but also at Ballykilmore is smaller incidences, is indicative of forest clearance and arable farming in the vicinity (Table 9.6).

Acquisition and disposal of food

Whether food was imported to the sites in this study or produced directly within the site is significant to our understanding of the interaction between settlement and wider community. The level of processing that occurs within a settlement and the extent to which waste is disposed or recycled also gives an indication of the nature and function, but also the wealth and status of the site.

Table 9.6 Comparison of cultivated and wild taxa from the early medieval period

Taxa	Common name	Rochfort Demesne	Ballykilmore	Clonfad
Anthemis cotula	Stinking chamomile	0	0	2
Asperula arvensis	Blue woodruff	0	5	0
Atriplex sp.	Orache	0	0	1
Brassica/Sinapsis sp.	Cabbage/mustard	0	0	1
Chenopodiaceae indet.	Goosefoot family	0	0	1
Corylus avellana	Hazelnut	0	1	0
Lens culinaris	Lentil	0	0	4
Polygonum avicularia	Knotgrasses	0	1	0
Polygonum minus	Waterpepper	0	0	1
Pisum sativum	Garden pea	0	1	0
cf Pinus sp.	Pine	0	0	1
Poaceae indet.	Grasses	0	9	32
Rubus sp.	Bramble	0	2	0
Rumex acetosella	Sheep's sorrel	0	0	1
Stachys sp.	Woundwort	0	0	0

At Rochfort Demesne, cattle are represented by bones from the whole carcass: cranial as well as post-cranial fragments and 'meat-rich' as well as 'meat-poor' bones. It suggests that whole animals were brought to the site for processing and ultimately consumption, either as carcasses or as live animals to be slaughtered (Miller E2723_Vol_2.pdf, CD-Rom). The relative frequency of animal body parts recovered from Ballykilmore was consistent with the primary processing of carcasses. The assemblage was dominated by cranial elements (horn cores, loose teeth and mandibulae), the forelimb (scapula, humerus, radius and metacarpus), and to a lesser extent the upper portions of the hind limb (femur, tibia, and talus) (Randolph-Quinney E2798_Vol_2.pdf, CD-Rom).

Chop and knife-marks present direct evidence of primary butchery, but do not provide testimony to slaughter happening on the site. Artefactual evidence, such as axes, is associated with the slaughter and primary butchery of a carcass. Knives are required for the finer work of filleting, skinning and preparation of the joints, and this process requires a sharpening whetstone or hone to be used regularly (Kyle et al. 2009, 78). No whetstones or axe-blades were recovered from Rochfort Demesne, although two early iron 'whittle-tang' knives were recovered (Finds E3315:8 and E3315:107), as well a rotary grinding-stone fragment used in the sharpening of metal tools including axes and possibly butchery knives (Find E3315:72; Channing E3315.pdf, CD-Rom). If slaughter was carried out on site, the artefactual evidence appears limited. In contrast, six early medieval knife

blades were retrieved from Clonfad, and nine knife-blades (and one antler handle) from Ballykilmore, along with six possible hand-held whetstones.

There are very few gnaw marks present on the bone samples from all three sites, and this may be evidence of efficient waste disposal or recycling of bone. Dogs were certainly present and represented on all sites. Clonfad also saw significant quantities of bone (disc) working waste, mostly from cattle but also some pig, and there was some limited antler-working waste present (Chapter 8, this volume; Antler&bone.pdf, CD-Rom). The status of the bone worker was among the lower ranks of craft-workers, possibly recycling the waste from a large settlement as a source of raw materials. The presence of waste exclusively in the outer enclosure may be significant in the social and sacred geography of the monastic site (Chapter 8, this volume).

A number of so-called animal (burial) pits are present at both Rochfort Demesne and Clonfad, which contain whole articulated animal body parts such as the leg of mutton from Rochfort or the side of beef at Clonfad (Channing E3315.pdf, CD-Rom; Stevens E2723_Vol_1.pdf, CD-Rom). While this cannot be associated directly with a specific purpose(s), there are several possible interpretations for this unusual behaviour; such as ceremonial sacrificial deposits, burial of surplus gifts or tithes, memorial deposits for absent or fallen colleagues, feasting and evidence of unconsumed meat or even bad meat, or even the burial in earth-cut pits for the purpose of curing or proving the meat. Whatever the reason, the burial of unused food in itself suggests a level of conspicuous consumption indicative of wealth and prosperity that seems at odds with the nutritional stress shown in the contemporary burials in Ballykilmore (Chapter 7, this volume; Appendix 2.pdf, CD-Rom).

Non-food resources

Some of the cattle bone from Clonfad exhibits stress patterns from heavy labour, and suggests the use of oxen as beasts of burden (Miller E3315.pdf, CD-Rom). This may be significant in the context of ploughing for tillage, but traction animals may also have been used for a variety of other functions—both agricultural and industrial. Horses are also present in limited numbers at all three sites in this study. In general, these animals were mature and over two years old at death. No evidence of butchery was noted from these specimens. The recovery of horse tack from Rochfort Demesne, identified as an iron horse buckle (Find E3315:53) supports the suggestion that the horse was kept for riding. Early law tracts associate rank with owning a horse for riding (Kelly 2000, 88–9). While the consumption of horse meat was outlawed in the early medieval period, it is unclear to what extent this prohibition was observed (Kelly 2000, 352–3; Murray & McCormick 2005, 67). At Kilcloghans, Co. Galway, butchered horse bone was recorded, but this was interpreted as evidence of skinning for hides or dismemberment rather than consumption (Kyle et al. 2009, 81).

Dog is represented at each of the three sites in this study. In Rochfort Demesne, a total of six individuals (MNI) was recorded, which is slightly higher than the number of cats present. Only four examples (MNI) of dog were recorded at Ballykilmore, and this smaller incidence is interpreted as evidence that the site was not continuously in use, as dogs and cats would be attracted to settlement as scavengers and for vermin (Randolph-Quinney E2798_Vol_2.pdf, CD-Rom). At Clonfad dogs were well-represented (% NISP 6.02; % MNI 12.1), however, and received individual burial in certain cases at this site, suggesting a degree of familiarity and devotion (Stevens E2723_Vol_1.pdf, CD-Rom). Dogs may have been kept as pets but may have been particularly useful as guardians or for hunting. Larger dogs may have been used in the hunting of deer, which also appears in low counts (Table 9.3).

Economic indications

Much has been made of wheat (more especially free-threshing wheat) in the assessment of the status of sites such as Rochfort Demesne. In the contemporary historical text *Breatha Déin Chécht*, or Judgements of Dían Décht, wheat, barley, rye and oat are all listed as common cereals (Kelly 2000, 219). However, free-threshing wheat or bread wheat and rye were more highly valued than spelt wheat and emmer wheat, followed by barley and lastly oat (ibid.). Wheat is easier to process as a free-threshing cereal, but intolerant of damp or wet weather and poor soils. As such, wheat was the preserve of people such as kings, and barley was reserved for the strong farmer or *bóaire*, while oat was classed as the lowest cereal (Edwards 1990, 60; Murray & McCormick 2005, 75; Kelly 2000, 219).

The low value of oat appears to be based on the quality of bread that can be obtained from the grain (Kelly 2000, 226–7). However, bread was not the only food that was made from cereals, as they were also used for making meals, porridges, gruels and soup bases and were possibly used as fodder (Sexton 1998, 76; Dillon E3315.pdf, CD-Rom).

It is perhaps significant that rye is absent from Clonfad and rare at Ballykilmore, as this would be expected in an early monastic site (Vaughan-Williams E2723_Vol_2.pdf, CD-Rom; E2798_Vol_2.pdf, CD-Rom). Both barley and rye cereals would have contributed to the monastic diet in products such as the bread loaf *secundarius* (Sexton 1998). Cereals were also important in the penitential and ascetic diets of the monastery in the form of porridge and thin gruel (Kelly 2000, 332, 348).

The apparent absence of fish from the diet in Clonfad, Ballykilmore and Rochfort Demesne is significant, and may perhaps also be due to the recovery techniques used in excavation. Clonfad was situated adjacent to a small stream, which presumably at some stage would have been a source of fresh fish, but it was not evident in the excavated record, despite extensive bulk sampling of deposits and features at Clonfad.

Environmental indications

In addition, a small number of charcoal samples were analysed with a view to submission for radiocarbon dating (Dillon E3315.pdf, CD-Rom; OCarroll E2723_Vol_2.pdf, CD-Rom; E2798_Vol_2.pdf, CD-Rom). The scope of this analysis was limited in nature and the sample counts and identifications were quite low; consequently the level of environmental information is less reliable. At Ballykilmore, charcoal was not widely analysed because of the availability of other suitable material for dating, and so is excluded from this discussion (OCarroll E2798_Vol_2.pdf, CD-Rom). At Rochfort Demesne, 13 samples were analysed from early medieval features or deposits, while eight were analysed from contemporary features at Clonfad (Table 9.7; Appendix 1; Dillon E3315.pdf, CD-Rom; OCarroll E2723_Vol_2.pdf, CD-Rom; E2798_Vol_2.pdf, CD-Rom). When the available data are combined, small glimpses of the local environments exploited by these communities can be gleaned. This can be integrated into wider pollen studies for the area, such as Heery's study from Cornaher Lough, Co. Westmeath, discussed by O'Sullivan (Chapter 2, this volume). These present evidence of a progressively more open landscape with increased woodland clearance and farming activity after c. AD 400, despite brief periods of woodland regrowth around AD 1000 (ibid.).

The type and range of species identified from the assemblage analysed at Clonfad and Rochfort Demesne are reflected in other assemblages analysed in Ireland. Oak charcoal was the dominant species identified in both sites. It is one of the preferred woods for making charcoal as it is slow burning and gives out substantial heat. Charcoal, rather than wood, was the preferred fuel for

industrial firings because it burns hotter and certain temperatures can be controlled (OCarroll E2723_Vol_2.pdf, CD-Rom). Recent excavations along the M4 road scheme have identified a number of charcoal-production pits (Carlin et al. 2008, 89–91, 102–3, 107). Conversely, oak also has unique properties of great durability and strength, which also makes it a suitable species for structural requirements. Oak was used in all early medieval and undated metallurgical features at Clonfad. However, ash, elm, blackthorn and hazel were also recovered in small counts from the smithing hearths (Table 9.7; Appendix 1; OCarroll E2723_Vol_2.pdf, CD-Rom; Stevens E2723_Vol_1.pdf, CD-Rom). This may indicate the use of starter twigs or accidental inclusion with the oak, which was the dominant material within the assemblage. Despite the industrial scale of the metalworking activities at Clonfad, there does not appear to be a shortage of oak as a raw material until the 17th century (Chapter 3, this volume; OCarroll E2723_Vol_2.pdf, CD-Rom). This is borne out by the use of oak in later medieval and post-medieval features at Clonfad (OCarroll E2723_Vol_2.pdf, CD-Rom; Stevens, E2723_Vol_1.pdf, CD-Rom).

At Rochfort Demesne, several excavated features were identified as refuse or latrine pits and therefore reflect a random inclusion of the surrounding woodland resource and provide a glimpse of the local woodland vegetation (Chapter 6, this volume). These pits contained charcoal of oak, hazel, elm, apple-type (*pomoideae*) that is indicative of primary woodlands comprising mainly oak woods with elm and ash and possible hazel under-storey present within the oak woods. Scrub hedgerow was also present in the surrounding area as evidenced by the presence of *pomoideae* and hazel (and blackthorn at Clonfad). Wetland species such as willow, birch, alder and alder buckthorn were identified primarily in ditch fills from Clonfad, where access to a wet area or stream is indicated (OCarroll, E2723_Vol_2.pdf, CD-Rom).

Table 9.7 Charcoal indications identified in early medieval Clonfad and Rochfort Demesne

Species	Common name	Site(s)	Feature(s) types	Landscape indications
Alnus glutinosa	Alder	Clonfad only	Ditch fills/ Hearths	Wetland habitats
Alnus frangula	Alder buckthorn	Clonfad only	Ditch fills/ Hearths/spreads	Moist acid soils, riversides and peat
Prunus spinosa	Blackthorn	Clonfad only	Ditch fills	Scrub and woodlands
Salix sp.	Willow	Clonfad only	Ditch fills	Wetland habitats
Fraxinus excelsior	Ash	Clonfad only	Ditch fills/hearths	Coloniser to open land and hedgerows
Corylus avellana	Hazel	Clonfad/Rochfort Demesne	Ditch fills, pits, hearths and bank	Widespread habitats
Pomoideae	Apple type	Clonfad/Rochfort Demesne	Ditch fills, hearths, pits	Coloniser to open land and hedgerows
Quercus sp.	Oak	Clonfad/Rochfort Demesne	Ditch fills/hearths	Widespread, tolerant to flooding, robust
Ulmus sp.	Elm	Clonfad/Rochfort Demesne	Ditch fills/heaths	Damp woodlands, limestone
Betula sp.	Birch	Clonfad/Rochfort Demesne	Ditch fills	Coloniser to open land and bogs

Discussion

The three enclosures in this study show similarities in consumption habits and tastes, but also differences that may reflect the economic status and nature of the sites; a comparison is given in Table 9.8. The largest assemblage represented was from Clonfad, which itself represented a small portion excavated of a large monastic site. Conversely, the sampled assemblage from Rochfort Demesne represents the excavated remains of most of this occupation site, and shows a lower level of activity but possibly similar level of status. Ballykilmore was not well represented in dateable material from sealed early medieval deposits, but did reveal patterns of a lower status ecclesiastic site, possibly not occupied continuously. Evidence from all three sites of the surrounding environmental conditions was limited but informative, providing an indication of an open landscape of mature hedgerows, open fields, rotation farming and exploitation of the local forests, wetlands and marshes.

The faunal assemblages from the three sites show there is a uniform pattern in the overall exploitation of domesticated species that included some wild species as well. Cattle was the dominant species exploited at all three sites, a pattern repeated across the spectrum of early medieval excavated sites in Ireland. Meat was likely to have been imported live and not reared at any of the sites, but does appear to have been processed on site at any of the three sites. Evidence for boiled joints in favour of roasting was also noted in the assemblage from Clonfad. Bone and antler working was also practised at Clonfad for the production of combs, beads and pins.

No evidence for dairying was noted at either Clonfad or Ballykilmore, the two ecclesiastical sites, but this was in contrast to the evidence at the secular site of Rochfort Demesne, where dairying

Table 9.8 Comparison of the main environmental and dietary evidence

Comment	*Rochfort Demesne*	*Ballykilmore*	*Clonfad*
Dominant meat type	Cattle	Cattle	Cattle
Age profile indicates	Dairy	Beef	Beef (boiled)
Other main fauna	Sheep, pig	Pig, sheep	Sheep, pig
Dominant cereal type	Oat	Barley	Barley
Cereals present	Wheat, barley	Oat, wheat, rye	Wheat, oat, rye
Other edible taxa	No data	Pea	Lentil, goosefoot, cabbage/mustard
Wild species	Red deer, rabbit/hare, small/medium birds	?rabbit/hare	Red deer, rabbit/hare, birds
Edible birds present	Corncrake, eagle? Passerine	Goose	Fowl, corncrake, crane
Pets/work animals	Dog, cat, horse	Dog, cat	Dog, cat, horse
Secondary working	Horse tack	No data	Draught animals, bone/ antler craft-working
Environment	Mixed open woodlands, adjacent marshland with hedgerows and cereal production	No data	Arable rotation with open grasslands, mixed open woodlands, adjacent marshland

appears to be the significant and is present in both phases of enclosure within the early medieval occupation of the site. In general, earlier early medieval sites have a high presence of cattle, which reflects a value system based on cows and dairying. This value system appears to have been universal throughout Ireland, and beyond. In the 10th century the importance of cattle seems to decline in Ireland (McCormick & Murray 2007, 108–9). However, the excavated data set from the Rochfort Demesne does not continue beyond the 10th or 11th century to test this thesis.

In addition to cattle, pig and sheep were also eaten and well represented at all three sites. The limited early medieval sample size at Ballykilmore may account for the paucity of sheep over pig, which appears second in this assemblage. Alternatively, this may be a product of the site's limited and/or seasonal occupation. Sheep/goat provided secondary products that were also valued, such as bone, leather and possibly wool. Although no leather or wool was recovered from excavation, metal and bone tools were recovered from Clonfad, suggesting both were being worked on this site. This reflects the nature of a larger settlement with a range of resident craft-workers.

Domesticated fowl or goose was consumed at both the ecclesiastical sites of Ballykilmore and Clonfad, but not at the secular site of Rochfort Demesne. This is unlikely to be a product of sampling bias as other wild bird species were recovered at Rochfort Demesne, but rather a social or economic indicator. Whilst the consumption of horse, dog and cat were not apparent at any of the three sites, these animals were represented in the archaeological record from all three sites, and possibly used as working animals. Evidence in the faunal record of draught animals was recorded at Clonfad, whilst the artefactual evidence showed horse-riding at both Rochfort Demesne and Clonfad.

Clonfad produced evidence for a varied and nutritious diet that included boiled beef, mutton, pork, chicken (fowl), and possibly some game, accompanied by oaten bread, ale and porridge, with cabbage, lentils, roots and herbs. Fish is absent from the faunal assemblages at the three sites, curious for a locality adjacent to rivers, lakes and streams. The presence of buried joints of beef or mutton was noted at Clonfad and Rochfort Demesne, and may have had a ritual or practical application. This provides an indication of economic prosperity and sustainability, which appears at odds with the osteo-archaeological evidence of nutritional stress and disease amongst the population buried at Ballykilmore (Appendix 2.pdf, CD-Rom).

Excavations at both Clonfad and Rochfort Demesne produced evidence for the presence of bread wheat, a highly prized commodity that was grown and consumed at both sites. Although, in both cases this was not the dominant cereal, it does provide further indication of some enhanced prosperity and status at both sites, in contrast to Ballykilmore, where the wider archaeological evidence indicates the burial place of a local rural community. Barley, oat, rye and wheat as well as vegetables were grown with fallow in evidence at Clonfad (Vaughan-Williams E2723_Vol_2.pdf, CD-Rom). The scale on which food was produced suggests a very organised and efficient monastic estate management.

The environmental indicators from this study are limited, but showed a uniformity of selection-bias towards oak charcoal. Published pollen studies show relatively stable levels of oak throughout the early medieval period, but increasing levels of cereal and grasses. Hedgerow species, hazel and ash reflected in the charcoal assemblage, along with the archaeobotanical evidence, for both Clonfad and Rochfort Demesne, confirm a highly organised landscape with arable fields and established hedgerows, interspersed with pastureland and scrubby woodland.

10

CONCLUSIONS

John Channing and Paul Stevens

The archaeological and historical narrative of central Westmeath reveals a rich landscape of monuments and artefacts that reflect this fertile region amidst rivers, lakes and bogs as presented in the early medieval period. Situated at a crossroads of communications, Lough Ennell with its great crannogs, attendant ringforts, churches and hoards of silver is a strong reminder of the Clann Cholmáin kings and their subject peoples, as charted by O'Sullivan and by Connon in the opening chapters. Yet perhaps the most enduring observation that can be made from the excavations reported in this volume is a new-found sense of balance in this landscape. The Fir Tulach territories may not have been as important as those lands on the western and northern sides of the lake, but we now have a record of three extensive and detailed excavations from the lands lying east and south of the lake, on contemporary enclosure sites that are located within 10 km of each other.

Rochfort Demesne

There are strong indications of high status at Rochfort Demesne. The absence of houses and limited indications for food processing and other domestic activities, coupled with the fleeting but persistent visibility of high status artefacts, the suggestion of feasting and, perhaps most importantly, the expansion of the site to achieve a greater visibility all attest to this. Prior to excavation, Rochfort Demesne looked like an ordinary small ringfort; even this identification is problematic because of the later folly works. While the Crannóg Archaeology Project recognised the site as a ringfort, subsequent machine-assisted test-trenching suggested that it was a formal or designed landscape feature (Brady 2007, 95; Tierney & Elder 2004). The site lacks indicators of continuous domestic occupation. There are no structures or internal division and the quantity and nature of the cultural deposits do not suggest continued occupation over several generations. Yet the site was evidently important and within c. 150 years was modified to almost double its area, while retaining univallate form. The faunal and artefactual evidence suggest the processing of animal carcasses, metalworking and occupation on an intermittent basis. Items such as the ringed pin combine with the site's morphology to suggest the presence of the well-groomed (comb) and fashionable (ring pin), with access to the Viking world of exchange and trade. The expansion of the site used the natural topography to greatest visual effect, and no doubt enhanced its defensive character as well. This combination indicates a desire to project strength and authority.

There is no evidence to suggest a family farmstead at Rochfort Demesne. A consideration of the surrounding archaeological landscape may explain the site's distinctions. It lies in close proximity to similar enclosures that form a cluster of sites along the south-east side of Lough Ennell (Illus. 6.1), while the lake and its shoreline hosts a cluster of adjacent crannogs and modified rock platforms. If

Rochfort Demesne and Goose Island crannog were contemporary with each other, what was the nature of their relationship? Was the expansion of Rochfort Demesne linked to changes within the contemporary local political elite?

Radiocarbon dates from the primary enclosing ditch may fit with the defeat of the Fir Tulach at Dún Bile in AD 764 by Donnchad Mídi—King of Clann Cholmáin and, as Connon points out (Chapter 4, this volume), it may have been at this point that Clann Cholmáin established direct control over the defeated sub-kingdom. Further evidence of the Clann Cholmáin's active presence in the sub-kingdom lies in the title *Rex Telach Mide*—'king of Tulach of Mide', conferred upon Donnchad's son Óengus at his death in AD 830. Is it possible that the site's expansion was a physical manifestation of the transfer of influence, through internecine rivalry, possibly between lineages such as Ua Dublaich and Uí Domnalláin?

The model of intermittent use and elevated status proposed by O'Sullivan (Chapter 3, this volume), as part of the royal panoply, suggests explanations for the details raised by the excavation and by the location of the site in relation to its wider landscape. Further study may confirm and add detail to Rochfort Demesne's relationship with Lough Ennell and local royalty. It seems clear, however, that the details of the excavation question the all-too-easy identification of the 'ringfort' as an early medieval family farmstead. These embanked enclosures had multiple functions and Rochfort Demesne probably functioned on an intermittent basis to support or even host the progress of a royal retinue.

Ballykilmore

The Ballykilmore excavation presents a different perspective on this early medieval territory. The burial record provides a deep insight into the ordinary people who lived, worked and died. Side-by-side with early medieval high society, we glimpse the very local nature of medieval culture, where long-distance travel and communications are not unknown, but where the majority of the population appear to spend their lives in close proximity to the place they were born. The human bone remains highlight the closeness of the community, with some indications for endemism. The community continued to bury their dead here for over a millennium, right into the later medieval period, showing little sign of change and remarkable consistency. The interred population contains notable atypical burials, but the vast majority of burials tell the same story. The mortality profile indicates high levels of infant death; there was a steady decline in mortality after the age of four years, rising slightly into the early teens, and then falling again until individuals reached middle adulthood. The high infant mortality rate may be slightly biased by overprinting of the subsequent *cillín*. Apparent mortality rose sharply after 45 years but this is a statistical compression due to the age determination technique itself: the mature age category could contain individuals living into their 70s or 80s but we are unable to resolve this period of extended biological ageing. Family plots may also be present, as multiple grave reopenings and possible osteological familial markers suggest, with the concomitant stability in terms of gene-flow and admixture over time. The majority of adults lived a life of manual labour that ended naturally, a pattern repeated in the record of other excavated medieval Irish cemeteries. As both Connon and Murphy describe, the common people in the Fir Tulach territory remain unchanging over time, and even during the Tyrell lordship in the later medieval period, it was unlikely that large numbers of newcomers from Britain arrived to work their Irish lands. Certainly this sense of continuity is borne out by the bone assemblage from Ballykilmore.

The early dates for burial at Ballykilmore, pre-dating the first radiocarbon determination from the site of cal AD 395–578, reveal an active cemetery, possibly for mixed transition beliefs (O' Brien 1992, 133; Ó Carragáin 2010, 217–21). Through its many years of use the western half of the

enclosure appears to have been outside the burial area, suggesting a place of habitation and occupation rather than burial, although the hard evidence for the former was elusive. Neither Ballykilmore nor Rochfort Demesne was a static site. Rochfort Demesne was redeveloped while Ballykilmore may have balanced settlement and cemetery, and later added a stone church before declining in its final stages of use to serve informal or *cillín* burials. Whether Ballykilmore was used simultaneously for settlement and burial in its earliest centuries cannot be said from the present evidence. It may be that an original settlement evolved primarily into a cemetery from a desire for burial on ancestral ground. This model of activity would see descendant, adjacent, family groups returning to the ancestral cemetery at Ballykilmore for burial.

By the first Ordnance Survey in the 1830s Ballykilmore had effectively disappeared from the landscape, Clonfad had also become much reduced in terms of its visible archaeological fingerprint, while Rochfort enjoyed renewed interest as a folly of its former self.

Clonfad

The complexity of Clonfad as shown by excavation and survey provides significant amplification to the rather terse records of the monastery gleaned from contemporary sources. Undoubtedly, however, the most important discovery made during the excavations has been the unique new evidence for the manufacture of wrought-iron handbells and, above all, the discovery of casing fragments used for brazing. The application of a thin non-ferrous coating to the iron bells has not been studied in detail, but the Clonfad evidence suggests for the first time that it was applied by brazing (Bourke 1980; 2008, 22). The bells manufactured at Clonfad were evidently of Bourke's Class I type (ibid.). The forging of handbells, one of the largest iron liturgical artefacts of their period, may be the reason for the production of the blooms suggested by the exceptionally large smithing hearth cakes at Clonfad.

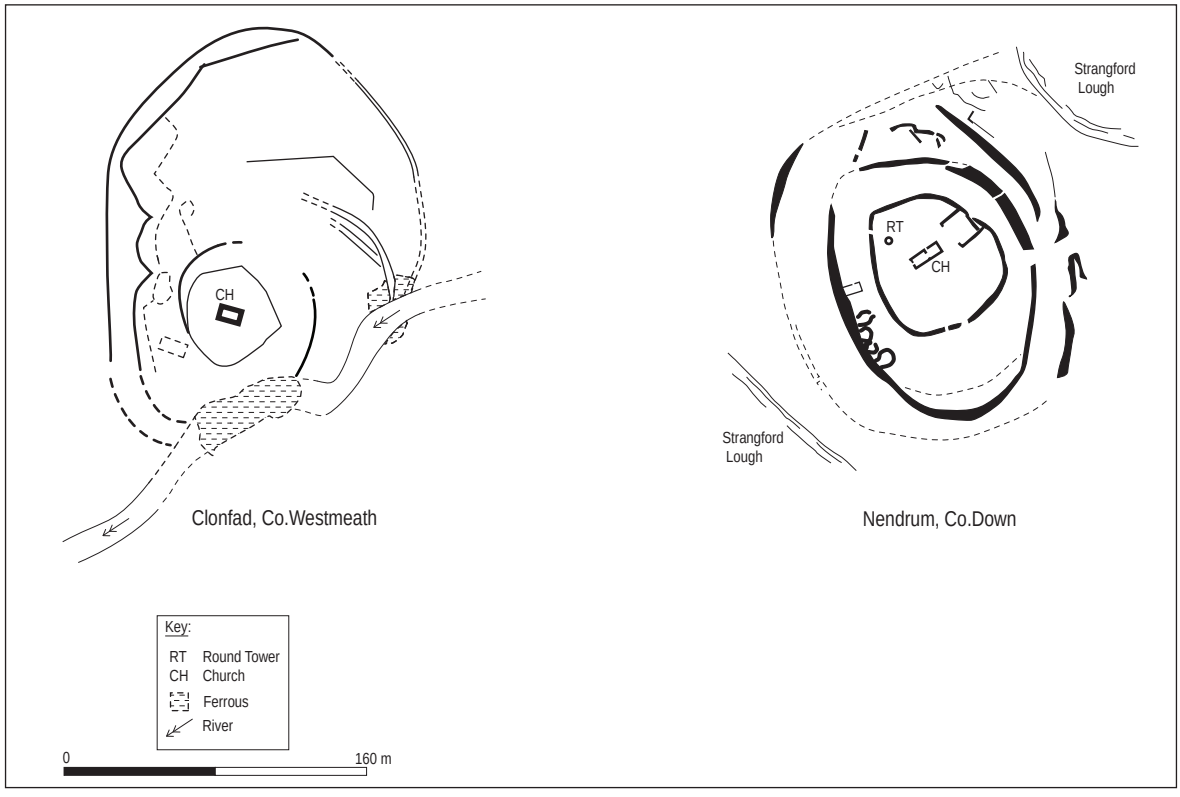
The production and finishing of one or more handbells at Clonfad has significant implications for the early medieval period in terms of wider economic and organisational aspects. A study of handbells has shown a distribution pattern that is focused on the Irish midlands, and which extends to Scotland, Wales and England (Bourke 1980; 2008). The production of handbells was for limited and exclusive patrons, as this type of bell was used by an abbot to call priests to prayer, and was a symbol of status and position. Furthermore, it required specialised smithing techniques, demanding considerable skill, knowledge, time and resources. It is reasonable to assume that production centres were specialised and, if the consistent record at Clonfad is indicative, such centres focused on their product over a long period of time. Clonfad was well placed to serve in this capacity: it had ready access to the raw material; it was located in a political heartland close to the seat of power and wealth of Míde; and it was well positioned for access across the country by road/esker and by water. The scale of production witnessed at Clonfad is a further demonstration of the need for archaeologists to rethink our understanding of the economic structure that was capable of providing this service in early Ireland (Brady 2006, 40).

Iron-working was the most prolific activity seen within the excavated area at Clonfad. A total of 1.5 tonnes of archaeometallurgical residues were recovered, making the Clonfad assemblage one of the largest recovered to date from an early medieval ecclesiastical site in Ireland. The assemblage is almost entirely of residues from iron-working (Appendix 3.pdf, CD-Rom). A number of new categories in the study of metallurgy have been highlighted in this assemblage, and the Clonfad information merely reaffirms the need for a complete reappraisal of metalworking, both in terms of origins, technology and classifications in Ireland. This must also address classifications in the field, and point to a firmer understanding of metallurgical features on site.

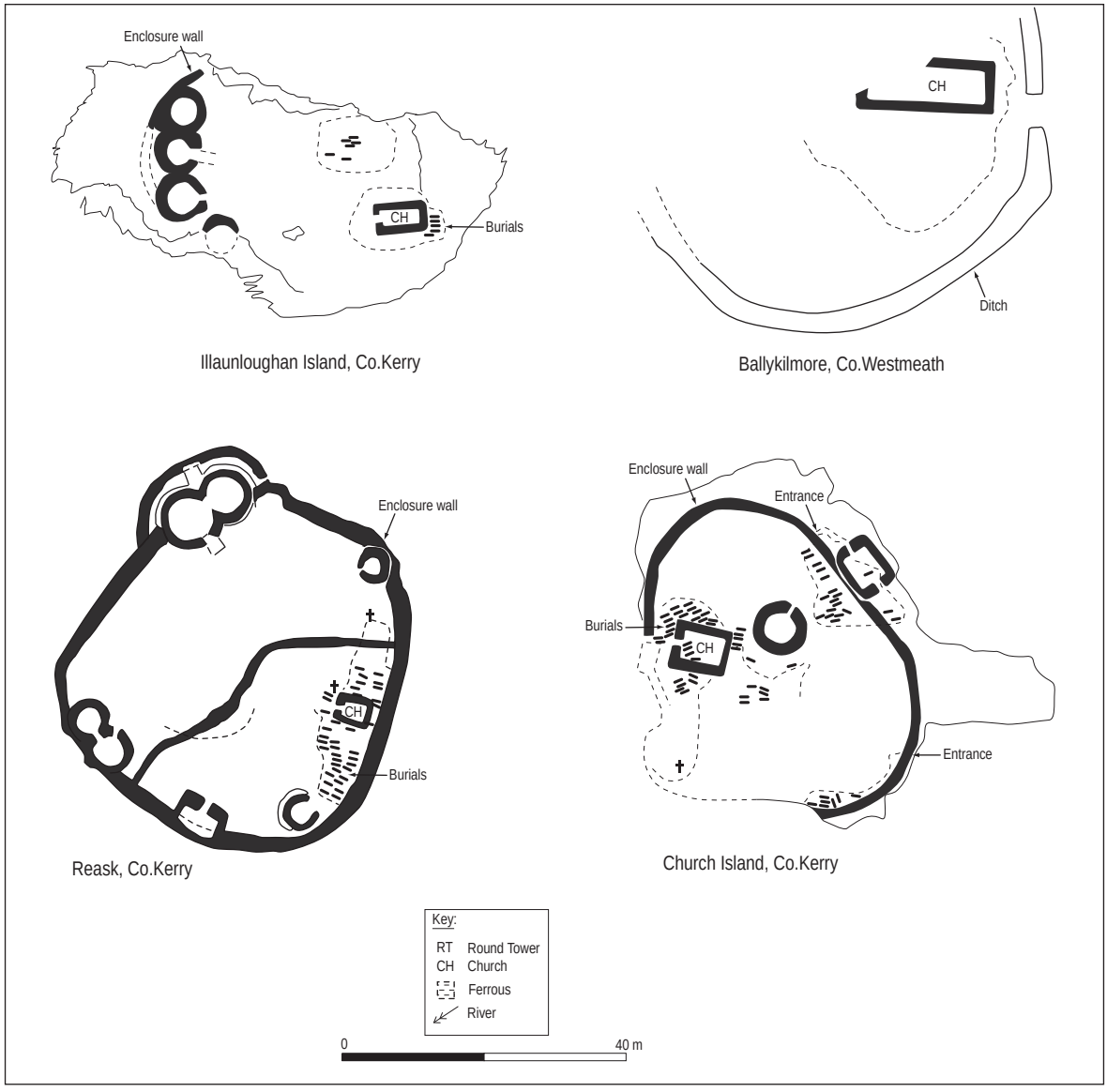
Clonfad was the only site of the three excavations to be mentioned in the historical records, probably because it was an important monastic centre. The association with Finnian of Clonard, and/or a certain priest known as Librán, permits a correspondence to be observed between the written sources and the archaeological record, both of which confirm the existence of the monastery between the sixth and ninth centuries. A suggestion of political instability and inter-regional rivalry may have led to the downfall of the monastery, which was the main church in the southern half of the Fir Tulach territory, and may have competed with Lynn for dominance (Chapter 4, this volume).

The excavations database by the Early Medieval Archaeological Project (http://www.emap.ie) reveals only two ecclesiastical sites where excavations occurred between 1970 and 2004 in Westmeath (including Clonfad), out of a total of 225 excavated or partly excavated ecclesiastical sites across Ireland, the majority of which occurred in Dublin, Galway, Cork and Antrim (O'Sullivan et al. 2008, 119–20). Less than 10% (22) of those sites where excavation has occurred have produced highly significant findings (ibid.).

Unlike Ballykilmore, no evidence for a contemporary church or burial ground was found by excavation at Clonfad, but that is easily explained by the fact that the excavations took place within the manufacturing zone between the outer enclosures of the site and at a remove from the inner enclosure, the *santicissimus* zone, where a ruined church building and small graveyard still remain. The archaeological work at Clonfad has presented yet another example of the classic tripartite division of an early monastic centre into concentric trians (Doherty 1980, 57; Bradley 1998, 44). Comparison was made throughout with Nendrum, where a similar layout of three large concentric enclosures is seen, using stone walls and banks instead of ditches, while the small hillock on which the County Down monastery is located helped to define the limits of the settlement, ensuring access to its foreshore to facilitate the construction and use of its tidal watermill (Lawlor 1925; McErlean



Illus. 10.1 *Size comparison between ecclesiastical site Clonfad and Nendrum, Co. Down (source: Lawlor 1925; McErlean & Crothers 2007).*



Illus. 10.2 Size comparison between Ballykilmore and small ecclesiastical sites in County Kerry.

& Crothers 2007; Illus. 10.1). Other comparisons may be made with the single enclosure sites of Illaunloughan Island, and Reask, Co. Kerry (White-Marshall & Walsh 2005; Fanning 1981; Illus. 10.2). A sense of spatial division within the monastery is indicated by the concentrated industrial activity in the eastern side of Clonfad, and further inference is presented in the wider geophysical survey data, especially to the west of the present-day ruined church.

Comparisons between the three sites

Diet and environmental evidence is combined in this study to compare and contrast the three sites in the early medieval period. A simple and limited diet was common to both secular occupants and monks alike, and reflects a well managed agricultural landscape, with an organised regime of both crop rotation and animal husbandry. Dairying was not in evidence at either ecclesiastical site, but is

indicated by the slaughter patterns of the early and later phases of settlement at Rochfort Demesne. Agriculture was practised by alternating cereals, pulses and fallow. Barley appears to have been the favoured cereal from the early medieval period, with the possible exception of Rochfort Demesne where oat and bread wheat are preferred. Horse, dog and cat were not eaten at any of the three sites, at least not from the evidence recovered.

Like Ballykilmore and Rochfort Demesne, the archaeological evidence at Clonfad shows how the monastery transformed, expanded, contracted, and changed between the early and later medieval periods. Clonfad demonstrated evidence for continuous occupation between the sixth to the ninth centuries. During later periods, the focus of this site changed and centred on a small parish church and farm dwellings (possibly a priest's house and range), finally beginning a burial ground.

The three sites in this volume share a common element of morphology, an enclosing ditch. Enclosure is one of the most common elements in many upstanding recorded field monuments in the archaeological landscape, but it does not necessarily imply a uniformity of function, period or status. The comparisons and contrasts in this volume between three contemporary enclosure sites at Rochfort Demesne, Ballykilmore and Clonfad, provide for a rich and varied picture of settlement activity at each site. At a regional level, research in the area in which the three sites lie was hitherto largely focused on the lakeside settlement and wetlands. The study of these three land-sites now contributes greatly to the emerging pattern of human activity of the early medieval period. Nationally, the new findings presented in this study for iron-working and handbell manufacture have significant implications for the evolving understanding of economy and technology in this period.

ENDNOTES

Chapter 4

1 On the other side of the Brosna lay the Southern Uí Néill sub-kingdom of *Cenél nÉnna* whose name is preserved in the 'kindalen' element of Castletownkindalen, the civil parish to the immediate west of Newtown (Walsh 1957, 256; Orpen 1920, 169) (Illus. 4.1, 4.3).

2 A further hint that the early medieval kingdom may have extended farther west than the modern baronial border is found in the *Life* of Colmán mac Luacháin, a key source for the history of the Fir Tulach region. This saint's *Life*, which likely dates to the early 12th century in its current form, mentions that the grave of a certain 'Bishop Áed' lay within Fir Tulach (Meyer 1911, 92, §89). Within the context of the over-kingdom of Mide, the 'Bishop Áed' in question is almost certainly Áed son of Bricc, bishop of Killare (near Uisnech, barony of Rathconrath, Co. Westmeath), who died c. AD 589 (AU 589.1, 595.3; AFM 588). Áed is strongly associated with *Ráith Áeda*, the townland of Rahugh in the civil parish of Rahugh, where he is commemorated by a holy well and a rock known as'Bishop Hugh's stone' (Walsh 2003, 271; Cogan 1867, Vol. 2, 521–2). Walsh suggested that Rahugh townland was also the site of the bishop's burial place (Walsh 2003, 271); however his claim may be based on a misreading of a passage in Áed's Latin *Life* (Plummer 1910, Vol. 1, 44) which describes the burial at Rahugh as the grave not of Áed but of the rich man who owned the site before it was donated to the bishop. Rahugh, which now lies in the barony of Moycashel directly to the south of the western half of Newtown parish, has traditionally been viewed as part of the Southern Uí Néill kingdom of Cenél Fiachach (Pender 1951, 74, §881; MacCotter 2008, 197). Also known as *Fir Chell*, 'The Men of the Churches', Cenél Fiachach lay to the south-west of Fir Tulach, encompassing such prominent Mide churches as Rahan, Lynally, and Durrow. If Rahugh were indeed the burial place of Bishop Áed, however, then perhaps for at least part of its history the parish was within the bounds of Fir Tulach.

3 Mide was divided between two rival sons of Donnchad Midi son of Domnall in 802, but it is unclear along what lines the division ran (AU 802.2).

4 Clúain Gamna is now represented by the townland of Clongawny (Walsh 1957, 220, 230), while Senráith Lis an Daire is likely near the townland of Ballinderry (ibid., 230). Both holdings are located beyond the current northern boundary of Fartullagh, situated in the section of the civil parish of Mullingar that lies north of the Fartullagh border and south of the fork of the Brosna that runs between Lough Ennell and Lough Sheever.The argument that Fir Tulach originally extended further north than the present barony of Fartullagh follows Smyth (1974, 142); however, Smyth would extend the border even further, to as far north as Lough Sheever and Knockdrin (civil parish of Rathconnell, barony of Moyashel and Magheradernon) (1974, 142).

5 The first of these is the townland of Clonfad, which takes its name from the monastery of Clúain Fóta Báetáin Aba. In the martyrologies, Clúain Fota Baetáin Aba is described as being *i Feraib Bile a ndescert Mide atá*, 'in Fir Bile in southern Mide'. The Kinnegad river, which is likely the eponymous *aba*, 'river', in *Clúain fóta Báetáin Aba*, forms the modern boundary between Clonfad and Fartullagh at this point and is also likely to be the early medieval boundary. The second border townland in Farbill is 'Knockaville' which derives from *Cnoc in bili*, 'the hill of the sacred tree' (*Ordnance Survey Name Book*, Co. Westmeath, Vol. 2, 193, §3). It is probable that this townland was the site of the tree that gave Fir Bile its name.

6 Bishop Étchén (d. AD 587), the saint most strongly associated with the monastery of Clonfad in Fir Bile, belonged to Dál Messin Corb (Ó Riain 1985, 30, §181.7, 72, §558, 77, §641, 97, §662.155; Smyth 1974,

132). According to the saints genealogies, so did Scoth and Mengen, two clerics with links to St Brigit, who were associated with the Fir Tulach site of Clúain Moescnae (Ó Riain 1985, 114, §670.33; Stokes 1895, 12).

7 The pedigree claims that Ailill son of Domnall was the eponym of Ráith Ailella in Uí Fhelmeda (Mac Fhirbhisigh 1645–66, Vol. 2, 281, §474.6).

8 The pedigree claims that the grandson of Ailill son of Domnall was a certain Cú Choille son of Dublach. Roughly speaking, Cú Choille's place in the pedigree suggests that he would likely have lived in the first half of the eighth century. According to the *Life* of Colmán mac Luacháin, however, Cú Choille son of Dublach was king of Fir Tulach in the late 11th century (Meyer 1911, 52, §50). The annals, meanwhile, record the death of a certain Cú Choille grandson of Dublach in 1021 (ATig [1021]). Similarly, the pedigree claims that Ailill's great-great-grandson was Onchú son of Sárán, whose position in the line of descent suggests he would have lived in the early ninth century. The annals, however, record the death of a certain Onchú son of Sárán, very likely the same person, in 662 (ATig [662]). The *Life* of Colmán would seem to be in line with the annals in this regard, making Flann son of Onchú a contemporary of the Clann Cholmáin king, Conall son of Suibne, who died in AD 638 (Meyer 1911, 66–7, §65). (See note 19 for further discussion of Onchú son of Sárán.) The pedigree is also clearly several generations short.

As the most marked discrepancies in the Ua Dublaich pedigree occur directly after the name of Brandub's great-grandson, Ailill son of Domnall, Ailill likely represents the point at which the Ua Dublaich stem was grafted on to the descendants of Brandub son of Eochu.

9 The *Life* of Colmán mac Luacháin claims that Lessar, sister of St Colmán of Lynn and a saint in her own right, was buried in a church in Uí Cheinnselaig (Meyer 1911, 10, §9). Colmán's *Life*, moreover, twice brings the saint into contact with Máedóc, founder of the Uí Cheinnselaig ecclesiastical seat at Ferns, Co. Wexford (Meyer 1911, 43, §42; 75, §71). The hagiographical depiction of such a meeting between two saints is usually interpreted as signalling some sort of contemporary relationship between the churches they founded (Mac Shamradháin 1994, 139–50). The second of the Máedóc episodes recounts how Uí Dochartaig, one of the hereditary families at Lynn, were originally based at Ferns (Meyer 1911, 75, §71).

Moving slightly further east, the saints' genealogies and the *Banshenchas*—a tract on the 'Lore of Women'—claim that the mother of Etchén son of Maine, bishop of Clonfad in Fir Bile, was the Uí Cheinnselaig noblewoman Brigit daughter of Cobthach (Dobbs 1930, 306, 331; 1931, 181, 218; Ó Riain 1985, 58, 176). Brigit's other son by Maine was said to be Áedán, bishop of Glendalough, a figure whom the 11th-century *Bóruma* saga portrays as advisor to none other than Brandub son of Eochu (Stokes 1892, 76–8).

10 The evidence suggests that the Ua Dublaich pedigree may have been manipulated in a way that would afford the Benntraige a claim to descent from both Fir Tulach and Uí Cheinnselaig, specifically the Uí Cheinnselaig descendants of Brandub son of Eochu. When trying to understand the motivation behind such a fabrication, one should perhaps look to an institution which was not only usually responsible for maintaining the genealogical record but also had strong links to Uí Cheinnselaig: the monasteries of Fir Tulach. Could one of the monasteries in the kingdom have been ruled by an abbot of Benntraige descent who wished to offset his outsider status by claiming shared ancestry with Fir Tulach's ruling line? If so, Clonfad, whose probable position as a daughter house of Clonard linked it to Brandub son of Eochu, is a strong candidate. One cannot, however, rule out the monastery of Lynn, which also had strong associations with Clonard (see section on ecclesiastical settlement below) as well as self-advertised links to the Uí Cheinnselaig monastery of Ferns.

11 Though see note 18 for the possibility that a seventh-century king of Fir Tulach may have fought against Uí Fhailgi, possibly as an ally of Clann Cholmáin.

12 The holdings of Lynn that were said to have belonged to Colmán's 'father's brothers' were Ráith Lechet, Clúain Gamna, and Senráith Lis in Dáire (Meyer 1911, 78, §74). Ráith Lechet has not been identified, but Clúain Gamna is the townland of Clongawney in the south-east of the civil parish of Mullingar, barony of Moyashel and Magheradernon. There is much confusion in the *Life* about the location of Senráith Lis an Daire, but it seems to be either in the area around the townland of Ballinderry, civil parish of Mullingar, barony of Moyashel and Magheradernon (Walsh 1957, 230), close by to Clúain Gamna, or in the area around the townland of Derry, civil parish of Castlelost, barony of Fartullagh (Meyer 1911, 90, §89).

13 There is some evidence to indicate that Colmán Mór and Colmán Bec may have been doublets of the same historical figure (Mac Shamhradháin 1999, 90–1, 97; McCone 1990, 251).

14 Dún Bile was likely on the Fir Bile/Fir Tulach border, in the townlands of either Wooddown, Greatdown, or Newdown, civil parish of Killucan, barony of Farbill (Ó Murchadha 1996–7, 13).

15 Walsh incorrectly identifies this Óengus as the son of the king of Leinster (Walsh 1957, 247) and thus does not realise the full import of the reign of a Clann Cholmáin dynast as king of Fir Tulach. Charles Thomas-Edwards correctly identifies Óengus as the son of Donnchad Midi (Charles-Edwards 2000, 604).

16 The genealogical passage does not give the paternity of Máel Sechnaill, ancestor of Árchú, so it is uncertain whether it intended the ninth-century Clann Cholmáin king of Tara, Máel Sechnaill (d. AD 862), son of Máel Ruanaid, or his great-great-grandson, the 11th-century king of Tara, Máel Sechnaill Mór (d. AD 1022) son of Domnall. Neither one is otherwise known to have had a son called Brian. Nowhere in Árchú's eight-generation pedigree is the name 'Dublach' to be found, and the passage accounts for the family's surname by saying that it derived from the 'black ambush' (*dubh luighe*) perpetrated by Árchú on the high king.

The suspicion aroused by this questionable etymology is compounded by discrepancies in the details of the treachery which call the reliability of the passage further into question. Although the account claims that Árchú slew the high king of Ireland, the last high king/king of Tara to meet a violent end solely at the hands of an Irishman, either through treachery or in battle, died as early as the mid eighth century (AU 743.4). This is 100 years too early for even the first Máel Sechnaill, let alone one of his eighth-generation descendants. If, then, there is any truth to the passage, it would appear to have been transmitted in a garbled form.

17 The *Banshenchas* claims that the mother of the children of the 11th-century king of Munster, Murchad (d. AD 1068) son of Donnchad Ua Briain, was 'Liathain, daughter of Ua Dublaich of North *Éile*' (Dobbs 1931, 198, 231).

18 One of the names in the Ua Dublaich pedigree is 'Onchú son of Sárán', a figure named as an early king of Fir Tulach by the *Life* of Colmán son of Luachán (Mac Fhirbhisigh 1654–66, Vol. 2, 281, §§474.6–7; Pender 1951, 132, §§1772, 1775; Meyer 1911, 46–52, §§47–50). If the *Life* is correct in its depiction of Onchú as king of Fir Tulach, and if the genealogies are accurate in their positioning of Onchú as an ancestor of Dublach, then the reigns of Fiachra, Cú Duilig and their Ua Dublaich successors would represent the return to power of a dynasty who may have ruled Fir Tulach since the seventh century.

This Onchú may be identical with the Onchú son of Sárán who the annals say fought on the winning side of the Battle of Ogomain, contested in 662 between Áed of Slane's sons, Diarmait and Blathmac, the joint Síl nÁedo Sláine kings of Tara (ATig [662]). An Onchú grandson of Sárán also appears in the genealogies of the Osraige (O'Brien 1962, 104); however, a Fir Tulach dynast would be more likely than an Osraige one to be fighting in an internal Síl nÁedo Sláine dispute.

He may also be the Onchú who defeated the king of Uí Fhailgi in 652 at the Battle of Cúl Corrae likely as an ally of Clann Cholmáin (AU 652.2) (*Cúl Corrae* is possibly Coolure Demesne, parish of Mayne, barony of Fore, Co. Westmeath (Hogan 1910, 319)).

19 The printed version of the *Life* refers to the protectors of the king as Uí Domnain, but Walsh has shown that 'Uí Domnalláin' is the manuscript reading (Walsh 2003, 305, note 168).

20 I owe this point to Dr Niall Brady.

21 Some of the details concerning this episode in the *Life* are problematic. The *Life* claims that the king of Fir Tulach at the time of the seizure was Cú Chaille son of Dublach (Meyer 1911, 52, §50), possibly the Cú Chaille grandson of Dublach whose death is recorded in the annals in AD 1021 (ATig [1021]). Conchobar Ua Máel Sechlainn, however, did not become king of Mide until AD 1030, and his marriage to Mór likely did not occur until after he kidnapped her in AD 1053 (AFM 1053).

22 There is also a large parish of Kilbride just to the south of Fir Tulach, split between the County Offaly baronies of Kilcoursey and Ballycowen.

23 The Ua Mochain name may be enshrined in that of the modern Fartullagh townland of Mahonstown (civil parish of Enniscoffey) (Walsh 1957, 179).

24 The five local churches were: Cell Clúana Gamna (Clongawny, civil parish of Mullingar, barony of Moyashel and Magheradernon) (Meyer 1911, 8, 76); Cell Becracháin (ibid., 100, §101); Cell Uidrín (possibly near the townland of Derry, civil parish of Castlelost) (ibid., 82); Cell Chóca (ibid., 38, §39); Tech Cholmáin (near Brannockstown, Enniscoffey) (Walsh 1957, 178; Meyer 1911, 56, 84, §§54, 82). The hermitage was Tír in Dísert (possibly in the townland of Carrick, civil parish of Carrick) (Meyer 1911, 56, §53).

[25] The relationship with Lackan is deduced from the emphasis the *Life* puts on the relationship between Colmán and a holyman by the name of Fursa. The *Life* does not seem to mean St Fursa of Péronne. Instead, it may refer to Fursa, an eighth-century abbot of Lecan Midi (AU 751.8).

[26] O'Donovan suggested that '(f)oran' enshrined the Irish name *Odrán* (Walsh 1957, 47), the name of several saints in the saints' genealogies (Ó Riain 1985, 262), but Walsh argued that the consistent use of 'foran' rather than 'oran' in English sources indicated the presence of an initial 'f' (ibid., 176).

[27] However, *The Historical Dictionary of Gaelic Placenames* interprets *Ceall Fhuar(r)áin* as 'the church of the spring', and suggests that *Ceall Fhua(r)ráin* may have been Fooraun Well, Ballynaclonagh townland, civil parish of Multyfarnham, barony of Corkaree, Co. Westmeath (Ó Riain et al. 2008, 175).

[28] See, for example, AU 1179.2.

APPENDIX 1 RADIOCARBON DATING RESULTS

Site	*Lab Code*	*Sample description*	*Years BP*	*Calibrated Date*
Chapter 6 Rochfort Demesne—power and expansion, family farmstead				
Rochfort Demesne	SUERC 8586 (GU-13573)	Cattle (*Bos* sp.) mandible from Period 1 enclosure ditch.	1350 ± 35	AD 640–690 (one sigma) AD 610–770 (two sigma)
Rochfort Demesne	SUERC 8587 (GU-13574)	Cattle (*Bos* sp.) mandible from base of Period 2 ditch.	1200 ± 35	AD 775–875 (one sigma) AD 680–950 (two sigma)
Rochfort Demesne	SUERC 8588 (GU-13575)	Elm (*Ulmus*) charcoal from pit, Period 1 or 2.	1230 ± 35	AD 710–870 (one sigma) AD 680–890 (two sigma)
Rochfort Demesne	UBA-8158	Cattle (*Bos* sp.) mandible from Period 1 enclosure ditch.	1318 ± 23	AD 660–762 (one sigma) AD 655–769 (two sigma)
Rochfort Demesne	UBA-8159	Unidentified medium mammal from pit. Period 1 or 2.	1184 ± 43	AD 778–890 (one sigma) AD 710–971 (two sigma)
Rochfort Demesne	UBA-8160	Sheep/goat (*ovis*) tibia from pit, Period 1 or 2.	1167 ± 22	AD 782–933 (one sigma) AD 778–949 (two sigma)
Rochfort Demesne	UBA-8161	Cattle (*Bos* sp.) radius from deposit. Period 2.	1036 ± 22	AD 993–1018 (one sigma) AD 974–1027 (two sigma)
Rochfort Demesne	UBA-8163	Unidentified medium mammal from pit, Period 1 or 2.	1157 ± 21	AD 784–946 (one sigma) AD 780–967 (two sigma)
Rochfort Demesne	UBA-8164	Unidentified medium mammal from pit, Period 1 or 2.	887 ± 25	AD 1054–1208 (one sigma) AD 1044–1217 (two sigma)
Rochfort Demesne	UBA-8165	Unidentified medium mammal from pit, Period 2.	1210 ± 41	AD 772–884 (one sigma) AD 687–937 (two sigma)
Rochfort Demesne	UBA-8873	Apple-type (*Pomoideae* sp.) charcoal from pit Period 2.	1093 ± 30	AD 898–988 (one sigma) AD 891–1013 (two sigma)
Rochfort Demesne	UBA-8875	Oat (*Avena* sp.), barley (*Horteum* sp.) and wheat (*Triticum* sp.) seeds from hearth, Period 2.	1071 ± 31	AD 901–1016 (one sigma) AD 895–1020 (two sigma)

Site	Lab Code	Sample description	Years BP	Calibrated Date
Chapter 6 Rochfort Demesne—power and expansion, family farmstead (continued)				
Rochfort Demesne	UBA-8876	Apple-type (*Pomoideae*) charcoal from hearth, Period 2.	1189 ± 29	AD 781–882 (one sigma) AD 723–943 (two sigma)
Rochfort Demesne	UBA-8877	Cattle (*Bos* sp.) sternum from bank. Period 2	1211 ± 22	AD 776–866 (one sigma) AD 721–887 (two sigma)
Rochfort Demesne	UBA-9228	Cattle (*Bos* sp.) left humerus from pit, Period 1 or 2.	1383 ± 29	AD 638–666 (one sigma) AD 607–675 (two sigma)
Rochfort Demesne	UBA-9453	Oat (*Avena* sp.) grains from pit, Period 1 or 2.	760 ± 31	AD 1219–1279 (one sigma) AD 1219–1283 (two sigma)
Chapter 7 Ballykilmore—living with the dead, the development and continuity of an early medieval graveyard				
Ballykilmore	UBA-8339	Human parietal bone from Phase 1 burial, with ear muffs (C4).	762 ± 50	AD 1224–1279 (one sigma) AD 1166–1379 (two sigma)
Ballykilmore	UBA-8340	Human femur bone from burial (C99) cuts building collapse.	892 ± 50	AD 1047–1211 (one sigma) AD 1026–1251 (two sigma)
Ballykilmore	UBA-8342	Cattle (*Bos* sp.) bone from sample from the base of the enclosure ditch.	1425 ± 51	AD 591–657 (one sigma) AD 540–679 (two sigma)
Ballykilmore	UBA-8343	Cattle (*Bos* sp.) bone from smithing hearth.	1479 ± 51	AD 549–635 (one sigma) AD 435–655 (two sigma)
Ballykilmore	UBA-8344	Cattle (*Bos* sp.) bone from large linear feature east of ditch entrance (C152).	727 ± 50	AD 1227–1297 (one sigma) AD 1211–1390 (two sigma)
Ballykilmore	UBA-8345	Human parietal bone from burial (C335) (head to south – 203 degree orientation).	659 ± 48	AD 1282–1389 (one sigma) AD 1272–1400 (two sigma)
Ballykilmore	UBA-8346	Human parietal bone from Phase 2 upper burial (C341) in deep sequence.	534 ± 50	AD 1324–1435 (one sigma) AD 1301–1447 (two sigma)
Ballykilmore	UBA-8347	Human rib bone from later burial (C396) (280º alignment).	479 ± 44	AD 1413–1448 (one sigma) AD 1322–1607 (two sigma)

Site	Lab Code	Sample description	Years BP	Calibrated Date
Chapter 7 Ballykilmore—living with the dead, the development and continuity of an early medieval graveyard (continued)				
Ballykilmore	UBA-8349	Human (right) parietal bone from burial (C436) western limit of site.	1079 ± 44	AD 899–1013 (one sigma) AD 876–1029 (two sigma)
Ballykilmore	UBA-8350	Human rib bone, from burial (C439) within church, under building collapse.	1065 ± 43	AD 899–1019 (one sigma) AD 888–1029 (two sigma)
Ballykilmore	UBA-8351	Human rib bone, burial (C490) within church. Parallel to north wall.	944 ± 44	AD 1029–1154 (one sigma) AD 1017–1206 (two sigma)
Ballykilmore	UBA-8352	Human rib shaft from second lowest burial (C500) in deep sequence.	1578 ± 44	AD 432–535 (one sigma) AD 395–578 (two sigma)
Ballykilmore	UBA-8353	Human ilium bone, cranial lining. 286° orientation. Phase 2.	950 ± 44	AD 1015–1153 (one sigma) AD 1015–1206 (two sigma)
Ballykilmore	UBA-8354	Human tibia bone, from eastern limit of site adjacent and external to church wall.	792 ± 19	AD 1225–1260 (one sigma) AD 1218–1269 (two sigma)
Ballykilmore	UBA-8355	Human rib bone, from burial (C676) within church.	1198 ± 33	AD 779–876 (one sigma) AD 695–942 (two sigma)
Ballykilmore	UBA-8356	Human parietal bone from neonate burial cluster (C722).	990 ± 33	AD 987–1148 (one sigma) AD 987–1154 (two sigma)
Ballykilmore	UBA-8357	Human parietal bone from north–south burial (C789) northern limit of site, latest in cluster.	938 ± 34	AD 1035–1153 (one sigma) AD 1022–1169 (two sigma)
Ballykilmore	UBA-8358	Human rib bone from Phase C, enclosure ditch. Associated with fetus (C946).	1067 ± 42	AD 899–1019 (one sigma) AD 890–1026 (two sigma)
Ballykilmore	UBA-8359	Phase 3. *Cillín* burial with hair (C925).	280 ± 31	AD 1523–1659 (one sigma) AD 1495–1795 (two sigma)
Ballykilmore	UBA-8360	Human long-bone from pit cut by church foundation trench C62.	1511 ± 32	AD 536–603 (one sigma) AD 434–631 (two sigma)

Site	Lab Code	Sample description	Years BP	Calibrated Date
Chapter 7 Ballykilmore—living with the dead, the development and continuity of an early medieval graveyard (continued)				
Ballykilmore	UBA-8361	Human tibia bone from linear boundary feature.	973 ± 35	AD 1019–1150 (one sigma) AD 997–1157 (two sigma)
Ballykilmore	UBA-8362	Human ulna bone from possible familial plot (C993).	999 ± 32	AD 992–1117 (one sigma) AD 982–1153 (two sigma)
Ballykilmore	UBA-8363	Human rib bone from Phase 2. Prone burial (C995).	929 ± 32	AD 1042–1155 (one sigma) AD 1024–1176 (two sigma)
Ballykilmore	UBA-8364	Human occipital bone from burial (C1015) cut by church foundation trench.	1197 ± 32	AD 779–877 (one sigma) AD 711–942 (two sigma)
Ballykilmore	UBA-8365	Cattle (Bos sp.) bone from bisecting gully to south of site (latest cut C1080).	1047 ± 34	AD 974–1022 (one sigma) AD 896–1031 (two sigma)
Ballykilmore	UBA-8367	Human rib bone from burial (C1192) southern limit of site.	878 ± 19	AD 1050–1217 (one sigma) AD 1050–1217 (two sigma)
Ballykilmore	UBA-8368	Unidentifiable animal bone from fill of metallurgical furnace (C1201).	601 ± 25	AD 1308–1397 (one sigma) AD 1298–1407 (two sigma)
Ballykilmore	UBA-8681	Human rib bone from Phase 2 burial (C399). Non-accidental trauma.	840 ± 26	AD 1169–1224 (one sigma) AD 1160–1258 (two sigma)
Chapter 8 Clonfad—an industrious monastery				
Clonfad	GrA-33802	Unidentified large mammal bone from brazing hearth.	1335 ± 35	AD 651–762 (one sigma) AD 656–732 (two sigma)
Clonfad	GrA-33803	Unidentified large mammal bone from floor of smithy. Animal bone from smithy floor.	1165 ± 35	AD 781–939 (one sigma) AD 803–925 (two sigma)
Clonfad	GrA-33804	Unidentified large mammal bone from floor of smithy.	1215 ± 35	AD 772–878 (one sigma) AD 734–856 (two sigma)
Clonfad	UBA-8116	Charred wheat (*Triticum* sp.) grain from stone-lined, corn-drying kiln.	166 ± 38	AD 1666–1952 (one sigma) AD 1660–1953 (two sigma)

Site	Lab Code	Sample description	Years BP	Calibrated Date
Chapter 8 Clonfad—an industrious monastery (continued)				
Clonfad	UBA-8117	Charred barley (*Hordeum* sp.) grain from stone-lined corn-drying kiln.	751 ± 39	AD 1228–1283 (one sigma) AD 1211–1376 (two sigma)
Clonfad	UBA-8118	Charred barley (*Hordeum* sp.) grain from stone-lined, corn-drying kiln.	203 ± 24	AD 1659–1951 (one sigma) AD 1650–1951 (two sigma)
Clonfad	UBA-8119	Charred grass (*Poaceae* sp.) seeds from stone-lined corn-drying kiln.	120 ± 28	AD 1686–1927 (one sigma) AD 1680–1953 (two sigma)
Clonfad	UBA-8120	Charred grass (*Poaceae* sp.) seeds from stone-lined corn-drying kiln.	117 ± 25	AD 1689–1925 (one sigma) AD 1681–1953 (two sigma)
Clonfad	UBA-8121	Charred barley (*Hordeum* sp.) grain from stone-lined, corn-drying kiln.	154 ± 22	AD 1674–1941 (one sigma) AD 1667–1953 (two sigma)
Clonfad	UBA-8216	Apple-type (*Pomoideae* sp.) charcoal from outer enclosing ditch.	1199 ± 30	AD 779–874 (one sigma) AD 713–937 (two sigma)
Clonfad	UBA-8217	Oak (*Quercus* sp.) charcoal from outer enclosing ditch.	1224 ± 33	AD 722–868 (one sigma) AD 689–886 (two sigma)
Clonfad	UBA-8218	Oak (*Quercus* sp.) charcoal from of outer enclosing ditch.	1281 ± 30	AD 680–770 (one sigma) AD 662–800 (two sigma)
Clonfad	UBA-8219	Hazel/alder (*Corylus/Alnus* sp.) charcoal from outer enclosing ditch.	1231 ± 31	AD 713–863 (one sigma) AD 688–882 (two sigma)
Clonfad	UBA-8220	Oak (*Quercus* sp.) charcoal from stone-lined pit.	1206 ± 33	AD 778–867 (one sigma) AD 723–889 (two sigma)
Clonfad	UBA-8221	Oak (*Quercus* sp.) charcoal from smithy floor	1187 ± 23	AD 782–883 (one sigma) AD 774–933 (two sigma)
Clonfad	UBA-8679	Oak (*Quercus* sp.) charcoal from inner enclosing ditch.	1235 ± 31	AD 694–860 (one sigma) AD 688–878 (two sigma)
Clonfad	UBA-8680	Oak (*Quercus* sp.) charcoal from linear ditch.	1579 ± 20	AD 433–534 (one sigma) AD 427–538 (two sigma)

Remaining appendices are contained on the attached CD-Rom

Appendix 2.pdf From the cradle to the grave–the biodiversity of Clonfad and Ballykilmore
Pat Randolf-Quinney

Appendix 3.pdf Exploiting the Bog–iron production and metalworking
Tim Young

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AFM	O'Donovan J (ed.) 1851 *Annals of the Four Masters*. Dublin.
ALC	Hennessy W M (ed.) 1871 *Annals of Loch Cé*. London.
ATig	Stokes W (ed.) 1993 *Annals of Tigernach*. Felinfach, Lampeter.
AU	MacAirt S & MacNiochaill G (eds) 1983 *Annals of Ulster*. Dublin.
CS	Hennessy W M (ed.) 1866 *Chronicon Scotorum*. London.
Lec	*The Book of Lecan*.
MCB	Ó hInnse, S 1947 *Mac Carthaig's Book*, fragment one of the *Miscellaneous Irish Annals*. Dublin Institute for Advanced Studies. Dublin.

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APPENDICES

APPENDIX 1—RADIOCARBON DATING RESULTS

Site	***Lab Code***	***Sample description***	***Years BP***	***Calibrated Date***
Chapter 6. Rochfort Demesne—power and expansion, family farmstead				
Rochfort Demesne	SUERC 8586 (GU-13573)	Cattle (*Bos* sp.) mandible from Period 1 enclosure ditch.	1350 ± 35	AD 640–690 (one sigma) AD 610–770 (two sigma)
Rochfort Demesne	SUERC 8587 (GU-13574)	Cattle (*Bos* sp.) mandible from base of Period 2 ditch.	1200 ± 35	AD 775–875 (one sigma) AD 680–950 (two sigma)
Rochfort Demesne	SUERC 8588 (GU-13575)	Elm *(Ulmus*) charcoal from pit, Period 1 or 2.	1230 ± 35	AD 710–870 (one sigma) AD 680–890 (two sigma)
Rochfort Demesne	UBA-8158	Cattle (*Bos* sp.) mandible from Period 1 enclosure ditch.	1318 ± 23	AD 660–762 (one sigma) AD 655–769 (two sigma)
Rochfort Demesne	UBA-8159	Unidentified medium mammal from pit. Period	1184 ± 43	AD 778–890 (one sigma)

Site	***Lab Code***	***Sample description***	***Years BP***	***Calibrated Date***
		1 or 2.		AD 710–971 (two sigma)
Rochfort Demesne	UBA-8160	Sheep/goat (*ovis)* tibia from pit, Period 1 or 2.	1167 ± 22	AD 782–933 (one sigma)
				AD 778–949 (two sigma)
Rochfort Demesne	UBA-8161	Cattle (*Bos* sp.) radius from deposit. Period 2.	1036 ± 22	AD 993–1018 (one sigma)
				AD 974–1027 (two sigma)
Rochfort Demesne	UBA-8163	Unidentified medium mammal from pit, Period	1157 ± 21	AD 784–946 (one sigma)
		1 or 2.		AD 780–967 (two sigma)
Rochfort Demesne	UBA-8164	Unidentified medium mammal from pit, Period	887 ± 25	AD 1054–1208 (one sigma)
		1 or 2.		AD 1044–1217 (two sigma)
Rochfort Demesne	UBA-8165	Unidentified medium mammal from pit, Period	1210 ± 41	AD 772–884 (one sigma)
		2.		AD 687–937 (two sigma)
Rochfort Demesne	UBA-8873	Apple-type (*Pomoidaea* sp.) charcoal from pit	1093 ± 30	AD 898–988 (one sigma)
		Period 2.		AD 891–1013 (two sigma)
Rochfort Demesne	UBA-8875	Oat (*Avena* sp.), barley (*Horteum* sp.) and	1071 ± 31	AD 901–1016 (one sigma)

Site	***Lab Code***	***Sample description***	***Years BP***	***Calibrated Date***
		wheat (*Triticum* sp.) seeds from hearth, Period 2.		AD 895–1020 (two sigma)
Rochfort Demesne	UBA-8876	Apple-type (*Pomoidaea*) charcoal from hearth, Period 2.	1189 ± 29	AD 781–882 (one sigma) AD 723–943 (two sigma)
Rochfort Demesne	UBA-8877	Cattle (*Bos* sp.) sternum from Bank. Period 2	1211 ± 22	AD 776–866 (one sigma) AD 721–887 (two sigma)
Rochfort Demesne	UBA-9228	Cattle (*Bos* sp.) left humerus from pit, Period 1 or 2.	1383 ± 29	AD 638–666 (one sigma) AD 607–675 (two sigma)
Rochfort Demesne	UBA-9453	Oat (*Avena* sp.) grains from pit, Period 1 or 2.	760 ± 31	AD 1219–1279 (one sigma) AD 1219–1283 (two sigma)
Chapter 7. Ballykilmore—Living with the dead, the development and continuity of an early medieval graveyard				
Ballykilmore	UBA-8339	Human parietal bone from Phase 1 burial, with ear muffs (C4)	762 ± 50	AD 1224–1279 (one sigma) AD 1166–1379 (two sigma)
Ballykilmore	UBA-8340	Human femur bone from burial (C99) cuts	892 ± 50	AD 1047–1211 (one sigma)

Site	***Lab Code***	***Sample description***	***Years BP***	***Calibrated Date***
		building collapse		AD 1026–1251 (two sigma)
Ballykilmore	UBA-8342	Cattle (*Bos* sp.) bone from Sample from the base, of the enclosure ditch	1425 ± 51	AD 591–657 (one sigma) AD 540–679 (two sigma)
Ballykilmore	UBA-8343	Cattle (*Bos* sp.) bone from smithing hearth	1479 ± 51	AD 549–635 (one sigma) AD 435–655 (two sigma)
Ballykilmore	UBA-8344	Cattle (*Bos* sp.)bone from large linear feature east of ditch entrance (C152)	727 ± 50	AD 1227–1297 (one sigma) AD 1211–1390 (two sigma)
Ballykilmore	UBA-8345	Human parietal bone from burial (C335) (head to south – 203 degree orientation).	659 ± 48	AD 1282–1389 (one sigma) AD 1272–1400 (two sigma)
Ballykilmore	UBA-8346	Human parietal bone from Phase 2 upper burial (C341) in deep sequence	534 ± 50	AD 1324–1435 (one sigma) AD 1301–1447 (two sigma)
Ballykilmore	UBA-8347	Human rib bone from later burial (C396) (280^{o} alignment)	479 ± 44	AD 1413–1448 (one sigma) AD 1322–1607 (two sigma)
Ballykilmore	UBA-8349	Human (right) parietal bone from burial (C436)	1079 ± 44	AD 899–1013 (one sigma)

Site	*Lab Code*	*Sample description*	*Years BP*	*Calibrated Date*
		western limit of site.		AD 876–1029 (two sigma)
Ballykilmore	UBA-8350	Human rib bone, from burial (C439) within	1065 ± 43	AD 899–1019 (one sigma)
		church, under building collapse.		AD 888–1029 (two sigma)
Ballykilmore	UBA-8351	Human rib bone, burial (C490) within church.	944 ± 44	AD 1029–1154 (one sigma)
		Parallel to north wall.		AD 1017–1206 (two sigma)
Ballykilmore	UBA-8352	Human rib shaft from second lowest burial	1578 ± 44	AD 432–535 (one sigma)
		(C500) in deep sequence		AD 395–578 (two sigma)
Ballykilmore	UBA-8353	Human illium bone, cranial lining. 286^{o}	950 ± 44	AD 1015–1153 (one sigma)
		orientation. Phase 2.		AD 1015–1206 (two sigma)
Ballykilmore	UBA-8354	Human tibia bone, from Eastern limit of site	792 ± 19	AD 1225–1260 (one sigma)
		adjacent and external to church wall.		AD 1218–1269 (two sigma)
Ballykilmore	UBA-8355	Human rib bone, from burial (C676) within	1198 ± 33	AD 779-876 (one sigma)
		church.		AD 695–942 (two sigma)
Ballykilmore	UBA-8356	Human parietal bone from Neonate burial	990 ± 33	AD 987–1148 (one sigma)

Site	*Lab Code*	*Sample description*	*Years BP*	*Calibrated Date*
		cluster (C722).		AD 987–1154 (two sigma)
Ballykilmore	UBA-8357	Human parietal bone from N/S burial (C789)	938 ± 34	AD 1035–1153 (one sigma)
		northern limit of site, latest in cluster.		AD 1022–1169 (two sigma)
Ballykilmore	UBA-8358	Human rib bone from Phase C, enclosure ditch.	1067 ± 42	AD 899–1019 (one sigma)
		Associated with fetus (C946)		AD 890–1026 (two sigma)
Ballykilmore	UBA-8359	Phase 3. Cillín burial with hair (C925).	280 ± 31	AD 1523–1659 (one sigma)
				AD 1495–1795 (two sigma)
Ballykilmore	UBA-8360	Human long-bone from pit cut by church	1511 ± 32	AD 536–603 (one sigma)
		foundation trench C62		AD 434–631 (two sigma)
Ballykilmore	UBA-8361	Human tibia bone from linear boundary feature	973 ± 35	AD 1019–1150 (one sigma)
				AD 997–1157 (two sigma)
Ballykilmore	UBA-8362	Human ulna bone from possible familial plot	999 ± 32	AD 992–1117 (one sigma)
		(C993).		AD 982–1153 (two sigma)
Ballykilmore	UBA-8363	Human rib bone from Phase 2. Prone burial	929 ± 32	AD 1042–1155 (one sigma)

Site	***Lab Code***	***Sample description***	***Years BP***	***Calibrated Date***
		(C995).		AD 1024–1176 (two sigma)
Ballykilmore	UBA-8364	Human occipital bone from burial (C1015) cut by church foundation trench	1197 ± 32	AD 779–877 (one sigma) AD 711–942 (two sigma)
Ballykilmore	UBA-8365	Cattle (*Bos* sp.) bone from bisecting gully to south of site (latest cut C1080)	1047 ± 34	AD 974–1022 (one sigma) AD 896–1031 (two sigma)
Ballykilmore	UBA-8367	Human rib bone from burial (C1192) Southern limit of site.	878 ± 19	AD 1050–1217 (one sigma) AD 1050–1217 (two sigma)
Ballykilmore	UBA-8368	Unidentifiable animal bone from fill of metallurgical furnace (C1201).	601 ± 25	AD 1308–1397 (one sigma) AD 1298–1407 (two sigma)
Ballykilmore	UBA-8681	Human rib bone from Phase 2 burial (C399). Non-accidental trauma.	840 ± 26	AD 1169–1224 (one sigma) AD 1160–1258 (two sigma)
Chapter 8. Clonfad—an industrious monastery				
Clonfad	GrA-33802	Unidentified large mammal bone from brazing hearth	1335 ± 35	AD 651–762 (one sigma) AD 656–732 (two sigma)

Site	***Lab Code***	***Sample description***	***Years BP***	***Calibrated Date***
Clonfad	GrA-33803	Unidentified large mammal bone from floor of smithy Animal bone from smithy floor	1165 ± 35	AD 781–939 (one sigma) AD 803–925 (two sigma)
Clonfad	GrA-33804	Unidentified large mammal bone from floor of smithy	1215 ± 35	AD 772–878 (one sigma) AD 734–856 (two sigma)
Clonfad	UBA-8116	Charred wheat (*Triticum* sp.) grain from stone-lined, corn-drying kiln	166 ± 38	AD 1666–1952 (one sigma) AD 1660–1953 (two sigma)
Clonfad	UBA-8117	Charred barley (*Hordeum* sp.) grain from stone-lined corn drying kiln	751 ± 39	AD 1228–1283 (one sigma) AD 1211–1376 (two sigma)
Clonfad	UBA-8118	Charred barley (*Hordeum* sp.) grain from stone-lined, corn drying kiln	203 ± 24	AD 1659–1951 (one sigma) AD 1650–1951 (two sigma)
Clonfad	UBA-8119	Charred grass (*Poaceae* sp.) seeds from stone-lined corn-drying kiln	120 ± 28	AD 1686–1927 (one sigma) AD 1680–1953 (two sigma)
Clonfad	UBA-8120	Charred grass (*Poaceae* sp.) seeds from stone-lined corn-drying kiln	117 ± 25	AD 1689–1925 (one sigma) AD 1681–1953 (two sigma)

Site	***Lab Code***	***Sample description***	***Years BP***	***Calibrated Date***
Clonfad	UBA-8121	Charred barley (*Hordeum* sp.) grain from stone-lined, corn-drying kiln	154 ± 22	AD 1674–1941 (one sigma) AD 1667–1953 (two sigma)
Clonfad	UBA-8216	Apple-type (*Pomoideae* sp.) charcoal from outer enclosing ditch	1199 ± 30	AD 779–874 (one sigma) AD 713–937 (two sigma)
Clonfad	UBA-8217	Oak (*Quercus* sp.) charcoal from outer enclosing ditch	1224 ± 33	AD 722–868 (one sigma) AD 689–886 (two sigma)
Clonfad	UBA-8218	Oak (*Quercus* sp.) charcoal from of outer enclosing ditch	1281 ± 30	AD 680–770 (one sigma) AD 662–800 (two sigma)
Clonfad	UBA-8219	Hazel/alder (*Corylus/Alnus* sp.) charcoal from outer enclosing ditch	1231 ± 31	AD 713–863 (one sigma) AD 688–882 (two sigma)
Clonfad	UBA-8220	Oak (*Quercus* sp.) charcoal from stone lined pit	1206 ± 33	AD 778–867 (one sigma) AD 723–889 (two sigma)
Clonfad	UBA-8221	Oak (*Quercus* sp.) charcoal from smithy floor	1187 ± 23	AD 782–883 (one sigma) AD 774–933 (two sigma)

Site	***Lab Code***	***Sample description***	***Years BP***	***Calibrated Date***
Clonfad	UBA-8679	Oak (*Quercus* sp.) charcoal from inner enclosing ditch	1235 ± 31	AD 694–860 (one sigma) AD 688–878 (two sigma)
Clonfad	UBA-8680	Oak (*Quercus* sp.) charcoal from linear ditch	1579 ± 20	AD 433–534 (one sigma) AD 427–538 (two sigma)

Remaining appendices are contained on the attached CD-Rom

Appendix 2.pfd—From the cradle to the grave—the biodiversity of Clonfad and Ballykilmore

Pat Randolf-Quinney

Appendix 3.pfd—Exploiting the Bog—iron production and metalworking

Tim Young

APPENDIX 2—FROM THE CRADLE TO THE GRAVE—THE BIOARCHAEOLOGY OF CLONFAD AND BALLYKILMORE

Patrick Randolph-Quinney

This chapter discusses the skeletal populations recovered from Ballykilmore and Clonfad (Chapters 7 & 8, printed volume). Together these populations provide a significant window onto the biological and cultural past of the early and later medieval periods in Ireland. In approaching bioarchaeological assemblages it is important to stress that human remains say more about the lives of the people buried than their deaths. As such, we must first and foremost view the Ballykilmore and Clonfad skeletal assemblages as normal 'living' biological populations, one in which individuals socialised and loved, ate and drank, and, if they were fortunate, survived long enough to pass on their genes to later generations. Ultimately they died. Their lives may have been short, ending in the womb or during childhood—or they may have been long. Their life while they lived may have been comfortable and free from illness, or hard and beset by disease and chronic suffering. Whatever the manner or cause of their deaths, they contributed in some way to the biological population, and their story is held by the bones recovered during excavation. In unlocking that story the aim of this chapter is not to catalogue every disease, pathology or ailment that the population suffered from, but rather to discuss the living and the dead in context, integrating what we have learned about other aspects of their society such as economy, diet and social status, with trace evidence from their bones.

Who were the people of Ballykilmore and Clonfad? Genes, survival and mortality

Ballykilmore produced the remains of almost 1,000 individuals, and Clonfad yielded only 1% of that figure (Table A2.1). The Clonfad human remains assemblage was comprised of one *in situ* burial, and a very small assemblage of disarticulated remains.

In total the parts of at least six individuals are represented, but it is likely that 10 individuals were recovered on contextual grounds. The *in situ* burial was that of a juvenile aged between six and eight years at death. The youngest individual specimen was a neonate (from birth to around one month of age), while the oldest was a mature adult male (>50 years). As such, the human remains recovered from Clonfad are too few to be considered representative of the population from which they were drawn, but the cemetery at Ballykilmore yielded sufficient individuals to allow demographic analysis, with the aim of explaining variations in population size, structure and dynamics through time (Chamberlain 2006).

At Ballykilmore a minimum number of 934 individuals were recovered from 882 graves or other contexts (797 inhumations, with the remainder comprising bone clusters, and disarticulated remains from topsoil and accretion layers). This is large enough of a population to allow meaningful inference with regards to local bio-history and demography. However, the inferences that can be drawn about changes in mortality and disease patterns over time are more limited. Though the site records a significant period of use as a burial ground, over half of the burials (n. 443) expressed some degree of stratigraphic overprinting by subsequent inhumations, disturbance by animal burrowing or plant roots, or truncation through post-abandonment land use (Chapter 7, printed volume). Consequently, it was impossible in the main to isolate different chronological or phased groups within the cemetery. As a result, the majority of burials from the cemetery were treated as one population for analysis, although it is clearly recognised that this group comprises individuals from the fourth or fifth century AD to a period post-dating the collapse and abandonment of the church during the 13th century. A significant number of burials clearly post-date the ecclesiastical abandonment of the site, marked by the collapse of the stone-built structure interpreted as a church. Some of these most likely represent formal burials taking place within the cemetery as indicated by burials, which post-date the building collapse. Thereafter, it is suggested that the site continued in usage for informal burial as a *ceallúnaigh* or *cíllín* cemetery (see below).

The demographic profile of the population (Table A2.1; Illus. A2.1) is dominated by non-adults, with the greatest proportion of individuals dying either slightly prematurely or shortly after birth (19.3%), or up to the age of four (17.7%). Foetuses or very premature births account for 4.4% of the total. The youngest individual recovered from the assemblage was just 18 weeks *in utero* at death, which

is very premature and clearly not viable. Older juveniles (children from four to 12 years of age) comprised some 15.3% of the assemblage, while adolescents were relatively rare (7.9%). Analysis of the population suggests that there was a steady decline in mortality after the age of four years, rising slightly into the early teens, and then falling again until individuals reach middle adulthood; individuals who managed to survive the first few years of life were more likely to survive into adolescence and adulthood. Adults represent the remaining 34.1% of the assemblage, with the majority of these dying in middle age. Few individuals lived into skeletal old age with only 4.5% of individuals surviving into this category (13.2% of the adult total). In the adult population females are more frequently represented than males (Table A2.2; Illus. A2.2), with 1.39 females to every male (where sex could be determined); this ratio rises significantly with advancing age with almost 2.5 times as many females present aged 45 years or older compared to younger age cohorts. This profile suggests that males tended to die earlier than females in middle adult life.

Death came early for the majority of the population, and such mortality profiles are common in pre-industrial and third-world societies, and are reflected in many archaeological populations at the global level (Chamberlain 2006). The early childhood period is a critical one for the developing individual with infants having to deal with the trauma of birth, and eventually the process of weaning, which is acknowledged to represent a significant accelerator of infant mortality in the developing world (Lewis 2007). In modern medical practice infant deaths are uncommon and infrequent, with stillbirths accounting for around 1% of pregnancies (Gilbert-Barness & Debich-Spicer 2004) and infant mortality around 0.6% of Irish live births (UNICEF 2003). However, in non-developed societies the risk of stillbirth, premature live birth, and infant death is exacerbated by maternal risk factors such as poor nutritional status, multiple pregnancy, short inter-pregnancy interval, maternal infection, anemia, and poor maternal weight gain. Increased levels of infant mortality can thus be seen as a reflection of maternal and overall population health status. The mortality profile from Ballykilmore would suggest that a high level of infant mortality was the single biggest factor affecting the biological make-up of the population. Birth rates would have been commensurately higher than seen today, possibly to offset the likelihood of infant loss, and this risk of early mortality is reflected in the Ballykilmore profile.

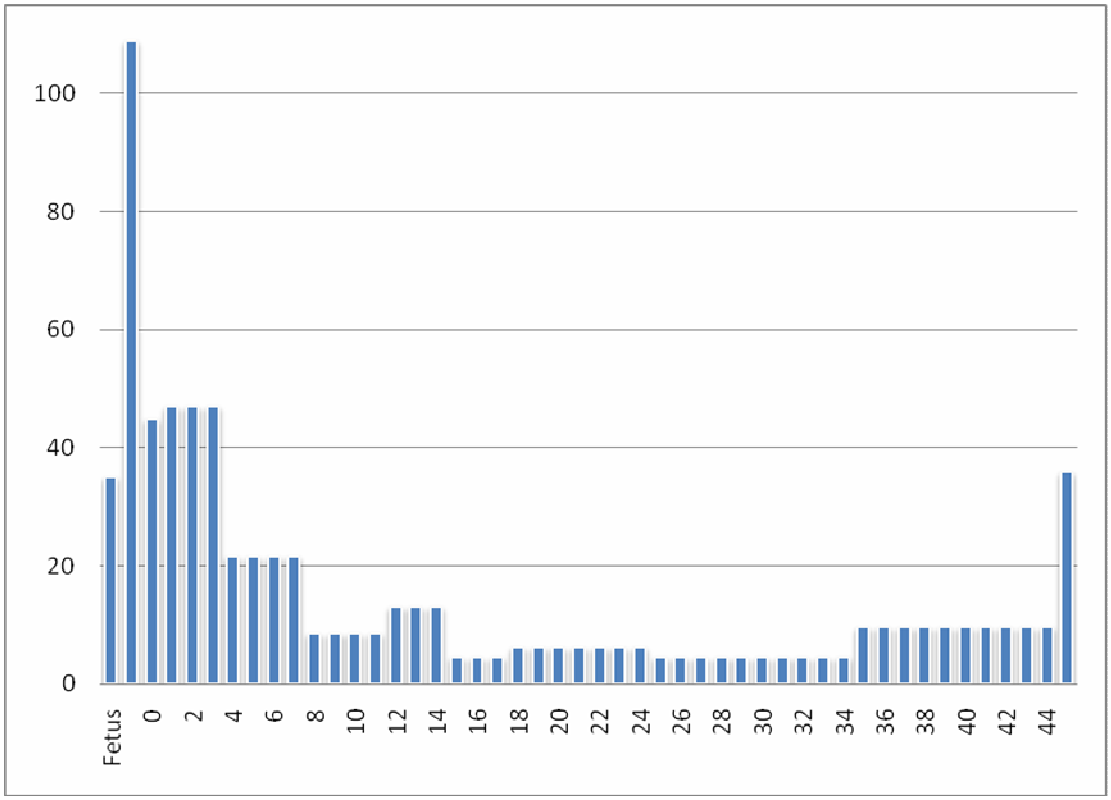
Table A2.1—Age composition of Clonfad 3 human remains and Ballykilmore 6 formal inhumation assemblage.

Note: *The Ballykilmore assemblage produced a minimum number of 934 individuals recovered from at least 882 recognizable burials of which 797 were from formal inhumations.*

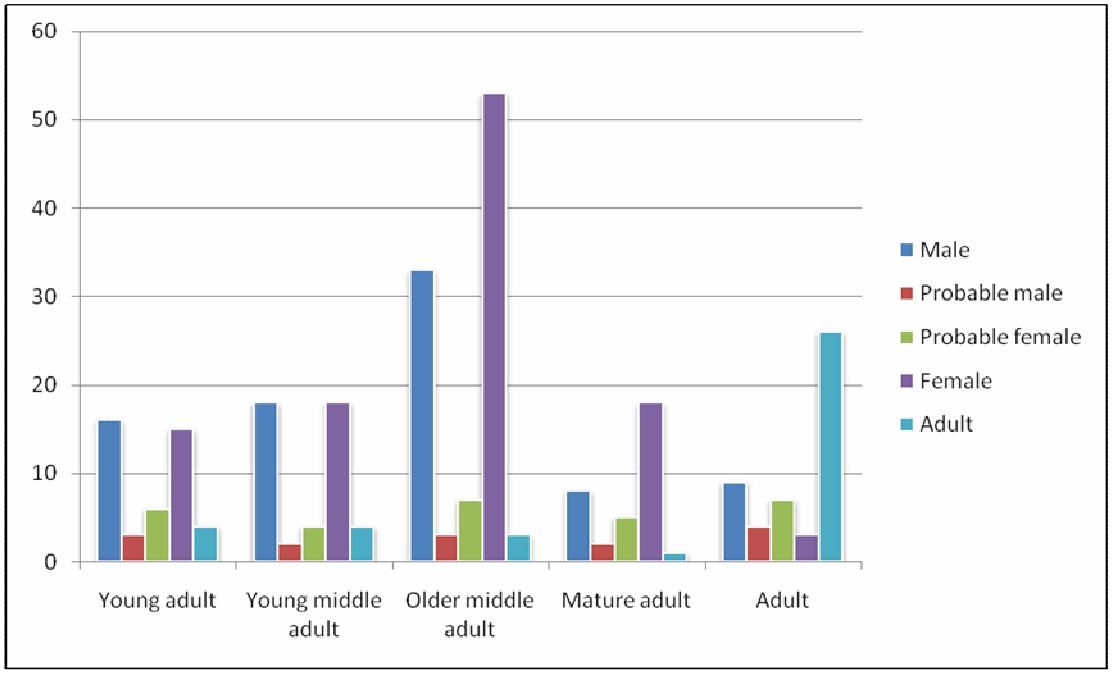
	Clonfad 3 (MNI 6)		**Ballykilmore 6 (MNI 934)**	
Age Group	***Specimens***	***Percentage of total***	***Inhumations***	***Percentage of total***
Infants (pre-birth to 1 year)	2	20.0	194	24.3
Fetuses			35	4.4
Perinates and neonates	1	10.0	109	13.7
Infants	1	10.0	45	5.6
Infans			5	0.6
Juveniles (1 to 12 years)	1	10.0	268	33.6
Juv I (1 to 4 years)			141	17.7
Juv II (5 to 8 years)	1	10.0	87	10.9
Juv III (9 to 12 years)			35	4.4
Juvenile			5	0.6
Adolescents (12 to 18 years)	1	10.0	63	7.9
12 to 15 years	1	10.0	39	4.9
15 to 18 years			14	1.8
Adolescent			10	1.3
Adults (18 + years)	6	60.0	272	34.1
Young adult			44	5.5
Young middle adult			46	5.8
Older middle adult			97	12.2
Mature adult	1	10.0	36	4.5
Adult	5	50.0	49	6.1
Total	10	100%	797	100%

Table A2.2—Sex composition of Ballykilmore formal inhumation assemblage divided by age class.

Sex	***Young adult***	***Young middle adult***	***Older middle adult***	***Mature adult***	***Adult***	***Total***
Male	16	18	33	8	9	98
Probable male	3	2	3	2	4	
Probable female	6	4	7	5	7	136
Female	15	18	53	18	3	
Adult	4	4	3	1	26	38
Total	44	46	99	34	49	272



Illus. A2.1—Time-averaged mortality profile for Ballykilmore inhumation assemblage. Horizontal axis represents age cohorts from pre-birth to 45+ years of age. Vertical axis represents number of individuals in each age cohort.



Illus. A2.2—Sex composition of Ballykilmore formal inhumation assemblage divided by age class.

However, while the overall mortality profile for Ballykilmore is heavily skewed towards the younger cohorts, the profile is somewhat biased by stratigraphical overprinting of a predominantly juvenile skeletal population during the cíllín cemetery phase (Chapter 7, printed volume). *Cíllíní* (also referred to as Ceallúnaigh) primarily represent the burial grounds of unbaptised infants, and were usually clandestine in nature. Their origin is ultimately derived from the incorporation of the rite of infant baptism into Irish Christian liturgical practice. Failure to baptise an infant would ensure they still carried the taint of Original Sin, and result in their failure to enter the kingdom of Heaven; if they should die in a pre-baptismal state the infant's soul would be consigned to the realm of Limbo (*limbus infantium*), forever trapped between Heaven and Hell. As such, these individuals were routinely denied burial within consecrated church burial grounds, as only those absolved of their sins through baptism could be interred within. Cíllíní were also used for the burial of individuals who may have been considered socially marginal or unfit for burial in consecrated ground. This class of individuals includes drowning victims, criminals and suicides, victims of infanticide or murder, and strangers and itinerants (Channing & Randolph-Quinney 2008; Randolph-Quinney & Channing 2006; Dennehy and Lynch 2001; Donnelly et al. 1999; Leigh-Fry 1999).

As well as undesirables and unfortunates, cíllíní were also used for the burial of women who died during or shortly after childbirth (Dennehy 1997), and Ballykilmore produced poignant evidence for the inherent dangers associated with childbirth, through the recovery of several interments of mother and foetus. One of these burials has been discussed by Channing (Chapter 7, printed volume) with respect to the unusual method of disposal of the mother and her baby. The burial (C827) was discovered within the upper fill layers of the enclosure ditch (C104). The remains were those of a young adult female whose corpse was dumped into the silted-up enclosure ditch without a formal grave being dug. A large stone had been wedged into the oral cavity of the skull during burial. A partial skeleton of a perinate (C943) was found partly within the pelvic outlet of the adult burial, and partly outside and below the pelvis (Illus. A2.3). The separation between the two groups of foetal bones was due to the decomposition processes and post-mortem changes in the organs and soft tissues of the mother, which would eventually be released under pressure into the burial environment, flushing foetal tissue through the pelvic outlet but trapping some bones inside the mother. The process of decomposition discharge in such

circumstances has been termed ‘coffin birth’ (Møller-Christensen 1982) and is both extremely rare and much debated (Lewis 2007). As such, we cannot know whether the mother died giving birth, but she was heavily pregnant at the time of her death.



Illus. A2.3—Female skeleton C827 deposited in the fill of the main enclosure ditch.

In contrast, burial (C955) appears to provide strong evidence of death during childbirth but without evidence of social exclusion or stigma. A young adult female

was buried in an extended supine position within the main body of the churchyard with the remains of a full-term foetus (C957) lodged within her pelvic cavity. The foetal bones were arrayed in a similar fashion to the first example described above, in that a portion of the foetus was contained within the adult pelvis with the remaining material outside the pelvic outlet. However, the child appears to have rotated relative to the normal foetal carrying position, suggesting that birth was active or imminent; the retained and dispelled foetal bones suggest that the child was expelled head-first and was close to, or in, the normal birth position (Illus. A2.4). This represents the best evidence at the site for death in childbirth on both obstetric and taphonomic grounds, and we can only speculate as to why this individual was afforded conventional burial within the limits of the consecrated churchyard, whereas the so-called 'vampire' burial was marginalised and buried in a liminal position—neither inside the enclosure nor outside it, trapped between consecrated social inclusion and the outside secular world.



Illus. A2.4—Foetus C957 in obstetric position within pelvic cavity of C955 adult female suggestive of maternal mortality in or close to childbirth.

You are what you eat: effects of nutrition on growth and development

Assessing adult height attainment (stature) and overall body size is a powerful way to investigate patterns of general health and nutritional status in past populations. Although there is a genetic and social component to height attainment, changes in stature also tend to co-vary strongly with changes in socio-economic status, diet and calorific intake, and are therefore potential indicators of periods of environmental or dietary stress, or conversely, of bounty and excess. As such, stature is routinely used to investigate secular change in archaeological populations through time (Feldesman et al. 1990; Feldesman and Lundy 1988; Hens et al. 2000; Kondo et al. 2000; Smith 2007; Wolfe and Gray 1982; Humphrey 2000). In particular, individuals subjected to elevated levels of environmental stress tend to exhibit a slower rate of bone growth, diminished adult size, delayed maturation and a prolonged growth period; this can generally be referred to as growth retardation. The most common causes of retardation are inadequate nutrition and exposure to infectious diseases – together these create a vicious circle in which malnutrition and disease are entwined; many diseases such as typhoid fever, typhus and dysentery/diarrhea, piggyback on suppressed immune systems, which are often suppressed through reduced calorific intake and poor nutrition.

At Ballykilmore, the level of adult height attainment was broadly in keeping with average stature measurements for published contemporary early medieval Irish populations, with females observed to have a mean stature of 158.1 cm (range from 143.4 cm to 176.5 cm) and males having an average of 170.1 cm (153.2 cm to 183.6 cm). Males ranged in height from 153.2 cm to 183.6 cm (from five foot one inch to just over six feet in height), whereas females ranged from 143.4 cm to 176.5 cm in height (four foot eight inches to 5 foot nine inches). Table A2.3 compares the average adult stature observed at Ballykilmore with a range of contemporary Irish sites, and the average population stature was clearly within contemporary limits, though slightly shorter than the early medieval average height for both males and females (Roberts & Cox 2003).

Table A2.3—Comparison of adult estimates of Ballykilmore adult assemblage with contemporary and later published populations

Site	***Male***	***Female***	***Source***
Ballykilmore 6	170.1	158.1	Randolph-Quinney, 2009
Johnstown 1 (Main Group), Co. Meath (Early medieval)	169.7	158.6	Fibiger, 2008
Johnstown 1 (Topsoil), Co. Meath (Early medieval)	176.7	164.4	Fibiger, 2008
Ardsallagh 1, Co. Meath (Early medieval)	175.1	159.3	Randolph-Quinney, 2006
Early Medieval Ireland (average)	172.0	161.0	Roberts and Cox, 2003
Dominican Priory, Drogheda (13th–14th century)	171.0	155.0	Halpin & Buckley 1995
Waterford City (Early 12th–mid 13th century)	167.5	163.0	Power, 1995
Waterford City (Mid 13th–16th/early 17th century	168.2	158.3	Power, 1995
Creagh Junction, Ballinasloe (Post-Medieval)	169.3	155.7	Fibiger, 2002
St. Mary's Cathedral, Limerick (Post-Medieval)	175.0	156.0	Power, 1995
Waterford City (17th–18th century)	173.2	154.0	Power, 1995

However, while the body size of the adult population was found to be within the limits of contemporary medieval populations, the Ballykilmore juvenile population presented a pattern of growth, which suggested pressure and stress on those growing to adulthood. It is realized that the consequences of stress starts in the womb; in particular a reduction in maternal nutritional reserves has a profound effect on the developing fetus, and the quality of maternal nutrition during pregnancy is known to have a significant effect on fetal growth and development (Allen 1994; Luke 1994; Susser 1991) which carries on into juvenile life. This can reflect itself in a number of different ways, the two most significant of which are small size for age and the delaying of maturation into later adolescence (termed ‘catch-up growth’). This leads to a disparity between true chronological age and developmental or skeletal age, and can lead to an individual having a ‘younger’ looking skeleton than someone of optimum nutritional or growth status. This realisation can be exploited in archaeological populations through an analysis of the disparity between dental age

and skeletal growth. In this case a base-line age using the dentition is utilised as dental development has been shown to be more strongly under genetical control and is buffered against the effects of environmental stress; dental age tends to reflect chronological age more closely than skeletal age. The assessed dental age is then compared to skeletal age determined against an accepted modern growth standard such as the Denver Growth Study. If growth and development in the Ballykilmore population are aligned with modern standards then ages derived from dental development will agree with ages derived from the respective length of lower limb development (i.e. children will be the correct height for their age); any difference between the two assessed ages will either be due to accelerated growth (children 'big' for their age) or retarded growth ('small' for their age).

The Ballykilmore juvenile population was found to be retarded compared to modern growth standards, with children small for their age compared to modern populations. This presents as a lowered mean population growth trajectory compared to the modern standard, and one which falls below the 10th percentile at almost every stage of development. On this basis it is likely that a significant proportion of the Ballykilmore non-adult sample suffered a degree of environmental stress (possibly dietary in nature), sufficient to cause growth retardation and delayed maturation, and which may be implicated in their early mortality.

Growth retardation and delayed maturity may also be brought about through childhood illness and disease, or deficiencies in vital nutrients and minerals, and not just overall calorific levels. In particular, anaemia, rickets and scurvy were deficiency diseases (Table A2.4) that affected the people of Ballykilmore, all of which can affect the viability of normal growth. Clonfad produced one individual with probable evidence for childhood anaemia, whilst Ballykilmore produced 246 specimens with possible or diagnostic anaemic traces. Anaemia is deficiency of haemoglobin function, which normally carries oxygen from the lungs to the organs and other tissues as part of normal cardiovascular function; consequently anaemia leads to hypoxia or a lack of oxygen in the body. Factors that can contribute to anaemia are numerous, and diet is only one group of potential causes that includes physiological processes within the body causing inadequate iron absorption: it is now considered that a variety of conditions, including both acquired and genetic anaemia, bacterial infections, parasites, vitamin deficiencies (e.g. scurvy and rickets) and malnutrition may also be implicated. The symptoms of anaemia are generally related to the

underlying cause, with lethargy seen in iron deficiency, and shortness of breath if related to folic acid or vitamin B-12 deficiency; such symptoms would directly impact on an individual's capacity to contribute economically to their society whilst the condition was expressed. The percentage incidence of anaemia at Ballykilmore based on cribra orbitalia was 23.8%, which is comparable to contemporary early medieval populations where the incidence can range from 1.3% to as high as 50% (Roberts & Cox 2003, 186–7). The incidence of anaemia affected both juveniles and adults roughly equally, suggesting an endemic level of environmental stress, though whether this was due to insufficient iron in the diet (restrictions on the availability of red meat, eggs or green vegetables), the presence of intestinal parasites, or other disease processes we cannot determine.

Table A2.4—Incidence of selected palaeopathological conditions within the Ballykilmore assemblage compared to published assemblages spanning 1050 to 1550 AD—note the some conditions not mentioned in the text (comparative data from Fibiger, 2008; Roberts and Cox, 2003).

Presentation	***Ballykilmore***	***Johnstown, Co. Meath***	***Abingdon Abbey, Oxon***	***St Helen-on-the-Walls, York***	***Whithorn, Scotland***
Total Number.	934	460	589	1037	1553
Rickets	22	6	7	2	-
Scurvy	8	3	-	-	-
Gout	3	1	-	-	-
Perisotitis	146	66	112	218	150
Osteomyelitis	18	3	16	10	-
Septic arthritis	2	-	-	-	-
Tuberculosis	22	24	2	10	25
Osteochondritis dissecans	22	13	-	-	-
DISH	2	1	25	-	-
Syphilis (possible)	1	1	-	1	1
Legg-Calvé-Perthes	1	2	-	-	-

Ballykilmore also produced 22 incidences of rickets. Rickets is a disease in which mineralisation is decreased at the developing growth plates of a juvenile individual, resulting in retarded growth and delayed skeletal development (Roberts & Cox 2003; Roberts & Manchester 1996; Aufderheide & Rodríguez-Martin 1998; Ortner 2003; Gessner et al. 1997) and can have serious consequences into adulthood.

Rickets primarily results from deficiency of vitamin D intake or metabolism. The disease can pose a significant developmental risk for developing children, leading to poorly developed long bones with pronounced distortion and bowing; these deformities are irreversible and will persist into adulthood. The ligaments and muscles may also be affected, with lax joints and poor muscle tone. This combination leads to a delay in motor development in the child, who may remain under-developed physically (in addition to having an odd appearance in the shape of the skull and limbs), which may lead to being unable to take part in normal physical activities or play. In its adult form (termed osteomalacia), the condition can cause severe problems such as increased risk of stress fractures (Ortner 2003; Resnick & Niwayama 1988), abnormal curvature of the spine which may limit normal movement, and a reduction in the diameter of the pelvis which can cause complications during childbirth. At Ballykilmore, the incidence of rickets affected both juveniles and adults (evidence by healed lesions) roughly equally, suggesting that a small proportion (2.4%) of the population had restricted dietary availability or possibly lack of access to solar radiation through being swaddled or kept indoors as children. The incidence at Ballykilmore is slightly elevated though broadly comparable to contemporary early medieval assemblages (Fibiger 2008, 67; Roberts & Cox 2003, 248) such as Johnstown, Co. Meath (1.3%), Temple Lane, Dublin (1.7%), St. Francis' Abbey, Limerick (0.2%) and St. Peter's Church, Waterford (1.7%).

Ballykilmore yielded eight instances of scurvy. Scurvy is the direct result of vitamin C deficiency. Vitamin C is essential for normal collagen synthesis, and skin, joint, bone and vascular integrity, and is also critical for normal muscle function.Young children and older persons may be predisposed to scurvy because of their diet or the over-preparation of food (prolonged cooking to soften foods often leads to the destruction of vitamin C), and the condition is also linked to a lack of fresh fruit and vegetables in the diet. The incidence of scurvy at Ballykilmore was 0.9%, which is comparable to the few Irish assemblages where it has been recognised such as such as Johnstown, Co. Meath (0.7%) and St. Francis' Abbey, Limerick (0.4%) suggesting diet at the time was generally sufficient for normal vitamin C uptake in the population (Fibiger 2008, 69; Roberts & Cox 2003, 248). For those individuals unfortunate enough to express the disease it can present a variety of symptoms such as lethargy, confusion and altered mental status, gum disease and

tooth loss, the failure of wounds to heal, heart and skeletal muscle damage, gastrointestinal blood loss, and arrested skeletal development.

The Ballykilmore assemblage also presented possible evidence of dietary excess, as expressed by three cases of gout and two cases of DISH. Gout is a condition caused by a disorder of uric acid metabolism that can lead to deposition of monosodium urate crystals in the soft tissue and joint surfaces, causing recurrent episodes of painful joint inflammation. The incidence of the disease is heavily biased by sex and age, with a male to female bias of 2:1 (Resnick 1995) and it is usually associated with obesity and heavy alcohol intake. One of the gout cases (C548) was an older middle adult male who displayed pronounced erosion of the joints of the left big toe consistent with gout. The individual also displayed evidence of lumbar sacralisation—interlocking bony growths on the lower thoracic and lumbar vertebral bodies—suggesting a response to heavy loading of the spine, possibly through excess body weight. A single mass consistent with a kidney or bladder stone was also found within the abdomen during excavation; this suggests a significant disruption to normal metabolic function, and is often associated with prostate gland enlargement (Resnick 1995).

Obesity is also possibly implicated in the limited presence of Diffuse Idiopathic Skeletal Hyperostosis (DISH) within the population. DISH leads to ossification of ligaments, which most characteristically affects the spine. Depending on the severity of the condition it may slightly limit flexibility, but if vertebral fusion is extensive, reduction in the range of normal spinal motion occurs. Two individuals with DISH were recorded among the Ballykilmore assemblage (amounting to 0.2% incidence of the disease). C582 was a mature adult female who presented fusion of four thoracic vertebrae, and as well as severe osteoarthritis of the right knee joint. C914 was a mature adult male who expressed pronounced candle-wax fusion of four thoracic vertebrae with partial fusion of two others. The individual displayed pronounced midline asymmetry, with the vertebral column showing presence of scoliosis (abnormal curvature) and severe skeletal changes associated with an abnormally twisted posture that led to concomitant degenerative changes throughout the joints of the shoulder girdle, though with the expression worse on the right side. The man would have had severely limited mobility during life and a pronounced twisted posture. The underlying causes of DISH are unknown, though there appears to be a measurable association with obesity and diabetes (Rogers 2000). In northern

Europe a higher prevalence of DISH has been found in monastic and high status sites than in those of lower socio-economic or social status, perhaps indicating better nutritional status (and hence capacity for obesity) in higher status social groups. The presence of gout has often been associated with well-fed or obese individuals, with heavy alcohol and saturated fat intake, and like DISH is often seen in ecclesiastical populations.

The combination of stature and growth data, and evidence from deficiency disease (anaemia, rickets, scurvy) suggests that the population of Ballykilmore experienced a significant degree of environmental stress during their lives. It is highly likely that this stress was due in the main to chronic or acute bouts of infection, disease and general ill health (common in most pre-industrial societies) commensurate with lower socio-economic status for much of the population. Certainly the palaeo-economic evidence from Ballykilmore and Clonfad (Chapter 8, printed volume) suggests that both populations would have had access to a range of animal protein from cattle, pig, sheep and game such as deer, hare and wild birds, and hulled barley, oat, rye and wheat, and garden pea. The palaeopathological evidence for dietary deficiency diseases such as rickets and scurvy is relatively and absolutely low at Ballykilmore, suggesting that most individuals within the population had sufficient access to vitamin C and D, which may indicate a relatively balanced, though perhaps of low overall calorific intake; high levels of anaemia may be due to low levels of iron in the diet (for instance if red meat or iron-rich foods were only irregularly consumed) but is equally likely to be due to chronic disease or parasites. It is also clear that some individuals within the society may present evidence for dietary excess (gout and DISH). Thus a component of social stratification may be seen at Ballykilmore, with the 'haves and have-nots' buried within the same burial space.

Disease, illness and trauma

The study of palaeopathology investigates the evolution and expression of ancient disease processes through time and how human societies adapted to them. In studying diseases in archaeological populations we are primarily looking at processes that leave characteristic changes or lesions on the skeleton. Understanding the expression of such changes and the clinical impact that they had on the individual is of importance

in understanding how past societies understood and adapted to their environment, and how they tried to overcome the impact of disease and sickness through treatment or palliative care (Aufderheide & Rodríguez-Martin 1998). However, it is important to realize that not all disease processes leave skeletal lesions, and that any skeletal expression of a disease will be affected by both the life stage of the individual, the pathophysiology of the disease itself, and the duration for which the individual has been affected; as such, skeletal lesions of disease will only tend to be expressed in chronic rather than acute cases, and more often in adolescents or adults, and rarely in younger individuals (Ortner 1991; Ortner 2003).

Congenital defects and inherited traits

One of the fundamental questions that can be levelled at any archaeological population concerns their origins—who were they? Other chapters in this book have drawn attention to the geographical setting of the population supplying the Ballykilmore and Clonfad cemeteries, and which placed distinct physical constraints on movement through the district. In looking at the populations of Ballykilmore and Clonfad, we may well be observing relatively insular, stable populations through time with occasional immigrant or intrusive elements. Evidence for such endemism is expressed through factors which are suggested to have a strongly heritable or genetic component, or which are inherited defects likely to arise as a result in small gene pools. The first are often termed non-metric traits. They are primarily identified as occurring on the cranial skeleton, and are seen by some researchers as a means to determine population relationships or biological distance between individuals within a population, and which may provide some information with regard to heritability and familially-transmitted traits (Tyrell & Chamberlain 1998).

At Ballykilmore one commonly occurring non-metric trait involved the expansion of the lambdoidal suture, with occurrence of multiple small accessory ossicles or "wormian bones", together with the presence of an occipital chignon or bun (Scheuer & Black, 2000a/b). Usually, not more than one or two ossicles are found in a single individual (where present), but multiple sets (often several tens) of small ossicles occur in individuals with cranial growth abnormalities such as

hydrocephaly or craniostenosis. A number of the Ballykilmore adult assemblage displays multiple lambdoidal wormian bones together with an occipital chignon (Table A2.5; Illus. A2.5). The chignon occurs in 21.4% of adult specimens, with the lamboidal ossicles in 32.1% of adult crania. This variant appears to be particular to a subset of the Ballykilmore assemblage in this specialists' experience of Irish medieval populations, however, little comparative data exists for Irish medieval assemblages with regards to non-metric traits and this is an area which is clearly worthy of further research.



Illus. A2.5— Lateral aspect of craniostenotic skull showing pronounced posterior extension and multiple wormian bones within lambdoidal suture, from Burial C827.

Levels of endemism are also indicated by the frequency of congenital defects, which are thought to be indicative of in-breeding and a reduced gene pool (Barnes 1994). In the main these comprise *segmentation errors* of the axial skeleton (ribs and vertebrae), which may develop from a variety of genetic and epigenetic causes. Such defects are generally not noted at birth, and may have no deleterious effects in the developing individual, though severe segmentation errors are often accompanied by secondary complications and defects of the cardio-pulmonary and renal systems (Gilbert-Barness & Debich-Spicer 2004) and as such may be incompatible with life. Irregular segmentation can produce a variety of forms including bifurcations,

abnormal wideness, flaring, merging (fusion), bridging and partial bridging with articulations between ribs, together with the presence of additional or accessory ribs which can occur although there is little reporting of such defects in the palaeopathological literature. Barnes (1994, 72) has suggested that multiple instances of rib segmentation suggest a reduced gene pool or levels of inbreeding. Segmentation errors encountered in the Ballykilmore population included rib bridging, bifid and trifid cervical lamina, cervical ribs, lumbar ribs and 5th lumbar sacralisation. The incidence of these is highlighted in Table A2.6. This incidence suggests a degree of endemism in the Ballykilmore gene pool. Together with the high incidence of heritable non-metric traits suggest it is possible we are observing a series of familial traits expressed by closely related individuals, or at the very least the Ballykilmore population display a degree of endemism and stability in terms of gene flow and admixture through time.

Table A2.5—Occurrence of wormian bones and occipital chignon with the Ballykilmore adult formal inhumation assemblage. Values are expressed as occurrence and percentage occurrence of adult individuals of sufficient preservational status to record presence or absence of the traits concerned (Ballykilmore n 168, Johnstown 1 n 114; Johnstown data from Fibiger, 2008).

	Ballykilmore 6		***Johnstown 1***	
	n	***Percentage***	***n***	***Percentage***
Metopic suture	14	8.3%	9	7.9%
Coronal ossicles	3	1.8%	1	0.9%
Sagittal ossicles	8	4.8%	3	2.6%
Lambdoidal ossicles	54	32.1%	27	23.7%
Occipital bun or chignon	36	21.4%	Not recorded or recognised	

Table A2.6—Incidence of congenital defects within the total Ballykilmore assemblage

	Juvenile/adolescent	***Male***	***Female***	***Adult***	***Total***
Spina bifida occulta	5	4	3	2	14
Lamina errors	3	-	-	-	3
Rib segmentation	5	2	-	-	7
L5 sacrilisation	-	2	1	-	3
Craniostenosis	-	-	1	-	1
Congenital syphilis	1	-	-	-	1
Total	14	8	5	2	29

Dental health and hygiene

Dental diseases and anomalies are among the most commonly occurring pathological conditions reported for human archaeological populations. The main factors of dental disease recorded at Clonfad and Ballykilmore fall into two broad categories: developmental defects caused by extraneous factors during the development of the dentition, and acquired disease conditions caused by poor oral hygiene or trauma.

The most common developmental defect observed was enamel hypoplasia. This is a developmental anomaly caused by environmental insult to developing teeth, which can disturb enamel formation (amelogenesis), and may result in localised defects on the erupted tooth crown. They arise as the result of body-wide metabolic insult and record episodes of nutritional stress or pathological disturbance during development sufficient to disrupt formation of the tooth crown. Such disruption could be due to dietary stress, such as periods of starvation or malnutrition (both *in utero* or post-partum), weaning, deficiency diseases such as rickets or scurvy (see above), or the impact of life-threatening diseases such as congenital syphilis or tuberculosis. Hypoplasias affected the tooth crowns of 14.2% of the observable permanent teeth, equating to 17.5% of the population (see Tables A2.7 & A2.8) which is comparable to early and later medieval populations where the incidence can range from around 1% to as high as 60%, with an average of 18% of individuals affected (Roberts & Cox 2003, 187) suggesting that overall levels of developmental stress were not atypical for the time.

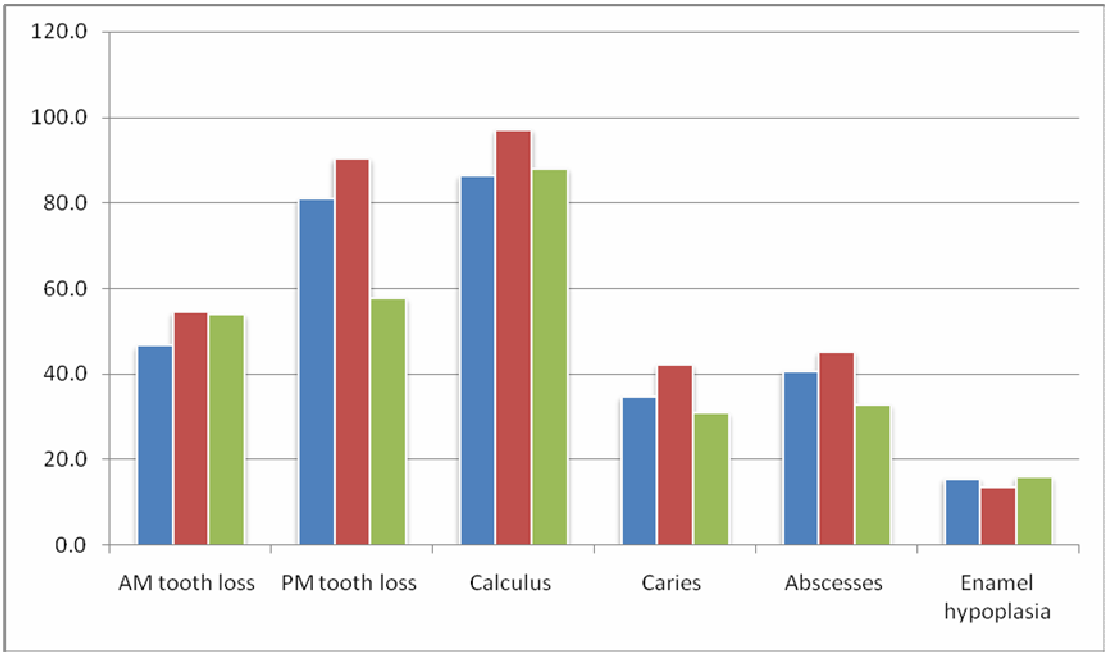
The most common type of dental disease was acquired and is a good indicator of standards and levels of dental hygiene (Illus. A2.6). The most commonly occurring condition was calculus. This is a cement-like deposit laid down on and around the cervix of tooth crowns, and which primarily affects the anterior teeth. The deposit is made up of mineralized plaque (a matrix of oral bacteria and salivary proteins), which is deposited quickly when high levels of protein or carbohydrates, or sugars such as sucrose, are present in the diet (Roberts & Manchester 1996; Hillson 1986; Hillson 1996). Although the presence of calculus is generally painless for the affected individual, the presence of substantial deposits can contribute to the development of periodontal disease and infections, and generally indicates a lack or complete absence of oral hygiene. At Ballykilmore, over 90% of adults, 94% of adolescents and 45% of

juveniles were affected by some level of calculus build-up, suggesting overall poor levels of dental hygiene as seen elsewhere in Ireland during the medieval period (Roberts & Cox 2003). Poor levels of oral hygiene were also indicated by high incidences of dental caries. At Ballykilmore, 37% of adults, 3.8% of adolescents and 12.7% of juveniles were affected by dental caries, much of this implicated in high levels of ante-mortem tooth loss evidenced in later life.



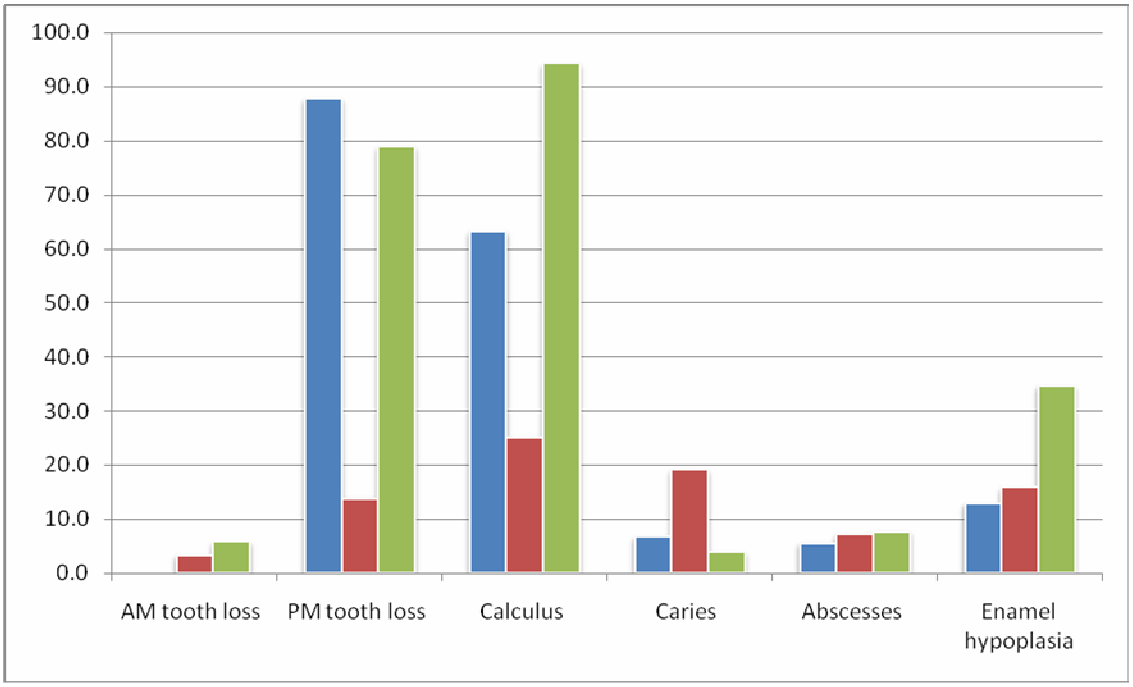
Illus. A2.6—Skeleton from burial C93, showing right mandibular corpus with antemortem tooth loss, dental calculus, peridontitis, periapical abscess affecting the second permanent molar, severe caries, and dental wear.

Tables A2.7 & A2.8 show the overall occurrence of dental pathologies from Ballykilmore. The values are presented as incidences of the condition in absolute numbers of teeth, and as individuals affected. The overall percentages for the number of teeth affected by different conditions in the inhumation burials were relatively low with the exception of calculus (dental plaque), which is almost universal in all age groups. However, the percentage of individuals affected by dental disease was relatively high (Illus. A2.7a–b), with almost half of all adults in the main group of individual inhumations showing evidence for ante-mortem tooth loss, dental abscesses and caries. Most dental pathologies were unrepresented in the juvenile group, with the exception of calculus and developmental hypoplastic defects. Overall, a higher number of females presented defects such as caries, abcesses and periodontal disease when compared to men. This may be due to slightly greater life expectancy of females in this assemblage, within which extended timeframe dental disease could develop.



Illus. A2.7a—Percentage incidence of adult dental pathologies expressed as incidence of individuals affected.

Key: Blue-male. Red-female. Green-adult (un-sexed)



Illus. A2.7b—Percentage incidence of non-adult dental pathologies expressed as incidence of individuals affected.

Key: Blue-juvenile deciduous teeth. Red-juvenile permanent teeth. Green-adolescent.

Table A2.7—Occurrence of dental pathologies and disease within the Ballykilmore adult assemblage.

	Male				*Female*				*Adult*				*Total*
	Teeth	***%***	***Indiv***	***%***	***Teeth***	***%***	***Indiv***	***%***	***Teeth***	***%***	***Indivi***	***%***	**Teeth**
Observable tooth positions	1752	-	73	-	2636		103	-	665	-	26	-	5053
AM tooth loss	212	12.1	34	46.6	367	13.9	56	54.4	53	8.0	14	53.8	632
PM tooth loss	175	10.0	59	80.8	239	9.1	93	90.3	65	9.8	15	57.7	479
Teeth present	1367	78.0	72	98.6	2032	77.1	101	98.1	1833	275.6	25	96.2	5232
Calculus	881	64.5	62	86.3	1360	66.9	98	97.1	1349	71.6	22	88.0	3590
Caries	56	4.1	25	34.7	162	8.0	43	42.1	24	1.3	8	30.8	242
Abscesses	85	6.2	29	40.7	124	6.1	46	45.1	7	0.4	8	32.9	216
Enamel hypoplasia	123	9.0	11	15.5	126	6.2	14	13.5	158	8.4	4	15.8	406
Periodontal disease	NA	-	10	13.6	NA	-	17	16.6	NA	-	2	8.4	NA

Table A2.8—Occurrence of dental pathologies and disease within the Ballykilmore non-adult assemblage.

	Juvenile								*Adolescent*			
	Deciduous				*Permanent*							
	Teeth	***%***	***Indiv***	***%***	***Teeth***	***%***	***Indiv***	***%***	***Teeth***	***%***	***Indiv***	***%***
Observable tooth positions	1856	-	163	-	1216	-	152	-	1164	-	52	-
AM tooth loss	0	0.0	0	0.0	6	0.5	5	3.3	8	0.7	3	5.8
PM tooth loss	448	24.1	143	87.7	96	7.9	21	13.8	70	6.0	41	78.8
Teeth present	1408	75.9	163	100.0	1114	91.6	152	100.0	1086	93.3	52	100.0
Calculus	441	31.3	103	63.2	319	28.6	38	25.0	557	51.3	49	94.2
Caries	11	0.8	11	6.7	31	2.8	29	19.1	2	0.2	2	3.8
Abscesses	10	0.7	9	5.5	12	1.1	11	7.2	4	0.4	4	7.7
Enamel hypoplasia	59	4.2	21	12.9	319	28.6	24	15.8	332	30.6	18	34.6
Periodontal disease	NA	-	0	0.0	NA	-	2	1.3	NA	-	1	1.9

Key: Values are given as absolute incidence of teeth and individuals affected, and percentage occurrence of both.

Infections and acquired conditions

Infection and infectious diseases are considered to be one of the major causes of death in the past; modern First World improvements in healthcare, sanitation and general hygiene have insulated us from the effects of micro-organisms such that many may now be manageable as chronic treatable conditions rather than acute life-threatening ones. Thus there is a paradox when dealing with disease processes in the past (or a non-First World context) in that many conditions would often have killed an individual quickly without leaving any visible signs on the skeleton. As such, when we encounter individuals showing skeletal signs of infection from Ballykilmore we are generally observing the effects on those individuals who were strong enough to resist the effects of disease for sufficient time to acquire associated skeletal changes.

Infections are divided into two broad classes: non-specific and specific. Non-specific infections are the most common form of infection, but cannot be readily attributed to any specific disease process and as such will not be discussed in detail here. The most common non-specific infection among the Ballykilmore population was perisotitis, which expressed in 146 cases. Unilateral periosteal lesions cannot often be ascribed to a specific disease or cause and thus will not be discussed in great detail here. Bilateral lesions are more indicative of a systemic condition. Woven bone was present in the majority of these cases, which indicates that in these cases the disease process was active and proliferative at the time of death, and most likely of relatively short duration. The presence of compact bone indicates the disease process had been affecting the individual for a significant period of time, sufficient to see rapidly forming woven bone remodel and restructure into more the more mature and mechanically sound compact form. The majority of cases affected non-adults (63.7%) and most of these presented unilateral periosteal woven bone reaction most frequently on the bones of the lower limb, followed by the upper. Many of these affected two or more elements of the same limb (i.e. the tibia & fibula) and are most likely due to localised infection following trauma or minor injuries to these limbs. It is possible that in these cases the condition indicated by the changes observed was a contributing factor in the cause of death as even minor infections can lead to high levels of morbidity and even mortality in pre-antibiotic cultures. Traumatic injuries are often

subject to contamination with skin flora, with the most common one being *Staphylococcus aureus.*

This bacterium is implicated in the condition known as septic arthritis, also known as *infectious arthritis* (or non-specific pyogenic arthritis), which is a direct invasion of a joint space by various microorganisms which can be acquired through open wounds or infected sores. Prior to the advent of antibiotics, the consequences of septic arthritis were usually severe and often fatal (Ortner 2003). Two cases of probable or likely septic arthritis were recovered from Ballykilmore (C532 and C536). The most severe of these (C536) provides a significant window on the provision of palliative care among the population. The burial was that of a middle-aged male who expressed significant pathological lesions, which were noted during excavation of the skeleton (Illus. A2.8). The primary lesion centred on the left knee joint, which was flexed at approximately 30°, with local bony fusion of all three of the structural components of the knee. All three bones of the knee were involved with bony ankylosis consistent with septic arthritis, which has lead to extensive joint destruction. Whilst the three elements maintain their gross overall shape, the joint capsule has collapsed and the patella fused directly to the distal femur; there was also evidence of incipient septic arthritic change to the right knee joint. There were pronounced changes in the bony structure of the major joints of the shoulder, elbow and wrist joints, both hips, ankles and feet, suggest that this individual was forced to use crutches, probably over a significant period of time, and he would have had limited mobility as a result—yet he survived, and would undoubtedly have had to be cared for and supported by other members of the community.

The incidence of certain specific infections suggests that the general health of the Ballykilmore population may have been compromised by chronic disease. The most significant of these conditions was tuberculosis (TB). This is a bacterial infection caused by inhalation of *mycobacterium tuberculosis* (in human to human transmission), or *mycobacterium bovis* through ingestion of contaminated animal products such as milk (Roberts & Cox 2003). Most persons infected with TB do not develop the active disease. In healthy individuals, the lifetime risk of developing disease is 5 to 10%; this increases significantly in individuals with pre-existing disease conditions or suppressed immune systems. TB is a complex disease and may manifest itself in several forms depending on the age at which the individual is infected and which organ systems are involved. Skeletal manifestations of TB occur

in only between 3% and 5 % of clinical patients, and these occur predominantly in the spine, the pleural surface of the ribs, the hip and the knee (Roberts & Buikstra 2003), or as *lupus vulgaris*, tuberculosis of the soft tissue indicated by a porous erosive lesions that affect the cranial vault. In all, 22 possible or probable cases of tuberculosis were presented at Ballykilmore. This incidence (2.4% of the population) is in keeping with contemporary medieval sites such as Johnstown, Co. Meath (5.2%) and Temple Lane, Dublin (3.39%), and within the range of prevalence elsewhere in Europe (0.34% to 3.57%), which suggests that TB was endemic in the Irish population at the time as elsewhere (Fibiger 2008; Roberts & Cox 2003). The true epidemiological prevalence cannot be calculated for archaeological populations, but it is worth noting while the absolute incidence of the disease within the Ballykilmore assemblage was low (2.4%), given that skeletal manifestations of TB only present in between 3% and 5% of clinical cases the absolute incidence of TB within the Ballykilmore population must have been quite pronounced, even assuming a 5% rate. The incidence of TB in recent Irish history has been a significant public health problem, accounting for over 23,000 deaths per year in the mid-19th century (Deeny 1962) and with a prevalence approaching that of endemic TB in Africa and southeast Asia today (W.H.O. 2010). Depending on the specific type of TB symptoms can include pneumonia, fever, cough, malaise and weight loss, haemoptysis (expectoration of blood or blood-stained sputum from the lungs or bronchial tract), swollen and enlarged lymph nodes, inflammatory response of the intra-cranial meninges (which can lead to deterioration of mental status, coma, and death), and skeletal skeletal involvement. These clinical symptoms must have placed significant limitations on the range of activities and occupational roles that individuals affected by the disease at Ballykilmore (and elsewhere in Ireland) could have undertaken, dealing as they were with a chronic debilitating condition.



Illus. A2.8—Burial C536 during excavation. Note angle of left knee and extended position of left foot.

Wear and tear, trauma and occupational pathologies

Degenerative joint disease (DJD) which is one of the most common pathological ailments observed in archaeoskeletal assemblages, and which is seen in many cases as a natural internal response of the body to 'wear and tear'. DJD is a chronic disease process affecting joints, particularly large weight-bearing joints. It is common in older patients but can also occur in younger patients either through a genetic mechanism or, more commonly, because of previous joint trauma. Affected individuals may express reduced mobility, reduced flexibility and chronic pain. In modern western clinical practice DJD is equally prevalent in men and women in their mid forties to mid fifties, although the disease has been shown to affect much younger age groups in recent, historical and archaeological populations with more physically stressful lifestyles, or in environmentally aggressive contexts (Roberts & Manchester, 1996, Rogers 2000).

Tables A2.9 & A2.10 summarise the incidence of spinal and extra-spinal degenerative joint disease in the Ballykilmore population. Degenerative lesions and joint disease were a relatively common phenomenon with 68.0% of adult males, 40.4% of adult females and 57.9% of unsexed adults recording degenerative lesions of the vertebral column (spinal DJD) or appendicular skeleton (extra-spinal DJD). No expression of DJD (spinal or extra-spinal) was noted amongst the non-adult assemblage. In general, males displayed a greater relative percentage incidence of all spinal and extra-spinal degenerative changes with the exception of temporo-mandibular joint changes, which were greater in females (7.1% to 8.5% difference). Both sexes displayed an overall trend in spinal DJD with cervical, then thoracic, then lumbar regions most heavily affected.

Table A2.9—Incidence of spinal degenerative joint disease within the Ballykilmore inhumation assemblage

Element	***Male***	***%***	***Female***	***%***	***Adult***	***%***
Cervical bodies	102	14.9	111	11.7	23	8.6
Thoracic bodies	311	26.4	409	25.1	67	14.7
Lumbar bodies	208	42.4	275	40.4	63	33.2
Cervical facets	126	18.4	133	14.0	31	11.7
Thoracic facets	241	20.5	252	15.4	46	10.1
Lumbar facets	73	14.9	76	11.2	23	12.1

Table A2.10—Absolute and percentage incidence of extra-spinal degenerative joint disease within the Ballykilmore inhumation assemblage

	Male	***%***	***Female***	***%***	***Adult***	***%***
Temporo-mandibular joint	14	7.1	23	8.5	5	6.6
Acromioclavicular	32	16.3	30	11.0	6	7.9
Sternoclavicular	23	11.7	16	5.9	5	6.6
Glenohumeral	45	23.0	31	11.4	6	7.9
Ribs	40	20.4	33	12.1	7	9.2
Elbow	25	12.8	20	7.4	9	11.8
Wrist	35	17.9	37	13.6	7	9.2
Hand	33	16.8	29	10.7	8	10.5
Hip	43	21.9	31	11.4	10	13.2
Knee	44	22.4	29	10.7	9	11.8
Ankle	11	5.6	14	5.1	3	3.9
Foot	15	7.7	11	4.0	2	2.6

Males tended to express a signature of DJD consistent with heavy loading of the spine. In particular they expressed almost a 2:1 ratio of features known as Schmorl's nodes compared to females. Schmorl's nodes are frequently present as irregular indentations on the upper and/or lower surfaces of the vertebral bodies, and are caused by age-related, loading-related or traumatic herniation of intervertebral disc material into the end plates of the vertebrae (Rogers 2000). Ballykilmore males also had more severe and larger osteophytes in the lower thoracic and lumbar region. This is correlated with the expression of Schmorl's nodes and most likely reflects functional requirements of the lower spine in relation to weight-bearing, with males having greater overall body weight, coupled with likely differences in activity patterns between the sexes. Extra-spinal joint disease (ESDJD) was relatively more common in males than females, with distinct differences in ESDJD patterning in the anatomical regions affected. In particular, males displayed greater incidence in the shoulder joint and pectoral girdle, rib articulations, elbow, hand, hip joint, knee and foot; this suggests that males were subject to greater loading and resulting wear-and-tear on these joints compared to females. Coupled with the elevated expression of degeneration of the hip and knee joints (and spinal DJD noted above) this suggests that males were subject to a greater regime of loading and activity compared to females, probably in more strenuous manual labour. Such patterns of DJD are relatively common in contemporary populations to that of Ballykilmore (Fibiger 2008; Roberts & Cox 2003). While there is likely to have been some degree of sexual-

division of labour, the general skeletal pattern at Ballykilmore is consistent with the agro-pastoral evidence for land use and economy discussed elsewhere in the printed volume. As such males and females would have both engaged in hard physical activity as part of the economy, with men likely to have been engaged in heavier work such as land clearance, ditch digging, and ploughing.

A land-based economy is also suggested in the incidences of accidental trauma seen among the Ballykilmore population. Trauma is the application of force to the human body sufficient to cause damage, irritation or inflammation of the soft and hard tissues, and can be accidental or deliberate. In the majority of archaeological cases trauma is induced by torsion, shearing or compressive forces, all of which contribute to the general classification of blunt force (Galloway & Mason 2000; Galloway 1999). Of principal interest amongst the Ballykilmore assemblage was evidence for accidental fractures and dislocations that might support inferences of site economy or sex-division of work. In general, these are markers for high-force mechanisms, such as trauma from blunt force or a fall. Fractures and dislocations were observed to be present in 119 cases comprising 93 individuals; this number included 45 females, 40 males and five unsexed adults, two adolescents and one infant (Table A2.11). Of these, 26 individuals had fractures at more than one location on the skeleton, and the most commonly affected sites were the ribs, vertebrae and upper limbs.

Table A2.11—Incidence of accidental skeletal trauma within the Ballykilmore inhumation assemblage.

Affected area	***Infants***	***Juven.***	***Adoles.***	***Male***	***Female***	***Adult***	***Total***
Cranium	-	-	-	6	4	1	11
Upper limb	-	-	2	18	13	2	35
Vertebral column and pelvis	-	-	-	12	8	1	21
Ribs	1	-	-	19	9	2	31
Lower limb	-	-	-	10	11	-	21
Total cases	1	0	2	65	45	6	119

Of particular interest was evidence for trips and falls, with upper limb trauma dominated by Colles', Smith's and Barton's fractures of the distal forearm. These typically occur when individuals are trying to break a fall with an outstretched hand; relatively little force (105 to 440 kg) is required to initiate a fracture. Nine such cases occurred in females, all of whom were older middle adults or mature adults (>45 years). Other cases of upper limb trauma were composed of dislocations of the

shoulder joint, with four cases occurring in young adult males. One individual (C94; older middle adult female) presented evidence of acute spinal trauma with fracturing of the atlas vertebra (first cervical vertebra) through the neural arch – there was no obvious sign of healing. This type of fracture is often associated with a fall from a height (Galloway 1999) and the trauma may be implicated in the cause of her death. A number of individuals presented complications of fracture healing involving misalignment or angulation of the fractured bone ends, often with attendant infection. In one instance a young adult male (C656) presented fusion of the bones of the second and third fingers following trauma. An older middle adult (probable) female (C662) presented a mis-aligned fracture to the proximal right humerus. The fracture healed relatively well with some distortion. Given the tremendous muscle pull generated by deltoid and biceps brachii when humeral shaft fractures occur, it is highly likely that the broken limb was placed in traction and set with a splint, leading to a good outcome in what is often a very difficult element to set correctly in modern clinical practice (Galloway 1999; Resnick 1995).

Clay-Shoveller's fracture was also presented. This is classed as an avulsion fracture of the spinous process of the seventh cervical or first thoracic vertebrae caused by the release of tension during the upward thrust of the shovelling movement, though the application of direct blows to the back of the neck can also cause this condition. The expression of the condition in adult male C564 (Illus. A2.9) appears most likely to be an evulsion rather than due to blunt force trauma. The presence of the condition is consistent with agricultural working in heavy soil.

There were also a limited number of cases of non-accidental trauma, which suggest that life at Ballykilmore could be dangerous and brutal at times. Non-accidental trauma is force deliberately applied to the human body, usually in the form of blunt force (beatings or bludgeoning), sharp force (stabbings, cuttings and dismemberment), or ballistic trauma caused by high-kinetic energy from bullets or projectile weapons (Byers 2008; Sauer 1992; Randolph-Quinney et al. 2009). The first of these cases related to the simultaneous burial of a young middle adult male (C399) and a juvenile probable male (C415) aged between 13 and 14 years at death; the adult was dated by radiocarbon determination to the mid-12th to mid-13th centuries AD (UBA-8681; cal AD 1160–1258). Both individuals had suffered brutal traumatic assault with a fine-edge blade, possibly a cleaver or heavy knife. Blade thickness was consistent across all blade wounds for both individuals suggesting one attacker, or

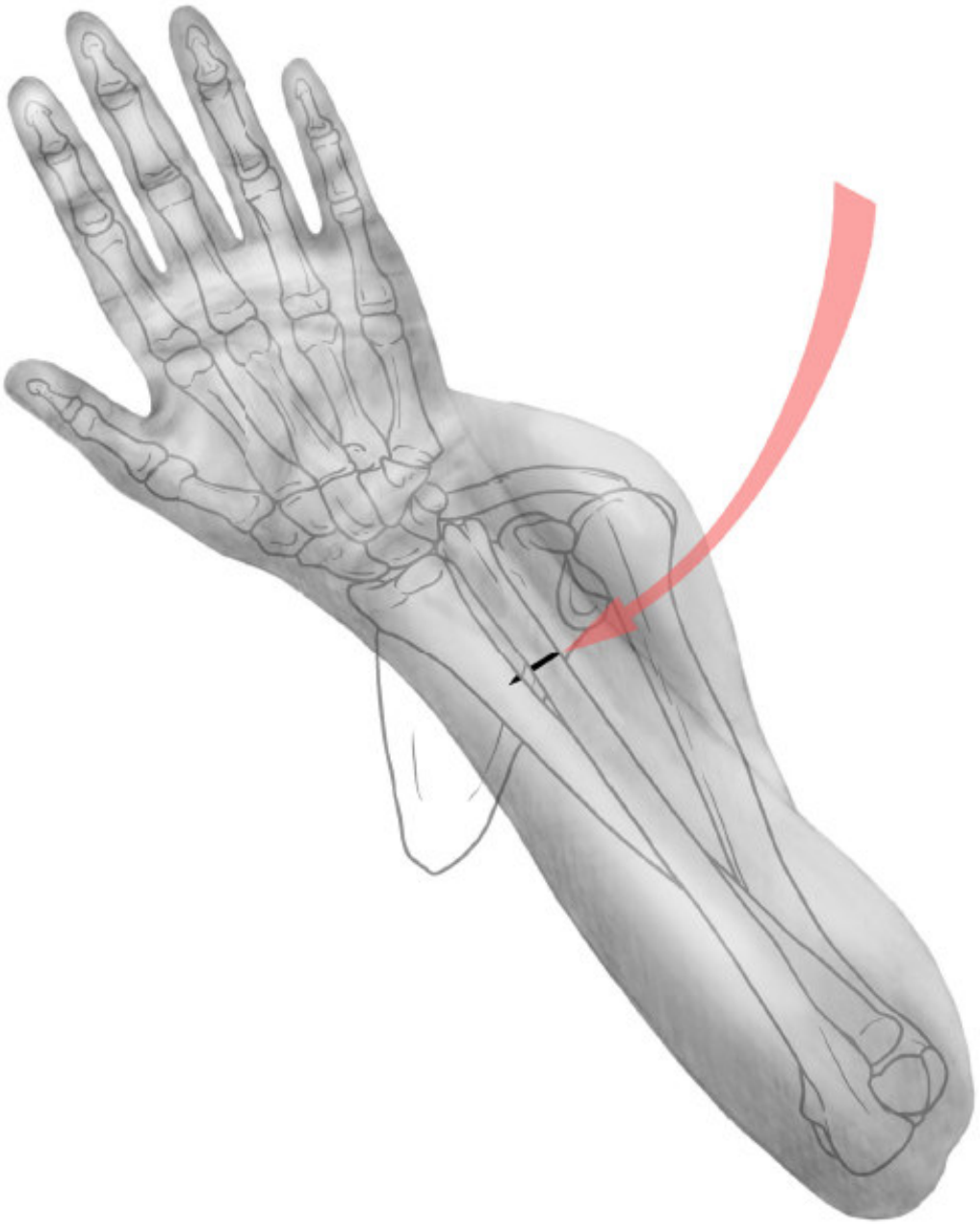
several armed with similar weapons. The adult male showed evidence of an ante-mortem defensive wound to the left forearm—termed a parry fracture (Illus. A2.10)—which almost severed the limb, with the remainder of the wounds being delivered from behind and predominantly from the left rear quadrant. The remainder of the wounds to both individuals suggest an unsuccessful attempt to behead them, and in the case of the adult male to butcher the lower portion of the shoulder blades; the wound patterns are consistent with an attempt to remove or dismember the upper limbs. Overall the pattern of the injuries seen on these two skeletons was consistent with an attempt at dismemberment and beheading (or *coup de grace*), rather than a series of blows directed in combat.

The third case of non-accidental trauma was evidenced by a younger middle adult male (C564). The cranium displayed clear evidence of interpersonal trauma (Illus. A2.11), with a large shallow slice wound which removed the outer surface surface of the left parietal bone at the parietal boss, leaving a clear ring of bone exposed. The blow was delivered from above, behind, and to the left of the individual; this may have been caused by a sword blow possibly delivered from on horseback.

None of the burials displaying non-accidental trauma appear to have been treated differently from the norm in terms of position within the graveyard, disposition of the body and grave goods. While the skeletal population buried at Balykilmore most likely represents a sedentary agricultural community, these people were unlikely to have been strangers to inter-personal violence and warfare. The nearby village of Tyrrellspass is cited on an important historical routeway through midland bogs, reinforced by the presence of Tyrrell castle, built by the Tyrrells in the 15th century, lords since the time of Henry II (Chapter 5, printed volume). Captain Richard Tyrrell was a commander of the Irish forces during the Nine Years War of 1594–1603, and was responsible for leading a significant victory over English Crown forces in the battle of Tyrrellspass, just north of the village, in July 1597, at *Baile an Bua*. Local tradition has it that the slain from the battle are buried within the limits of the current village at Tyrrellspass, and there is no evidence in the skeletal record of Ballykilmore to suggest that they were buried in that cemetery. While the individuals discussed above met violent and unpleasant ends it is clear that the manner of their deaths did not disqualify them from formal Christian burial or special treatment in any way.



Illus. A2.9—First thoracic vertebra from burial C564 close-up showing Shoveller's fracture of spinous process.



Illus. A2.10—Reconstruction of non-accidental sharp force trauma to the left arm of burial C399, showing wound track in anatomical position indicating a defensive parry wound. (Caroline Needham, University of Dundee)



Illus. A2.11—Cranium of Burial C564 in norma lateralis showing peri-mortem sharp force trauma.

Discussion

While Clonfad is a small skeletal sample (and thus unrepresentative of the population as a whole), the Ballykilmore assemblage provides a significant burial record stretching over a millennium, which shows remarkable consistency in burial practice and rite over this period. Infant and juvenile mortality were high, and the Ballykilmore population appears to present an environmentally stressed group, short in stature compared to the modern average, and with poor levels of dental hygiene. Patterns of acquired disease, degenerative joint disease and accidental trauma are consistent with a rural agricultural population, with sexual division of labour and heavy manual working by males. In keeping with palaeopathological conditions generally seen in contemporary medieval populations, some social stratification may be in evidence, and certain individuals seem to have been singled out for exclusion during the burial rite, possibly due to cultural attitudes to strangers or those dying in childbirth. There is also compelling evidence for endemism within a restricted gene pool. As a population group rediscovered during the excavation of a 'forgotten' or lost

graveyard, the Ballykilmore assemblage represents what may have been typical across much of the medieval countryside in Ireland, and the presentation of its results makes a useful contribution to the wider study of rural communities in medieval Ireland.

Glossary

Abscess: An accumulation of pus which forms within a cavity in bone or soft tissue. An abscess is formed as a reaction to infectious processes caused by bacteria or parasites or foreign material entering the body

Acromioclavicular joint: The junction between the acromial process of the scapula and the clavicle

Ameloblast: Specialised cells which deposit tooth enamel during the development of the dentition.

Anaemia: The qualitative or quantitative deficiency of haemoglobin, a protein which normally carries oxygen from the lungs to the organs and other tissues as part of normal cardiovascular function. The incidence of anemia leads to hypoxia or lack of oxygen in bodily organs.

Anatomical direction: Terms which describe the relative positions of different anatomical elements in objective terms. See anterior, posterior, superior, inferior, proximal, distal, cranial and caudal.

Antemortem: An event occurring before death.

Anterior: Situated to the front of the body – the opposite of posterior or dorsal.

Anthropometry: The process of taking linear measurements on the human body in order to describe and analyse patterns of variation.

Apophyseal joint: A point where two or more bones join in the spine. Each vertebra has a pair of apophyseal joints—one on the left and one on the right. Each joint is composed of a superior articular facet joint that faces up and an inferior articular facet that faces down. Apophyseal joints are hinge-like joints that allow the flexion, extension and torsion of the spine. These joints also interlock the vertebra to make the spine more stable.

Appendicular skeleton: The appendages. The appendicular skeleton is composed of 126 bones in the human body. Functionally it is involved in locomotion (the lower limbs) of the axial skeleton and manipulation of objects (the upper limbs).

Atlanto-axial joint: The articulation between the first (atlas) and second (axis) cervical vertebrae of the spine.

Avascular: Not associated with or supplied by blood vessels.

Avulsion fracture: A fracture which occurs when a fragment of bone tears away from the main mass of bone as a result of physical trauma.

Axial skeleton: The axial skeleton consists of 80 bones in the head and trunk of the human body. It is composed of the skull, the ossicles of the inner ear, the hyoid bone of the throat, the rib cage (thorax), and the vertebral column. The axial skeleton and the appendicular skeleton together form the complete skeleton.

Barton's fracture: An intra-articular fracture of the distal radius with dislocation of the radiocarpal joint.

Bioarchaeology: The study of biological remains from archaeological sites. Remains are further categorised into respective disciplines: osteoarchaeology (human remains), zooarchaeology (animal remains), palaeobotany (plant remains), palynology (pollen), palaeoentomology (insects) and palaeoichthyology (fish).

Bone: Bones are rigid organs that form part of the endoskeleton of vertebrates. They function to move, support, and protect the various organs of the body, produce red and white blood cells and store minerals. Human bone is mainly made up an inorganic mineralised component (hydroxyapatite) which gives structural rigidity, and the protein collagen which lends flexibility and elasticity.

Bregma: A point which marks the intersection between the frontal and parietal bones of the skull.

Buccal: Towards the cheek.

Calculus (plaque): A cement-like deposit laid down on and around the margin of tooth crowns, made up of mineralized oral bacteria and salivary proteins. Calculus is strongly laid down when sugar is present in the diet.

Cancellous bone: Also referred to as trabecular bone or spongy bone. It typically occupies the interior region of bones underlying the cortex, and has an open cell or sponge-like structure. It has a higher surface area compared to compact bone but is less dense and mechanically weaker. Cancellous bone is highly vascular and frequently contains red bone marrow where hematopoiesis occurs (the production of blood cells).

Caudal: Towards the tail – in humans this means towards the sacrum and coccyx.

Colles' fracture: A fracture of the distal radius which involves dorsal displacement of the fracture fragments. The fracture tends to occur when a body falls onto the hand with the wrists in extension.

Coronal suture: The intersection between the posterior margin of the frontal bone and the anterior margin of the parietal bones. The coronal plane respects this axis.

Cortical bone: A type of osseous tissue sometimes referred to as compact bone which

forms the cortex, or outer shell, of most bones. Cortical bone contributes about 80% of the weight of a human skeleton, and is much denser with higher mechanical strength than cancellous bone.

Cranial: Anatomical direction – towards the crown of the head (same as superior).

Deltoid tuberosity: A roughened triangular raised area on the lateral (outer side) of the mid humerus. The tuberosity marks the site of insertion of the deltoid muscle.

Demography: The statistical study of biological populations, and their changes over time or space. It encompasses the study of the size, structure and distribution of populations, and spatial and/or temporal changes in them in response to birth,migration, aging and death. Palaeodemography refers to the study of demography in exinct or archaeological populations.

Dental alveolus: A tooth socket.

Dental caries: Also known as tooth decay, characterised by local demineralisation of the inorganic portion of the tooth by acid-producing bacteria with subsequent destruction of the organic part. This is a disease whereby bacterial processes damage hard tooth structure (enamel, dentin and cementum). These tissues progressively break down, producing dental cavities (or holes in the teeth).

The shaft of a long bone which occurs between the epiphyses (growth plates)

Diploë: Refers to the spongy bone of the internal part of short, irregular, and flat bones. The diploe houses and protects the red bone marrow only found in the pelvic bones, ribs, sternum, vertebrae and ends of the long bones. Its fluid-filled spaces reduce the weight of most bones, allowing them to be more easily moved and supported by skeletal muscles. In the skull, the layers of cranial vault bones are familiarly known as the tables of the skull; the outer one is thick and tough; the inner is thin and dense. The intervening cancellous tissue is called the diploë.

Distal: Situated furthest from the point of attachment or origin of a bone (opposite of proximal).

Dorsal: Towards or on the back - the dorsum (see posterior).

Ectocranial: The outer surface of the skull.

Edema: An abnormal accumulation of fluid beneath the skin, or in one or more cavities of the body. Also known as oedema.

Endocranial: The inner surface of the skull or cranial vault.

Endocrine disorders: Disease which affect the endocrine system and the production of

hormones. Hormonal abnormalities affect growth and development, the metabolism, digestion, waste elimination, respiration, blood circulation, the maintenance of body temperatur, sexual function and reproduction, and mood. The most common endocrine disorder today is diabetes.

Epigenetic: The interaction between genes and their developmental environment. Epigenetics is often referred to as the study of heritable changes in genome function that occur without a change in DNA sequence.

Epiphysis: The end of a long bone that is originally separated from the main bone by a layer of cartilage but that later becomes united to the main bone through ossification. The epiphyseal plate (or growth plate) is a cartilagenous plate at each end of a long bone, which is responsible for the longitudinal growth of bones. The epiphysis fuses to the main shaft of the bone (diaphysis) at the cessation of the juvenile growth phase.

Erythema: A skin condition characterized by redness or rash.

Evulsion: A forcible pulling out or extraction. Often refers to the loss of a tooth.

Foramen: A natural opening, usually in bone. Foramen (plural foramina) through which a blood vessel or nerve will often pass.

Glabella: Anatomical point. The most anterior point on the supraorbital margin - the space between the eyebrows and above the nose

Glenohumeral joint: The shoulder joint. This is a multiaxial synovial ball and socket joint that involves the articulation between the glenoid fossa of the scapula (shoulder blade) and the head of the humerus (upper arm bone)

Gonion: The outer point on either side of the lower jaw at which the jawbone angles upward

Greater tubercle: A prominence on the lateral part of the proximal humerus that serves as the insertion for the supraspinatus,infraspinatus, and teres minor muscles

Hematological disorders: Diseases which affect the production of blood and its components, such as blood cells, haemoglobin, blood proteins, or the mechanism of coagulation.

In utero: In the womb.

Inferior: Towards the feet or away from the head (the opposite of proximal, cranial or superior).

Labial: Towards the lips.

Lambdoid suture: The joint between the parietal, temporal and occipital bones of the skull.

Lateral: Away from the anatomical midline.

Lingual: Towards the tongue.

Medial: Towards the anatomical midline.

Meninges: A system of membranes which envelops the brain and central nervous system. They consist of three layers: the dura mater, the arachnoid mater, and the pia mater. The primary function of the meninges and of the cerebrospinal fluid is to protect the central nervous system

Metatarso-phalangeal joint: The joints between the heads of the metatarsal bones and the bases of the proximal phalanges. The first metatarsophalangeal joint is commonly known as the big toe joint. The little toe joint is known as the fifth metatarsophalangeal joint.

Necrosis: The premature death of cells and living tissue. Necrosis is caused by external factors, such as infection, toxins or trauma.

Neural tube: The embryonic precursor to the central nervous system, which comprises the brain and spinal cord.

Olecranon process: The large bony process at the proximal end of the ulna which projects behind the articulation with the humerus and forms the bony prominence of the elbow.

Ossicle: A small bone, especially one of the three bones of the middle ear.

Ossification: Bone tissue formation. Ossification is the process of the synthesis of bone from cartilage. There are two types of ossification—intramembranous and endochondralossification. Bone may be synthesized by intramembranous ossification, endochondral ossification, or a combination of the two.

Osteoblast: A bone forming cell responsible for the secretion of osteoid matrix that then becomes mineralized. Bone mass is maintained by a balance between the activity of osteoblasts that form bone and osteoclasts which break it down.

Osteoclast: A bone destroying cell. Osteoclasts remove bone tissue by absorbing its mineralized matrix and breaking up the organic component. This process is known as bone resorption.

Perimortem: An event occurring at, or around, the time of death.

Periosteum: A membrane that lines the outer surface of all bones, except at the joints. Periosteum consists of dense irregular connective tissue and is divided into an outer fibrous layer and inner osteogenic layer which contains progenitor cells that develop into

osteoblasts. These osteoblasts are responsible for increasing the width of a long bone and the overall size of other bone types. After a bone fracture the progenitor cells develop into osteoblasts and chondroblasts, which are essential to the healing process. Periosteum also provides an attachment for muscles and tendons.

Posterior: Towards the back (see dorsal).

Postmortem: An event occurring after death.

Proximal: Situated nearest to the point of attachment or origin of a bone (the opposite of distal).

Radiocarpal joint: The wrist joint. The joint between the distal radial bone and the carpal bones of the wrist.

Remodelling: A life-long process where old bone is removed from the skeleton bone (resorption) and replaced by new bone (bone formation). These processes also control the reshaping or replacement of bone during growth and following injuries. Remodeling responds to functional demands and muscle attachments. As a result bone is added where needed and removed where it is not required.

Resorption: The process by which osteoclasts break down bone and release the ingorganic minerals, resulting in a transfer of calcium from bone fluid to the blood.

Sacroilliac joint: The joint between the sacrum and the ilium of the pelvis. It is a weightbearing synovial joint with irregular elevations and depressions that aid interlocking of the two bones.

Sagittal suture: The joint between the two parietal bones of the skull.

Sepsis: Sepsis is a condition in which the body is fighting a severe infection that has spread via the bloodstream. If a patient becomes "septic," they will likely be in a state of low blood pressure termed "shock." This condition can develop either as a result of the body's own defence system or from toxic substances made by the infecting agent (such as a bacteria, virus, or fungus).

Sinus: A void, cavity or sac within bone or tissue.

Smith's fracture: A fracture of the distal radius with ventral displacement of the fragments

which occurs when a body falls onto the hand with the wrists in flexion.

Spinous process: The spinous process of a vertebra is directed dorsally and inferiorly from the junction of the laminae and provides the attachment of muscles and ligaments along the back.

Stature determination: The living height of an individual often calculated by extrapolating the length of the long bones of the appendicular skeleton, particularly the bones of the lower limb, to estimate overall height.

Sternoclavicular joint: The articulation between the sternum (breast bone) and the clavicles.

Stress fracture: A type of incomplete fracture in bone caused by unusual or repeated stress.

Styloid process: A slender pointed process of bone which usually serves as the point of attachment for muscles.

Subchondral: Situated beneath cartilage .

Subgingival: Situated beneath the gumline.

Sulcus: A depression or fissure.

Superior: Towards the head or away from the feet (the opposite of inferior).

Supragingival: Situated above the level of the gumline.

Supraorbital margin: The area of the frontal bone above the orbit, sometimes referred to as the brow ridge.

Synovial joint: A joint with a capsule (synovial cavity) which surrounds the articulating surfaces of the joint, which are lubricated by synovial fluid within the capsule.

Taphonomy: The laws of burial. The study of the processes which effect the decay, decomposition, preservation and recovery of skeletal remains.

Trabecullar bone: See cancellous bone.

Ventral: Towards the front (see anterior).

Vertebral lamina: The protective arch of a vertebra within which the spinal cord sits. The laminae are two broad plates, extending dorsally and medially from the body which fuse to complete the roof of the vertebral arch.

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APPENDIX 3—EXPLOITING THE BOG—IRON PRODUCTION AND METALWORKING

Tim Young

The archaeological sites described in the printed volume lie on raised ground above adjacent bogs and wetlands: Clonfad is to the east of the bogs surrounding the southern end of Lough Ennell, whereas Ballykilmore lies on the southern edge of the *Eiscir Riada*, immediately to the north of Croghan Bog. Such locations were ideally placed to exploit the natural resources of the boglands.

One of the most important natural resources found in and around the bogs are the bog iron ores. Iron weathered from the geological substrate is carried in solution in a reduced state in the groundwaters of the bogs but, where oxidation of these groundwaters occurs, the oxidised iron becomes fixed as insoluble iron minerals that grow in the pore spaces of the host sediment, both inorganic sediments and peat deposits. Suitable conditions for such oxidation may occur particularly around the bog margins and may be marked by the development of an iridescent oily 'slick' on the surface of surface waters, enabling smelters to locate and harvest the ore deposits.

Drier ground around the margins of the bogs would also have supplied wood for production of the charcoal required as fuel for the various stages of iron production: the smelting of the bog iron ore, the refining of the raw blooms (bloom smithing) and the smithing of the iron into finished artefacts (blacksmithing).

The three sites discussed in this chapter show different aspects of the exploitation of bog iron ores during the early medieval period. The iron working undertaken in the Rochfort Demesne ringfort appears not to have been part of the chain of iron production, but rather concerned solely with the end-use of the iron, with evidence for blacksmithing (the production and repair of artefacts). The blacksmithing was probably also accompanied by the casting of artefacts in copper alloy. At Ballykilmore there is evidence for both the primary smelting of bog iron ore and secondary bloom refining – in the earlier phases of use of the enclosure before the erection of the church, with one early metallurgical feature dated to between the fifth and seventh centuries. The evidence from the monastic enclosure at Clonfad suggests large scale metallurgical activity during the sixth to ninth centuries (1.5 tonnes of iron slag was recovered during the excavations, one of the largest assemblages of early

medieval age from Ireland), including both bloom refining and smithing. Evidence for smelting is largely lacking at Clonfad and it is likely that the primary smelting was undertaken in outlying parts of the monastic estate, closer to the raw materials. Clonfad has also provided evidence for the production of brazed wrought iron handbells, a key item of regalia in the early Irish Church. This is the first time a production site for these iconic artefacts has been identified.

In addition to the evidence from these sites for early medieval iron production and use, a second phase of iron production was undertaken at Ballykilmore following disuse of the church. One feature from this late phase of iron production has been dated to the 14th or 15th centuries, and it is possible that iron production continued into the post-medieval period. Some post-medieval blacksmithing was also undertaken at Clonfad.

It is striking that although iron production continued (albeit discontinuously) within the excavated sites for a millennium, the technology employed was remarkably stable. This chapter describes the evidence for iron production and iron working on each of these sites in turn, discussing both metallurgical residues and structures, and pieces together the nature of that technology. The sites have produced remarkable new insight into the technology of the early Irish smith, which has ramifications for slag nomenclature and possibly also for the nature of the trade in iron within early medieval and medieval Ireland.

Scientific investigation of the metalworking residues has been undertaken to improve understanding of the ancient technology. Detailed description of the morphology of the residues can provide a basic understanding of the processes. This can be supplemented by chemical analysis to trace the materials which reacted to generate the slags and by microscopic investigations of texture and mineralogy which provide evidence on how the molten material solidified.

Rochfort Demesne

Rochfort Demesne ringfort yielded a small assemblage of about 8.5 kg of iron-working residues. Of these residues about 6.3 kg was slag in the form of smithing hearth cakes (SHCs), of which 5.3 kg came from the early medieval ditches (C10 and C12). In contrast, the interior features yielded only 0.5 kg of SHC, but about 1.3 kg of

micro-residues and associated small slag material. Such a differentiation of accumulation of residues, with fine-grained materials being deposited close to the activity and coarse slags at a distance, is commonly assumed, but rarely observed. The total amount of material recovered is very small, but sufficient to indicate at least occasional operation of a smithy on the site.

Description of residues

The macroscopic slag assemblage is dominated by examples of whole or fragmentary SHCs. The range of original weights for the six SHCs for which the original weight is measurable or can be estimated is 192–2460 g, with a mean of 950 g. There are too few examples for the weight distribution to be very meaningful, but the range lies within that recorded at other early medieval sites, and includes no examples of a size necessarily indicative of bloom smithing (compare sites in Table A3.1 at end of chapter).

The assemblage includes some sherds from tuyères (fired-clay tubes used for conveying the air blast into a furnace or hearth), together with a larger quantity of fired-clay fragments in a similar rather gravely fabric, which are probably of a similar origin. There are also examples of a dense slag backflow from the underside of a tuyère, and a 'slag beard' (a characteristic accumulation of iron-rich slag that formed attached to lower margin of a tuyère). Such remains are typical components of early medieval iron-working assemblages.

The micro-residues include fines assemblages dominated by flake hammerscale (a thin film produced by superficial oxidation of the hot iron when exposed to the air), although also bearing some spheroidal hammerscale (formed from slag droplets expelled from the workpiece during hammering and then chilled in the air into small spheroidal particles), together with slightly coarser-grained materials including slag spheroids of up to about 6 mm and pieces of slag flats (slag sheets that were probably formed either in contact with the workpiece or possibly the smith's tools). The general appearance of the fines assemblages strongly resembles those from Coolamurry Site 7, Co. Wexford (Young 2008b, forthcoming), a site of approximately tenth-century age, with good evidence for iron working (blacksmithing), rather than primary iron production.

The assemblages from Coolamurry, Navan, Moneygall, Carrigoran and Parknahown are interpreted as being dominantly blacksmithing residues. The assemblages from Trumra, Clonmacnoise, Ballykilmore, Woodstown, Clonfad, AR36 and Lismore/Bushfield are interpreted as including bloomsmithing residues.

Interpretation

The available evidence suggests that the enclosure at Rochfort Demesne was the site of occasional blacksmithing, the end use of iron for making or repairing artefacts. It was not, unlike Ballykilmore and Clonfad, involved in the actual processes of iron production. The residue assemblage is small, suggesting that smithing was not a major or continuous activity. The distribution pattern of fines in the interior features and macroscopic slags in the ditches, matches the expected pattern of residue disposal on an enclosed site, but is rarely actually observed.

Ballykilmore

The enclosure at Ballykilmore was the location for iron production and iron working over a very long time from the early medieval period probably into the post-medieval period. The site yielded a total of 110 kg of archaeometallurgical residues, of which 47 kg are slags from SHCs, 10 kg are iron smelting slags, 28 kg are miscellaneous and indeterminate slags and 25 kg are tuyères. The site has also yielded small quantities of micro-residues (hammerscale) from soil samples, together with a few small lumps of concretionary 'smithing floor'. Much of the assemblage occurs in reworked contexts, but two major periods of both iron smelting and smithing are identified: one probably pre-church phase, including a feature radiocarbon dated to between the fifth and seventh centuries, and a second probably post-church phase, with a feature dated to the 14th or 15th centuries. It is not known whether there was continuity between the phases.

Early medieval iron smelting and smithing are represented by residues recovered from numerous pits and hearths within the enclosure, but also by reworked

material in later graves. Iron smelting was undertaken in slag-pit furnaces and appears to have used a bog iron ore with a low manganese content.

Later iron working and iron production is represented by abundant residues (82 kg out of the 110 kg recovered from the site as a whole) in the enclosure ditch and within the fill of the large pit cutting it (C1231/5). Iron smelting residues from this phase are largely from a single deposit, which includes some poor-quality unconsolidated bloom material. Most of the later residues are from smithing, including dense smithing hearth cakes (SHCs) ranging up to about 4 kg in weight, probably indicating that bloom smithing was undertaken here, and a very large proportion of exceptionally big tuyères. The large tuyères indicate the use of technology similar to that of the early medieval period, but with a change in tuyère design. The exceptionally high proportion of tuyères in the assemblage may be a function of the much larger tuyère size than at Clonfad, but may also be a possible indicator of an intermittent activity.

Distribution of the residues

Stratigraphic distribution: Of the 110 kg of residues recovered from the site, 49 kg were derived from the enclosure ditch, 36 kg from the large pit (C1231/5) cut into the ditch in the southwest of the site, 12 kg came from various other cut features, 8 kg of residues were recovered from graveyard deposits and 4 kg of residues were recovered from topsoil or other modern contexts.

It would therefore appear that the vast majority of the metalworking residues derive from contexts deposited late in the history of the site: the upper fills of the enclosure ditch and the large pit (C1231/5). A sparse residue assemblage occurs in the earliest ditch fill on the southwest side of the enclosure and throughout the ditch on the southeast side. This suggests a low background level of residue accumulation. The upper levels of the enclosure ditch on the southwest side have an abundant smithing residue assemblage and the large pit (C1231/5) cut through the enclosure ditch in the southwest of the site also has a rich smithing assemblage (including fines). The presence of a wide size-range of material within this pit suggests that dumping of residues took place from a closely adjacent smithy. A lesser quantity of residues from upper levels of the graveyard (mainly from the southern part) may be associated with

the build-up of slag in the adjacent enclosure ditch. The metallurgical features cut into the middle levels (probably phase B/C) of the enclosure ditch on the southeast side of the enclosure (C979 & C1183) contain mainly smelting residues. One of these features (C979) yielded bone that gave a radiocarbon date of cal AD 1298–1371, 1378–1407 (UBA-8368). The evidence that these features constitute smelting furnaces is not conclusive (see below). Interestingly, they are not accompanied by deposition of smelting slags into the adjacent ditch apart from a single fragment from a nearby grave fill. These are referred to in this chapter as the 'late' contexts.

Small quantities of residues were recovered from cut features within the enclosure. A group of five pits aligned approximately north/south adjacent to the east end of the church yielded small quantities of both smithing and smelting slags. The quantity, 0.36 kg, is very small, but the significance lies in the probable early age of the pits, for although detailed stratigraphic relationships are unclear, one pit was truncated by the south-east corner of the church. A further 2.3 kg of residues were recovered from individual grave-fills, mainly from an area in and around the eastern part of the church, the same general area as the pits described above. It seems likely therefore that iron smelting was conducted early in the history of the site, somewhere in the area of the later east end of the church. To the south of the enclosure a cluster of features of metallurgical significance lies close to the enclosure ditch. One of these (C137) has given a radiocarbon date of cal AD 435–439, 508–518, 528–655 (UBA-8343). These contexts are referred to as the 'early' contexts in this chapter.

A significant proportion of the archaeometallurgical material was recovered from the graveyard soils and other contexts, which may contain material derived from either of these two periods.

Dating of the phases of metalworking is largely with respect to features dated by radiocarbon measurements: one from the 'early' group (C137; fifth to seventh centuries) and one from the late group (C979; 14th and 15th centuries). It seems likely on stratigraphic grounds that much of the metallurgical activity in the centre of the enclosure must pre-date the church (and so is probably pre-tenth century). The dated early feature (C137) lies close to the margin of the enclosure, suggesting that the metallurgical activity within the enclosure is in general within the period fifth to tenth century. Evidence from the enclosure ditch fills is problematic, but the dated metallurgical feature (C979) is probably fairly early in the major accumulation of residues in the ditch, with substantial residues still present in the uppermost layers,

which also contain recent artefacts. Thus the 'late' period of this report is probably from the 14th century into the post-medieval period. Since evidence suggests that the church may have collapsed by the 13th century, it is possible that the two periods of metallurgical activity pre- and post-date the church respectively.

Features of metallurgical origin: Four features have good evidence for being associated with metallurgical activity. These occur in two pairs of similar features.

The first pair were cut features (C137 & C139) on the inner side of the possible bank on the southern side of the enclosure, both with physical evidence of burning and both yielding smithing residues. As described above, one of these (C137) has given a fifth to seventh century radiocarbon date. They are both rather small features (0.31 m and 0.34 m in diameter respectively and 0.10–0.12 m deep) more consistent with the basal pit of a slag-pit iron-smelting furnace than a smithing hearth, so if the features are smithing hearths, they would not represent the entire hearth, but merely a hollow in front of the tuyère for collecting slag. A hollow of this size would be consistent with the largest SHC recovered from the site, which is estimated to have been c. 0.25 m in diameter and 0.05 m deep.

Alternatively, they may indeed be the remains of smelting furnaces that have merely been backfilled with smithing residues. Similarly sized pits from slag-pit furnaces have been described from many sites (e.g. Celbridge, Co. Kildare, Young 2003b; Ballydavis B & Cappakeel F, Co. Laois, Young 2005b; Derrinsallagh 3, Co. Laois, Young 2008g; Cuffsborough 4, Co. Laois, Young 2009a) and appear to be typical of the later Iron Age to early medieval periods. The Cuffsborough example is particularly relevant in being a paired furnace of late Iron Age date (first to third century AD). Supporting evidence for small smelting furnaces at Ballykilmore was supplied by a slag block (sample BYK25) from a grave-fill (C688), which suggested a slag pit diameter of perhaps as little as 250 mm.

An associated 'charcoal spread' (C1247) survived only in patches scattered within an area of c.1.3 by 1.0 m, but was of a size more consistent with a smithing hearth.

The second pair of features were moderately large pits (C979, C1183), together with two charcoal deposits (C138, C1186), that were cut into the upper layers of the enclosure ditch, just to the south of the entrance to the enclosure.

The fill of C979 (C1201) produced a 9 kg assemblage of iron-smelting slags, together with some 'sinter', tuyère fragments and possible smithing slags. As already stated this fill gave a 14th to 15th century radiocarbon date. Pit C979 was 1.02 m by 0.70 m and 0.24 m in depth.

The second pit (C1183) was 0.7 m in diameter and 0.35 m deep and its fill produced a large block of concretionary or sinter material similar to that from pit C979.

Although the dominant materials from these features were smelting residues, they are rather large for slag-pit furnaces. An alternative interpretation is presented by the 14th to 15th century furnace at Derrinsallagh 1, Co. Laois (Young 2008f), which had two pits dug into an adjacent hollow in front of the furnace, which were probably used for holding slag, charcoal and other debris raked out through a furnace arch. A similar model, applied to these features, might mean the furnaces themselves were not preserved, but were situated on the outer lip of the enclosure ditch.

Description of the iron-smelting residues

Early smelting residues: Iron smelting is represented in the early contexts almost exclusively by dense flow slags. Flow slags are typically formed in the basal pits of non-tapping furnaces, where slag flows downwards from the hot zone of the furnace, sometimes cooling in the body of the pit as individual blebs and prills (prills are cylindrical flows of slag); but the prills may become amalgamated into larger blocks, particularly close to the blowing wall. Much of this material was recovered from grave fills and other reworked deposits, and was typically in rather small pieces.

One larger block from grave C688 comprised amalgamated flow lobes, apparently from slag flowing downwards close to the pit wall and flowing between rather large pieces of charcoal/wood (now present as large moulds). Moulds of large wood fragments, representing an original pit-packing, are a common feature of slag-pit furnaces. This piece has a curvature suggesting that the slag pit was of a small diameter (perhaps about 250 mm if regularly shaped). The microstructure of this specimen comprised flow lobes of varying texture and mineralogy: some areas showed abundant primary wustite (an oxide of divalent iron) followed by olivine (a group of silicate minerals), others a smaller proportion of primary wustite followed by

an olivine-wustite cotectic intergrowth. Analysed olivine was typically close to end-member fayalite with relatively low levels of calcium substitution. The extremely fine-grained interstitial areas probably contained late-stage kirschsteinite and rhönite, together with an aluminous glass (see the Glossary for explanations of these various minerals).

Late smelting residues: The late smelting residues described here are almost all from a single deposit, C1201, a fill of pit C979 (discussed above). The general textures present in the late smelting materials are characteristic of smelting in a non slag-tapping slag-pit furnace. There are, however, some features of this assemblage which are rather unusual.

Flow slags are represented by a single complex flow of approximately 260 mm by 180 mm and a thickness of up to 60 mm, showing horizontal flow across the slag pit floor, and which contains moulds of large wood fragments with minimum dimensions of 40 mm by 35 mm by 140 mm and 45 mm by 20 mm by 200 mm. In contrast to the earlier flow slag, however, this example is pale in colour and of relatively low density. It has a microstructure (Illus. A3.1c) dominated by sheaves of elongate olivine crystals (at least 3 mm in length and up to about 80 μm in width), with interstitial olivine dendrites, all of fairly calcic compositions (the main olivine has cores with 5% calcium, Ca, substitution, the later olivines have up to 24%), but with very low manganese Mn, contents (Mn, 1–2% substitution).

Accompanying the flow slag are friable masses of dense slag full of small charcoal moulds and fragments, apparently locally grading into a marginal crust of more homogeneous slag. There are also more rounded, nub-like, slag fragments where the dense slag encloses a core of low density charcoal-rich material. One piece shows a contact between a charcoal-rich, dark grey slag and a paler, dense, vesicle-free slag with some ceramic material adhering to the exterior, probably deriving from wall-slag reaction close to the blowhole. As an assemblage these materials are all associated with the slag from the upper part of the slag pit, just below the level of the bloom. One feature of the microstructure of these materials is the occurrence of early-formed slag blebs completely enclosed by later melts, suggesting that at least some of these materials have formed through the amalgamation of flowed material. This group has higher iron contents than the associated flow slag and shows a more conventional mineralogy, with minor primary wustite, followed by blocky to elongate calcic

fayalite (sometimes with a fayalite-leucite cotectic growth), followed in turn by kirschsteinite overgrowths and interstitial dendrites. The specimen from close to the blowhole shows minor late leucite and apatite in addition to the kirschsteinite. As with the flow slag, calcium substitution in the olivine is very high, rising from 17% in the cores of some early olivine, through to values as high as 30% in the late stage olivine. In a sample showing a cotectic intergrowth with leucite, the olivine is up to 80% kirschsteinite and 20% fayalite, well to the kirschsteinite side of the minimum on the liquidus – which lies at about 0.47 molar fraction kirschsteinite for the simple binary join (Bowen et al. 1933; Mukhopadhyay & Lindsley 1983).

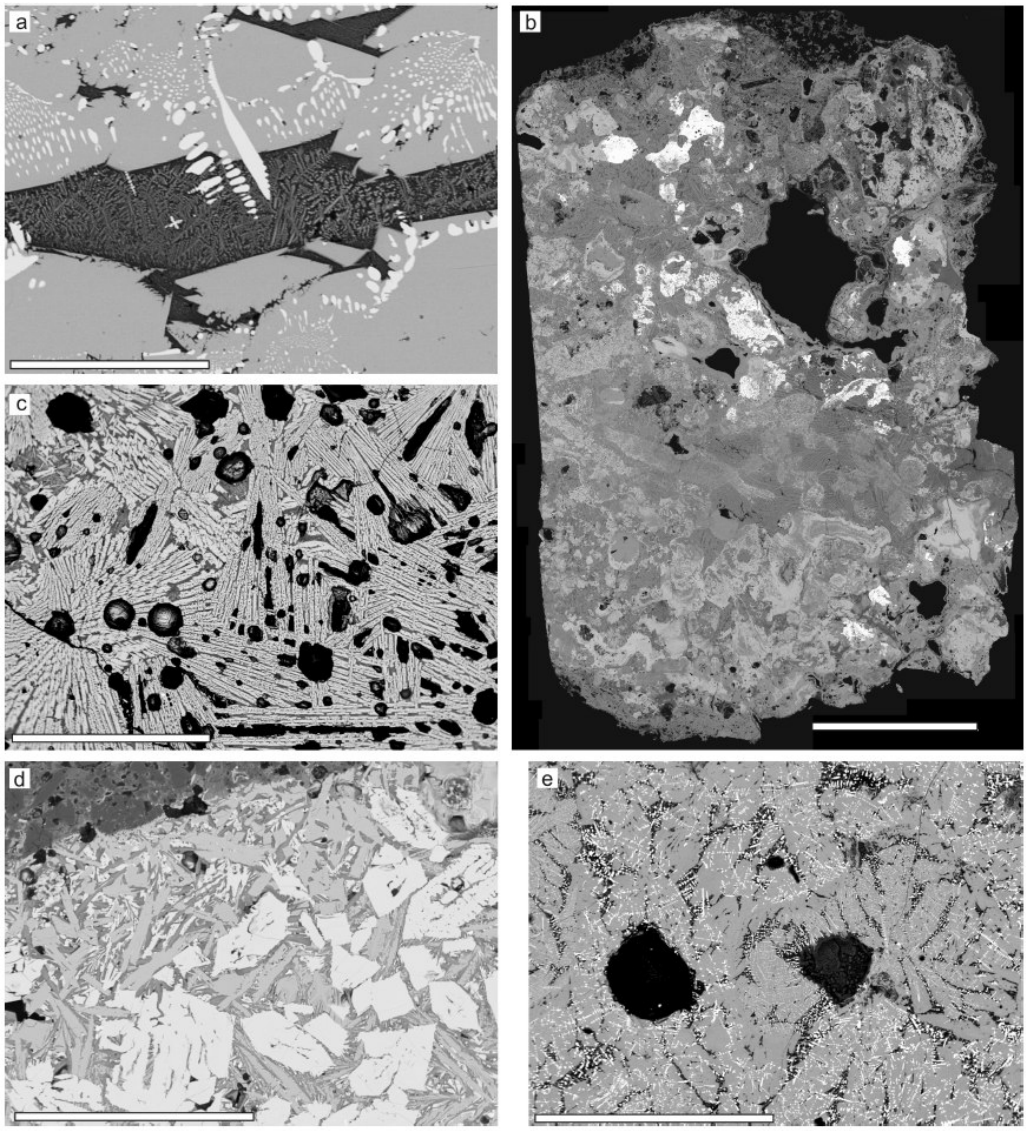
One rounded slag nub (Illus. A3.1b) from this context contained numerous fragments of iron bloom, with a variable surrounding mineralogy, locally of kirschsteinite (Fa95–97 Fo5–3 with 27–30% Ca and 3% Mn substitution), but in places of calcic fayalite, (Fa96–97 Fo4–3 with 17–21% Ca and 2–3% Mn substitution) plus hedenbergite (clinopyroxene). In either case the interstitial areas are replete with small iron particles set in a calcic and potassic glass. The fringing of bloom material by fayalite + hedenbergite suggests local depletion of the iron in the slag by about 50% in these areas, strong evidence that the specimen represents a smelting slag, rather than a bloomsmithing slag (in which reaction of the iron into the melt would be expected, leading to localised iron-enrichment in the slag). The iron particles have an irregular outline, which may represent a modified form of the original ore particles, and a size of about 3 mm, similar to that of the ore particles observed at Cherryville, Co. Kildare (Young 2008a), and also in the granular concretionary material of this study (see below). The iron pieces show high sphericity internal slag inclusions and voids indicating a lack of compaction and, therefore, that these are primary iron particles, rather than worked pieces.

Both pit C1201 and the nearby pit C1183 yielded pieces of a friable granular concretionary material; a further fragment was recovered from pit C1231/5. These materials included particulate debris including large rounded iron oxide-rich particles of up to 3 mm, together with smaller angular particles of about 100 µm. There are also charcoal particles of a range of sizes, together with a few quartz and feldspar grains (also of about 100 µm). The material is present either as substantial sheets (up to 80 mm thick in C1201) or as plano-convex blocks of up to 200 mm diameter (in pit C1231/5). This material is interpreted as comprising fine debris that has fallen through the charge of the smelting furnace and accumulated on the base of the slag pit. Some

of the material shows consolidation through the admixing of slag drips, but most is friable and cemented by iron oxides, giving a sinter-like appearance. Similar material has been recorded from other sites, including Cherryville, where the component tiny bog iron particles were very well preserved (Young 2008a, Plate 2).

Chemical composition of the smelting residues: The smelting residues show a sharp distinction in chemical composition between those retrieved from 'late' contexts in the enclosure ditch (C104) or in the features (C979 & C1183) cut into the ditch and those recovered from pits and graves within the enclosure (the 'early' contexts).

There is some limited evidence for the nature of the ores smelted in each of the two phases: a single analysis of a fragment of bog iron ore from pit C860, an early feature close to the east end of the church, gives a trace element signature close to that of the early smelting slags and, with some qualification, the granular 'sinter' specimens recovered from the late contexts can provide some indication of the feedstock for the late smelting activity.



Illus. A3.1—BSEM images of archaeometallurgical residues from Ballykilmore.

KEY:

(a) *An example of an early phase smithing slag (BYK14, Area 2). This image is from the thick basal bowl of the smithing hearth cake (SHC). The coarse-grained, fairly simple texture indicates this was a completely molten slag with a simple cooling history. The primary phase is dendritic wustite (white, centre), which is followed by fayalite (pale grey) and wustite at least partly as a cotectic structure. The interstitial material includes fine fayalite dendrites in glass (dark). Scale bar 200 μm.*

(b) *A fragment of poorly consolidated bloom material from the late smelting phase (BYK5 composite). The piece consists of small pieces of iron (white) in a matrix of slag. Away from the centre of the specimen the iron has mainly secondarily oxidised (pale grey). The size of the iron particles may reflect the grain size of the ore being smelted. Scale bar 5 mm.*

(c) *A flow slag from the "late" smelting phase (BYK1, Area 4). The slag is almost entirely fayalite, in elongate crystals arranged in radiating bundles. Scale bar 1 mm.*

(d) *The base of a late SHC (BYK18a, Area 6). The sediment of which the hearth was formed is seen in the upper left (dark). The slag shows reaction zone between the main iron-rich slag and hearth floor with abundant hedenbergite (clinopyroxene; mid grey) and a calcic feldspar (dark), as well as fayalite (pale grey). Scale bar 300 μm.*

(e) *Texture within the body of a late SHC (BYK19b, Area 5). The texture shows primary wustite (white) with contrasting sizes and orientations of dendritic arrays, probably delimiting early pores. The wustite is flowed by fayalite (pale grey), with interstitial zones containing a fayalite-leucite cotectic growth (speckled). Dark areas are vesicles. Scale bar 600 μm.*

The upper crust-normalised rare earth element (REE) profiles for the early smelting residues (Illus. A3.2b; shown recalculated on an iron-free basis) are parallel to that of the ore sample (but enriched with respect to it), which has a relative progressive, almost linear, depletion towards the light REE and a slight negative cerium anomaly (Pr_N/Lu_N approximately 0.5). The profile is quite distinct from that of the later smelting slags (Illus. A3.2c), which have a flatter profile (PrN/LuN of 0.7 to 1.1).

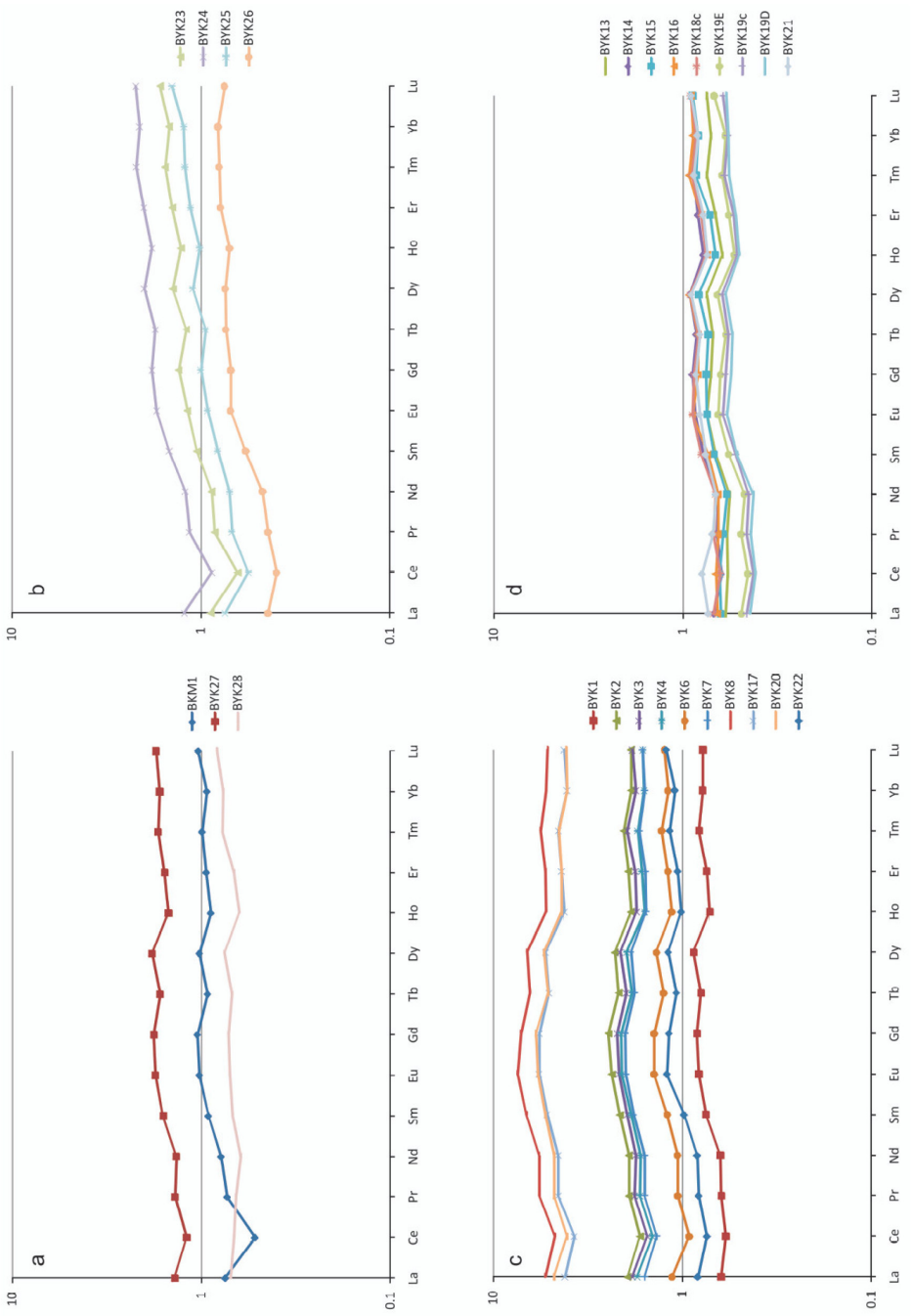
The early flow slags have FeO contents of 66–68 wt%, with 24–27 wt% SiO_2 and 1.2–1.4 wt% Al_2O_3. MnO is low at only 0.8–0.9 wt%, as is P_2O_5 at 0.4–0.5 wt%. CaO is low at 1.9–2.5 wt% as is K_2O at 0.29–0.35 wt%. The sample of bog iron ore recovered from pit C860 shows compatible levels of the major elements, with SiO_2 and Al_2O_3 at about 10% of their levels in the flow slag. In the flow slags the ratio of SiO_2:Al_2O_3 (by weight) is close to 20 and is about 22 for the iron ore sample (Illus. A3.3d).

The later smelting slags show much lower FeO contents (54–64 wt%) and MnO contents (0.45–0.75 wt%), but higher CaO (4.8–9.7 wt%). The ratio of SiO_2:Al_2O_3 (by weight) is in the range of 12–15 for the slags.

The granular 'sinters' show high iron contents (70–80 wt% when calculated as Fe_2O_3), low MnO at 0.2–0.3 wt% and low CaO at 1–3 wt%. The SiO_2:Al_2O_3 ratio (by weight) is in the range of 7–10 for the sinters. This relatively aluminous composition may be responsible for the late smelting slags having a much lower SiO_2:Al_2O_3 ratio than the early smelting slags (Illus. A3.3d).

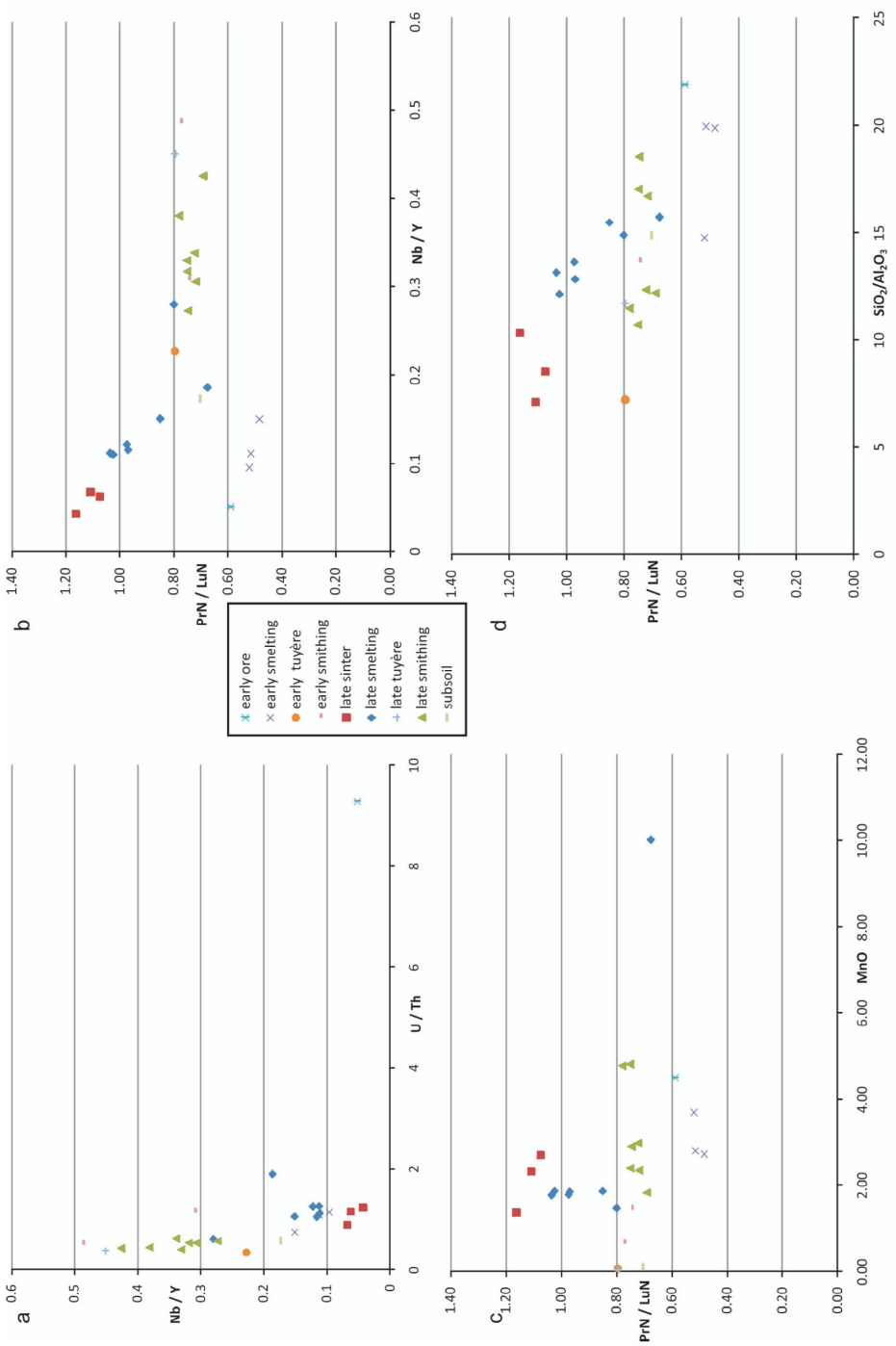
All the smelting slags show a low Nb/Y ratio (Illus. A3.3a,b). The U/Th ratio is 0.8–2.0 (by weight) for all the smelting slags. The ore sample shows an anomalously high U/Th ratio of >9, but there are no slags which have indications of having inherited such a ratio (Illus. A3.3a).

Description of the iron-working (smithing) residues: The smithing slags from Ballykilmore are mostly in the form of smithing hearth cakes (SHCs). There were 43 SHCs for which the original weight could either be measured or estimated. Of these, 30 were recovered from the late contexts, forming a small assemblage that can be compared with those from other sites. The late assemblage shows a size range of 94–4033 g, with an average weight of 1022 g. Too few SHCs were recovered from early contexts for a useful description of the size distribution.



Illus. A3.2 Rare earth element (REE) profiles for samples from Ballykilmore 6.

KEY:
All profiles are normalised against Upper Crust (after Taylor and McLennan 1981). Elemental concentrations of samples have been recalculated on an iron-free basis.
(a) *Ceramic materials: BKM1: subsoil sample, BYK27 and BYK28 tuyère samples.*
(b) *Bog iron ore samples (BYK26) and iron smelting slag (BYK23, 24, 25) from early features. REE profiles of the slag samples are parallel to that of the associated ore.*
(c) *Samples of materials associated with the late smelting BYK1–8 and BYK22 are smelting slags; BYK17 and 20 are samples of 'sinter'. The REE profiles of the smelting slags parallel to those of the 'sinter' specimens. They are not parallel to the materials associated with the early smelting – indicating the use of a different ore.*
(d) *Samples of smithing slags. BYK14 and BYK21 are from early contexts, BYK13, BYK15, BYK16, BYK18 and BYK19 are from late contexts.*



Illus. A3.3 Chemical trends and groupings within Ballykilmore archaeometallurgical residues.

KEY:
(a) *Nb/Y v. U/Th : this plot shows a distinction between the smelting slags and the smithing slags, with the smelting materials having higher U:Th and lower Nb:Y ratios.*
(b) *Pr_N/Lu_N v. Nb/Y : using the REE profile measure Pr_N:Lu_N divides the smelting slags into the early and late groups.*
(c) *Pr_N/Lu_N v. MnO : the early smelting slags show lightly higher Mn contents than the later ones.*
(d) *Pr_N/Lu_N v. SiO_2/Al_2O_3 : there is a spread of SiO_2:Al_2O_3. Pr_N and Lu_N are values normalised against Upper Crust (after Taylor & McLennan 1981). MnO is expressed in weight%.*

Table A3.1 allows the comparison of the late SHC weight statistics with assemblages from other sites. The comparative sites are mainly significantly older, but given the apparent stability of the technology employed, the comparison is probably valid. The Ballykilmore material is in the middle of the spectrum of the described assemblages. It implies that the SHCs are extremely unlikely to represent blacksmithing alone, but equally unlikely to represent the residues from the smithing of very large blooms, as seen elsewhere in early medieval contexts (at Clonfad, for instance). The Ballykilmore SHC statistics are close to those of the early medieval assemblages from Woodstown, Co. Waterford (Young 2009d), and from Clonmacnoise, Co. Offaly (Young 2005a), which are associated with smelting residues and interpreted to be largely (although not necessarily solely) associated with bloom refining as opposed to blacksmithing.

The late SHCs have a variable shape, with both narrow deep and broad shallow varieties present. The SHCs are characterised in general, however, by being unusually dense, and very often slightly rusty in a particularly dark colour. A few examples show tool marks and holes, but they do not in general show deformation of the cake on extraction.

The smithing slag assemblages also contain a small proportion of slags that are not incorporated into SHCs. These include various small, detached slags from the hearth, including rare balls of material of similar composition to the SHCs, together with examples of more fluid slag flows and blebs, particularly small flows believed to be generated close to the tuyère. Also associated with the tuyère are various slags that have formed attached to the tuyère tip. These include varieties of highly iron-rich materials that have accumulated through adhering to the tuyère tip, but have reacted little with it, but also some iron-poor 'lining' slags whose major input would have been melt from the tuyère.

Tuyères form an important and abundant component of the smithing residues with most recovered from later contexts. The late tuyères are extremely large blocks, with fragments of apparent diameters of 200–300 mm, indicating that the original cross-section of the tuyère was probably oval. In addition to the tuyère blocks themselves, there are several occurrences of pieces of fired clay that have been placed to provide lateral support for the tuyère. Some of these supports have finger-impressions where the clay has been squeezed into position, and some incorporate

fragments of broken, used tuyères. This use of very large tuyères with lateral support has not yet been recorded on any other site.

The fragments of tuyère from pit C979/C1201 in the ditch are rather different from the remainder of the material, appearing to have been approximately 140 mm in diameter, with a central hole, which tapers rapidly towards the frontal face.

Excluding the material from pit C979, there was a weight of 23.5 kg of tuyère material. This is a very large quantity (ratio = 0.50) in comparison with the associated 46.6 kg of SHCs (for comparison Clonfad yielded 17.3 kg of tuyères to 711 kg of SHCs, a ratio of 0.02). It is unclear whether this difference is related solely to the larger size of the tuyères or whether there was a more rapid turnover of tuyères at Ballykilmore.

Early iron-working slag microstructure and mineralogy: Two pieces of early iron-working residue were examined in detail, both from hearth C139. One was a small fragment from a large SHC, which had a thick crust indicating a deep slag puddle. The upper surface of the crust shows protruding olivine crystals. The microstructure (Illus. A3.1a) has a small amount of primary wustite in small, aligned dendrites, followed by a wustite-olivine cotectic intergrowth. The olivine is in complex elongate crystals many millimetres in length and up to 1 mm in width. The outer sections of the olivine are generally wustite-poor. The interstitial areas are filled with a glass containing small fine olivine dendrites. The main olivine ranges from cores close to end-member fayalite, at Fa98Fo2 with 2% Ca and 1% Mn substitution, to margins with Fa100 with 11% Ca substitution and 1% Mn. Overgrowths on the margins are of Fa100 with 25% Ca substitution and the late interstitial dendrites appear to have even higher levels of Ca.

The other specimen examined from hearth C139 was of slag attached to the tip of a tuyère. The formation of this slag close to the tuyère is reflected in the presence of minor magnetite, indicating a degree of oxidation by the air blast not seen in the SHC, but otherwise the slag is close in mineralogy to that of the associated SHC. The olivine shows quench textures close to the contact with the tuyère and the glass in this area has much higher Si and Al and lower Fe than the interstitial glass further from the margin. Silica has been removed preferentially from the ceramic within 3 mm of the tuyère surface, leading to a rise in the apparent abundance of the other major elements. From a point about 1 mm inside the apparent margin of the ceramic, the

highly vesicular ceramic is transitional to the slag composition, which stabilises within 1–2 mm outside the ceramic.

Later iron-working slag microstructure and mineralogy: The SHCs from later contexts show a reasonably consistent texture and mineralogy (Illus. A3.1e). Most samples show a very limited and patchy development of primary wustite. This is followed by olivine with zoned crystals typically a few millimetres in length. The cores of the olivine have compositions typically around Fa94Fo6 with 8–14% Ca and 2–6% Mn substitution; the outer parts show decreasing Mg and increasing Ca, to around Fa98Fo2 with 16–28% Ca and 1–2% Mn substitution. The main olivine is followed by a second generation of a kirschsteinite composition (Fa100 with 25–32% Ca and 1–3% Mn substitution), which may form either dendrites (some as outgrowths from the main phase olivine) associated with rounded leucite, or as a complex cotectic intergrowth with leucite. Apatite and rhönite are also seen as late stage accessory minerals.

Two specimens show rounded 'clasts' of similar slag. These are probably prills formed early in the development of slags in the hearth, which have become surrounded by later melts. One specimen shows a very narrow zone of interaction between slag and clay on the bottom of the hearth and shows a localised mineral assemblage including clinopyroxene (hedenbergite) and calcic feldspar, as well as minor olivine (Illus. A3.1e).

Chemical composition of the smithing residues: The chemical composition of all the SHCs is broadly similar: FeO contents vary from 51–65 wt%, with SiO_2 from 10–30 wt% and Al_2O_3 from 1.1–2.3 wt %.

The upper crust-normalised REE profiles (calculated on an iron-free basis) for the smithing slags are very tightly clustered (Illus. A3.2d) and are broadly parallel to those of the tuyères and subsoil sample (Illus. A3.2a). The similarity of shape of the smithing slag REE profiles is reflected by a very small variation in PrN/LuN (Illus. A3.3). This narrow range of values also embraces the samples of tuyères and of the subsoil, indicating the dominance of the ceramics as the source of REE in the smithing slags.

The SiO_2/Al_2O_3 and Nb/Y ratios (Illus. A3.3) show a wide spread, indicative of mixing of two different components—a more aluminous, Y- and U-poor material

(interpreted as being tuyère ceramic) and a siliceous, Y- and U-rich component with values for these ratios close to those observed in the smelting slags, sinters and ore.

The chemical composition of two tuyère fragments was determined, one from the early context C195, the other from C115 (ditch C104, Phase D; a late context). The samples had broadly similar chemistry, both being siliceous (SiO_2 of 78 wt% and 85 wt% respectively), but they differ in detail. The SiO_2/Al_2O_3 ratio was markedly different for the two samples, being 7 for that from C195, but 12 for that from C115. The trace element compositions also show some differences, with the Nb/Y ratio being much higher for the late example.

The chemical composition of the smithing slags can be interpreted as being influenced by the input of a relatively siliceous component derived from the smelting slags, introduced either as slag contamination of the raw bloom during bloom smithing, or through the release of slag inclusions from the metal (during working of more finished iron), and a more aluminous component from the tuyères.

Interpretation

Ballykilmore has produced evidence, both in the area of the east end of the medieval church and to the south of the enclosure, for iron smelting at an early period in the site's development, while evidence from the enclosure ditch to the south indicates later iron smelting. Abundant residues from late contexts on the south side of the enclosure indicate iron working, at least in part involving bloom smithing.

The detailed identification of metallurgical structures is more problematic. The two early furnaces or hearths in the south of the enclosure morphologically resemble the remains of slag-pit smelting furnaces, but contain fills rich in smithing debris. The later iron smelting is mainly represented by an assemblage from a pit (C879), with a lesser assemblage from a nearby pit (C1183). As described above, each of these might conceivably be the remains of a large slag-pit furnace, but the possibility also exists, since they lack convincing diagnostic features, that they represent working pits in front of a developed furnace with furnace arch, which is itself not preserved. Suspicion that the residue assemblage from pit C879 is not simply that of an in situ. smelting furnace is heightened by the presence of a tuyère, similar to those employed

for smithing, but whose use in smelting has not yet been demonstrated (despite early claims, e.g. Scott 1990, 162–7).

Tuyères are a key feature of the late smithing assemblages at Ballykilmore. They are represented by very large tuyère blocks (c. 200 mm by 300 mm), which are supported to either side by fresh clay containing reused tuyère debris, pressed against the lower margins of the block. These tuyères were presumably used in ground-level hearths (on the basis of the gravely sediment adhering to the base of some of the SHCs), but no such hearths of this period were located in the excavated area. At the western end of the site, the large pit cutting the enclosure ditch (C1231/5) had fills rich in both macroscopic slags and micro-residues (hammerscale) suggesting that a contemporary smithy lay nearby, possibly immediately outside the excavated area. A location in this area is also suggested by the increasing slag content of the boundary ditch as it passes westwards.

The major and trace element chemical compositions of the smelting slags from the two phases are markedly distinct. Both phases are very low in manganese compared with other examples of smelted bog ores in central Ireland. The slags of the later phase are particularly rich in calcium. The late smithing slags have a consistent mineralogy and chemistry, which is also characterised by a high calcium content. The most likely explanation is that the calcium entered the system at the smelting stage, either because of a high calcium content in the furnace structure or because of the use of bog iron ore from lime-rich environments close to the *Eiscir Riada*. The high calcium content of the smithing slags would be due to inheritance of calcium from the smelting slags, which were reworked into the smithing slags during bloom smithing. The statistics of the size-frequency distribution of the late SHCs also suggest that the smithing included bloom smithing. The relatively modest maximum SHC weight suggests that the blooms were small, or split for forging.

Clonfad

Clonfad yielded an assemblage of 1.5 tonnes of archaeometallurgical residues, one of the largest assemblages of early medieval age from Ireland and almost entirely composed of residues from iron working. Much of the material derives from the southeast of the monastic enclosure, with residues dumped both into an old stream

course and contemporary ditches. Iron-working residues date mainly from the monastic period of the site (sixth–ninth centuries), but some limited smithing was also undertaken in the area in the post-medieval periods.

The assemblage is dominated by smithing hearth cakes (SHCs), many of exceptionally large size. The extensive analysis of the Clonfad assemblage represents a major contribution to the investigation of plano-convex slag cakes. Some of the large slag cakes described in this report are of a form hitherto assumed to have been produced during iron smelting. Evidence is presented here that the large cakes form a textural and chemical continuum with smaller, more conventional smithing hearth cakes, and it is suggested that their approach to the chemical composition of smelting slags is mainly due to an origin during bloom refining.

The presence of a large volume of tuyère debris (over 300 sherds totalling 14.7 kg), but no other vitrified hearth material, suggests the use of a wide hearth, with the air blast fed from the bellows to the central part of the hearth through an elongated tuyère. A further, previously undescribed, distinctive form of slag associated with use of such tuyères is presented here as the 'pro-tuyère tongue'.

The SHCs vary from forms with a thick, dense, slag puddle to forms with a highly porous, sometimes extremely friable, charcoal-rich texture, indicating a diversity of metallurgical practice.

The recognition of pieces of vitrified clay coating (shroud) from the brazing of wrought iron handbells is of great significance. Such handbells formed an important symbol in the early Irish Church, and were made from the seventh (and probably the sixth) century through to the ninth, as described above by Stevens (Chapter 8, printed volume). Although widely distributed across the area of influence of Irish monks (particularly Wales, Scotland and Ireland), they are most common in the south Midlands region of Ireland. The thin non-ferrous coating on the iron bells has not been studied in detail, but the Clonfad evidence suggests for the first time that it was applied by brazing. The forging of handbells, one of the largest iron artefacts of their period, may be the reason for the production of the large blooms suggested by the exceptionally large SHCs.

Although there is little evidence for iron smelting, the evidence for bloom refining suggests that smelting was being undertaken locally, perhaps in the parts of the monastic estate closer to the bogs that would have been the source of the iron ore, rather than within the monastic settlement.

Stratigraphic distribution of the residues

The vast majority of the archaeometallurgical residues from the site occur in early medieval contexts, particularly within the ditches and the streamside dumps (see Table 8 in Young E2723_Vol_2.pdf, CD-Rom). Representative sampling of the streamside dumps (C478 and C479) suggests the excavated section contained approximately 460 kg of slag, approximately one third of the 1.5 tonnes of slag from the site, but because this material was heavily overgrown by secondary mineralisation (a low grade bog ore), complete identification and quantification of the residues in these deposits was not possible. The presence of large quantities of metallurgical residues in the deliberate backfills of the monastic ditches suggests that disposal of the residues had taken place in dumps, which may or may not have been adjacent to the ditches, and which may or may not have been contemporary with the use of the ditches, but which were easy sources of spoil for the subsequent levelling of the ditches. Small quantities of residues were associated with some of the metallurgical hearths, but the residues dumped into disused hearths may not reflect the original activity in those hearths (compare the discussion of the Ballykilmore hearths/furnaces above).

Iron working took place at Clonfad throughout Phase 1, with the evidence for handbell manufacture being particularly strong in Phase 1B, but with brazing residues also being associated with the Phase 1C smithy.

Phase 3 iron working is represented mainly by microresidues (hammerscale) in several apparently ephemeral floor-level smithing hearths.

Features of metallurgical origin: In the south of the site there were several well-developed metallurgical hearths, at least some of which are associated with activity during Phase 1b. South of the old stream course there were three hearths, the fills of which all contained smithing hearth cakes: C590 (0.8 m diameter by 0.08 m deep); C568 (0.75 m by 0.65 m by 0.15 m deep); and C577, (1.2 m by 0.6 m by 0.08 m deep). To the north of the stream course were two rather deeper hearths: C437 (0.90 m diameter by 0.35 m deep) and C464 (1.20 m wide by 0.61 m deep; truncated by a later pit).

C483, a fill of C464, contained fragments of up to ten SHCs, including one with an estimated original weight of 10 kg, together with numerous sherds from the clay coating applied during the brazing of a handbell. It is possible that the unusual depth of this hearth was to accommodate the firing of such a large object. The problem with operating such a large sunken hearth is to provide oxygen to the base, and it is possible that the truncation has removed evidence for the blowing location, which may even have been from the ditch (C463) to the north of the hearth.

To the northeast of these features lies the Phase 1C smithy, dated by two radiocarbon dates of cal AD 803–925 (GrA-33803) and cal AD 734–856 (GrA-33804). This did not contain evidence for a smithing hearth, but did contain a masonry footing (C452), which might conceivably have been the base for a raised hearth. Such a structure would be extremely unusual in Ireland, but not impossible given the evidence for the high quality of the innovative iron working being undertaken at Clonfad.

To the north and west of this area there are many scattered occurrences of burning, of which some, particularly those overlying ditch C101, may be associated with occurrences of hammerscale. None of these features is deeply incised and, if metallurgical, they probably represent short-lived floor-level smithing hearths. Most, but not necessarily all, of these belong to Phase 3 and some are dated by artefacts to the 17th or 18th centuries.

Description of iron smelting residues

Only two pieces of slag were identified as possible residues from iron smelting. Both pieces had indications of flow lobes adjacent to a steep wall. Despite the low level of evidence for iron smelting, that evidence is discussed in detail here since it is important for understanding the large slag cakes.

One piece is securely from an early medieval context (C538, a fill of pit C536) and is a small fragment of slag with coalesced flow lobes. This piece is likely, but not certainly, to be a true smelting slag, although broadly similar textures are to be found in many of the more prilly SHCs on the site.

The second piece is Find E2723:628, probably from C137, a fill of pit C145, which may be of post-medieval date. It is part of a large, deep, bowl of vesicular slag,

reaching approximately 100 mm in thickness in the centre. One side of the lower face of the bowl is almost planar and lies at a high angle to the other faces. At the margin of the planar face there is a smooth slag surface, apparently blown, approximately perpendicular to the planar surface. The original orientation is very difficult to reconstruct, but one possibility is that the blown surface was horizontal and that the slag 'bowl' formed not in the bottom of a hollow, but at the foot of a vertical wall. Three features differentiate this piece from most other large slag cakes on the site: the presence of thin flow lobes on the margin of the cake, the irregularly vesicular nature of the slag within the deep bowl, and the presence of possible straw impressions on the lower surface. Straw is known widely as a pit packing in slag-pit smelting furnaces in mainland Europe (Pleiner 2000, 149–154) and more rarely in the British Iron Age. Wood is a more usual pit-packing in Ireland (compare the material from Ballykilmore). An alternative interpretation of the piece is that the flow lobes represent localised flow below the tuyère, as is commonly seen on large SHCs. The evidence does not support a certain identification of this piece either way.

Smelting residues: microstructure and mineralogy: The microstructure of Find E2723:628 (see above) was broadly similar to pieces interpreted as SHCs (see below). There is a patchy distribution of wustite dendrites, followed by a main phase of olivine in elongate crystals up to several millimetres in length. The main olivine shows cores of $Fa_{97}Fo_3$ with 6% Ca and 19% Mn substitution which grade outwards to thin marginal zones of Fa100 with 27% Ca and 11% Mn substitution. The secondary interstitial olivine shows compositions of Fa100 with 20–36% Ca substitution and Mn substitution of 8–11%. The high level of manganese in the primary olivine is a feature, which, although often associated with smelting slags, is capable of other interpretation (see discussion below).

Chemical composition of the iron smelting residues: The analyses of Find E2723: 628 show a cake of broadly fayalitic composition, but with a low iron content (50–57 wt% FeO) in conjunction with a very high Mn content (11 wt% MnO). Most other major elements are in rather low concentrations, apart from calcium, which reaches 6.4 wt% CaO. Phosphorus is low at 0.35–0.40 wt% P_2O_5.

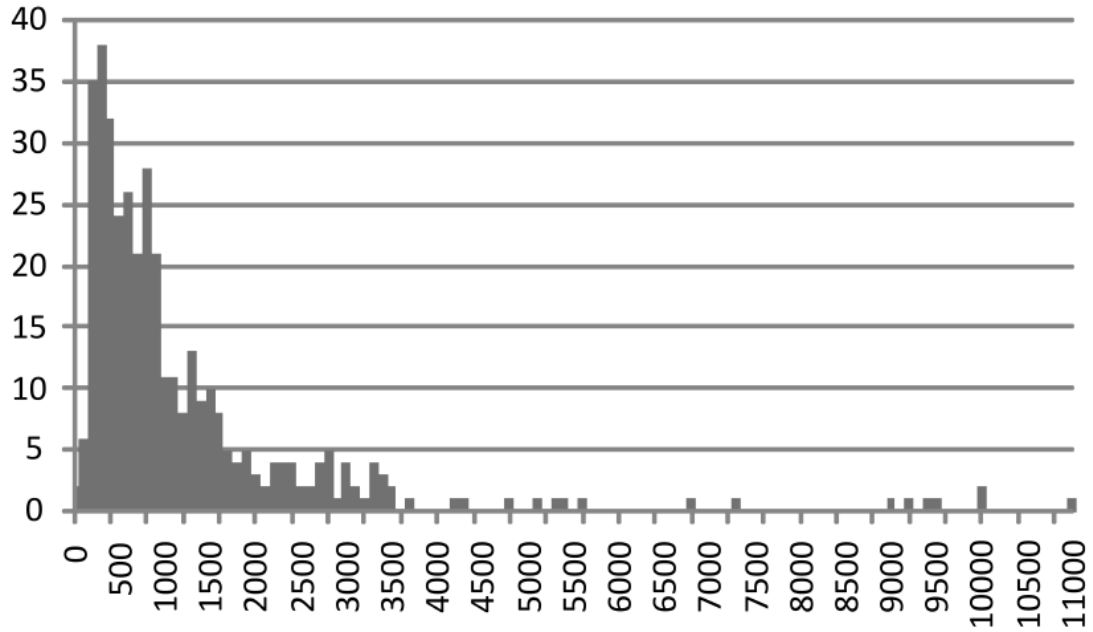
Description of iron-working (smithy) residues

The archaeometallurgical residue assemblage is dominated by plano-convex slag cakes with a wide variety of form (SHCs, or parts thereof, comprise 774 kg—78% of the 990 kg of residues available for study). Of the remainder of the assemblage, 2% is other forms of smithing slag and 18% comprises indeterminate iron slags, which are likely to be from smithing. In this study, all of the plano-convex slag cakes are described as *smithing hearth cakes* (SHCs), despite ranging up into sizes within the range conventionally described as *furnace bottoms* (FBs; Scott 1990). The established English-language nomenclature for such plano-convex slag cakes (Crew 1995, 1996) was developed in Britain, where there appears to be a distinct upper limit on the size of slag cakes produced during smithing. No such subdivision can be recognised on textural or chemical criteria within the Clonfad assemblage, a feature of Irish material already noted by Scott (1990, 156).

The plano-convex SHCs are very variable in detailed morphology and internal texture. Small, conventional SHCs show a vesicular dense slag filling the bowl-shaped part of the cake, often with either a charcoal-rich upper part, or a smooth glassy top. These forms grade into SHCs informally termed 'thick crust' cakes, which have a deep bowl with a thick, dense slag fill, often with vertical tubular vesicles, and with vertically elongate crystals suggesting the thick crust represents a solidified slag puddle. It is commonly observed in SHCs with a thick crust that the upper surface of the slag bowl shows the protruding terminations of the olivine crystals, probably exposed by the contraction of the surrounding melt during the solidification process. Such cakes often show signs of a significant void space (which may have secondarily collapsed) between the top of the dense bowl and the overlying low-density, charcoal-rich slag layer. The conventional SHCs also grade into forms with a reduced basal crust to the bowl (typically less than 15mm thick), with the interior of the bowl filled by a carious or charcoal-rich slag.

The early medieval plano-convex slag cakes are very variable in size, with a maximum size of 11 kg (with such examples having diameters of over 300 mm and a thickness of 150 mm). The catalogue of SHCs from secure early medieval contexts contains 381 individually described SHCs for which a total cake-size could be measured or estimated, representing a total original weight of 496 kg and an average

weight of 1.30 kg. The overall size distribution of SHCs (Illus. A3.4; Table A3.1) is very similar to assemblages from Clonmacnoise (material from the water treatment plant; Young 2005b) and from Ballykilmore. At both of these sites the residues includes smelting slags as well as SHCs and the assemblages appears to be the result of production from raw blooms to bar iron or to artefacts.



Illus. A3.4—Frequency v weight (in 100 g intervals) for SHCs from Clonfad recovered from early medieval contexts.

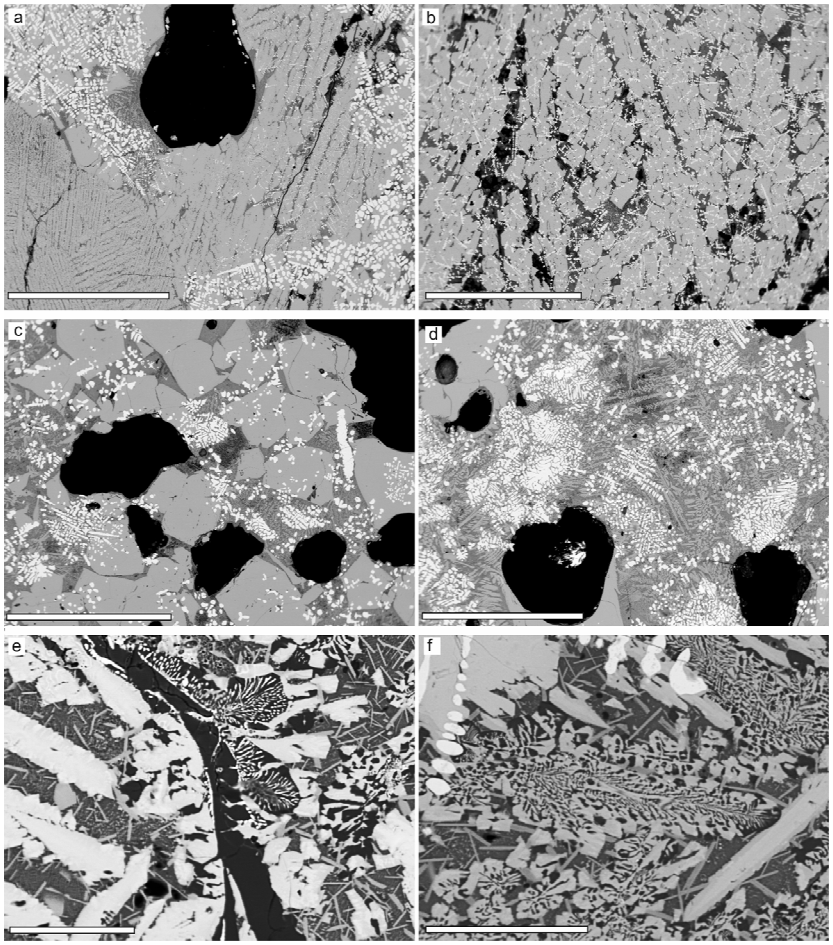
Twenty-four SHCs were recovered from contexts of medieval or younger age, with a lower average weight of 770 g and a similar range of morphology to the early medieval examples. Some of these are likely to represent residual material, but they provide a hint that the post-monastic iron-working was restricted to end-use blacksmithing.

As well as, and in association with, the SHC material, the assemblage includes a large number of pieces of tuyère, with 300 sherds weighing 14.7 kg. The tuyère outside diameters apparently ranged from 110–200 mm. The smallest measured tuyère had a bore diameter of just 18 mm and the largest 40 mm. Typical material probably has an outside tip diameter of 140 mm and a bore of about 26 mm. The presence of tuyères on early medieval iron-working sites has long been recognised, but a probably erroneous association between tuyères and smelting has been claimed. Instead, the tuyères should be recognised as an essential component of an iron-working technology that also produced the large SHCs.

The collection contains some important specimens showing the linkage between the tuyère and main slag cake. A characteristic slag morphology of flowage up along the underside of the tuyère tube was noted (forming thin tabular dense flow slags), as was a particular class of slag mass in front of the tuyère, at a high level above the main slag cake. These small slag cakes (typically less than 300 g) have a distinctive morphology: they form as irregular, tabular cakes, with an approximately planar upper surface with a glassy composition, often blue or green in colour, with a low iron content. In contrast, the lower surface comprises short lobate prills, almost stalactitic in form, of a much more iron-rich slag, often with a rusty surface to the dark crystalline slag. These cakes are sometimes observed to show proximal attachments to the lower parts of the faces of tuyères. They show compositional similarity to the slabs of strongly ceramic-influenced slag found as the uppermost layers of some the large complex SHCs. These cakes are herein termed 'pro-tuyère tongues' and have been excluded from calculations of SHC size statistics. Other slag masses were also found attached to tuyères; these were typically prilly, somewhat amorphous masses, ranging up to about 500 g and often forming a beard-like mass along the lower tuyère margin. These too were excluded from calculations of SHC size. The melting of the tuyère must have been one of the main sources of silicate for slag generation, for no pieces of vitrified hearth lining were found.

Iron-working residues: microstructure and mineralogy Most of the SHCs show a relatively small proportion of primary dendritic wustite (Illus. A3.5a–d). In all samples the main phase was of olivine with a composition close to fayalite. The olivine typically grades from Fa96Fo4 with 7–11% Ca substitution and <1% Mn substitution in the cores, to Fa98–99 with 26–30% Ca substitution in the margins. In some cases, notably the bowls of thick crust SHCs, the olivine may comprise very close to 100% of the slag. In other textures rather more of the late-stage interstitial materials may be present, and these fall into two main divisions: 'simple' interstices with fine dendritic olivine and those dominated by a cotectic intergrowth of leucite-wustite.

The 'simple' interstices are filled by late-stage fayalite, typically calcium-rich and often of a feathery dendritic texture, set in a low proportion of glass. Very fine-grained rhönite is a relatively common accessory phase with apatite and leucite crystals occurring more rarely.



Illus. A3.5 BSEM images of textures of Clonfad SHCs..

KEY:
(a) *1.4 kg SHC (Find E2723:529, CFD8b Area 2), sample from SHC crust. Image shows an inhomogeneous texture typical of smithing slags – apparently with early formed parts of the slag having substantial primary wustite dendrites (white) followed by coarse-grained fayalite (pale grey). Areas solidifying later have less wustite and finer, elongate fayalite. Scale bar 1 mm.*
(b) *2.9 kg SHC (Find E2723:217, CFD18b Area 4), sample from near base of crust. The texture has evenly distributed fine wustite dendrites (white), flowed by elongate fayalite (pale grey). The interstitial areas are to fine to resolve at this scale, but include complex intergrowths of wustite, fayalite and leucite. Scale bar 2 mm.*
(c) *7.3 kg SHC (Find E2723:435, CFD13b Area 1), sample from crust. This specimen shows incomplete reaction of iron oxide debris from the workpiece into the slag, leaving clusters and plates of wustite (white) in the slag. Pale grey is fayalite. Interstitial areas are fine olivine dendrites in glass (dark). Scale bar 1 mm.*
(d) *7.3 kg SHC (Find E2723:435, CFD13b Area 22), sample from crust. As (c), but showing a concentration of wustite (white) masses in an area without large fayalite crystals. Scale bar 1 mm.*
(e) *9.3 kg SHC (Find E2723:210, CFD21c Area 4), sample from upper part of SHC. Complex texture from the margin of former vesicles associated with burning charcoal, later plugged by further slag. The influence of the charcoal ash produces minerals rich in calcium and potassium. The margin of the former vesicle is marked by a rim of leucite (black, diagonally across centre of view). To the right of this there are rounded masses of a cotectic growth of leucite and wustite (white). The pale grey large crystals are kirschsteinite. The smaller darker grey crystals are plates of rhönite. The matrix (dark) is largely glass. Scale bar 100 µm.*
(f) *9.3kg SHC (Find E2723:210, CFD21c Area 8), sample from upper part of SHC. A chemically similar slag to that in* (e). *Early wustite (white) is followed by olivine (fayalite, becoming increasingly calcic towards it margins). A second olivine is a kirschsteinite in a cotectic growth with leucite (variegated dendritic growths). The matrix is glassy, but with plates of rhönite (mid-grey).*
Scale bar 100 µm

The second interstitial texture, with abundant leucite and probably indicative of liquid immiscibility, is much less common. Leucite-wustite cotectic intergrowths are sporadically well developed in some samples and one shows well-developed leucite and leucite-wustite vesicle margins (Illus. A3.5e–f).

Several samples showed inclusions of metallic iron (although secondarily oxidised in some instances). One sample showed inclusions of angularly polycrystalline wustite with a texture similar that of the oxidised iron in hammerscale.

Iron-working residues: chemical composition The sampled slag cakes ranged from small examples, the identification of which as SHCs is straightforward, through to the large cakes, weighing many kilograms, whose identification as SHCs is more controversial. Investigation of the chemistry of these iron-working residues from Clonfad shows that they lie within a compositional continuum. This supports their identification as smithing slags, albeit from a wide range of smithing activities.

Smithing slags will have chemical input from several distinct sources: from the iron of the workpiece, from the slag entrained within the workpiece, from the technical ceramic of the smithing hearth, from the fuel of the smithing hearth, from any smithing flux employed by the smith and possibly also from any slag deliberately added to the hearth for specialist tasks. The purpose of chemical analysis of smithing slags is to attempt to identify and interpret the influence of such sources.

The range of major element composition of the Clonfad slags is fairly limited. Silica contents of the sampled slags vary from 15–28 wt% in general, apart from two particularly iron-rich SHCs with 10–11%. Most slags have between 20% and 28% silica and 55–75 wt% FeO, which gives the samples the dominantly fayalitic mineralogy described above. Almost all the manganese-rich cakes lie close to this composition, but a few low-manganese/high-iron cakes lie at higher iron contents.

Alumina is low, with almost all samples falling in the range of 0.5–2.8 wt%. The silica:alumina ratio varies quite widely (from about 8 to 21 by weight), with most materials clustered around 8–15 (Illus. A3.6a). Manganese (calculated as MnO) varies up to about 12 wt% and shows a moderately strong correlation with the size of the SHC: of the small SHCs (<1500 g) only two of the thirteen had bulk MnO contents of over 2 wt%, whereas six of the ten SHCs over 1500 g had MnO contents of >2 wt% with three being >8 wt% (Illus. A3.6d). Magnesium contents are generally low

(mainly <0.5 wt% MgO), as are those of Na (<0.5 wt% Na_2O), K (<1.4 wt% K_2O) and Ti (<0.5 wt% TiO_2). Calcium is present in more significant quantities (1.6–7.4 wt%), with a slight correlation with SHC weight, particularly among the small SHCs.

Trace element compositions are generally quite low, with the exception of barium, which ranges up to over 6400 ppm. Barium shows a very strong correlation with Mn, athough the relationship is not quite linear, with the Mn:Ba ratio slightly higher for the very high Mn samples, suggesting the mixing of two discrete components – one with a higher Ba:Mn ratio dominant in the low Mn samples, and a component with lower Ba:Mn ratio present in the higher Mn samples (Illus. A3.6b).

Uranium and thorium are present in low levels and show a very variable U:Th ratio from 0.51 to 1.91 for the slags, with the ratio for the tuyère and subsoil samples being very low at 0.4–0.5. The U:Th ratio is plotted against the Ba:Mn ratio in Illus. A3.6c. Individual slag cakes may show subsamples with variable Ba:Mn ratios, but the U:Th ratio is almost constant for all such cakes except one (Find E2723:424, CFD20). The tuyères and a sample of subsoil have low U:Th ratios and very low concentrations of Ba and Mn, but with a high Ba:Mn ratio.

The rare earth elements all show very similar profiles (normalised to upper crust after Taylor & McLennan 1981), with only very subtle differences in shape (Young Illus. 11–12 in E2723_Vol_2.pdf, CD-Rom). This indicates that all the various components of the system have an alumino-silicate component similar to local subsoil. This is a common feature of assemblages from smithing, whereas the alumino-silicate material in the ore may lead to different signatures for smelting slags (compare Ballykilmore, this chapter).

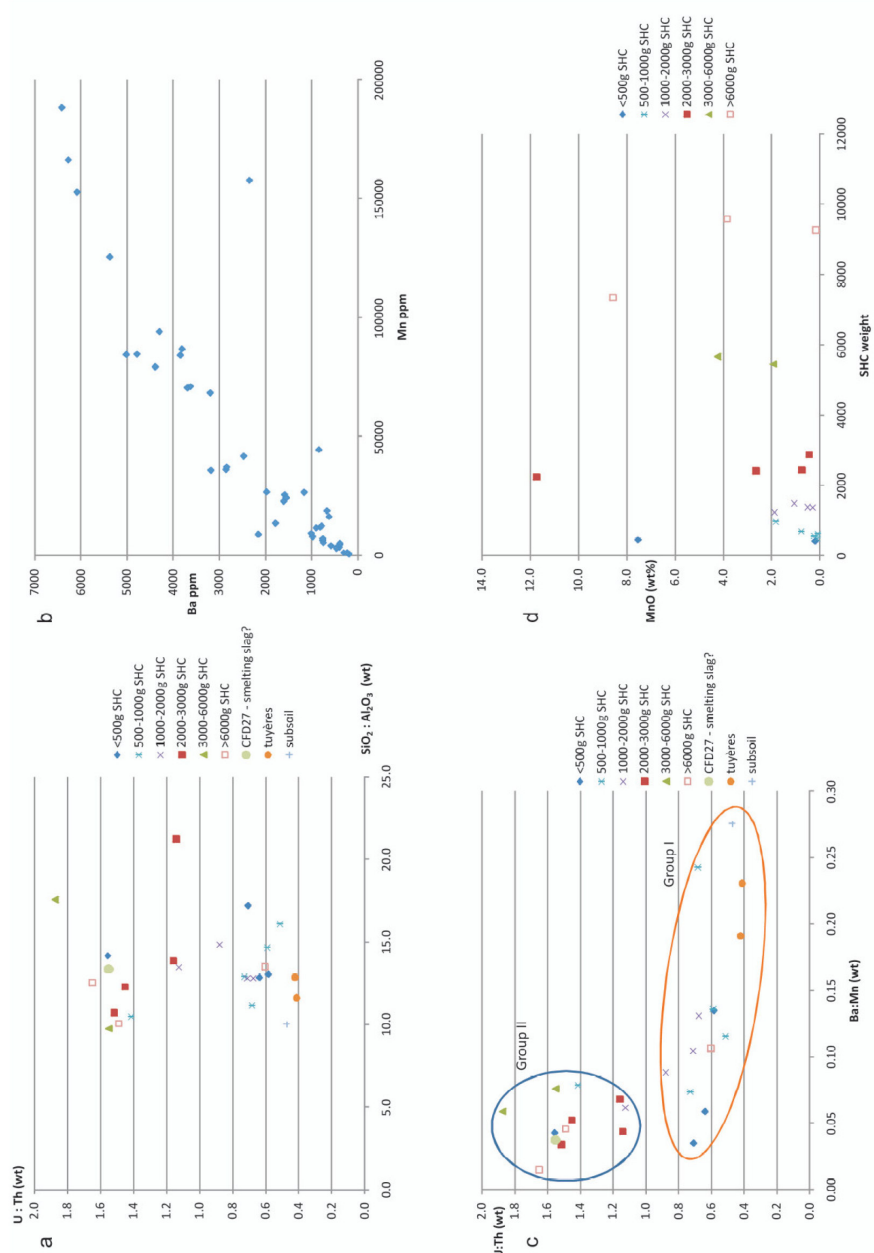
Two broad groups of slags can be identified on the basis of their Mn, Ba, U and Th contents (Illus. A3.6c). One group of slags (Group I) shows U:Th varying little from the value of about 0.4 shown by the subsoil and tuyère samples, but with a wide spread of Ba:Mn values dropping from 0.15 (with an outlier at 0.24) down to 0.02. A second group of slags (Group II) shows an increased U:Th ratio (between 1.1 and 2.0), but with a fairly narrow range of Ba:Mn of 0.02 to 0.11. Group I can be seen to comprise almost entirely SHCs of below 2000 g in weight (Finds E2723:529, 533, 612–5, 621–2) with the exception of one (Find E2723:210; 9260 g) and Group II contains the majority of cakes over 2000 g (Finds E2723: 217, 435, 535, 537, 567, 616, 620, 623, 624), together with three of the smaller cakes (Finds E2723:617, 626).

The possible iron-smelting slag (Find E2723:628), also lies within the field of this group.

The three small slag cakes falling into Group II are worthy of further discussion. Two of the three have modest Mn concentrations and are marginal to the group: CFD7 (Find E2723:626) has 1.81% (4.67% on an iron-free basis) and CFD17 has 1.05 wt% MnO (3.30% on an iron-free basis). One of the samples however, CFD3 (Find E2723:617), has a very high concentration of MnO (bulk MnO of 6.14wt%; 16.19% on an iron-free basis). CFD3 is a small SHC (460g) of conventional appearance. One possible explanation for a small conventional SHC having a chemical signature close to that of a smelting slag would be that this SHC represents the refining of either a small bloom, or just a small part of the process of refining a large one. On the other hand it is possible that smelting slags may have been deliberately added to the hearth to create a slag bath; a technique that can be employed both in rejoining small bloom fragments and in small-scale processes of steel making (Lee Sauder pers comm. 2009).

A high Mn concentration in slag has generally been assumed to be indicative of a smelting slag, since Mn concentrations are high in many iron ores, particularly some bog iron ores, and Mn is not reduced into the metal, but is concentrated in the slag phase. Transfer of Mn into a smithing slag can normally only be via the slag inclusions in the iron being worked, which should limit the amount of Mn incorporated into the slag. The amount of slag trapped in a raw bloom, however, can be quite considerable, depending on the quality of the bloom, and that slag may be particularly manganese-rich, so the loss of Mn to the smithing hearth during refining may be considerable.

The evidence from the chemical composition of the slags, particularly the data for Mn and Ba presented here, suggest that there is a continuum of composition, with mixing of a high-uranium, high-manganese component with materials having higher Ba:Mn and Th:U ratios.



Illus. A3.6 Graphs showing chemical trends within Clonfad smithing residues.

KEY:
(a) *U:Th v. SiO2:Al2O3. This graph shows two groups of analyses, with the increased ratio of U:Th in some samples interpreted as an indicator of the increased influence of the original ore in the bloom-smithing slags.*
(b) *Ba v Mn (ppm). This graph shows the correlation between these two elements, which both tend to be derived from the iron ore.*
(c) *U:Th v. Ba:Mn. This plot allows the discrimination of two groups of smithing slags: Group I heavily influenced by the tuyère composition (a feature of blacksmithing slags), and Group II showing an increased inherited influence from the iron ore, a feature of bloom-smithing and smelting slags.*
(d) *MnO (wt%) v SHC weight. A weak correlation exists, but most small cakes are manganese-poor and most large cakes are manganese-rich. This suggests that the larger cakes tend to be the bloomsmithing cakes.*

Group I slags can be interpreted as those in which the U and Th contents are controlled by the influence of the technical ceramic (tuyère; although other similar inputs are possibly involved), but which show a variable influence of Mn inherited from inclusions in the iron being worked. This is the behaviour to be expected during blacksmithing. The size range of the Group I SHCs too is similar to that from sites on which only end-use of iron is suspected, rather than iron production (e.g. Coolamurry, Navan and Moneygall; Table A3.1).

Group II slags are interpreted as having their silicate material predominantly supplied by the slag from the workpiece. They show a composition trending towards a likely smelting slag composition (perhaps indicated by the composition of Find E2723:628). Group II slags would be the products of bloom smithing rather than secondary smithing. It is conceivable that Group II includes some true smelting slags, but many members of the group (e.g. Find E2723:617, mentioned above) are firmly classifiable on textural grounds as SHCs. There are no firm criteria – textural, mineralogical or chemical, apart from size – that differentiate the large cakes from the smaller ones in this group. This leads to the conclusion that the large Group II cakes are also bloom-smithing slags.

Description of the non-ferrous metalworking residues

Twenty-three sherds of pyramidal crucibles were recovered from the outer enclosure ditch. The collection appears to form an homogeneous collection of vessels of similar form and fabric, although it is unclear how many crucibles are actually represented. The crucibles are triangular in plan with only slightly curved sides and tight corners; the fabric is finely sandy, with abundant organic (hair?) temper. The sherds mainly show a pale grey, thin external glaze, a slightly darker grey body, and in an internal surface that is typically of an oxidised buff tint. Both surfaces may show some cracking. None of these sherds shows any internal glazing or slag.

The interpretation of this material is uncertain. The presence of slight oxidation of the internal surface of the crucible is extremely unusual and may indicate that, despite the minor vitrification of the exterior, these crucibles were never used for copper-alloy working (the usual purpose of crucibles of this shape). They may possibly be crucibles that were taken up to temperature empty, in order to prove them,

but which failed, and were then discarded. The form of the crucibles is a widespread one in early medieval Ireland (various examples are presented by Comber 1997, 2004). The material, if used, would be indicative of non-ferrous metalworking, but the limited geographical and stratigraphic distribution of the material suggests that either non-ferrous metalworking was not a normal component of activities on the site, or that the main focus of that activity has yet to be located.

A single sherd (Find E2723:229), from the fill of a medieval pit (C290), is in a slightly coarser fabric, but with a shape suggestive of a similarly pyramidal form and with the same hair tempering. This sherd shows a white external vitrification that was sufficiently intense for the ceramic to start to flow in places. Internally the piece shows a purple glaze, suggestive of incorporation of copper-alloy residues.

Description of the brazing residues

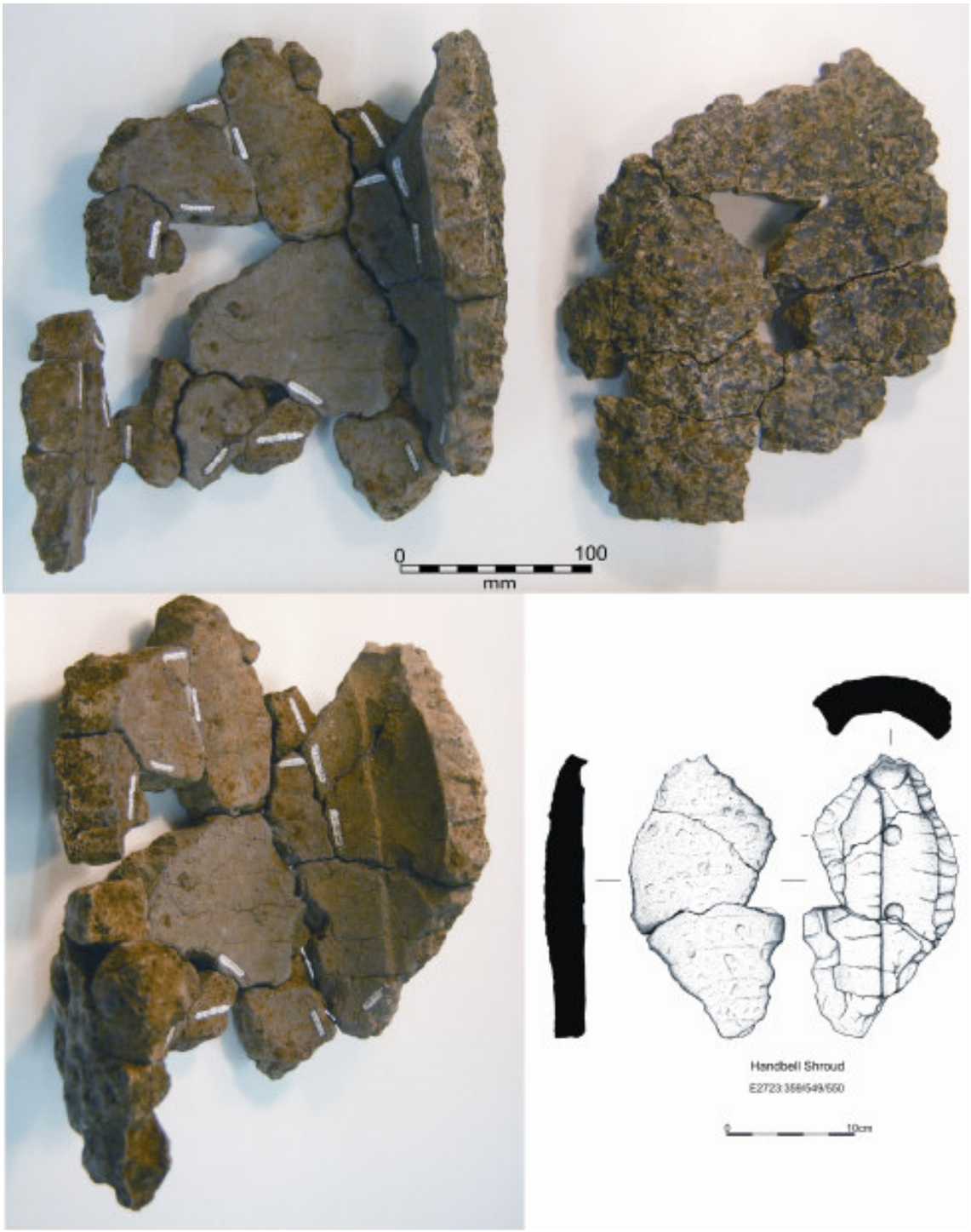
The technique of brazing: Brazing is a technique that is the high-temperature equivalent of soldering, commonly employed for joining metal, but which may also be used for coating. The brazing metal melts at a lower temperature than the workpiece and can flow over its surface and into joints by capillary action. Brazing was employed in the early medieval period to join components formed of wrought iron in circumstances where forge welding was either impossible or undesirable. Probably the best-known brazed Early Medieval artefacts are locks of Viking age (Gustafsson 2005). The copper-alloy coating on Early Medieval handbells has long been noted, but has not previously been positively associated with brazing.

The brazing process, as practised in early medieval times, involved coating the iron pieces in clay, together with pieces of the copper-alloy brazing metal, sometimes with the iron and copper alloy bound in cloth inside the clay wrap. The package was then fired in a hearth, during which process the copper alloy melted and tracked over the surface of the iron, providing a striking and corrosion-resistant finish, as well as infilling any cracks between adjacent pieces of iron to form a strong join and, in the case of a handbell, to enhance its acoustic properties. This style of brazing was described by Theophilus (himself a metalworking monk) in the early 12th century.

Description of the residues from hearth C464: Clonfad yielded a number of pieces of vitrified ceramic that can be interpreted as fragments of clay coatings, or shrouds, placed over a wrought-iron object to enable it to be brazed. The largest collection of brazing shroud fragments (52 sherds) derives from C483, a fill of hearth C464, dated to cal AD 656–732 (within Phase 1B; GrA-33802). A single sherd from ditch C435 (a later ditch apparently cutting hearth C464) may be derived from the same shroud. The sherds can be reconstructed as an almost complete brazing shroud (Illus. A3.7, A3.8) from a Type 1 handbell (Bourke 1980, 1986).

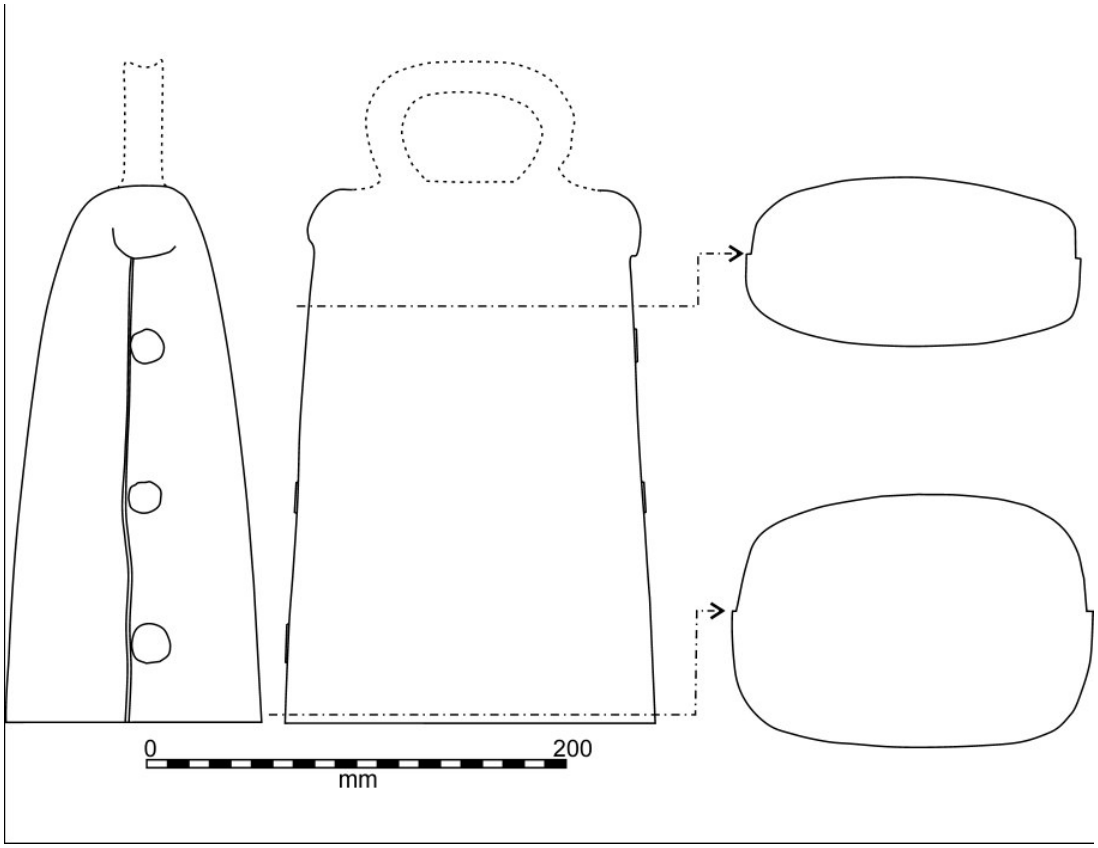
The coating is coil built, with coils 20–25 mm thick, in a low density, pale, sandy fabric, with abundant tabular primary voids, suggestive of the use of an organic temper. The inner face of the coatings shows a vesicular, thin, greenish, glassy, surficial coating in some areas. Externally there is a deeply dimpled dark green glaze, below which the ceramic is strongly vitrified and vesicular. The strong vesicularity rarely extends more than 10 mm below the surface. The fabric is pale grey through most of its thickness, becoming paler into the vesicular zone. Pieces associated with what is probably the coating over the handle (upper) end of the bell are more darkly slagged, suggesting the bell was inverted in the hearth. The thickness of the coating is variable – ranging from about 30 mm low on the bell, to about 12 mm over the shoulder of the bell. Very few sherds are preserved from the top of the bell; not only would these have been most heavily fired (the bell appears to have been fired in an inverted position), but would have become fractured during removal of the shroud from the handle area. One piece may show the side of the handle, and if so it suggests that the top of the handle may even have been exposed through the coating, though whether by accident or design is not clear. ED-XRF examination of several sherds showed no detectable metal residues, although one (unanalysed) sherd does show a few specks of copper-alloy corrosion on the inner surface.

Only two coatings on early medieval handbells appear to have been analysed: Anderson (1881, 181) has provided an analysis of the coating on the Fortingall Bell (Perthshire) which recalculates (subtracting iron) as a 6.9% tin (Sn) bronze, and Smith (1882, 279–80) gave three analyses of material from the Ednam Bell (Berwickshire), which were all of a 16% Sn bronze. The absence of detectable zinc in the fabric of the coatings from Clonfad suggests that the copper alloy did not contain zinc, so it too was probably a simple tin bronze.



Illus. A3.7—The larger fragments of brazing shroud from furnace C464. The upper images show

KEY:
(a,b) *the complete assemblage apart from a few non-contiguous fragments. The section on the left shows the internal surface, that on the right the external surface.*
The lower left image **(c)** *shows an oblique view, with the side and end of the bell, showing the seam, rivets and shoulder flap.*
Lower right **(d)** *is a line drawing if the sherds from the narrow end of the bell.*



Illus. A3.8—Reconstruction of the bell brazed in the shroud from C483. The form of the handle is conjectural.

There is little indication of how the copper alloy was placed in the coating. The good preservation of the imprint of the rivets shows that the bell was not covered in copper sheet (the Swedish approach described by Björklund, 1982) and there are no obvious depressions in the coating suggesting the presence of lumps of brazing material as plates or wire. Sherds from near the mouth of the bell show the coating thinning towards the lip, although no sherds actually record the closure of the clay over the end of the iron, so emplacement of pieces of bronze on the lip (as in the experimental reconstruction) seems unlikely, although possible.

The bell (Illus. A3.8) appears to be a typical example of a wrought-iron handbell. Reconstruction of the shroud suggests that the bell being coated was approximately 255 mm tall (excluding the handle). The mouth of the bell was well-rounded, measuring approximately 175 mm by 120 mm. The narrow sides of the bell only sloped inwards towards the top very slightly, so the top of the bell was about 160 mm wide. Four of the six rivets are shown by the shroud. They were approximately 15 mm in diameter and most were flat, although one was very slightly domed. The central rivet on one side appears to be displaced upwards by about 15 mm from an

equidistant location. The uppermost rivet was placed about 42 mm below the rounded flap. The lower rivet was about 35 mm above what appears to be the foot of the bell.

The brazing process as represented at Clonfad is closely linked to more recent techniques for brazing animal bells (Björklund 1982; Jouffray 1993; Laurence 1991). Some of the modern techniques differ in detail, because they employ the volatility of the zinc in a zinc-containing copper alloy as part of the mechanism of coating, but the essential process using clay packages remained the same in wrought-iron bell manufacture through to recent decades (Laurence 1991).

Description of the residues from other contexts: Three small shroud sherds are also known from C563 (an upper fill of ditch C506; Phase 1C), with single sherds, probably also from bells, known from C561 (fill of ditch C506; Phase 1B) and C426 (fill of pit C425/272 adjacent to the Phase 1C smithy). The piece from C426 shows no evidence for being coil built and has a pelleted texture distinct from the other bell shroud sherds.

A collection from C508 (three sherds) shows some different features, including the binding of the workpiece in fabric, a feature commonly seen in Viking period brazing in Scandinavia (Söderberg & Holmquist Olausson 1997), but also in some material from Armagh (Gaskell Brown & Harper 1984, 147–149) and Dublin (Bayley, 2008). One of these sherds has a bulbous form, which might, if from a bell, be the only piece that shows the form of the shroud as it turns across the lip of the bell, in this case to end in a bulbous, rim-like lobe, possibly facing into the mouth of the bell. A sherd from C298 (a gully or beam slot in the Phase 1C smithy) shows a somewhat corrugated internal surface, probably because of wrinkling of a fabric wrapping. None of the fabric-wrapped material from C508 or C298 is certainly from a handbell.

Interpretation

The evidence from Clonfad is for a significant scale of bloom smithing during the monastic period and for later smithing of uncertain character. The intensity of activity and large volume of residues in a fairly small section of the site illustrates that this was a very structured approach to iron production. The primary smelting was

presumably undertaken in parts of the monastic estates closer to the bogs supplying the iron ore. The centralisation of bloomsmithing is a common feature of early iron working. The forge is commonly a more permanent installation than the ephemeral smelting furnaces. The separation of smelting and smithing may, at least in part, reflect a need to spread the requirement for charcoal production over a larger area.

Most of the large SHCs interpreted as having been produced during bloom smithing have inherited a characteristic chemical signature from the primary smelting, including a very high manganese content. Such a signature is more characteristic of the Midlands bogs than is the low-Mn high-Ca signature of the Ballykilmore smelting. However, at least one of the large SHCs has a low Mn content; whether this implies the use of iron from outside the area or just a variable composition of the ores in the local bog, is uncertain.

The interpretation of the technology employed at Clonfad is discussed in more detail below but, at least in Phase 1B, the floor-level hearth seems to have been employed, together with the ceramic tuyère. The exceptionally deep hearth, C464, may be related to the requirements of the brazing process. It is uncertain whether the masonry structure with the Phase 1C smithy might have been a base for a raised hearth. Ephemeral floor-level hearths occur abundantly across the northern part of the site during Phase 3, possibly suggesting that the later smithing was an intermittent, occasional activity.

Discussion

Iron-production in the landscape

The three sites encompass several quite distinct classes of context for the metallurgical activities. At Rochfort Demesne ringfort there is no indication that the ironworking formed part of the chain of production of iron, but appears to have been the end-use of iron produced elsewhere. It is likely that artefacts were made and repaired here, in parallel with the evidence for the casting of copper-alloy objects.

The location of Ballykilmore on the rise above extensive bogs must have made it an ideal location for smelting and bloom-refining operations, surrounded by the natural resources of ore and fuel. It appears to have been reused for this purpose

sporadically over a period of around 1,000 years. The scale of the iron making in the early period at Ballykilmore is very hard to assess, but it does not appear to have been large scale and may have been for purely local needs. The social context of the later metallurgical activity at Ballykilmore can only remain the subject of speculation in the absence of the smithy itself. One explanation for the high volume of tuyère debris at Ballykilmore might be that the smithing facility was dismantled after sporadic (seasonal?) use, leading to a higher rate of disposal of tuyères than in more continuously used sites (such as at Clonfad). The size of the SHCs at Ballykilmore is moderate, and one can assume that perhaps the blooms being worked were of moderate size too. After the late medieval smelting evidence, there is no indication for continued smelting at Ballykilmore itself, and the site must have been employed for smithing of blooms created elsewhere, perhaps nearer to the bogs.

Clonfad shows a more developed version of this centralised bloom smithing. Here the smithing of blooms was undertaken on a significant scale. The evidence from the extremely large SHCs suggests that very large blooms were being worked and the evidence for the production of handbells indicates that some very high quality ironwork was being produced. Whether all the iron produced at Clonfad was used locally, or whether the monastery supplied iron into a broader 'market' is not known. Unfortunately the production cannot be estimated accurately: even the large volumes of residue recovered might represent a very small annual production over a long period of time. What is clear, however, is that some of the product was very specialised.

The later iron-working at Clonfad has not yielded much diagnostic residue, but there is little to suggest that it represented a major activity. The location of many of the late smithing hearths over the backfilled monastic ditches has resonances with the situation at Ballykilmore, and a multiplicity of ephemeral hearths might fit more with sporadic or seasonal bloomsmithing, rather than with end-use blacksmithing.

All three sites provide evidence for the large scale of iron production and use in the area during the early medieval and later periods. It is striking that the evidence for actual smelting is limited and it is to be hoped that the locations where the primary smelting was undertaken around the Westmeath bogs will be discovered in the future.

The technology of medieval iron production

The evidence from the 'late' phase of metalworking at Ballykilmore allows some discussion of late medieval to post-medieval iron-working. The evidence for smelting is rather limited, with the inconclusive evidence suggesting the operation of a developed style of non-slag tapping furnace. The limited evidence, particularly the very small quantity of slag, suggests that iron smelting was not a major component of the activities at Ballykilmore at this period. It is possible that the smelting was undertaken closer to the bog, with the bloom smithing taking place close to the graveyard. The link provided by the high-calcium, low-manganese signature of the both the smelting slags and the smithing slags suggests that the operation went on using the same ore source as the late medieval smelting, possibly well into the post-medieval period. It is tempting to link this chemical signature with the influence of the limestone gravels of the *Eiscir Riada* and to interpret the exploited ore source as being very close by.

The persistence of the hearth technology, with ceramic tuyères being employed for smithing, is remarkable. The size may have changed, but the basic use of the tuyère remained the same in the post-medieval period at Ballykilmore as it had in the 'early' phase a millennium earlier. Indeed, in general, there is nothing to distinguish the later smithing residues at Ballykilmore from those of the early medieval period (apart from the tuyère morphology).

The evidence for the post-medieval smithing at Clonfad is lacking in detail, but appears to show the persistence of floor-level smithing hearths into the 17th or 18th centuries. This date supplements the rather poor understanding of the latest phases at Ballykilmore, which might also be of that same period.

The technology of early medieval iron working

The assemblage of iron-working residues from Clonfad is one of the largest assemblages of its date from Ireland that has been examined in detail and provides an excellent case-study for the re-evaluation of the large plano-convex slag cakes that are so characteristic of Irish early medieval iron working. Interpretation of such residues has been controversial.

Scott wrote his seminal book on early Irish iron working just at a time when ideas in other parts of Europe were developing rapidly. He recognised that his division of the plano-convex slag cakes into smaller smithing hearth bottoms (SHBs) and larger furnace bottoms (FBs) was somewhat arbitrary, with no clear distinguishing criteria besides size. He commented that, 'for the Irish archaeologist in the field, the situation is fraught with uncertainty when trying to identify origin, and hence anticipate structural evidence, from slag morphologies' (Scott 1990, 156).

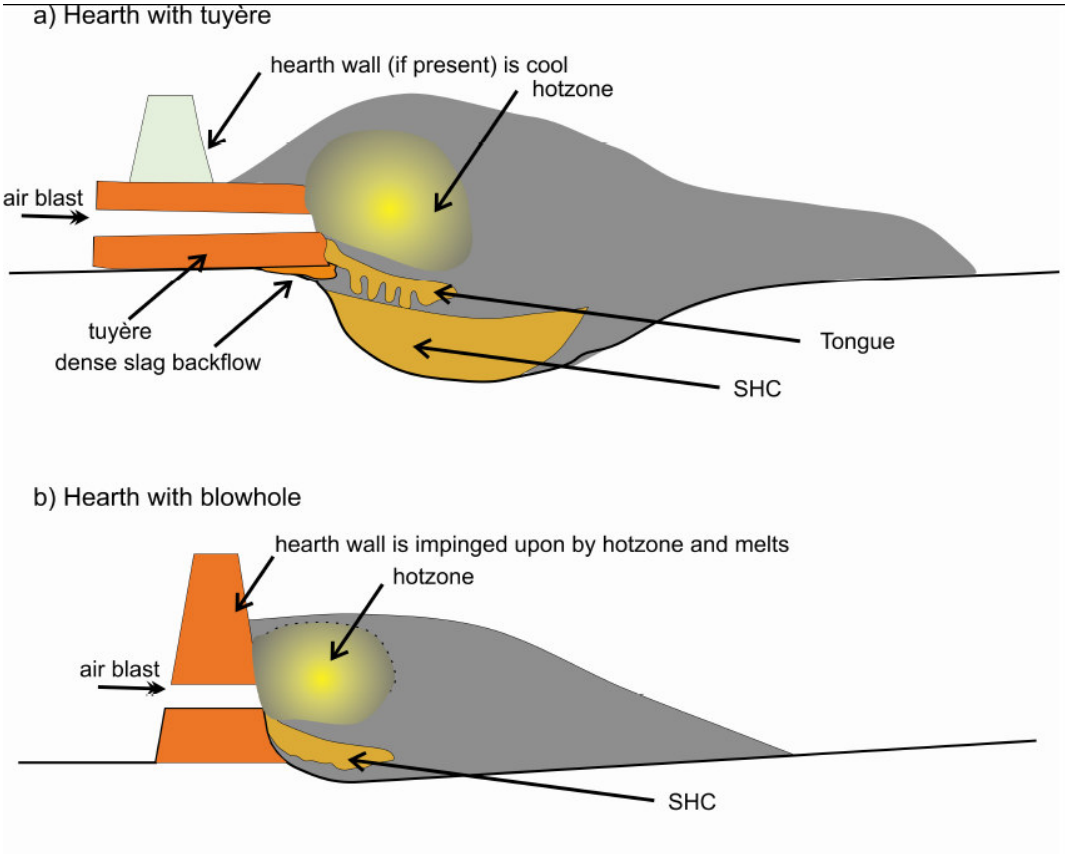
One of the great initial benefits of the national roads programme to Irish archaeometallurgy has been the opportunity to examine many examples of smelting furnaces. Recent development work has resulted in large numbers of iron-smelting residue assemblages being recognised, and many described in detail, although most are as yet unpublished (e.g. Young 2003a & b, 2005a & b, 2006, 2008a, c, f–l), and a new view of early Irish iron smelting has been developed (Young 2003d, revised in Young 2005b). Residue assemblages are now recognised that are identical to those found in non slag-tapping low-shaft smelting furnaces in Britain (e.g. Crew 1987, 1989, 1998) and in mainland Europe (Pleiner 2000, 149–63), and supported by extensive experimental work (e.g. Crew 1991). This allowed the previously ubiquitous interpretation of the remains of smelting furnace as 'bowl furnaces' to be replaced by a model of their being the basal pits of slag-pit shaft furnaces. One of the clear outcomes of the recognition of these smelting furnaces was that their residue assemblages did not include the large plano-convex slag cakes previously considered to be 'furnace bottoms' (FBs) produced during smelting. The origin of these large plano-convex slag cakes needs to be sought elsewhere.

Scott's viewpoint on plano-convex slag cakes fitted with, and relied heavily on, the conventional wisdom of the day, for instance meshing neatly with the account of such cakes in the Historical Metallurgy Society's datasheets (Crew 1995, 1996). In the description of the terms offered by Crew, the upper limit of plano-convex slag cakes from smithing was taken to be around 2 kg, with larger examples being termed FBs. This terminology is rooted in the nature of slag assemblages from Britain. On Iron Age, Roman and early medieval sites in southern Britain, the maximum SHC size produced during blacksmithing is typically around 800 g (on average 300–400 g). A SHC weight of 1 kg was frequently an indicator of bloomsmithing. However, by the later medieval period, larger SHC sizes seem commonplace in smithies. The maximum SHC size from Worcester Deansway Period 8 (11th to 13th centuries) was

1490 g (a mean of 492 g), for Period 9 (13th to 15th centuries) it was 1800 g (a mean of 499 g) and from Burton Dassett (14th to 15th centuries) it was 1670g (a mean of 550 g) (McDonnell & Swiss 2004; McDonnell 1992).

Before the issue of the extremely large plano-convex cakes can be addressed, these British statistics need to be compared with early medieval blacksmithing sites from Ireland. Although some post-medieval sites in Ireland appear to conform to the same pattern as the British sites (e.g. Mucklagh; Young 2008d), the earlier sites do not. Sites such as Coolamurry, Co. Wexford, Navan, Co. Meath and Moneygall, Co. Offaly (Young 2008b, 2007 and 2008e) show no indication of being involved directly with iron production, and they have the assemblages of smallest SHCs in Table A3.1, yet they have both high maximum SHC weights (2588 g, 2990 g and 1800 g respectively) and moderately high mean SHC weights (386 g, 507 g and 527 g respectively). In this study, the material from Rochfort Demesnes and the SHCs with Group I chemistry from Clonfad fall into this same size range, exceeding the size of contemporary British blacksmithing SHCs, yet being attributable with confidence to smithing. Even at the level of the small SHCs produced during blacksmithing, the Irish evidence does not accord with the British-based terminology.

One answer to this problem may be sought in the fundamentally different structure of early smithing hearths in Britain and Ireland. As this study has shown, tuyères are a fundamental component of the assemblages of Irish smithing residues. Indeed they occur to the exclusion of any other vitrified hearth ceramic. The fuel in early Irish smithing hearths was constrained at the edges by materials that did not become hot, just as in a modern blacksmith's hearth. These materials are not preserved, but might have included a wooden or earthern surround to the hearth, which usually has the form of a shallow pit. The tuyère carried the air blast into the heart of the fuel, so the hot zone did not impinge on its margins. The sides of the tuyères are often very poorly-fired, suggesting that they were embedded in the otherwise unpreserved hearth surround. In contrast, early forges in lowland Britain generally have a clay wall with a blowhole between the hearth and the bellows (Illus. A3.9). There seems no intrinsic reason why the tuyère-blown hearths should develop larger SHCs than those with blowholes, but they were clearly operated in a completely different way.



Illus. A3.9—Comparison of the location of slag formation within an early medieval smithing hearth with a ceramic tuyère (above) and a simple clay-walled hearth with a blowhole (below). Current nomenclature of smithing residue classes is largely based on the blowhole hearth. The use of terms employed here for slags formed in the tuyère hearth is indicated.

Another possible explanation for the relatively large size of SHCs on sites which are not suspected of being involved with iron production might be that the trade iron was not fully refined when it arrived at the forge. Pleiner (2000, 241–2) describes split blooms from Denmark, where the low density bloom fragments ('kloder'; apparently comprising up to 50% slag) were traded for use in rural settlements (in contrast to other areas, where trade iron tended to be more completely refined bar iron). Such a practice decentralises bloomsmithing (lessening the local load on forestry resources) and will lead to the occurrence of bloom-refining slags on rural smithy sites. A similar model for a trade in iron within Ireland would be in agreement with current evidence from the slag, and with the lack of identifiable trade iron in Ireland (in comparison, for instance, with the relative abundance of currency bars of the British Iron Age).

The key evidence from the detailed analysis of the assemblages described here is that the larger cakes, including the 'late' iron-working assemblage from Ballykilmore (ranging up to SHCs of 4 kg) and the Group II material from Clonfad (ranging up to SHCs of 11 kg), can be seen to show chemical continuity with the smaller cakes, but having a trend towards compositions more strongly influenced by smelting slags. The smaller cakes, in general, show a low proportion of input from material with broadly the composition of a smelting slag, whereas a large proportion of the big cakes show a significant contribution from such material. This supports the hypothesis that the smaller cakes tend to represent the residue from the working of finished iron, whereas the larger cakes are associated with the refining of raw iron.

The production of such large SHCs during bloom smithing can be seen as a continuation of the hearth technique exhibited in blacksmithing, but taken further. It is unlikely that the explanation for the size of the SHCs is simply that the hearths were not cleaned out very frequently. One experience of modern smiths working in a traditional manner is that the slag cake acts as a major thermal mass, providing heat to the workpiece. The promotion of a large slag bath in the base of the hearth allows the smith to heat and work large blooms. The use of deep molten slag puddles as noted in the assemblages described here might be an important component in the smiths' remarkable ability to work large blooms into, for instance, the sheet iron from which the Clonfad bells would have been forged.

The brazing residues, with their evidence for handbell manufacture, provide a clue for the purpose behind at least some of the large blooms apparently being refined at Clonfad. The production of the sheet iron required for the bells would have presented enormous technical challenges for the smiths, and the creation of the bells must be regarded as one of the pinnacles of early medieval iron working. The challenges include not only the primary production of large homogeneous blooms, but also their refining, the forging down to sheet and the brazing of such a large object.

The basic process of forging an iron bell has been described by Bourke (1980, 1986). The precise order of the folds, together with the details and timing of the attachment of the handle to the body, are the subjects of ongoing experimental studies. In outline, however, the body of a handbell is forged from a single sheet of iron, which is folded to shape. The short sides are folded in from the long sides so that they overlap and are riveted with three rivets on each side. The straight edge of the sheet adjacent to rivets suggests it was bored through, rather than punched (in which case

the sheet margin would be likely to bow outwards around the hole). The handle is forged from a separate piece of iron, and is probably attached to the body before the folding is complete. The handle continues inside the bell to form the suspension loop for the clapper. The brazing process serves to fill the gaps in the seams to allow the bell to ring, secures the attachment of the handle/suspension loop, enhances the aesthetic appearance of the bell and improves its corrosion resistance.

The sheet from which the bell brazed in the shroud from Clonfad was forged, would have measured approximately 560 mm in length and 260 mm in width. The thickness of the sheet is less clear; the edge of the outer sheet on the side seams is about 3 mm, but it is quite likely to have been thinned by the smith over the area of overlap. The Ednam Bell, one of the few well-described examples of such a bell, has a body thickness of 3/16 inch (Smith 1882; equal to 4.8 mm). This gives an approximate value with which to calculate the amount of iron in the body of the bell. The density of wrought iron is approximately 7.75 g/cm^3, so the weight of a 560 mm by 260 mm sheet would be 3.4 kg at 3.0 mm thickness and 5.4 kg at 4.8 mm. The Ednam Bell, of slightly larger size (280 mm tall, excluding the handle), weighs 13 lbs 8 ounces (Smith 1882, 278; equal to 6.12 kg), inclusive of its handle.

Bourke (1980, 62) commented on the bells as representing an unusual use of iron sheet at this period. The forging of iron into a sheet is a demanding process, requiring a good quality bloom, and it is likely that each sheet would have been forged from a single bloom, rather than welding several smaller pieces together. No evidence for welding of the iron sheet has been noted by studies of the Type 1 bells. The loss of iron from a bloom during refining and smithing can be as high as 50% (Crew 1991; Sauder & Williams 2002). This suggests that the smelters supplying the Clonfad smiths were capable of generating raw blooms as large as 8–10 kg. The smithing of such large blooms to sheet is indeed a remarkable feat.

Experimental investigations of the brazing technique have shed light on the technique. The stages in the experimental bell brazing are illustrated in Illus. A3.10 and A3.11. The key problem faced during experimental brazing is the attainment of a suitable temperature to melt the bronze (approximately 950°C for a 16 wt% tin bronze) and to allow it to flow over the iron, while avoiding too much variation in temperature across the bell. If parts of the clay package become too hot, then there is a risk of melting or cracking the ceramic, allowing hot gas to enter and causing the iron to oxidise or even melt. If parts of the package are too cold then the bronze may

freeze before coating the iron. Trying to turn the package in the hearth, to make the heating even, can result in damage to the shroud. The experiments suggest that a deep fuel bed in the hearth assists with the even heating of a package placed high in the hearth (but still covered by the fuel), and this has led to the interpretation of the large burnt pit (C464: 1.20 m wide by 0.61 m deep) in which the main collection of bell-brazing shroud was found, as possibly being the hearth in which the brazing was undertaken. The problem with such a deep hearth is how to blow air into its base, and successful experiments were conducted in which air was blown from bellows mounted in a ditch adjacent to the brazing hearth. It is conceivable therefore that this arrangement was employed at Clonfad, where the possible brazing hearth (C464) was apparently cut by ditch C463. Avoiding the failure of the shroud at high temperature requires finding the correct composition for the ceramic. The early parts of the experimental programme employed a ceramic composition too rich in clay, generating shroud residues that were denser than the original pieces, so requiring more heating, as well as being more brittle and not generating the characteristic dimpled external vitrification of the Clonfad material. These issues were rectified in later experiments by using a very sand-rich ceramic.

The key outstanding issue to be addressed is the form and location of the bronze within the package. In experiments in which full-sized bells were brazed, the bronze (in the form of short sections of rod) was placed around the lip of the bell. Subsequent reconstruction of the Clonfad shroud suggests that this was unlikely to have been correct: it appears that the shroud simply curved around the lip of the bell. The advantage of this approach is that gravity assists in the flow of the bronze down over the bell; the disadvantage is that in order to melt the bronze at the lip of the bell, the inverted top of the bell can become overheated. One possible solution to this problem is to place the bronze in and around the top of the bell and then to invert the bell after the bronze is melted. The shroud fragments from Clonfad include very few from the top of the bell, so it is not currently known if this was a possible technique. Some supporting evidence for this approach is an account from post-medieval Sweden that describes smiths taking brazing packages containing cowbells from the hearth and rolling them on the smithy floor to ensure an even coating (Björklund 1982, 345).

This present study has not revealed much evidence for the smelting technology employed at Clonfad, but the remarkable bloomsmithing slags indicate much about the process of working down the blooms to sheet iron. The evidence described above

suggests that the maintenance of a molten slag puddle in the hearth was essential to being able to heat sufficiently large areas of the iron sheet. It may be significant that working of such large iron sheet does not reappear in Europe until 13th and 14th centuries, when the advent of water-powered trip hammers allowed the production of plate armour. The technological understanding behind the use of water mills in early medieval Ireland could have extended to operate trip hammers, but there is currently no evidence that this happened. Instead, the development of the forge technology described here probably allowed the manual working of sheet iron. The range of residues and the evidence for the production of handbells raises the significance of the Clonfad smiths, and their status should be viewed alongside the craftsmen who produced the contemporary non-ferrous metalworking treasures, such as the Tara Brooch, the Ardagh Chalice and the Derrynaflan hoard.



Illus. A3.10—The experimental brazing process (Part 1/2).

KEY:
(a) *The two wrought iron bell components: the main body (cut out ready to fold) and the handle/suspension loop (note: suspension loop still straight, to allow it to be passed through the hole in the bell body).*
(b) *The finished forged bell.*
(c) *The forged bell is wrapped in cloth, then the coil-built clay shroud is applied.*
(d) *Bronze was placed around the lip of the bell, before the shroud was completed.*
(e) *Brazing hearth, (modelled on Clonfad hearth C464). The double-action bellows are anachronistic; the medieval smiths would probably have used a pair of single-action bellows.*



a



b



c



d



e

Illus. A3.11—The experimental brazing process (part 2/2).

KEY:
(a) *Shroud exposed in the hearth at the end of the heating. In this case the shroud has a serious flaw (lower right) where the shroud has cracked.*
(b) *The package is removed from the hearth and allowed to cool, before being given a final quench to break it open.*
(c) *Experimental clay shroud showing the imprint of the end seam of a bell, with rivets, and the remnants of the carbonised cloth.*
(d) *The bell is dull when removed from the package because of oxide scale formation.*
(e) *Bell is cleaned with jeweller's pickle to remove the scale and reveal the brazed surface.*

Table A3.1—Comparison of smithing hearth cake (SHC) assemblages.

	Coolamurry	***Navan***	***Moneygall***	***Carrigoran***	***Parknahown 5***	***Trumra 4***	***Clonmacnoise (NG)***	***Ballykilmore***	***Woodstown 6***	***Clonmacnoise (WWS)***	***Clonfad***	***AR36 Borris***	***Lismore/ Bushfield 1***
date	C10–C12	E. Med.	E. Med–Med.	C10?	C5–C10?	C5/C6	C7–C10	C10–C15?	C9–C10	C10?	C7–C9	C7–C9?	E. Med.?
SHC count	41	17	22	18	89	57	117	30	140	38	381	88	23
SHC min. wt		60	114		86	92	100	94	68		60	154	426
SHC max. wt	2588	2990	1800	3866	2898	3163	7815	4033	6310	5540	11000	7440	4390
SHC mean wt	386	507	527	553	567	727	843	1022	1060	1087	1302	1618	1737
% <500g	83%	82%	55%	72%	70%	47%	50%	47%	40%	39%	30%	22%	4%
% <1000g	95%	88%	95%	89%	84%	75%	78%	73%	71%	68%	61%	41%	39%
% >1000g	5%	12%	5%	11%	16%	25%	22%	27%	29%	32%	39%	59%	61%
% >3000g	0%	0%	0%	6%	0%	2%	3%	10%	7%	8%	9%	16%	13%
Modal 100g interval	100–200	100–200	200–300	100–200	400–500	100–300	400–500	200–300	200–300	300–400	300–400	200–300	500–600

Assemblages ordered by mean SHC weight.

Key:

Coolamurry from Young, 2008b; Navan Site 1 from Young 2007; Moneygall from Young 2008e; Carrigoran from Young 2006; Parknahown 5 from Young 2009c; Trumra 4 from Young 2008l, Clonmacnoise New Graveyard site from the author's work in progress; Ballykilmore this study; Woodstown from Young 2009d; Clonmacnoise Waste Water Scheme from Young 2005; Clonfad this study; Lismore/Bushfield 1 from Young 2008j.

Apatite: a calcium phosphate mineral with a the general formula $Ca_5(PO_4)_3(OH,F,Cl)$.
Blacksmithing: the working of iron for the creation or repair of artefacts.
Bloom: the raw block of iron produced during smelting in the bloomery process. Blooms require further compaction and reworking (bloom smithing or bloom refining) in order to remove voids, charcoal and most of the slag entrained in the raw bloom. The remaining slag forms elongate inclusions in the iron, which gives bloomery iron its toughness. Many of the objects described as blooms have undergone at least some compaction. Fully compacted blooms (but not yet worked down to usable bar iron) are termed billets.
Bloom refining: an alternative term for bloom smithing.
Bloom smithing: the process of reworking a raw bloom, through repeated reheating and hammering, to reduce its content of slag, to remove unwanted inclusions and to draw out the remaining slag into elongate inclusions. The end product may be a bar or billet. An alternative term for bloom refining.
Blowhole: a hole through a furnace or hearth wall through which air is blown.
Bog iron ore: an iron ore formed by the oxidation of groundwaters carrying reduced iron in solution. The typical bog ores form around the margins of bogs, but they also occur in other settings, such as river flood plains. They vary from dense thick masses to granules or even powder. The dominant iron-bearing mineral is usually goethite.
Brazing: the joining or coating of one metal, by a metal of lower melting point. The high-temperature equivalent of soldering. In early times the brazing metal used to coat and join iron would have been a copper alloy, usually bronze (copper-tin) or brass (copper-zinc).
Brazing shroud: the ceramic coating applied over an iron object to allow its surface to be brazed. The brazing metal would have also been included within the shroud.
Clinopyroxene: a subgroup of the pyroxene minerals.
Coffee-bean spheroid: a small droplet (usually <10mm) of slag that has chilled against charcoal particles in the fuel bed, giving rise to a dimpled sub-spheroidal shape.
Cotectic: referring to conditions under which two or more solid phases crystallize at the same time from a single liquid.
Dendrite: a branched crystal with a tree-like form, typically formed by rapid crystal growth during cooling.

End-member: the limits of solid solution in a mineral system. Used in cases where all the possible sites which a particular element can occupy in a crystal are occupied by atoms of the element. An example would be fayalite, Fe_2SiO_4 being the iron end-member of the olivine group, whereas forsterite, Mg_2SiO_4 is the magnesium end-member.

Fayalite: the iron end-member of the olivine group, with formula Fe_2SiO_4

FB: abbreviation for furnace bottom

Feldspar: a common aluminosilicate mineral group, which includes the most common minerals in igneous rocks. The two main groups within the feldspars are the alkali feldspars, with formula $(K,Na)[AlSi_3O_8]$, and the plagioclase feldspars with formulae ranging from $Na[AlSi_3O_8]$ to $Ca[Al_2Si_2O_8]$

Fines: the fine-grained particles in an assemblage. Smithing fines include hammerscale, together with other fine-grained slag, ceramic, metal and fuel debris.

Flow slag: slag with a morphology indicative of flow inside the furnace. Usually formed of prills (horizontal and vertical), flow lobes, blebs, spheroids and the more contiguous slags formed by the merging of individual flows.

Forging: the process of forming a metal by beating it

Forsterite: the magnesium end-member of the olivine group, with formula Mg_2SiO_4

Furnace arch: an opening into the base of a bloomery shaft furnace. This may be used in non-slag tapping furnaces for cleaning, repairing the furnace and possibly for bloom extraction. In slag tapping furnaces the arch is opened to allow slag to flow from the furnace (tapping). In either case the arch is normally closed during smelting.

Furnace bottom: a large slag block formed by slag accumulation in the bottom of a non-slag tapping bloomery furnace.

Goethite: a hydrated iron oxide with the formula FeO.OH.

Hammerscale: micro-residues formed during forging, in two distinct varieties. Flake hammerscale is a thin film produced by superficial oxidation of the hot iron when exposed to the air. The thin film separates from the underlying unoxidised iron and may accumulate on the smithy floor, particularly around the smith's anvil. Spheroidal hammerscale is formed from slag droplets expelled from the workpiece during hammering, particularly during forge-welding. The slag chills in the air into small spheroidal slag particles.

Hedenbergite: a clinopyroxene mineral with an end-member composition of

$CaFe[Si_2O_6]$

Hercynite: a spinel group mineral with ideal formula $FeAl_2O_4$

Iron smelting: the process of reducing iron ore to metallic iron. In the bloomery process the product will be a solid iron bloom, in contrast to the liquid iron produced in a blast furnace.

Kirschsteinite: the end-member with the maximum calcium substitution into a fayalitic olivine. Only one of the two iron atoms in the crystal unit cell can be replaced by calcium, giving a formula of CaFeSiO4

Leucite: a potassium aluminium silicate mineral with the formula $K[AlSi_2O_6]$. In slags this mineral may be particularly common where the slag has been influenced by a potassic ceramic, or, more commonly, where it has absorbed potassium from fuel (charcoal) ash

Magnetite: an iron oxide; a spinel group mineral with ideal formula Fe_3O_4

Micro-residues: fine-grained residues, typically collected by sieving or flotation rather than direct acquisition in the field. They include hammerscale from smithing, but also a wide variety of small slag particles.

Olivine: a group of silicate minerals, including the end-members fayalite (Fe_2SiO_4), forsterite (Mg_2SiO_4), tephroite (Mn_2SiO_4), kirschsteinite ($CaFeSiO_4$) and monticellite ($CaMgSiO_4$). The complex substitutions are described in this chapter by using the convention of describing the Fe-Mg as the fayalite-forsterite proportion (for instance Fa95Fo5, where Mg is 5% of the total of Mg+Fe) and then describing the Ca and Mn concentrations as percentage substitutions of the forsterite-fayalite.

Plagioclase: a feldspar group mineral with a composition between $Na[AlSi_3O_8]$ and $Ca[Al_2Si_2O_8]$

Prill: a cylindrical or sub-cylindrical flow, usually described as being either a horizontal or vertical prill depending on the direction of flow of the slag.

Pro-tuyère tongue: a slag mass formed in front of, and just below, the tip of the tuyère. They typically have a tabular form with an upper, glassy, silicate-rich layer (strongly influenced by material melting from the tip of the tuyère) and a lower, lobate layer (formed of fluid slags formed by the reaction of the upper silicate-rich melt with iron oxides derived from the workpiece). These lobes represent the chilled remains of slag drips, which in large hearths may feed the development of an SHC lower in the hearth.

Pyroxene: a large group of silicate minerals, many with a formula close to $(Ca,Mg,Fe,Mn)_2Si_2O_6$.

Rare earth elements: these are the lanthanoid elements (atomic numbers from 57-71). They are sometimes also held to include the elements scandium and yttrium. They are relatively immobile in many geological situations so their relative abundance (usually given in a form normalised to one of several standards) can be used, for instance, for provenancing studies of ores.

Rhönite: an aenigmatite group mineral with a formula of $Ca_2(Mg,Fe^{2+},Fe^{3+},Ti)_6(Si,Al)_6O_{20}$.

Shaft furnace: a furnace that is taller than wide. The shaft furnace permits the reaction of the charge, which descends as the fuel burns, with rising carbon monoxide. Many bloomery furnaces are shaft furnaces, as are blast furnaces.

SHC: abbreviation for smithing hearth cake. A typically plano-convex slag cake that forms just below the air inlet in a smithing hearth

Sinter: fine-grained material which has become a coherent mass through heating, but without melting

Slag beard: a characteristic accumulation of iron-rich slag, often in a rather open-textured, spiky or prilly with a triangular or crescentic shape which forms attached to lower margin of a tuyère, just below the air blast.

Slag flat: a thin slag sheet, typically 1-5mm thick, which forms and chills usually on the surface of the workpiece (in which case it may be gradational with flake hammerscale) or occasionally on the surface of the smith's tools.

Slag spheroid: a spheroidal or sub-spheroidal drop of slag. Typically used without genetic connotation, but often including material formed from drops of slag descending through the fuel bed of a hearth or furnace. One variety of form shows one or more dimples on the surface through contact with fuel particles; these have been termed "coffee-bean" spheroids.

Slag-pit furnace: a variety of shaft smelting furnace that terminates downwards in a pit, which accumulates slag during the smelt. Smaller slag-pit furnaces are designed to be cleaned out and are multi-use structures. Some large slag-pit furnaces simply accumulate the slag into a large pit, which is then abandoned. Slag-pit furnaces of a variety of forms are increasingly seen as the standard Iron Age furnace across much of northern Europe.

Smithing: the activity involved in forming a metal object, including, but not limited to, forging metal and joining metal by welding

Smithing floor: a concretionary material formed by cementation of micro-residues derived from smithing. Cementation may occur on the smithy floor (hence the name), but also in rubbish pits and other deposits. Cementation is often largely through rusting of small iron particles. Other clasts include hammerscale, slag debris and particles of fuel as well as any background sediment (sand grains etc).

Smithing hearth: a hearth used for the heating of metals for smithing.

Smithing hearth cake: a cake of slag formed in the smithing hearth below the level of the air blast. They typically have a rounded convex base, with an upper surface that may be concave, planar or convex depending on the amount of slag that accumulates.

Spinel: a group of minerals including hercynite and magnetite. These minerals are important in slags for their ability to contain a variety of elements including titanium, manganese, zinc and vanadium, as well as iron and aluminium.

Tuyère: a tubular structure for conveying the air blast into a furnace or hearth.

Wustite: an oxide of divalent iron with the formula FeO.

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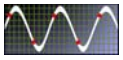
Geophysical Survey
Adjacent To Clonfad Monastic Site WM032:089
N6 Kinnegad – Kilbeggan Road Scheme, Co. Westmeath

License No. 09R121

TAG Project No. 09022

Client:
Valerie J. Keeley Ltd.

On Behalf Of:
Westmeath County Council



TARGET Geophysics

Specialists In Geophysical Prospection For Archaeological Assessment

PROJECT DETAILS

Project	Geophysical Survey Adjacent To Clonfad Monastic Site WM032:089, N6 Kinnegad – Kilbeggan Dual Carriageway, Co. Westmeath
Client	Valerie J. Keeley On Behalf Of Westmeath County Council
Townland	Clonfad
Nat Grid Ref	240599 240591 (Central Coordinate)
License Number	09R121
Project Start Date	20th June 2009
Report Date	26th August 2009

Summary Of Results

Detailed gradiometer survey adjacent to Clonfad monastic site has been successful in recording much of the northern, southern and western limits of archaeological activity associated with the monument. The survey has highlighted a substantial complex of settlement remains representing the continuation of features identified during previous archaeological works undertaken in connection with the proposed N52 Link Road for the N6 Kinnegad to Kilbeggan Dual Carriageway. The data set corresponds well with the findings from the previous testing, geophysics and excavation, and demonstrates a large spread of archaeological activity as is normally encountered from survey over ecclesiastical remains. This spread of activity includes one main external enclosing element to WM032:089, two substantial inner enclosures encompassing the church and graveyard, a network of smaller enclosure remains, numerous pit type features, linear anomalies and evidence for industrial activity. The location of one possible building, possibly a former mill, has also been recorded to the south of WM032:089.

*** The summary of survey results should be read in conjunction with the main report.**

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Table 1 Recorded Monuments Within 1km Of Survey

1. Introduction

Geophysical survey was carried out adjacent to the early medieval monastic site at Clonfad, near Tyrrelspass, in Co. Westmeath. This survey was undertaken for Valerie J. Keeley Ltd to the west of the N52 Link Road for the N6 Kinnegad to Kilbeggan Dual Carriageway road scheme. The aims of this survey were to assist in the interpretation of results from partial excavation carried out from 2004 to 2005 prior to construction of the N52 Link Road, and to gain a broader understanding of the site following its inclusion in the register of national monuments (serial no. 1/2009).

2. Site Description

Figure 1

The investigation area comprises a predefined 1.8 hectare survey grid, which extends across parts of two fields situated on a ridge of elevated pasture land to the north, south and west of the remaining church (WM032:089) and graveyard (WM032:089001) at Clonfad. The N52 Link Road for the Kinnegad to Kilbeggan Dual Carriageway lies shortly to the east of the survey location, which is bound to the north and west by agricultural land, and to the south by a stream.

2.1 Soils & Geology

The surrounding landscape at Clonfad is predominantly flat to undulating pasture, interspersed with areas of bog. Soils of the locality are mainly grey brown podzolics, with gleys, brown earths and basin peat occurring locally (Association 31, National Soil Survey Of Ireland, 1980). The underlying geology for this part of County Westmeath includes drift-covered limestone.

2.2 Archaeological Background

As part of the Contract 2 Tyrrelspass to Kilbeggan Advanced Archaeological Works geophysical survey and testing were undertaken at the eastern perimeter of the early mediaeval monastic enclosure site of Clonfad (WM032:089) by IGAS & CRDS Ltd in 2004. Later excavation by Valerie J Keeley from 2004 to 2005, under Ministerial Direction A001/036, Registration No. E2723, revealed the site to be a large multi-vallate monastic enclosure, dating from mid 5th / early 6th century AD to the mid 9th century, with later medieval and post periods of reuse.

Clonfad monastic site is situated within 1km of a significant number of further recorded monuments. Summary information on these monuments, and for the upstanding remains of the church and graveyard at Clonfad are provided below in Table 1:

RMP	NGR	Townland	Description
WM032-089	240599 240591	Clonfad	Church
WM032-089001	240599 240591	Clonfad	Graveyard
WM033-025	242247 240559	Calverstown	Ringfort
WM033-027	242097 241759	Kilbrennan	Earthwork
WM033-051	240830 239518	Temploran North	Earthwork
WM033-052	241455 239745	Templeoran North	Church

Table 1. Recorded Monuments Within 1km Of Survey

3. Methodology

Detailed gradiometer survey totalling 1.8ha extended through the investigation area to the north, south and west of WM032-089 & WM032-089001 (Areas A – D).

Grids utilised for both surveys were set out and tied-in to the OS using differential GPS, tapes, ranging rods and an optical square.

Instrument specifications and survey methodology are discussed in the *Summary Technical Information* document attached to this report.

3.1 Data Display Figures 1 - 3

Figure 1 presents a composite figure showing the 1st edition OS map extract 32/33 overlaid with the locations of survey Areas A – D and site phasing identified from earlier excavation (scale 1/4000).

The results from gradiometer survey are presented in Figure 2 at a scale of 1/2000, with an interpretation provided as Figure 3 at the same scale.

3.2 *Ground Conditions & General Considerations*

Ground conditions at the site were suitable for survey, the investigation area having been previously cleared of silage in advance of fieldwork. No physical obstructions which might impact on the progress of survey were noted.

Isolated ferrous responses occur throughout the results from survey. These are usually caused by the presence of modern debris within the topsoil, and are not referred to in the text unless considered relevant. Broad concentrations of ferrous response also occur at the edges of Areas A, C & D and these derive from interference caused by existing and former boundaries intersecting with the survey grid.

4. Survey Results

Figures 2 & 3

Detailed gradiometry through Areas A – D, to the north, west and south of Clonfad church and graveyard (WM032:089 & WM032:089001), has recorded an extensive network of enclosure ditches, pit type features, and further anomalies of archaeological interest. These represent the buried remains of the monastic settlement extending beyond the area of partial excavation undertaken between 2004 – 2005 by Valerie J Keeley Ltd. The responses recorded are generally magnetically strong, as is typical from magnetic survey over monastic remains, with concentrations of burnt / fired debris / possible industrial activity indicated. Together the responses demonstrate a radial pattern to the north, south and west, encompassing the remains of WM032:089 & WM032:089001.

The western boundary to WM032:089 is evident as a fragmented and relatively ill-defined linear response (1), extending north-east / south-west through Area B, then north to south through Area C. Partially aligned with response 1 within 10 – 15m to the east lies response 2, which although presenting a slight zig-zag formation through Area C, represents an internal enclosure to the monument. Continuations of responses 1 & 2 are discernible at a lesser magnitude extending through to the eastern edge of Area B.

Response 2 appears to form a substantial inner boundary for a series of smaller enclosures (3 & 4) at the western and north-western perimeter of WM032:089001. Response 4 extends eastwards beyond the limit of survey, and is likely to represent the continuation of a fragmented and ill-defined enclosure ditch recorded from previous geophysical survey in connection with the proposed road (IGAS & CRDS Ltd. 2004). This anomaly is visible curving north-west to south-east through the south-western portion of the previous geophysics grid, and is also present extending across the northern portion of detailed survey Area D. These combined linear responses are likely to represent part of a large inner enclosure encompassing WM032:089 & WM032:089001.

A large complex of ditch type anomalies, burnt / fired responses, broad negative linears, weak trends and small-scale responses (5) recorded to the south-east of WM032:089001 may represent the remains of a substantial building. The proximity of these responses to the stream at the southern survey edge suggests they may represent the site of a possible mill.

Linear responses 6 extending across the northern portion of Area B are thought to represent remains of possible outlying field systems, some of which may be contemporary with the WM032:089 & WM032:089001. Extensive disturbance through this section of survey may have obscured the locations of further anomalies in this region.

Numerous pit type responses, ill-defined linear anomalies, and weak trends have been recorded throughout Areas A – D, and the majority of these are deemed to represent remains of settlement activity associated with the monument. The potential that some represent recent landuse, interference from soil variations, or underlying geology should not be dismissed.

5. Conclusions

Gradiometer survey at Clonfad monastic site, to the north, south and west of WM032:089 & WM032:089001 has highlighted an extensive network of enclosure remains, with further dense responses pertaining to a substantial monastic settlement . The results show the continuation of anomalies identified from previous archaeological works in connection with the proposed road, highlighting the western portion of the monastic enclosure, and the below ground remains of further enclosures, pit type features and probable industrial anomalies throughout each block of detailed survey.

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Report Author John Nicholls MSc MIAI

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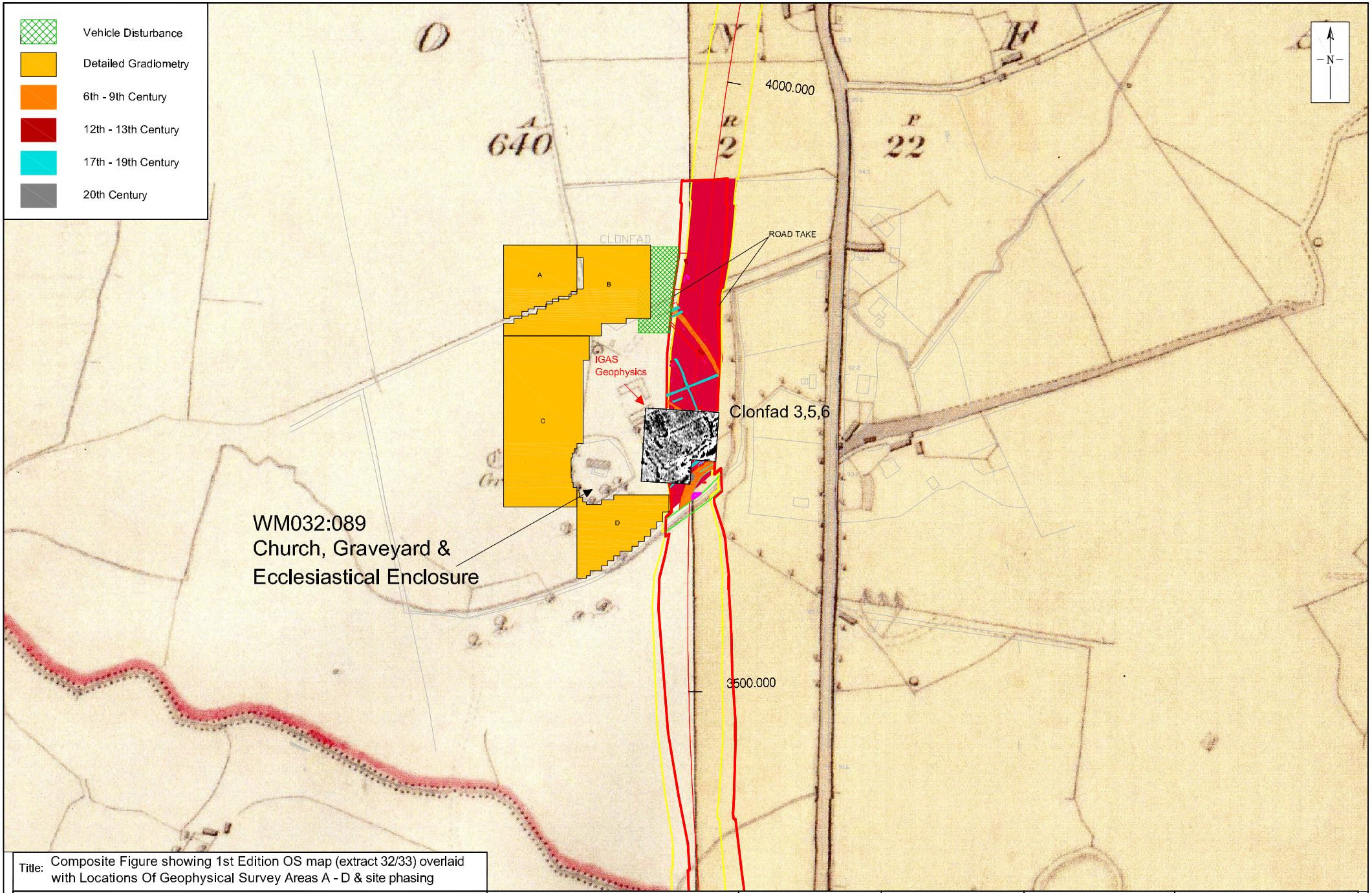
Appendix: Digital Archive Information

A complete digital archive for this project is provided on CD with this report. The archive includes the report text with digital versions of all drawings and displays relating to this work.

All report figures are included in AutoCad format (.DWG, Version 2004), and can be re-referenced to the raw and processed data included as part of this archive. Greyscale and XY Trace displays forming part of this archive are provided at –1/1.5nT and 15nT/cm respectively unless otherwise stated. A complete PDF version of this report is also included.

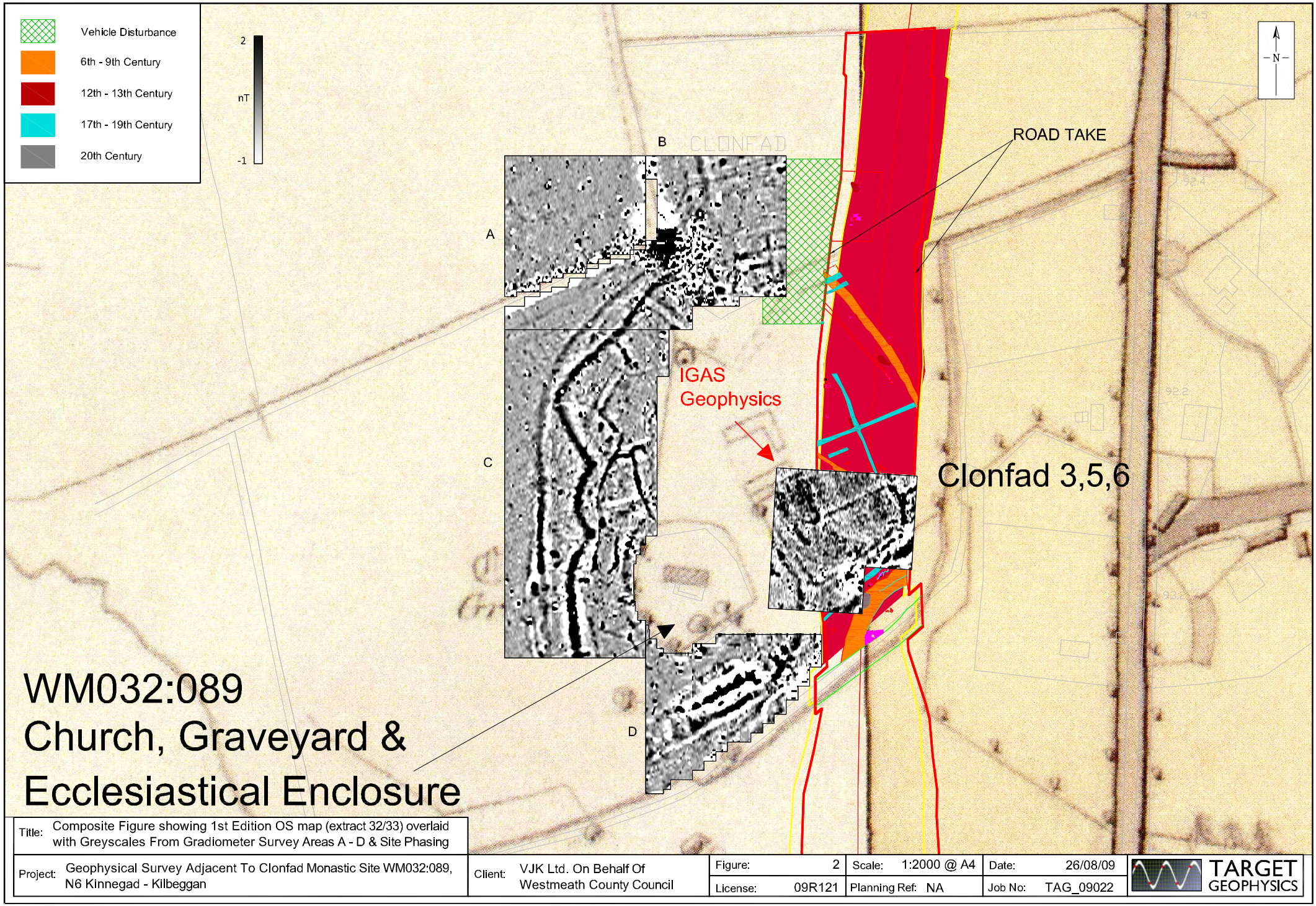
The following table details the various file types provided.

Description	File Type
Survey Location	.DWG
Greyscale (Interpolated Data)	.DWG
Interpretation	.DWG
Greyscale (Raw Data)	.BMP
XY Trace (Raw Data)	.TIF
Area Interpretation	.DWG
Report Text	.DOC
Entire report as PDF	.PDF



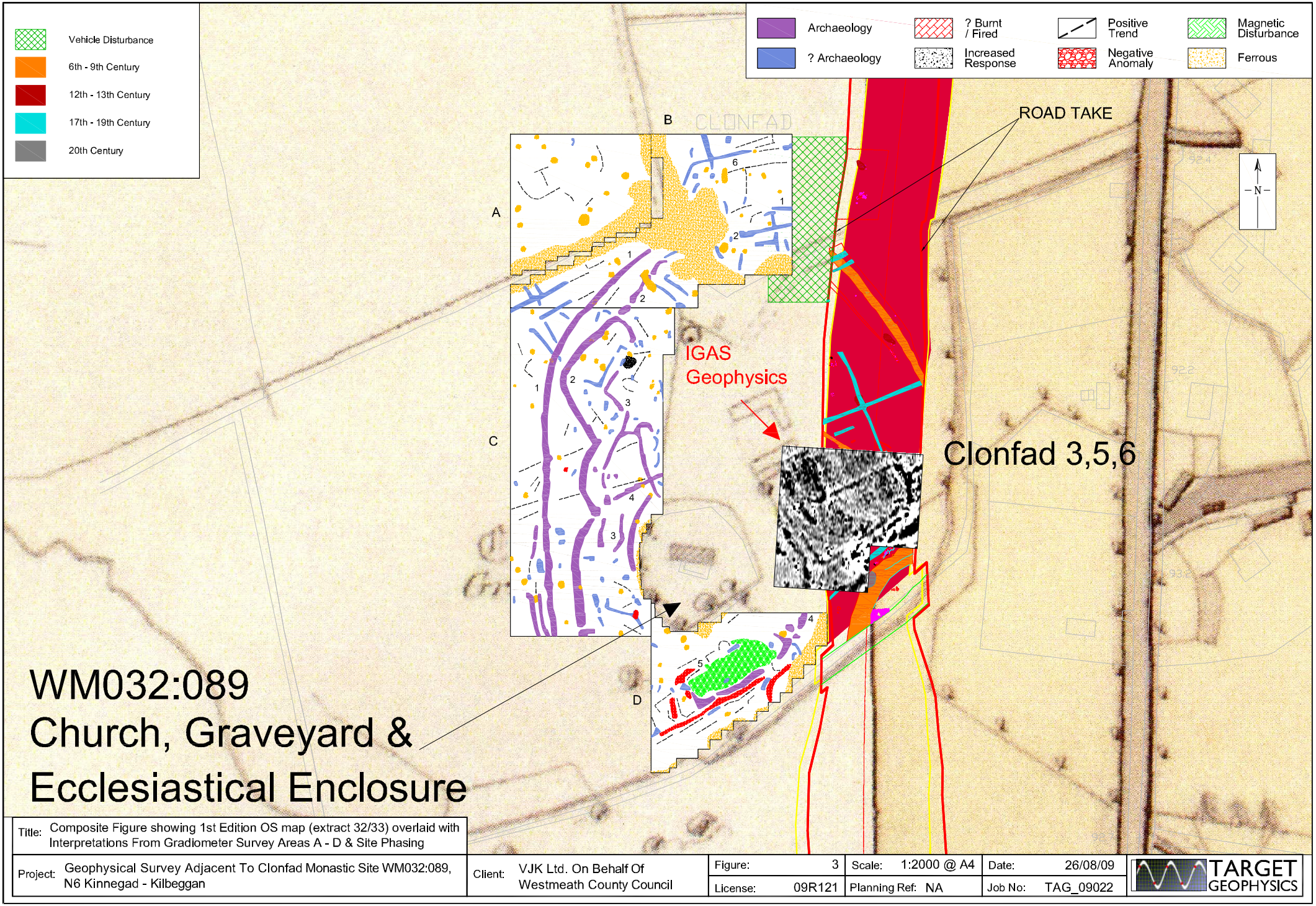
Title:	Composite Figure showing 1st Edition OS map (extract 32/33) overlaid with Locations Of Geophysical Survey Areas A - D & site phasing				
Project:	Geophysical Survey Adjacent To Clonfad Monastic Site WM032:089, N6 Kinnegad - Kilbeggan	Client:	VJK Ltd. On Behalf Of Westmeath County Council	Figure: 1	Scale: 1:4000 @ A4
				License: 09R121	Planning Ref: NA
				Date: 26/08/09	Job No: TAG_09022

TARGET GEOPHYSICS



Title:	Composite Figure showing 1st Edition OS map (extract 32/33) overlaid with Greyscales From Gradiometer Survey Areas A - D & Site Phasing				
Project:	Geophysical Survey Adjacent To Clonfad Monastic Site WM032:089, N6 Kinnegad - Kilbeggan	Client:	VJK Ltd. On Behalf Of Westmeath County Council	Figure: 2	Scale: 1:2000 @ A4
				License: 09R121	Planning Ref: NA
				Date: 26/08/09	Job No: TAG_09022

TARGET GEOPHYSICS



Title: Composite Figure showing 1st Edition OS map (extract 32/33) overlaid with Interpretations From Gradiometer Survey Areas A - D & Site Phasing					
Project: Geophysical Survey Adjacent To Clonfad Monastic Site WM032:089, N6 Kinnegad - Kilbeggan	Client: VJK Ltd. On Behalf Of Westmeath County Council	Figure: 3	Scale: 1:2000 @ A4	Date: 26/08/09	TARGET GEOPHYSICS
		License: 09R121	Planning Ref: NA	Job No: TAG_09022	

Gradiometer Survey

This information is provided as a summary of the gradiometer technique employed in Target projects, the display formats used for presentation of the results from these surveys, and the interpretation terms included for each report. If you have any queries in relation to this documentation or geophysical survey in general please contact Target by email at survey@targetgeophysics.ie.

Background



Gradiometry is a soil magnetic technique used to define the location and determine the extent of buried archaeological sites. Such remains may include leveled enclosure systems, house platforms, pits, hearths, kilns, furnaces and metal working sites. These remains typically exhibit magnetic contrasts above background soil / geological variation due to burning and depositional activities deriving from site occupation. These contrasts are measured by gradiometers as variations in the local magnetic field in units of nanoTesla (nT).

Instrumentation

Target uses Bartington Grad-601 dual sensor fluxgate gradiometers. Each instrument comprises two highly stable 1m vertical separation sensors connected to a data logger, and mounted on a lightweight frame. These instruments are designed specifically for archaeological prospection purposes providing enhanced depth response and exceptional stability. Target uses the Grad601 for reconnaissance archaeological survey in *scanning* mode, and for archaeological site mapping through *detailed* survey.

Field Methodology

Target undertakes gradiometry in *scanning* mode as a means of locating buried archaeological sites, and conducts survey in *detailed* mode for recorded mapping of these sites over an OS referenced grid. The majority of Target projects commence with gradiometer scanning followed by percentage detailed survey based on the initial scanning results.



Scanned responses in red.

Gradiometer *scanning* allows for initial geophysical inspection of a site through reconnaissance survey. Two gradiometers are used to traverse the entire survey area along traverses spaced at 10m intervals. Instrument display panels are continuously monitored for significant responses during each traverse, with interference from modern ferrous and natural sources discounted where possible. Responses of definite archaeological character noted during the scan and any additional anomalies which may require further clarification are marked with canes and tied-in to the OS by DGPS. These responses are then selected for further examination by *detailed* gradiometer survey.

Detailed gradiometry is conducted over a rigid OS referenced grid to investigate significant responses observed during scanning and to carry out full mapping of known areas of archaeological activity. Survey data is normally collected at 0.25m x 1.0m intervals to map underlying features both accurately and in detail. Sampling intervals may be increased depending on the archaeological or soil / geological context specific to each project.

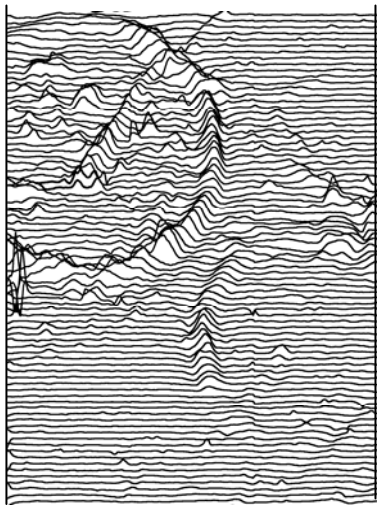
On completion of the *detailed* phase data is downloaded on site and compiled to produce greyscale maps of survey results. These greyscale maps and their subsequent interpretations are used by clients to form a basis for archaeological testing or excavation where appropriate.

** All Target services comply with English Heritage guidelines for geophysical survey in archaeological evaluation (2008).*

Data Display

XY Trace

XY Trace formats comprise a series of linear traces, enabling a semi-profile display of the respective anomalies along the X and Y-axes. This format is essential for distinguishing between modern ferrous materials (buried metal debris) and potential archaeological responses. The XY trace plot provides a linear display of the magnitude of the response within a given data set. Target normally displays XY traces at 15nT/cm unless otherwise specified.



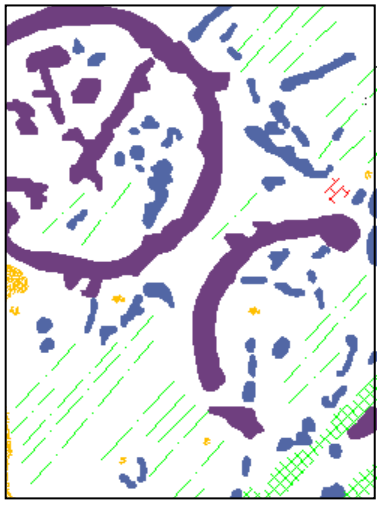
Greyscale

Greyscale formats assign a cell to each datum according to its location on the grid. The display of each data point is conducted at very fine increments, allowing the full range of values to be displayed within the given data set. This display method also enables the identification of discrete responses that may be at the limits of instrument detection. Target normally displays greyscales at -1 to 1.5nT unless otherwise specified.



Interpretation

The interpretations provided in all Target reports follow in depth analysis of survey data, and are designed to assist in highlighting the immediate archaeological concerns relating to each project. A concise legend describing all responses present is provided, and a glossary of terms used accompanies the technical information section provided with each report. It is highly recommended that Target reports are read in their entirety, including all text and figures.

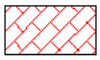


Glossary Of Interpretation Terms



Archaeology

This category refers to responses usually supported by comparative archaeological evidence (i.e. photographic transcriptions, excavation, etc), or for anomalies which display clearly recognisable archaeological patterns. The term is generally associated with significant concentrations of former settlement, such as ditched enclosures, storage pits and associated features.



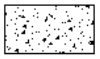
?Burnt / Fired

Such anomalies are mostly recorded in association with concentrations of settlement activity, possess a strong magnetic response and may equate with archaeological features such as kilns, furnaces, concentrations of fired debris and industrial material.



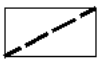
?Archaeology

This term refers to anomalies considered to be of potential archaeological interest, but for which a possible more recent landuse, modern ferrous or natural origin cannot be discounted.



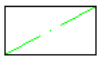
Increased Response

This category applies to poorly defined responses of potential archaeological origin. This poor definition may be caused by disturbance from more recent cultivation or equate with deposits which have a low capacity for magnetic enhancement. Natural or modern sources of interference causing these anomalies should not be discounted.



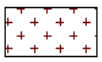
Trend

This category refers to low-level magnetic responses which are at the limits of instrument detection. In the absence of any clear archaeological context these anomalies are more commonly associated with natural variations in the underlying soils and geology.



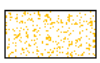
Cultivation

Visible as a series of closely spaced parallel linear responses, these anomalies equate with patterns of former cultivation.



?Natural

These responses are typically broad positive / negative variations caused by local changes in the underlying soils and geology. This can vary from slight mottled texturing across the data set within the 1 to 2nT range, to extensive ‘noise’ greater than +/-100nT. The latter may mask anomalies of interest.



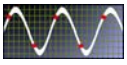
Ferrous

These anomalies exhibit typically strong magnetic positive /negative responses often referred to as ‘iron spikes,’ and are the result of modern metal debris contained within the topsoil.



Strong Magnetic Disturbance

This term refers to regions of magnetic interference to which no immediate modern ferrous or natural source can be assigned. A possible archaeological origin for these responses may be given depending on the individual project.



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Clonfad 3, Rochfort Demesne 3 and Ballykillmore 6
Objects and Waste of Antler and Bone

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The three sites produced a range of antler and bone implements of early medieval date, some of which are typical of the period, whilst others are quite exceptional. The range of objects includes combs, handles and needles, but extends also bead manufacturing waste and two rare examples of antler and bone stamps.

Combs

All of the combs are composite objects utilising antler or bone connecting plates and tooth segments, secured either by iron or bone rivets. Early medieval combs from Ireland were reviewed by Mairead Dunlevy (1988), who defined the principal classes and sub-types. These are now being developed and modified, in the light of recent discoveries, which are well-dated. The combs from Clonfad 3 and Rochfort Demesne 3 help to further the understanding of comb making across the eighth to ninth centuries, whilst the fragments from Ballykillmore 6 are significantly later in date, and fall towards the end of a long tradition in this craft.

The combs from Clonfad 3 survive only as fragments, some of which were dispersed across several contexts within the fill of the enclosure ditch 101. They form a very useful group, however, illustrative of different aspects of comb making in the eighth century. The largest fragment (*52*) is an unusual comb because it is secured entirely with antler or bone rivets, four of which remain at the centre. The rivets were doubled at the ends of the comb, a practice that can be seen also on combs from Ballynee, Carraig Aile and Rathtinaun (Eogan 1990, fig 24.6; O'Riordáin 1949, fig 13.94I; O'Sullivan 1998, fig 36). This was undoubtedly intended to provide extra strength at the ends, the weakest point of the composite comb, particularly in the absence of any iron rivets. Rivets of antler or bone are a particular feature of Irish early medieval combs but they do not appear on the earliest double-sided composites, which go back to the sixth century. They become widespread from the late seventh century onwards and continue in use up to the tenth century (Riddler and Trzaska-Nartowski forthcoming A). In most cases, they were used in conjunction with iron rivets, the latter applied to the ends of the comb in order to retain the end segments more securely. There is scarcely a sign of a single iron rivet across any of the Clonfad 3 combs, with the exception of some iron staining on one fragment (*201*). The comb workshop at Clonfad 3 avoided the use of iron. There may not have been good access to a blacksmith, but it is more likely that this was a deliberate, aesthetic choice. Iron rivets are prominent with comb designs, whilst antler and bone rivets can be disguised and are much less visible.

Few of the comb teeth survive on the double-sided comb (*52*) but there were originally eight per centimetre on either side, and this fineness of the teeth is also indicative of an eighth century date. The majority of double-sided composite combs from early medieval Ireland include between four and six teeth per centimetre. An increased fineness in comb teeth occurs in England in the late seventh to early eighth century, and appears to be reflected also in Ireland at around the same time. Finer teeth are more useful in dealing with hair hygiene and the problems of nits and lice in particular (Riddler, Trzaska-Nartowski and Barton forthcoming). The technology of comb manufacture was also improving at this time, allowing for longer and more elaborate combs with more precisely-cut teeth. The sparse

decoration of the connecting plates of this comb is a characteristic of the entire Clonfad assemblage, and reflects the products of a single workshop. Similarly restrained decoration occurs on combs from Carraig Aile and Drakestown, and further afield at Dun Cuier in Scotland (Ó Ríordáin 1949, fig 13.70; Young 1955-6, fig 13.3).

A fragment of a connecting plate (*201*) from a double-sided composite comb includes well spaced bands of vertical incised decoration. It has fractured across rivet holes at either end. Its trapezoidal section and, more particularly, the presence of prominent saw marks, place it within Dunlevy's Class D2, which she set in the period from the eighth to the tenth century (Dunlevy 1988, 360). The later examples of the class, stemming from Ballinderry and Dublin in particular, can be differentiated from the earlier form that is seen here. The vertical incised lines serve to separate the connecting plate into a series of panels, a form of decoration common in England during the late seventh to early eighth century, albeit on single-sided composite combs (Riddler forthcoming A). It can also be seen on a comb of Irish provenance, now at Alnwick Castle (Bruce 1880). Combs of eighth to ninth century date tend to be sparsely decorated, both in Ireland and in England, whilst both earlier and later forms of double-sided composite include elaborate designs and quite dense patterning.

The sparse decoration of the Clonfad 3 combs lies at the opposite end of the spectrum from the elaborate patterning seen on most of the combs from Lagore (Hencken 1950, figs 97-9 and 102). There is one important link between the two sites, however, exemplified by several connecting plates (*15* and *149/189*) that include saw marks along one edge only. This might suggest that they stem from single-sided composite combs, but there is another possibility. A small number of double-sided composite combs, assigned by Dunlevy to her class E, include paired connecting plates on each side (Dunlevy 1988, 361-2 and fig 6.1). They were dated from a period 'before the ninth century' to the tenth century and the majority belong to the eighth to ninth centuries. They formed the most elaborate composite combs of that period but were also the least successful, given that they all survive merely as small fragments. Part of a comb from Lagore illustrates the nature of the comb type (Dunlevy 1988, fig 6.1). As with many of the Irish early medieval combs, the ultimate origin of this type lies with late Roman designs, but the adaptation of the design is much later in date (Riddler 1996).

The comb from Rochfort Demesne 3 belongs to Dunlevy's class D3 (Dunlevy 1988, 360-1; McCutcheon, this volume). Few combs belong to this rare sub-type. Dunlevy could find only ten examples, making it one of the smallest groups of double-sided composite comb in her corpus, and not all of the combs in the sub-type actually fit there very well. The Rochfort comb has an elaborate profiled and decorated end segment, in the manner of combs from Garrynamona and Knowth, as well as Thetford in England (Riddler, Trzaska-Nartowski and Barton forthcoming). Whilst attention has understandably focused on the flared, decorative end segments, other features of these combs are more telling in terms of their typology. The trapezoidal cross section of the connecting plates, the dense mesh lattice decoration and the prominent saw marks, as well as the length of the comb, all suggest that it belongs to the ninth or early tenth century, and not to a later date.

All of the combs from Clonfad 3 are double-sided composites. Indeed, the majority of Irish combs produced prior to the ninth century are double-sided, usually with teeth of the same fineness on either side. Two small fragments of combs from Ballykillmore 6 stem from a single-sided composite comb with narrow, undecorated connecting plates, and another fragment of a similar comb came from Rochfort Demesne 3. In a sense, these small pieces exemplify Ireland's contacts with the wider world in the twelfth century, given that this comb type is widespread across northern Europe at that time (Riddler 2007a). They were produced in great quantities in Dublin and Waterford and have also been found in rural locations, including Beginish, Farrandreg, Knowth and Rathgureen (O'Kelly 1956, 177 and fig 3.2; Murphy 1998, fig 5; Riddler, Trzaska-Nartowski and Barton forthcoming; Comber 2002, fig 17.60). In some ways, this comb type echoes the earlier workshop at Clonfad 3. The combs

are undecorated and have fine teeth, extending to eight to nine per centimetre. But whilst the Clonfad 3 combs are likely to have been identifiable to that specific region of Ireland and quite possibly to that specific workshop, the twelfth century combs are indistinguishable from any seen across northern Europe.

Weaving Implements in Early Medieval Ireland

The nature of weaving practices in early medieval Ireland remains a little enigmatic. There is plentiful evidence for spinning from the presence of spindle whorls, which occur on some – but not all – sites. There are no antler or bone examples from any of the three sites and their broader distribution within Ireland suggests that the initial stages in textile manufacture did not take place on every site. A bigger problem is the lack of archaeological evidence for the succeeding stages of textile manufacture, and particularly weaving itself (Cramp 1986, 195; Mytum 1992, 211). Parts of wooden looms rarely survive but weaving activity can be identified from weaving battens, pin-beaters and loomweights. The two principal types of loom of this period can also be differentiated on the basis of the forms of implement recovered. The warp-weighted loom required a series of loomweights to secure its vertical threads and it was accompanied by double-pointed pin-beaters, which were used to separate and beat down the threads. The vertical two-beam loom, on the other hand, did not required loomweights, and is associated with single-pointed pin-beaters.

The situation is not helped by a certain amount of confusion in recent texts about the nature of antler and bone weaving implements. On the one hand, a wide range of objects are described under the generic term of pin-beater, and on the other, pin-beaters themselves have been given alternative interpretations. Pin-beaters have been well defined by Walton Rogers in several publications (Walton Rogers 1997, 1755-7; 2007, 33). The double pointed, stiletto-like type is associated with the warp-weighted loom whilst the single pointed type relates to the use of the vertical two-beam loom, which came into use in England in the late ninth century (Walton Rogers 2001). The problem is that there are no pin-beaters of either of these well-defined types from any of the three sites considered here, and few from any rural site in Ireland. The single pointed pin-beater is much more common in Ireland. It occurs in Dublin within tenth century and later contexts, precisely as would be expected from its English dating. Examples are known also from Carraig Aile, Cloghermore Cave, Garrynamona, Knowth and Moyne graveyard, as well as Lough Gur, where one example occurs amidst other items of tenth century date (Connolly and Coyne 2005, 109 and fig 31; Rynne 1964, 261 and fig 9.3; Eogan 1968, fig 43.240; Manning 1987, 54 and fig 10.47; Ó Ríordáin 1949, fig 14.11; 1954, fig 26.27, 33 and 40). The double pointed form of pin-beater is almost entirely absent from Ireland, however, as are objects that can be secured identified as loomweights (Hodkinson 1987, 47-8).

This provides the possibility that the vertical two-beam loom may have been in use in Ireland well before it was adopted in England (Hodkinson 1987, 48). It could have been introduced from Roman Britain or from Gaul in the post-Roman period. Indeed, it could well be that Ireland was influenced more by the Continent, and by France in particular, where the vertical two-beam loom continued in some areas from the Roman period onwards (Walton Rogers 2001, 163-4). Hodkinson suggested that bone gouges were used as single pointed pin-beaters, following an idea first proposed by Crowfoot (Hodkinson 1987, 49; Crowfoot 1945). This would certainly increase the quantity of weaving implements from Irish sites, but these objects are not well-suited to that purpose and it is much more likely, as noted below, that they were used as bone spearheads (Walton Rogers 2001, 160 note 8).

Two objects from Clonfad 3, made from pig fibulae (*308* and *519*) raise a further possibility. They are broadly similar in shape to the single pointed pin-beater, but less substantial. They are not perforated and, as a result, they have usually been regarded as pins (Hencken 1938,

38). There is a certain irony in noting that if all of these objects are pins, then there is abundant evidence for the presence of women on Irish rural sites of all types; but these women were seemingly not involved in weaving. These objects are noticeably common in Ireland and occur on almost every site that includes antler and bone implements. In most cases, as at Lagore for example, they are found alongside perforated examples, which served as needles and also formed a part of the weaver's toolkit. Three implements from Clonfad 3 have perforated heads, whilst two do not. In contrast, within most Anglo-Saxon assemblages, which are clearly quite different to those from Ireland, the perforated form is common whilst the unperforated type is rare. If the perforated examples are regarded as needles that would have been used for loose mesh work with textiles, then weaving begins to come back to individual sites of rural Ireland in the early medieval period. On the other hand, similar objects from prehistoric contexts are regarded as awls, as at Potterne, for example (Seager Smith 2000, 224 and fig 89), and that is a more likely interpretation of the object type, taking it away from the realm of weaving.

Pins and Needles

If the perforated pig fibulae from Clonfad 3 are regarded as weaving implements, as suggested above and endorsed by McCutcheon (this volume), then there are no bone or antler pins from the site. The only pin from any of the three sites is a fragment from Ballykillmore 6. This has a head with a series of grooves, which can be described as segmented. The pin type goes back to the Roman period and can be seen at South Shields, in particular (Riddler forthcoming B). Sixth century examples are known from Yorkshire, at Castledyke South, Driffield, Wharram Percy and Whitby, and there are also undated examples from Bantham in Devon and Freswick Links in Scotland. Within Ireland, bone or antler pins with segmented heads occur at Cahercommaun and Lagore (Hencken 1938, fig 23.117; 1950, fig 104.1362). The form is not seen amidst the extensive series of bone and antler pins from Dublin and this tends to suggest that it belongs to the sixth to eighth century and is ultimately based, like so many other things, on a Roman prototype.

Bone and Antler Stamps

Amongst the most unusual objects from Clonfad 3 are two stamps (*440* and *600*), one of bone and the other of antler. These are the first two examples of stamps to have come from Ireland. Antler stamps are more familiar from Anglo-Saxon and Merovingian contexts, where there is a reasonable if imprecise correlation between them and stamped ceramics (MacGregor 1985, 194; Riddler 1986; Knaut 1987). They also occur, however, on contemporary Scottish sites, where there are no stamped ceramics (Hallén 1994, 216). Thus it is much more likely that the Scottish and Irish examples, as well as some of the English stamps, were used to stamp leather and not ceramics. With this in mind, it is worth noting that the earliest example of stamped leather within an Anglo-Saxon context dates to the late seventh century and occurs on a knife sheath. One of the few early survivals of a leather manuscript cover, Codex Bonifatianus, also includes stamped decoration (Cameron 2005, 61 and fig 32; Wilson 1961).

Bone Discs and Object Manufacture

Two rectangular segments of antler (*108* and *171*) provide slight but useful evidence for the manufacture of combs at Clonfad 3. There is far greater evidence, however, for the production of bone beads. The surviving waste, all of which may stem from a single animal, includes examples of cattle femur, mandible and scapula. It may represent one episode of boneworking, intended to produce fifty or more beads from a selection of flat and relatively

thin surfaces of cattle bone. The discs were cut from either side of the bone using an iron tool specifically intended for that purpose, similar to an example found in a medieval context at Visegrád (Gróf and Gróh 2001, figs 2 and 6). In essence, the tool is an iron drill bit with a central prong, which was rotated and cut into either side of the bone. The prong provided a perforation mark that passed through to the opposite side, allowing both rotating cuts to line up. The surviving waste material from Clonfad 3 consists almost entirely of fragments of waste from which the beads have been successfully removed or failures in the cutting process. The finished beads are missing.

Waste from bead making has been found in great quantities on late medieval and early post-medieval sites, notably at Constance (MacGregor 1985, 101-2; Spitzers 1997). Within Ireland it is known from medieval deposits in Cork, but also from earlier contexts at Knowth (Hurley 2003, 338; Barton and Riddler forthcoming). It has been argued that sets of beads, or paternosters, were in use in Ireland from the twelfth century onwards (Hurley 2004, 464), but recent evidence suggests that they may have begun at a somewhat earlier date. Waste from Dublin may go back as early as the tenth century and that from York also seems to pre-date the twelfth century (Ottaway and Rogers 2002, 2948; Cathy Johnson, *pers comm*). Discoidal bone beads from York were recovered from late tenth century deposits (MacGregor, Mainman and Rogers 1999, 1944). Finished examples of discoidal bone beads have been found at Carraig Aile, Cloghermore and Lagore, which also suggests that they go back to a relatively early date (O'Riordáin 1949, fig 14.118; Connolly and Coyne 2005, 134 and fig 49; Hencken 1950, fig 106.1075). The finished product from Clonfad 3 would have resembled the bone necklace from Killeany, which includes 44 beads, a significant number for a paternoster (Riddler and Trzaska-Nartowski forthcoming B). The beads from Killeany are both thicker and wider than those from Clonfad 3, however, and the choice of a range of bone types at Clonfad 3 also implies a slightly less specialised manufacturing process. Medieval waste assemblages used a restricted range of bone types, largely focused on strips cut from cattle metapodia or scapulae. The Clonfad 3 waste is more varied, and arguably a little less successful, and sits in effect towards the beginning of a long tradition in bone bead manufacture occurring across northern Europe.

Hunting and Fishing

A tapering bone implement (*114*) with a lateral perforation at the butt end is redolent of prehistoric implements formerly identified as pin-beaters used in weaving, as noted above. More recently, however, they have been regarded as spearheads, particularly as the presence of a lateral perforation suggests that they were attached to shafts, probably of wood (Olsen 2003, 107-9). Westphalen suggested that those from Elisenhof were used as spear points, either in hunting or in fishing (Westphalen 1999, 8). Objects of this type are commonly found in late prehistoric deposits but also occur within early medieval contexts both in Ireland and on the Continent and an extensive survey of the Irish corpus has suggested that they were used as spearheads, and not as weaving implements (Riddler 2007b, 315-6; Mullins 2007).

A narrow, thin implement (*172*) is pointed at either end and at first sight appears to be a double pointed pin-beater. However, it is much too insubstantial for that role and may have served instead as a thin blade for delicate tasks. It is not unlike the small pointed implements from Birsay, possibly used to extract flesh from shellfish, although it could have had other functions (Curle 1982, 56).

Handles

A perforated antler tine end (*37*) from Ballykillmore 6 represents a fragment of waste, possibly from handle manufacture. It was accompanied by an unfinished antler handle (*804*).

Handles, usually produced from antler, are a conspicuous feature of Irish early medieval assemblages and are known from a number of sites. They are particularly well represented at Armagh (Gaskell Brown and Harper 1984, 125-8, fig 8 and pl 4) and can be seen also at Cahercommaun, Feltrim Hill and Lagore (Hartnett and Eogan 1964, fig 13.458; Hencken 1938, 64 and fig 39; 1950, 196), although some of the items described as handles from Lagore are actually needle cases. Handles were used on awls as well as knives and occur also in wood as well as antler. It is possible that horn handles, which are well attested on contemporary sites in England, were also widely used in Ireland and future studies of mineralised remains on knife tangs may confirm this suggestion. There is an inherent likelihood that the comb-maker, who worked largely with antler, was also the bone worker and the horn worker as well. This is certainly the case in Anglo-Saxon England during the eighth century and is implied in Triad 117 of the Triads of Ireland, where a comb-maker should be 'chanting upon a dunghill so that all antlers and bones and horns that are below come to the top' (Dunlevy 1988, 345).

Object Categories in Early Medieval Antler and Bone Working

The range of objects described above is largely typical of early medieval rural assemblages across Ireland. The emphasis lies with combs, pins and weaving implements, and other objects occur only in small quantities. The three sites provide a fairly wide range of object types in antler and bone, extending to stamps, discs, spearheads and handles. The antler and bone stamps are, as yet, the only examples to have been found in Ireland. Contemporary assemblages provide also gaming pieces, spindle whorls, motif pieces and amulets. Combs, gaming pieces and some forms of pin are composite objects with several components, whilst the bone discs required a specific implement for their manufacture. All of these objects are likely to have been produced by a specialised workshop. Antler handles could have been cut quite easily by a blacksmith and fastened to knives and awls, but horn handles require complex manufacturing techniques, and would also have been created in a sedentary and specialist workshop. Needles and pin-beaters are simple objects to manufacture but their distribution at Clonfad 3 echoes that of the other items. Whilst they could have been made by individuals as required, quite possibly by the women involved in spinning and weaving, they could equally well have been produced by the same craft workshop.

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