

seanda



Contents

seanda

PAGE

- 02 Project Updates
- 07 Obituary
- 08 Masters of their craft: worked wood from Annaholty, Co. Tipperary
- 10 Of grains and graves: excavations at Ballintotty 2
- 14 Crop remains from Ballynamona 2
- 16 Early hunter-gatherers by the Shannon
- 18 Cremains and questions: Bronze Age burial at Derrybane 2
- 22 A 'Meare' bauble
- 23 ASI: Archaeological Scene Investigation in north Louth
- 26 Medieval iron-working in the mire
- 30 Communicating archaeology through exhibition: gauging public opinion
- 34 The earliest cereal-drying kiln in Ireland?
- 36 Early days on the N25 New Ross Bypass
- 38 Bronze Age bathing?
- 40 Polypod bowls and continental yoghurt pots
- 41 Digging, data and dissemination
- 42 A souterrain at Ballynacarriga 2
- 45 Celtic Tiger archaeology—the view from afar
- 48 Building on a solid foundation: excavations at Rathmorrissey ringfort
- 50 Death remembered at Mullagh, Co. Longford
- 52 An unparalleled Neolithic enclosure and settlement at Tullahedy
- 56 The importance of 'When?'
- 60 The leaping faith of reconstruction
- 64 Glossary



- 08 Masters of their craft: worked wood from Annaholty, Co. Tipperary

Kate Taylor, an Excavation Director with TVAS (Ireland) Ltd, describes some wooden artefacts found during excavations on the M7 Nenagh–Limerick motorway scheme.



- 38 Bronze Age bathing?

Nial O'Neill, an Excavation Director with Headland Archaeology Ltd, describes an elaborate trough, well and platform uncovered beneath a fulacht fiadh/burnt mound on the M7 motorway.



- 56 The importance of 'When?'

Ken Hanley, NRA Archaeologist with the Southern Team, examines how scientific and technological advances continue to improve the range and accuracy of dating methods available to archaeologists.

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Cover image: A unique, Early Bronze Age
'face-mask' pot from Mitchelstown, Co.
Cork, recovered from a site on the N8
Mitchelstown Relief Road.
(Photos: John Sunderland)

Welcome to the Fifth Edition Of *Seanda*

FRED BARRY, Chief Executive of the National Roads Authority

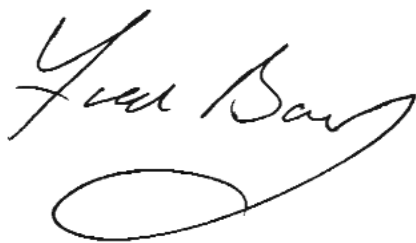


Fred Barry

It is with great satisfaction that I welcome readers to the fifth issue of *Seanda*, the NRA archaeology magazine. We are very proud to have now produced five editions of the magazine and that it has proven to be one of the most well received of the many archaeological publications currently produced by the NRA. Each issue has been greeted with warm praise from many quarters and the series has contributed to establishing the NRA as one of the foremost publishers of archaeological work in Ireland, as a recent book reviewer put it.

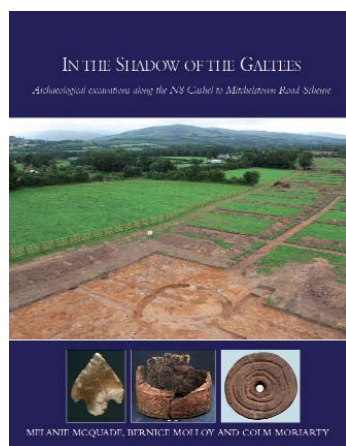
The success of *Seanda* magazine, the two NRA monograph series (see p. 6 and back cover) and other modes of dissemination, such as the NRA Archaeological Database (see p. 41), owe much to the vision and enthusiasm of Dáire O'Rourke, who was Head of Archaeology at the NRA from 2001 to 2010. Sadly, Dáire passed away in late April following a hard-fought battle with illness and she is greatly missed by her family, friends and colleagues. Her contribution to the work of the NRA and to the archaeology profession generally was considerable and her legacy will benefit both well into the future.

We dedicate this issue to her memory.



ProjectUpdates

In the Shadow of the Galtees



The fourth NRA scheme monograph, *In the Shadow of the Galtees: archaeological excavations along the N8 Cashel to Mitchelstown road scheme*, written by Melanie McQuade, Bernice Molloy and Colm Moriarty, was launched by Minister of State Martin Mansergh TD on 16 November 2009 in the medieval setting of the Banqueting Hall at Cahir Castle, Co. Tipperary. The event, which was organised by South Tipperary County Council

Heritage Officer Labhaoise McKenna, helped promote the rich archaeological and cultural heritage of South Tipperary. Cathaoirleach Liam Ahearn, South Tipperary County Council, gave the opening address, while Mary Cahill, Keeper of Antiquities in the National Museum of Ireland (and native of Clonmel), delivered a keynote address. The atmospheric setting was enhanced by some participants who had donned splendid medieval costumes and by the 'wee drop' of mead that was on hand to welcome guests.

In the Shadow of the Galtees describes the results of the archaeological excavations along the route of the N8 Cashel to Mitchelstown Road Improvement Scheme, which were undertaken by Margaret Gowen & Co. Ltd (MGL). These investigations led to the identification of 63 previously undocumented archaeological sites, where archaeologists uncovered the remains of settlement, ritual, burial and industrial activity. The authors describe the fascinating artefacts found at these sites, which reflect the changing needs, tastes and political allegiances of the people who lived in this area over the past 5,000 years. The presentation of the excavation results is enhanced by an accompanying CD-ROM that incorporates all of the final excavation and specialist reports, enabling the reader to get a fuller picture of the landscapes in which our ancestors lived from prehistory to the post-medieval period.

In the Shadow of the Galtees is published by the NRA and is available through bookshops or directly from Wordwell Book Sales, Wordwell Limited, Media House, South County Business Park, Leopardstown, Dublin 18 (tel: +353 1 2947860; e-mail: helen@wordwellbooks.com).

Mairéad McLaughlin, NRA Assistant Archaeologist, Southern Team.



From left to right: Melanie McQuade (MGL), NRA Assistant Archaeologist Mairéad McLaughlin, Colm Moriarty and Bernice Molloy (MGL) at the launch of *In the Shadow of the Galtees*. (Photo: Sheelagh Conran)



Some re-enactment action before the book launch. (Photo: Fintan McCarthy)



Giant Irish Deer and early alder: the significance of a fragment

Giant Irish Deer (*Megaloceros giganteus*) remains were recovered from the eastern shore of a late glacial lake in Ballycahill, Co. Tipperary, during recent excavations on the M7 Nenagh–Limerick motorway. A deep bed of marl had accumulated within the lake and the site was subsequently enveloped by bog. The fragments identified by Osteoarchaeologist Auli Tourunen comprised antler and other skeletal fragments, including two left mandibles (lower jawbones), indicating that the remains represent a minimum of two individuals. All of the bone derived from adult specimens and the presence of antler confirms at least one male. This limestone-dominated, calcium-rich environment would have provided the kind of highly nutritious grazing required to support the impressive antlers for which the species is most celebrated (3.6 m span, 40 kg weight). Radiocarbon dates of 10939–10861 BC, 10902–10782 BC and 10480–10178 BC were returned from three samples and are consistent with other published dates. The exact timing of the extinction of this species is still a matter of debate, with later examples known from Siberia.

An alder wood (*Alnus glutinosa*) fragment, initially identified by Archaeobotanist Karen Stewart and confirmed by Palaeoenvironmentalist Ingelise Stuijts, was also recovered from Ballycahill. This wood was radiocarbon-dated to 7308–7073 BC. The arrival of alder into Ireland is traditionally dated to around 6000 BC. Pollen studies from Killarney, Co. Kerry, and from Glendalough, Co. Wicklow, have suggested that isolated populations of alder were present alongside pine and oak during the initial postglacial woodland colonisation. This early evidence for alder was derived from wind-blown pollen grains that could arguably have originated from a source outside of Ireland. The Ballycahill sample is significant as it confirms that alder was growing in Tipperary at least a millennium earlier than previously expected.

Lisa Doyle, Site Manager, Headland Archaeology Ltd.



Awards for the Presentation of Heritage Research 2010

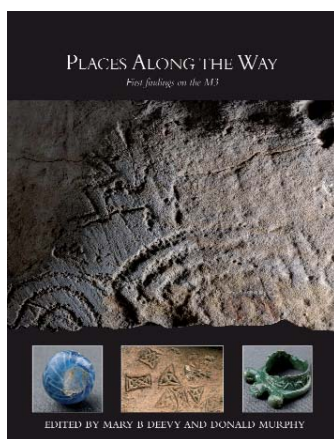
Against a field of 10 of Britain's leading archaeologists, Brendon Wilkins, formerly of Headland Archaeology Ltd, won second prize at the prestigious English Heritage Awards for the Presentation of Heritage Research 2010. The prize was awarded for his presentation on various cemeteries excavated on the N6 Galway to East Ballinasloe road scheme. This annual awards ceremony, which encourages researchers active in all areas of heritage in Britain and Ireland to present their findings to the wider public, was hosted this year by *Current Archaeology* magazine and the Portable Antiquities Scheme as part of the Archaeology 2010 conference at the British Museum, London, on 26–28 February. Speaking at the awards, Brendon said: 'This has been a phenomenally exciting project to work on. Over the past 10 years Ireland has been leading the world in both the quantity and quality of the archaeological work undertaken—a rarely acknowledged benefit of the construction boom.'

More information about the awards, which are co-sponsored by the Irish government's Department of the Environment, Heritage and Local Government, can be viewed at: <http://www.english-heritage.org.uk/professional/training-and-skills/improving-practice/awards-for-presentation-of-heritage-research/>.

Michael Stanley, NRA Archaeologist, NRA Head Office.

ProjectUpdates

Places Along the Way: the first M3 monograph



Although the M3 Clonee–North of Kells motorway scheme opened ahead of schedule this year, it was pipped at the post by the first major publication on the archaeology discovered on the scheme.

Places Along the Way: first findings on the M3, edited by NRA Senior Archaeologist Mary B Deevy and Donald Murphy, a Director of Archaeological Consultancy Services Ltd,

was launched in March 2010 by Minister for Transport Noel Dempsey TD at the Solstice Arts Centre in Navan, Co. Meath. Dr Michael Ryan, Director of the Chester Beatty Library in Dublin, addressed the launch and welcomed the early dissemination of substantial accounts of and reflections on eight of the most significant sites excavated on the M3 motorway between Dunboyne and Navan in County Meath, an area that incorporates the broader landscape around the Hill of Tara. Dr Ryan commented that although the chapters describing the individual sites in this volume are all interim statements written while post-excavation research was continuing, many of the conclusions tentatively proposed are unlikely to be radically altered by further research.

Dr Ryan dedicated his address to Dáire O'Rourke, NRA Head of Archaeology 2001–2010, and paid tribute to her achievements, including establishing the NRA as one of the principal publishers of archaeology in Ireland.

Places Along the Way is the fifth publication in the NRA Scheme Monographs series and the first monograph of a series dedicated to the excavation results from the M3. It was published by the NRA in December 2009 and is available through bookshops or directly from Wordwell Books Sales, Media House, South County Business Park, Leopardstown, Dublin 18 (tel: +353 1 2947860; e-mail: helen@wordwellbooks.com).

Mary Deevy, NRA Senior Archaeologist, Eastern Team.



Archaeologist Robert O'Hara, one of the contributing authors, signing copies at the launch. (Photo: Alan Russell)



From left to right: author Robert O'Hara, Minister for Transport Noel Dempsey TD, Cathaoirleach William Carey (Meath County Council), Dr Michael Ryan, editors Mary Deevy and Donald Murphy and author Aidan O'Connell at the launch of *Places Along the Way*. (Photo: Alan Russell)



Past Times, Changing Fortunes

The NRA Archaeology Section will hold its annual National Archaeology Seminar on 26 August 2010 at the Gresham Hotel, Dublin, to coincide with National Heritage Week (21–29 August). A theme reflecting current economic concerns seemed appropriate, so the title of this year's seminar is *Past Times, Changing Fortunes*.

This year's speakers are being challenged to address the archaeological evidence for cycles of boom-and-bust. For instance, environmental archaeologist Dr Scott Timpany will present *Agricultural boom and bust in medieval Ireland: plant macrofossil evidence from sites along the N9/N10 road scheme*, while NRA Archaeologist Ken Hanley will give a paper entitled *Profiting from the land: mixed fortunes in historic landscapes*.

The full seminar programme can be viewed on the NRA website, at www.nra.ie/Archaeology/ArchaeologySeminar2010/. The NRA National Archaeology Seminars are free events, but booking is essential. To register for this event please contact Lillian Butler (tel: +353 1 6602511; e-mail: lbutler@nra.ie).

Michael Stanley, NRA Archaeologist, NRA Head Office.



Researching archaeogeophysics on road schemes

Like any major developer, the NRA is concerned with the early identification of major archaeological constraints to ensure that it can satisfactorily mitigate and hopefully minimise any adverse impacts. Over the past decade the NRA has used a variety of methods to identify such constraints, one of the key methods being geophysical survey. The results of such surveys have been published in previous editions of *Seanda* (for instance, see Issue 1 [2006], pp. 12–15).

Given the magnitude and quantity of the archaeological work that has taken place on national road schemes, we believe it is now timely to review the results of this work and to assess whether such surveys fulfilled their individual objectives and to what extent it has been of benefit to the NRA. We also recognise that a wide-ranging review such as this will have a broader application as a key source of primary archaeological data and that to make such information accessible is very much in keeping with our objective of disseminating the information arising from national road schemes.

This study is taking place on foot of the *Near Surface* conference on archaeogeophysical surveying, which took place at Trinity College Dublin in autumn 2009. The conference clearly showed the considerable work carried out on national road schemes and the tremendous

technological and methodological advances in archaeogeophysical surveying both in Ireland and internationally in the past decade or so.

The review has been commissioned as part of the NRA Fellowship Programme, with a stated fourfold objective:

1. Review archaeogeophysical practices on national road schemes over the past 10 years.
2. Develop an accessible database of all such schemes.
3. Undertake pilot studies to investigate the different variables that impact on a survey's success or failure, including factors such as seasonality, regionality and geology.
4. Make recommendations to the NRA regarding the most cost-effective geophysical techniques.

Ultimately, this study will enable the NRA to benchmark its practices against international best practice and will also provide a remarkable information resource that can be used by planners, researchers, academics and, of course, members of the general public.

We expect the fellowship to be awarded in the coming weeks and look forward to updating readers on its progress in forthcoming issues of *Seanda*.

Rónán Swan, NRA Head of Archaeology (acting), NRA Head Office.

ProjectUpdates

Peaks and troughs: forthcoming NRA publications

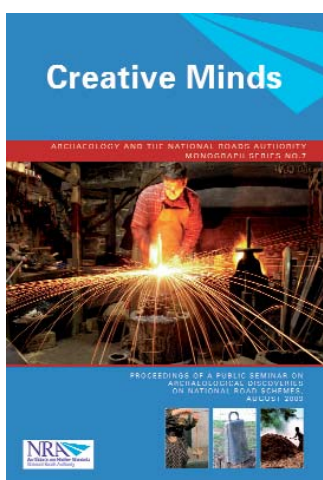
Creative Minds: production, manufacturing and invention in ancient Ireland, the seventh volume in the Archaeology and the National Roads Authority Monograph Series, will be published at the end of August 2010. This new book, edited by Michael Stanley, Ed Danaher and James Eogan, contains the proceedings of the NRA National Archaeology Seminar held on 27 August 2009 at the Gresham Hotel, Dublin.

The speakers at the *Creative Minds* seminar sought to examine, comprehend and celebrate the creativity of our ancestors, as evidenced by the many discoveries made on national road schemes. The resulting monograph examines the production of stone tools, pottery and textiles during prehistory; some of the earliest evidence for wheeled transport in Ireland; the manufacture of hand-bells at a monastic site and other metalworking processes during the later prehistoric and medieval periods. Through their use of experimental archaeology and computer-generated reconstructions, and by synthesising evidence from many sites around the country, the authors also demonstrate the creativity required of archaeologists to marshal, understand and present their evidence.

Of Troughs and Tuyères: the archaeology of the N5 Charlestown Bypass, the latest addition to the NRA Scheme Monographs series, will be published in October 2010. This new book, written by Richard F Gillespie and Agnes Kerrigan, contains the results of excavations conducted by Mayo County Council on the route of the N5 Charlestown Bypass in counties Mayo and Roscommon. The excavated sites included settlement, funerary and industrial features of, variously, Neolithic, Bronze Age and early medieval date. Highlights from the assemblage of finds recovered during the excavations were featured in the previous issue (*Seanda*, Issue 4 [2009], pp. 8–11) and have proven to be important artefacts in the retelling of the archaeological story of the country. As with the finds uncovered along other national road schemes in counties Leitrim, Galway and Sligo in recent years, these fascinating discoveries highlight the key role that the West plays in the unfolding archaeological story of this island.

Creative Minds and *Of Troughs and Tuyères* are published by the NRA and will be available through bookshops or directly from Wordwell Book Sales, Media House, South County Business Park, Leopardstown, Dublin 18 (tel: +353 1 2947860; e-mail: helen@wordwellbooks.com).

Michael Stanley, NRA Archaeologist, NRA Head Office.



NMI's revised *Advice Notes for Excavators*

The National Museum of Ireland has revised and reissued its *Advice Notes for Excavators* (first issued in 1997) in conjunction with the planned opening of the Museum's new Collections Resource Centre at Balheary, Swords, Co. Dublin, in autumn 2010. With the opening of the Collections Resource Centre it is hoped that the Museum can resume the intake of archaeological objects recovered in recent excavations. In order for this process to be as efficient as possible, it is essential that the excavated finds are properly conserved, documented, numbered, labelled and packaged—and this is where the *Advice Notes* come in. The *Notes* provide full guidance for archaeologists and other specialists to assist them in preparing material for deposition in the new Resource Centre.

Alongside general guidelines on documentation, numbering, labelling and packing, the revised *Advice Notes* feature an expanded section on the care of finds by excavators and also reproduce in full the Irish Professional Conservators' and Restorers' Association's revised *Conservation Guidelines for Archaeologists*. There are also material-specific packing guidelines, an explanation of new requirements for submission of digital documentation on finds and an outline of the formal deposition procedures that will be used by the Museum.

The *Advice Notes* can be viewed or downloaded on the National Museum of Ireland website, at <http://www.museum.ie/en/list/policies.aspx>, or can be requested from the Duty Officer in the Irish Antiquities Division, at antiquitiesdo@museum.ie. All archaeologists who have or may in the future have responsibility for excavated finds are strongly encouraged to familiarise themselves with these *Advice Notes*.

Andy Halpin, Assistant Keeper, Irish Antiquities Division, National Museum of Ireland.

‘The honour of her evening’— Dáire O’Rourke remembered

Dáire O’Rourke, who died aged 45 on 28 April 2010, was Head of Archaeology with the NRA. Since her passing, warm tributes have been paid to her that try to convey, as much as words can, the character that she was—the dynamic and fearless woman, not least in her battle with illness over the last few years; the warm colleague yet exacting boss; and the loyal, loving wife, sister, aunt, daughter and friend.

I first met Dáire while waiting for interviews in 2001. I remember her that day as an inquisitive and energetic woman. That inquisitiveness was an essential part of her nature. As the NRA archaeology structure subsequently developed under her firm guidance, I was embraced as a friend within Dáire and her husband Ed’s life, as were other colleagues. Dáire fostered a sense of collegiality and friendship within our fledgling group—a difficult task, as at the time we were all employed through the County Councils rather than the NRA. Creating cohesion under such complex circumstances was a huge achievement on her part and a testament to her personality and to her considerable mediation and managerial talents.

Dáire knew her own mind. Accordingly, as a boss she could be tough, and Ed tells me that she was no different as a partner and a wife. At her beautiful funeral Ed mentioned her ‘imperial domination’ streak when playing *Risk*. She was single-minded in her vision of where things should go—open to debate, certainly, but rarely conceding or straying from her original path. I remember those collegial work days and social evenings spent with Dáire, Ed and friends and colleagues for their intellectual and political content, for discussions not only about the NRA structure and where it was going but also about the bigger picture of archaeology in Ireland.

Dáire was in her element on such occasions, embroiled in debate about vision, strategy and values, yet ending it always with a simple yen for a song—and hers was a mighty voice. Songs like *Take me up to Monto* revealed her genesis, her ‘Dublinness’, her rearing in the heart of a loving family with their own political values—a love she returned, as she and her siblings enjoyed so much fun with their father in his final days. I cannot enter the foyer of the Sligo Great Southern without seeing Dáire at the fireplace one beautifully long summer’s evening in 2004, elbow on mantel and pint in hand, head thrown back and eyes closed, in full voice. It was an evening of song, of camaraderie and of the excitement of archaeological discovery, as a Neolithic causewayed enclosure on the N4 was being revealed.

Dáire wanted to be an archaeologist from the age of eight. Her mum purchased a handbook recommended by *Blue Peter*, and this, in her own words, got her ‘hooked’. Her subsequent career cannot be separated from



her personality. She graduated with a BA and MA from UCD, where she met her not-soon-to-be husband and best friend, Ed. The part-time bus conductor received the Ruaidhrí de Valera Memorial Prize for her MA thesis. Dáire spent a few post-grad years in the trenches; those digging and specialist years were followed by her first foray into management, and she eventually became assistant director at Dublinia. Her management path continued with her appointment as City Archaeologist with Dublin Corporation in 1995. It was here that her fighting instincts were developed, at the front line of defending and championing the archaeological heritage of her home city. She loved the fight and the struggles, and she confronted many more challenges as she headed up the NRA structure from 2001. But they were stressful times, too. Faced with what can be viewed as inevitable

conflict between development and archaeology, Dáire asked simple questions of values—why, and for what reason?

Dáire worked for an acceptance of the value of proper archaeological structures and project management, of publication and public engagement, and much more. In so doing, many impact-led conflicts and opponents have been disarmed. The struggle she led, at such a young age, to achieve their acceptance is not forgotten. My colleagues and I, and others, now assume her work values as our own. It is hard to accept that she is gone.

She will be missed by so many people—family, friends and colleagues—so many with such fond memories of the shooting star that was Dáire O’Rourke, as her great friend Helen sees her. There will be some with less fond memories too, those who were silly enough to enter ill-prepared into debate with her! But even they must surely acknowledge her commitment, tenacity and powers of persuasion.

While she was unforgettably formidable in debate, my abiding memories of Dáire are of a young woman who was most herself when simply at home with Ed, in Inchicore, Ballyhaunis or convalescing in Dog’s Bay, in the company of friends and family around a campfire on the Inishkeas, all sharing her warm hospitality, irreverent humour and laughter. Dáire’s endearing inner child was strong in her until the end.

And from whatever rocky throne upon which she sat, Dáire ensured that glasses were ever full and the music always on as she made ready for the song.

As did so many, I had the honour of her evening.

Michael MacDonagh, NRA Senior Archaeologist, North-west Team.

(This obituary first appeared in *Archaeology Ireland* magazine, Issue No. 92, Summer 2010.)



One of the posts from Annaholty, Co. Limerick; the numerous tool marks show the use of a very sharp axe by a skilled wood-worker. (Photos: John Sunderland)

Masters of their craft: worked wood from Annaholty, Co. Tipperary

Kate Taylor, an Excavation Director with TVAS (Ireland) Ltd, describes some wooden artefacts found during excavations on the M7 Nenagh–Limerick motorway scheme.

In 2007 a substantial timber causeway was revealed during monitoring of construction works in Annaholty Bog, on the Tipperary–Limerick border. The results of the excavation were briefly described in Issue 3 of *Seanda* (pp. 54–5). The 7–8 m wide causeway, which connected two dry islands in the bog and was probably part of a wider road network crossing the otherwise impassable wetland area, was dated by dendrochronology (tree-ring analysis) to around 40 BC, the middle of the Iron Age.

Many pieces of wood were used in the causeway construction, including planks, roundwood runners, posts and stakes, and the surviving toolmarks on some of these demonstrated the use of sharp, well-maintained iron tools by highly skilled workers. Also included in some of the layers of the structure were 15 wooden artefacts that had previously been used elsewhere before being incorporated into the causeway. These items have been examined and identified by wetland archaeologist Cairríona Moore.

Some of the objects are domestic items, including parts of at least three vessels made of alder wood. One of these was a portion of a crude trough that may have been a losset, used for kneading dough. Several pieces of a cylindrical tub were also recovered, including parts of two handles. This type of vessel is often found containing bog butter, however the Annaholty example had been broken into small pieces by the time it was deposited. Also found was a narrow piece of another tub, 76 mm



The broken trough or losset that may have been used for kneading dough.

tall, with a beautifully finished surface showing lots of small, oval tool marks, probably made with a sharp knife. This would have been an attractive as well as functional item within somebody's home in the first century BC.

Two agricultural objects were also recovered from the site. A fragment of an animal yoke, broken at both ends, has one complete and one incomplete collar. The close spacing of the collars and the small size of the intact example suggest that this is part of a head yoke that would have sat behind the horns of the animal. Cattle would have to lower their heads and push forward on the yoke. The yoke is made of ash, which is a strong, elastic and shock-resistant wood, ideal for this type of implement.

Also recovered was a broken item that is probably part of a cart. This object is a piece of alder with ash pegs or dowels set into small holes and has a thin rectangular slot. Planks would have been fitted into the slot and held in place with more small pegs to form the base or side of a cart or sled. Another small carved peg and a shaft with a hole in its end that were found nearby might also have been part of the same vehicle. A similar cart fragment was recovered from the famous Iron Age wooden trackway at Corlea, Co. Longford, and together these pieces provide evidence of the type of vehicle that may have used the roads of this scale that were constructed across the bogs.

Whether the artefacts, which were all fragmentary, were deposited in the causeway because they were no longer useful or because they had some special significance is open to debate. In any event these wonderfully preserved objects have shed light on the lives of the inhabitants of the region during the Iron Age, both at home and on the road.



The yoke fragment. A complete collar can be seen in the centre and a partial collar is at left. This yoke would have been used with draught animals.



Part of a cart. Planks would have fitted into the slot to form the base or side of the vehicle.

Of grains and graves: excavations at Ballintotty 2

Lee Scotland, an Excavation Director with Aegis Archaeology Ltd, reports on the preliminary dating and ongoing interpretation of two medieval enclosures excavated in County Tipperary on the M7 Nenagh–Limerick motorway scheme.

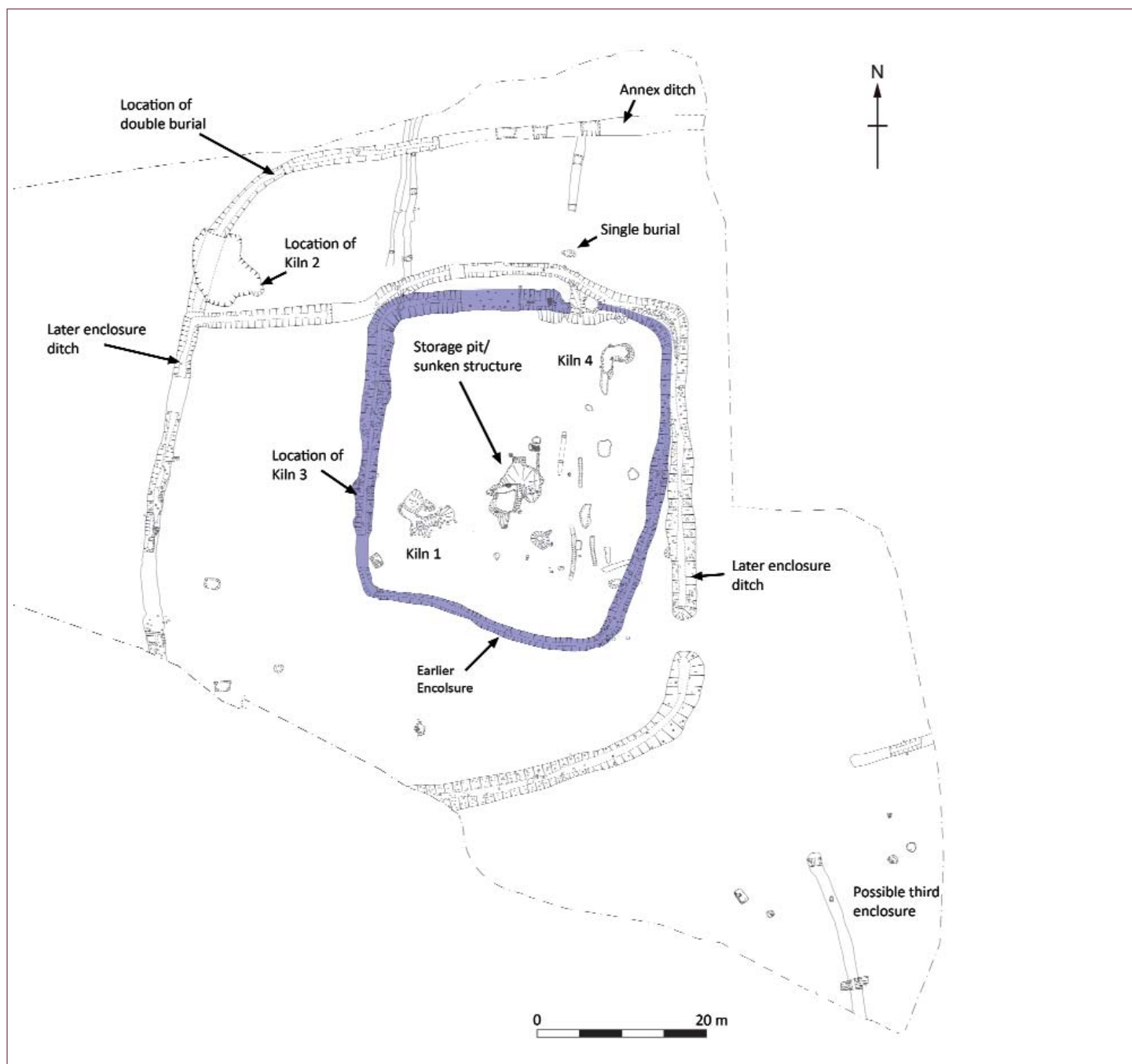
A newly identified multiphase enclosure site in Ballintotty townland, c. 4.5 km south-east of Nenagh, was one of a number of exciting archaeological discoveries made on the M7 Nenagh–Limerick motorway (see *Seanda*, Issue 2 [2007], pp. 44–6). Aegis Archaeology Ltd excavated two sites in Ballintotty. The first (Ballintotty 1) comprised a *fulacht*

fiadh/burnt mound and the remains of a timber trackway or platform. The second (Ballintotty 2), excavated by Frank Coyne and Frank Ryan, consisted of two intercutting enclosures with a number of associated features, including four stone-lined cereal-drying kilns, an annex to one of the enclosures and a possible third enclosure, much of which lay outside the road corridor.

Both enclosures were defined by ditches and were subrectangular in plan. The smaller of the two measured approximately 35 m by 32 m; the other enclosure was much larger, measuring approximately 57 m by 59 m.



Aerial view of the two enclosures at Ballintotty 2, Co. Tipperary, with Ballintotty Castle at the extreme left. (Photo: Markus Casey)



Plan of Ballintotty 2 showing the principle medieval features (earlier enclosure ditch shaded) and the location of the two burials. (Drawing: Aegis Archaeology Ltd)

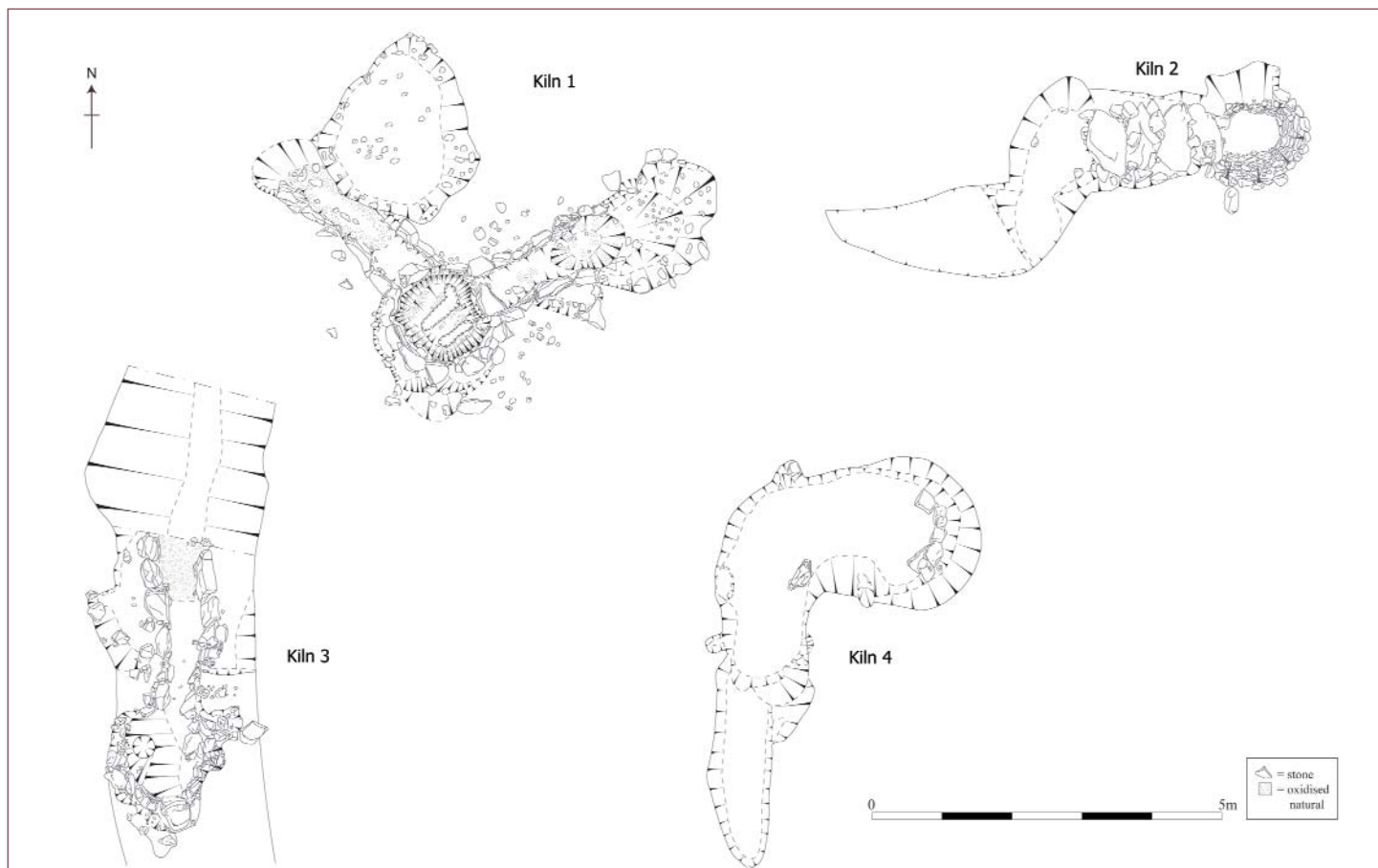
During the excavation it became apparent that these two enclosures dated from separate periods as the larger had truncated the smaller for much of the eastern part of the northern extent. There was little evidence of domestic occupation, with minor structural remains and a large pit-like feature, which may have been a sunken house, being the only domestic features evident. The excavation of four cereal-drying kilns and a number of rotary quern-stone fragments presented a picture of a rural medieval site primarily concerned with the drying and processing of cereals.

It was clear from the nature of the features and finds that the site was medieval in date,

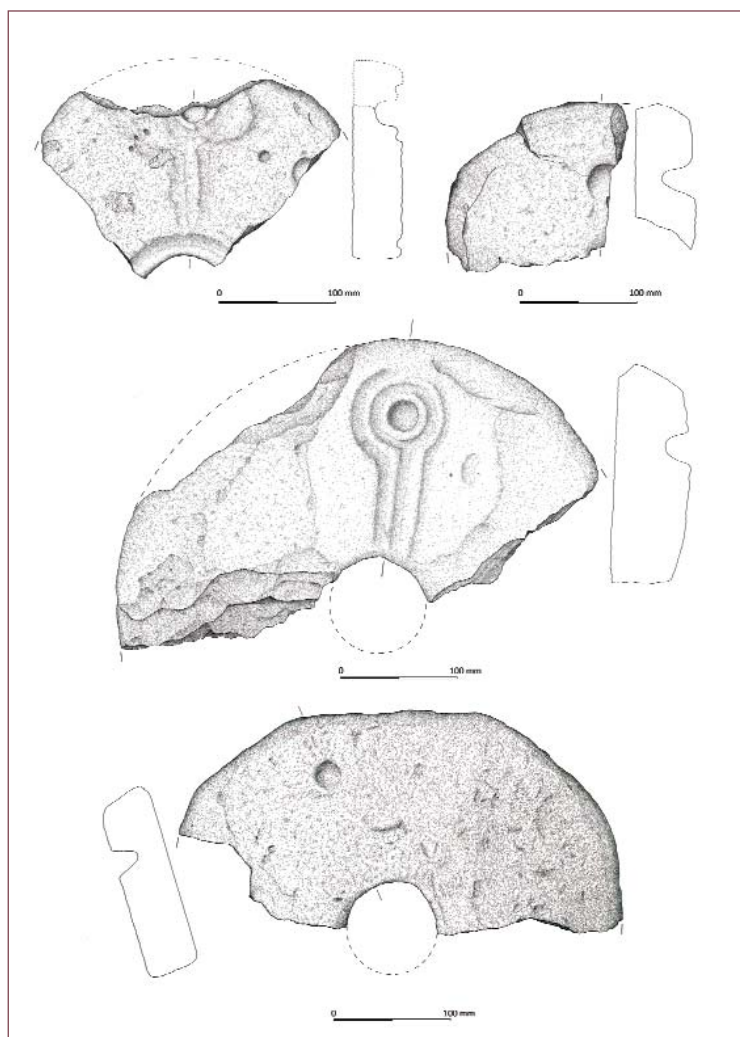
although the recovery of a Neolithic polished stone axehead did provide evidence of prehistoric activity at this location. Upon completion of the excavation, though the nature of the site had been established, no definitive date could be proposed. During the initial post-excavation analysis, without the aid of radiocarbon dates, it was suggested that both enclosures, while not contemporary, were possibly late medieval in date, although NRA Assistant Archaeologist Paul O'Keeffe did highlight the possibility of an early medieval date (*Seanda*, Issue 2 [2007], p. 46).

The preliminary dating of the site was determined from its location close to the

remains of a 13th–14th-century hall house, approximately 200 m to the NNE, which was excavated in advance of the construction of the N7 Nenagh Bypass, and from the extant remains of Ballintotty Castle, a late medieval tower house, approximately 300 m to the east. From the orientation of the enclosure entrances and the relationship between the enclosures, the earlier, smaller enclosure was assumed to be associated with the hall house, conforming to the general trend of Anglo-Norman nucleated rural settlement. These settlement types were formed by a central fortified building, such as a motte and bailey, a hall house, or even a moated site, with farmsteads clustered around it. The site was later enlarged by the



Plans of the four kilns. (Drawing: Aegis Archaeology Ltd)



Four of the rotary quern-stone fragments recovered during the excavation. (Drawing: Andrzej Wojtowicz, Aegis Archaeology Ltd)

construction of the larger enclosure—possibly as a result of the wealth brought to the site through cereal-drying—and was associated with Ballintotty Castle.

Thus by the end of the excavations the preliminary interpretation of the occupation of the site seemed clear, though some evidence was a little more elusive. A number of animal carcasses were buried on site along with two graves—one that had truncated the annex ditch and contained two individuals (an adult and child), the other a single burial located near the entrance of the earlier enclosure. It was believed that the burial of the animal carcasses and the three inhumations may have occurred during a time of disease when the proper disposal of dead animals and the burial of individuals in consecrated ground were not possible owing to the need to remove them quickly to halt the spread of disease. The inhumations generally followed Christian tradition, but did not adhere to it completely. The double burial was orientated south-west–north-east, with the heads to the south-west, while the individual was buried lying on its right shoulder and hip and on an east–west axis, with the head at the east. This east–west orientation is not the usual Christian burial practice, except for clerics, who would be expected to be buried in a graveyard.

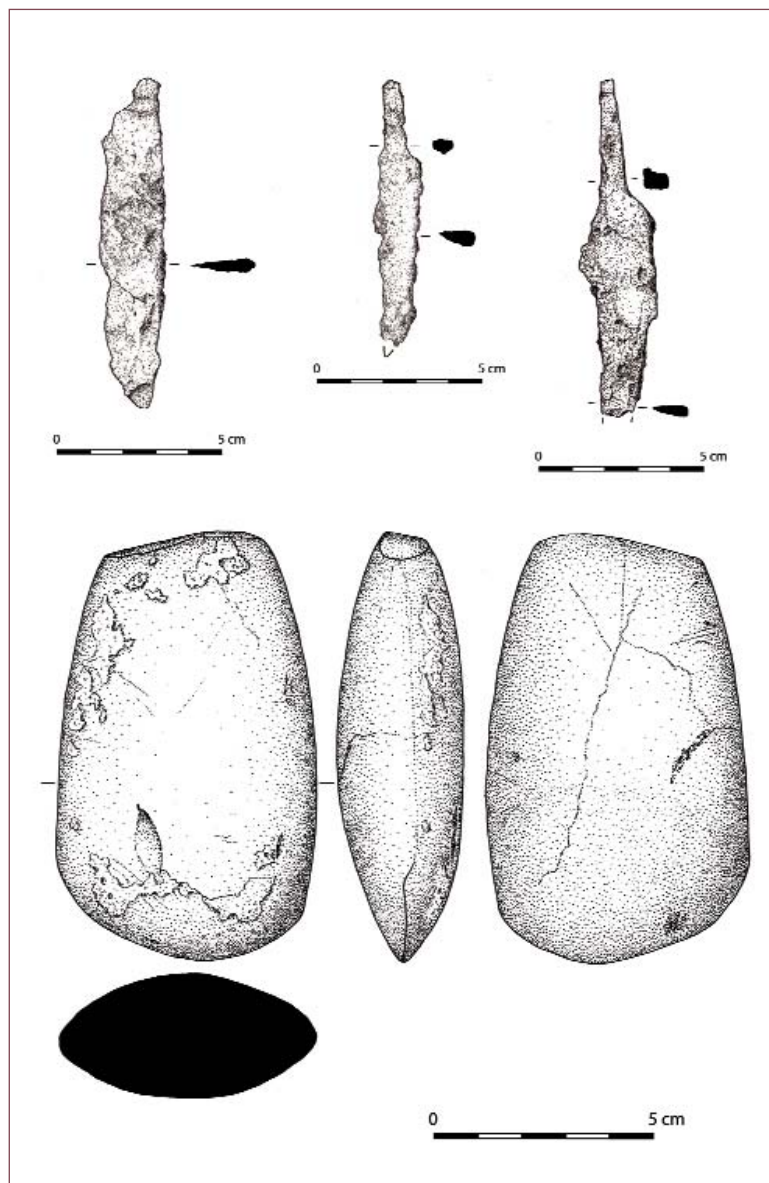
Further post-excavation analysis and dating has led to a refining of the interpretation of the site. Though a large amount of cereal grains were recovered and identified from a number of features, supporting the view of the site as being primarily involved with processing cereals, the dates returned have shown the inception of the site to have begun as early as the seventh century AD, suggesting that it may have been occupied by a local Gaelic tribe, such as the Éile. The earliest radiocarbon date (AD 620–690) came from one

of the flues of Kiln 1, which, from its position on site, may also date the earlier enclosure. This early medieval date was reinforced by two dates received from Kiln 3 and spanning AD 710–990. This kiln had truncated the earlier enclosure ditch, showing not only that the early enclosure ditch had been backfilled but also suggesting the later enclosure was occupied at this period.

Dates from the other two kilns (AD 1030–1220 and AD 1160–1280 for Kiln 2; AD 1270–1390 for Kiln 4), which respected the enclosing elements, showed that the site was used not only in the transition from the early to later medieval periods but was also in use during the occupation of the nearby hall house. Dates from other features, including the possible third enclosure, also indicate long-lived occupation through to the beginning of the 15th century. With the aid of the new analyses we can now see the site changing little over 800 years, while around it the political landscape went through major changes—from the breakup of the Éile lands to the Anglo-Norman invasion, which saw the granting of land in 1185, including Ballintotty, to Theobald FitzWalter (the founder of the Butler clan) who constructed Nenagh Castle between 1200 and 1220, through to the rise of the O’Kennedys in the later 14th century.

The rise of the O’Kennedy clan may have coincided with a change in focus towards Ballintotty Castle and the decline of the Ballintotty enclosures. Though a town is referred to at Ballintotty in the *Patent Roll of James I 1618* and a mill, orchard and eight cabins are listed at Ballintotty in the Civil Survey under the former ownership of an O’Kennedy (AD 1654–6), these are likely to be references to a deserted settlement situated immediately north of Ballintotty Castle. The burials may date from this period, with the abandoned site being used as a hasty graveyard. Though dates are pending, the analysis of the remains by osteologist Linda Lynch showed the single inhumation was that of a juvenile female aged 12–15 years, who suffered from tuberculosis at the time of death. The adult from the double burial was identified as a female aged 35–39, with the child aged 5–6 years, and the intimate nature of the burial suggests these may have been mother and child.

To further our understanding of the site additional analysis and dating is currently being carried out. The results, along with the full interpretation of the site, will be published as part of the NRA scheme monograph series.



Three medieval iron knives and the Neolithic polished stone axehead found during the excavation. (Drawing: Andrzej Wojtowicz, Aegis Archaeology Ltd)



The single inhumation during excavation. (Photo: Aegis Archaeology Ltd)



The double burial during excavation. The child was placed by the side of the adult, with its head resting upon the adult's arm. (Photo: Aegis Archaeology Ltd)

Crop remains from Ballynamona 2

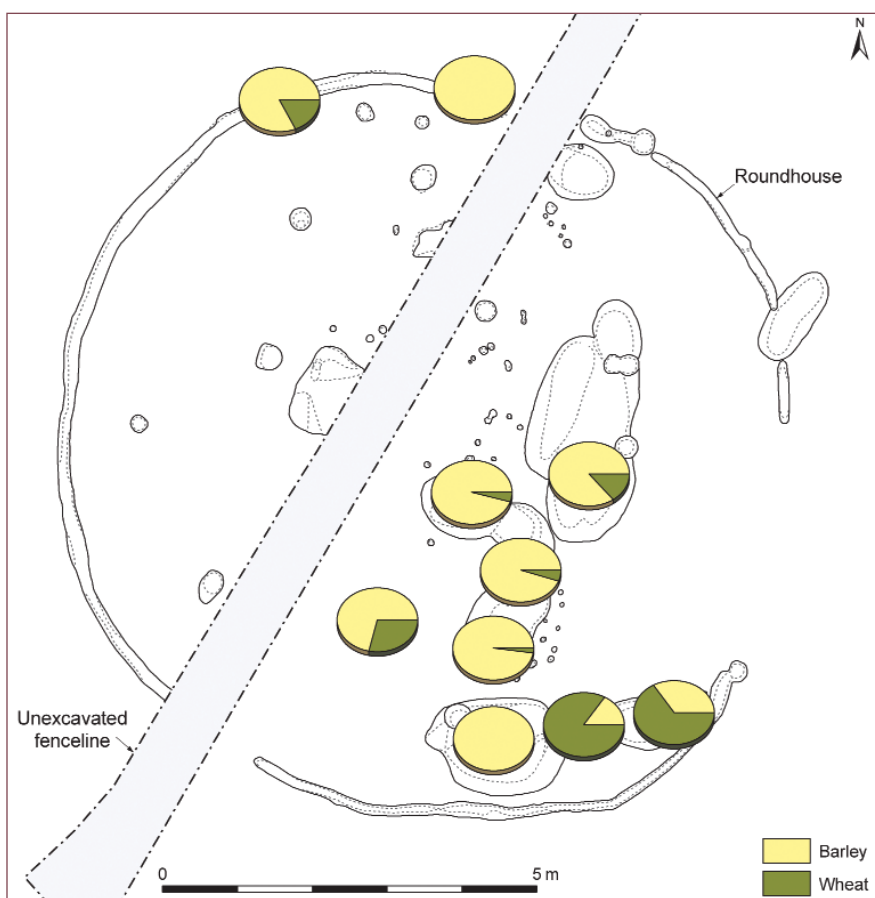


The house at Ballynamona 2, Co. Cork, during excavation. (Photo: John Sunderland)

Penny Johnston of Eachtra Archaeological Projects outlines the evidence for crop storage and processing at a Bronze Age house excavated on the route of the N8 Mitchelstown–Fermoy road scheme in County Cork.

Archaeobotanical analysis (the study of botanical material from archaeological sites) can tell us about what types of crop that were grown and used in the past. The plant remains from a roundhouse excavated by archaeologist Linda Hegarty at Ballynamona 2, Co. Cork, provide a perfect example of a site where this sort of evidence has been preserved in abundance and what it can reveal. At Ballynamona 2 rich stores of grain associated with the house were burnt and left largely undisturbed since the Middle Bronze Age (c. 1600–1100 BC).

Charred seeds are small (many are less than 1 mm in size) and are usually widely dispersed within archaeological deposits, which means they are not easily visible to the naked eye. The deposits at Ballynamona 2, however, were so rich in grain that seeds were clearly visible as the site was excavated. Many samples were taken during excavation in order to identify the crops that were present. When the samples were processed and then examined under magnification, it was found that the majority of the cereals were naked barley, with a small amount of emmer wheat also present. It was possible to plot what part of the house the samples with naked barley were taken from and to show where the samples rich in emmer grains were found. This showed that the emmer



Plan of the roundhouse at Ballynamona 2, including the distribution of cereal remains. (Illustration: Eachtra Archaeological Projects)



Elevated view of the Ballynamona 2 house during excavation and sampling. (Photo: John Sunderland)

was probably mostly stored in the south-eastern part of the house and that the naked barley was stored in the central and southern parts of the house.

Emmer is a hulled wheat, which means its grains grow surrounded by ‘hulls’ or protective husks. At Ballynamona 2 there was a lot of evidence for these hulls still attached to the base of the grains. It is likely that the grains were stored within the husks, on the ear. This is said to prolong the life of stored grain because it helps to protect it from insect and fungal attack. The presence of hulls on emmer grains, however, means that the crop must go through a complicated series of crop-processing stages before it can be used as food, since the coarse hulls and stalks need to be removed before the grain can be eaten. In contrast, naked barley does not have hulls. While this may mean that the grains are not as well protected in storage, it has the advantage that they are easier to prepare for consumption since there is less labour and time required for their preparation.

Quern-stones and rubbing stones were recovered in association with these rich grains deposits. It is clear that emmer and naked barley grain crops were stored at this house at Ballynamona 2 and that crop processing and food preparation were important activities carried out at the house.



Quern-stones and rubbing stones found during the excavation. (Photo: John Sunderland)



Rubbing stone found at Ballynamona 2. (Photo: John Sunderland)



Quern-stone found at Ballynamona 2. (Photo: John Sunderland)

Early hunter-gatherers by the Shannon

TJ O'Connell, a Senior Supervisor with Headland Archaeology Ltd, reports on the discovery and dating of an Early Mesolithic axehead in County Limerick, on the M7 Nenagh–Limerick motorway scheme.

A stray polished stone axehead from a wet and poorly drained field in Richhill, some 2.5 km north-east of the village of Annacotty at the eastern edge of Limerick city, has provided a new addition to our existing knowledge of early human activity in the Shannon region. The artefact, which was recovered in October 2006 during archaeological monitoring of topsoil-stripping prior to excavation works on the M7 Nenagh–Limerick motorway, has proven to be an Early Mesolithic (8000–5500 BC) axehead that would have been used by some of the first inhabitants of the region between 7,500 and 9,000 years ago.

The find spot was c. 2.5 km south-east of the River Shannon and was the site of three *fulachta fiadha*/burnt mounds and a single human cremation burial, which were excavated subsequent to the discovery of the axehead. It was recovered from the middle portion of the site,

at a remove from the main archaeological features. The burnt mounds have been radiocarbon-dated to the Late Neolithic period (c. 2900–2500 BC), the Final Neolithic/Early Bronze Age (c. 2500–2200 BC) and the Middle Bronze Age (c. 1600–1100 BC) respectively and the cremation burial was radiocarbon-dated to the Middle Bronze Age.

The axehead was examined by Emmet O'Keeffe of the Irish Stone Axe Project and by lithic technology expert Dr Farina Sternke. It is a modified piece of shale measuring 108 mm long, 41 mm wide and 22 mm thick. It has a square to round cutting edge and slightly straightened sides, and its butt remained unfinished. There were signs of heat damage on its edge and on one side, which also shows some use-wear and polish. Straight facets were also noted on both sides of the axe.

Polished stone axeheads can range in date from the Mesolithic period to the Bronze Age. However, unlike the burnt mounds or the cremation burial, radiocarbon dating could not be employed to date the axehead. Therefore the dating of this example relied on a number



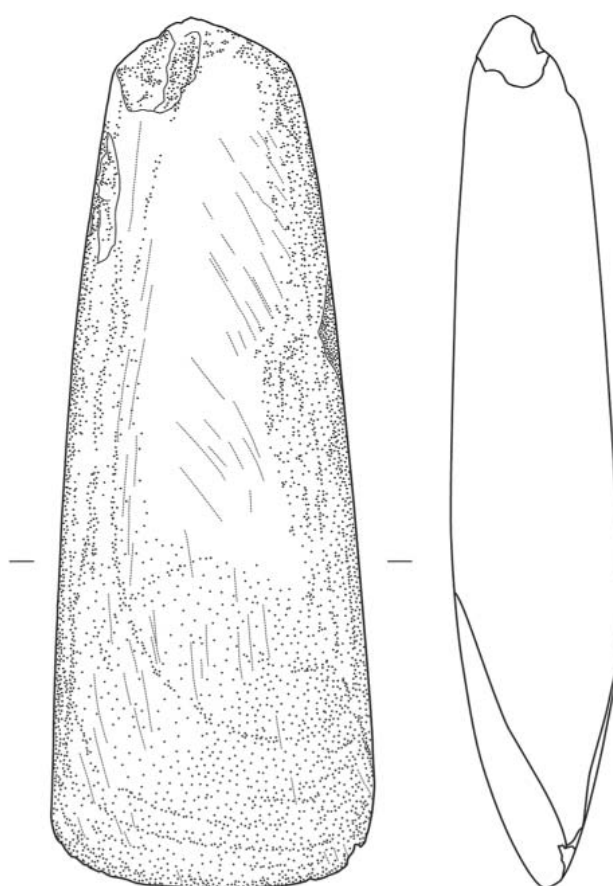
Face 1 of the Early Mesolithic shale axehead from Richhill, Co. Limerick. (Photo: Headland Archaeology Ltd)



Face 2 of the Richhill axehead.
(Photo: Headland Archaeology Ltd)

of characteristics that were apparent on the artefact itself, including the presence of flat facets on both sides of the object, which are commonly found on axeheads of the Early Mesolithic period, and the use of shale for its production. Shale is a stone material that was commonly used for the manufacture of axeheads during the Mesolithic period, but does not seem to have been used much as a resource for axe production during the subsequent Neolithic period.

Early Mesolithic occupation sites in Ireland are usually focused on coastal, river and lakeshore positions, which allowed early populations to take advantage of a variety of different natural resources. Rivers also provided convenient routeways to different places by means of boats. The proximity of the Richhill discovery to the Shannon, from which other Mesolithic axeheads have been recovered, is likely to be significant. Though a direct link cannot be made, it is possible that the Richhill axehead is related to activity uncovered in 2001 on the banks of the Shannon at Hermitage, near Castleconnell, just over 2.5 km north of Richhill. A number of Early Mesolithic cremation burials and stone axeheads were uncovered here. The Richhill axehead is regarded as being closely comparable to those uncovered at Hermitage, as well as those from other Mesolithic sites in Ireland.



Drawing of the Richhill
axehead, showing Face 1.
(Drawing: Sara Nyland,
Headland Archaeology Ltd)

Cremains and questions: Bronze Age burial at Derrybane 2



Excavation of the eastern cremation cemetery at Derrybane 2, Co. Tipperary, from the west. (Photo: John Sunderland)

Linda Lynch, Penny Johnston and Jacinta Kiely of Eachtra Archaeological Projects describe complex burial rites uncovered at two cremation cemeteries excavated on the N7 Castletown–Nenagh: Derrinsallagh to Ballintotty road scheme in County Tipperary.

For much of the Bronze Age (c. 2400–800 BC) cremation was the predominant funerary rite practiced by our ancestors. The manner in which cremated human remains were treated varied throughout the period and it would appear that the partial deposition of cremated bone in cist or pit graves represented but one element in a complex funerary repertoire. It may be that the bulk of the cremated remains were used in secondary funerary rites that were unrelated to a ‘final’ resting place. Analysis of the remains from two Bronze Age cremation cemeteries recently excavated at Derrybane in North Tipperary has revealed diverse burial practices indicative of complex ritual processes.

In 2007–8 excavations in advance of the construction of the N7 Castletown–Nenagh road scheme led to the discovery of a number of Bronze Age settlement sites. Investigations at Derrybane 2 revealed a settlement with two cremation cemeteries located over 300 m apart to

the east and west of the main area of habitation. Cremated human remains (cremains) were recovered from 21 features at Derrybane 2. The remains comprised a total of 18 individuals: 12 adults and six juveniles (three additional samples could only be identified as human). The human cremains were recovered from four different areas of the site:

1. From four pits in the western cemetery.
2. From a hollow near the centre of the site in the vicinity of a Bronze Age roundhouse.
3. Interspersed with cremated animal bone in a hearth in the same area.
4. From 17 pits in the eastern cemetery. One of the latter included the rim of an inverted urn (the only such find from the site).

Invariably, the cremains were white in colour, indicating complete cremation.

In most cases it was only just possible to identify the sample as being from an adult (17+ years) or a juvenile individual (<17 years). It was possible that two of the cremains, including the burial in the urn, were female adults, but it was not possible to determine the sex of any other



One of the cremation pits at Derrybane 2. (Photo: Eachtra Archaeological Projects)

cremains. No pathological lesions (tissue damage resulting from disease) were present on the fragments. This lack of data is exclusively due to the small volumes of bone, which hindered the osteological assessment.

The most revealing information emerges in relation to the actual treatment of the remains. A total of 56.5% of the 23 samples were less than 100 g in weight. The largest sample (from the urn) weighed 782 g. Indeed, the total weight of human cremains from the site was just 3,396 g (adults and juveniles). Modern studies indicate that the cremated remains of an adult individual can range from between 1,600 g and 3,500 g. The small volumes from Derrybane 2 suggest that only part of a cremation was selected for deposition or that only certain body parts were cremated. The evidence from two of the pits at the eastern end of the site, including the urn burial, was interesting in this respect. All the cremains in one of the pits were long bones. This may have been a fortuitous result of the collection process in antiquity or it may have been deliberate.

The assessment of the cremains in the urn revealed a wealth of information, not least because it was the largest sample of bone recovered. The cremains were those of a single, possible female, adult. Again, this does not represent the entire skeleton. An assessment of the frequency of bone type and their locations within the urn (albeit taking into account post-depositional soil movement) reveal two factors. First, cranial (skull) remains appeared to have been deliberately targeted for cremation/

deposition. Secondly, the cranial remains were amongst the last to be deposited in the urn, before it was inverted.

Apart from the two pits described above there was no substantial evidence in the other cremains that certain body parts were targeted. This suggests that entire bodies were cremated, but that only portions of the total were deposited. It is impossible to determine what happened with the remainder of the cremations or whether one cremation may have been deposited in a series of pits.

There is also evidence of straight fractures on bones from two of the pits in the western cemetery. It is generally accepted that straight fractures occur with the cremation of defleshed dry bone, while concentric fractures (curving fractures occurring in long bone fragments) occur with the cremation of fleshed bones (typically complete bodies). The concentric fractures are linked with the constriction and shrinking of the muscles with the heat of the cremation fire and subsequent warping and fracturing of the bone. The identification of straight fractures (defleshed dry bones) suggests that there may well have been a degree of selection in what was cremated.

Some cremation deposits may have been retained for some time prior to deposition: the cremains in two of the pits were visibly worn. This is evidently not due to post-depositional fractures but rather retention of the bones after cremation and prior to deposition. An assessment of the

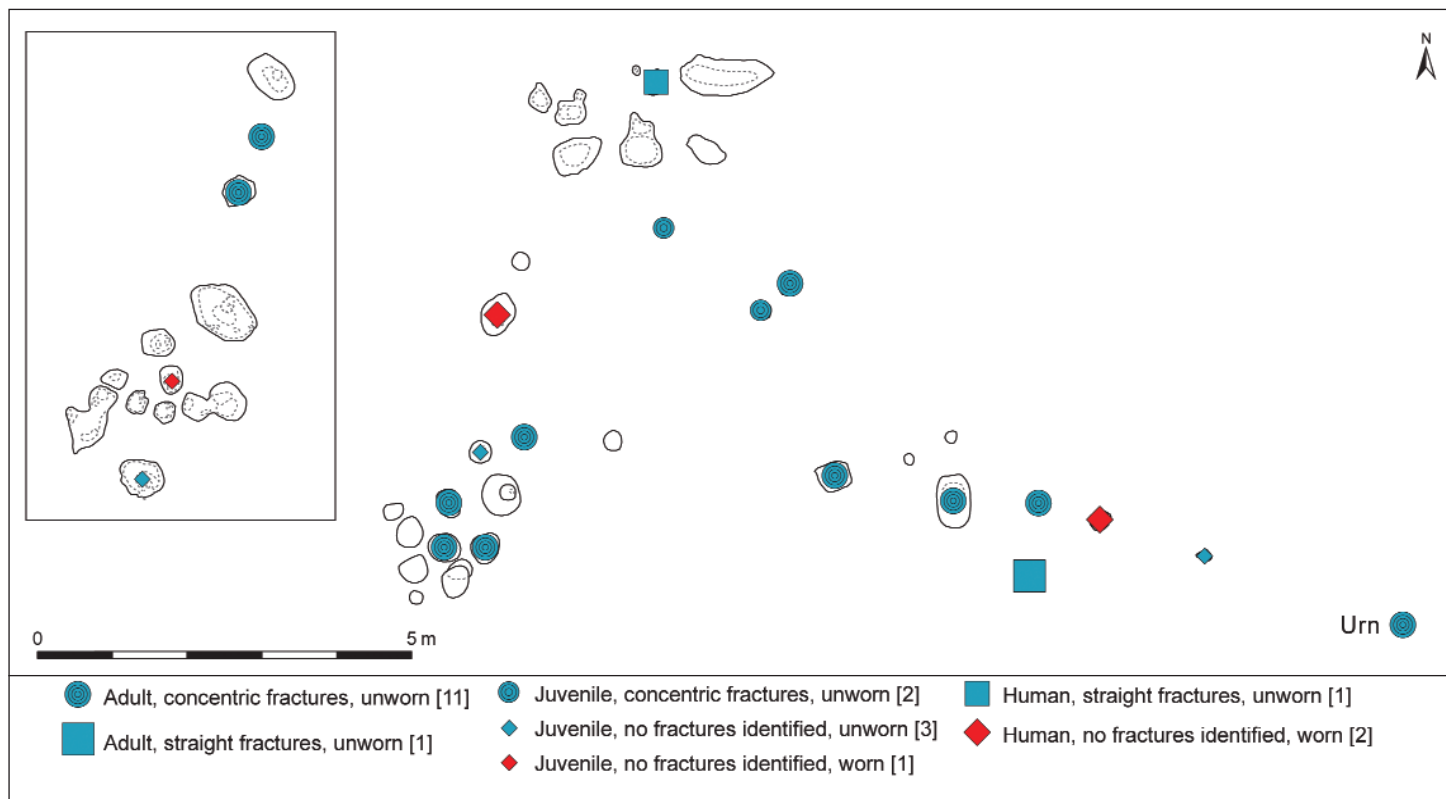


Excavation of the eastern cremation cemetery at Derrybane 2, from the north. (Photo: Eachtra Archaeological Projects)

fragment sizes of the bones indicates that the bones were not pounded and crushed after cremation.

The analysis of the human cremains from Derrybane 2 indicates a complex ritual process. Emerging evidence from prehistoric cremations reveals diverse practices, and such is the evidence from Derrybane 2. The cremains raise more questions than they answer and the analysis highlights the complex issues that surround them. There are clear and significant variations in the treatment of the cremated remains of certain individuals. Cremation may have been an honourable method of disposal or it may have been the opposite. Perhaps it was the actual treatment of the bones after the cremation that was the important factor. Both fleshed remains and dry bones were cremated. Perhaps the reason for this was as simple as the weather being too wet or fuel being unavailable. Why, too, were only portions of cremations deposited here? And what happened to the rest of the cremains? What is the significance of the other pits at the site that do not contain cremated bone? Perhaps they were meant to be similar to cenotaphs. There is evidence that at least some of the cremains were retained for a time prior to deposition.

A wide variety of different methods of deposition were apparent. Compare, for example, the apparent ‘token burial’ of 64 g of adult cremains in a hollow near the centre of the site with the 782 g of adult cremains from the urn. The majority of samples of cremains were recovered from earth-dug pits. Which were the ‘high-status’ burials, if, indeed, there were any? It would be unwise to assume that the individual buried in the urn was of a higher social ranking. Perhaps they committed some crime in the community and the inverted urn was a method of trapping and imprisoning their remains. Perhaps the small deposit in the hollow represents the remains of a high-ranking individual. And what is the relevance of the tiny fragments of human cremains recovered intermingled with cremated animal bone in a hearth near the centre of the site? Was this accidental? Or was it a deliberate act? Although there are many questions that may never be answered regarding prehistoric cremations, their analysis constantly highlights the complex issues that surround them.



Distribution of the cremains in the western (inset) and eastern cremation cemeteries at Derrybane 2. (Image: Maurizio Toscano, Eachtra Archaeological Projects)



The western cremation cemetery at Derrybane 2, from the south. (Photo: Eachtra Archaeological Projects)

A ‘Meare’ bauble

Niall Roycroft, NRA Archaeologist with the Eastern Team, reports on the discovery of a small glass trinket imbued with deep symbolic meaning.

Eternal life is seen in this superb glass bead from Newtownbalregan ringfort in County Louth, which is decorated with a ‘Meare spiral’—a triple spiral in opaque yellow drawn in vitreous glass over a clear glass bead. The triple spiral is one of the oldest and most dramatic images in archaeology. It is thought to signify birth, maturity and death, including the calendar year of the Sun and the monthly cycle of the Moon. All humans are born, mature to adulthood and wither to death before being reborn again, so the Meare spiral represents all life. This triple aspect of ancient myth was eagerly adopted by Christianity to represent the three aspects of God Himself.

The Meare spiral bead from Newtownbalregan was discovered during excavations conducted in 2003 by David Bayley of Irish Archaeological Consultancy Ltd on the M1 Dundalk Western Bypass. The bead belongs to an Iron Age bead-making tradition that probably originated around Meare, Somerset, in Britain. Meare spiral beads were initially produced c. 250 BC–AD 50 in the UK, but the tradition is now accepted as running to the sixth or seventh century AD. Glass beads with Meare spirals are found across late Iron Age and early medieval Britain and Ireland. The Newtownbalregan bead was found near a copper-alloy penannular brooch with zoomorphic (animal-like) terminals and several other glass beads dating from the sixth/seventh century AD. Meare spiral beads have been found in counties Donegal, Down, Meath, Laois and Cork, but this is the first from County Louth.



The Meare spiral bead (11.3 mm in diameter) recovered from an early medieval ringfort at Newtownbalregan, Co. Louth. (Photo: Niall Roycroft)



Aerial view of the ringfort and souterrain excavated at Newtownbalregan. (Photo: Studio Lab)

ASI: Archaeological Scene Investigation in north Louth



ASI: Archaeological Scene Investigation in North Louth exhibition at County Museum, Dundalk. (Photo: Niall Roycroft)

Brian Walsh, Curator of the Louth County Museum in Dundalk, reviews the success of a recent NRA-funded exhibition on the archaeological discoveries made on road schemes in north County Louth, which was held from November 2009 to February 2010.

When the opportunity arose to present the archaeology uncovered in advance of the construction of the M1 Dundalk Western Bypass and the A1/N1 Newry Dundalk Link Road, a simple question came to mind: what is the best way for the Museum to display these finds so that it will be

different, refreshing and will ultimately excite a form of childlike curiosity in the visiting public? Like many things in life, while the question may be simple, the answer often is not. The 'Eureka' moment came while examining the items destined for exhibition—why not use the artefacts in two very different but complementary ways? Use them not only as evidence of historical activity but also as ciphers explaining the manner in which an archaeologist pieces together the past using the incomplete evidence that has survived. With that realisation *ASI: Archaeological Scene Investigation in North Louth* was born.



Display of reconstructed animals made by local model-maker Jim Martin. (Photo: Niall Roycroft)

Of course, the quality of an exhibition can only be determined through recourse to the artefacts on display and this is where *ASI* scored heavily. Amidst an array of fascinating items dating back to the Neolithic period (c. 4000–2400 BC), several in particular spark the imagination: a piece of rock art displaying a paisley-style motif found in the roof of a souterrain; a large stone in the shape of a sheep or calf, complete with ‘stab holes’; and a collection of decorated urns approximately 4,500 years old. Another feature of the exhibition was the inclusion of a short video piece that was originally aired on UTV’s *Hidden Heritage* series. The five-minute video highlighted the discovery of a ringfort at Faughart Lower, complete with graveyard. Of particular interest here was the discovery of two skeletons—an adult female and a small child. Closer examination revealed the possibility that the child was a newborn. Following forensic analysis, this proved to be the case. The inclusion of such a poignant discovery greatly enhanced the exhibition by providing an emotional focus that reminded visitors that the interpretation and display was not simply a dry academic exercise, but rather a salient reminder of the past as experienced by their ancestors over several millennia.

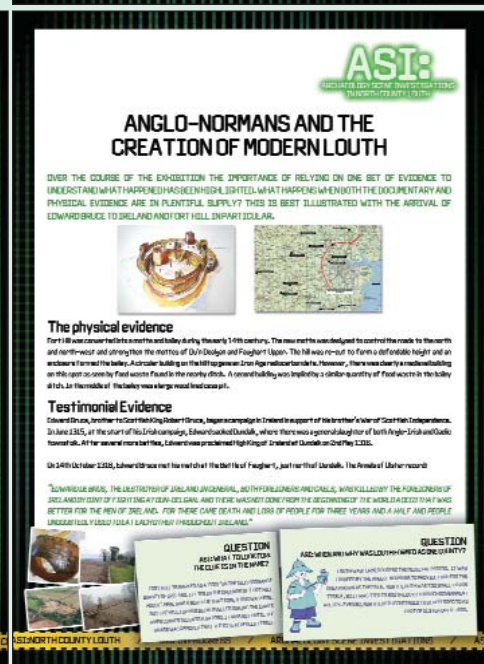
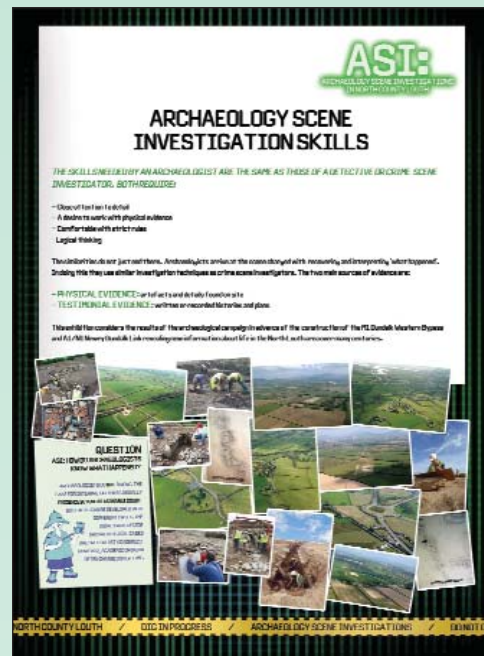
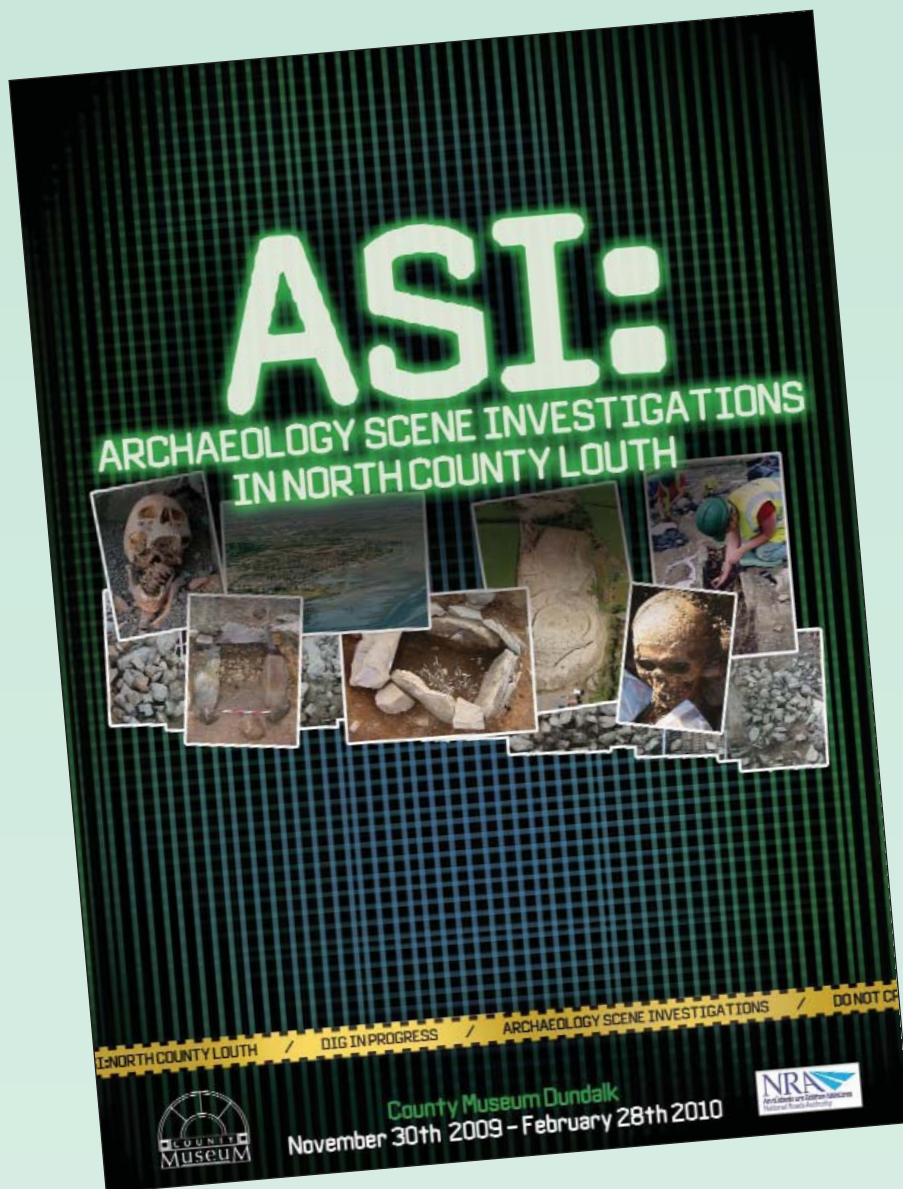
This objective was further supported through the organisation of a series of workshops aimed at primary school children over the month of December. Led by local model-maker Jim Martin, who specialises in making reconstructed animals with fibre-glass and man-made fibre fur, these workshops focused on the nature of the area’s flora and fauna and on the manner in which an area’s geography/topography affected and determined inhabitants’ lives on a day-to-day basis.

In planning the exhibition and the attendant activities we consciously adopted a holistic approach to the presentation and examination of the area, one that highlighted the delicate interplay of how human expansion

affected, and was affected by, its immediate environment and, most importantly, how this interaction could be traced through an examination of the archaeological and historical record. By presenting this information as elements in a mystery setting, visiting groups and individuals were afforded an all-too-rare an opportunity to see the past and the methods of its interpretation in a different light.

Thankfully, amidst all of this planning and organising the exhibition was well received by those who came to see it. Some 14 national schools attended the workshop events, while secondary schools from Dundalk, Drogheda and Meath visited the exhibition. Teachers and pupils alike were uniform in their appreciation not only of the exhibition and workshops but also with respect to the brochure and workbook that were produced to accompany the displays. (The workbook can be downloaded from the County Museum website, at <http://www.dundalkmuseum.ie/en/main/news-and-events/109/>.) The media were also taken with the project, and it featured on RTÉ’s *Six-One News*, *Newstalk’s Cultureshock*, as well as reviews on LMFM and DundalkFM. Coverage of the launch of the exhibition may be viewed on YouTube: http://www.youtube.com/watch?v=A-U8Y-E1_pg.

All in all the exhibition provided a timely boost for everyone involved. Teachers and their students could avail of the opportunity to interact with archaeology in a new and refreshing way, while residents of the area could see for themselves the finds uncovered on their own doorstep. From a Museum perspective, the exhibition gave us the chance to articulate creatively the nature of the area’s archaeological record through a variety of forms. Moreover, with the launch of a dedicated website (www.asi-louth.ie) to the exhibition, a permanent legacy of its content (and reports) will be available for new audiences for many years to come.



A selection of pages from the brochure accompanying the exhibition.

Medieval iron-working in the mire

Patricia Long, an Excavation Director with Headland Archaeology Ltd, questions the siting of a medieval iron-working complex in bogland on the M7 Nenagh–Limerick motorway scheme in North Tipperary.

Cappadine Bog in north County Tipperary is roughly circular in shape and divided between three townlands—Garraun, Cappadine and Rossfinch—with the townland boundaries converging at the centre. In the townland of Garraun, evidence of a localised medieval iron-working industry was uncovered on a small but pronounced knoll surrounded by wet, marshy land, at the south-west edge of Cappadine Bog. An Early/Middle Bronze Age (c. 2200–1100 BC) *fulacht fiadh*/burnt mound was identified on the north-east side of the knoll, while the evidence for medieval iron-working was found closer to the summit of the low rise. It consisted of a smelting furnace base, two smithing hearths, two charcoal production pits and a large dump of waste material.

The smelting furnace base indicates that iron was extracted from ore on the site to produce unrefined iron called ‘bloom’. The smithing hearths and the presence of hammerscale (a by-product of hammering hot, unrefined iron) indicate that further refining of this bloom was also taking

place to produce iron billets that could be forged for the production of tools, weapons, etc.

Archaeometallurgist Barry Cosham analysed the metallurgical material recovered during the excavation and found that the deposit of waste material was perhaps the most valuable source of iron-working evidence. It contained fragments of ore, as well as evidence of smithing and several smelting episodes, indicated by a number of furnace base fragments within it. A radiocarbon date of AD 1216–1278 was returned from a sample of this waste material, which, compared with other radiocarbon dates from the site, indicates that the activity was taking place at the cusp of the early to high medieval periods.

The charcoal-production pits identified at Garraun are likely to have supplied charcoal exclusively to the iron-working site. Charcoal production was an integral part of the iron-working process; without charcoal, the necessary temperatures for iron smelting (c. 800–1,000° C) and smithing (c. 1,100–1,200° C) could not have been achieved. The charcoal-production pits at Garraun have the typical attributes of this feature type, being shallow, earth-cut features with *in situ* burning and



Aerial view of iron-working site at Garraun, Co. Tipperary, with Cappadine Bog in the background. (Photo: Markus Casey)



abundant charcoal in the fills. The radiocarbon dating of one of these pits showed that they were contemporary with the iron-working.

At first glance it seemed that this iron-working activity was taking place in apparent isolation in the middle of inhospitable and wet terrain, but on closer examination it became clear that there was careful planning behind the choice of location. The two key resources needed for iron-working were the metal ore and the wood to provide charcoal fuel. The industry at Garraun seems to have been sited deliberately to have ready access to both.

Probable bog iron ore was identified in the dump of waste material on the site and it is reasonable to suggest that this ore would have come from Cappadine Bog, 20 m north of the site. (Bog ore is known to

accumulate at the interface between the organic layer of bog and the underlying natural ground surface.) Early bloomeries were usually located near to the ore source and the location of this site on the margin of a bog basin would have been ideal for the recovery of naturally occurring bog ore. The extraction of the iron from the ore at the edge of the bog also meant that only refined iron billets, and not large quantities of ore, had to be transported uphill from the bog. No definite evidence for the preparation of ore for the extraction of the metal-rich components was identified at the excavated site in Garraun, but it is likely to have taken place in the immediate vicinity.

Although the immediate environs of the site were waterlogged, the sloping hills on the east and west sides would have been suitable for

dryland wood species, such as oak and ash, which may have provided the fuel source for the iron-working activity. The townland name Garraun (meaning 'thin wood/grove') is a strong indication that the area was forested in the past. It is interesting to note that the results of charcoal analysis by wood specialist Simon Gannon indicated that the Bronze Age activity on the site had a wide variety of wood species represented in the charcoal, but the charcoal associated with the iron-working features and charcoal-production pits indicated that the gathering of fuel was more selective, with oak being the dominant species. This is common in relation to metal-working owing to the longer burning time and superior high temperature-producing qualities of oak.

Overall there was relatively little evidence of day-to-day occupation of the site. Given the damp surroundings it is perhaps unsurprising that no domestic structures were noted, however a shallow refuse pit and two of the iron-working features were found to contain burnt animal bone and charcoal, as well as small amounts of charred cereal grain. This seems to present a picture of iron-workers coming to the site with prepared food and later disposing of leftovers into industrial fires.

There was no evidence at Garraun for artefact production and it seems likely that the site was acting as a supplier of iron billets to nearby settlement sites. When the location of the site is viewed in relation to the surrounding topography and the Record of Monuments and Places (RMP), it becomes apparent that Cappadine Bog is located within a basin, with a number of recorded enclosure/ringfort sites on the hillslopes overlooking the area. A small part of one of these ringforts (RMP No. TN025-069) was



Smelting furnace base, as identified during excavation. (Photo: Headland Archaeology Ltd)

investigated during the M7 excavations and was radiocarbon-dated to AD 1056–1223, indicating the likelihood that the occupation of this ringfort was contemporary with the iron-working at Garraun.

The iron-working complex identified at Garraun may have been supplying a number of these nearby settlements and it is likely to have been part of a larger iron-working industry associated with the bog in that area. In modern times the bog is seen as undesirable in agricultural terms, however the townland boundaries that divide it could indicate that the bog was much more valuable in the past, perhaps owing to the presence of naturally occurring bog ore.



Furnace base fragments recovered from the dump of waste material. (Photo: Hannah Simms, Headland Archaeology Ltd)



Probable bog ore recovered from the dump of waste material. (Photo: Hannah Simms, Headland Archaeology Ltd)



Extract from the RMP map showing the location of the iron-working site at Garraun, Cappadine Bog and nearby enclosures/ringforts. (Image: Headland Archaeology Ltd)

Communicating archaeology through exhibition: gauging public opinion



Early Bronze Age (c. 2400–1600 BC) 'face-mask' pot from Mitchelstown—a popular exhibit piece at the NRA's *New Roads, New Discoveries* exhibition held at the Cork Public Museum. (Photo: John Sunderland)

Ken Hanley and Sheelagh Conran, NRA archaeologists with the Southern Team, assess the public's impression of New Roads, New Discoveries: Archaeological Excavations on National Road Schemes in County Cork 2001–2007, an NRA-funded exhibition held in Cork Public Museum in late 2008.

Archaeological discoveries never cease to amaze. Few other endeavours form such a direct link between past and present. Each new site has a story to tell, each threading a new piece of knowledge into the evolving tapestry of human history. It is the archaeologist's job to record, analyse, interpret and communicate such findings. One age-old method of

communicating archaeological findings is by public exhibition. But how can we be sure about what has been communicated, and to whom?

The exhibition

In 2008 the NRA funded an exhibition of archaeological discoveries made in the course of six recent national road projects in County Cork. The exhibition, *New Roads, New Discoveries*, was held at the Cork Public Museum from June to December 2008 and was launched by Mr Batt O'Keefe TD, then Minister of Education and Science. Archaeological discoveries from the N8 Fermoy–Mitchelstown, the M8 Rathcormac/Fermoy Bypass, the N8 Glanmire–Watergrasshill, the

N8/N72 Mitchelstown Relief Road, the N22 Ballincollig Bypass and the N25 Youghal Bypass were displayed. In all, 178 sites had been investigated, revealing a wide range of previously unknown archaeological sites spanning 10,000 years. The range of discoveries were exhibited by means of a combined display of over 200 artefacts, an array of eye-catching and informative display boards and several computer-generated, 3D-animated reconstructions (see *Seanda*, Issue 3 [2008], pp. 31–2). (The authors would like to acknowledge the warm co-operation received from Stella Cherry and Dan Breen of Cork Public Museum, the kind assistance of staff from the National Museum of Ireland, particularly Fiona Reilly, and the primary work of the relevant excavation directors and staff from Archaeological Consultancy Services Ltd, Sheila Lane & Associates and Eachtra Archaeological Projects.)



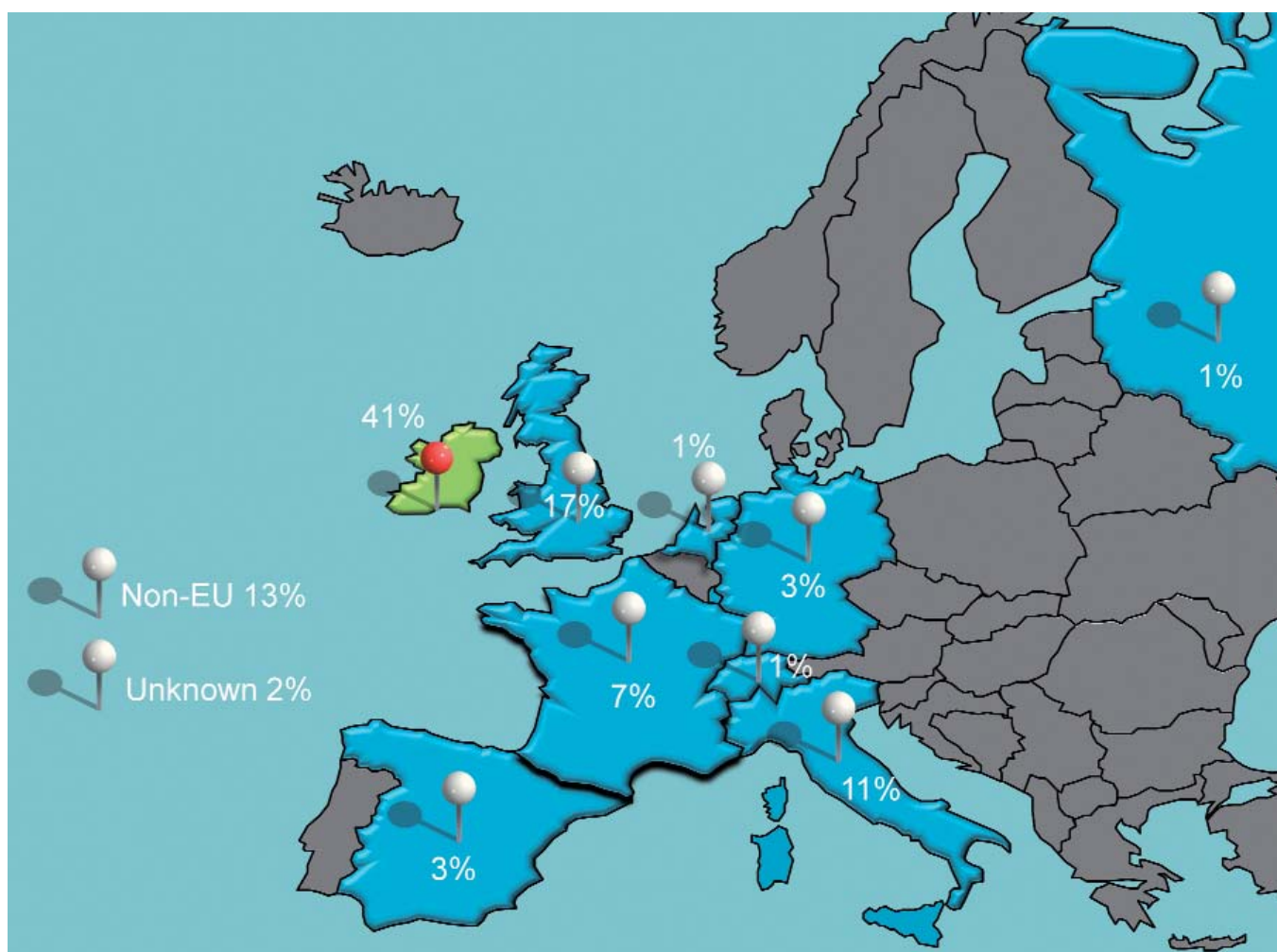
Fragment of a medieval rotary quern-stone from the M8 Rathcormac/Fermoy Bypass, as displayed at the exhibition. (Photo: Archaeological Consultancy Services Ltd)

The main aim of the exhibition was to present and explain the archaeological discoveries in a manner that would appeal to as wide an audience as possible. The exhibition was intended to humanise, dramatise and contextualise the findings so as to highlight the considerable potential

each new road has in terms of archaeological discovery. But who came to see it, and did it work?

Assessing visitor attitudes

While anecdotally successful, the authors decided to gauge public impressions in a more structured manner. Mindful of George Bernard



National origin of polled visitors (survey sample number (n) = 150).

Shaw’s cautionary note that ‘The problem with communication is the illusion that it has been accomplished’, visitors to the exhibition were invited to complete a questionnaire devised to assess visitor make-up and attitudes. The museum recorded 2,500 visitors during the course of the exhibition (D. Breen, pers. comm.). From these, 150 responses to the questionnaire were received, representing a 6% sample of total visitor numbers.

So, who came?

Nationalities

Unsurprisingly, a high proportion of respondents (41%) were resident in Ireland, while 57% were international visitors (the remaining 2% were of unstated nationality). The percentage of international visitors broke down into 44% European and 13% non-European. Some intrepid respondents hailed from as far away as Kenya, Brazil, the Unites States of America and New Zealand.

Age profile

All ages attended the exhibition (from 6 to 80+). As expected, the largest group were those of school-going age (37% of respondents). The 18–33-year-olds made up 32%, the 34–60 group made up 25%, while the 61+ age group comprised 6% of all respondents.

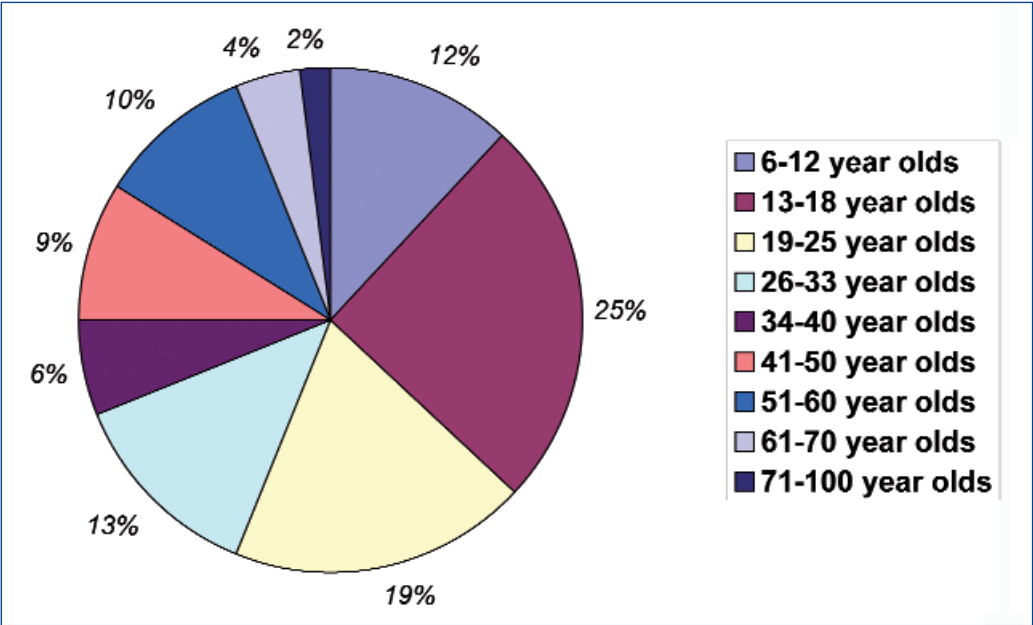
Educational backgrounds

One of the difficulties in preparing the exhibition was deciding what age group to pitch at. The convention for museum exhibitions is to write for a readership age of 12 in order to maximise the readership group. Of the respondents, 12% were in primary school and roughly 25% were at secondary level. Interestingly, 50% were educated to third level.

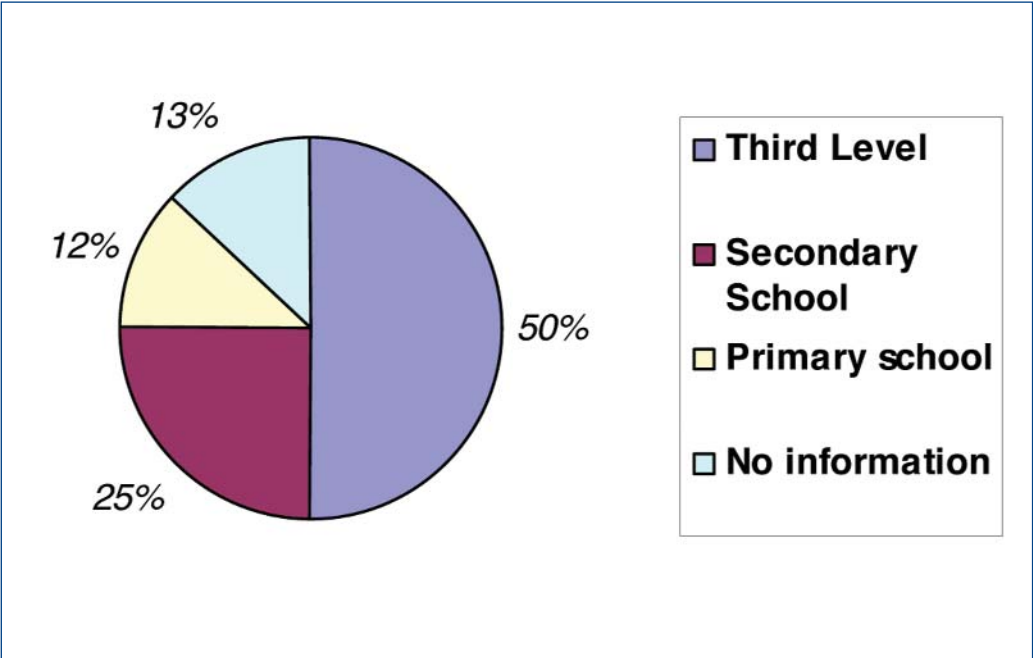
They came, they saw... but what did they think?

Enjoyment ratings

Good exhibitions should both entertain and inform. The questionnaire had invited visitors to rate their enjoyment of the exhibition on a five-point scale from ‘Poor’ to ‘Excellent’. Some 84% of respondents rated the exhibition as either ‘Good’ (21%),



Age profile of visitors (n = 150).



Educational background of visitors (n = 150).



Visitors’ stated enjoyment of the exhibition (n = 150). Note: a further 10% expressed no opinion. (Image modified from <http://customersrock.files.wordpress.com/2007/05/happy-sad-faces.jpg>)

'Very Good' (38%) or 'Excellent' (25%). Only 2% of respondents ranked it as 'Average', while 4% felt it was 'Poor'. A further 10% of respondents offered no opinion.

Preferred exhibition medium

The exhibition was made up of three media: artefact displays, information display boards and computer-generated 3D-animated reconstructions. When asked to choose their preferred medium, a marginally higher number (31%) cited the artefact displays, while 23% preferred the information panels. These were followed closely by 21% who preferred the 3D reconstructions. A further 25% expressed no particular preference. The responses suggest a reasonably even, three-way split in visitors' preferences. In truth, each information medium augmented the other and their combined aim was to offer visitors the opportunity to understand the archaeological process of recovery, analysis and interpretation.

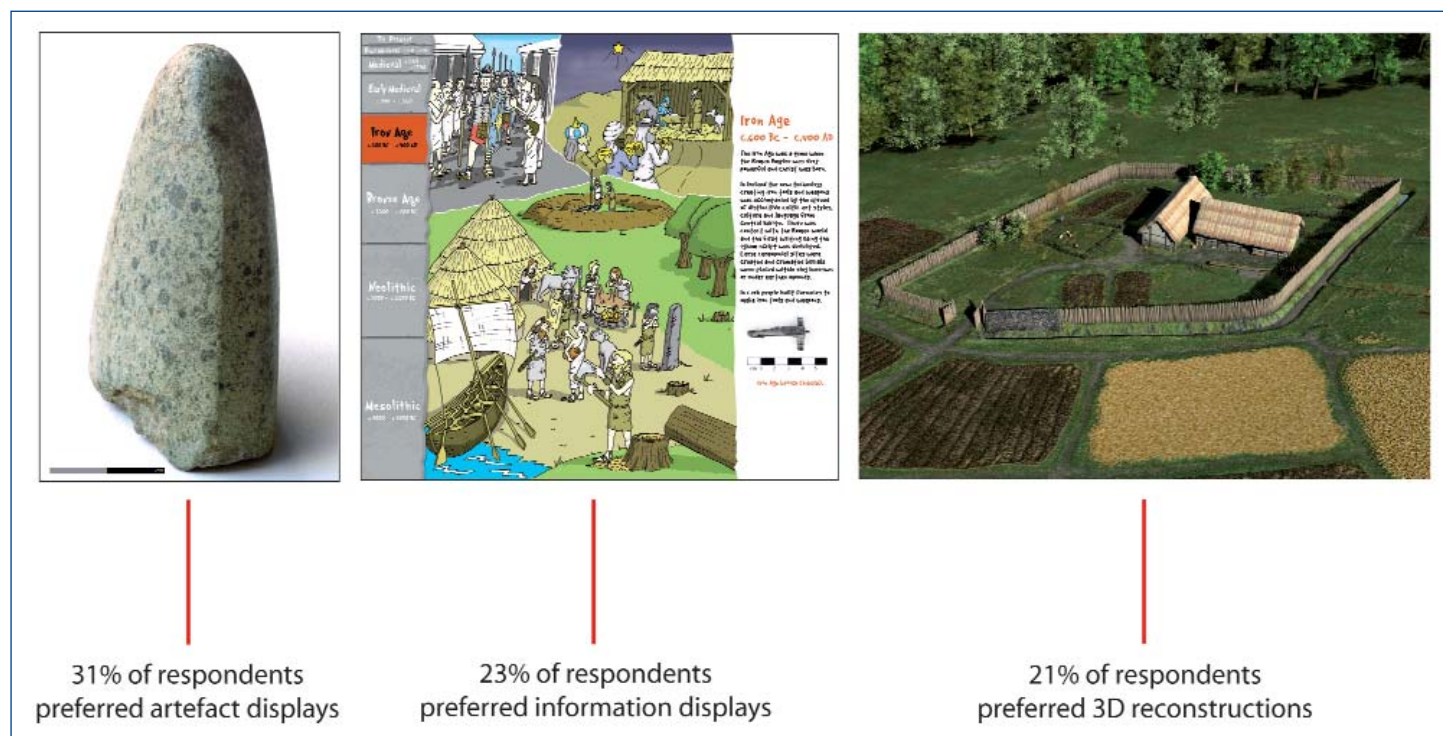
Key learning outcome

One of the core aims of the questionnaire was to ascertain what main message visitors retained from the exhibition. The relevant question was left open and answer options were not prompted. While a disappointing number of respondents (41%) offered no feedback, a few different themes emerged from those who did. A high proportion (39%) of those who gave

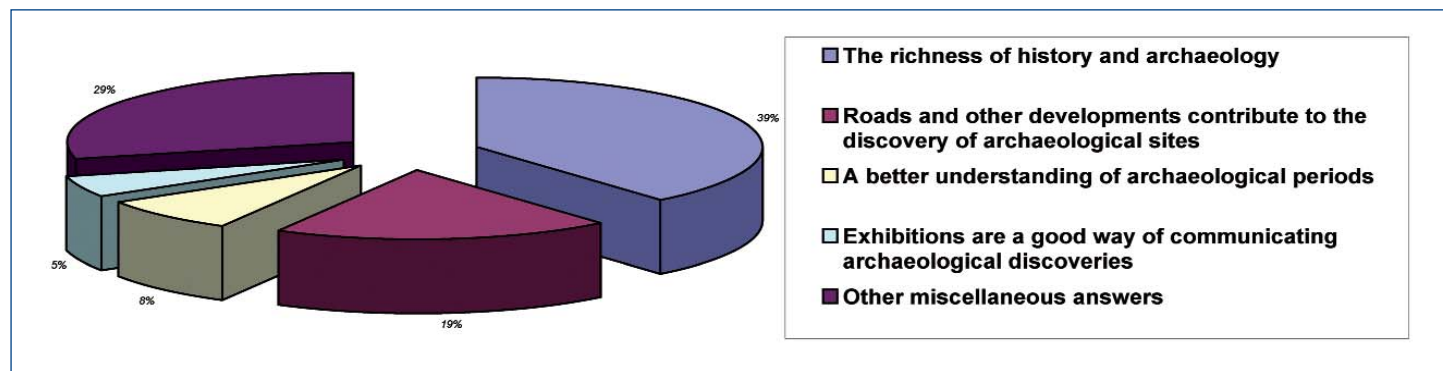
an opinion left the exhibition generally mindful of the richness of history and archaeology in County Cork specifically and in Ireland generally. A further 19% cited that the building of roads and other development projects contributes to the discovery of new archaeological sites. A small number (8%) responded that they better understood the difference between the main archaeological periods (something expressly highlighted in the exhibition), and a further 5% commented that the exhibition was a good way of communicating archaeological discoveries to the public. The remaining responses (29%) incorporated a wide range of miscellaneous, largely unrelated comments. There were virtually no negative responses.

Was it a 'success'?

The stated aim of the exhibition was to present the archaeological discoveries in a manner that would appeal to as wide an audience as possible. In terms of inclusiveness, it seems clear from the flavour of the questionnaire responses that a good mix of nationalities, age profiles and corresponding educational profiles attended the exhibition. Furthermore, reported enjoyment of the exhibition was satisfyingly high. While the specific aim of highlighting the considerable potential each new road has in terms of archaeological discovery was measurably achieved, visitors also expressed a wider spectrum of archaeological awareness.



Visitors' enjoyment of the exhibition (n = 150). Note: a further 25% expressed no preference.



The message visitors took from the exhibition (n = 89).

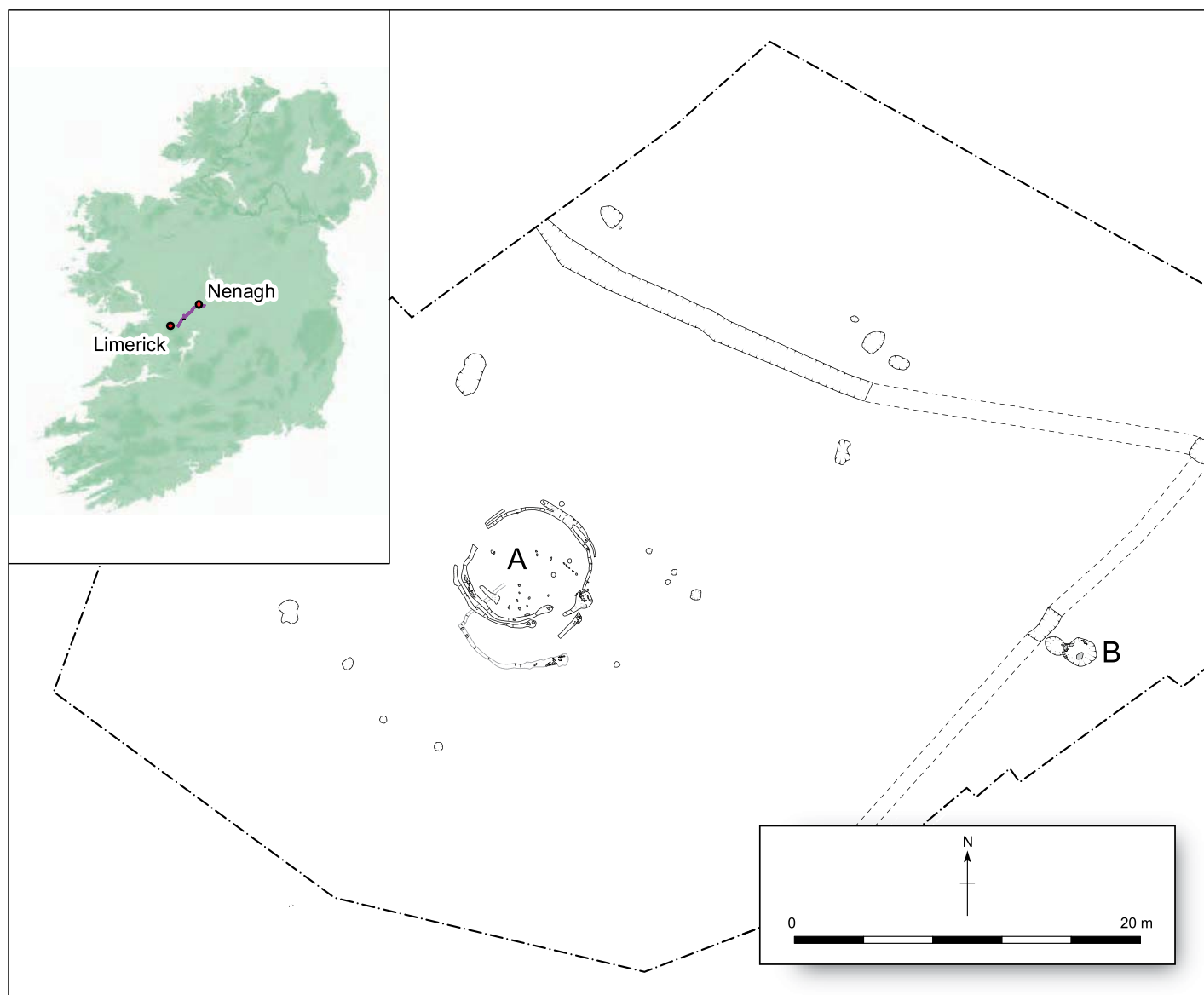
The earliest cereal-drying kiln in Ireland?

Liam Hackett, a Site Manager with Headland Archaeology Ltd, describes what may be the earliest figure-of-eight cereal-drying kiln yet discovered, radically altering the accepted chronology of this site type in Ireland.

Cereal-drying kilns are found countrywide, mainly due to the damp Irish climate, which made it necessary to reduce the moisture content in harvested crops using controlled heat from a fire. The upsurge in development-led excavations over the last two decades has increased both the number of kilns known in the country and the corpus of knowledge about them (for instance, see *Seanda*, Issue 3 [2008], pp. 28–30). In October 2006 a prehistoric settlement at Carrigatogher (Harding), Nenagh, Co. Tipperary, was excavated on the M7 Nenagh–Limerick motorway scheme. The site consisted of a circular structure defined by

concentric slot-trenches, an associated external hearth, pits and a ‘figure-of-eight’ cereal-drying kiln. Early Neolithic (c. 4000–3500 BC) and Late Bronze Age (c. 1100–800 BC) pottery was also recovered from the site. Previously excavated figure-of-eight-shaped kilns have generally been found to date from the early first millennium AD onwards, but the Carrigatogher kiln has proven to be much earlier in date.

The structure, hearth and cereal-drying kiln at Carrigatogher (Harding) have all been dated to the Early to Middle Bronze Age; radiocarbon dating of a charred hazelnut shell retrieved from the kiln produced a date range of 1520–1435 BC. This makes this cereal-drying kiln the earliest known example of its type in the Irish archaeological record and radically changes the accepted chronology of this feature type.



Location and plan of site at Carrigatogher (Harding), Co. Tipperary, showing the structure (A) and figure-of-eight cereal-drying kiln (B). (Image: Headland Archaeology Ltd)

The kiln consisted of a drying chamber, fire-pit and short connecting flue, with the fire-pit on the lower side of the structure facing the open air, a feature typical of this type of cereal-drying kiln. The entire kiln measured 2.9 m long and 1.3 m wide, with depths of 0.22 m for the fire-pit and 0.5 m for the drying chamber. The flue was of very basic construction, with medium-sized stones used to contain the heat at the desired point into the drying chamber, which lay upslope, and to act as a baffle (barrier) to prevent the grain from becoming alight. Red, oxidised soil, more vivid in the fire-pit and lighter in the drying chamber, was present at the base of the kiln.

Samples taken from the fills of the kiln showed that charred wheat grains, indeterminate cereals and hazelnut shell were present—a similar assemblage to that retrieved from the structure and hearth located 35 m north-west of the kiln. This similarity, alongside the radiocarbon dates, shows that the kiln and structure were in use at the same time, which further increases our knowledge of the day-to-day activities of prehistoric people.

Up until now it has appeared that the development of figure-of-eight-type cereal-drying kilns was influenced by external factors; similar kiln-types are well known from Late Roman Britain (overlapping with the Late Iron Age/early medieval date range of what were previously the earliest Irish examples). The findings from Carrigatogher (Harding) may allow for an indigenous origin and development of cereal-drying kilns to be traced. Further analysis of the material retrieved during the excavation is ongoing to confirm the date of the kiln and further enhance our understanding of this very significant site.



The cereal-drying kiln, with baffle stones in place. (Photo: Headland Archaeology Ltd)



Aerial view of the kiln, post-excavation. (Photo: Headland Archaeology Ltd)

Early days on the N25 New Ross Bypass



Testing on the N25 New Ross Bypass in Ryleen townland, Co. Wexford. (Photo: Mairéad McLaughlin)

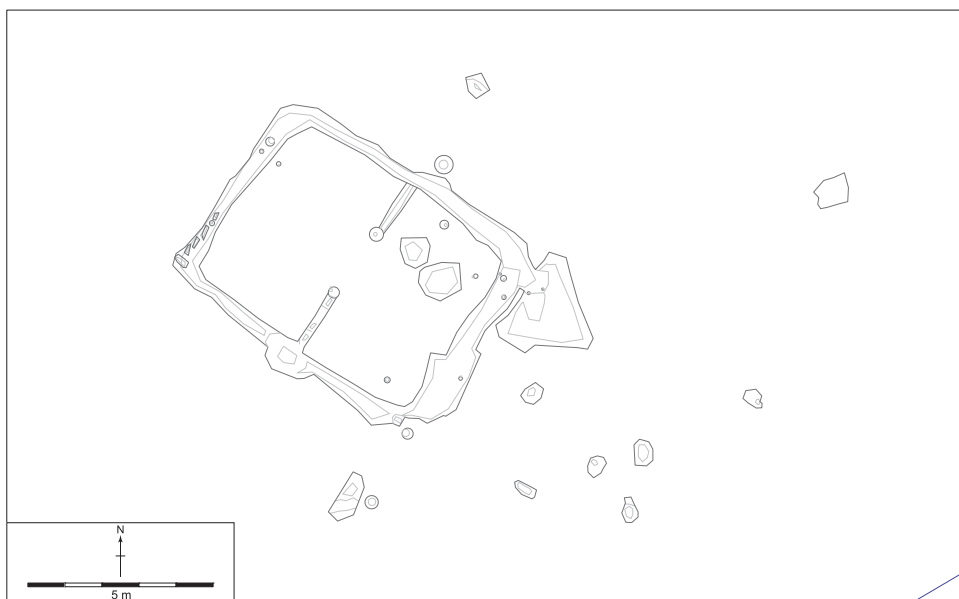
Mairéad McLaughlin, NRA Assistant Archaeologist with the Southern Team, describes the initial results of test-trenching undertaken at the end of 2009 in advance of the construction of the N25 New Ross Bypass.

As dawn broke on 30 November 2009 the project team, comprising the project engineer, the land liaison officer, the archaeological staff of Headland Archaeology Ltd, machine drivers and NRA archaeologists, set off into the early morning mist. The areas designated for test-trenching were already laid out and two teams of archaeologists commenced testing for archaeological remains at opposite ends of the road scheme. Just days before the winter solstice (21 December) the teams came together again, having tested 12% of the 14.8-km-long route and discovering 26 previously unknown archaeological sites.

The proposed N25 New Ross Bypass commences at Glenmore in County Kilkenny; at Pink Point it crosses over the River Barrow into County Wexford by way of a planned extrados-type bridge (a cross between a cable-stayed bridge and a girder bridge); then from Stokestown, Co. Wexford, it emerges east of Corcoran's Cross onto the existing N30 Enniscorthy road. The route crosses 17 townlands (five of which are in Kilkenny), passing through a scenic agricultural landscape characterised by gently undulating valleys and hills.

Among the new discoveries was a promising rectangular house identified by Excavation Director Lisa Doyle and her team

in Ryleen townland, Co. Wexford, which was the cause of some excitement during testing. Anticipation mounted as a slot-trench through the structure yielded some Early Neolithic (c. 4000–3500 BC) carinated bowl pottery—could this possible Neolithic house be an exciting first for County Wexford? The house had internal occupational evidence in the form of pits and associated external features were also identified, so the return to this site for full excavation is eagerly awaited. Archaeologists have been getting tantalising hints of a Neolithic presence in the New Ross area since 1928 when a stone axehead was found in Mylerspark. Excavations in McMurrrough's Island townland in 1985 uncovered a stone axehead and some lithics (stone tools) in association with a pit and



Post-excavation plan of the probable Neolithic house at Ryleen, Co. Wexford. At the time of writing full excavation of the New Ross Bypass sites had just commenced. (Drawing: Headland Archaeology Ltd)

hearth. Testing on the New Ross Bypass has added to this corpus of Neolithic artefacts through the recovery of a stone axehead in Creaken Upper townland, but the excavation of the house at Ryleen would add greatly to the growing evidence of Neolithic occupation in the surrounding area.

An emerging Bronze Age landscape in the form of five burial sites and eight *fulachta fiadh*/burnt mounds was also revealed by the test-trenching. Burials in the Bronze Age included both cremation and inhumation, although cremation was the most common burial rite in prehistoric Ireland. Poignant expressions of different traditions are revealed through a variety of burial practices, and on this scheme alone five possible cremation cemeteries were uncovered. At least two of these are ‘flat cemeteries’, so-called because they comprise simple grave pits with no upstanding remains, although stone or wooden markers probably denoted the location of the cemetery originally. Three of the cremation cemeteries found on the New Ross Bypass may form part of a wider ritual/burial landscape and were associated with circular enclosures known as ring-ditches and one possible urn burial, though the type of urn is not yet known.

The burnt mounds uncovered varied in size and the majority were located in the vicinity of the River Barrow and its tributaries. Some have good potential for organic preservation and possible timber troughs. Considering the prevalence of these sites in the countryside, eight burnt mounds is a pretty representative figure for this scheme when considering some of the low-lying aspects of the route and there is no denying that they were an integral aspect of the life of any Bronze Age community, being used to heat water for a variety of possible purposes.

The testing results were also marked by discoveries dating from the medieval period. Excavation director Liam Hackett and his team identified features and artefacts (such as pottery known as North Leinster cooking ware) in Landscape townland, Co. Wexford, that hint at a possible medieval industrial or settlement site at this location. At only 3 km from New Ross, it may be linked to the medieval origins of this town.

As with all human activity, location is an important element in site selection and it is interesting to note that a number of charcoal-production sites were also identified and that all are sited near the New Ross end of the scheme. This is possibly due to the exploitation and management of woodlands and the ease of transportation via the River Barrow. The two main types of charcoal-production kiln used in Ireland were the mound kiln, which tends to leave little trace in the subsoil, and the pit kiln, which is the type represented on this scheme. Generally, these pits were filled with wood—normally oak because it produces intense heat when burnt—and covered over with earth before being fired. The major use of charcoal would have been in the smelting or smithing of iron. While such pits could be Iron Age (c. 800 BC–AD 450) in date, they



Bronze Age cremation cemetery at Rathgaroge, Co. Wexford. (Photo: Mairéad McLaughlin)

generally tend to date from the early medieval (c. AD 450–1169) or medieval (c. AD 1169–1550) periods.

Once a site was discovered during testing it was photographed and recorded using detailed site drawings and its location was plotted using state-of-the-art surveying equipment, such as Penmap (a pen-based computer system for graphical data collection) and a total station (an electronic surveying instrument for measuring horizontal and vertical angles). Protective procedures were put in place prior to backfilling the newly identified sites pending full excavation; this entailed laying a permeable fabric known as a geotextile over all of the archaeological features discovered. As an archaeologist it is a privilege to witness new sites being uncovered and the return to the N25 New Ross Bypass for full excavation is a very exciting prospect when the full extent of these discoveries will be revealed.



Archaeologist recording cremation pits at a Bronze Age flat cremation cemetery discovered at Berkeley, Co. Wexford. (Photo: Mairéad McLaughlin)

Bronze Age bathing?

Nial O'Neill, an Excavation Director with Headland Archaeology Ltd, describes an elaborate trough, well and platform uncovered beneath a fulacht fiadh/burnt mound on the M7 motorway.

Although long suspected, the idea that some *fulachta fiadh*/burnt mounds represent open-air bathing sites, perhaps of a ritual nature, is given further weight by the results of an excavation of a burnt mound in Annaholty townland, Co. Tipperary, on the route of the M7 Nenagh–Limerick motorway. The excavation, which was carried out in early 2007 under the direction of Liam McKinstry of Headland Archaeology Ltd, uncovered a burnt mound measuring 11.6 m in length, 7.93 m in width and 0.32 m in depth.

The burnt mound was found to be covering an 8-m-long feature dug into the subsoil. At the south-western end the feature contained a

rectangular trough lined with wood, stone and clay. A wooden platform, held in place by wooden pegs, and a clay- and stone-lined well was located at the north-eastern end. These were all shown to be contemporary, dating to the Middle Bronze Age. The bottom fill in the well was radiocarbon-dated to 1208–1014 BC, one of the planks from the platform dated to 1265–1028 BC and one of the planks from the trough base dated to 1188–979 BC.

The exact function of individual burnt mound sites is often unclear. This is due in no small part to the general lack of artefacts found at these sites. A variety of functions have been suggested for different sites, including cooking, bathing, cloth dying, animal hide processing and even beer production. As this site produced no artefacts, bone or grain, we must look to the nature of the structures (the trough, well and platform) identified at the site to decipher its function.



Aerial view of the burnt mound at Annaholty, Co. Tipperary. (Photo: AirShots Ltd)

The factors that necessitated the construction of the well and associated platform for a water source are not entirely clear. The immediate environs of the site, located at the centre of a low depression within the landscape, were extremely waterlogged, so why construct a well and an elaborate platform if an ample water supply was readily available? It seems most likely that the natural groundwater in the area was viewed as not clean or pure enough for the purpose for which it was intended. Also, if the trough was intended for cooking, why construct an elaborate wooden base and line the sides with stone, wood and clay?

The most plausible function, based on present evidence, is that this may have been an open-air bathing site—there was no evidence for a superstructure above the trough. Moreover, the elaborate construction and artificial water source on a site with an ample supply of groundwater is suggestive of ritualistic behaviour.



The well and associated platform. (Photo: Headland Archaeology Ltd)



The wooden trough base being uncovered. (Photo: Headland Archaeology Ltd)

Polypod bowls and continental yoghurt pots

Niall Roycroft, NRA Archaeologist with the Eastern Team, speculates about the function of a footed prehistoric pot recovered on the M1 Dundalk Western Bypass.

A polypod bowl has a rounded base with attached feet, allowing it to stand. These bowls, which date from the Chalcolithic or ‘Copper Age’ (c. 2450–2300 BC), are very rare and must have had a special function. One such bowl was recovered from Newtownbalregan 2, Co. Louth, during excavations conducted by David Bayley of Irish Archaeological Consultancy Services Ltd on the M1 Dundalk Western Bypass. The pot is small, having a width of 138 mm and a maximum height of 76 mm. The bowl itself is 44 mm deep and the feet are 22 mm wide by 15 mm to 18 mm high. The pot originally had five feet, but one was missing when found.

This bowl, which was analysed by prehistoric pottery experts Dr Eoin Grogan and Helen Roche, was virtually intact and had been carefully placed upright in a shallow pit outside a circular building dating to 2630–2340 BC. The impression is that this important bowl, having been slightly broken, was formally placed when it had out-lived its usefulness.

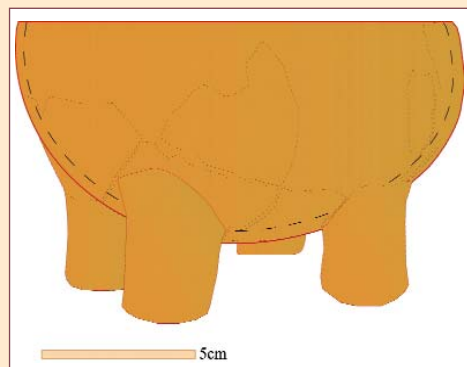
So-called ‘Beaker people’ at this time knew perfectly well how to make a flat-bottomed pot if they wanted to. Clearly they wanted a bowl-shaped vessel in this instance, which would normally mean a desire for a rare and special liquid to pool in the base. In the Czech Republic an analysis of fats from a polypod bowl showed the presence of beeswax. This could have been an aid to waterproofing the vessel. Could yoghurt have been one of the substances associated with such pots?

People have been making yoghurt for over 4,500 years and yoghurt is made in bowls. Yoghurt is well known for having healthy digestive properties and this gives it a special significance, especially in Central and Eastern Europe during the last two millennia. So was yoghurt part of the Beaker ‘Cultural Package’?



The polypod bowl from Newtownbalregan, Co. Louth, on display at the recent AS/ exhibition in County Museum, Dundalk (see pp. 23–5). (Photo: Niall Roycroft)

The presence of very slight sooting on the base of the Newtownbalregan pot feet could indicate where the bowl was placed on some gentle, smoke-free heat, for example a hot, flat stone that still had some ash on it from a fire. Such heat could have kept milk culture warm (38°C) during the seven-hour-plus setting process needed to make yoghurt. The pot’s splayed feet would have aided heat distribution around the bowl. The feet would also have ensured that the pot was stable when the necessary insulation and coverings were removed.



Reconstruction of the Newtownbalregan polypod bowl. (Drawing: Eoin Grogan)



View of the underside of the Newtownbalregan polypod bowl; note the missing foot on the right hand side of the image. (Photo: Eoin Grogan)



Close-up view of the Newtownbalregan polypod bowl. Note the slight sooting on the base of the feet. (Photo: Niall Roycroft)

Digging, data and dissemination

Deirdre McCarthy, NRA Assistant Archaeologist with the North-west Team, provides an update on the web-based NRA Archaeological Database.

From 1992 to 2009 almost 2,300 archaeological sites were excavated on 129 road schemes in Ireland. The bulk of these (83%) have been excavated since 2001 (2007 being a high point, when 653 sites were investigated) and most (92%) were newly discovered during archaeological test-trenching. A Code of Practice agreed between the NRA and the then Department of Arts, Heritage, Gaeltacht and the Islands in 2000 resulted in the employment of a small number of archaeologists by the NRA. A larger number were also employed by local authorities to address national road-related issues and these archaeologists subsequently joined the NRA in 2007. A key element of the work of NRA archaeologists is to ensure the delivery of post-excavation analyses and the dissemination of the site information to the wider public. This is achieved via a range of media, including publications such as this and the NRA scheme monographs. Another key component of the dissemination strategy is the NRA Archaeological Database, launched in 2008 (see *Seanda*, Issue 3 [2008], p. 13).

Created through collaboration between the IT Section and the Archaeology Section of the NRA, the aim of the Archaeological Database is to generate a database of archaeological sites uncovered on road schemes, providing baseline information and allowing for comparison between and quantification of site types, locations and dating periods. It also facilitates site types being examined nationally to see what patterns emerge, which may help in the future prediction of site locations in the landscape. The database is an ongoing project because as the national roads programme continues to be rolled out, the database continues to expand as more new sites are discovered. It is also envisaged that with the continuing development of the database, entries relating to certain key sites will be accompanied by final excavation and specialist reports, as well as site drawings and photographs.

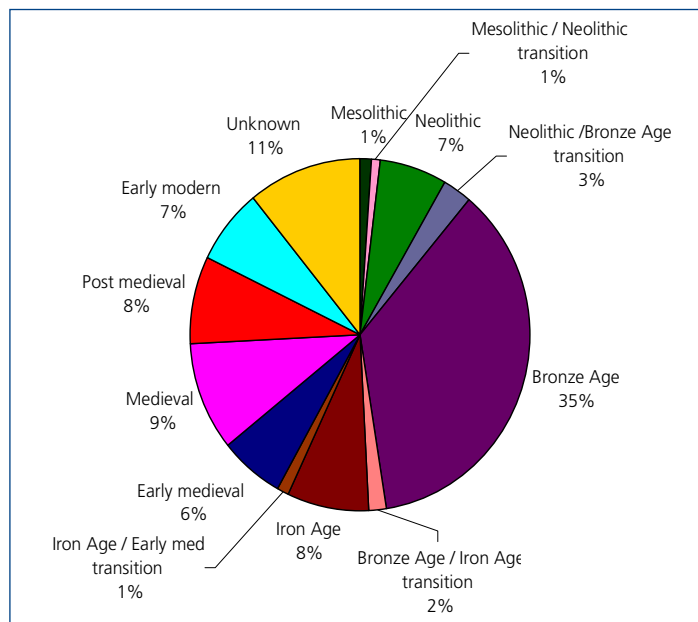
Analysis of the almost 1,000 sites currently on the NRA Archaeological Database reveals some interesting details. The Bronze Age (c. 2400–800 BC) is the most frequently represented period (35%), while the Mesolithic period (c. 8000–4000 BC), perhaps unsurprisingly, is the least frequent (1%). Among the other periods there is a somewhat even spread of sites: 7% Neolithic (c. 4000–2400 BC); 8% Iron Age (c. 800 BC–AD 450); 6% early medieval (c. AD 450–1169); 10% medieval (c. AD 1169–1550); 8% post-medieval (c. AD 1550–1700); and 7% early modern (post-1700). There are also examples of sites spanning time periods, with 7% of sites excavated being transitional and multiperiod. There are some sites (11%) not assigned to any period, generally because of a lack of datable evidence.

The most frequent sites excavated on road schemes are *fulachta fiadh*/burnt mounds and burnt spreads (i.e. spreads of burnt stone and charcoal-rich soil); in fact, over a third (35%) of all sites excavated are of this site type. The majority date from the Bronze Age, but there are examples dating from as early as the Early Neolithic period (c. 4000–3500 BC) and as late as the early medieval era. The data also shows a wide spectrum in relation to size and possible function of these sites, with

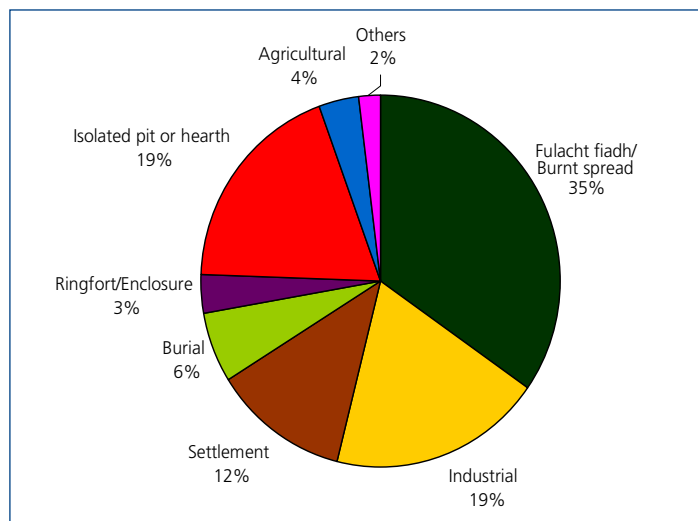
some sites having small, unlined, shallow troughs and others having very large and elaborate timber-lined troughs (see pp. 38–9 for an example).

Analysis of the data also revealed that 19% of sites excavated were industrial in nature, for example metal-working sites, kilns and charcoal-production pits. The other sites discovered on road schemes consist of isolated pits and hearths (19%); settlement sites (12%) comprising the remains of temporary and more permanent structures; burial sites (6%), ranging from single burials to graveyards with the remains of up to 1,000 individuals and both cremations and inhumations; ringforts and enclosures (3%); agricultural sites (4%) consisting of ditches, field boundaries, farm tracks and gullies; and ‘other’ sites (2%) that cannot easily be assigned to any of the above categories.

The NRA Archaeological Database is continually updated as final excavation reports become available for inclusion and can be accessed at www.nra.ie/Archaeology/NRAArchaeologicalDatabase/.



Dating of archaeological sites currently recorded in the NRA Archaeological Database.



Site types currently recorded in the NRA Archaeological Database.

A souterrain at Ballynacarriga 2

Jacinta Kiely, an Excavation Director and Partner in Eachtra Archaeological Projects, details the excavation of a souterrain associated with a cliff-edge fort on the N8 Mitchelstown–Fermoy road scheme.

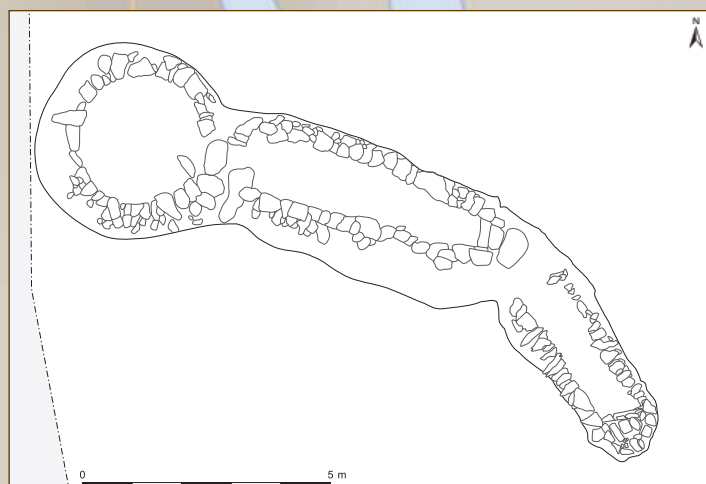
A limestone ridge overlooking the River Funshion in the townland of Ballynacarriga, Co. Cork, was chosen as a settlement site by early medieval people seeking a sense of security beyond that furnished by the average ringfort of the period. Here they built a cliff-edge fort and strengthened its defensive character with the addition of a souterrain (previously recorded in the Record of Monuments and Places as CO027-109). Excavations here in advance of the construction of the N8 Mitchelstown–Fermoy scheme have produced dating evidence indicating that the site was occupied from the sixth to ninth centuries AD.

A souterrain is an underground structure; the term derives from the French *sous*, meaning ‘under’, and *terrain*, meaning ‘ground’. This site type is generally found in association with settlement and church sites, but can also occur in isolation. Over 220 souterrains have been recorded in North Cork. The function of a souterrain was storage and/or refuge. The underground structure would have been suitable for storage of perishable food products at a constant cool temperature and for temporary refuge of people and their valuables. The ease of access, or lack thereof, in relation to the entrance and the passages may be an indication of whether storage or refuge was the primary function of each individual souterrain. Two forms of souterrain have been recorded in Ireland, tunnelled and drystone-built. The component parts of a souterrain are an entrance, a passage or passages and a number of chambers. The chamber is the most important element in the structure.

The souterrrain at Ballynacarriga 2 was drystone-built and comprised an entrance, a passage and a chamber. The entrance was 4.7 m in length by 0.8 m wide and the passage was 5.3 m long, 1.2–0.6 m wide and 0.6 m in height. The construction involved digging three trenches. Drystone walls were built against the side of the entrance and passages trenches and these were capped with a flagstone roof. The passage was accessed from the entrance via two stone steps. The circular chamber was more intricate in design and build, having a corbelled roof. A drystone wall was built against the side of the chamber to a height of



Location of the cliff-edge fort and souterrain at Ballynacarriga 2, Co. Cork, on the bank of the River Funshion. (Drawing: Eachtra Archaeological Projects)



Plan of the souterrain at Ballynacarriga 2. (Drawing: Eachtra Archaeological Projects)



Excavation of the souterrain at Ballynacarriaga 2.
(Photo: John Sunderland)

0.6 m; above this level the wall curved inwards and was built of overlapping stones. Finally, the chamber was capped with a single large capstone. The chamber measured 2.6 m in diameter and was c. 1.2 m in height.

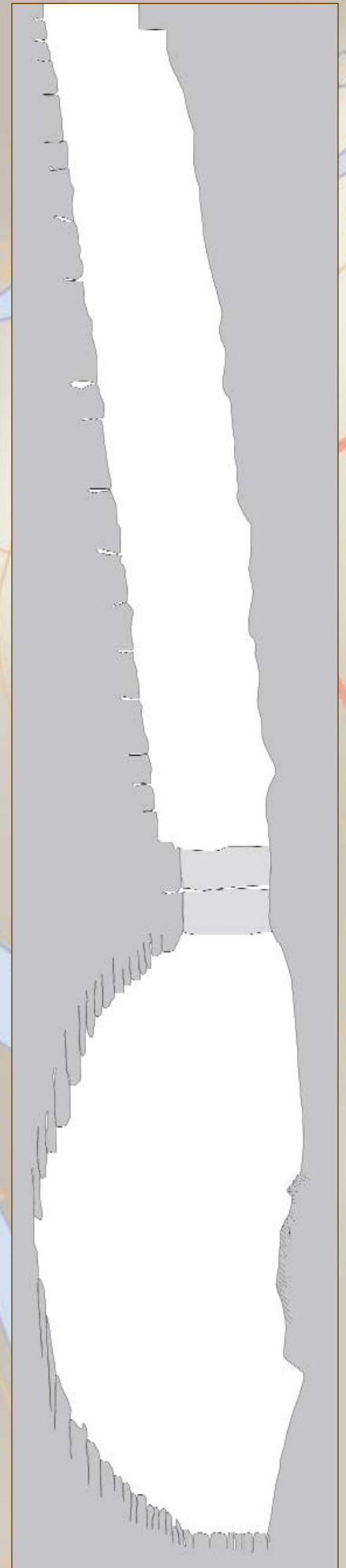
The location of Ballynacarriga 2 on the bank of the River Funshion was strategic in terms of movement of goods and people on the river. Cattle-raiding and slavery were prevalent in the early medieval period and it is not difficult to imagine how useful an underground shelter would be during a raid. The narrow width of the passage, through which an adult could travel only on hands and knees, would suggest that the primary function of the souterrain at Ballynacarriga was refuge, albeit on a temporary basis.



Interior of the passage. (Photo: John Sunderland)



The lintelled roof of the passage. (Photo: John Sunderland)



Simplified profile of the passage and the chamber.
(Drawing: Eachtra Archaeological Projects)



A large team of international archaeologists excavating at Lismullin, Co. Meath, on the M3 Clonee–North of Kells motorway. (Photo: Archaeological Consultancy Services Ltd)

Celtic Tiger archaeology—the view from afar

Brendon Wilkins, Senior Project Manager with Wessex Archaeology in the UK, offers a perspective on Irish archaeology following his time spent excavating here during the ‘Celtic Tiger’ years.

Ten years ago I left my native Yorkshire to work on an archaeological road scheme project in Cork, and I have been moving back and forth between Britain and Ireland ever since. Like Vincent Vega in the opening scene of *Pulp Fiction*, describing to Jules Winnfield why he digs Europe, what has struck me most about working as a commercial archaeologist in both countries are the ‘little differences’. Not just the differences in the archaeological sequence and the remains of the past, but the differences in terms of how the archaeology is actually dug. Example: compared to the long-handled Irish shovel, the British version has a short handle barely 3 ft long, and they swear that anything different would break their backs. And at morning break in Ireland, they eat this thing from a petrol station called a ‘breakfast roll’ containing everything your heart (attack) could desire, as well as a mystery substance called ‘white pudding’. I could go on.

I recently returned home to settle down and work on British road schemes, and the experience has left me reflecting on the passage of the years. Did I learn anything from ‘Celtic Tiger’ archaeology and, if so, what insights would that give me into how archaeology is practiced in my own country? When scholars finally write the history of the Celtic Tiger archaeology boom, there is a strong argument to be made that it began at precisely 9.00 am on 22 February 2002, and finished at exactly 2.00 pm on 6 November 2008. Two NRA seminars were held on both days, and although they did not feel like turning points at the time, hindsight may show that they bookend a period during which Ireland was the best country in the world to be an archaeologist.

The first NRA seminar, in 2002, was intended to open the doors to international archaeological consultancies as construction-led demand for archaeologists far outstripped supply. I was caught up in this first wave of immigrant labour, and eagerly joined the ranks as a journeyman archaeologist. The second seminar, in 2008, unveiled the Department of

Finance's new form of archaeological contract. By that stage I had reached the dizzying heights of project management, and as I looked around the room, not only were there no international companies in attendance but only a handful of Irish companies had come to the table, too.

Commercial archaeology is the canary in the coal-mine—the first business to feel the faintest fluctuations in the health of the wider economy—and the prognosis in Britain in the latter part of 2008 was just as bad as in Ireland. The majority of archaeologists in both countries are employed to work on development-led projects, and their skills are indispensable to anyone with the business confidence to invest in planning permission. This structure, embedding archaeology in the planning process, might be termed 'Rumsfeldian Archaeology' because it is best explained in the words of the existential poet (and previous US Secretary of State for Defence) Donald Rumsfeld's '*Known knowns, known unknowns, and unknown unknowns*' speech.

In both Britain and Ireland large-scale developments must be preceded by an impact assessment, where archaeological remains are a material consideration (if you like, these are our *known knowns*). In the case of road schemes, these known sites will be avoided, where possible, and a desk-based study of maps and documents or other non-invasive techniques will be used to assess the land adjacent to these sites, or our *known unknowns*. If this has archaeological potential, then test-trenches

will have to be excavated to evaluate the depth, nature and extent of archaeological layers to determine whether full excavation should proceed.

What is different in Ireland is that these trenches are not just focused around known areas of potential. In fact, the entire road corridor is comprehensively tested, with a centreline trench running from start to finish designed to find those *unknown unknowns* that, under any other system, could well have fallen through the net. This represents a considerable investment in the 'front-end' of archaeological works prior to construction as compared to the case in Britain, where a much smaller percentage of the road corridor is tested. The bulk of archaeological work on highways projects in the UK is undertaken during construction, with a monitored strip of the road to ensure that no *unknown unknowns* are missed. This is a significant difference, as the Irish system allows for more time to plan for unexpected archaeology that could potentially place the construction schedule in jeopardy.

Perhaps the reason this time-pressured system is manageable in Britain is because they have a fundamentally different approach to excavation. Let's call it the Anglo-Irish disagreement: a presumption to 'total archaeology' in Ireland and 'sample archaeology' in Britain. In the UK the norm is to sample excavate sites, normally at a rate of 10% of all linear features, 50% of discrete features and 100% of structures.



An example of test-trenching on an Irish road scheme. (Photo: John Sunderland)



An Iron Age enclosure being excavated on the N9/N10 Carlow Bypass. (Photo: Headland Archaeology Ltd)

Construction impact is controlled through planning guidance and a problem-orientated methodology of sample excavation is practiced to filter out the irrelevant. In Ireland, all archaeology is treated as potentially unique, requiring 100% excavation and preservation by record. A committed legal framework underwrites all decisions that may potentially impact on the archaeological heritage, and any proposed development must be preceded by full excavation of all sites and features.

But digging larger quantities also entails larger costs, and if this is undertaken in the public interest, then one has to ask if digging more equals value for money? Who does it better, the British or the Irish? Recognising the pervasive cost factor, it sounds like the British are the poor relations, with excavations understaffed and under-resourced—not so much ‘preservation by record’ as ‘destruction in denial’. But they may respond by citing the law of diminishing returns, insisting that the sample approach is actually a better way of filtering the irrelevant, compared to the indiscriminate information-gathering practiced by the Irish model. The Irish may state their defence equally forcefully: the National Monuments Act loves all her children equally, and it is precisely this indiscriminate approach that safeguards the archaeology from commercial pressure.

So what did I learn, personally, moving between Britain and Ireland—two countries separated by a common language? First, that an argument

like this could rage for at least 800 years and still not move to resolution. And secondly, by taking an ‘outsider’ perspective, I can see that archaeologists from both countries have moved independently towards common ground. At the beginning of 2010 the British replaced the planning document that coined the phrase ‘preservation by record’ with a new statement ensuring that archaeology can realise a ‘public benefit’. Similarly in Ireland, the question of whether strategies are fit for purpose is currently under ministerial review, with wide-ranging reforms eagerly anticipated. These policy changes suggest that archaeologists from both countries have been grappling with the inherited shortcomings of their frameworks and principles, and that there is a tremendous amount to gain by learning from each other.

Ultimately, it is this shared understanding that I will take away from my experience working in Ireland. The Celtic Tiger archaeology programme was a golden opportunity for a young archaeologist, and it has left me with a depth and breadth of knowledge and skills that I could hardly have imagined if I had stayed at home in Yorkshire. During those heady years, the calibre of the sites, the scale of the projects and the international make-up of the teams left me constantly amazed that more British archaeologists had not also made the move. To borrow a phrase from another age, ‘bliss was it in that dawn to be alive, but to be young was very heaven!’

Building on a solid foundation: excavations at Rathmorrissy ringfort

Martin Jones, NRA Assistant Archaeologist with the Mid-West Team, and Tony Bartlett, an Excavation Director with Headland Archaeology Ltd, consider the status of the erstwhile inhabitants of an early medieval ringfort excavated on the M17 in County Galway.

At the very southern end of the M17 Galway–Tuam motorway scheme, straddling the townland boundary between Castlelambert and Rathmorrissy, lies a ringfort in gently undulating pastureland with good views in all directions, interrupted occasionally by low drumlins. Approximately 60% of the ringfort lies within the footprint of the proposed new road and is currently being excavated by a team of archaeologists, under the direction of Tony Bartlett, for Headland Archaeology Ltd.

The ringfort itself is quite straightforward. The circular enclosure is 50 m in diameter and univallate, meaning it has a single ditch with an internal bank formed of the upcast material from the digging of the ditch. The V-shaped ditch measures 4 m in width and over 2 m in depth. Alone this would have formed an impressive defence, but coupled with a bank measuring over 1 m in height it would have presented a formidable obstacle to potential raiders. The single entrance to the enclosure is at the north-east and is neatly cobbled. There are indications of a stone revetment on the outside face of the bank. Similar features are suggested at Feerwore Rath, Co. Galway, and at Ardcloon, Co. Mayo, where deposits of stone at the bottom of the ditches were interpreted as the remnants of an external revetment. Walling at either side of the entrance at Rathmorrissy is also suggested, and both this and the revetment were presumably to increase the defensiveness of the enclosure (with the added bonus of being aesthetically pleasing).

Evidence for activity at the interior is slight, in contrast to the obvious effort taken in the construction of the bank and ditch, but what exists is



Sections through the enclosing ditch at Rathmorrissy ringfort, Co. Galway. (Photo: Martin Jones)

impressive. The foundations of two circular structures were found towards the southern limit of the enclosure, some 3 m apart; one represented by a shallow trench (thought to be an animal pen or similar), the other quite clearly a habitation of some sort. A geophysical survey beyond the road corridor indicated no substantial structures in that portion of the fort.

The circular foundation trench of the probable house measures 4.7 m in internal diameter and 5.7 m in external diameter, 0.55 m in average width and 0.5 m in average depth. Large quantities of stone were noted along the entire length of the trench and interpreted as packing that would have supported the load-bearing elements and walls of the house. These organic elements do not often survive, but this house seems to have been burned down, either deliberately or accidentally, so that the burnt stumps of timber planks—and the clay used to pack them in place—

survive *in situ*. Careful excavation revealed what appear to be the remains of at least five timber planks. In addition to these, a composite iron/copper-alloy pin (a possible ring-pin), the complete blade of an iron knife (the handle had long since decayed) and a few fragments of ferrous metal were also found during excavation of the foundation.

A number of other ringforts in mid- and north-west Ireland show similar evidence. Circular or oval structures at Carrigoran, Co. Clare, Mackney, Co. Galway, and Letterkeen, Co. Mayo, were found to measure between 4.8 and 5.4 m in diameter and showed evidence of having been post- or plank-built. At House 1 (4.6 m in diameter), Lislackagh, Co. Mayo, the burnt remains of wattle-and-daub walls (apparently burnt *in situ*) were noted and part of a bronze pinhead was also found during excavation of the foundation remains. At the Letterkeen site a bronze pin was found in the foundation trench and a bronze pin was also discovered during excavations at Ardcloon, Co. Mayo.



Detail of the packing stones in the foundation trench of the roundhouse. (Photo: Tony Bartlett)



The entrance to the roundhouse. (Photo: Tony Bartlett)

The size of the house at Rathmorrissey suggests that the site was inhabited by an *ócaire*; a non-*nemed* (literally ‘sacred, holy’, but more accurately meaning ‘privileged’ and referring to kings or lords, clerics and poets) freeman. The term can be translated as a ‘young freeman’ who would have owned his own land while being a *céile* (or client) of a lord. From this he would have received a fief of eight cows and in return he provided food-rent and services. The eighth-century law-tract *Críth Gablach* gives a quite detailed account of the property that someone of *ócaire* status held, part of which was a dwelling-house of 5.7 m (in diameter) and an outhouse of 4 m. It is not specifically stated, though it can reasonably be assumed, that this measurement for the dwelling-house was an external diameter. That being the case it ties in exactly with the dimensions for the habitation structure at Rathmorrissey.

The entrance to the house faces north-east—towards the entrance to the ringfort itself and the other structure to the immediate north—and measures 0.8 m in width. The close siting of this other structure is also

interesting. Excavation evidence currently suggests that it may be an animal pen of some sort and written evidence seems to support this. In *Ancient Laws of Ireland* archaeologist A T Lucas states that up to four structures, ‘the house [of the master] ... and of the fold of sheep, and of the byres of the calves and of the oxen’, were common within an enclosure.

Of 128 ringforts excavated nationally between 1930 and 2004, a large proportion may represent examples of lower-status settlements, based on quantities of domestic, agricultural or industrial items found during excavation. The principal function of many of these may have been the corralling of animals and they all seem to share characteristics, including finds of low quality, quantity, or both, as well as evidence for a relatively short period of occupation. This would seem to support habitation, at Rathmorrissey and generally, by the lower social grades of freemen (*ócaire* and *bóaire* farmers) described in the seventh- and eighth-century historical sources.



The roundhouse at Rathmorrissey ringfort. (Photo: Tony Bartlett)

Death remembered at Mullagh, Co. Longford

Finola O'Carroll, co-founder and senior archaeological partner of CRDS Ltd, speculates on a forgotten medieval cemetery on the N5 Longford Bypass.

The long forgotten graves of 56 people buried on a low-lying hill surrounded by boggy land were excavated recently at Mullagh, Co. Longford, 1.95 km west of Longford town. The site, which was found during testing by TVAS Ltd in advance of the construction of the N5 Longford Bypass, was excavated in summer 2009 by Excavation Director Mandy Stephens and her team from CRDS Ltd. A cereal-drying kiln was situated on the crest of the hill in the west of the site and evidence of medieval agricultural activity, in the form of ditches and gullies, was also uncovered.

The cemetery was located at the northern end of the site and extends beyond its limits, with the densest cluster of graves in the west of the area. These graves were examined by Osteoarchaeologist Ciara Travers of CRDS Ltd. There were 38 adults and 18 juveniles and most of the remains were in a poor state of preservation. Many were only partly preserved and they fragmented on lifting—the result of later agricultural activity and soil acidity.

Most of the burials were face-up and lay with their heads to the west and feet to the east. This is in line with the Christian tradition of burying the dead with their heads positioned to face the rising sun. Exceptions to this were four individuals who were buried with their heads to the east, another that was buried with its head to the south, and one with its head to the north. The position of the burials, with feet and knees close together and hands around the pelvic area, suggests that they were wrapped in shrouds or winding sheets of some description, although no shroud pins were recovered.

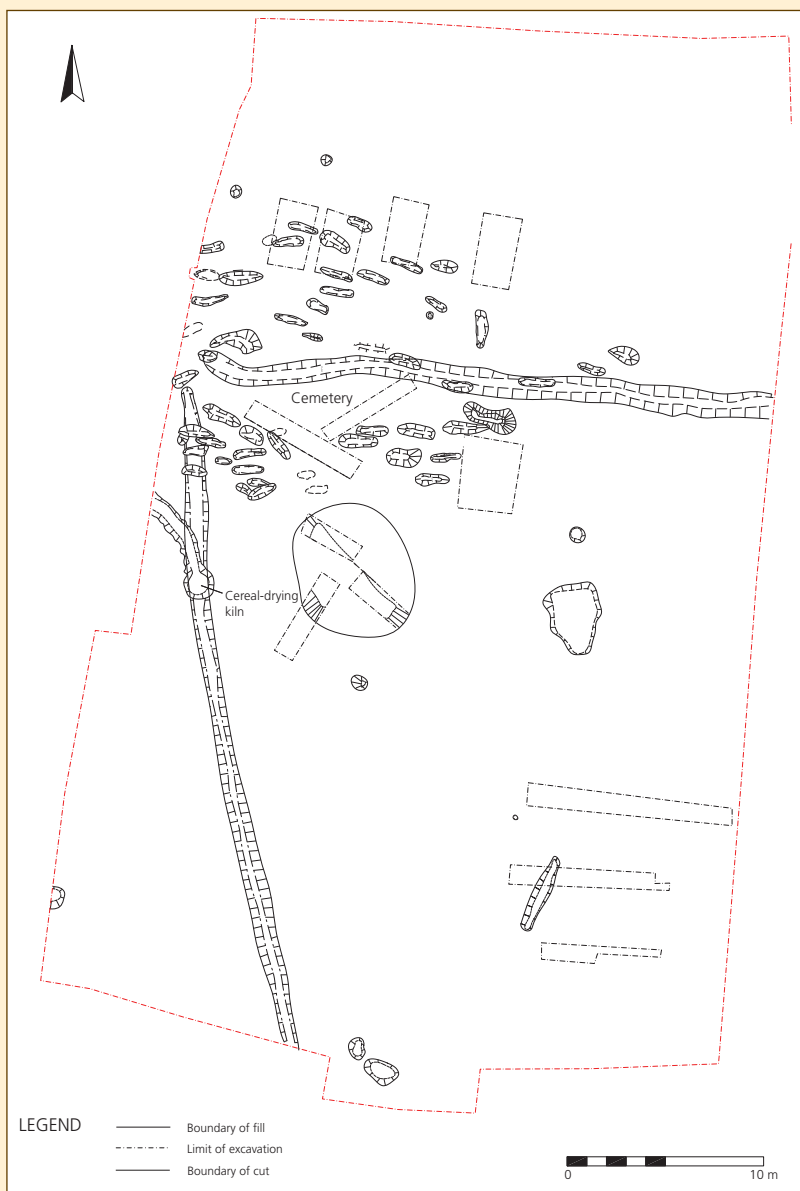
One individual, a late middle-aged male, was interred prone (or face-down) in the grave. His left arm was bent backwards and flexed at the elbow, with the lower arm and hand resting beneath his torso. His right arm was extended along the right side and twisted backwards awkwardly and his legs were spread and flexed to the left. Prone burials are often seen as a mark of disrespect to the individual, and the awkward positioning of this burial indicates that this person was not shrouded and perhaps was simply thrown into the grave.

A number of the graves were intercut, suggesting possible family plots. So far five burials have been dated by radiocarbon, giving a range roughly from the late 14th century to the early/mid-18th century, spanning a period of approximately 250–300 years. The earliest dated burial, a woman aged between 25 and 35 years old, dated to AD 1320–1440.

The site was unknown prior to testing and has no apparent association with a church or other ecclesiastic foundation in the

area. Although a now unknown church site may have existed beyond the limits of this excavation, the cemetery may be associated with a potential castle site (Record of Monuments and Places No. LF013-023) of uncertain date, located a short distance to the north-west, in the grounds of Mullagh House, 300 m from the cemetery. The population buried in the cemetery may be from an adjacent, but unidentified settlement associated with the castle and/or Mullagh House. Certainly the topography of the area would have been suitable for settlement as it offered natural defence, well-drained agricultural land and other natural resources.

The field pattern recorded on the first edition (1837) Ordnance Survey 6-inch map of the area suggests the presence of a large, possibly subcircular enclosure around Mullagh House and the castle site. If such existed, it may well have enclosed lands adjacent to the castle, including



Post-excavation plan of the cemetery at Mullagh, Co. Longford. (Drawing: CRDS Ltd)

the cemetery. No evidence of an enclosure was found during the testing or full excavation of the site. The 1655 Down Survey map depicts a substantial dwelling at the top of a hill in Mullagh townland and belonging to a Mr John Kennedy. The 17th century was one of the bloodiest in Ireland's history. Two periods of civil war (1641–53 and 1689–91) caused huge loss of life and resulted in the dispossession of the Irish Catholic landowning class and their subordination under the Penal Laws. By the time of the 1659 census, approximately 15% of the population of Longford was recorded as Protestant. The relative size of the Protestant population would have necessitated leasing land to Catholics, who then became substantial tenants on Protestant-owned farms.

The Mullagh cemetery may have been used by Mr Kennedy and his Protestant settler tenants during a period when no church existed in Longford for the Protestant community. An existing, though possibly unmarked, burial-ground may have been appropriated by them. Alternatively, it may have been used by Catholic tenants and labourers restricted in practising their faith under the Penal Laws.



Burial of a female, aged between 20 and 30 years, face-up and with evidence for shrouding. (Photo: CRDS Ltd)



Burial of a male, 33–45 years old, lying face-down, with no evidence for binding or shrouding. (Photo: CRDS Ltd)



Extract from the 1655 Down Survey parish map depicting a substantial dwelling at Mullagh belonging to 'Mr. John Kennedy'. (Reproduced with the permission of the Board of the National Library of Ireland)

Death of a graveyard

When people read about the excavation of a previously unknown historic burial-ground, they often find it difficult to fathom how so central a place in the life of a community could dissolve away into the landscape, lost from local memory until rediscovered, by chance, centuries later. The loss of so many people from the countryside through death and emigration during the Famine and later through urbanisation are likely the chief causes of such deficits in local folkloric knowledge. Of course, the redistribution of Catholic land confiscated during the Plantations of the 16th and 17th centuries will also have had an impact.

In *Historical Notes and Stories of the County Longford*, published in 1886, James P Farrell records the destruction of Kilbreeda Graveyard at Corteen in Mullolagher townland, c. 1.5 km south-west of Mullagh. Writing of one of the first members of the Levinge family to live there, Farrell states that he was a man of 'eccentric disposition, violent temper, and uncertain habits'. Kilbreeda Graveyard was located at one end of

his farm and shortly after taking possession of the lands from the Kennedys of Mullagh House, Mr Levinge forbade interments there. Farrell documents what reputedly followed:

'... the next spring he set horses and plough to work, and, having tilled the graveyard, sowed a large crop of oats in it. In the course of the cultivation he dug up headstones, bones, skulls, and pieces of coffins; but, disregarding the awful sacrilege he was committing—a sacrilege regarded with more than horror by all his Catholic neighbours—he persisted in cultivating the piece of land, until he left it down in grass again, leaving, as the only memento of Kilbreeda Graveyard, a few old stones, which now lie in the ditch that once bounded the cemetery.'

Undoubtedly, this was a terrible loss, but more was to follow. His successor 'took another queer notion, which was to level all the existing forts and till their interior level portions'.

Michael Stanley, NRA Archaeologist, NRA Head Office.

An unparalleled Neolithic enclosure and settlement at Tullahedy

Excavation Director Hilary Kelleher provides a summary of her investigation of a unique Neolithic settlement at Tullahedy, Co. Tipperary, which she excavated on behalf of the Department of Archaeology, University College Cork.

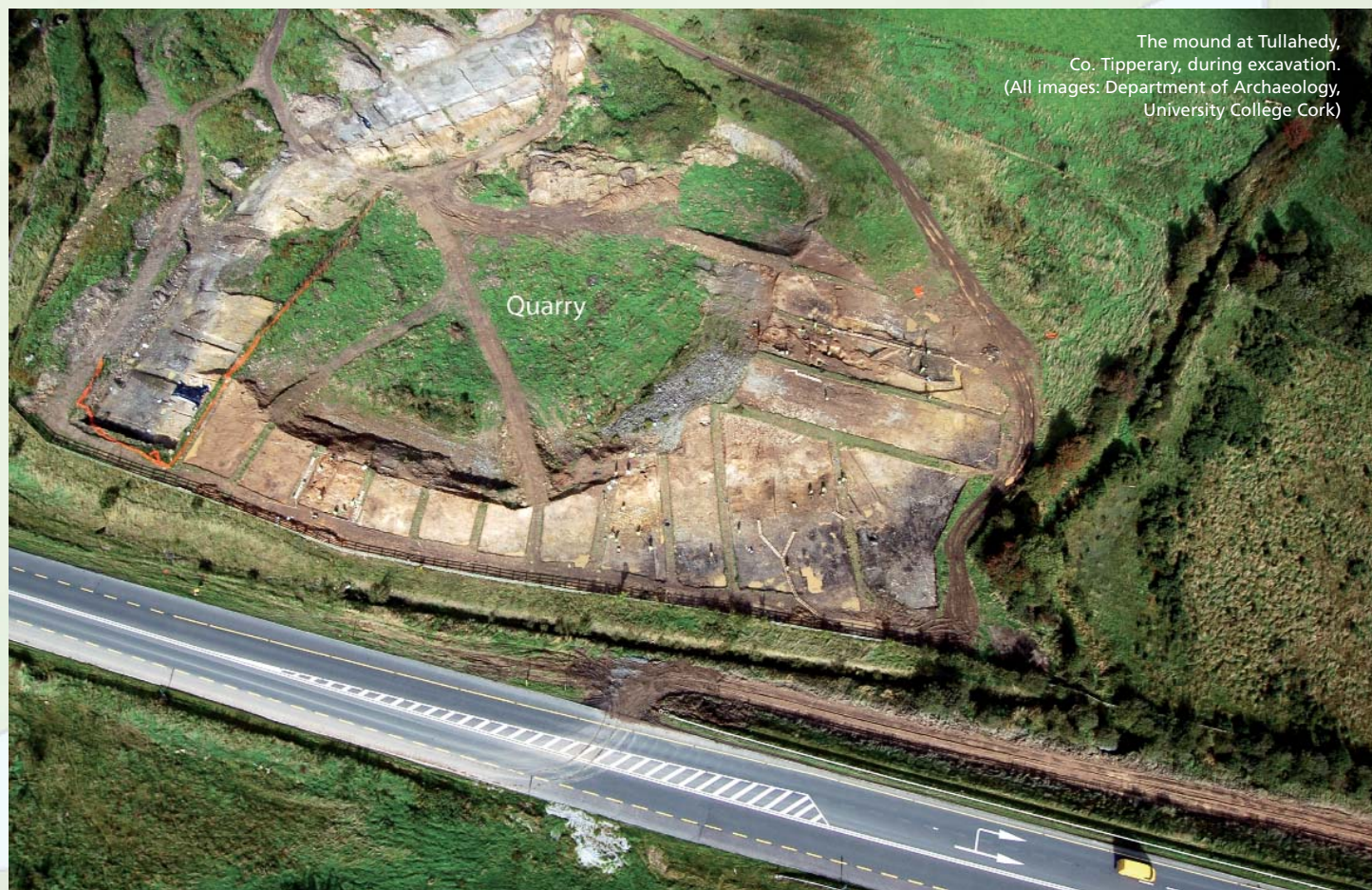
Sometime during the fourth millennium BC Neolithic people living in the North Tipperary region embarked on a major landscaping project on a natural, glacially derived hillock at Tullahedy, Nenagh, c. 5 km east of Lough Derg. On this mound they established an enclosed settlement complex, much of which has been quarried in the past. All that remained on excavation was undisturbed archaeological remains on the lower slopes of the mound. In 1997–8 this site was partly excavated by Cia McConway of Archaeological Development Services Ltd in advance of the construction of the N7 Nenagh Bypass; further excavations in 2006 were necessitated by the construction of the M7 Nenagh–Limerick motorway.

Tullahedy is interpreted as an enclosed Neolithic settlement site and available radiocarbon dates place the activity in the period 3700–3390 BC. At the time of settlement in Tullahedy, sea-levels were higher than today and the low-lying hinterland was flooded below the 50 foot contour.

Flat peatland around the site now marks the former lake. The surrounding landscape was a large ribbon-type lake, extending into the River Shannon and presumably providing egress and access via boat for the inhabitants.

A lake edge that was probably contemporary with the Neolithic settlement was recorded on the south and south-east side and must have formed a natural barrier or enclosing feature on that side. A band of cobbles marked the former shoreline and the former lake was visible as peat that formed over lacustrine marl. The artificially constructed enclosing element was a palisade along the north-west and west side of this glacial mound. The palisade was constructed of oak planks set in a slot-trench and the recorded length on the excavation was c. 96 m. A radiocarbon date of 3641–3524 BC from the palisade shows that it was contemporary with the settlement.

The extant settlement evidence comprised two Neolithic houses, with associated hearths, built within a hollow on the south-east side of the mound. The hollow may originally have been a glacial kettle-hole (a shallow, sediment-filled body of water formed by retreating glaciers) that was deepened to provide shelter for the houses. The view from the houses





Reconstruction of the landscape at Tullahedy in the Neolithic period.

would have been towards the lake. The houses were rectangular in plan and it is estimated that one structure was about 6–7 m long and 5 m wide, while the second structure was at least 9 m long and 7 m wide. The walls were probably oak planks set in foundation trenches. Some of the packing stones were quern-stones, perhaps reused deliberately as part of the foundations in some ritual act, much as we do today when coins are buried in house foundations. Dates for the structures are c. 3650 BC. Remains of a third Neolithic house were excavated near the lakeshore, and this was again rectangular in plan but relatively small, measuring only 3.5 m wide and 4 m long.

One of the most remarkable aspects of the site was the number of pits that were recorded. These extended across the entire site, with exceptionally large earth-cut pits on the south-west where the ground was low-lying; but pits were also recorded upslope, where they were cut into the glacial mound. Finds from the pits included stone tools, such as polished stone axeheads, pottery and charred plant remains, including wheat, oats and barley. The interpretation of these pits may be, on the most banal level, that they were rubbish dumps, but there may also have been some type of ritual



Old lakeshore marked by cobbled surface.



Palisade trench enclosing the settlement.



One of the houses during excavation.

action whereby precious material was returned to the earth from which it came.

The Neolithic houses may have burnt down and once the buildings were abandoned, they were covered over by charcoal-rich clay layers. Finds from these layers included polished stone axeheads, arrowheads, scrapers, pottery and the largest quantity and greatest variety of plant remains on the site. Large quantities of hazelnut shell fragments were recorded in almost every layer. Cereal grains of mainly wheat and some barley and a substantial quantity of apple pips were found in the clay layers. A radiocarbon date of 3699–3639 BC dates the layers used to seal the abandoned settlement. Charcoal-rich clay layers elsewhere on the site were contemporary with the post-abandonment of the Neolithic houses, and a considerable amount of pottery suggested that the layers derived from habitation deposits. These post-abandonment layers also sealed the majority of the pits.

A later phase of Neolithic activity is represented by the introduction of layers of over 1 m of glacial till onto the lower slope. This activity significantly altered the contours of the mound. Layers of mixed sand/silt/gravel sealed the old ground surface. The introduced glacial till extended from the lower surrounding boggy ground on the north and west to the shoreline of the former lake on the south and south-east. Finds recovered during the excavation, including 50% of the stone tools, pottery and stone axeheads, were retrieved from these layers. The finds suggest that the infilling of the lower slope dates from the Middle Neolithic period (c. 3500–2800 BC) through to the Early Bronze Age (c. 2400–1600 BC).

A long, linear scarping or ditch on the north-western side of the mound was cut through the introduced infill layers and the old ground surface towards the base of the mound. A second palisade was erected in a trench that also cut into the surface of the infill layers. The stone tools



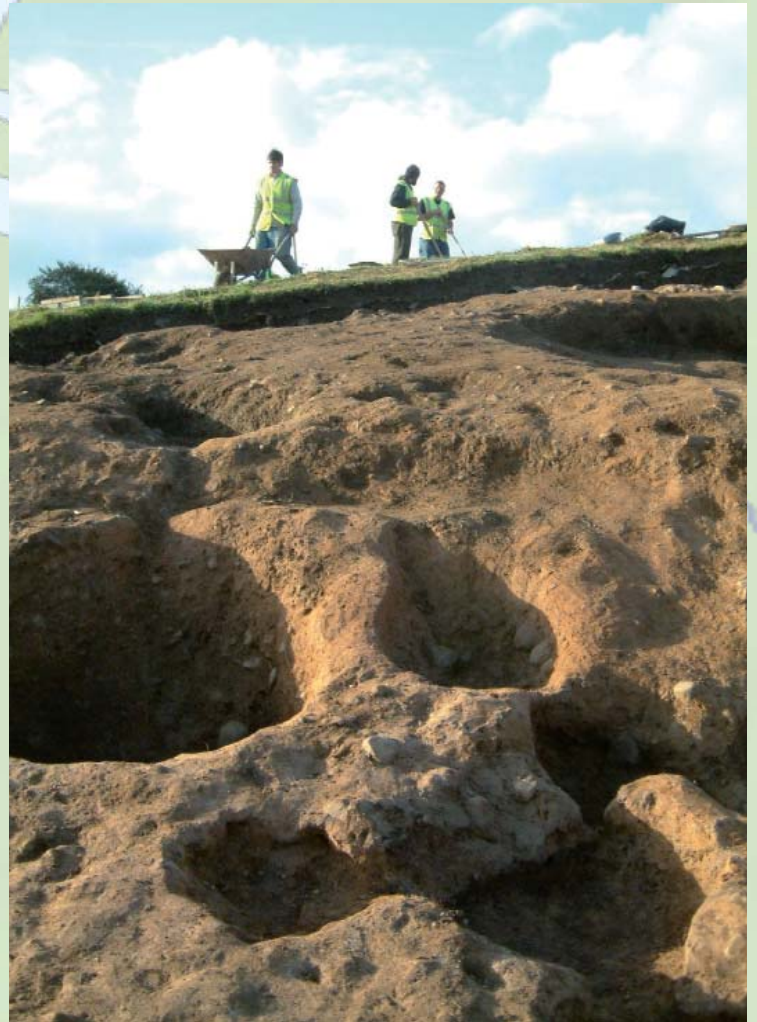
Stone packing, including quern-stone fragments, in house foundation trench.

from the trench fill suggest this palisade was also Neolithic in date. This feature enclosed the land-facing side of the mound, but had a larger circumference than the earlier palisade. A small group of shallow circular pits, packed with charcoal-rich soil and burnt clay, were cut into the upper levels of the introduced infill layers.

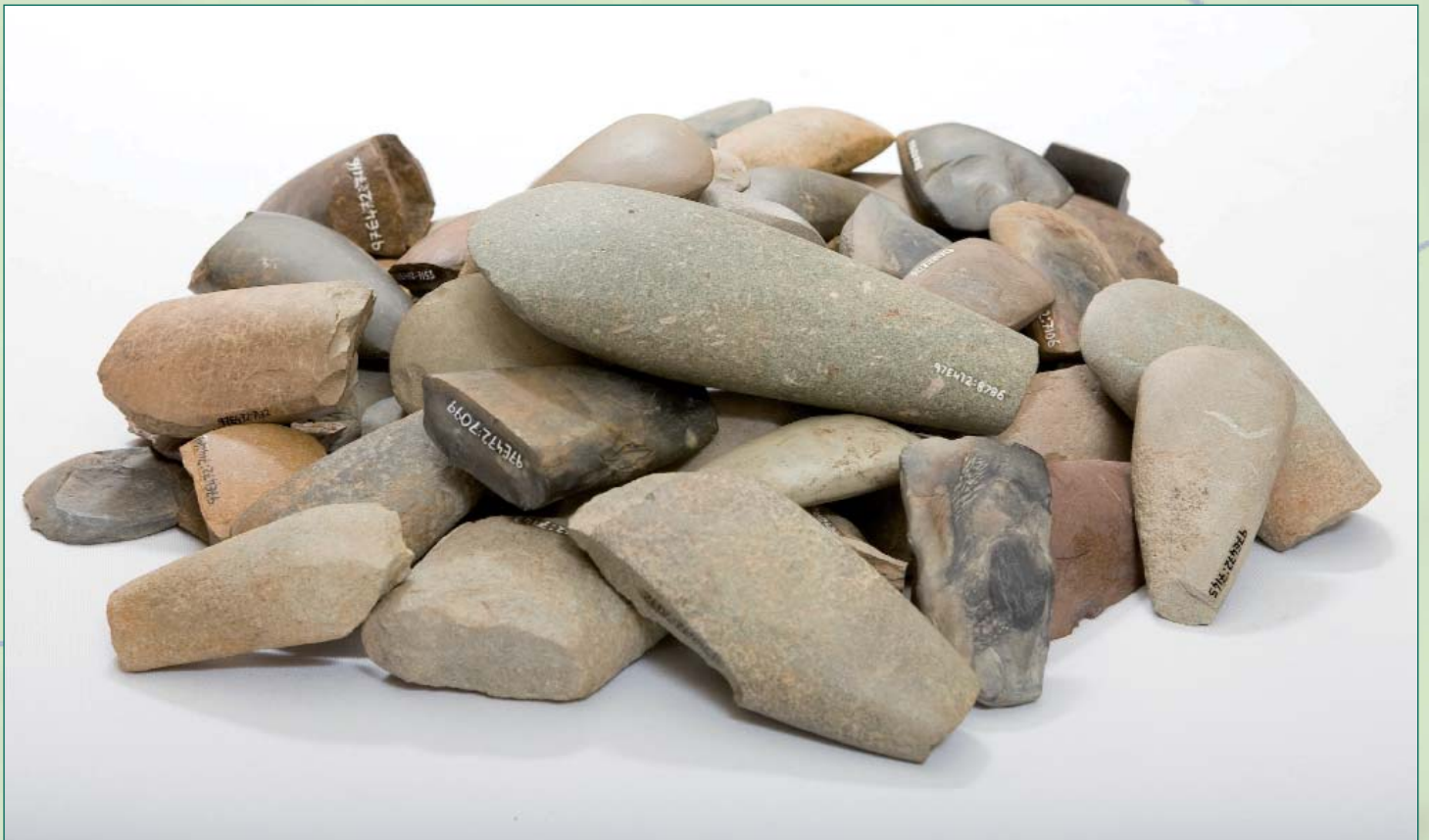
High-quality artefacts were retrieved from nearly all contexts throughout the site, including complete and fragmentary polished stone axeheads, mainly chert arrowheads and scrapers and pottery. The high number of axeheads and arrowheads is atypical of occupational debris and may suggest either a manufacturing or/and ritual element to the site. Very few of the stone tools were found as finished artefacts, suggesting some on-site knapping with the finished tools being produced elsewhere, perhaps on-site at locations within the enclosure long since damaged by quarrying. This large Neolithic enclosed site is currently unparalleled in the known Irish archaeological record and a full publication on the excavation results from Tullahedy is currently in preparation.



Neolithic pottery from Tullahedy.



Pits adjacent to the houses.



A selection of stone axeheads recovered at Tullahedy.

The importance of ‘When?’



The science of dating: part of an Accelerator Mass Spectrometer used for radiocarbon dating. (Photo: Barrie Hartwell, Queens University, Belfast)

Ken Hanley, NRA Archaeologist with the Southern Team, examines how scientific and technological advances continue to improve the range and accuracy of dating methods available to archaeologists.

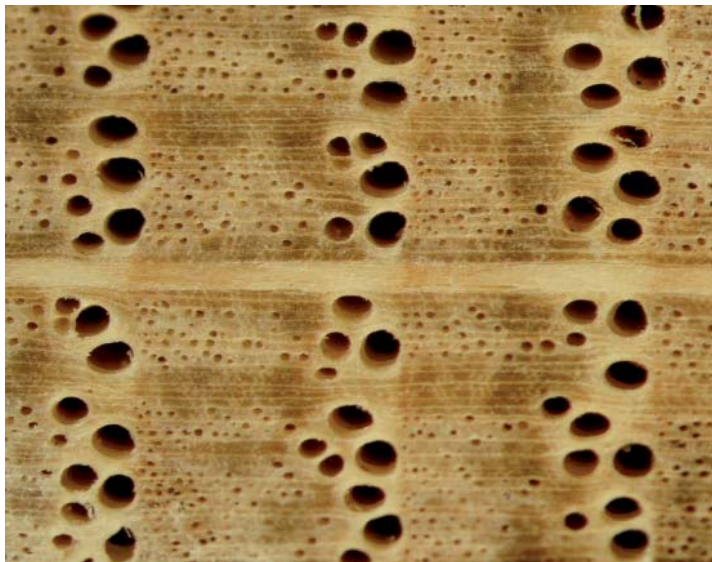
‘Time is a brisk wind, for each hour it brings something new ... but who can understand and measure its sharp breath, its mystery and its design?’

Paracelsus (1493?–1541)

Time is the currency of archaeology. The term ‘archaeology’ is derived from the Greek word *arkhaiologi* (*arkhaios* meaning ‘ancient’ and *logi* meaning ‘discourse or study’). Archaeology is the study of past human cultures and their environments, primarily through the analysis of

material remains. Fundamental to archaeology is an understanding of *when* things happened. Therefore the history of archaeology as a discipline is intertwined with the history of attempts to improve archaeological dating methods.

At its most basic level, archaeologists assess the date of an artefact, event or site by using two broad techniques: relative dating and absolute dating. Relative dating is intuitive and involves assessing the age of something relative to something else. The most widely used application is stratigraphy and the Law of Superposition, borrowed from Geology. In simple terms, this law states that in normal conditions of deposition, younger layers will be deposited on top of pre-existing (and therefore



A close-up of two complete annual growth rings from a sample of oak. The larger vessels are the spring growth, which takes place during late April–May or early June, depending on the tree and the weather at this time. The summer growth is more fibrous and has smaller vessels. The tree is then dormant from November to March/April and the next ring starts with the larger vessels for the next year. (Photo: David Brown, Queen's University, Belfast)

older) layers. So, when archaeologists see a deposit lying over, or cut into, an underlying deposit, then the underlying deposit is deemed to be older *relative* to the upper deposit. In addition, any artefacts from the underlying deposit would most likely be older than artefacts in the upper deposit.

Stemming from the Law of Superimposition is another relative dating technique called cross-dating. This technique identifies consistencies in the stratigraphy from within a site, or even across multiple sites, to help determine if archaeological events are of equal age, in *relative* terms. Assume an ancient volcano (of known date) had erupted in the Mediterranean region and that excavations of several neighbouring sites revealed a thick volcanic ash deposit sandwiched between other layers. Cross-dating might suggest that the ash layer from each site originated from the eruption and was therefore of equal age.

By using a technique called Seriation, relative dating can also be applied to artefacts. Seriation is based on the concept that things change over time and that the sequence of change (seriation) can be modeled and used to estimate the relative age of artefacts, often with remarkable precision. For example, based on the sequence of technological change involved, we can deduce with a high degree of confidence the *relative* ages of a gramophone, a record player and an iPod, even if we don't know the precise age of each. While sounding simplistic, these long established techniques continue to be powerful tools, enabling archaeologists to devise quite complex models of how archaeological sites and technologies developed over time. However, while relative dates will always be extremely useful, the search for absolute dates remains an on-going focus of archaeological investigation: when, precisely, did events occur?

As the name suggests, absolute dating (in contrast to relative dating) attempts to determine a more precise, calendar date for artefacts, events or sites. It is rare, however, that absolute dating methods will deliver a fixed date or year, although some methods (see below) can. The most direct absolute dating method is where a known date (e.g. a known historical event or a date-inscribed object) can be attributed to an archaeological deposit or find. A very successful absolute dating method is dendrochronology or tree-ring dating (see *Seanda*, Issue 4 [2009], p. 45). This method exploits the fact that most trees experience annual

cell growth increments to their trunks. These tend to be larger in spring and summer and smaller in winter months, leading to the development of individual tree-rings we can see and measure. Depending on the external environmental conditions, the rates of growth can vary and by matching the pattern of rings from a sample of, say, oak wood to a known (and dated) tree-ring sequence, archaeologists can in many cases derive a very accurate date for the wood sample and, by association, the layer, event or find from which it came. Its limitations, however, are obvious: dates are only possible from suitable wood with sufficient tree-rings present for comparison.

Radiocarbon dating is by far the most common method of absolute dating used by archaeologists. Working on the discovery that all living matter absorbs isotopes of a carbon called Carbon-14 (or ^{14}C) and that on death these isotopes break down at a known rate, scientists are able to establish the age of an archaeological sample by measuring one of the resulting decay products (known as conventional radiocarbon dating) or by directly measuring the proportional number of ^{14}C atoms relative to the ^{13}C or ^{12}C isotopes in the sample (known as Accelerator Mass Spectrometry (or AMS) dating). However, radiocarbon dating still involves a degree of uncertainty. When samples like charcoal, bone or shell are radiocarbon-dated, the result from the laboratory tends to be a date range that is typically based on a probability rate of around 95.4%. A sample date range may be 5725–5580 cal. BC, the abbreviation 'cal.' implying the measured radiocarbon reading has been calibrated to give a calendar date range. Recent statistical improvements have helped significantly to fine-tune the date ranges offered by traditional radiocarbon dating.

In October 2009 the School of Geography, Archaeology & Paleocology at Queen's University, Belfast, held a workshop on *Dealing with Archaeological Dates*. The workshop was organised in association with the college's ^{14}C Chrono Laboratory and with University of Oxford, and was funded by the Heritage Council as part of the *Cultivating Societies* strand of the Irish National Strategic Archaeological Research (INSTAR) programme (see *Seanda*, Issue 4 [2009], p. 6). The workshop included a practical demonstration on the application of Bayesian modeling within radiocarbon date analysis, using the OxCal software programme developed and maintained by Christopher Bronk Ramsey at University of Oxford and available free to download at <http://c14.arch.ox.ac.uk>. Not only does the software allow the user to calculate the probable age ranges for scientifically dated organic samples (charcoal, wood, bone, etc.), but by using Bayesian modeling it also allows the user to apply knowledge about the grouping of known events (either general knowledge or knowledge of specific stratigraphic relationships) to narrow down the probable age ranges of events, often with remarkable improvements. Bayesian modeling derives from Bayesian statistics, which is based on Bayes' Theorem, a novel approach to statistics devised by Reverend Thomas Bayes. (His theorem was only discovered after his death and was published by a friend in 1763.)

Learning from the INSTAR workshop, the following is a simple example devised to show the value of Bayesian modeling (using OxCal v4.1.5). Let us consider that we have excavated a hypothetical site, 'Site A', which contained the footprint of a house and some associated pits. Based on the radiocarbon dates received, we know that the site is Mesolithic in date (early sixth millennium BC), which is helpful, but can we do better? The following demonstrates some basic applications of Bayesian modeling to help solve the question of when our hypothetical site was in use.

<i>Sample ref.</i>	<i>Sampled material</i>	<i>Context of sample</i>	<i>Measured years BP (before present)</i>	<i>Measured 2-sigma calibrated date</i>
Sample 1	Charred grain seed	Fill of pit that is truncated by house	6750 ± 25	5710–5626 cal. BC
Sample 2	Charred hazelnut shell	Packing fill from house post-hole 1	6800 ± 30	5731–5640 cal. BC
Sample 3	Charred hazelnut shell	Packing fill from house post-hole 2	6760 ± 25	5713–5630 cal. BC
Sample 4	Charred hazelnut shell	Packing fill from house post-hole 3	6735 ± 23	5708–5619 cal. BC
Sample 5	Charred grain seed	Fill of pit that truncates house	6750 ± 22	5709–5626 cal. BC

Five samples are dated. Three (Samples 2–4) belong to a suspected house structure. Sample 1 pre-dates the house and Sample 5 post-dates it.

Using the OxCal software to simply plot the date ranges derived from the house (Samples 2–4), we get the resulting plot in Figure 1. This gives an overall date range of 5731–5619 cal. BC (112 years). However, 112 years is a multi-generational range and as a date may not be specific enough.

The OxCal programme can improve on this by grouping the house dates in a sequenced phase (Figure 2). The Bayesian model iteratively assesses the statistical likelihood of these three dates occurring in these precise ranges within a boundary of probability. The result is a revised-down date range of 5720–5624 cal. BC (96 years)—better! The degree of statistical agreement with the modeling procedures is indicated by the agreement indices. These are output as part of each model. The key agreement indices are as follows.

Model agreement index: A_{model}

This is used to see how likely each model is as a whole, given the data. This agreement index should score in excess of 60 (%) for the model to be considered likely.

Individual agreement index: A_i

This is used to assess which samples (if any) do not agree with the model. Again, this agreement index should score in excess of 60 (%) for an individual sample to be considered likely to agree with the model.

The model in Figure 2 records a model index agreement score (A_{model}) of 93% for the model as a whole and an individual agreement indices (A_i) score of 90% for Sample 2, of 108% for Sample 3 and of 95% for Sample 4.

There is still further room for improvement, however. By applying some knowledge of the stratigraphy from the site we can include the date (Sample 1) retrieved from a pit truncated by our hypothetical house and

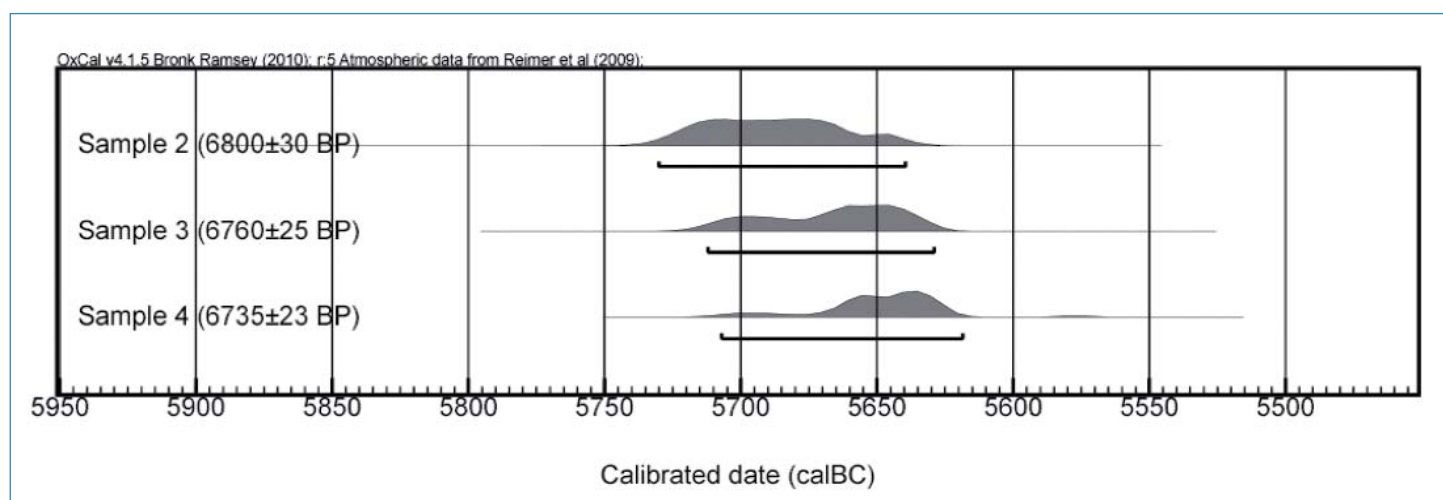


Figure 1: Plot of unmodeled calibrated date ranges for a hypothetical house at Site A.

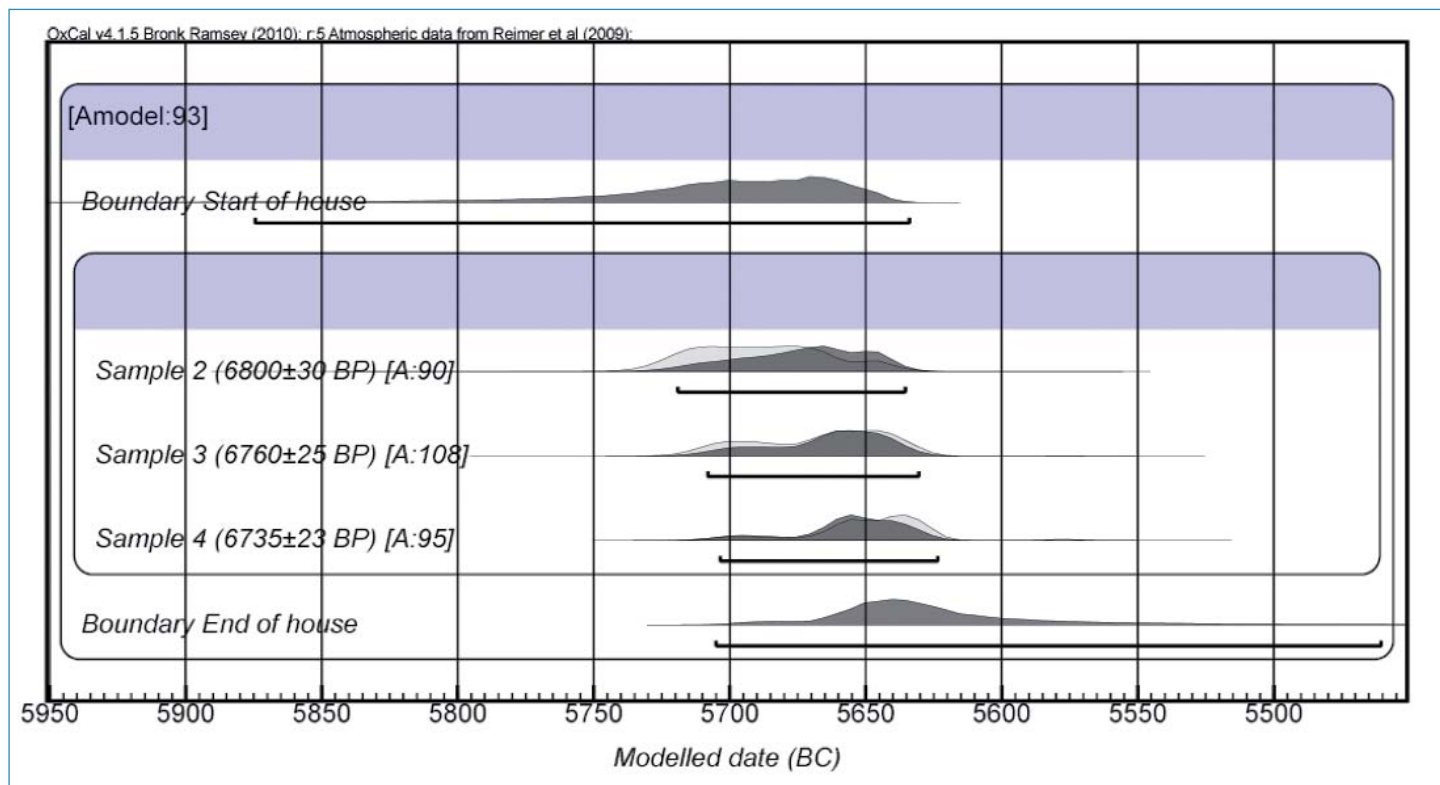


Figure 2: Plot of modeled calibrated date ranges for hypothetical Site A. Note slight fine-tuning of date ranges for Samples 2–4.

another (Sample 5) from a pit cutting across (and therefore older than) the house. These dates act as constraints within the model, and by incorporating this knowledge (Figure 3) the resulting date ranges for the house (Samples 2–4) are refined further (with a 95.4% probability), down to 5684–5633 cal. BC (51 years). In fact, the model suggests, with a (still high) 68.2% probability, that the date range may be 5665–5643 cal. BC—a mere 22 years! This ties down the date range to one or (at most) two generations and is a significant improvement on the 112-year range produced by the standard, unmodeled radiocarbon analysis.

Scientific and technological advances continue to improve the range and accuracy of dating methods available to archaeologists. Over the last two decades or so the established Irish archaeological record has been re-written, to a significant degree, as a result of the increasing use of new and improved dating techniques. All human action happens in context and to fully understand how past societies developed we need to understand, from the micro level to the macro level, when the sequences and groupings of events occurred. This allows us to see our past in motion; without it, all turns to stone.

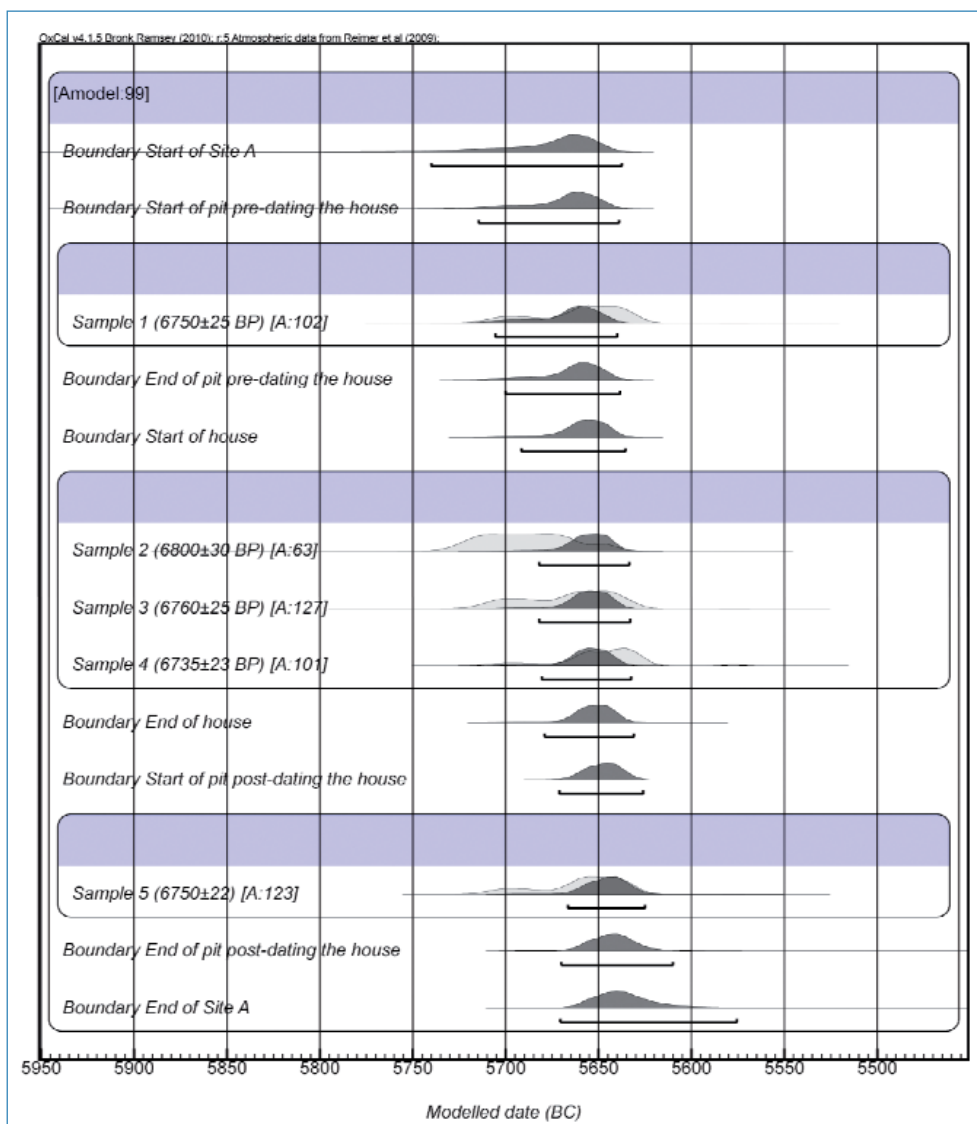
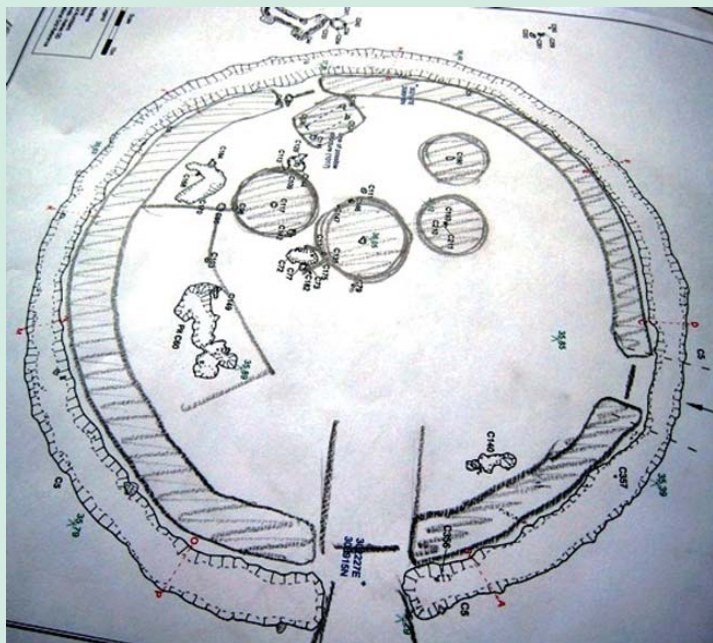


Figure 3: Stratigraphic knowledge applied to the model, offering greatly improved date ranges for Samples 2–4.

The leaping faith of reconstruction



Oblique photo of a plan of a ringfort excavated at Newtownbalregan, with conjectured banks and buildings. (Photo: Niall Roycroft, based on excavated evidence from David Bayley, IAC Ltd)

Niall Roycroft, NRA Archaeologist with the Eastern Team, offers some speculative reconstructions of five sites excavated on two road schemes in north County Louth.

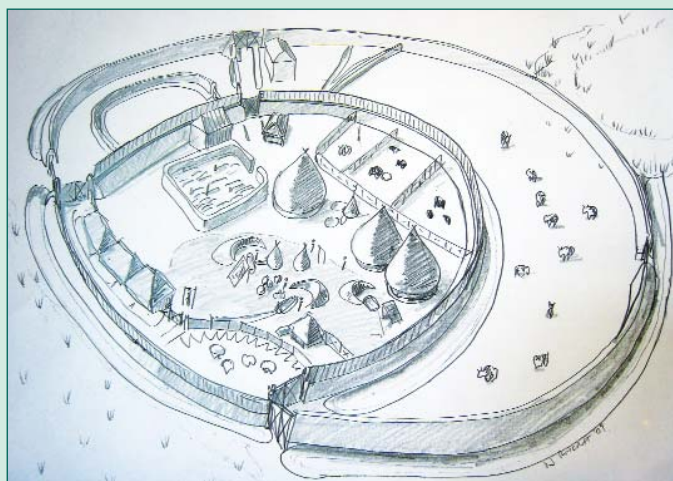
‘There’s no evidence for that’ is a common cry from the post-excavation room. The phrase is used to maintain a sterile and logic-based formula

of reporting. Without empirical evidence, there is no proof. However, one of the first things to accept for many periods of Irish rural archaeology is that there is often very little factual evidence for anything! If we relied solely on what was actually found and what could be wholly interpreted as proven correct, our picture of the past would be very bare indeed. There are ‘facts’, of course, but of necessity there must also be conjecture.

This leads to two schools of thought. First is interpretation based solely on the few recognisable facts, leaving all other ideas to low-grade conjecture. The second is to interpret the site primarily on conjecture (professional interpretations of land use, function and layout), based on a few low-grade facts. In reality, of course, both methods are essential to the reasoned argument of report writing. But it is primarily through reconstruction ideas that archaeologists can come to grips with the (lack of) evidence from timber and earth.

Archaeologists love post-holes. You know where you are with a post-hole. If the post formed part of a building, other posts can show its general shape. But can a single post-hole represent a building? If it was a central support to an earth-walled and thatched conical hut, then yes, it can. If we start looking for a building around an isolated post something else often jumps out, for example a possible hearth, a partial drip gully or a blank circular space. Maybe a series of buildings once linked together to form a partition within the site, separating one area of site use from another.

If there are buildings but no enclosure ditch, the site can still be enclosed with a bank or fence. Is there a cluster of activity 20–30 m across with nothing beyond? Is there a building roughly in the centre of this



An intermediate stage reconstruction sketch (left) of an early medieval enclosed settlement at Balriggeran, based on excavated evidence from Shane Delaney of Irish Archaeological Consultancy Ltd. Much of the outer boundary on the right is conjecture based on later ditch patterns. The alternative—and there are always alternatives—was that the water body in the top right extended all the way to the inner enclosure ditch. If this were the case, it would mean the water levels on either side of the site did not match. However, seeing the water-stained gravel in the aerial photo to the right it is possible the outer enclosure was only added after the left, low-lying part of the site was flooded—in archaeology, anything is possible. (Drawing: Niall Roycroft; photo: Studio Lab)

cluster? Once an archaeologist looks for these patterns, many ideas spring to mind.

Leaps of faith come when putting buildings into their setting. This can only be done by accepting a series of assumptions. The assumptions come from speculating about function or land use, and these assumptions can suddenly make an empty site come to life.

Simple reconstructions

There is a simple technique for quick and easy reconstructions: add all the conjecture and land uses to the site plan. Once the areas of buildings, pitting, animal enclosures, entrances and access-ways have been added, the site will show a basic layout. But there might still be things missing. The next step is to take an oblique photograph of this plan and add the vertical elements. By playing around with this stage, missing items can be added; in many cases 'something' should fill the empty spaces.

When a reasonable image is achieved, the picture can be re-drawn using a light box and the key light and shade added. This image can then be circulated for comment. An advantage in avoiding a computer at this stage means the author really gets a feel for the site, which adds significantly to the interpretative element. (Furthermore, avoiding a computer means that anyone can do this; everyone should be encouraged to reconstruct sites.) The final image can then be re-drawn, either using a computer or using a light box, and coloured.

Neolithic houses at Plaster

Plaster on the A1/N1 Newry Dundalk Link Road was a group of three Early Neolithic rectangular houses excavated by Sinclair Turrell of Archaeological Development Services Ltd (ADS Ltd). In reconstructing an image, certain assumptions had to be made. First was to decide if all three

buildings were contemporary. From their typical layout (an arrangement also seen at Monanny, Co. Monaghan, and Corbally, Co. Kildare), it was feasible they not only acted as buildings but also as site partitions. Two distinct pitting zones showed areas of storage and disposal. The site had no enclosure ditch, but in a period of bears, boars and wolves it would seem sensible to enclose it. A scatter of stake-holes around the edge of the site was therefore linked up to indicate an irregular boundary.

Aghnaskeagh court tomb

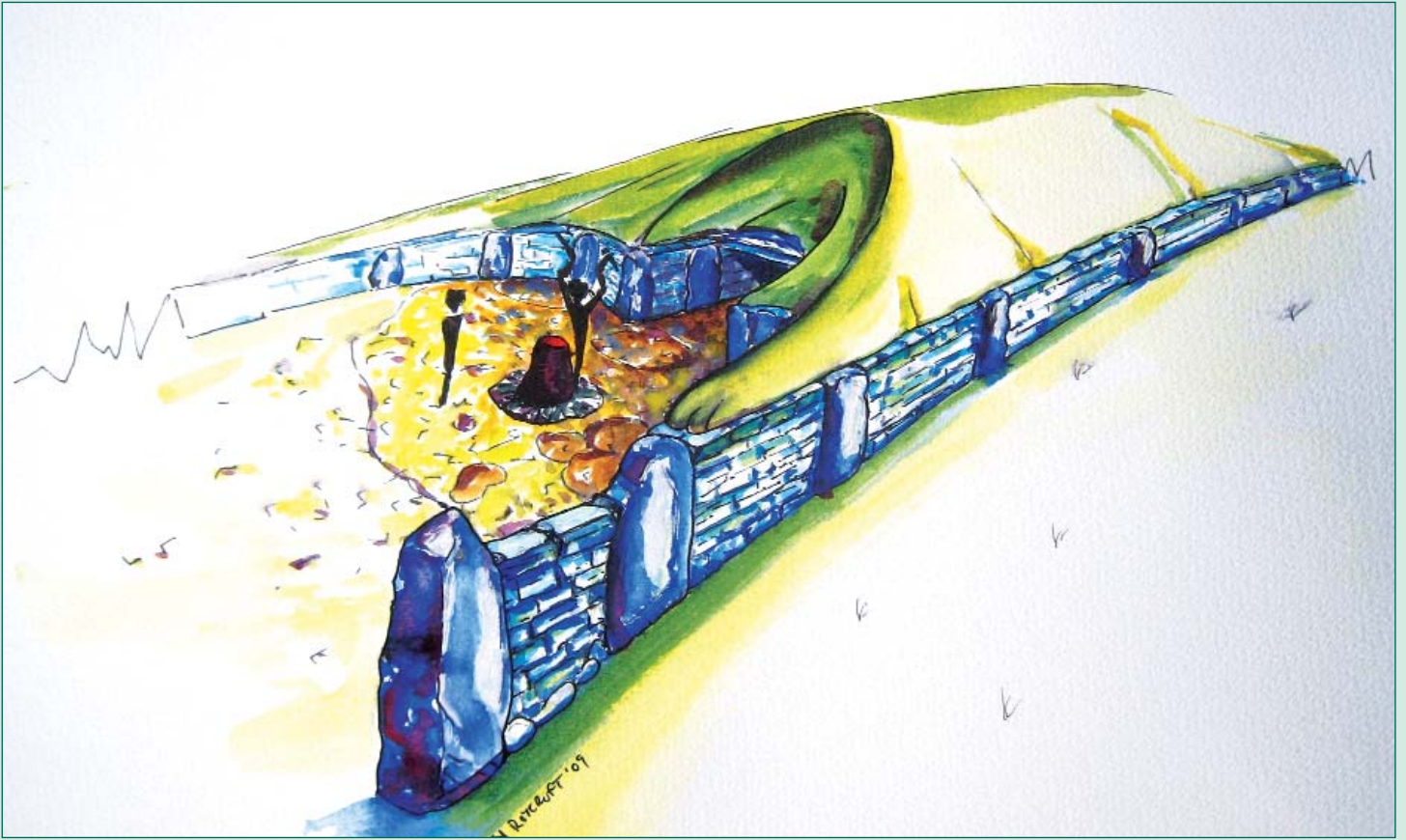
Aghnaskeagh was a Neolithic court tomb excavated by Jo Ronayne, ADS Ltd, on the A1/N1 Newry Dundalk Link Road. The drystone kerb wall survived in places, but there were regular gaps. The assumption is that there were large 'megalithic' stones that once occupied these gaps, showing a typical Neolithic drystone wall-building technique.

Balregan henge

Balregan was a circular henge (an embanked enclosure with a ritual/ceremonial function) on M1 Dundalk Western Bypass excavated by Brian O'Donnchadha of Irish Archaeological Consultancy Ltd (IAC Ltd). In 1748 Thomas Wright illustrated the site in *Louthiana*, before it was cleared a short time later. Wright also illustrated a nearby henge at 'Ballynahattin' (Carn Beg), where he appears to show stones on top of the enclosing bank. At Balregan there was a stone foundation to anchor a (probable) turf bank of around 3000 BC. Turf banks are typically very steep-sided and give excellent support. Therefore, standing stones were added onto the reconstruction of a steep-sided Balregan bank. Balregan also had large hollows that may have originally held stones at the bank and ditch ends, forming a grand entrance or perhaps forming an outer ring of standing stones. Large stones in such positions were indicated by Wright at both Balregan and Ballynahattin.



Reconstruction of an Early Neolithic settlement at Plaster. (Drawing: Niall Roycroft, based on excavated evidence from Sinclair Turrell, ADS Ltd)



Reconstruction of a Neolithic court tomb at Aghnaskeagh, showing the northern court. (Drawing: Niall Roycroft, based on excavated evidence from Jo Ronayne, ADS Ltd)

Newtownbalregan ringfort

The assumption at Newtownbalregan, excavated by David Bayley of IAC Ltd, is that some dispersed post-holes represent a group of circular buildings dating to the seventh or eighth century AD. It is also assumed that these buildings partly acted as a land-use partition. The buildings were adjacent to a food and domestic rubbish deposit in the enclosure ditch. The external souterrain entrance (seen at the top of the picture)

appeared to have been accessed by a back gate, indicated by a large post-hole. Both Newtownbalregan and nearby Balrigger appear to have an obliquely placed four-post structure (here interpreted as a building) adjacent to the gate. The Newtownbalregan interior had very few features, but there were enough to suggest a few fence lines, if that is what you were looking for.



Reconstruction of Balregan henge, from the south-west. (Drawing: Niall Roycroft, based on excavated evidence from Shane Delaney, IAC Ltd)



Reconstruction of Newtownbalregan ringfort and external souterrain (entrance only). An aerial photograph of the site can be seen on p. 22. (Drawing: Niall Roycroft, based on excavated evidence from David Bayley, IAC Ltd)

Faughart Lower cashel

Two souterrains at Faughart Lower on the A1/N1, excavated by Peter Bowen of ADS Ltd (see *Seanda*, Issue 3 [2008], pp. 9–11), are assumed to have originated inside buildings. The main souterrain was partly hidden inside the remnant bank for the original inner enclosure (middle

of the reconstruction drawing). A gap in the cemetery is assumed to indicate a rectangular church/chapel and patches of stoning are taken to be animal/work areas, with associated buildings. A wooden structure is assumed on top of the cashel wall, since this is the location for the main souterrain exit.



Reconstruction (left) of the cashel and expanded cemetery phases at Faughart Lower around 10th century AD. The image shows the full extent of the cemetery that pushes the habitation/activity areas away from the centre of the site. (Drawing: Niall Roycroft, based on excavated evidence from Peter Bowen, ADS Ltd; photo: ADS Ltd)

GLOSSARY	
Archaeological feature	Any component of an archaeological site, such as a post-hole, pit, wall, ditch, or any deposit that may have accumulated on-site.
Anglo-Norman	The Anglo-Normans were the descendents of the Normans who ruled England following the conquest by William of Normandy in AD 1066. In AD 1169 Ireland was invaded by the Anglo-Normans.
Artefact	Any movable object that has been used, modified or manufactured by humans.
Chert	A grey, black or blue siliceous rock that occurs in the form of bands in limestone deposits and was often used for tool production in the Irish midlands.
Cremation	The practice of burning the bodies of the dead. In prehistory the ashes were commonly placed in a pottery vessel and buried in a pit.
Dendrochronology	A scientific dating method based on the study of tree-ring layers, which can provide precise dating results for the formation of each tree-ring layer.
Fill	A term used to describe the individual layer(s) of material contained within archaeological features, such as post-holes, pits or ditches.
<i>Fulacht fiadh</i>	A site, generally dating from the Bronze Age, consisting of a horseshoe-shaped mound of burnt stones, a hearth(s) and a trough(s). These sites were used to heat water for a variety of possible purposes. Also known as ancient cooking places.
Geophysical survey	A scientific method of exploring below the ground surface by measuring differences, or 'anomalies', in the magnetic, electrical and other properties of the earth capable of being detected by survey instruments.
Hall-house	An Anglo-Norman rectangular stone building, two storeys high, with only one principle room on the first floor consisting of a long, undivided chamber open to the roof and running the length of the house. The ground floor was used mainly for storage and defensive purposes.
Inhumation	The practice of laying the bodies of the dead in a grave.
Iron Age	The final period of prehistory, beginning around 800 BC. In this period iron superseded bronze for the manufacture of tools and weapons.
Knapping	Breaking or chipping stone with sharp blows, as in shaping flint into tools.
Medieval	The period succeeding the Iron Age, which in Ireland is dated from the advent of Christianity in the fifth century AD up to the 16th century.
Mesolithic	The Middle Stone Age, c. 8000–4000 BC, when Ireland was first settled by early hunters and foragers.
Moated site	An Anglo-Norman defended homestead consisting of a square or rectangular enclosure defined by a bank and a broad, flat-bottomed ditch.
Motte and bailey	An Anglo-Norman earthen fortification comprising a large, steep-sided mound, flat on top, and surrounded by a ditch, with an adjoining rectangular or oval enclosure, called a bailey, defined by a bank and outer ditch.

Neolithic	The New Stone Age, c. 4000–2400 BC, preceded the introduction of metalworking and is characterised by the beginnings of farming.
Osteology	The scientific study of bones. Osteological analysis can provide information about an individual's sex, age at death, growth and development, health, ancestry, geographical origin and, rarely, cause of death.
Post-medieval	The period after the medieval period, often taken to be the era after the dissolution of the monasteries in the mid-16th century.
Quern-stone	A large stone used for grinding grain into flour. The four main categories of querns found in Ireland are, in chronological order: the saddle quern, beehive quern, rotary quern and pot quern.
Radiocarbon dating	A scientific method of dating by measuring the decay of the radioactive isotope Carbon 14, which is present in all organic material.
Record of Monuments and Places	A list of archaeological sites with accompanying maps recorded on a county-by-county basis by the State. Inclusion in the list affords archaeological sites certain legal protections.
Ringfort	An early medieval defended farmstead consisting of a circular enclosure defined by an earthen bank and an external ditch. High-status ringforts can have two or three banks.
Souterrain	An early medieval underground structure consisting of one or more passages and chambers, with a concealed entrance at ground level. They functioned as temporary refuges and storage areas.

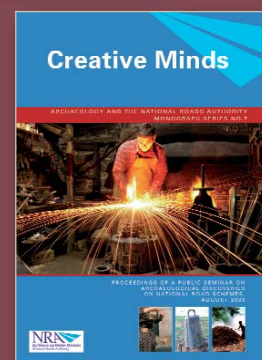
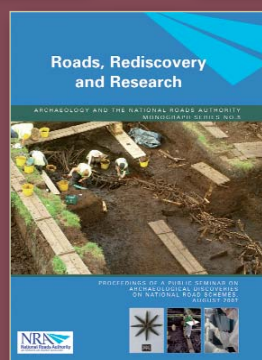
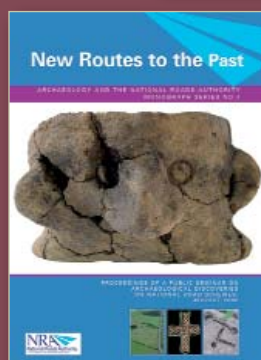
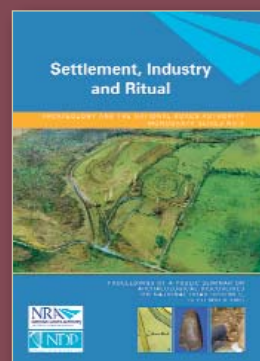
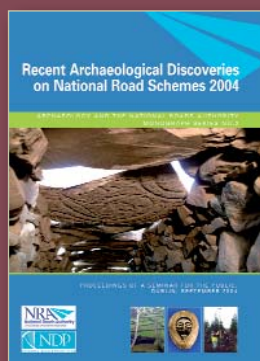
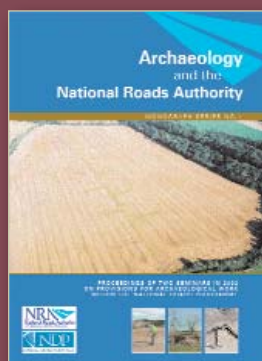
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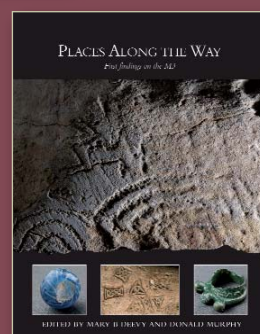
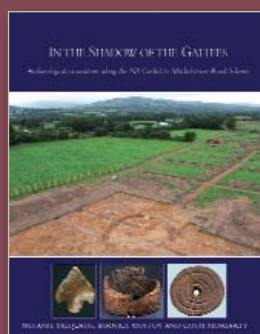
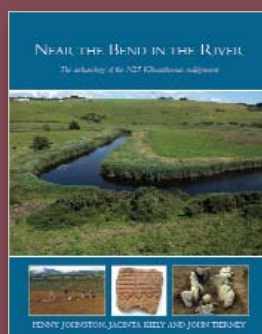
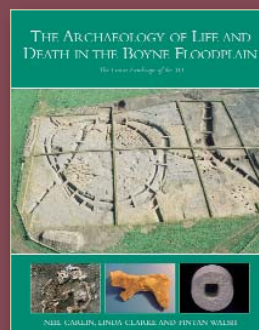
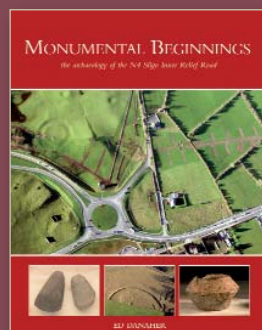
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