Of Troughs and Tuyères

The archaeology of the N5 Charlestown Bypass

RICHARD F GILLESPIE AND AGNES KERRIGAN

OF TROUGHS AND TUYÈRES:
THE ARCHAEOLOGY OF THE N5 CHARLESTOWN BYPASS

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Richard F Gillespie and Agnes Kerrigan

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An tÚdarás um Bóithre Náisiúnta
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Front cover photographs:

Top—Pins and pin fragments from Lowpark (photo: Jonathan Hession).
Middle—Artist's reconstruction of the gold filigree panel from Lowpark.
Bottom—Lowpark, during excavation, from the west.

Back cover photographs:

Top (from left to right)—Selection of iron knives from Lowpark resting on a sharpening stone with deep pin grooves (photo: Jonathan Hession).
Horn/antler cylinder and bone pin fragment from Lowpark (photo: Jonathan Hession).
Porcellanite axeheads from large Late Neolithic pit and from keyhole-shaped pit at Lowpark (photo: Jonathan Hession).
Barbed-and-tanged siltstone arrowhead from Ballyglass West I:(photo: Jonathan Hession).

Bottom left—Rotary grindstone from wall of Souterrain 1, Lowpark (photo: Jonathan Hession).

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Dia is Muire linn

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FOREWORD

The opening of the N5 Charlestown Bypass to traffic in 2007 was a key part in the national roads programme, increasing access to the West and benefiting east–west road traffic immensely. I am delighted to introduce another National Roads Authority (NRA) publication, of archaeological discoveries made along that routeway. These fascinating discoveries, just as those found along other national road improvements in counties Leitrim, Galway and Sligo in recent years have done, highlight the key role that the West plays in the unfolding archaeological story of this island.

Full credit is due to the Mayo County Council archaeological team for their diligence and expertise in executing the archaeological works. The identification and excavation of a timber circle and of massive assemblages of Neolithic pottery and the excavation of the multi-phased and complex settlement at Lowpark and of the many *fulachta fiadh* discovered along the route are evidence of this expertise. The retrieval of the tiny tin bead from Sonnagh and the beautiful fragment of ancient gold filigree from Lowpark, a reconstruction of which adorns the front cover of this book, is testament to excavating vigilance and to the fact that archaeological significance may lie in the smallest of things. These are important artefacts in the retelling of the archaeological story of this country, a revision that has been happily brought to us owing to the high level of discovery made along major road projects and other developments during years of growth.

The site at Lowpark holds centre stage here, a place where human activity stretches across the millennia, starting from before 4000 BC. Settlement continued in that place throughout the following centuries, seeing the transition from stone to the use of metal, first bronze and then iron. The medieval ironworking phase at Lowpark, representing the apex of settlement on the site, dominates the site's history. The weighty accoutrements of the ironworker's craft are well represented among the artefacts discovered—anvils, furnaces and the nozzles of bellows used to flare the smelting fires, or tuyères.

While the metalworkers of Lowpark hold centre stage, the multitude of *fulachta fiadh* and burnt spreads found along the route tell much of domestic life throughout the ages. Archaeologists are well used to this site type, the most common found on any development; our road projects no exception, but rarely are such large numbers of well-preserved sites discovered on a single project. The bogland that so dominates parts of the West provides a protective blanket and ensures the preservation of archaeological sites with organic components. Throughout this publication the beautiful illustrative depictions of the wooden troughs discovered, such as those at Sonnagh and Fauleens, add splendid colour and organic vitality.

It is a pleasure to introduce another NRA archaeological publication—making our discoveries available to the public is a key principle behind what we do. Our library is growing steadily, and this is a credit to all those employed on our projects and to the wonderful archaeology of this island itself that is continually revealed while constructing a modern and safe road network.

Fred Barry
Chief Executive, National Roads Authority

PREFACE

Linear transepts made during motorway construction across the Irish countryside have allowed archaeologists to discover the remains of human activity in the landscape and broadened the understanding of past societies. The archaeology of a locale is forensically and methodically recorded, allowing the exploration of landscapes where the visible remains are frequently unspectacular. Indeed, these projects strive to avoid the known monuments and, as part of the pre-construction review of the environment, detailed reports and actuarial-type predictions of the potential of archaeological material are presented, with mitigation strategies designed to avoid and prevent damage to the archaeological heritage. These pre-construction studies are guided by various legislative requirements but essentially are in place to protect archaeological heritage and have the precept that archaeological sites are unique and irreplaceable. The results of road schemes have allowed an exploration of communities where the environment had been changed and ordered many times by what can be considered 'ordinary living'. Hithertofore, Irish archaeology tended to be very monument-focused, evident in the type of survey and excavation undertaken before recent economic developments, and most research was carried out on upstanding or known archaeological sites. Indeed, without these large-scale projects, there was little opportunity to discover the residue of human activity on what can be considered mundane archaeological landscapes, and the results provide an opportunity to revise our understanding of past societies in a local and regional setting.

The scope of the archaeological work on the Charlestown Bypass spans six millennia, from Early Neolithic sites at Sonnagh II to the mid-20th-century wood-lined drain at Cloonaghboy. This broad range of occupation in a relatively confined area is indicative of a hidden Ireland only slowly being discovered, excavated and published as part of the archaeological work on the national road network. The sites reflect how society moulded the landscape and, conversely, how the landscape shaped human activity. Human activity is seen in the ordinary life whereby people needed shelter, food and all of the activities that make up the combined processes referred to as 'living'. Added to this is the cosmology of living, the belief in something outside the individual, expressed as ritual and remaining as clearly symbolic actions. These actions are visible, widely spaced in time, and include the ritual deposition of pottery and stone tools in Neolithic pits, the cremation burial at Lowpark, interred with fragments of a Food Vessel, and in later times the location of ironworking areas close to the entrances of early medieval palisaded enclosures at Lowpark, where a fire and the transformation of iron possibly created a magical aura on the site.

Study of Early Neolithic landscapes of County Mayo has focused on the megalithic tombs, settlement and land use at the Céide Fields area in north-west Mayo. These landscapes can be considered spectacular in terms of surviving monuments. The route of the Charlestown Bypass was through an 'ordinary' terrain and yet produced remarkable results. Early Neolithic structures found at Sonnagh provide evidence for sequential settlement and the use of round structures. The round structures at Sonnagh clearly pre-date the classic, rectangular houses such as the example at Ballyglass, which appear to fall into a mid-Neolithic date and which recent research has shown fall within a relatively confined date bracket of perhaps 500 years, extending from about 4000 BC. The Sonnagh structures may provide evidence for architectural styles associated with Early Neolithic agricultural communities and settlement. Other Neolithic evidence from the scheme comprised a series of pits at Lowpark, c. 600m east of Sonnagh, that included pottery and lithics and yielded a ^{14}C date of 3936–3661 BC. These types of depositions are clearly of a ritual nature where fragments of vessels and stone tools are deliberately buried. This esoteric aspect of Neolithic 'religion' clearly requires further study and interpretation. Similarly, a burnt spread at Ballyglass West radiocarbon-dated to 3491–2921 BC presents pyrotechnology in the Neolithic period, possibly related to the mundane task of food preparation but also possibly part of some ritual.

Finding a Late Neolithic Grooved Ware timber circle at Lowpark has widened the scope for study of these enigmatic monuments. The circle itself and ritual deposition of pottery and stone tools on the site clearly indicate a sacred space and, within this, a concept of returning to the earth those things that are found in the earth. There are clear connections between the timber circles and the Grooved Ware pottery with Scottish examples. This link in Late Neolithic times was probably not unexpected, given the similarity of megalithic tombs and pottery styles in the earlier Neolithic. Sea routes between the north-west of Ireland and the Scottish regions were undoubtedly a mode of access and egress, contact and communication. The *fulacht fiadh* at Sonnagh III was contemporary with the use of the timber circle at Lowpark and, on the basis of the traditional interpretation of *fulacht fiadh*, the site may be linked to some type of ritual communal feasting or cleansing.

The majority of *fulachta fiadh* on the Charlestown Bypass date to the Bronze Age. The Early Bronze Age in Ireland has exhibited a paucity of settlement remains, given the prevalence of burial sites of this period. The Early Bronze Age *fulachta fiadh* such as Fauleens I add to the understanding of how the landscape was used and points to community activity and communal mobility.

The *fulachta fiadh* recorded on this scheme were situated largely in low-lying peat basins in former inter-drumlin lakes. *Fulachta fiadh* clusters were recorded in Sonnagh, Currinah, Fauleens and Mullenmadoge. Fauleens I was initially used in the Early Bronze Age, and Fauleens II was Late Bronze Age in date. This continuity of landscape use over almost two millennia reflects shared tradition through time and probably stored collective memory.

The preservation at the *fulachta fiadh* sites was remarkable, and the quality of the remains adds greatly to the interpretation of the site type. The care used in the construction of troughs shows the importance of these sites to the community. Water filtration systems with the use of moss and sand were recorded at Sonnagh I, IV and V and Fauleens I. Moss packing purified the groundwater, providing clean, clear water—fundamental to all life. Trough lining, including dressed planks at many sites and a moss and wicker lining at Sonnagh IX, shows the detail of construction. The large and complex troughs also indicate communal use by a large number of people. The sites included the remains of ancillary structures interpreted as huts, windbreaks and racks. Timber platforms provided dry, safe areas and allowed access to and from the troughs, hearths and pits. One carefully constructed platform was built adjacent to the trough in Sonnagh I, and rough platforms and random deposits of timbers at Sonnagh I, IV, V and IX must have facilitated passage across soft, wet peat. Large, albeit dispersed, mounds indicate that the sites were used numerous times over a lengthy period. Artefacts from *fulachta fiadh* sites are rare, and the tin bead from Sonnagh V is unique to date in the Irish archaeological record. In itself, the bead indicates external contacts. The preservation of evidence for woodworking and dressing of trough timbers displayed competent craftsmanship using adzes and axes, and the toolmarks indicate the typological evolution of axe types from the Early to the Late Bronze Age.

Excavations at Lowpark uncovered a previously unknown complex of monuments spanning a timeframe from the Neolithic to the eleventh century AD. The site location on the crest of a hill was ideal for settlement, with commanding views of the surrounding terrain. The concentration of activity on this site was in the early medieval period, and the information from the site adds significantly to the knowledge of early medieval settlement and technology. The study of secular life of early medieval Ireland has largely focused on ringforts, from which excavation has provided an insight into architecture, material culture, socioeconomic life, crafts and trade of the period. In contrast to many excavated ringforts, the Lowpark site provided a unique record of the technology of ironworking, spanning a period from AD 620 to AD 970, initially on an unenclosed site and latterly in large, palisaded enclosures. The evidence comprised at least three semi-underground workshops, ironworking pits with anvils/crushing stones, tuyères and 1.36 tonnes of iron slag.

Early medieval research has been monument-focused and also somewhat dominated by the hegemony of powerful kingships. Sites such as Lowpark may reflect more ordinary life, well removed from the echelons of power struggles and the rise and fall of dynasties. However, gold filigree panel recovered from the site suggests wealth. The site was sequentially enclosed with simple timber palisades and, although the interior was poorly preserved, the site produced evidence for a roundhouse, well-preserved souterrains and a stone-lined, keyhole-shaped pit. Radiocarbon date ranges of AD 540–660 are among the few available for souterrains in Ireland.

The Cloonaghboy ringfort and souterrain, dated to AD 565–860, was in a similar temporal and spatial setting to Lowpark. The bivallate ringfort, set on a drumlin ridge, dominated the surrounding farmland, the lifeblood of a local community. Agricultural activity is also seen in the use of a medieval cereal-drying kiln in Ballyglass West, 250m to the east of the Lowpark enclosures.

In modern Ireland, relics of mid-19th-century rural Ireland have become well-nigh effaced from the landscape. These include the pre-Famine houses of the small farmers and cottiers that were abandoned through death or emigration or, latterly, when the Congested Districts Boards and the Land Commission allowed for the division of the land into viable farms and resettlement in the midlands or east. The remains of these buildings continue to be a reminder of a past where poverty and destitution forced families from their homes. These abandoned houses were latterly used as byres or fell into disrepair. The surveys of vernacular buildings conducted on this scheme preserve for the future a record of structures that are a testament to social and economic conditions in many parts of 19th-century Ireland and are intrinsic to the history of the country.

Rose M Cleary
Academic Editor

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Photography
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The authors wish to acknowledge and thank the National Roads Authority (NRA) for funding the excavation, the post-excavation work and this publication; Mayo County Council (MCC) and the National Roads Design Office (NRDO) for cooperation, advice and interest throughout the project, especially Richard Glancy, Project Engineer, and Tony McNulty, Senior Engineer; Gerry Walsh, MCC Senior Archaeologist and Project Archaeologist for the scheme, 2004–7; Michael MacDonagh, NRA Senior Archaeologist, for his subsequent steering of the project and the publication; the contractors, SIAC Wills JV, for their cooperation; Reg Cowie, NRDO, for his surveying on the scheme and for providing numerous maps and related information; Kevin Quinn, MCC, for technical support and advice; Carmel Worsfold, GIS MCC, for providing the contour and geological maps; Jerry O'Sullivan, NRA, for providing the initial template for the monograph and advice; Fergus Niland for the final preparation of the figures and photos; Brendan Walsh for help in compiling the historical background; Martin Reid, National Monuments Service, for his assistance throughout the project; and Mary Cahill, National Museum of Ireland, for necessary support. Thanks also go to Michael Stanley, NRA, for his expert copy-editorial review of the draft manuscript and advice. Final thanks go to Rose Cleary for her comments, advice and encouragement in her capacity as academic editor, and to Wordwell, Nick Maxwell and Aisling Flood for all of their expert assistance in bringing this book to publication.

Richard F Gillespie
Agnes Kerrigan

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Michael MacDonagh

1
INTRODUCTION

Agnes Kerrigan and Richard F Gillespie, with contributions by Michael MacDonagh

Of Troughs and Tuyères presents the results of extensive archaeological investigations along the route of the N5 Charlestown Bypass. These investigations commenced in 2004 before construction of the road scheme and were carried out by Mayo County Council and funded by the National Roads Authority (NRA). In total, 52 archaeological sites were excavated, the results of which are presented here.

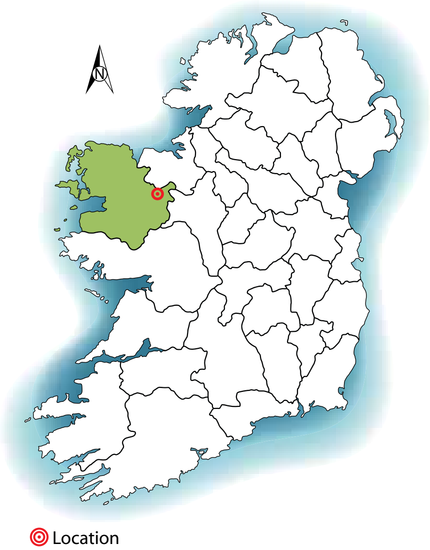
The N5 Charlestown Bypass was opened in 2007. It consists of an 18 km-long single carriageway bypassing the town of Charlestown, stretching from Gortanure in the east in County Roscommon to link with the existing N5 at Cloona in County Mayo.

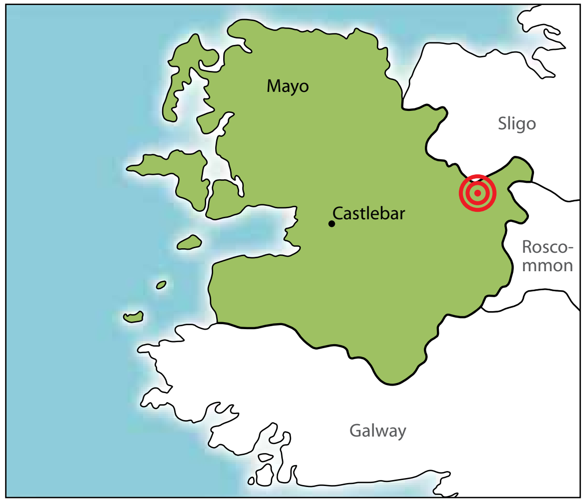
Archaeological sites were discovered and excavated in 15 of the 28 townlands through which the road development ran (see Fig. 1.2). They range in date from the Early Neolithic period to the medieval period. All are presented here, with comprehensive data on the specific archaeology of each site and discussion of their significance and interpretation in the context of the archaeological record. The multi-period site at Lowpark has pride of place in the publication, presenting important evidence of medieval life on a site where earlier, prehistoric settlement evidence was also discovered. The very important medieval metalworking evidence retrieved from the excavation of this site, with the accoutrements of the smith's trade, inspired one half of the book's title: tuyères are ceramic nozzles of bellows used to fan the smith's fires. Further metalworking evidence from the site, in the form of a very small and intricate gold filigree panel, provides one of the most remarkable images from the excavations, reproduced on the book's cover.

The other half of the title alludes to the very large number of well-preserved *fulachta fiadh* discovered along the route. Archaeologists are very well acquainted with these sites and their related, less distinctive burnt-spread or mound sites being discovered on large developments. That said, the Charlestown *fulachta fiadh* and their well-preserved troughs, of either stone or wood, were a dominant feature of the excavations and merited a reference in the book title.

The archaeological sites excavated along the bypass route are clearly important locally, adding to the heritage of the Charlestown region. Some are regionally significant. Other discoveries add significantly to the national archaeological picture, providing new insights and topics for discussion.

The publication starts with some background to the scheme and the geographical and historical landscape that the N5 Charlestown Bypass traverses in this chapter. Chapter 2 provides an appropriate chronological start to the archaeology of the scheme, with details of Neolithic





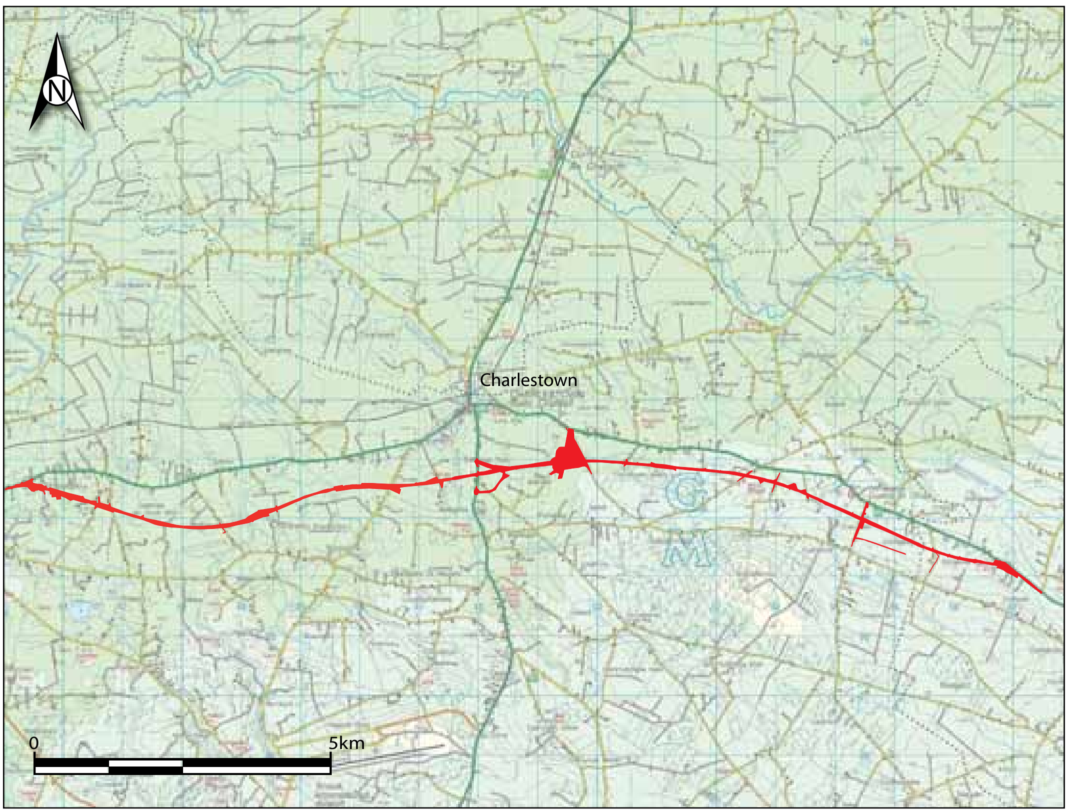


Fig. 1.1—N5 Charlestown Bypass location map (extract from OS Discovery Series map).

activity at Sonnagh, Ballyglass West and Cashelduff, Co. Mayo. Chapter 3 addresses the large number of well-preserved burnt-stone sites discovered along the route, *fulachta fiadh* and burnt spreads. Many certainly belong to the Bronze Age, the period to which such sites are commonly assigned, but the range of dates for the Charlestown discoveries, spanning five millennia from the Neolithic to the medieval period, provides much scope for discussion. Chapter 4 deals with the very complex and important multi-period site of Lowpark, Co. Mayo. Its complexity demands a phased approach to give some structure to its interpretation and chronology. This chapter, with some specialist contributions, describes the several thousand years of activity on the site, the metalworking activity, the various periods of enclosing the site by palisade or ditch, and the various subterranean, stone-built structures on the site. Chapter 5 discusses a distinctive early medieval enclosure at Cloonaghboy, Co. Mayo, with an associated souterrain, adding further to the picture of medieval life in the region. Chapter 6 provides details of more recent heritage—the results of surveys of vernacular architecture impacted by the bypass. It also details various charcoal-production pits excavated along the route and provides a picture of more recent life in the area.

There are a number of specialist inserts in some of the chapters. These are extracted from specialist reports commissioned as part of the extensive post-excavation process. There are a great many different specialists who contributed to post-excavation analyses of metal artefacts, stone, organic remains, bone, wood and more. All of the specialist reports are contained in full on the accompanying disk. Specialist reports are listed as appendices in the contents section, at the start of this publication, and are referenced throughout the text as 'Appendix I, II' etc.

Planning, design and archaeological impact

Archaeological, architectural and cultural heritage are important elements in the process of route selection and road design, with the aim being to minimise, reduce or avoid, where possible, impact on these resources. As with all major road projects, the N5 Charlestown Bypass went through the initial design processes of a constraints study identifying all possible impacts, route selection whereby the preferred corridor was selected and, finally, the statutory planning stage, involving detailed design and an assessment resulting in the publication of the Environmental Impact Statement (EIS).

The EIS for the N5 Charlestown Bypass identified 12 direct and three indirect impacts on eight known and seven potential archaeological sites. These were subsequently investigated and excavated by Mayo County Council before road construction.

Three monuments included in the Record of Monuments of Places (RMP) for County Mayo were excavated along the route: an enclosure at Cloonaghboy (RMP no. MA062-058), an 'enclosure' at Cashelduff (MA063-033) and a '*fulacht fiadh*', or burnt spread, at Ballyglass West (MA063-053). The excavations uncovered a substantial early medieval bivallate ringfort at the Cloonaghboy site, a prehistoric site disturbed by medieval pits in Cashelduff, and a Neolithic burnt spread and medieval cereal-drying kiln at Ballyglass West. Archaeological testing was carried out

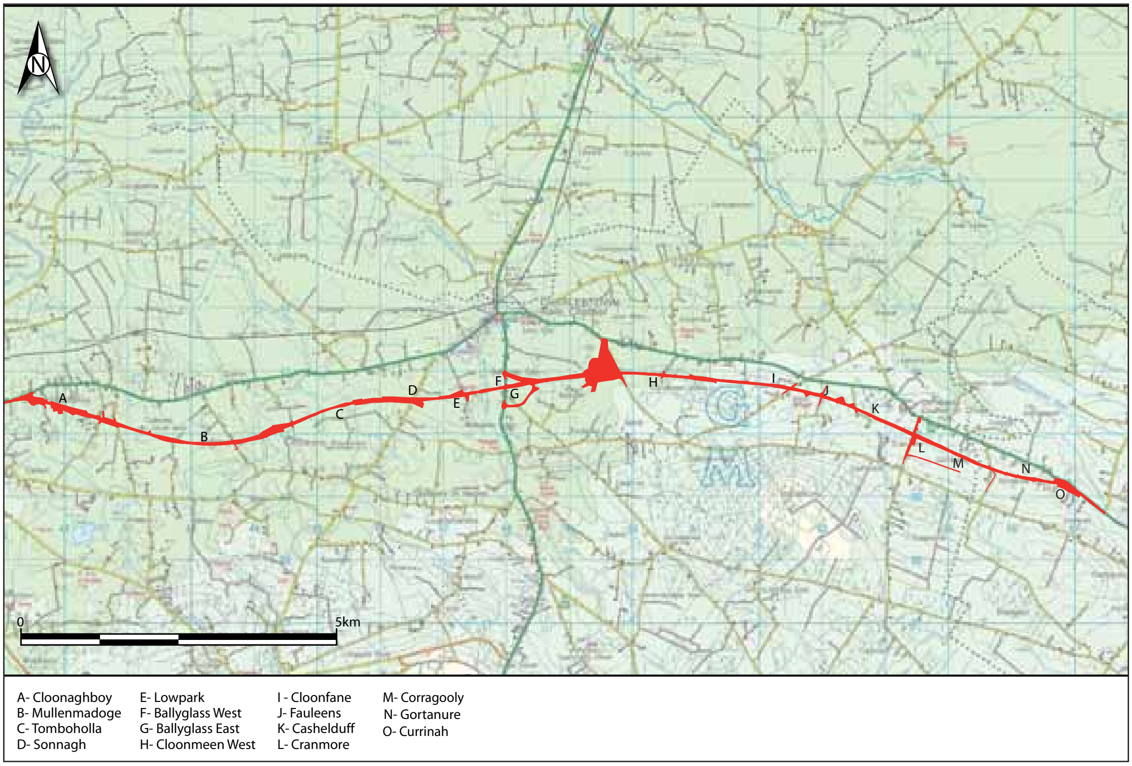


Fig. 1.2—Townlands with archaeological sites on route of Charlestown N5 Bypass (extract from OS Discovery Series map).

adjacent to two recorded monuments that lay outside the road corridor: an enclosure/children's burial ground at Gortanure, Co. Roscommon (RO008c-004), and an enclosure at Cranmore, Co. Mayo (MA063-035). A small pit excavated at Gortanure and radiocarbon-dated to AD 1314–1448 may have been a charcoal-production pit.

Three recorded monuments—a *fulacht fiadh* at Gortanure (RO008c-033) and two enclosures at Cloonmeen West (RMP nos MA063-051 and MA063-010)—were listed as being indirectly impacted as they were 20–25 m outside the road corridor. Archaeological testing was carried out on the line of the road adjacent to these sites and identified two *fulachta fiadh* in Gortanure, which were subsequently excavated.

Eight possible archaeological sites newly identified through fieldwork during the EIS process were listed as being directly impacted and were archaeologically tested, but no archaeological features were identified. One newly identified site, a *fulacht fiadh* in Ballyglass East, Co. Mayo, was listed as being indirectly impacted as it was 10 m outside the development. Testing adjacent to this site identified three pits, subsequently radiocarbon-dated to AD 1429–1631, which may have been used for charcoal production.

In total, 57,000 linear metres of test-trenches was excavated along the route of the bypass, consisting of 2 m-wide trenches along the centre of the route, with offset trenches every 15 m (Pl.

Pl. 1.1—Section of centre-line testing on N5 Charlestown Bypass.

Pl. 1.2—Aerial view of Sonnagh II under excavation.

Table 1.1—List of archaeological sites excavated along the road scheme.

Name and RMP no.	Site type	Ministerial Direction no.	Registration/ excavation licence no.	National Grid reference
Ballyglass East	Medieval pits	A020/008	E3335	147744/300699
Ballyglass West, MA063-053	Neolithic burnt spread (I), medieval kiln (II) and pit (III)	A020/001	04E1507	14759/30067
Cashelduff I, MA063-033	Medieval charcoal-production pits and disturbed prehistoric site	A020/010	E3336	153910/300229
Cashelduff II	Burnt spread	A020/018	E3341	153705/300316
Cashelduff III	Burnt spread	A020/019	E3342	153705/300316
Cashelduff IV	*Fulacht fiadh*	A020/020	E3343	153705/300316
Cloonaghboy I, MA062-058	Enclosure—bivallate ringfort	A020/002	04E1341	140619/300541
Cloonaghboy II	Burnt pits	A020/005	E3333	140496/300455
Cloonaghboy III	Burnt spread	A020/007	E3334	140716/300532
Cloonaghboy IV	*Fulacht fiadh*	A020/071	E3357	141301/300284
Cloonaghboy V	*Fulacht fiadh*	A020/071	E3357	141346/300272
Cloonfane I	Burnt spread	A020/041	E3407	152863/300629
Cloonfane II	Burnt spread	A020/042	E3408	152826/300639
Cloonfane III	Burnt spread	A020/043	E3409	152802/300632
Cloonfane IV	Burnt spread	A020/044	E3388	152778/300621
Cloonfane V	Pit	A020/053	E3411	152209/300779
Cloonfane VI	Burnt spread	A020/055	E3412	152403/300745
Cloonfane VII	Burnt spread/pit	A020/056	E3413	152720/300674
Cloonmeen West	*Fulacht fiadh*	A020/036	E3351	150493/300957
Corragooly	Burnt spread	A020/057	E3432	155675/299438
Cranmore I	*Fulacht fiadh*	A020/051	E3410	154432/299983
Cranmore II	*Fulacht fiadh*	A020/074	E3433	154525/299927
Currinah I, II and III	*Fulachta fiadh* and pit	A020/060	E3356	156643/299239 and 156683/299247
Currinah IV	*Fulacht fiadh*	A020/059	E3355	157248/298959
Fauleens I and II	*Fulachta fiadh*	A020/038	E3353	152993/300612 and 152964/300618
Fauleens III and IV	Burnt spreads	A020/040	E3406	152987/300569
Fauleens V	Burnt spread	A020/037	E3352	153123/300548
Fauleens VI	*Fulacht fiadh*	A020/079	E3390	153419/300446

Table 1.1—List of archaeological sites excavated along the road scheme.

Name and RMP no.	Site type	Ministerial Direction no.	Registration/ excavation licence no.	National Grid reference
Gortnaure, RO008c-004	Testing adjacent to an enclosure and children's burial ground	A020/046	E3354	16629/29927
Lowpark	Multi-period site	A020/012	E3338	147233/300643
Mullenmadoge I	*Fulacht fiadh*	A020/011	E3337	143188/299827
Mullenmadoge II	*Fulacht fiadh*	A020/013	E3339	143612/299845
Sonnagh I	*Fulacht fiadh*	A020/017	E3340	146630/300538
Sonnagh II	Neolithic structures and *fulachta fiadh*	A020/029	E3344	146653/300257
Sonnagh III	*Fulacht fiadh*	A020/030	E3345	146570/300469
Sonnagh IV	*Fulacht fiadh*	A020/031	E3346	146551/300495
Sonnagh V	*Fulacht fiadh*	A020/032	E3347	146387/300539
Sonnagh VI	Burnt spread	A020/033	E3348	146361/300550
Sonnagh VII	Burnt spread/	A020/034	E3349	146183/300579
Sonnagh VIII	Burnt spread/	A020/072	E3526	146866/300558
Sonnagh IX	*Fulacht fiadh*	A020/076	E3358	146463/300532
Sonnagh X	*Fulacht fiadh*	A020/077	E3359	146319/300574
Sonnagh XI	Burnt spread	A020/077	E3359	146286/300377
Sonnagh XII	Pit	A020/028	E3519	146823/300532
Sonnagh XIII	Charcoal-production pit	A020/003	E3528	146973/300582
Tomboholla	Burnt spread	A020/035	E3350	145749/300520

1.1). Areas of high archaeological potential were extensively tested, and 39 'new' archaeological sites were identified, predominantly *fulachta fiadh* and burnt spreads. Some areas proved inaccessible to test owing to deep peat and poor ground conditions, and these were subsequently monitored during construction works, as indeed were all previously tested areas. Six additional archaeological sites were identified through monitoring. In all, 21 *fulachta fiadh*, 19 burnt spreads, one multi-period site, six charcoal-production pits and two pits were identified in the testing phase, all of which were subsequently excavated.

In total, 52 sites, including three recorded monuments (RMP nos MA062-058, MA063-033 and MA063-053), were excavated along the route of the N5 Bypass, providing a broad range of dates from the Early Neolithic period to the late medieval period.

Surveys of vernacular structures and townland boundaries were also undertaken as recommended in the EIS. Fourteen vernacular structures directly or indirectly impacted by the development were surveyed.

Radiocarbon dating

A total of 81 samples of both charcoal and wood from excavations along the N5 Charlestown Bypass scheme were dated by the radiocarbon method (Appendix A). The radiocarbon determinations spanned from the Early Neolithic period to the late medieval period and indicate occupation and exploitation of the landscape over many millennia. Radiocarbon dates are given in conventional years BP (Before Present: AD 1950) at a 1-sigma (68 % probability) level of confidence. The conventional dates are then quoted in calibrated date ranges, which correspond to the probable calendar age of the sample material. The calibrated dates included in the text are expressed at a 2-sigma (95 % probability) level of confidence, which results in a wider date range for some features.

Radiocarbon dating, while the most widely used dating technique, is not without some difficulties. The main problem for excavators is the choice of material for dating, with charcoal being the most widely available surviving material on archaeological sites. Careful processing of the soil sample is required to prevent cross-contamination of the charcoal between different archaeological strata. Charcoal has vertical mobility on sites, and younger charcoal can be found in earlier deposits because of root intrusions or percolation of groundwater (Lanting & van der Plicht 1993–4, 4).

A further problem that besets both charcoal and wood is the 'old-wood effect': a long-lived tree, such as oak, may be several hundred years old before its use on a site. Thus the radiocarbon date may be in error as it measures the age of the tree and not the actual archaeological event (ibid., 4). Where available, short-lived wood species were submitted for dating, although this was not possible with many of the samples from Lowpark as oak was the predominant charcoal type recovered from archaeological deposits.

One notable exception to this from Lowpark relates to C528, a pit that yielded Bronze Age pottery and cremated human remains. A sample of alder and hazel charcoal returned a date of 4840±50 BP (3700–3620 and 3600–3520 BC), placing it in the Neolithic period. This inaccuracy can be explained by the re-cutting of an earlier Neolithic feature by a later Bronze Age cremation pit, as evidenced in the section of the pit. The charcoal clearly related to the earlier feature, and hence the discrepancy between the pottery type and the radiocarbon date.

Dates obtained from Beta Analytic laboratory (Beta lab code) were calibrated using the IntCal04 calibration dataset (Reimer et al. 2004) and the Talma & Vogel (1993) calibration program. Dates from the University of Groningen laboratory, the Netherlands (GrN and GrA lab codes), were calibrated using IntCal04 (Reimer et al. 2004).

Geography and geology of the region

The N5 Charlestown Bypass takes a west–east route from Swinford, Co. Mayo, to Gortanure townland, Co. Roscommon, running to the south of Charlestown. The area described below centres on the bypass and is a rectangular land-bank extending from Kiltimagh in the south-west to Doocastle in the north-east, measuring c. 26 km east–west by 20 km north–south.

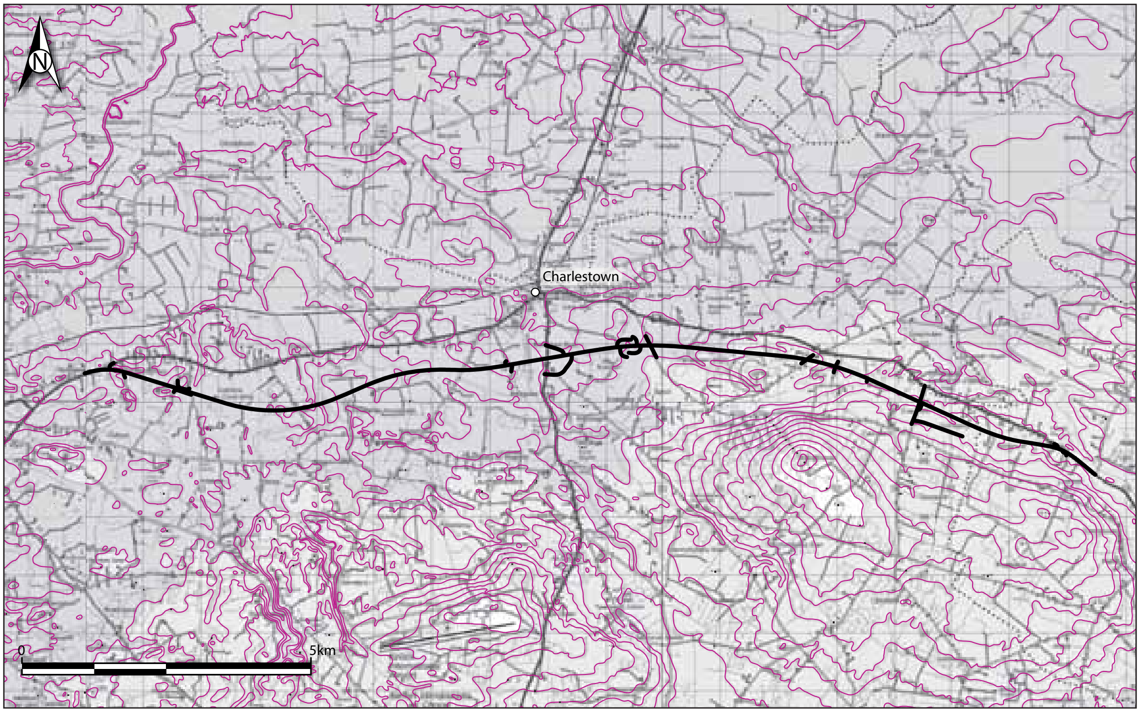


Fig. 1.3—Contour map (10 m intervals) showing N5 Charlestown Bypass and surrounding area (extract from OS Discovery Series map).

Geography

The area in which Charlestown is situated is known as the Ballymote Lowlands and has a predominantly low relief, with rolling topography mostly lying at 80–100 m OD. The characteristic topography is reflected in the various townlands and place-names with the element *cluain* (meadow). Two elevated areas, the location of Ireland West Airport (or Knock International Airport) (c. 200 m OD) to the south and the Hill of Mullaghanoe (c. 234 m OD) to the south-east, form the south-western extremity of the Curlew Mountains.

Bedrock geology

The geology of the Charlestown area is composed of rock formations representing three major episodes in the geological history of Ireland.

- The oldest rocks in the area are the Dalradian metamorphic rock formations of the Ox Mountains in the north-west. The granitic rocks of the Ox Mountains are later intrusions.
- The younger, Ordovician and Silurian rocks are found to the south and east of Charlestown and form the triangle of higher ground that extends from Ireland West Airport east and north-east toward Carracastle.
- Carboniferous shale and limestone underlie the remainder of the area, including Swinford and Charlestown. A small area of Devonian volcanic and sedimentary rocks lies to the extreme east of the study area.

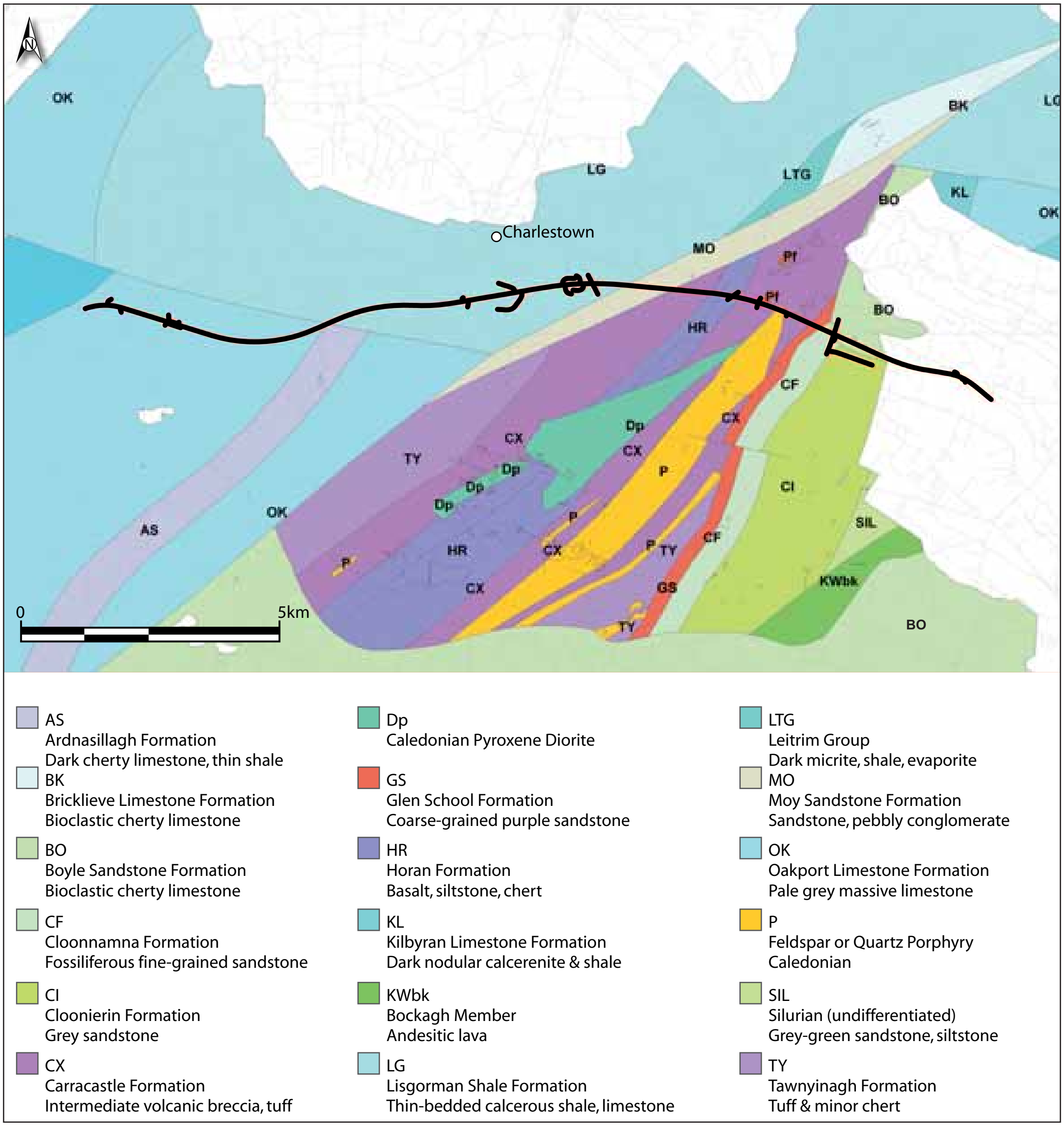


Fig. 1.4—Bedrock geology map of the Charlestown area showing main geological rock formations (Baxter, Appendix XIV).

In the Charlestown area the main flow of ice in the Quaternary period was in a north-west direction, from an ice sheet centred on a line stretching from Carrick-on-Shannon to Lough Neagh. The glacial deposits of till (boulder clay) in the area form elongated hills and drumlins. In some parts these deposits reach over 60 m thick, but in other, higher-ground areas they are relatively thin or even absent.

Soils

In general, prehistoric soils were broadly similar to those that exist today (Grogan 2005, 8). Processes such as deforestation, drainage, changing water table levels and increased rainfall can affect the soil types. Deforestation and overgrazing may result in leaching and the formation of impermeable layers, leading to waterlogging and peat formation (Waddell 1998, 113). Deforestation and overgrazing are the result of human impact on the environment and, coupled with an increase in rainfall, may have resulted in rapid peat growth. The Neolithic farming settlement at the Céide Fields in north Mayo is an example of peat growth over former farmland (ibid.).

The late third millennium and second millennium BC are contemporary with the sub-Boreal vegetation period in northern Europe (ibid.). Temperatures may have been 2–2.5 ºC higher than today, and the climate was suitable for a mixed agricultural economy augmented by wild food sources (Cooney & Grogan 1994, 36–7). The early farmers must have had the ability to recognise suitable soil types for cultivation from the overlying forest cover, and this was an important aspect in settlement location to allow for the exploitation of land for a number of uses (ibid., 46; Grogan 2005, 10). The ability to work land must also have dictated settlement locations, given primitive tool types. The ard may have been in use by at least the fourth millennium BC (Waddell 1998, 29) but was suitable for lighter, drier soils, hence limiting the population from exploiting heavier soils such as brown earths and grey–brown podzolics, which are favoured by modern farmers (Grogan 2005, 9–10).

The modern soils associated with the Charlestown Bypass area may not exactly mirror prehistoric soil types, but they provide a general picture of the soil types available for exploitation by the early settlers and subsequent generations. The area can be divided into four main physiographic divisions into which soil associations are grouped (Gardiner & Radford 1980). These are (1) mountain and hill (12 %), (2) rolling lowland (41 %), (3) drumlin (10 %) and (4) flat to undulating lowland (37 %). For the most part, the soils of the area are nutrient-deficient and waterlogged with limited use potential, being mainly suited to grassland, except in the case of the peatland. The soils in the study area are podzolic (leached of iron and aluminium). Grey–brown podzolics formed on calcerous parent material that counteracts leaching and forms a loamy A horizon with a clay B horizon. Lithosols are skeletal stony soils, often associated with podzols at higher altitudes). Gleys develop where ground is permanently or intermittently waterlogged owing to a high water table, a ‘perched’ water table where soil is impervious, or seepage or run-off from slopes; peaty gleys, with a 0.20–0.40m-thick surface organic layer, usually indicate wetter conditions than for a gley soil. Peatland is characterised by a high proportion (>30 %) of organic matter (blanket peat accumulates under conditions of high rainfall and humidity and is usually 1–2 m thick; basin peat may be up to 10 m thick and forms in lake basins, hollows, such as inter-drumlin landscapes and river valleys, or where the water table is raised [Pl. 1.3]) (Bridges 1997).

The mountain and hill soils on higher land in the area around Mullaghanoe and in the north-west in the Ox Mountains are predominantly peaty podzols, with associated lithosols and blanket peat. An iron-enriched horizon is usually underlain by a sandstone, volcanic tuff or metamorphic

Pl. 1.3—Aerial photo of peat basin in Cloonaghboy townland.

bedrock. The rolling lowland soils that dominate the area (41 %) underlie most of the bypass route and have been the focus of farming communities since prehistoric times. About half of the soils are podzols; gleys make up about one-third; and the remainder is peaty gleys and peatland, which provided suitable ground conditions for *fulacht fiadh* construction. A thin, cemented iron-pan is typical of these soils. The parent material is glacial till, particularly derived from sandstone, granite and mica schist, but there may also be some limestone material in the till. Drumlin soils are mainly grey–brown podzolics, gleys and peatland and occur from Swinford southward and westward, as well as to the north of Charlestown. The parent material is a limestone-derived glacial till, which may also contain some sandstone. The grey–brown podzols are up to 0.70 m thick and moderately well drained. Poorer drainage on flat drumlin summits and in inter-drumlin flats leads to the development of gleys and peat basins. About 34 % of the soils of the area are classified as basin peat, with only a small area of degraded grey–brown podzolics in the south near Lough Roe. Basin peat is always associated with wet surface conditions, is 3–8 m thick and is underlain by glacial till.

Drainage patterns

The Moy River dominates the drainage pattern and flows south-west across the north-west of the study area, c. 7 km north-west of Charlestown. The Owengarve or Coarse River is a tributary of the Moy and flows west in the northern part of the study area. Minor rivers, including the

Sonnagh and Mullaghanoe and various streams, flow north-west between the Moy River and the area of high ground at Mullaghanoe and the Ireland West Airport. Streams joining the Moy from the Ox Mountains flow in a generally south-east direction.

Townlands

There are in the region of 63,000 townlands in Ireland, and they represent the legacy of a medieval land assessment system that emerged as both an expression of land ownership and a means of

Table 1.2—Townlands along the route of the N5 Charlestown Bypass.

Townland name	Alternative name	Translation of townland name
Ballyglass East	Baile Glas	Green town
Ballyglass West	Baile Glas	Green town
Bracklagh	Bracklogh, Bracklough, Breaclach	Speckled land
Bulcaun	Bulcán, Bulkane, Bulkaun	Central land
Cartron	Cartoon, Cartún	Anglo-Norman land division
Cashelduff	Caisiol Dubh, Cashilduff, Castleduff	Black stone fort
Charlestown	n/a	n/a
Cloonaghboy	Cloonaghbwee, Cluanach Buidhe	Yellow lawn or meadow land
Cloonfane	Clonefeane, Cloonfaune, Cluain (na) Féinne	Lawn or meadow of the Fianna
Cloonlara	Cluain Lara, Cloonlarah	Lawn of the mare
Cloonmeen West	Cluain Mhín	Smooth lawn or meadow
Corragooly	Carrowgolagh, Cor a‘ Ghualaigh, Corringully	Round hill of the charcoal burner
Cranmore	Crann Mór	Great tree
Cuilmore	Coill Mhór, Coilmore, Culmore	Great wood
Currinah	Cor an Fhiaidh, Corynea, Currina	Round hill of the tree
Fauleens	Fáilínidhe, Fallens, Fallyny	Little enclosures
Gortanure	Gort an Lubhair, Gortanoor, Gortinure	Field of the yew
Gowel	Gabhal, Gowell, Gowill, Gowyll	A fork
Hagfield/Treanacally	Hackfield, Trian Na Cailliighe, Treenacolly	The hag’s third part
Killaturly	Coill a‘ Turlaigh, Cull a Turlough, Killiturly	Wood of the turlough or winter lake
Lavy Beg	Lavybeg, Lawagh, Leamaigh Bheag	Small elmwood
Lavy More	Lavymore, Lawagh, Leamaigh	Big elmwood
Lowpark	Béal Átha na Sróna	Mouth of the ford of the nose
Mullenmadoge	Muileann Madóige, Mulinmadoge	Maddock’s mill
Sonnagh	Sonnach, Trien de Sonnagh, Sunnagh	A mound or rampart
Tomboholla	Tom Both Thola, Tombowhill, Tuaim Boithe Thola	The mound of Tola’s tent or hut
Trouthill/Knockbrack	Cnoc Breac, Throwthill	Speckled hill

*Based on O’Donovan 1837–8.

imposing dues/taxes on the populations in Gaelic lordships or in the manors of the Anglo-Normans (Duffy 2007, 58). There is an inherent logic in the system, which usually resulted in more extensive territories on poorer land, thus providing a larger area for cultivation and livestock grazing, as was a necessity on poorer land compared to richer, more productive, arable land (ibid.).

Of the 27 townland boundaries (Table 1.2) crossed by the N5 Charlestown Bypass, 12 are marked by streams or rivers. Streams are natural boundaries in the landscape and are obvious markers for human-defined territories. The bypass crosses the main stream flow direction, resulting in the high number of townland boundaries marked by streams. Many streams and rivers probably acted as routeways in the heavily forested landscape inhabited by the earliest people of the area. The Moy River and its tributaries would have provided a route from the coast.

Archaeological and historical landscape overview

The archaeological excavations on the route of the Charlestown Bypass have provided new evidence for settlement and daily life in the area over the last five millennia and highlight a long history of human occupation in an environment that constantly changed and evolved. These excavations have provided archaeological information that is of national, regional and local significance.

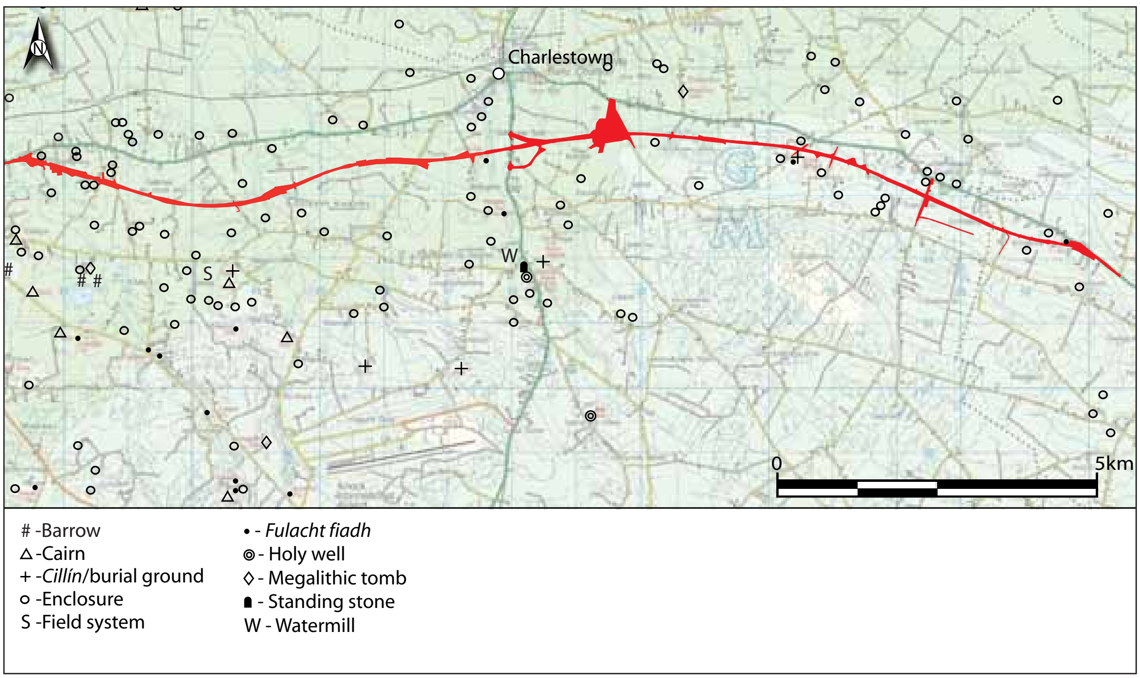


Fig. 1.5—Archaeological monuments in Charlestown area (extract from OS Discovery Series map).

The Mesolithic period (7000–4000 BC)

Evidence for Mesolithic activity in the general area comes from Lough Gara, Co. Roscommon, c. 20 km east of Charlestown, and dates to the period c. 7000–4000 BC (Fredengren 2002). Beyond the study area, a Mesolithic site at Belderrig, Co. Mayo, 62 km north-west of Charlestown, comprised a scatter of worked quartz, lithic material (worked stone implements and debris from their manufacture), plant and insect macrofossil remains, and mammal and fish bones sealed beneath a peat layer (Warren 2006, 1–5). Other Mesolithic evidence in County Mayo includes Bann flakes found in Burrishoole, near Newport, Lough Lannagh, Castlebar (Gibbons et al. 2004, 5), and Ballinrobe (Anderson 1995, 33–6). The radiocarbon date range from Sonnagh II (Chapter 2) spans the transition from the Mesolithic to the Neolithic, but the site has been interpreted as Early Neolithic. No other evidence for Mesolithic activity was found on the Charlestown Bypass.

The Neolithic period (4000–2400 BC)

The Neolithic period in Ireland was characterised by sedentary farming with an emphasis on cereal production, animal husbandry, substantial dwelling-places, elaborate funerary monuments, pottery production and new lithic technology. The change from the preceding hunter-gatherer society was gradual, with increasing emphasis on farming, which gradually became the main economy (Zvelebil & Rowley-Conway 1986, 86).

Megalithic tombs are the most visible evidence for Neolithic activity in the landscape. The number of megalithic tombs in the study area is low but is average for relatively low-lying ground in the wider region encompassing east County Mayo, south County Sligo and north-west County Roscommon. At Ballyglass in north Mayo, c. 55 km north-west of Charlestown, a central court tomb was built over the remains of a rectangular house measuring 13 m by 6 m, and charcoal from the wall-trenches produced a radiocarbon date of 3700–2900 BC (Waddell 1998, 33 and 81; Ó Nualláin 1972).

A major focal point of megalithic tomb construction was in and around the Coolera peninsula in County Sligo, 52 km north of Charlestown, where the Carrowmore megalithic cemetery is situated. Thirty of a known 100 tombs survive in Carrowmore, most consisting of a boulder circle with a polygonal chamber covered by a capstone in the centre (Danaher 2007, 9). The highly visible passage tombs of Knocknarea, Knocknashee and elsewhere are situated on hilltops (ibid., 9–10) surrounding Ballysadare Bay, where they dominated the landscape and provided a focal point for Neolithic communities. These megalithic cemeteries indicate prolonged and intensive activity and are no more than a day's walking distance from the Charlestown area. These megalithic tombs were broadly contemporary with the Early Neolithic structures excavated as part of this scheme at Sonnagh (Chapter 2) and pits, pottery and lithic remains at Lowpark (Chapter 4). A lithic assemblage and disturbed cairn excavated at Cashelduff (Chapter 2) may have been the disturbed remains of a megalithic tomb.

Larger rectangular houses are also a feature of the Early Neolithic in Ireland. Two rectangular Neolithic houses have been identified in Mayo at Ballyglass, 55 km north of Charlestown, and Gortaroe, Westport, 52 km west of Charlestown. The Ballyglass house was overlain by a court tomb and has been interpreted variously as a dwelling-place or a cult house (Topping 1996, 168; Waddell 1998, 54). The Gortaroe house did not have comparable ritual associations but could equally have functioned as more than a dwelling. It measured 9.80 m by 6.80 m, with packing stones lining the foundation slot-trench, and alder charcoal from the foundation trench was radiocarbon-dated to 3623–3105 BC (Gillespie, forthcoming). The Céide Fields, a system of pre-bog coaxial rectangular fields in Glenulra, Behy and adjacent townlands, 56 km north-west of Charlestown, provides evidence for communal effort in land clearance and subsequent animal husbandry and cereal cultivation in the Neolithic period. Pollen analysis indicated that there was a period of intensive farming around 3700–3200 BC and that the growth of blanket bog, which sealed the sites, was under way by 2700 BC (Waddell 1998, 36–7). Pre-bog stone walls have also been recorded on Clare Island and may point to the colonisation of this island by early farmers (Corlett 2001, 11).

Excavations at a ringfort at Carrowkeel, near Crossmolina, Co. Mayo (MA038-004), produced evidence of an underlying Neolithic phase that comprised a series of pits within a narrow-ditched enclosure (Zajac 2002). Pottery sherds from one of these are identified as a classic Carinated Bowl dating to 4700–3200 BC (R Cleary, pers. comm.). Five hollow scrapers, one end-scraper and assorted retouched pieces were also recorded from this site and indicate a Neolithic date (Milliken 2002).

Neolithic stone axeheads have been recovered from Rockfield, near Aghagower, 44 km south-west of Charlestown, and from Rockfleet and Burrishoole townlands, Westport (Corlett 2001, 11). In addition, a chert leaf-shaped arrowhead and a flint thumbnail scraper were recorded from a ringfort excavation in Letterkeen, 52 km west of Charlestown (ibid., 11; Ó Ríordáin & MacDermott 1952, 114–15).

These features, although at a significant distance, are indicative of a more general Early Neolithic landscape contemporary with the early structures in Sonnagh and pits in Lowpark (see Chapters 2 and 4).

Wedge tombs occur relatively late in the chronology of megalithic tombs, with dates spanning the Late Neolithic period and the Early Bronze Age (Waddell 1998, 92–101). Wedge tombs are recorded at Cuillaun, 8 km south-west of Charlestown, Clooncous, 3 km east of Charlestown, and Barnalyra, 6 km south-west of Charlestown. There are cairns that may also date to the Neolithic or the Bronze Age at Barnacahoge, 7 km south-west of Charlestown, and at Cloontubbrid, 6 km west of Charlestown (de Valera & Ó Nualláin 1964, 74). These sites are closer to and may have been in contemporaneous use with the Lowpark timber circle (see Chapter 4) and reflect ritual aspects of this prehistoric society. The earlier *fulachta fiadh* and burnt spreads excavated as part of the Charlestown Bypass were also dated to this period.

The Bronze Age (2400–500 BC)

The Bronze Age was a period defined by the introduction of metallurgy, new burial practices, new pottery, increased concentrations of *fulachta fiadh* and the appearance of new monumental sites, including standing stones, stone alignments and stone circles. The Irish landscape underwent a major change during the Late Neolithic/Early Bronze Age, and much of the forest cover had been cleared by the early second millennium BC. Blanket bog expanded at the Céide Fields, and by the end of the Late Neolithic period the bog extended over fields that had been enclosed in the Early Neolithic period (O'Connell & Molloy 2001, 123) and soil deterioration was widespread (Cooney & Grogan 1994, 99). The emphasis changed from large megalithic tombs to simple pit or cist graves, barrow or tumuli cemeteries with associated funerary pottery and other grave-goods. Lithic technology was largely replaced by bronze, and in the later Bronze Age votive offerings in rivers, bogs and other sites were widespread. Evidence of Bronze Age metallurgy on the Charlestown Bypass excavations was confined to two tin beads from a trough base excavated at Sonnagh and metal axe and adze cut-marks on timbers preserved at various *fulachta fiadh* (Appendix VII).

The most numerous and widespread monument type identified and excavated as part of this scheme was the *fulacht fiadh*. These occurred in clusters and in isolation across the scheme, with access to the water table as the apparent main factor in site location. Radiocarbon dates from these *fulachta fiadh* generally fall within the Bronze Age, with a small number dating to the Late Neolithic period. They consisted of mounds of heat-affected stone and charcoal. A wide variety of troughs were present, some of which were lined with a variety of materials, including flagstones, large timbers, roundwoods, brushwoods, wicker and moss. Two tin beads, occasional lithics and bone were the only artefacts associated with these sites (see Chapter 3). The high density of *fulachta fiadh* identified on this scheme reflects an extensive distribution throughout the county.

Bronze Age burial practice in the region is represented by several barrow clusters around Urlaur Lake and Mannin Lake, c. 15 km south of Charlestown, and there are individual and small groups of barrows at Cashel South, 7 km north of Charlestown, and Magheraboy, 18 km north-east of Charlestown. A large Bronze Age barrow cemetery at Carrowjames, c. 30 km south-west of Charlestown, includes several tumuli of second-millennium BC date and two later ring-barrows (Waddell 1998, 367). Other cemeteries dating to the Bronze Age in County Mayo include a flat cemetery at Ballinachalla, one containing nine graves at Corrower, one at Kilbroney, which had 10 urn burials and one cist grave, and Letterkeen, which had five burials (Waddell 1990, 113–22; Ó Ríordáin & MacDermott 1952, 91–5). Other mounds/tumuli of possible Bronze Age date are at Parknashingaun and Rathnacreeva, close to Carrowjames (Morahan 1995–6, 1). A single cremation burial associated with Bronze Age Food Vessel pottery sherds was excavated at Lowpark, and a nearby pit produced a Bronze Age radiocarbon date (see Chapter 4).

One of the more unusual Bronze Age artefacts in the national collection, the Cloonlara shield, was found in 1934 at the western end of the bypass. This wooden shield, made of alder, was just over 300 mm in diameter and was dated to 1633–1132 BC (Waddell 1998, 242). Two possible Bronze Age wooden vessels were recovered from an unknown location in Cuilmore townland in 1932.

Bronze Age settlement sites in Mayo have been excavated at Leedaun, near Claremorris, 30 km south of Charlestown, Rossbeg, near Westport, 55 km west of Charlestown, Belderg Beg, 80 km north of Charlestown, and Carrownaglogh, 24 km north-west of Charlestown. The Leedaun hut site comprised a curved trench that partly enclosed a concentration of stake-holes, a hearth and a number of horizontal charcoal stains. A large number of chert and flint artefacts and animal bones, including cattle, sheep and pig, were recorded from the site, and a radiocarbon date of 2121–1750 BC places it in the Early Bronze Age (Walsh 2001). The Rossbeg house measured 4.50 m in diameter and comprised a series of post-holes in a sub-circular arrangement, with a possible annexe and an entrance feature. Oak charcoal from a structural post-hole was radiocarbon-dated to 1369–1127 BC (Gillespie, forthcoming). A circular stone house and associated field system of Early/Middle Bronze Age date were recorded at Belderg Beg, in north Mayo, and form part of the Céide Fields system. Finds included a saddle quern and a rubbing stone (Caulfield 1988; Doody 2000, 152–3). A Bronze Age house identified as a circular bank inside a stone enclosure at Carrownaglogh dates to the Middle Bronze Age (Herity 1981; Doody 2000, 152–3). The large number of *fulachta fiadh* excavated as part of the bypass implies corresponding habitation sites similar to the excavated sites elsewhere; however, no habitation sites were identified during this scheme.

In the wider landscape, there are monument clusters from both the Neolithic period and the Bronze Age, which Fredengren (2002, 174–5) refers to as tribal nodes. These include the area south-west of the Ox Mountains and north of the River Moy, c. 7 km north-west of Charlestown, where there are megalithic tombs, cairns, wedge tombs, standing stones and burnt mounds (ibid., 174). The high ground at Aghamore, 15 km south of Charlestown, situated between the Urlaur and Mannin lakes, is another tribal node, and the monument cluster includes a cairn, megalithic tombs, barrows, cist graves, ring-barrows and standing stones (ibid., 174–5). To the west of Ireland West Airport, in Barnacahoge/Barnalyra townlands, are megalithic tombs, several cairns, wedge tombs and burnt mounds, while south of Swinford there is a concentration of bowl-barrows on high ground (ibid., 174). A succession of monuments suggests important tribal centres in use over a long period (ibid., 175–6). The importance of earlier monuments to later populations may partly explain the clusters of *fulachta fiadh* in Sonnagh, Fauleens and Currinah, with periods of several hundred years between the construction of some *fulachta fiadh* in the groups. The construction of *fulachta fiadh* adjacent to earlier mounds may reflect continuity and connections with past generations or simply opportunistic use of suitable ground (see Chapter 3).

The Iron Age (500 BC–AD 400)

There is very little surviving evidence of Iron Age settlement or material culture in Ireland. Hillforts such as Rathgall, Co. Wicklow, and Freestone, Co. Kilkenny, were occupied in the Late Bronze Age, and there is evidence of occupation or re-occupation of hilltops in the early centuries AD, but there is a hiatus between the two periods, and settlement evidence is lacking (Raftery 1994, 59). Wooden trackways such as Corlea I, Co. Longford, point to the existence of a large settled population, but traces of settlement are elusive (ibid., 112). Attempts to understand and describe Iron Age society are to a large degree based on the examination of artefacts, many ornate and technically advanced, but most are unprovenanced (ibid., 112). A similar scenario occurs at Lough Gara, Co. Sligo, an area of known activity and settlement throughout the prehistoric and medieval periods, where there was a sharp downturn in evidence for the later part of the Iron Age (Fredengren 2002).

Excavations in the early 1990s on a ringfort (MA071-042) at Lislackagh, 12 km south-west of Charlestown, unearthed the foundation trenches of three Iron Age circular structures in the interior. These had internal diameters of 3.60–4.60 m, and spreads of charcoal in the foundation trenches were probably the remains of burnt structural timbers. Iron Age radiocarbon determinations returned from the charcoal in the trenches were: (House 1) 191 BC–AD 2, (House 2) 200 BC–AD 140 and (House 3) 192 BC–AD 58. An iron-smelting pit furnace and furnace bottoms were also recorded. The finds assemblage included iron nails, a hook, a knife, decorated blue glass beads, a yellow glass bead, a stone bead, a lignite bracelet fragment, a bronze stick-pin and 34 stone implements (Walsh 1995b, 7–8).

The excavation of a children's burial ground (MA039-107) before the construction of the N26 Ballina–Bohola road scheme at Tonybaun, 26 km north-west of Charlestown, revealed some Iron Age activity. Three groups of features relating to metalworking activity were situated 40 m north of the burial ground: furnace pits with charcoal-rich fills mixed with slag. The most complex of the furnaces was stone-lined and had a small slab laid flat on the base; charcoal from this feature returned a radiocarbon date of 477–210 BC. Another furnace yielded a radiocarbon date of 166 BC–AD 25 (Nolan 2006, 99).

Oak charcoal from two later features at Lowpark on the N5 returned Iron Age dates of AD 230–410 (Beta-231652) and AD 340–540 (Beta-231658) and may be residual material from an otherwise unrepresented Iron Age phase. Alternatively, these anomalous dates may be the result of the 'old-wood effect' (see p. 8).

The early medieval period (fifth–12th century AD)

Early medieval society can be understood and reconstructed from literary sources such as law-texts from the seventh and eighth centuries, which survive incompletely in 14th- to 16th-century versions, wisdom texts, sagas such as the *Táin*, histories, poetry, annals, genealogies and saints' lives (Kelly 1988, 1). This literary evidence, examined in conjunction with a growing body of archaeological excavation data, provides a comprehensive insight into the period. The law-texts indicate a highly organised society based around the *tuath*, or 'tribe', ruled by a king, with up to 3,000 people in each *tuath*. One text indicates that a poet and a churchman had to be present, along with a king, for a proper *tuath* to exist (ibid., 4). Other ranks in the tribe included the *ócaire* and the *bóaire*, or small farmer and strong farmer (ibid., 4–10). Slaves were also part of society, as were landless tenants (ibid., 11).

The period from the fifth to the 12th century AD saw some long-lasting changes in society, but the most dominant factor of social change was Christianity. The presence of the early medieval Church in the study area is evidenced by the round tower at Meelick, church sites at Rathscanlan, Swinford and Kilturra, near Doocastle, and a cross-inscribed stone at Derryronan, south of Swinford. The native population did not convert readily to Christianity, and monasticism spread only in the second half of the sixth century, with Durrow and Clonmacnois, Co. Offaly, and Bangor, Co. Down, founded in this period (Edwards 1990, 99). The organisation of the early Irish Church was diverse, with a monastic and a diocesan system operating in tandem, although abbots of monasteries were probably more powerful than the bishops, owing to their wealth, based on land and livestock (ibid., 100). Gradually, the larger monastic centres such as Kells, Co. Meath, developed into proto-towns with large populations of laypeople, including craft- and estate workers, fuelling a local economy and acting as centres of trade for the rural-based population (ibid., 100).

Christianity introduced literacy and new technical skills and may also have resulted in a population increase owing to the improved diet brought about by better farming techniques, resulting in longer life expectancy (Stout 1997, 131). The population increase resulted in widespread construction of a new settlement type, the ringfort (ibid., 131). Ringforts are farmsteads enclosed by circular or oval banks and ditches that can comprise one, two or three surrounding defences. It has been suggested, based on evidence from the early Irish law-tracts, that a large trivallate (three-bank) ringfort housed the king and the smaller sites housed the lesser ranks (ibid., 131; Fredengren 2002, 215). This places the bivallate (two-bank) ringfort at Cloonaghboy (Chapter 5) relatively high in the hierarchy but leaves the status of the palisaded enclosure at Lowpark (Chapter 4) difficult to assess. Metalworking and the gold panel at Lowpark may indicate a high-ranking site.

Law-texts suggest that farming was based on a mixed economy of cattle-, sheep- and pig-rearing, coupled with crop cultivation (Kelly 1988, 3). Archaeological excavations have aided in this interpretation through the recovery of cereal remains, along with finds of rotary querns and water-powered mills (Monk 1985–6, 35), which confirm that crop husbandry was widely practised. The ringfort at Cloonaghboy and the palisaded enclosure at Lowpark produced limited faunal remains and quern-stones, which support this interpretation of the medieval mixed economy. The ringfort was the standard farmstead of the early medieval period and the commonest field monument (Edwards 1990, 11). Territorial organisation can be inferred at Cloonaghboy and Lowpark, which occurred in close association with other ringforts; however, in the absence of scientific dating for the other sites, it cannot be assumed that all known ringforts in the area were contemporaneous or that all contemporaneous sites are known. The newly identified cereal-drying kiln in Ballyglass West, adjacent to Lowpark, provides further evidence of grain production toward the end of the period.

The distribution pattern of these ringforts, situated on the free-draining hills overlooking flat expanses of bog or lower ground containing a watercourse, is repeated in the wider locality. A similar group of ringforts is recorded around the Killasser area, near Swinford, and more locally around the townlands of Bracklagh, Treanacally and Ballyglass East, south of Charlestown.

The later medieval period (12th–16th century)

Later medieval sites such as churches, abbeys and castles, and especially the 15th- and 16th-century tower-houses, are not a feature of the archaeological landscape of the Charlestown area. Ringfort occupation may have continued beyond the early medieval period; however, no evidence of this was uncovered by the excavations carried out as part of this scheme. The 12th to the 16th century was a period of turbulent and fundamental change, especially in relation to the Cromwellian plantation and its aftermath. A series of anomalous, charcoal-rich pits were excavated along the N5 route and returned radiocarbon dates ranging from the early medieval period to the mid-17th century. These have been tentatively interpreted as charcoal-production pits and indicate forest clearance and industrial activity during this period.

A star-shaped fort was built at Bellaghy Pass in c. 1656, known as 'Fort Cromwell' (Anon. 1997, 46). This fort is marked on the first-edition Ordnance Survey 6-inch map. Star-shaped forts are rare in the west of Ireland. Bellaghy, which adjoins modern-day Charlestown, in County Sligo, is recorded as being a garrison town as early as 1585 (ibid., 42). A castle was reputed to have been built at Bellaghy in the later 17th century and belonged to 'Lord Kingston', Robert King of King House, Boyle (Wood-Martin 1889). These fortifications were constructed to house soldiers and to secure strategic areas or routeways from falling into native control.

19th-century Charlestown

The founding of Charlestown in 1846 by Charles Strickland, Lord Dillon's land agent, was mainly the result of rivalry between two landlords, Lord Dillon and Lord Knox. Bellaghy, a market town with a weighing scales and a granted patent, was situated on the Knox estate and provided for the economic needs of the Dillon tenants in Kilbeagh parish (Murray 1997, 62). Little interest was taken in this arrangement until Lord Knox, or his agents, decreed that the tenants of the Dillon estate must wait until last to weigh their produce and thus were at the mercy of the dealers and middlemen. The failure to achieve market price for their goods resulted in economic hardship and an inability to pay rent and thus affected their landlord. Other factors that may also have played their part in the foundation of Charlestown included a population of over 10,000 in the parish, which would have been more than able to sustain an urban development, and a new town would yield valuable ground rent to Lord Dillon (ibid., 62). The development of Dillonstown, as Charlestown was then called, commenced in 1846. The name was later changed to Charlestown in honour of Lord Dillon's land agent, Charles Strickland (Healy 1967). The town was built adjacent to Bellaghy, and to encourage people to move there Strickland offered land rent-free for life to whomever roofed and lit a fire in the first house. Charlestown was eventually to surpass Bellaghy as a market town and, despite some periods of economic decline, it continues to act as a focal point for surrounding communities (Anon. 1997, 75–6). Most of the vernacular structures recorded on this scheme are likely to date from the late 18th to the early 20th century and are contemporary with the development of Charlestown.

Conclusions

Archaeological excavations along the N5 Charlestown Bypass have yielded evidence dating from the Early Neolithic period to the later medieval period, reflecting continued settlement and exploitation of the landscape. The re-use of one location in successive periods, most notably at Lowpark but also at Sonnagh, and the *fulachta fiadh* clusters may simply be due to the suitability of the location. A prominent, free-draining fertile hill suitable for agriculture in the Neolithic period was attractive to succeeding generations for the same reasons, fertile land being of primary importance to agricultural communities. The prominence of Lowpark's location may have been suitable for Early Neolithic habitation or ritual, as evidenced by a series of pit deposits, for Late Neolithic rituals associated with a timber circle, for burial in the Bronze Age and for more extensive settlement in the early medieval period. The presence of earlier features that may have remained visible in the landscape may also have influenced the site selection in subsequent periods. Re-use of the site may indicate a link with the ancestral past or the replacement of a previously dominant group. The landscape both shaped and was shaped by the communities who inhabited the area. A strong link, either for superstitious reasons or as an attempt to stamp a new authority on old territories, was created between succeeding populations and the landscape. The re-use of areas for *fulacht fiadh* construction may also be a link with preceding generations, notwithstanding that the suitability of the locations (i.e. access to the water table is likely to have been the primary influence on site location). Society and the surrounding landscape are heavily interlinked and cannot be isolated; each influences and interacts with the other, and both are ever-changing as succeeding generations place their own mark on the landscape and will continue to do so into the future.

The archaeological remains described in this volume also point to broader, national and international cultural connections. Pottery from Lowpark is part of a wider Neolithic type diagnostic of the period, with fragmented 'classic' Carinated Bowls from a series of pits dated to the Early Neolithic period. The later Neolithic phase at Lowpark included a timber circle and the largest assemblage of Grooved Ware pottery from Ireland (Appendix II). This ties in with Late Neolithic ritual sites more usually associated with the east of Ireland and with Britain. The lithic assemblage, and in particular two fine polished stone axeheads from Lowpark, provided supplementary evidence of this.

A single cremation burial, which cut through a Neolithic pit, contained sherds of Bronze Age Food Vessel pottery that was also part of a wider tradition. A decorated tin bead from the base of a trough in Sonnagh, dated to 1407–1270 BC, is unique in an Irish context and is comparable to a number of tin beads found at Flag Fen, Norfolk, England, dated to the Late Bronze Age. The Flag Fen tin assemblage can be paralleled with objects from Switzerland (Appendix VII), which emphasises the rarity of the Sonnagh bead and suggests extensive trade connections with the Charlestown area in the Bronze Age. Two radiocarbon dates suggest Iron Age activity in Lowpark but do not securely date any of the associated features. The paucity of datable Iron Age evidence is a feature of Irish archaeology yet to be understood.

The early medieval period was the most intense phase of settlement and industrial activity uncovered by this scheme. The bivallate ringfort at Cloonaghboy and the multi-phase settlement in Lowpark included significant early medieval structures and artefacts, including ironworking areas with structural evidence and souterrains dating to the sixth century AD. Artefacts included grind stones, anvil stones, an anvil base, quern-stones, iron knives, copper-alloy ring-pins, bone and antler pins, beads, lignite armlet fragments and a very significant gold filigree panel. The gold panel is the only known parallel for a panel discovered during Hencken's excavations at Lagore crannóg Co. Meath (Hencken 1950). The Lagore and Lowpark panels both have a dating bracket of the late sixth to the late seventh century, making them among the oldest surviving pieces of filigree from early medieval Ireland (Appendix IV). These findings fit into a complex early medieval rural society that flourished and expanded in the second half of the first millennium AD.

2
NEOLITHIC DISCOVERIES AT SONNAGH, BALLYGLASS WEST AND CASHELDUFF

Richard F Gillespie

Introduction

This chapter describes discoveries of Neolithic activity in the townlands of Sonnagh, Ballyglass West and Casheldduff (Figs 2.1–2), which provided the earliest dates for human activity on the scheme.

The earliest evidence for Neolithic agriculture in Ireland includes cereal pollen from Cashelkeelty, Co. Kerry, with a date span of c. 4950–4470 BC, and domestic cattle from Ferriters Cove, Co. Kerry, dated to c. 4600 BC. Mitchell & Ryan (1997, 156) have suggested a slight climatic deterioration, with a drop of 1–2 °C in mean temperature combined with increased rainfall, followed by a return to normal conditions as the trigger for major social change. In these conditions forest clearance (*landnám*) was followed by small-scale cultivation and pastoralism. There is considerable evidence for clearance of tree cover and the growth of blanket bog in the warmer, sub-Boreal period in the West, reflecting both climatic change and human intervention (Malone 2001, 29). The slightly raised temperatures in Early Neolithic Ireland resulted in a productive agricultural landscape and allowed a greater range of potential settlement areas for arable farmers (Mitchell & Ryan 1997, 156–63).

A gradual transition occurred from a hunter-gatherer, Mesolithic economy to a more sedentary, Neolithic economy based on agriculture. Waddell (1998, 25–6) suggests that early dates (4770–4490 BC and 4670–4360 BC) from an occupation area in Ballynagilly, north-west of Cookstown, Co. Tyrone, may represent a pioneering phase of early agricultural activity in Ireland, with unambiguous evidence for early farming shortly after 4000 BC. The earliest Neolithic evidence found on the N5 at Sonnagh II (see below) coincides with this early phase of agriculture.

Keane (1995, 165) compiled the available radiocarbon dates for initial peat growth in County Mayo. These are included in Table 2.1, with additional evidence from Gortaroe and Attireesh, near Westport, Co. Mayo, and sites discussed in this volume. Allowing for localised variations, it can be established that, in general, peat growth in Mayo started in the Neolithic period and was well advanced in Sonnagh by 2871–2498 BC, before the construction of the earliest *fulachta fiadh* there.

Along the route of the N5 Charlestown Bypass, archaeological sites of Neolithic date were excavated in three adjoining townlands; Sonnagh, Lowpark and Ballyglass West, with additional evidence 7 km to the east in Casheldduff and 6.8 km to the west in Cloonaghboy.

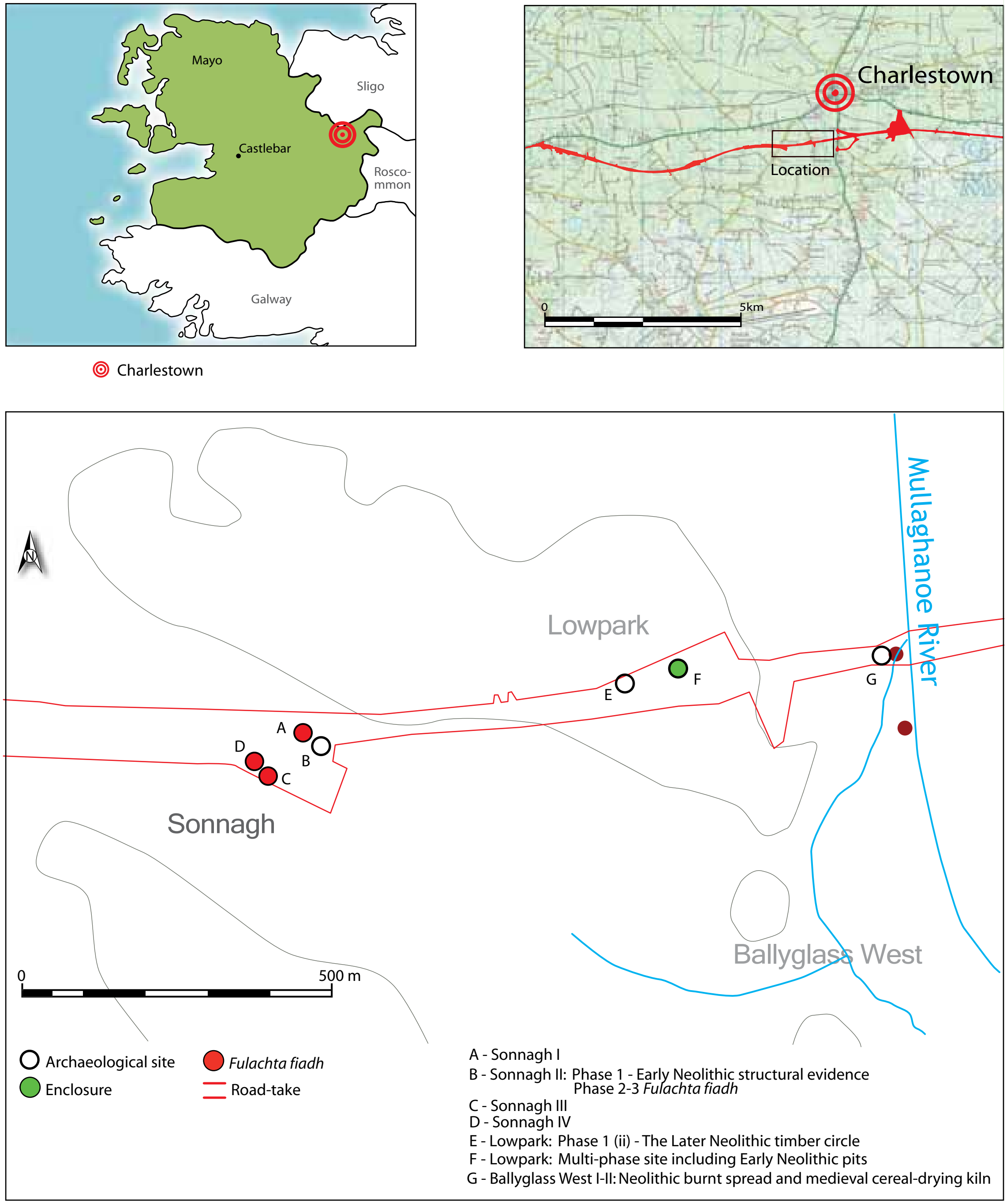


Fig. 2.1—Site location map for Sonnagh, Lowpark and Ballyglass West (extract from OS Discovery Series map).

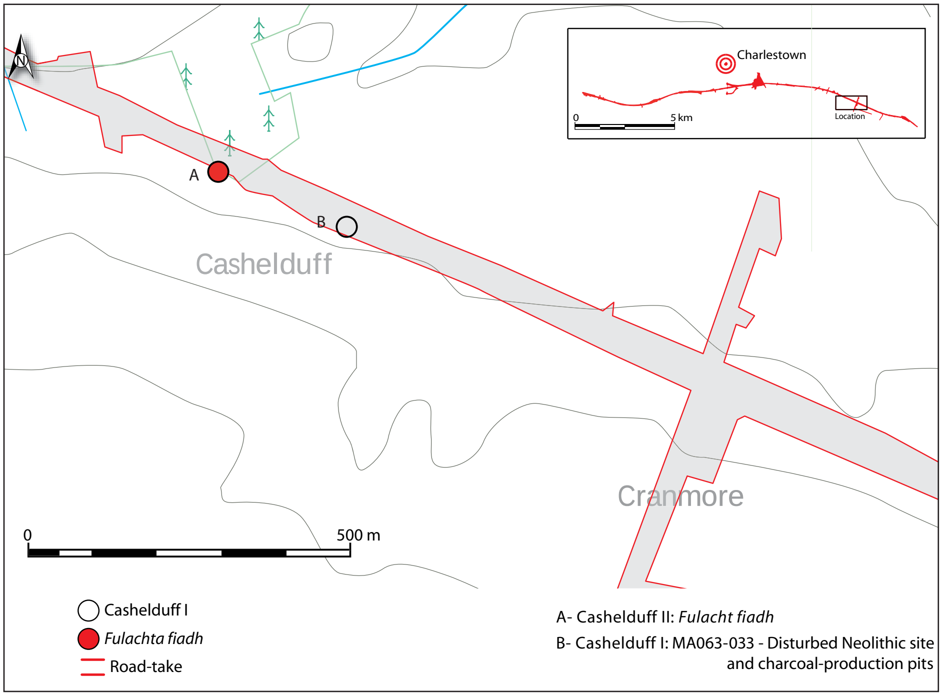


Fig. 2.2—Cashelduff site location map.

Table 2.1—Dates for growth of peat in County Mayo.

Location	Context	Date	Source
Carrowmore	Pine root, 0.20 m above mineral soil in peat	3328–2872 BC (4340±65 BP)	Håkanson 1974, 323
Belderg	Pine stump on thin lens of peat	3022–2493 BC (4200±95 BP)	Caulfield 1988
Gortaroe I, Area 4	Timber (willow) from *fulacht fiadh* trough resting on 6 m of peat	2576–2472 BC (4020±20 BP)	Gillespie, forthcoming
Sonnagh III	Charcoal (alder) from *fulacht fiadh* resting on 0.4 m of peat	2867–2467 BC (4100±40 BP)	Chapter 3
Tomboholla	Charcoal (alder and ash) from burnt spread resting on 0.55 m of peat	2831–2299 BC (3985±55 BP)	Chapter 3
Attireesh, Area 3	Charcoal (hazel) from *fulacht fiadh* resting on c. 2 m of peat	2575–2351 BC (3970±35 BP)	Gillespie, forthcoming
Deerpark East II, Area 1	Charcoal (willow) from *fulacht fiadh* resting on 2 m of peat	2465–2205 BC (3880±40 BP)	Gillespie, forthcoming
Carrownaglogh	Basal peat	1608–1410 BC (3210±45 BP)	O'Connell 1990, 268
Lough More	Crannóg on 6 m of peat (timber type not specified, probably oak)	AD 804±9 (dendro. date)	Lawless 1992, 15; Keane 1995, 165–80

A series of structural foundation trenches in Sonnagh were the earliest Neolithic features identified. Slightly later Early Neolithic pits and part of a Late Neolithic timber circle associated with Grooved Ware were recorded in Lowpark, 650 m east of the Sonnagh site. The Neolithic date for a burnt spread in Ballyglass West, 300 m east of Lowpark, fell between the Lowpark Early and Late Neolithic phases. The Cashelduff evidence included a lithic scatter and a number of disturbed features. A small lithic assemblage was found during the ringfort excavation in Cloonaghboy, including a chert plano-convex knife that may date to the Neolithic or the Bronze Age. A *fulacht fiadh* at Sonnagh III and a burnt spread in Tomboholla were dated to the Late Neolithic. They were part of a total of 40 of *fulachta fiadh* and burnt spreads discovered along the scheme dating broadly to the Late Neolithic and the Bronze Age (see Chapter 3).

Sonnagh II (Phase 1: Early Neolithic structures)

A series of previously unknown Neolithic structures and two phases of *fulacht fiadh* construction were identified at Sonnagh II, 1.5 km south-west of Charlestown. The site was near the base of the south-facing slope of a gravel ridge, 12 m from the eastern limit of a peat basin. A cluster of 11 *fulachta fiadh* and burnt spreads were also excavated in this area as part of this scheme (Chapter 3). An Early Neolithic date of 4233–3991 BC (GrA-35591; see Appendix A for details) was returned from the fill of the latest of these structures, placing them almost 3,000 years earlier than the *fulachta fiadh* and contemporary with the earliest peat growth in the Sonnagh basin.

Three main phases of activity were represented on site—Phase 1: Early Neolithic structures; Phase 2: spread of burnt stone and pits; and Phase 3: *fulacht fiadh*. The Neolithic phase is described in this chapter.

At Sonnagh II the Neolithic structural remains consisted of a series of circular trenches cut into the natural gravel (C5) with varied fills. These can be divided into three sub-phases (i–iii):

(i) The earliest features included a small, C-shaped foundation trench (C31), which was filled by gravel-rich silt (C26), and two trenches (C27 and C32) to the south, which were severely truncated by an oval trench (C30).

(ii) This oval trench (C30) was filled by different mixes of silt, gravel and stone (C25, C28 and C29) and enclosed an area of 8.5 m by 10.5 m.

(iii) The main structural feature consisted of two concentric trenches enclosing a small, circular surface area (C19). The outer trench (C21) was filled with gravel and loam (C20), and the inner trench (C18) had gravel, loam and stone fills (C17 and C24). Blackthorn charcoal retrieved from the primary fill (C17) produced the radiocarbon date.

Sub-phase (i): the earliest trenches (C27, C31 and C32)

The earliest trenches were incomplete curved trenches truncated by larger foundation trenches (C30 and C21). The C-shaped foundation trench (C31) may originally have been circular; however, it was truncated by the oval trench (C30) to the north and the outer trench (C21) of the double-ringed structure to the south-east. Only 25 % of the projected maximum circumference

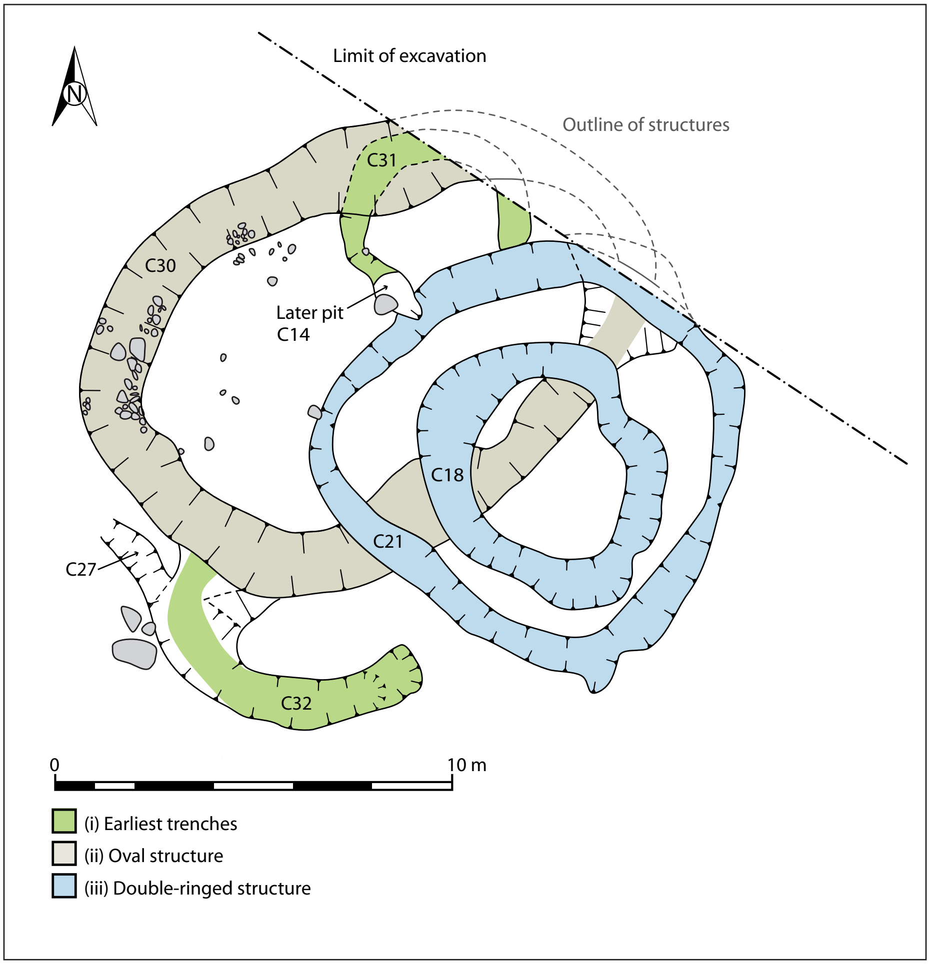


Fig. 2.3—Sonnagh II: plan of structural phases.

survived. This trench (C31) was 0.7 m wide and 0.6 m deep, with steep sides and an uneven base that sloped from west to east. The projected extent would have enclosed an area of 9.6 m^2 (3.5 m in diameter). The fill (C26) was moderately compact, dark brown, gravelly silt with frequent inclusions of orange boulder clay and pebbles. A later pit (C14) cut the outer trench (C21) of the double-ringed structure and impacted slightly on C31.

The other two early trenches (C27 and C32) were to the south. C27 was 0.9 m wide by 0.4 m deep and had a surviving length of 2 m. The fill was loose, mid-yellowish-brown, gritty silt with moderate inclusions of small pebbles (0.04 m in average diameter). It was not possible to define the western limits of this feature, and it was truncated to the east by the curved trench (C32) and petered out to the north-west, where it may also have been truncated. C32 was a well-defined, curved trench that had a projected diameter of 4 m and enclosed an area of 12.5 m^2. The trench had a maximum width of 1.5 m and was 0.54 m deep. It had gradually sloping sides and an uneven base, which inclined to the south. It was filled with moderately compact, mid-orange/brown, gritty clay with small pebbles. A baked clay fragment was retrieved from this fill. The clay may have

Pl. 2.1 (top)—Sonnagh II: curved trench (C32) with earlier trench (C27) in the background, from the east.

Pl. 2.2 (middle)—Sonnagh II: east-facing section of trench (C32).

Pl. 2.3 (bottom)—Sonnagh II: north-east-facing section showing curved trench (C31) and fill (C26) cut by oval trench (C30).

been an accidentally fired piece of daub. The eastern terminus may have been one side of an entrance, and the other side of this was obscured by later trenches.

Sub-phase (ii): trench (C30)

This trench (C30) was oval, with maximum internal dimensions of 8 m north–south by 7 m east–west, and enclosed an area of 44 m^2. The external dimensions were 12 m north–south by 11 m east–west. The trench was cut into the natural gravel (C5) and was flat-based; it was 1.6 m in maximum width and 0.85 m deep; the outer side was steep, and the inner side was more gradual. It had two main fills (C29 and C25) interspersed with a deposit of stones (C28). The basal fill (C29) was 0.6 m thick and consisted of moderately compact, mid-brown and yellow, silty soil with some inclusions of sandy gravel. The stone deposit (C28) was very dense throughout the basal fill (C29). The upper fill (C25) was moderately compact, dark brown and grey, gravelly soil, with decayed stone and fibrous roots. It was a maximum of 0.9 m wide by 0.3 m thick. The stone fill (C28) was much less prevalent than in C29, comprising c. 45 % of the trench fill and occurring

Pl. 2.4—Sonnagh II: post-excavation view of oval trench (C30) from the south-west.

consistently throughout the trench, with a maximum thickness of 0.7 m. It consisted of rounded cobbles ranging in size from 0.03 m to 0.25 m. Given the concentration and uniformity of this deposit (C28), it is possible that it represented deliberate backfilling of the trench. C30 was wider and deeper than any of the other features in this area, suggesting a non-structural function, perhaps delimiting the perimeter of a building. It was backfilled when the trenches for the double-ringed structure were dug.

Sub-phase (iii): the double-ringed structure

The double-ringed structure consisted of two roughly concentric trenches (C18 and C21). The outer foundation trench (C21) was sub-circular and enclosed an area of 57 m^2 (8.5 m in diameter). This trench was 1.9 m wide and 0.45 m deep, with steep sides and a flat base. It was slightly shallower to the south. It was filled with loose, mid-brown, fine gravel (C20), 60 % of which comprised medium-sized stones (0.05–0.07 m in diameter), with frequent inclusions of darker loam throughout the gravel. Five pieces of chert were associated with this context, including a retouched side-scraper (E3344:20:81). Charcoal from this fill included hazel, blackthorn, oak, apple-type and elm (Appendix XI).

The inner foundation trench (C18) was sub-circular and enclosed an area of 10.6 m^2 (4.1 m east–west by 3.3 m north–south). It had very steep sides and a flat base and was 1.36 m wide by 0.5 m deep. The distance between the two foundation trenches (C18 and C21) ranged from 0.2 m to 2.0 m but in general was c. 1 m. The main fill (C17) of C18 was a light brown and yellow–brown gravel and loam mix that was mostly composed of pebbles (0.01–0.02 m in diameter). This fill was present for most of the circumference of the trench. A deposit of packing

Pl. 2.5—Sonnagh II: post-excavation view of double-ringed structure from the south-east.

stones (C24), 1.4 m by 0.8 m by 0.3 m thick, was recorded at the eastern side of the trench within C17. This deposit included a mix of angular and rounded cobbles, many of which were split. The largest of these stones measured 0.26 m by 0.34 m by 0.15 m. Two chert flakes and a sandstone hammer-stone (E3344:17:68, 70 and 82) were recovered from C17, and blackthorn charcoal from this fill produced a radiocarbon date of 4233–3991 BC (GrA-35591). Oak charcoal was also present in this fill.

The area enclosed a surface (C19), interpreted as a floor, which consisted of a 0.2 m-thick layer of moderately compacted, light brown, gritty silt and sand with frequent inclusions of stones (0.04–0.25 m in diameter). C19 was extant for most of the interior.

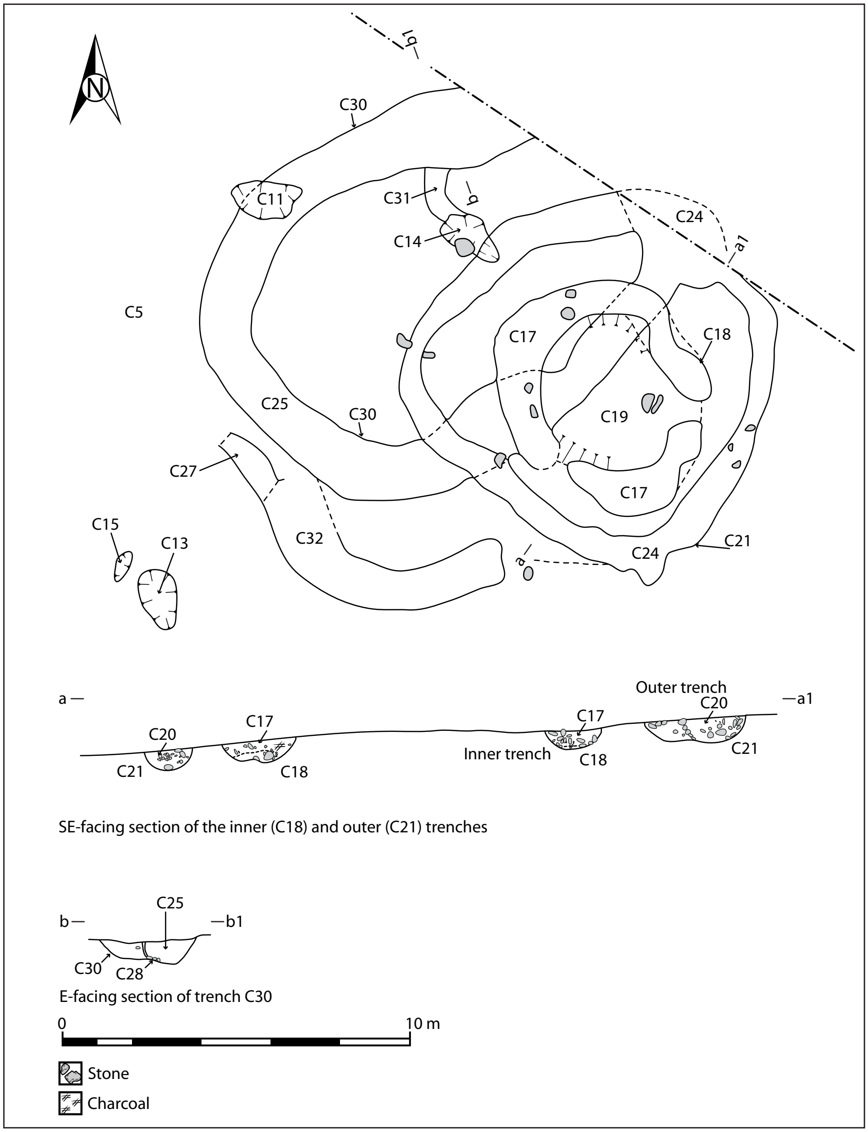


Fig. 2.4—Sonnagh II: plan and sectional profiles of structures.

Pl. 2.6—Sonnagh II: north-facing section of outer foundation trench (C21) showing fill (C20).

A 0.06 m-thick silt layer (C16) occurred over 75 % of the site and was probably lake sediment (see below) deposited during episodic flooding. The silt layer was important in the interpretation of the site stratigraphy, as the Early Neolithic structural features were partly covered by and earlier than the silt, and some of the later pits were cut into and post-dated the silt accumulation. Seventeen chert artefacts were associated with C16, including a side-scraper (E3344:16:53), a concave side-scraper (E3344:16:90), a core-trimming blade (E3344:16:76), five flakes and a bipolar core (E3344:16:54). These artefacts may have been associated with the Early Neolithic structures or the later phases of activity.

The overall lithic assemblage from Sonnagh II included 73 chert, four flint and three chalcedony artefacts. These included an arrowhead, a blade, a possible awl, 18 scrapers and 41 flakes. The assemblage documents the creation, use and discard of lithic artefacts at this location (Appendix III). These stone tools had a variety of domestic functions: skinning animals and preparing hides for clothing, butchering carcasses, and fine wood-, bone- and antler-working. The resilience of stone made it the only manufactured artefact to survive intact on these Neolithic sites.

Discussion

The dimensions of the trenches of the Early Neolithic structures at Sonnagh II provide a limited basis for their interpretation. The structural evidence consisted of the foundation trenches for at least two and possibly five structures, although C30 is interpreted as an enclosing ditch rather than a structural foundation trench. Of these, two (C31 and C32) were C-shaped and open-ended on the south side, where the archaeological remains did not survive. The morphology of a third structure (C27) is difficult to interpret as the foundation was very disturbed by later activity. The other structures were sub-circular (C30) and concentric trenches (C18 and C21). No discernible entrance feature was visible in any of these features, although the concentration of packing stones (C24) at the eastern end of both of the trenches in the double-ringed structure is the most likely entrance feature. The material culture was limited to occasional chert artefacts from the double-ringed structure, which was later covered by silt and topsoil.

Conditions on site were not conducive to organic preservation; the gravelly boulder clay made it difficult to establish the edges of the trenches, and no definite packing stones, post-holes or stake-holes were evident. Some or all of these trenches may have held plank walls retained by being packed with the material excavated from the trenches. There was no evidence for structural posts, and it is possible that the walls were load-bearing roof supports. Plank walling was evidenced in the Early Neolithic rectangular houses in Ballyglass, Co. Mayo (Ó Nualláin 1972), Ballynagilly, Co. Tyrone (ApSimon 1969), and Gortaroe II, Co. Mayo (Gillespie 2002; forthcoming). Structure 3 at Curraghatoor, Co. Tipperary, had a similar foundation trench to the smaller structures at Sonnagh and was interpreted as a bedding trench for a wall of closely set timbers, possibly resembling an upturned basket a little over 3 m in diameter (Doody 1987, 38–40, fig. 3.7; 2007, 22). The Curraghatoor structure was not directly radiocarbon-dated, but results from excavations in 1982 and 1987–91 showed that the site was both extensive and of multi-period date, with occupation extending from the Late Neolithic period to the Late Bronze Age (Cleary 2007, 3). This places the Curraghatoor occupation significantly later than Sonnagh II, but the structural interpretation may be analogous. An alternative interpretation is that these circular and oval trenches delimited and drained habitation areas where the material excavated from the trenches formed a low internal bank that held structural posts inclined toward the centre, as in the third-millennium BC structures at Townleyhall, Co. Louth, and Knocknarea, Co. Sligo (Waddell 1998, 39–43). Flimsy structures with a short use period, if not burnt *in situ*, would leave little or no evidence in the loose, gravelly subsoil of Sonnagh.

The earliest trenches (C31 and C32) may represent two circular structures similar to Structure 3 at Curraghatoor; the third trench (C27) was too short to interpret as a structural feature. If extra internal space when the packing material was in place is allowed for, these structures had internal diameters of 4–5 m and may have been in contemporaneous use.

The oval trench (C30) was more substantial, with a maximum diameter of 8 m, and enclosed a larger area than the other trenches. The large internal diameter and absence of internal structural posts may militate against interpretation as a roofed structure. The dimensions are more suggestive of a ditch that enclosed a flimsy internal structure, which left no evidence in the archaeological record. This ditch could have drained the habitation and protected it from hill-wash and flooding. If this interpretation is correct, a much smaller structure may have existed internally.

With regard to the concentric trenches (C18 and C21), it is possible that the inner ring held roof-supporting timbers and that the outer trench held a wall similar to the reconstruction suggested for a Bronze Age house at Lough Gur, Co. Limerick (Cleary 1995, 51), although irregular spacing between the ditches at Sonnagh suggests that two separate structural phases are possible. It is more likely that the inner trench, enclosing an area of 10.6 m^2 (4.1 m by 3.3 m), held structural walls supporting a roof and that the outer trench functioned as a drain around the habitation area or held an outer boundary fence. The diameter of the enclosed space may have increased to 14.4 m^2 (4.7 by 3.9 m) once the packing material was in place, thereby increasing the available floor space.

The sites occurred at the eastern end of a peat basin bounded by gravel hills. Radiocarbon determinations show that the peat basin was the focus of human activity from at least the Early Neolithic period to the early medieval period. The concentration of trenches, indicating a series of occupation phases in the Early Neolithic, shows use of one location on three to five occasions, with no further contemporaneous features identified in the area. This sheltered, broadly south-facing slope was a suitable location for settlement. O Carroll notes the presence of dryland wood species including hazel, oak, blackthorn/cherry, elm and apple-type (Appendix XI). This may indicate relatively dry conditions and a lower water table during the Early Neolithic period.

In the Early Neolithic period the Sonnagh basin was probably a lake before the peat growth and would have been an attractive settlement area, providing food in the form of fish, fowl and other wildlife, water, transport by canoe and transit along the margins in a wooded environment. A rise in water level, evidenced by the deposition of silt across the site, was probably the reason for the abandonment of the structures. Water erosion may also have removed surface evidence for habitation, such as occupation debris or shallow stake-holes, before the deposition of the sealing silt layer.

The continued re-use of the location of the Sonnagh II structures may be related to spatial constraints. It was situated on the lower slope of a gravel hill, with a lake (the modern peat basin) to the south-west, and was likely to have been set in a small forest clearing with dense forest on three sides. Habitation probably continued here as long as the ground remained suitable for small-scale mixed farming. The paucity of finds and habitation evidence can be explained by poor preservation conditions and later disturbance but may also reflect a relatively short period of use, seasonal use or possibly a pre-agriculture economy. A mixed economy of hunting, fishing and agriculture is most likely.

The time interval between the Neolithic activity and the later phases was so long that re-use of this location must be coincidental. The rise in the water table and peat growth in succeeding millennia created suitable conditions for *fulachta fiadh*. Eleven *fulachta fiadh* were discovered and excavated at Sonnagh, as discussed in Chapter 3. This activity continued over a period, possibly intermittently, between 2867–2497 BC (Sonnagh I) and 761–414 BC (Sonnagh III), giving an overall date range of 1,735 to 2,455 years. One burnt spread (Sonnagh VIII) produced an early medieval date of AD 982–1150. Most of the *fulachta fiadh* were dated to the Middle Bronze Age, between 1100 and 1300 BC.

Ballyglass West I: burnt spread

A disturbed burnt stone spread in Ballyglass West townland, 300 m east of the Lowpark Early Neolithic pits (see Chapter 1), was situated in flat, marshy ground adjacent to a small stream that ran into the Bracklagh River. Before excavation it was visible above ground as a dry, grass-covered mound surrounded by rushes. It was roughly square, with maximum dimensions of 9 m

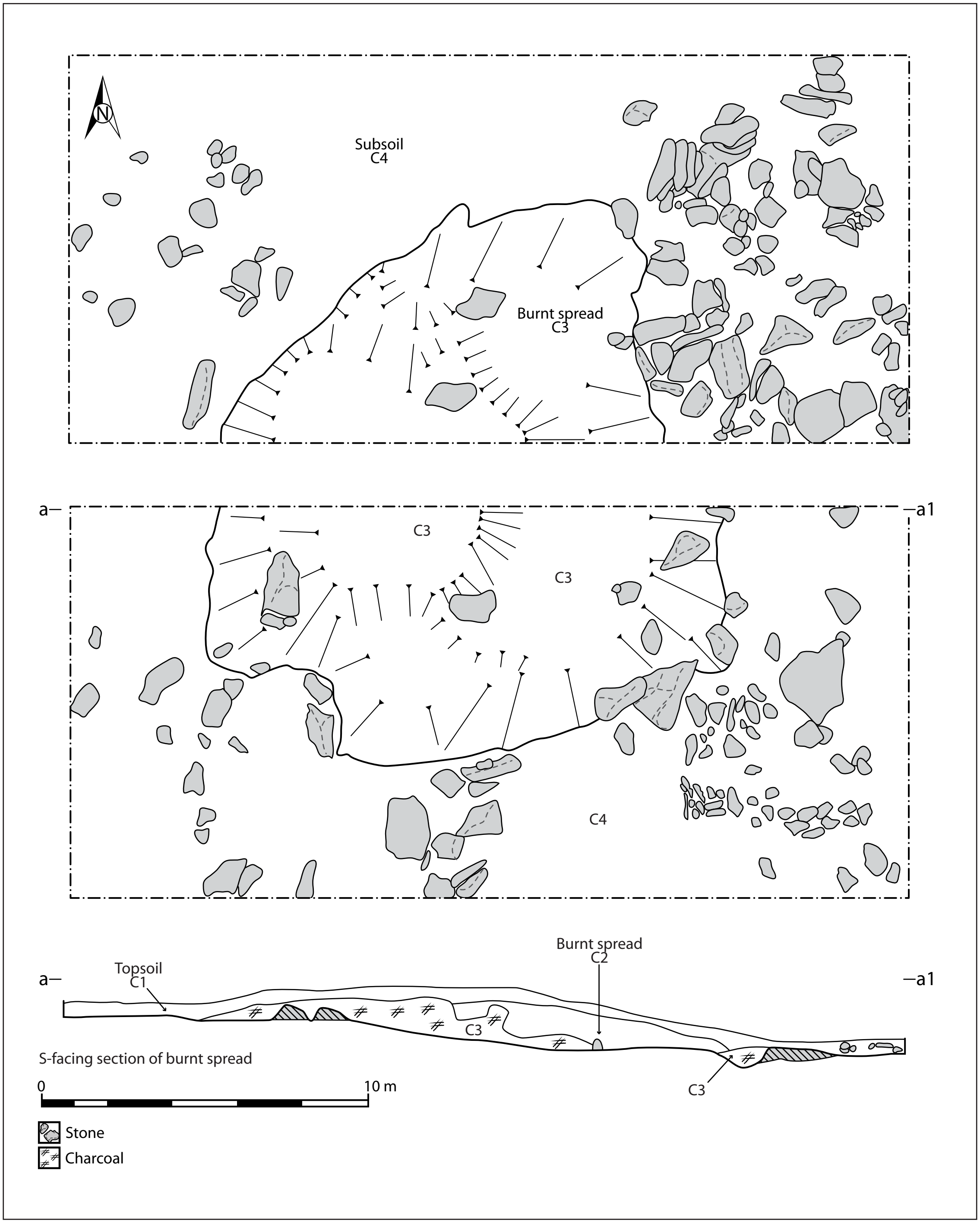


Fig. 2.5—Ballyglass West I: burnt spread.

Pl. 2.7—Ballyglass West I: barbed-and-tanged siltstone arrowhead (photo: Jonathan Hession).

north–south by 8.2 m east–west by 0.52 m high (Fig. 2.5). Although this was similar to a *fulacht fiadh* mound, there was no associated trough, and it was dated to much earlier than the normal range for *fulachta fiadh*, which suggests a different site type. Mixed charcoal (oak, elm, alder, hazel, blackthorn and apple-type) from the burnt spread produced a Middle to Late Neolithic date range of 3491–2921 BC (GrN-30744).

The morphology of the Ballyglass West I spread is interesting in that it was overlain by burnt stone (C2) that had no charcoal in the matrix. This may be due to modern disturbance exposing the spread and rain washing out the charcoal. Subsequently, an attempt at reinstatement left the spread with an atypical, square shape. The spread also had two distinct horizons of similar composition, with heat-fractured sandstone in a charcoal-rich matrix. The upper horizon was quite loose and easily excavated, while the lower horizon had fused into a solid mass attached to the protruding rocks. This fusing appears to be a natural process and may be related to iron-panning.

Lithics recovered from the site included a fine, ochre–brown, siltstone, barbed-and-tanged arrowhead (Pl. 2.7; 04E1507:1:4; overall dimensions: L 52 mm, W 25 mm, Th. 6 mm, Wt 6.75 g) and six chert items: two scrapers (04E1507:1:2 and 3), two unmodified flakes and two edge-damaged pieces (Appendix III). The arrowhead was found adjacent to the disturbed burnt spread.

Discussion

A *fulacht fiadh* by definition consists of two basic elements—a burnt mound and a trough. In the case of the Ballyglass West burnt spread, there was no extant evidence for a trough. The presence of an accumulation of burnt stone and charcoal close to a water source implies that there may have been some form of trough when the site was in use. Ground conditions were not conducive to preservation of a trough constructed with organic materials such as wood. The density of rock in the subsoil must have impeded digging out a trough pit. If the site is interpreted as a *fulacht fiadh*, this is a very early example. The *fulacht fiadh* at Sonnagh III (see Chapter 3) had a slightly later date range (2867–2497 BC), and the close proximity of Ballyglass West to Lowpark Phase 1 (i), with comparable Neolithic dates, provides evidence of a wider Neolithic landscape, with continuous exploitation of the area throughout the period.

Cashelduff I: disturbed Neolithic site

The landscape surrounding Cashelduff I consisted of low-lying peat and marshy land interspersed with well-drained, low, limestone hillocks. The excavated area was on one of these hillocks. There was slightly higher ground to the north and a sharper rise to the south, with an open vista to the west, north and east, but the southern view was restricted. Before excavation, the site consisted of a dry area c. 1.5 m higher than the surrounding marshy ground.

The excavation revealed a natural rise comprising rock outcrop and boulder clay overlain by an accumulation of small stones (C9), possibly a disturbed cairn. Larger stones within this material created two concentric arcs near the base of the slope and at the upper level of the rise (Fig. 2.6). The upper arc delimited the cairn and a later, charcoal-rich, sandy deposit. Topsoil over the stones (C2) contained an *ex situ* lithic scatter that comprised 236 pieces of chert, flint, chalcedony, quartz and crystal, most of which was worked and had clear Neolithic and probable Late Bronze Age elements (Appendix III). This *ex situ* material may have been disturbed from the underlying layers by deep ploughing evidenced by numerous furrows across the excavation area. The stone concentration (C9) pre-dated the other activity identified by the excavation. Two large pits that displayed evidence of intense burning and contained charcoal concentrations were dug into the central area, and seven pits or possibly stone sockets occurred within the area of the stone spread. Radiocarbon dates from three of these pits, interpreted as charcoal-production pits, placed them in the medieval period. The excavation area was severely disturbed by deep cultivation furrows, which on the southern side displaced or removed much of the 'cairn' (C9) material. In addition, two isolated charcoal-rich pits were excavated 35 m south of the western area and are likely to date to the early medieval period.

Site description

This site was on a 1.45 m-high hillock. The main feature, a 0.3 m-thick cairn of loose stones (C9), which was roughly circular with a maximum diameter of 24 m, rested on this natural rise, but there was no stone in the upper central area. C9 consisted of limestone cobbles, with an average diameter of 0.2 m, which rested on the boulder clay (C3) and were mixed with and overlain by topsoil (C2).

Two concentric U-shaped arcs of fairly evenly spaced, larger stones roughly delimited the inner and outer extent of C9, with loose stones spread 2–3 m outside the outer arc. The outer arc

Pl. 2.8—Cashelduff I: cairn (C9) with central area of charcoal (C10) from the west.

consisted of at least 13 boulders, up to 1.4 m long, 0.8 m wide and 0.7 m thick, close to the base of the rise and enclosed an area measuring 13.5 m east–west by 11 m north–south. The inner arc included 10 boulders, up to 1.30 m long, 0.3 m wide and 0.60 m thick, at the top of the hillock and enclosed an area measuring 10.5 m east–west by 8 m north–south. These arcs were on average 3 m apart and were open to the south-west. The stone spread (C9) was most densely concentrated on either side of the outer arc, possibly owing to the collapse or disturbance of the cairn.

Features post-dating the cairn (C9)

A series of pits and possible stone sockets (C13, C14, C15, C19 and C20) were cut into the cairn (C9) and boulder clay (C3). With the exception of C19, no artefacts were associated with these features. A possible pit or backfilled stone socket (C13) was cut into boulder clay (C3) near the north-western limit of C9. It was oval, measuring 1.05 m north–south by 0.62 m east–west, and was 0.32 m deep. It was filled with compacted cobbles (0.1–0.2 m in diameter) of angular blue shale and some reddish-brown, sticky loam. A roughly sub-circular pit (C14) in the north-west of the cairn had gradually sloping sides and a flat base, measuring 0.8 m by 0.7 m and 0.1 m deep. It

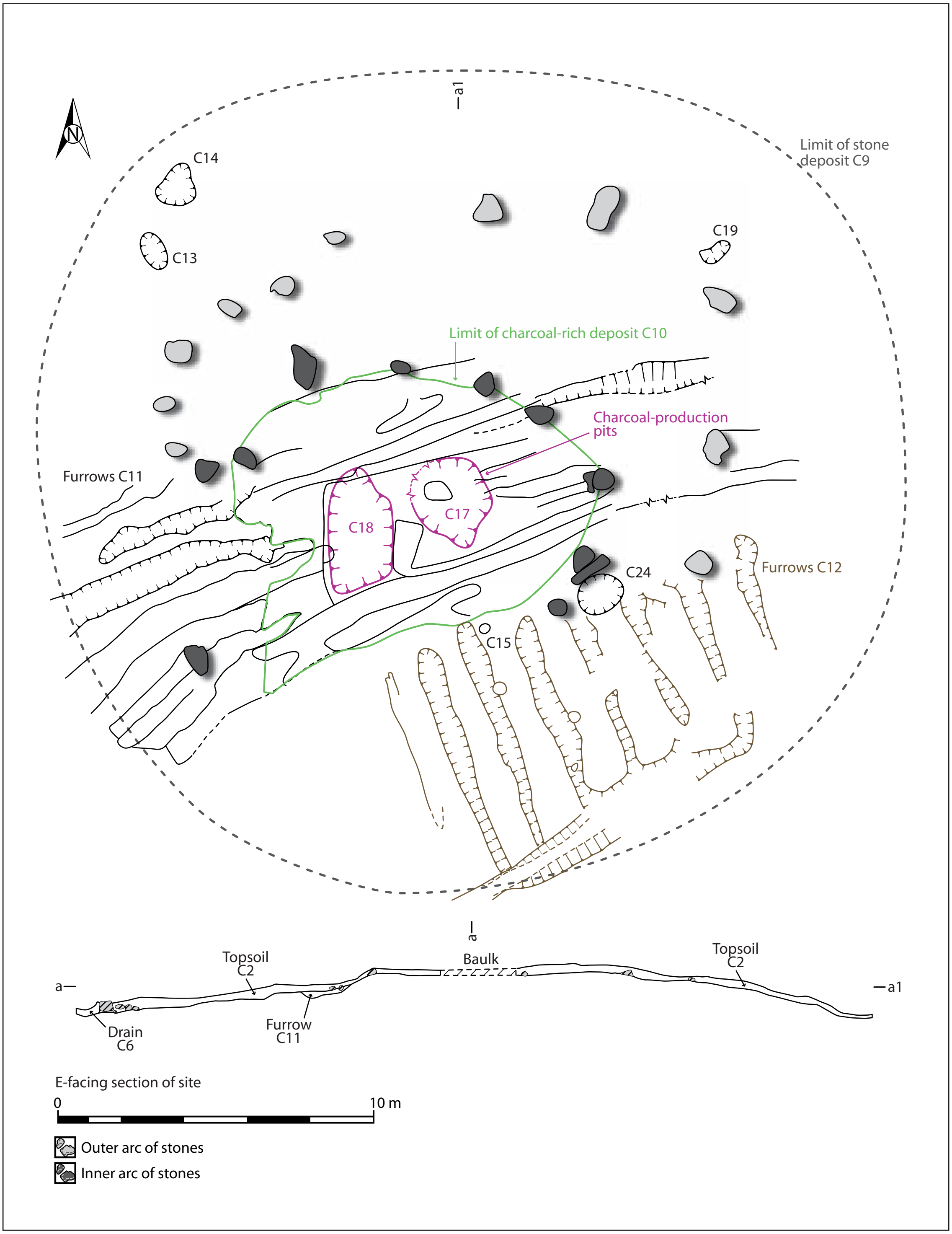


Fig. 2.6—Cashelduff I: site plan.

Pl. 2.9—Casheldüff I: two concave scrapers and a later gunflint (behind) (photo: Jonathan Hession).

was filled with charcoal-rich, loose, black silt and is thought to have been a charcoal-production pit. Oak charcoal from this pit produced a date of AD 579–656 (GrA-35582).

A possible stone socket or pit (C15) was situated in the south-east of the central area and the inner arc of large stones. It was oval with gradually sloping sides and a flat base with bedrock protruding. It measured 0.47 m east–west by 0.36 m north–south and was 0.08 m deep. It was filled by loose, dark brown, loamy clay with some white, silty soil mixed throughout.

A sub-circular pit (C19) was situated in the north-east of C9. It had vertical sides and an irregular base, measuring 1.1 m east–west by 0.45 m north–south and 0.8 m deep. It was filled by very mixed, loose, silty soil that was leached grey–brown near the top. The lower levels were interspersed with orange boulder clay. There were occasional flecks of charcoal and small pieces of fractured stone throughout, and a weathered chert flake (E3336:19:162) was included in this fill.

A pit (C20) near the centre of the site was sub-circular with gradually sloping sides and a flat base, measuring 0.75 m north–south by 0.65 m east–west and 0.15 m deep. It was filled by a moderately compact, charcoal-rich, black, silty soil.

The central features

Two large, charcoal-filled pits (C17 and C18) were centrally located within the inner arc of large stones. C17 was oval with concave sides and a flat base, measuring 3 m north–south by 2.3 m east–west and 0.65 m deep. It was filled by moderately compact, charcoal-rich, dark brown, silty soil with moderate inclusions of stones. The pit base was almost entirely covered with large pieces of charcoal. The pit base was oxidised red with bright orange scorching, evidence of *in situ* burning. C18, 0.6 m west of C17, was oval with steep concave sides and a flat base. It measured 4.48 m north–south by 2.2 m east–west and was 0.3 m deep. Similar to C17, the pit edges had concentrations of charcoal and the base was scorched red and bright orange, evidence of *in situ* burning. The fill was loose, charcoal-rich, black loam with dense charcoal at its base. Oak charcoal from this fill produced a radiocarbon date of AD 1026–1156 (GrN-35583).

These pits were within the area partly enclosed by the inner arc of large stones. This area was filled by a deposit of charcoal-rich, black, loamy soil (C10), measured 10.5 m east–west by 8 m north–south and 0.2 m thick, and directly overlay C17 and C18. As with the majority of the excavation area, C10 was disturbed by a series of cultivation furrows. Twenty artefacts were retrieved from this context, including 13 pieces of struck chert and a single fragment of unidentifiable burnt bone.

Modern disturbance of the site

The level of modern disturbance of the excavation area was extensive. Seven furrows (C11) extended south-west/north-east across the centre of the site, cutting through the stone cairn layer (C9), the central, charcoal-rich deposit (C10), pits beneath C10 (C17 and C18) and the subsoil (C3). A second group of furrows (C12) were at right angles to C11, aligned north-west/south-east, on the south side of the excavation area. The furrows (C11 and C12) were divided by a modern field wall foundation (C23) that extended south-west/north-east and was 12.5 m long, 0.62 m wide and 0.10 m deep. The fill consisted mostly of sub-angular stone (maximum size:

Pl. 2.10—Cashelduff I: quartz crystals (photo: Jonathan Hession).

0.25 m long by 0.15 m wide and 0.08 m thick) in a matrix of mid-brown, gritty, silty soil. A single piece of struck chert was associated with C23. The furrows were located on the hillock, the only well-drained area in an otherwise very marshy environment. The cultivation activity was hindered by the large stones in the cairn. It is likely that, in addition to these furrows, stone had been robbed out for drains and field walls in the recent past.

Isolated pits to the south of the site

Two adjacent pits (C26 and C27) were 34 m south of the main archaeological site. C26 was sub-oval with gradually sloping sides and a flat base that was oxidised red from burning. It measured 1.30 m north–south by 0.94 m east–west and was 0.14 m deep. It was filled by loose, black, silty soil overlain by grey, ashy soil and was cut on the surface by a furrow (C25).

C27, which was interpreted as a charcoal-production pit, was sub-oval with concave sides and an irregular, flat base that was fire-scorched red and orange. It measured a maximum of 2.2 m north–south by 1.87 m east–west and was 0.52 m deep, extending beyond the excavation area. The basal fill (C29) of the pit consisted of a loose deposit of grey, ashy soil, measuring 0.38 m east–west by 0.2 m north–south and 0.12 m thick, which filled a hollow in the pit base. The main fill (C28) rested on C29 and filled the remainder of the pit. It consisted of a loose, black, charcoal fill with inclusions of grey ash and measured a maximum of 1.7 m east–west by 0.8 m north–south and 0.2 m deep. Oak charcoal from this fill produced a radiocarbon date of AD 1055–1270 (GrA-35585). Some burnt animal bone was retrieved from C27.

Discussion

Cashelduff I is marked on the first-edition Ordnance Survey 6-inch map as an ‘enclosure’, depicted as a roughly circular series of hachures, and is listed in the Record of Monuments and Places as an ‘enclosure’ (MA063-033). The cartographic conventions implied that the site was an early medieval ringfort. Initial testing established that there were no features suggesting an enclosure, although three radiocarbon dates returned from excavated features fell within the early medieval period.

The earliest evidence from the excavation consisted of an *ex situ* lithic assemblage with clear Neolithic and probable later Bronze Age elements. All stages of lithic reduction were present, with a distinctive brown chalcedony, chert and quartz being worked. There was a preponderance of retouched pieces, notably scrapers, at this location. The presence of concave scrapers is interesting and, again, parallels can be made with the larger assemblage from Sonnagh II. The range of retouched pieces from Cashelduff I was restricted, in contrast to the other sites, and the focus appears to have been on scrapers, with some evidence for the use of borers or possible awls, although some caveats are needed in relation to a couple of these pieces (Appendix III). The artefacts such as the possible grinding and hammer-stones, the scrapers, débitage and a single fragment of butchered bone (Appendix IX) suggest domestic activity on this raised, relatively dry area, potentially over a short period of time in the Neolithic and possibly again in the later Bronze Age.

The cairn (C9) comprised three main elements: a spread of small cobbles and two arcs of large stones. The stones were quite thinly dispersed over the excavation area but were firmly *in situ* and were likely to have been a constructed layer, although later disturbance made the original morphology difficult to assess. Based on the undisturbed evidence, portions of the stone spread (C9) represented the base of a substantial cairn or platform.

One possible interpretation is that the Cashelduff cairn is a residual element of a destroyed megalithic tomb, the two arcs of stone perhaps representing kerbing. Two later pits (C17 and C18) in the centre of the cairn material may have removed all traces of a megalithic chamber and may account for the redeposition of the *ex situ* lithics. The site at Cashelduff is comparable to some court tombs in the Mayo region. The diameters of the cairns of five court tombs are similar to the 24 m diameter at Cashelduff. These court tombs are Dooncarton/Glengad (MA 1), Rosduagh (MA 2), Ballyglass (MA 14), Carrowleagh (MA 51) and Keel East (MA 62) (de Valera & Ó Nualláin 1964). Gaps are evident in the possible kerbing at Cashelduff, although it is possible to trace the perimeter. A similar situation is apparent particularly at Keel East (MA 62) and at another tomb at Creggaun (MA 55). A steep ledge or 'drop-off' at the north-eastern and southern sides of the cairn material at Cashelduff is paralleled at the court tomb at Dooncarton/Glengad (MA 1). Cairn material beyond the outer kerbing at Cashelduff was most likely the result of the cultivation disturbance, and this also occurred at court tombs at Barnhill (MA 27) and Creevaghamore (MA 29) (ibid.).

While the double ring of large stones and the outline of the cairn material bear a strong visual resemblance to court tombs, the site may be an anomalous or unclassified megalithic structure. The

Pl. 2.11—Cashelduff I: central area with two pits exposed from the east. Note curve of inner ring of large stones delimiting central area.

presence of the possible cobbling material between the two rings of large stones, the overall shape of the cairn and the dimensions of the space enclosed by the inner ring of large stones all bear a close resemblance to the Linkardstown megalithic cist burial, Co. Carlow (Raftery 1974), as well as, to a lesser extent, the wedge tomb at Baurnadomeeny, Co. Tipperary (O'Kelly 1960).

The second possible interpretation is that the site had a domestic use. If the surrounding ground was wet or subject to seasonal flooding or, indeed, held a small lake, it is possible that the site was constructed to take advantage of the natural rise, with the stones built up as a revetment against rising water. The large stones may have been the initial phase of the construction followed by collecting the infill, smaller cairn material. Given the landscape surrounding Cashelduff, the site may have been a temporary stopover in an area of marsh, woodland and seasonal lakes, which was used as a hunting base. The construction of a platform suggests that the site may have been a roughly constructed crannóg (artificially constructed island) in a marshy or seasonally wet area. Based on the classification of crannógs at Lough Gara, Co. Roscommon, 15 km east of the site at Cashelduff, the characteristics of the cairn material make it a circular, low-cairn crannóg, with a hollow mid-section and a loose packing of flags and boulders (Fredengren 2002, 80–1). Owing to the disturbance of Cashelduff I, it is not possible to ascertain the original form of the central area. The lithic assemblage appears to support a domestic function; however, it was not sufficiently diagnostic or well stratified to establish the site as a tomb or settlement.

Seven features cut into and post-dated the cairn material. Most of these were simple pits, and some charcoal in the fill of one produced an early medieval radiocarbon date of AD 579–656. The central area included two large pits (C17 and C18) dug into the subsoil to the surface of natural rock outcrop. The sides and bases of these pits were heat-affected, and they were filled with concentrated charcoal, generally oak. These pits and the whole central area were filled with charcoal-rich soil. The radiocarbon date range returned for one of these pits (C18) was AD 1026–1156, placing it in the high medieval period. The pits fills were dominated by dense amounts of charcoal, including large lumps. This, coupled with the soil oxidisation on their bases, suggests that these may have been charcoal-production pits.

These later pits constitute medieval re-use of Cashelduff I that disturbed and removed the central area of the site. There is also a possibility that the inner arc of larger stones was related to this phase of activity, as it defined the limit of the larger charcoal concentration (C10) that overlay the two central pits. The two pits to the south of the main site (C26 and C27) were roughly contemporary with the charcoal-production pits, but the presence of burnt bone suggests a domestic function rather than charcoal production (Chapter 6). It is possible that the stone layer (C9) was the result of early medieval field clearance or a constructed platform for charcoal. The size and large stone settings suggest a possible destroyed megalith with a cairn and kerbstones or possibly a circular, low-cairn crannóg as classified by Fredengren (2002, 80–1). Alternatively, it may be an early medieval platform constructed to facilitate charcoal production, with a residual lithic assemblage from a destroyed prehistoric site. The presence of a gunflint suggests that this may have been a suitable location for hunting in relatively modern times, and it may have had a similar function in prehistory.

3
FULACHTA FIADH

Agnes Kerrigan and Richard F Gillespie

Introduction

In his 1954 paper 'Excavations and experiments in ancient Irish cooking places' O'Kelly (1954) identified and interpreted the main features of *fulachta fiadh* based on five excavations in Ballyvourney and Killeens, Co. Cork, references to early literature, parallels with British burnt mounds and a programme of experimentation. This study established the main features of these sites as a trough, hearths and a burnt-stone dump or mound, the basic requirements for using heated stones to boil water. Additional features included huts, meat-racks, butcher's blocks, stepping stones and stone-lined pits. O'Kelly's interpretation of *fulachta fiadh* as cooking places is the most likely; however, alternative or additional functions are also possible. In this volume, sites with a trough and burnt mound are classified as *fulachta fiadh*. Deposits of burnt stone and charcoal without an associated trough are classified as burnt spreads. Burnt spreads are included in this chapter as the majority of them are likely to have been related to *fulachta fiadh*.

Landscape setting

In Ireland the siting of *fulachta fiadh* seems almost always to have been determined by the presence of wet or marshy ground (O'Kelly 1954, 140). *Fulachta fiadh* are invariably situated in marginal land, adjacent to water sources or at a level that facilitated access to the water table. Archaeological surveys in the Croagh Patrick area in County Mayo (Morahan 2001, 50) and in County Kilkenny (Condit 1990, 19), for instance, support this. Many sites locations on or at the edge of bogland must have been exploited in spring or summer, when drier conditions allowed access. Fourteen of the 21 *fulachta fiadh* included in this volume were situated either on peat or at the edge of a peat basin.

The Discovery Programme's North Munster Project highlighted the correlation between the presence of *fulachta fiadh* and other Bronze Age monuments in a large landscape study, with *fulachta fiadh* forming an important part of the large later prehistoric complexes of Mooghaun, Knocknalappa and Tonnagh in County Clare (Grogan 2005, 41). The Mooghaun study area is dotted with lakes, turloughs, bogs and marshy ground, and the majority of *fulachta fiadh* are situated along the margins of these features. Spatial analysis of the study area suggested that *fulachta fiadh* were not isolated features but occurred in clusters of up to four sites within 0.5 km of each other (ibid., 43). An earlier study indicated an association with standing stones in the Mooghaun region: 40 % of standing stones are within 1 km of a *fulacht fiadh*, and 52 % of *fulachta fiadh* are within 1 km of a standing stone (Grogan et al. 1996, 41). The correlation between *fulachta fiadh* and other prehistoric monuments was also noted in south County Limerick, where they formed an integrated system along with domestic and burial sites (Cooney & Grogan 1994, 102–3). Several groups of *fulachta fiadh* in County Kilkenny appear to have a similar distribution pattern to ring-ditches and standing stones (Condit 1990). Several monuments likely to date to the Bronze Age, including standing stones, most notably in Killadangan, and rock art at Boheh, Co. Mayo, occur in the same area as the Croagh Patrick *fulachta fiadh*, and some of the 51 hut sites identified in this area may represent related habitation sites (Morahan 2001). A hut site in Rossbeg adjacent to the survey area was dated to the Middle Bronze Age 1369–1127 BC (2990±30 BP; GrN-27926) (Gillespie, forthcoming).

Investigations of burnt mounds in Scotland resulted in the view that the mounds were too large, too permanent in character and too numerous to just be transitory in nature (Hedges 1974–5). Therefore, the mounds are interpreted as forming part of an integrated system of habitation, burial and ritual sites.

The Charlestown *fulachta fiadh* were not an integrated part of any extant major prehistoric complex such as Mooghaun; however, the multi-period site at Lowpark (Chapter 4) yielded evidence for Neolithic habitation, a Bronze Age cremation burial and a Late Bronze Age pit contemporary with *fulachta fiadh* 0.7 km to the west in Sonnagh townland. The Charlestown *fulachta fiadh* cannot have existed in isolation, and the prehistoric phases in Lowpark may be attributed to the same social group as the *fulacht fiadh* builders.

General distribution of *fulachta fiadh* and burnt spreads

Fulachta fiadh and burnt spreads were the most common site types identified and excavated as part of this road scheme, comprising 21 *fulachta fiadh* and 19 burnt spreads.

In 1997 there were over 7,000 *fulachta fiadh* recorded in Ireland (Power 1997), and the number has increased since then, with extensive archaeological assessments, testing, excavation and survey. In 1986 only two *fulachta fiadh* were known in County Mayo (Buckley & Lawless 1987, 33). The National Monuments database (as accessed in May 2010, on www.archaeology.ie), lists 372 *fulachta fiadh*, 50 burnt mounds and 23 burnt spreads in County Mayo. The number of *fulachta fiadh* in County Mayo is likely to be significantly higher as the county is 5,397 km^2 in extent, the third-largest Ireland, and only relatively small areas have been fully surveyed. In a survey of the Croagh Patrick area 27 *fulachta fiadh* were identified (Morahan 2001, 50). Seventeen *fulachta fiadh* were identified and excavated as part of the recent Westport Main Drainage and Waste Water Disposal Scheme (Gillespie, forthcoming). These *fulachta fiadh* are not included in the National Monuments database. County Cork, which covers an area of 7,457 km^2 has over 2,000 *fulachta fiadh*, giving a density of 1 per 3.7km^2 (Buckley 1990b, 9). The density of *fulachta fiadh* in Mayo is likely to be similar.

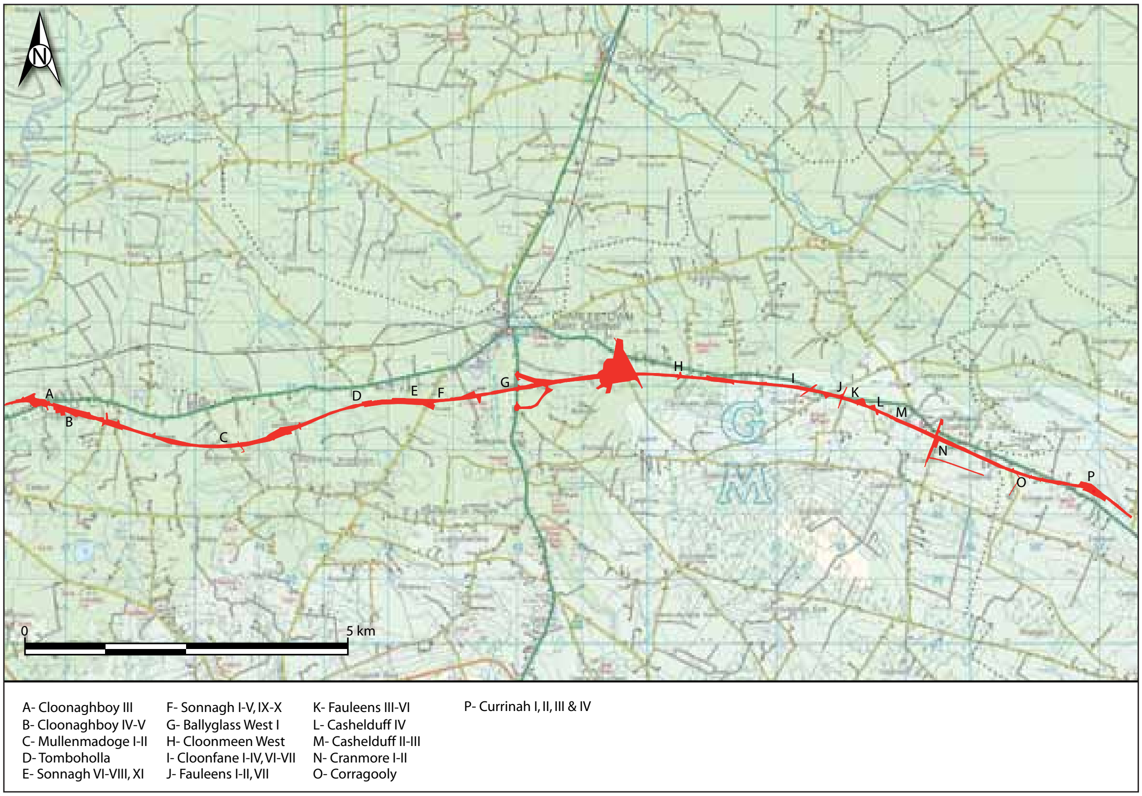


Fig. 3.1—Distribution of fulachta fiadh *and burnt spreads on N5 Charlestown Bypass (extract from OS Discovery Series map).*

Local distribution

The *fulachta fiadh* excavated along the route of the Charlestown Bypass exhibited a cluster pattern in the townlands of Sonnagh, Currinah, Fauleens and Mullenmadoge (Fig. 3.1). Seven *fulachta fiadh* with varied wood- and moss-lined troughs were excavated in Sonnagh, within 1 km of each other. In Currinah, Co. Roscommon, three *fulachta fiadh*, two with stone-lined troughs and one with wood lining, were situated within 0.5 km of each other, and a fourth, with stone-lined troughs (RMP RO008c-033), lay outside the road-take within 30 m of the excavated *fulachta fiadh*. In Fauleens two *fulachta fiadh* lay only 30 m from each other. In Mullenmadoge two *fulachta fiadh*, with earth-cut troughs and associated stake-holes, were situated within 500 m of each other.

Sonnagh and Fauleens had ideal conditions for the construction of troughs in peat with easy access to the water table. The two stone-lined troughs and the *fulacht fiadh* (RMP RO008c-033) in Currinah were adjacent to a stream, while the wood-lined trough was cut into peat. Troughs in Mullenmadoge and Cloonmeen West were cut into boulder clay that was likely to have been waterlogged when the *fulachta fiadh* were in use.

Dating

The radiocarbon dates for the *fulachta fiadh* on the Charlestown Bypass ranged from the early third to the mid-first millennium BC, stretching from the Late Neolithic period to the Late Bronze Age and encompassing over two millennia of activity (Appendix A). The earliest *fulacht fiadh*, Sonnagh III, was dated to the Late Neolithic period (2867–2497 BC; GrN-30754), contemporary with a *fulacht fiadh* in Deerpark East I, Area 2, Westport, Co. Mayo, which was radiocarbon-dated to 2837–2467 BC (Gillespie, forthcoming). The majority of excavated *fulachta fiadh* date to the Bronze Age. Fauleens I was first used in the Early Bronze Age, with Trough B providing a date of 1898–1746 BC (GrN-30833); Trough A represents a Late Bronze Age use of the site, dating to 774–521 BC (GrN-30831). This was roughly contemporary with the trough at Fauleens II, dating to 786–545 BC (GrN-30830), indicating that locations were re-used in the Late Bronze Age. The burnt mounds of the Early Bronze Age were probably visible to the people of the Late Bronze Age and marked out areas as suitable for *fulacht fiadh* construction. The re-use of such areas represents a later population group identifying and using the site for the same purpose as its predecessors and suggests continuity of practice over 2,000 years.

Cloonaghboy, Co. Mayo

Location

The general landscape is a deep peat basin oriented east–west that stretches west from Cloonlara, through Cloonaghboy to Cuilmore in the east, with small hills (85–96 m OD) and intermittent

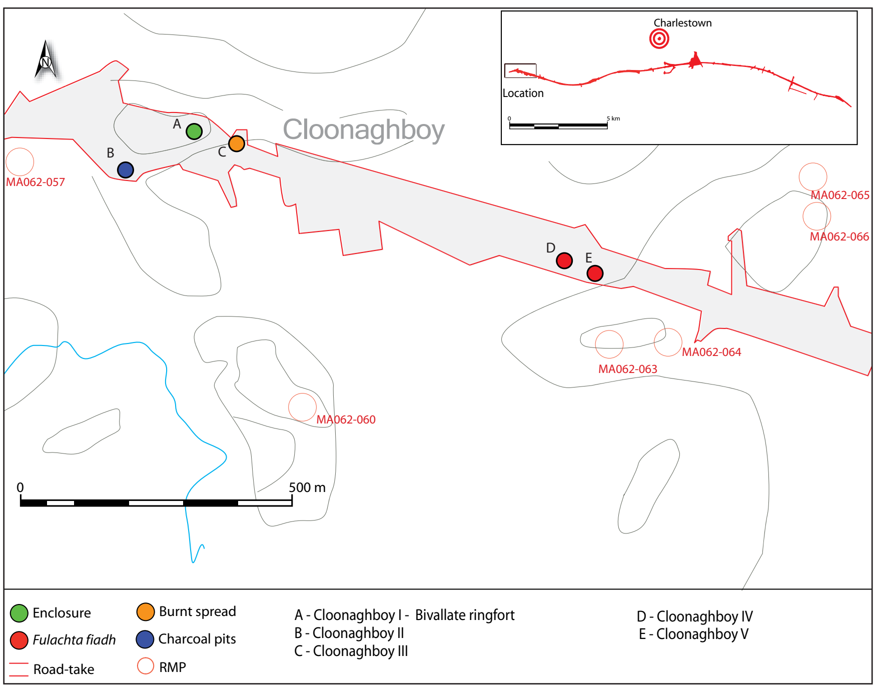


Fig. 3.2—Cloonaghboy location map.

valleys to the north and south. The land is used for rough pasture and coniferous forestry plantations and is drained by a series of small streams that flow into the River Moy, 2 km to the north. Two *fulachta fiadh* were situated in Cloonaghboy on the north-facing slope of an east–west ridge, bordering the deep peat basin, a typical setting for *fulachta fiadh*. Cloonaghboy IV was a heavily disturbed *fulacht fiadh* mound with a poorly preserved wood-lined trough. Cloonaghboy V was a disturbed *fulacht fiadh* mound with a pit and a trough and lay 45 m south-east of Cloonaghboy IV (Fig. 3.2). Oak charcoal from the Cloonaghboy V trough was dated to 2568–2437 BC.

Cloonaghboy IV

The mound

The *fulacht fiadh* mound was covered by a 0.15-m thick layer of stony, dark brown topsoil with frequent inclusions of rounded stones. There were three spreads of mound material (C15), which consisted of a 0.26–0.62 m-thick layer of heat-shattered sandstones in charcoal-rich, black, silty clay (Fig. 3.3). The spreads measured 10.10 m north–south by 5 m east–west.

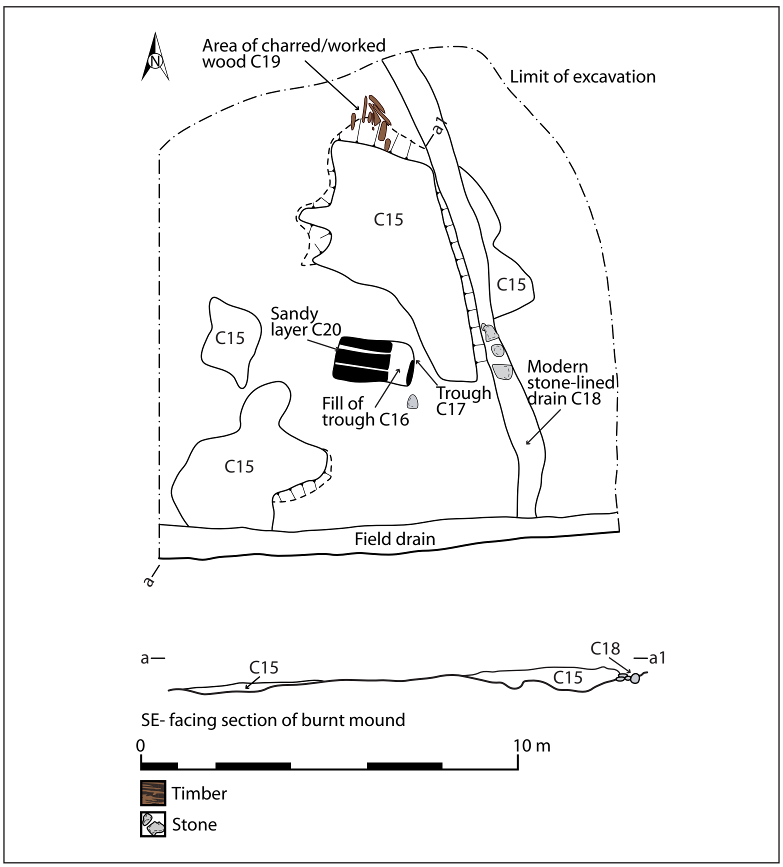


Fig. 3.3—Cloonaghboy IV: composite plan of fulacht fiadh *mound (C15), showing location of trough (C5) and deposit of timbers (C19).*

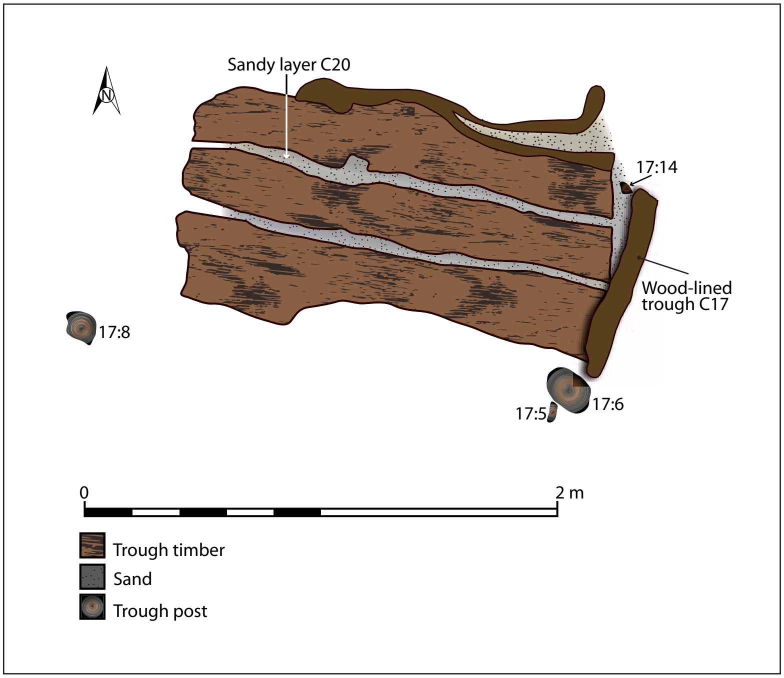


Fig. 3.4—Cloonaghboy IV: plan of trough (C17) showing wood lining, corner posts and sandy layer (C20) below the base.

The trough

The trough pit (C5) was oriented east–west, measuring 2.05 m by 1 m and 0.17 m deep. It was dug into an underlying peat layer (C14). A 0.05 m-thick layer of fine grey sand (C20) underlay the base timbers of the trough. It measured 1.80 m east–west by 1 m north–south. The sand (C20) lay directly over the peat (C14) and may represent an attempt to level the base of the trough pit to provide an even surface on which to lay the wooden planks (Fig. 3.3).

The wood lining (C17) was aligned roughly east–west and measured 2.05 m by 1 m, with a surviving height of 0.12 m (Fig. 3.4). Three basal timbers (17:17–19) were 1.85 m long, 0.28 m wide and 0.04 m thick and laid side by side. One substantial roundwood (17:3) on the east end formed the only extant side and was 0.78 m long and 0.09 m in diameter. Two posts survived in the south-east corner (17:5 and 17:6), one (17:14) on the north-east side, and one in the south-west corner (17:8). Some smaller pieces of brushwood made up the remainder of the wood lining. A total of 17 pieces of wood were identified from the trough as ash (12), hazel (two), oak (two) and alder (one).

An area of 11 worked and randomly spread pieces of wood (C19) was situated in the northern part of the site and was partly covered by mound material (Fig. 3.3; Pl. 3.1). The wood was spread over an area measuring 3.02 m north–south by 1.50 m east–west and ranged from 0.30 m to 1.7 m long and from 0.10 m to 0.50 m in diameter. Most were roundwoods; only one (19:5) may be a split timber. One roundwood (19:8) had intact bark, and two (19:1 and 19:4) had evidence of axe/adze marks. Three of the timbers showed evidence of charring (19:7, 19:9 and 19:10). Of the 11 timbers, 10 were identified as ash (three), alder (three), birch (one), willow (two) and oak (one) (Appendix XI). Animal bone was also retrieved from this context (see below)

Pl. 3.1—Cloonaghboy IV: view of wood deposit (C19) and animal bone in situ, *looking south.*

The fill
The fill (C16) of the wood-lined trough (C17) was heat-shattered stones with frequent charcoal inclusions. It measured 1.10 m north–south by 0.80 m east–west and was 0.10 m thick.

Overview
Two radiocarbon dates of 1253–1043 BC (GrN-30762), from an oak post (17:6) from the trough, and 1289–1128 BC (GrN-30763), from alder from the randomly deposited wood (19:6), place the use of this *fulacht fiadh* in the Middle Bronze Age.

The wood assemblage from both the trough and the random spread of wood was dominated by ash (56 %), with alder (15 %), oak (11 %), hazel (7 %), willow (7 %) and birch (4 %). Birch and willow were not identified in the trough structure, only in the spread of random timbers. The wood species indicate both a wetland and a dryland environment in the vicinity of the trough, with local resources exploited for the trough construction. Charcoal identified from the fill (C16) was of oak (87 %), alder (8 %), hazel (2 %), holly (2 %) and ash (1 %). Oak dominated, suggesting that it may have been the most suitable for providing long-burning wood and may have been deliberately gathered as fuel. Alternatively, the trough builders may have chosen ash as the preferred wood for trough construction and travelled some distance to source it, while oak was used as fuel as it was closest to hand (Appendix XI).

The area of random pieces of wood, several of which were worked, may be the preparation area for wood used in the trough construction. The 11 pieces may be the remnants of a wood assemblage that was not incorporated into the trough.

The remains of an upper jawbone from a cow aged 24–30 months and 28 rib fragments, probably from the same individual, were recovered from the wood layer (C19), partly lying on the peat (C14) and sealed by the mound material (C15). An animal of this age would be the optimum to slaughter and yield tender meat (Appendix IX) and may point to the *fulacht fiadh* being used for cooking. Faunal remains from *fulachta fiadh* are rare, but several sites, including Coolroe, Co. Mayo, had an assemblage of animal bone, including deer, pig and cow, with butcher marks (Gillespie 1998). A *fulacht fiadh* at Fahee South, Co. Clare, yielded five cattle teeth and two bone fragments, one deer tooth, two deer antlers, one horse mandible and tooth, and over 30 unidentifiable animal remains. The horse mandible had chop-marks, and two other bones showed similar markings (Ó Drisceoil 1988, 675–6). Two *fulachta fiadh*, Caltragh 1 and 2, excavated on the Sligo Inner Relief Road yielded animal bone, some with butchery marks (Danaher 2007, 21–2). Sonnagh IV and Sonnagh X yielded a charred rib fragment of a small mammal and 10 pig teeth attached to a mandible (see below).

The trough area did not fill with groundwater, but modern drainage may have lowered the water table, and it is probable that this trough was filled by groundwater originally.

The mound material had been disturbed and flattened owing to drainage ditches associated with forestry plantation and agriculture. Two modern agricultural drains had disturbed the site. A stone-capped drain (C18) aligned north-west/south-east cut the mound on the eastern side, and a second drain (C21) cut the mound on the southern side.

Cloonaghboy V

The mound

The roughly horseshoe-shaped mound was on the north-facing aspect of a gently sloping east–west ridge, which sloped into a deep peat basin. The mound comprised a 0.10–0.42 m-thick layer of heat-shattered stones in charcoal-rich, silty clay. It measured 9.50 m east–west by 9.20 m north–south. A pit and trough were identified under the mound.

The pit

The earth-cut pit was irregularly shaped and had only three sides. It measured 1.90 m by 1.48 m and was 0.10–0.39 m deep. The pit had steep sides and a flattish base, with a single fill of heat-shattered stones in charcoal-rich, black, clayey silt.

The trough

The trough was c. 2.50 m south-west of the pit. It was roughly oval, measuring 1.90 m by 1.14 m, and was 0.08–0.24 m deep. The trough was cut into a natural hollow, which measured 2.40 m by 1.32 m and was 0.04–0.32 m deep. It had a gently stepped profile on the west side and was cut into subsoil. The lower fill was a 0.24 m-thick layer of large, heat-shattered stones in charcoal-rich, black, clayey silt. The upper fill was a 0.04–0.08 m-thick layer of mottled, greyish-yellow, charcoal-rich, coarse-grained, sandy silt. Neither of the features filled naturally with water, but this may have been the result of modern land drainage of the area.

Mullenmadoge, Co. Mayo

Location

Two levelled *fulachta fiadh* 520 m apart were excavated in Mullenmadoge townland. Immediately east of the sites the ground dropped steeply toward the Sonnagh River, which was 0.75 km to the

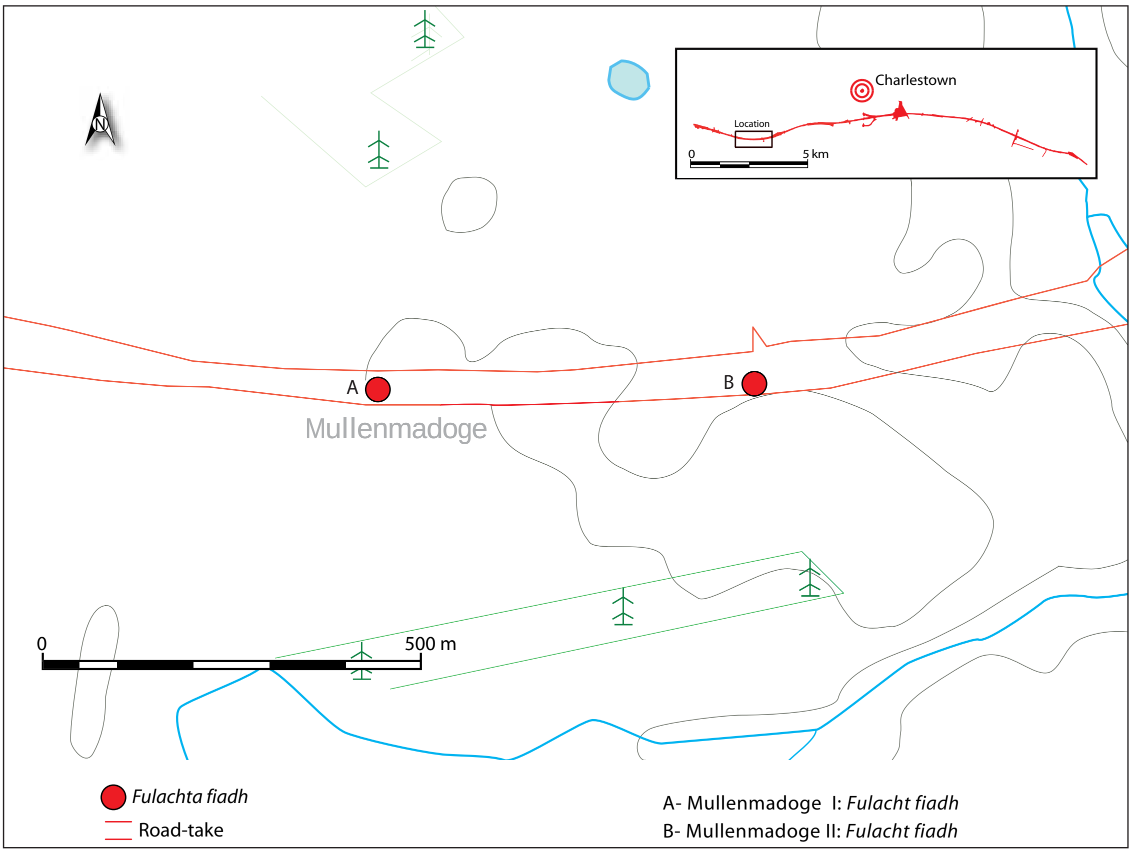


Fig. 3.5—Mullenmadoge site location map.

south. The *fulachta fiadh* were of similar construction and had similar Middle Bronze Age date ranges. Both sites were located on boulder clay, contained earth-cut troughs with stepped sides and associated stake-holes, and were overlain by disturbed burnt mounds.

Mullenmadoge I

This *fulacht fiadh* consisted of a trough (C9) and the base of a levelled mound of burnt stone.

The mound

The lower 0.08 m of this mound (C3) remained *in situ*. It was roughly horseshoe-shaped, measuring 9.5 m north–south by 7.35 m east–west, and consisted of heat-fractured sandstone in a matrix of charcoal-rich, silty sand (Fig. 3.6).

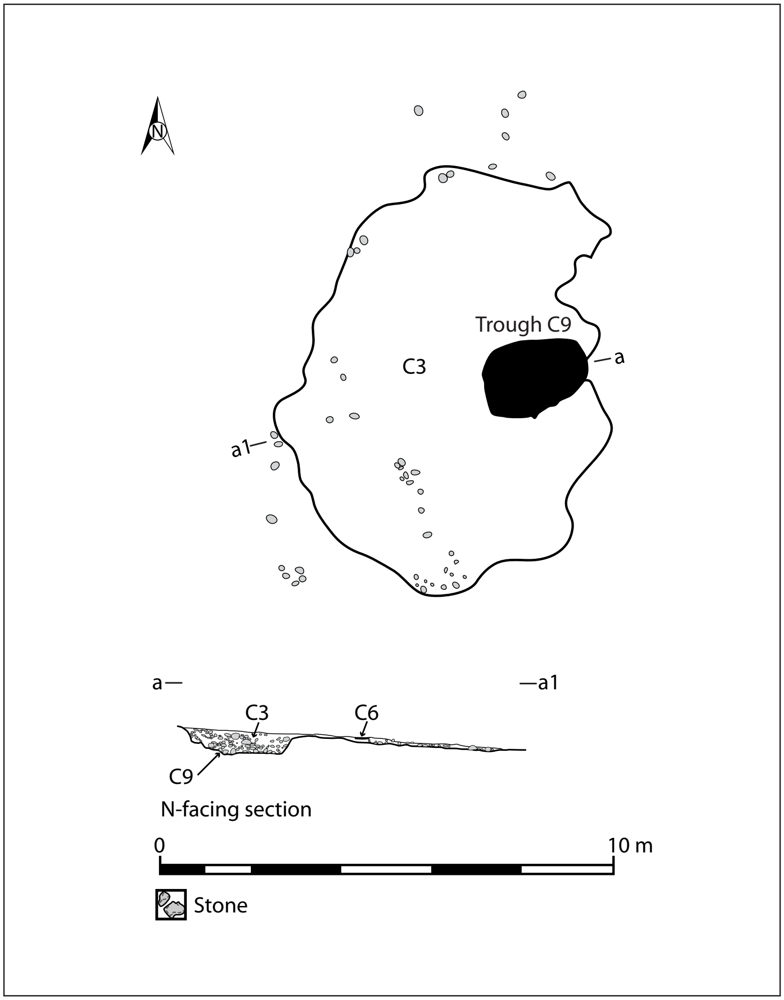


Fig. 3.6—Mullenmadoge I: plan and section of mound base (C3) and trough (C9).

The trough

The trough (C9) was sub-rectangular and aligned east–west, with maximum dimensions of 2.50 m by 1.30 m by 0.50 m deep. The sides were steeply sloped, stepped to the east, and the base was flat. There were four stake-holes (C10, C11, C12 and C13), one in each corner of the trough. These stake-holes were 0.10–0.16 m in diameter and had a maximum depth of 0.16 m. They were filled by loose, charcoal-flecked, dark grey, silty sand. This fill included alder, hazel and oak. Hazel charcoal from the fill of the north-eastern stake-hole (C13) returned a date of 1117–922 BC (GrN-30849). The lower trough fill (C8) comprised compact, heat-fractured sandstone in black, charcoal-rich silt. The upper fill (C4) was predominantly charcoal-flecked, silty sand with less stone (Fig. 3.7; Pls 3.2 and 3.3).

A spread of redeposited boulder clay (C6) to the north of the trough was irregular in plan and occurred intermittently, with maximum dimensions of 5.50 m by 2.10 m by 0.11 m thick. It

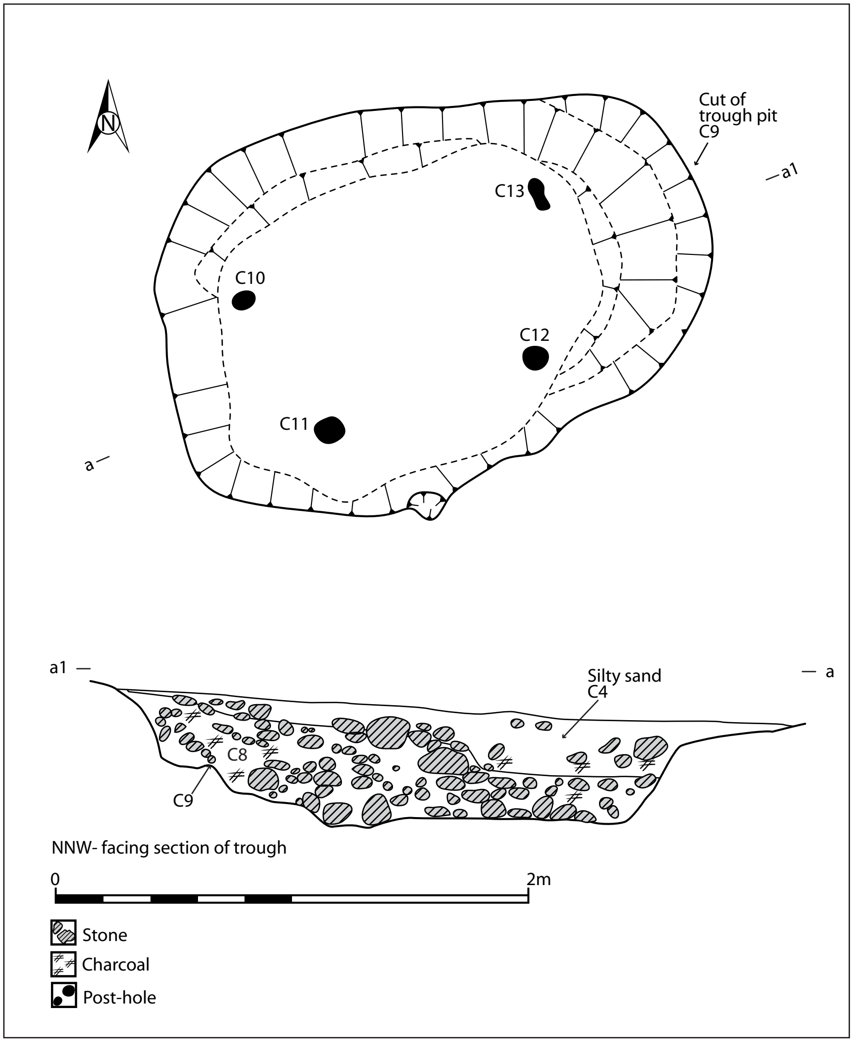


Fig. 3.7—Mullenmadoge I: plan and section of trough with eastern step and corner stake-holes visible.

Pl. 3.2—Mullenmadoge I: post-excavation view of trough, looking north.

Pl. 3.3—Mullenmadoge I: north-facing section of trough fill.

consisted of compact, charcoal-flecked, yellowish-brown clay and was probably upcast from the trough construction.

Overview

The mound of this *fulacht fiadh* was disturbed and is likely to have been substantial, possibly over 1 m thick, when intact. Slump from this mound (C4 and C8) filled the trough, which retained an arrangement of stake-holes at its base. A step was incorporated into the eastern side, probably to facilitate access. Similar stepped sides occurred at Mullenmadoge II, Coolroe and Carrowntriela, Co. Mayo (Gillespie 1998; forthcoming), all of which were situated on boulder clay. Stakes set in the corners of the trough are likely to have supported wood and moss linings similar to the rectangular wooden troughs preserved in peat in Sonnagh and Fauleens.

Mullenmadoge II

This *fulacht fiadh* consisted of an earth-cut trough flanked by nine stake-holes and one post-hole, with a further 13 stake-holes in the base of the trough. These were overlain by a disturbed burnt mound.

The mound

The mound (C3) was roughly oval, measuring 10.25 m south-west/north-east by 5.15 m north-west/south-east, and was 0.11 m thick. It consisted of heat-fractured sandstone in a matrix of charcoal-rich, silty sand. It is likely to be the base of a much larger mound (Fig. 3.8).

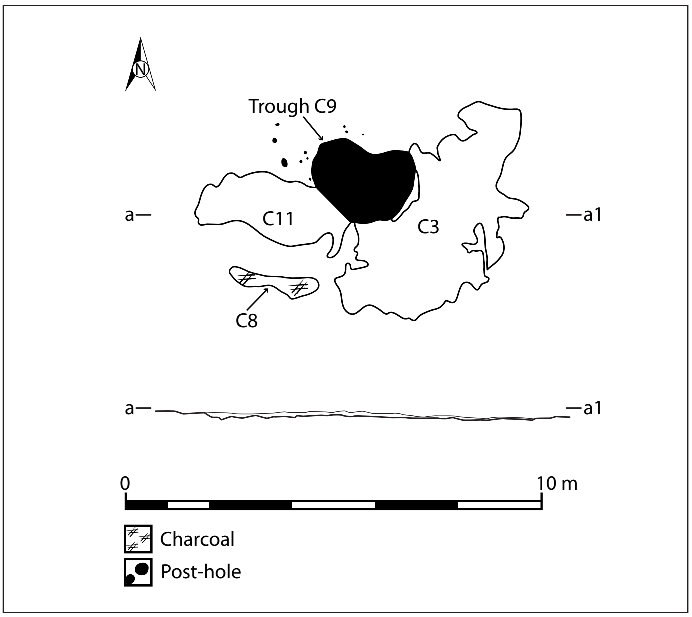


Fig. 3.8—Mullenmadoge II: burnt-mound base with trough.

The trough

The trough (C10) was sub-rectangular, aligned east–west, and was 2.44 m long, 1.92 m wide and 0.38 m deep. It had steep sides and a flat base with a semicircular step cut into the north-east side, which measured 1.4 m by 0.60 m. The step sloped from the north-east toward the trough to a depth of 0.15 m. There were 13 stake-holes (C20–31 and C34) inserted into the trough base and sides (Fig. 3.9; Pl. 3.4), which are likely to have held structural stakes as part of a trough lining. The lower stake-holes (C21–6, C28, C30 and C31) probably delimited the internal area of the working trough and may have supported woven rods, brushwood or plank lining, with space available for an outer moss lining. Variations on these trough types were identified in peat-cut troughs in Sonnagh, 2.5 km to the east. The remaining four stake-holes may relate to this lining or to a superstructure to cover or shelter the trough. Oak, alder, hazel and apple-type charcoal from the fill of one of the stake-holes (C26) was radiocarbon-dated to 1115–841 BC (GrN-30850), which overlaps with the date range for Mullenmadoge I.

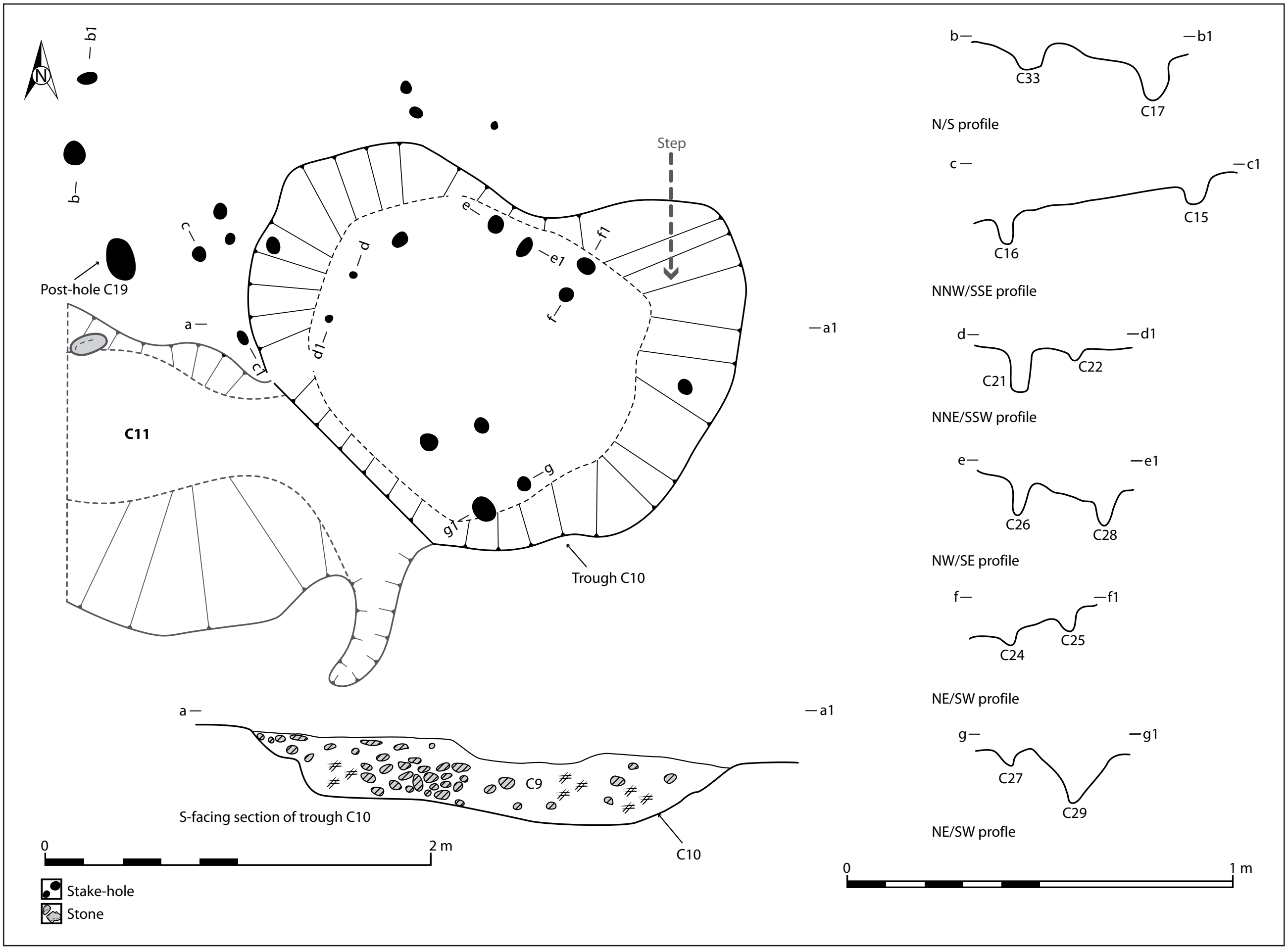


Fig. 3.9—Mullenmadoge II: plan and section of trough (C10) and associated post- and stake-holes.

Pl. 3.4—Mullenmadoge II: trough (C10) with stake-holes visible in base and step at north-east, looking south.

Ancillary features

There were nine stake-holes (C12–18 and C32–3) and one post-hole (C19) to the north and west of the trough. Two groups of three stake-holes flanked the trough at the north and west corners. A similar arrangement of stakes flanked two of the corners of the Fauleens II trough. The remaining three stake-holes (C16, C17 and C33) and the post-hole (C19) formed a shallow arc that may have been part of a circular or oval structure abutting or partly covering the trough if they were in contemporaneous use. The post-hole (C19) was 0.60 m to the west of the trough and measured 0.32 m by 0.27 m and 0.22 m deep. It had steep sides to the east, more gradually sloping in the west, and a flat base. The trough was filled by a moderately compact mixture of burnt and heat-fractured sandstone in a matrix of charcoal-rich, silty sand (C9).

Two large, irregular pits or depressions (C8 and C11) were situated to the south-west of the trough (C10). These pits may have been natural hollows created by a collapsed or uprooted tree and filled with displaced burnt-mound material. They are unlikely to have been functionally related to the *fulacht fiadh*.

Pl. 3.5—Mullenmadoge II: half-section of trough fill (C9).

Overview

The burnt spread was probably the base of a larger mound that had been disturbed. Stake-holes at the base of the trough probably supported a wood lining comprising wattle, brushwood or planks, with an outer moss lining. The step cut into the eastern end of the trough, similar to that in Mullenmadoge I, may have been added to allow easier working access. The stake-holes and post-hole adjacent to the trough may have supported a windbreak or flimsy ancillary structure.

Sonnagh, Co. Mayo

Location

The general topography of the area was an east–west peat basin c. 1.50–2.50 m deep in places, with higher, drier ground rising to the south and north, 65–75 m OD. The peat basin merged with higher ground to the east in Sonnagh and Lowpark townlands and stretched to Cuilmore townland in the west. Contemporaneous Neolithic, Bronze Age and medieval remains were excavated in Lowpark 500–1000 m to the east (Chapter 4). Arable pastureland lay to the north, and an east–west gravel ridge to the south. A series of small streams flowed north-east into the Sonnagh River. Seven *fulachta fiadh*, several with wood-lined troughs in various states of preservation, were excavated in this townland.

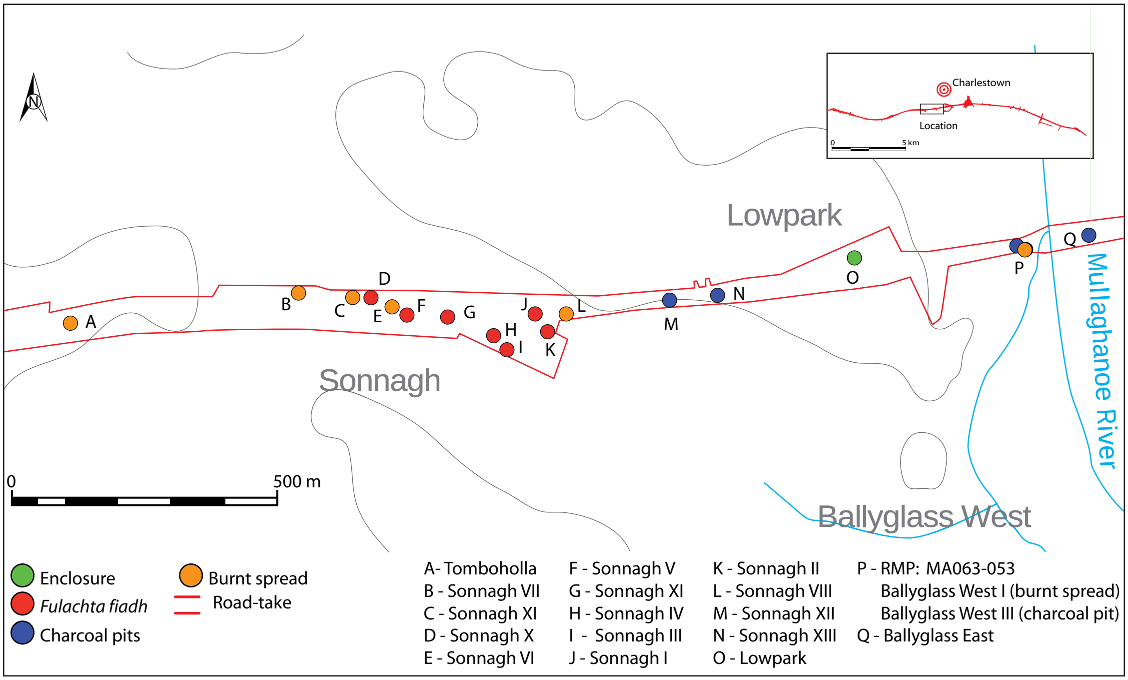


Fig. 3.10—Distribution of fulachta fiadh *and burnt spreads in Sonnagh townland and sites at Tomboholla, Lowpark and Ballyglass West.*

Sonnagh I

Location

The site was located in peat at the north-east edge of the Sonnagh peat basin. The closest *fulacht fiadh* (Sonnagh II) was 25 m south-east of this site, and a further three *fulachta fiadh* (Sonnagh II, IV and V) and one burnt spread (Sonnagh VI) were situated within 400 m west of this site. This was the latest of the Sonnagh townland *fulachta fiadh*. The trough fill (C5) contained alder charcoal that returned a radiocarbon date of 761–414 BC (GrN-30748), placing it in the Late Bronze Age, considerably later than most of the activity in the adjacent excavation area of Sonnagh II and at the end of the *fulacht fiadh* sequence in this area.

The site consisted of a wood-lined trough cut through the underlying peat (C3) into the boulder clay (C4) and was overlain by a mound (C2). The trough had an outer lining of moss (C9) held in place by a wood lining (C5) and filled with burnt stone and charcoal (C6). There was a wooden platform (C7) within the burnt mound (C2), and a random deposit of wood (C8) was set in the peat at the same level as the mound. The site was overlain by an upper peat layer (C1).

The mound

The mound (C2) was crescent-shaped, with a hollow to the west that overlay the trough within

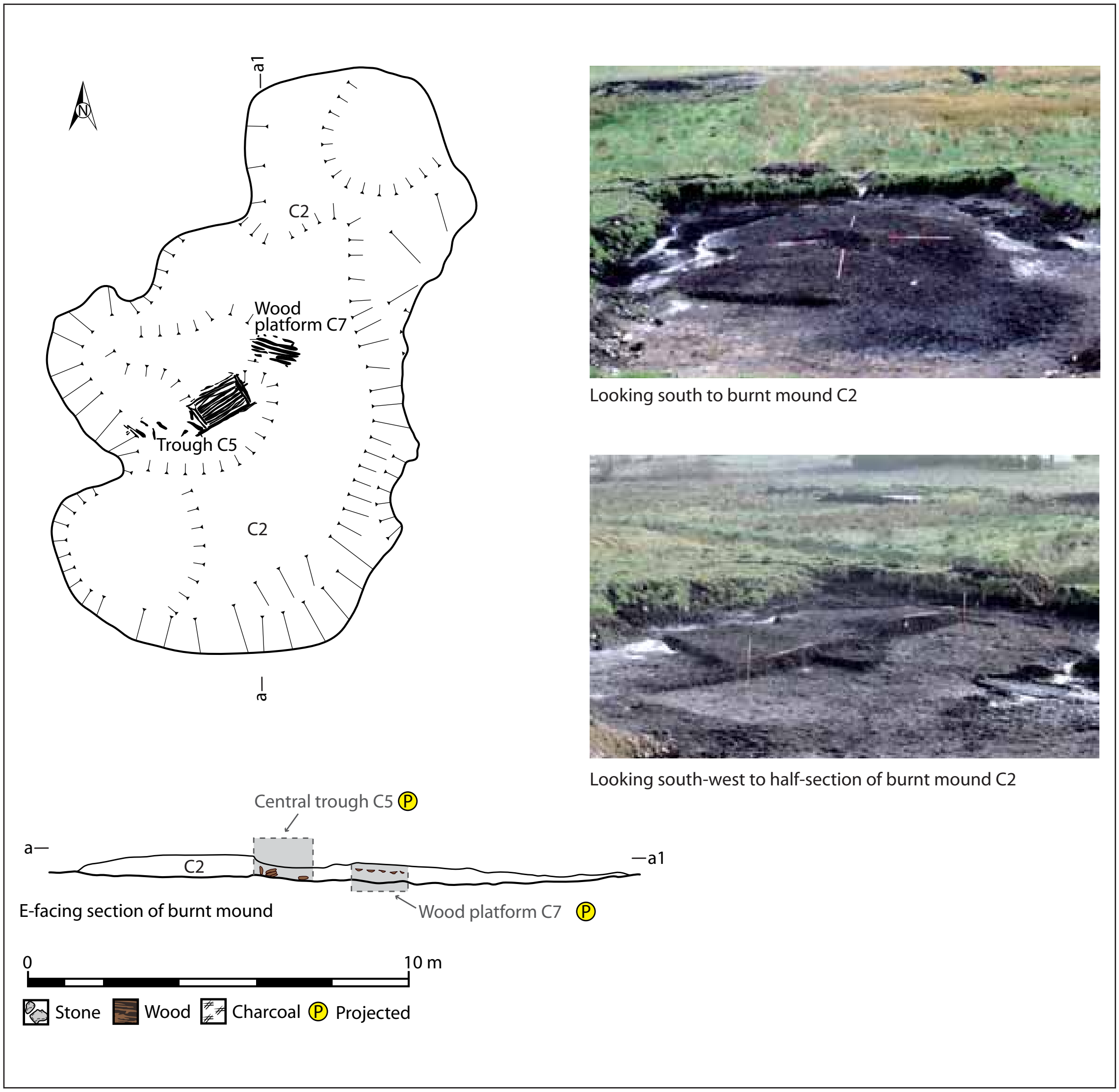


Fig. 3.11 and Pls 3.6 and 3.7—Sonnagh I: pre-excavation plan and views of mound (C2) with east-facing section and trough location.

the crescent. The mound comprised burnt and heat-fractured sandstone in a matrix of charcoal-rich, sandy peat, which measured 16 m north–south by 10.3 m east–west and had a maximum thickness of 0.64 m (Fig. 3.11; Pls 3.6 and 3.7). It contained a wooden platform (C7) and two chert flakes (E3340:Uns:1 and E3340:2:2). The composition of the mound was consistent throughout, with no evidence for sod regeneration or distinct layers, which indicated continuous use during the life of the site. The mound rested on the underlying peat (C3), which contained frequent matted roots from carr woodland.

Pl. 3.8 (left)—Sonnagh I: wood-lined trough (C5).

Pl. 3.9 (below, left)—Sonnagh I: moss packing (C9) between floor layers.

Pl. 3.10 (below, right)—Sonnagh I: lower floor roundwoods (C5).

The trough

The wood-lined trough (C5) was rectangular, measuring 2.6 m north-east/south-west by 1.5 m north-west/south-east, and was 0.5 m deep overall. Internally, it was 1.5 long, 0.85–1.00 m wide and 0.3 m deep, giving a capacity of 405 litres. The lining included a layered base of roundwoods and split alder and hazel timbers, with a layer of moss (C9) between and below the two layers of wood. The trough lining was held in place by seven hazel and one alder corner post, 0.065–0.1 m in diameter and 0.22–0.65 m long, with chisel and pencil points. Three posts were placed side by side in the south corner, and two each in the east and west corners, all of which were hazel; a large

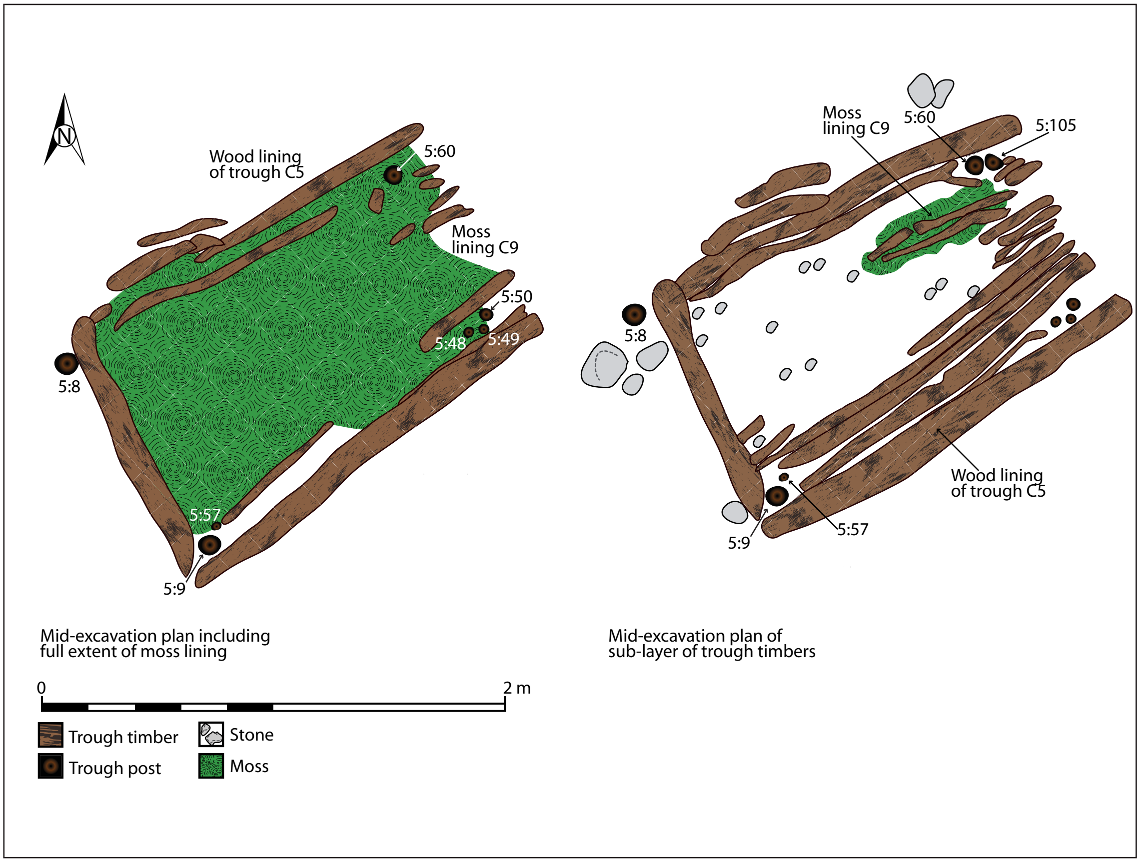


Fig. 3.12—Sonnagh I: mid-excavation trough plans including middle moss layer, lower layer of roundwoods and basal moss layer.

alder post secured the north corner. The poorly preserved basal layer of roundwoods and moss rested directly on the boulder clay (C4). The wood was mostly hazel, aligned north-east/south-west along the long axis of the trough. Three of these roundwoods extended the full length of the trough and measured up to 1.7 m long and 0.6 m in diameter. The basal moss was red, 0.05 m–0.07 m thick and very patchy. The moss was more substantial between the basal and upper floor elements, where it was a brown, compacted layer, with maximum dimensions of 1.6 m east–west by 0.96 m north–south, and it was 0.015 m thick (Pls 3.8–10).

The upper layer of roundwoods formed the trough floor (C5). It consisted of 15 alder and hazel roundwoods. The majority of these had toolmarks at both ends. The trough sides were 0.3 m deep to floor level and consisted of interlocked roundwoods placed inside and outside the corner posts to create a solid weave. Several of the end timbers had notches cut into them to fit the corresponding side timbers, while a fork at the end of one of the pieces was slotted in to fit around the corner post. The lining included 39 alder and 35 hazel elements with one horizontal apple-type.

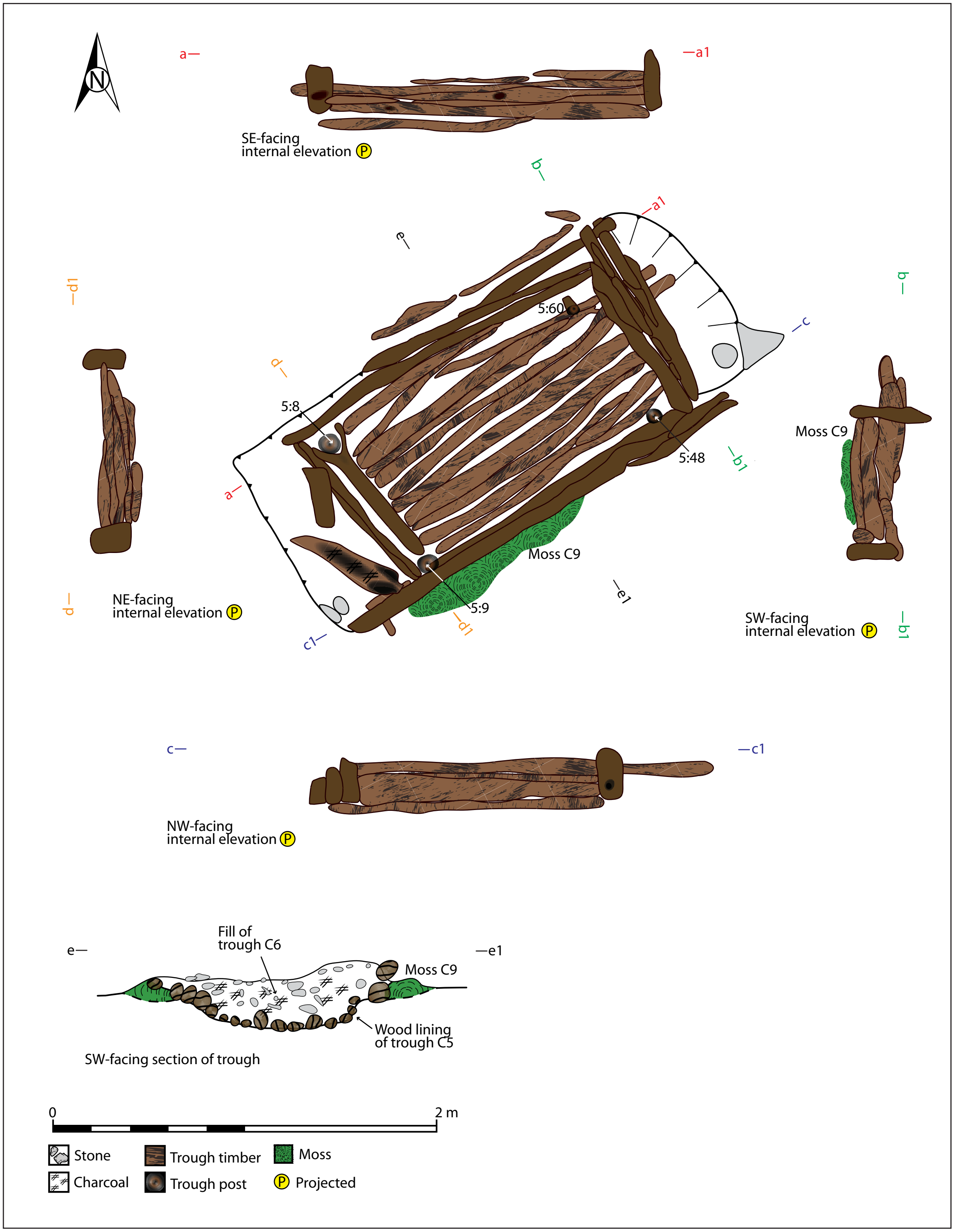


Fig. 3.13—Sonnagh I: plan and section of trough (C5) including upper floor level.

Ancillary features

A random deposit of roundwoods (C8) lay 0.4 m west of the trough (C5), consisting of seven pieces of hazel and one willow roundwood, laid horizontally on the underlying peat and held in place by three vertical stakes, one of which had worked ends. The horizontal elements extended over an area measuring 2.3 m north–south by 1.8 m east–west. The largest single element measured 0.89 m long and 0.045 m in diameter. The stakes were of similar size to each other, measuring up to 0.53 m long and 0.045 m in diameter. It is likely that the wood was laid down to solidify an area of wet ground during either the construction or the use of the trough. Hazel was also prominent in the trough lining and may indicate contemporaneous periods of construction.

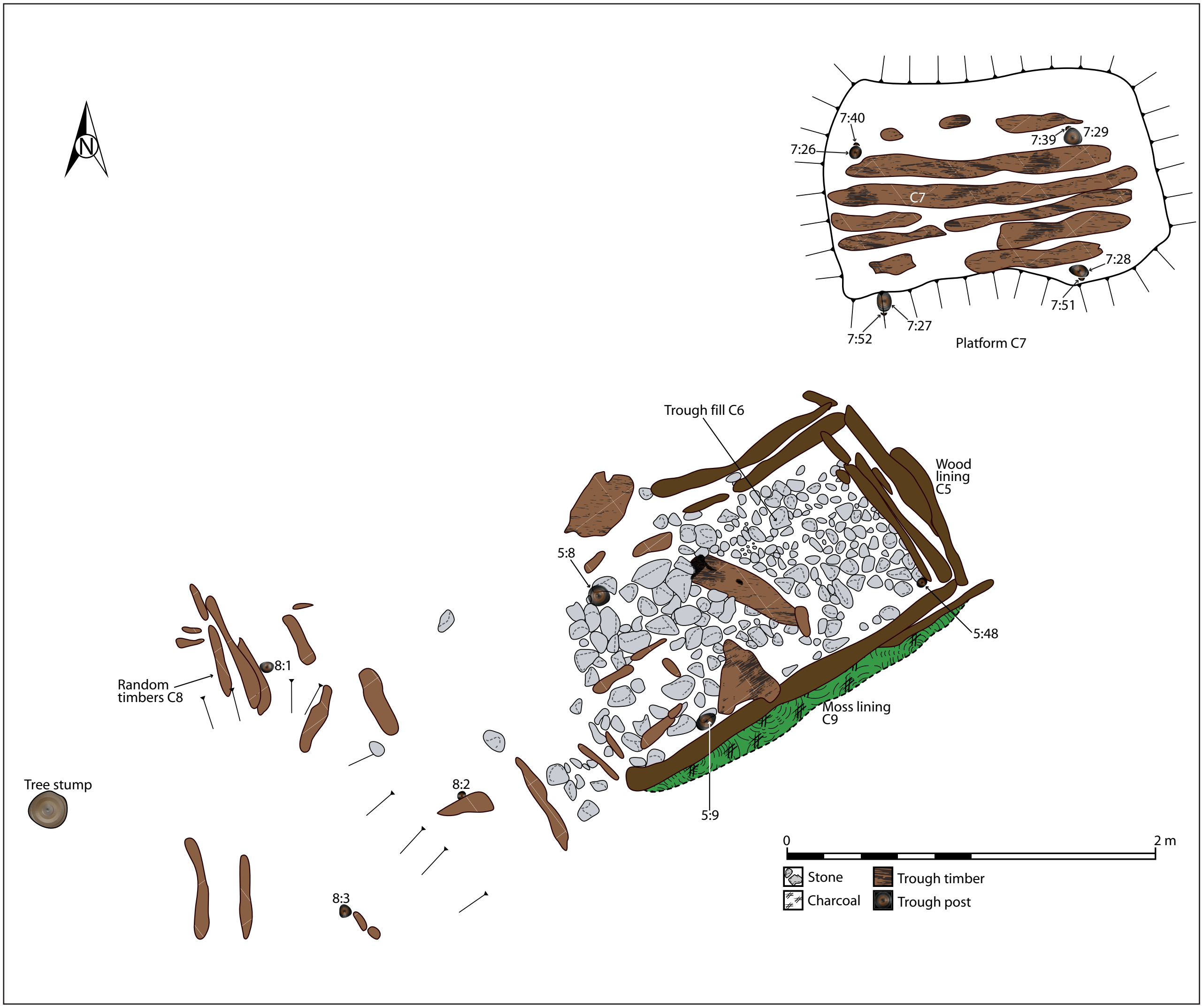


Fig. 3.14—Sonnagh I: mid-excavation plan of site after removal of mound, showing positions of trough, platform and random timbers.

Pl. 3.11—Sonnagh I: timber platform (C7) and trough (background).

The timber platform (C7), which may have been a trough base, was situated in the north-east of the mound (C2), 0.5 m north-east of the trough (C5). The platform measured 1.7 m east–west by 0.8 m north–south and was 0.1 m thick. It had been constructed later than the trough and wood deposit (C5 and C8) as it rested on a 0.3 m-thick layer of mound material (C2) (Fig. 3.14; Pl. 3.11). This platform (C7) comprised seven split timbers at the base and four corner stakes. These were mostly ash, with holly and oak also represented. Most of the base timbers had worked ends. The largest base timber was 1.67 m long and 0.095 m wide. Each corner stake had an accompanying chock; three of these were oak and one was holly. The timbers were poorly preserved owing to being encased in burnt-mount material instead of peat.

The fill

The trough was filled with burnt stone and alder and oak charcoal in compact, dark brown peat (C6). The western half of the trough contained unburnt stones and rested on smaller, angular, burnt stones that covered the entire trough base.

Overview

This *fulacht fiadh* was situated in peat, with a trough inserted through the peat to the subsoil. A layered wood and moss lining filtered the infilling water, which was then heated using burnt stone. Random timbers deposited to the west of the trough would have facilitated access to the trough, and a secondary wood feature in the mound material may have been a platform or trough base. The Late Bronze Age date returned from the trough fill indicates that this was one of the latest *fulachta fiadh* in the area.

Sonnagh II

Location

This site was in the east of the Sonnagh *fulacht fiadh* group, on marginal ground, with features dug into peat and into the boulder clay. It was on the south-facing slope of a glacial ridge at the eastern edge of the peat basin. The area had been drained in recent years by land drains, one of which was 3 m south of the site.

Three main phases of activity were present on site. Phase 1 consisted of foundation trenches of a series of Early Neolithic structures. Phase 2 comprised a *fulacht fiadh* with a burnt mound and the base of a substantial wood-lined trough. Phase 3 included a spread of burnt stone and charcoal with associated pits, which may have been the disturbed remains of a *fulacht fiadh*. Phase 1 was radiocarbon-dated to the Early Neolithic period and is described in Chapter 2. Phases 2 and 3 are described below.

Phase 2: fulacht fiadh

This *fulacht fiadh* was 10 m south-west of the Phase 1 Early Neolithic structural trenches (Chapter 2), near the base of a gradual slope, in shallow peat at the edge of the peat basin. The archaeological remains consisted of the base of a large, plank-built trough overlain by a mound of burnt stone in a charcoal-rich matrix. Ash wood from the trough produced a radiocarbon date of 1492–1413 BC (GrN-30751), placing it c. 2,500 years later than the Neolithic phase. The time lapse between the Phase 1 structures and the later phases is so long that they must have been coincidental.

The mound

The mound (C3) was oval, measuring 11 m east–west by 9 m north–south, and had a maximum thickness of 0.3 m. It consisted of very compact, burnt and heat-fractured sandstone in a charcoal-rich matrix of sandy peat. It was overlain by dark brown, silty topsoil (C2) that covered the entire site. There was no evidence for sod regeneration or phasing in the mound, which suggests continuous use throughout the life of the site.

The trough

The trough (C9) was situated on a gradual, north-east/south-west slope and had steep sides with a flat base. It was cut directly into the natural subsoil (C5), measured a maximum of 3.6 m north–south by 2.55 m east–west and was 0.50 m deep. Sixteen poorly preserved planks of ash (C10), oriented east–west, lined the base of the trough (Pl 3.12). They covered an almost square area and measured 2.5 m by 2.3 m and 0.05 m thick. The largest of the base timbers was 2.32 m long, 0.3 m wide and 0.04 m thick. One corner stake (10:16) was recovered from the base of the trough. The absence of toolmarks on the split timbers may be due to poor preservation. An ash artefact, possibly a handle from a vessel or implement (E3344:10:10), was found on the trough base (Pls 3.12–13; Fig. 3.16).

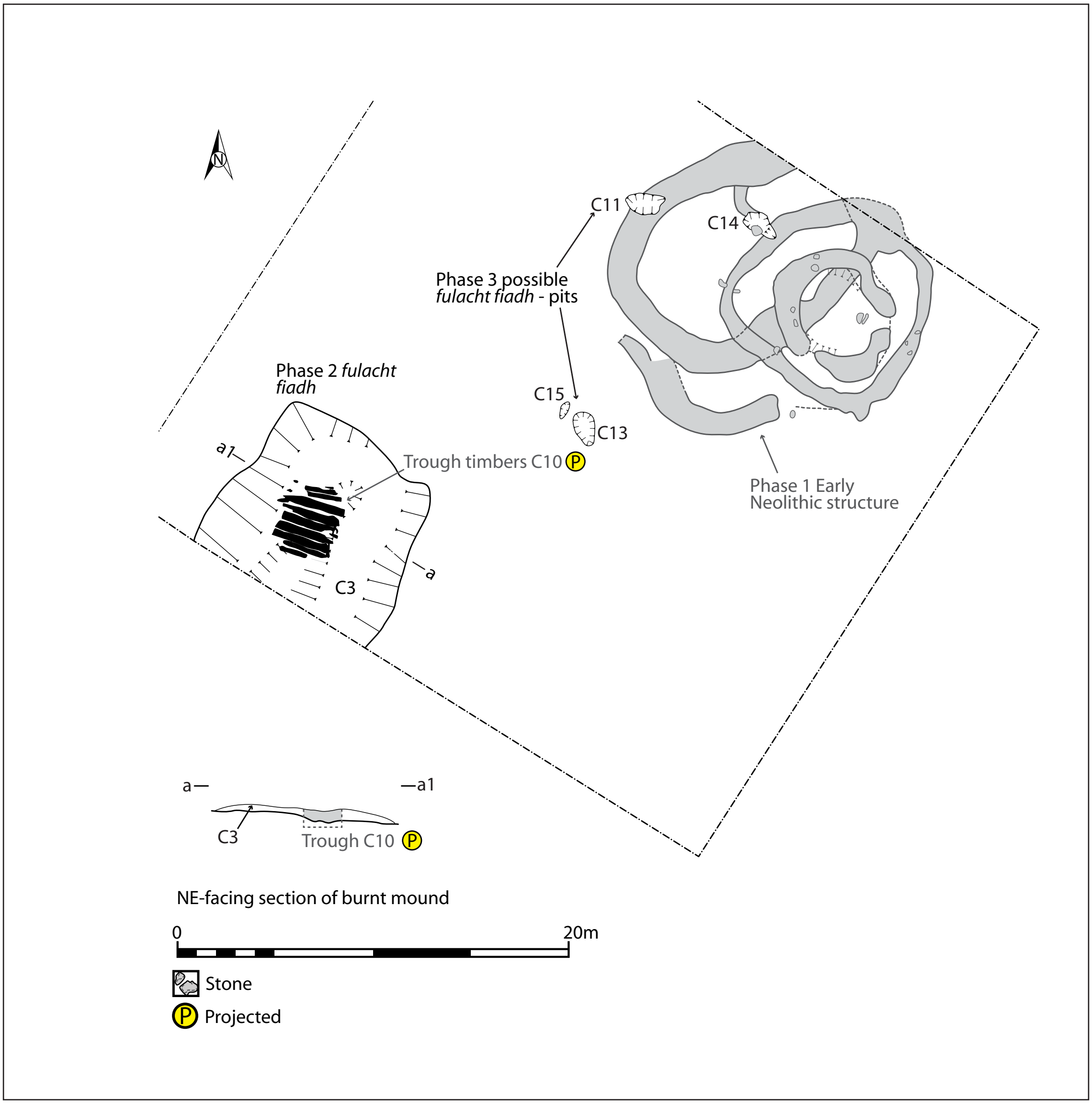


Fig. 3.15—Sonnagh II: general plan of Phases 1–3.

The fill

The trough was filled with a thin, compact layer of burnt stone in a matrix of gritty sand with occasional inclusions of moss and charcoal, which was more compact than that in the mound (C3). It measured 3.6 m north–south by 2.5 east–west and was 0.06 m thick. There were no side timbers present; however, it is likely that this was a substantial trough similar to that at Sonnagh IV (see below), which was 20 m to the south-west and had a slightly later date range of 1368–1132 BC (GrN-30755).

Pl. 3.12—Sonnagh II: Phase 2, trough timbers (C10), with possible ash handle (E3344:10:10) in situ *(bottom left).*

Pl. 3.13—Sonnagh II: possible ash handle (E3344:10:10).

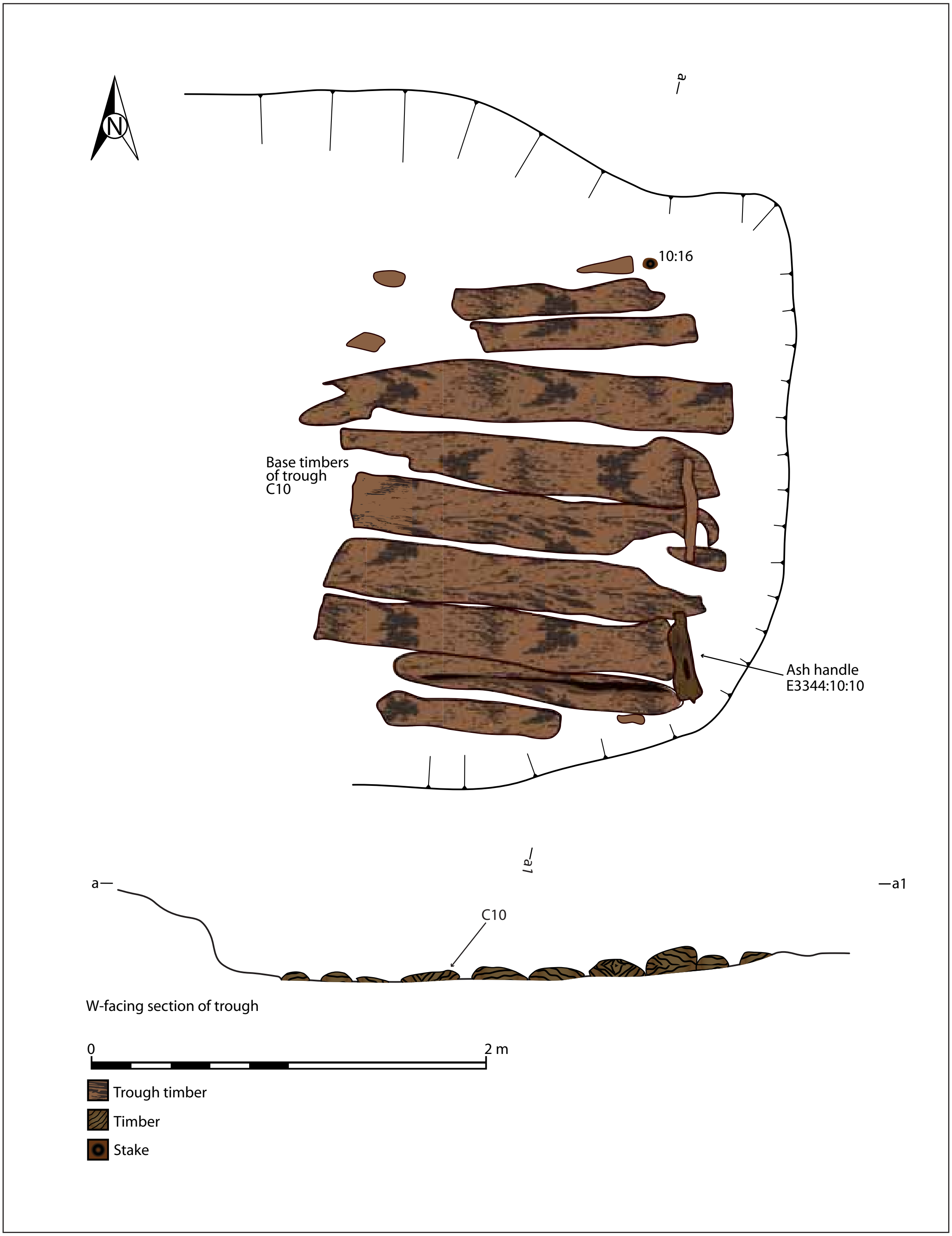


Fig. 3.16—Sonnagh II: plan of Phase 2, trough base (C10).

Phase 3: possible fulacht fiadh

Location

This phase consisted of a spread of burnt stone and charcoal (C12) and a series of pits to the north of the limit of the peat and the Phase 2 *fulacht fiadh*, with the more northerly features directly overlying the Phase 1 features (Fig. 3.15).

A 0.06 m-thick layer of lacustrine silt (C16) occurred over 75 % of the site, sealed the Neolithic features and underlay several of the Phase 3 features. Nine artefacts were associated with the silt, including struck chert and a hammer-stone. These artefacts may have been displaced from the Phase 1 Early Neolithic structures or may have been trampled into this surface during Phase 2 or 3.

The mound

The mound (C12) was not clearly defined, and extant remains consisted of a disturbed spread of loose burnt stone and charcoal over the northern half of the excavation area.

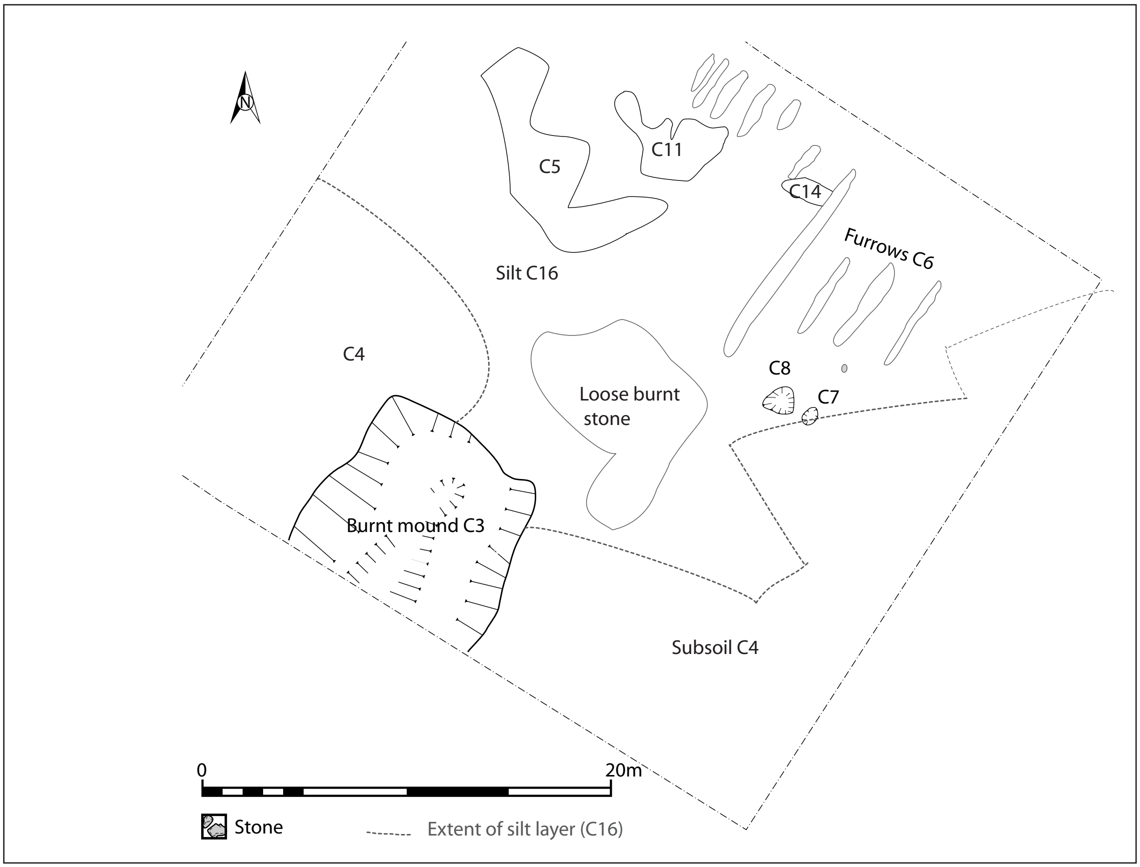


Fig. 3.17—Sonnagh II: composite plan showing limit of silt layer (C16), Phase 2 mound (C3), and Phase 3 pits (C7, C8, C11 and C14).

The trough

There was no well-defined trough; however, some of the six associated pits (C7, C8, C11, C13, C14 and C15) could have functioned as troughs. One pit (C15) was outside the limit of the silt layer; two pits (C11 and C14) cut through it; and two pits (C7 and C8) were sealed by it (Figs 3.15 and 3.17).

Pit C7 was sub-circular, measuring 1.05 m by 0.98 m, and was 0.14 m deep with sloped sides and a flat base. It was filled with burnt sandstone, silt and charcoal. Pit C8 was 0.5 m west of pit C7 and was oval. It measured 1.7 m by 1.1 m and was 0.3 m deep, with steep sides, a rounded base and a sandstone, silt and charcoal fill.

Pit C11 was at the north-western end of the site. It was sub-oval and cut through C16 and into the natural gravel (C5). It had gradually sloping sides and a flat base, measuring 2.1 m east–west by 1.53 m north–south and 0.35 m deep. The pit was scorched to a bright reddish-orange, indicating *in situ* burning. It was filled with 90 % burnt sandstone in a matrix of dark brown, gritty, sandy soil with moderate inclusions of alder charcoal. The uppermost portion of the fill was disturbed by a furrow (C6).

Two pits (C13 and C15) occurred between the Phase 2 *fulacht fiadh* and the Early Neolithic structures. C13 was sub-rectangular, measuring 1.2 m by 1.1 m, and was 0.27 m deep. It had gradually sloping sides and a flat base and was filled with charcoal-flecked, loose, sandy clay and heat-fractured stone. A circular pit (C15) lay 0.5 m west of C13. It was 0.45 m in diameter and 0.15 m deep, with gradual sides and a flat base, and was filled with charcoal-flecked, dark brown,

Pl. 3.14—Sonnagh II: lithics recovered from silt layer (photo: Jonathan Hession).

silty soil with occasional heat-fractured stones. A compacted layer of burnt stone with occasional charcoal inclusions (C12), which measured 7.75 m by 7.25 m and was 0.1 m thick, overlay C13. Part of the spread was disturbed by modern plough furrows (C6).

Pit C14 was at the northern limits of the site. It was sub-oval with gradually sloping sides and a flat base, measuring 1.9 m by 0.6 m and 0.28 m deep. It was filled with dark brown and black, moderately compact, silty soil with occasional inclusions of small stones and charcoal. Unlike the other pits, there was no burnt stone in the fill. C14 cut the upper level of and post-dated the structural oval trench (C30) (Chapter 2).

Alder charcoal from pit C11 produced a radiocarbon date of 1431–1212 BC (GrN-30749). Two of the smaller pits (C13 and C15) were sealed by the burnt spread (C12), and hazel charcoal from pit C13 produced a radiocarbon date of 1044–805 BC (GrN-30750), indicating that Phase 3 covered an extended period.

Overview

Phase 1 of Sonnagh II (Neolithic structures) is described in Chapter 2.

Phase 2 included the base of a substantial wood-lined trough and a substantial mound, which was dated to the Middle Bronze Age. A trough of similar proportions and slightly later date was preserved nearby in Sonnagh IV (see below).

Phase 3 features, including pits and burnt-stone spreads, are likely to be the remains of a small *fulacht fiadh* that was truncated by modern agricultural activity. Radiocarbon dating has placed Phase 3 in the Middle to Late Bronze Age. Two pits (C7 and C8) were overlain by the silt layer and may have been contemporary with the Neolithic activity. Pit C14 was stratigraphically later than the Neolithic phase. Most of the lithic assemblage was not diagnostic of a particular period, was poorly stratified and may have been from any of the phases.

More substantial features such as a burnt mound may have been removed by modern cultivation across most of the Phase 3 area. Furrows cut into the boulder clay (C5), silt (C16) and the upper level of two pits (C11 and C14) and the burnt spread (C12).

The topsoil layer (C2) had been disturbed by modern ploughing (C6) and contained 45 of the 84 lithics recovered during the excavation. This lithic assemblage included 10 pieces of struck flint (one arrowhead and two blades), three chert hollow scrapers and two possible arrowheads. The presence of cores and waste material indicates lithic processing on site (Appendix III).

Sonnagh III

Location

This *fulacht fiadh* was the most southerly of the Sonnagh cluster and rested on a 0.40 m-thick layer of peat. Sonnagh IV was 20 m north-west of this site, and Sonnagh I, II and IX were within 200 m. A large water drain flowing from east to west was 5 m south of the site and may follow the line of an earlier watercourse. The archaeological remains comprised a peat-cut trough overlain by a burnt

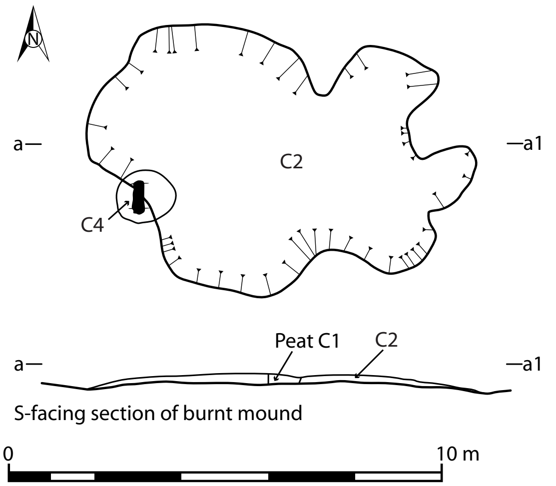


Fig. 3.18—Sonnagh III: plan and section of mound with trough location.

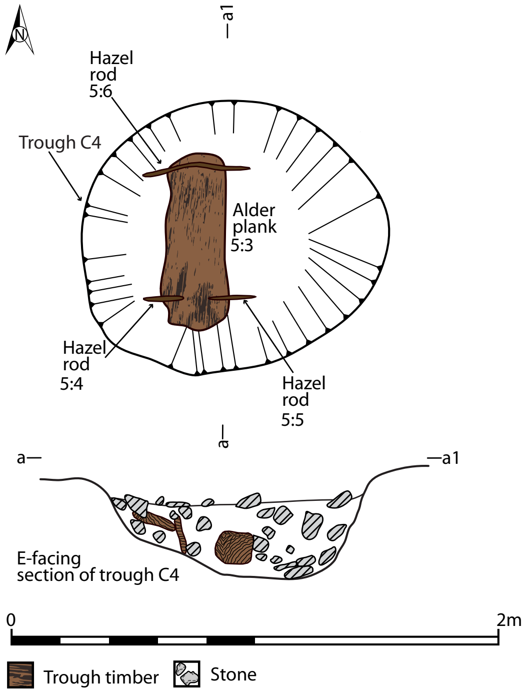
mound and sealed by peat. Alder charcoal from the trough fill produced a radiocarbon date of 2867–2497 BC (GrN-30754), placing it in the Late Neolithic period.

The mound

The mound (C2) was sub-oval, measuring 10 m east–west by 6.5 m north–south, and had a maximum thickness of 0.35 m. It consisted of burnt and heat-fractured sandstone in a matrix of sand, peat and charcoal. There was no layering or evidence of sod regeneration in the mound, indicating continuous use and deposition rather than seasonal or sporadic use.

The trough

The trough pit (C4) was circular with concave sides and a flat base. It measured 1.25 m in diameter and was 0.4 m deep (Fig. 3.19; Pl. 3.15). It was partly lined with poorly preserved timbers (C5). This lining consisted of a tangentially split alder plank, held in place by a hazel rod at either end. These rods, one of which had a chisel-pointed end, were inserted into the base of the trough. The trough was filled with heat-fractured sandstone in a matrix of sand, peat and charcoal, with small pieces of charred wood. These stones represent the final trough use and, consequently, were not completely fractured. Two charred timbers (C3) rested on top of the trough fill, directly underlying the mound.




Mid-excavation view of trough C4

Fig. 3.19 and Pl. 3.15—Sonnagh III: mid-excavation plan and view of trough with wooden base (C5).

Overview

This *fulacht fiadh* comprised the basic features of the site type: a mound of burnt stone and an associated trough. Its early date and unusual trough lining are significant and may indicate an alternative function to the fully lined, rectangular troughs.

Sonnagh IV

Sonnagh IV consisted of a wood-lined trough (C5) inserted through the underlying peat (C3) to the natural boulder clay (C13) and was partly overlain by a burnt mound (C2). The trough lining included moss packing (C8) between the timbers, as well as a layer of moss (C9) between the two timber floors (C10). The fill (C6) included burnt stone and charcoal overlain by loose timbers (C7), and there were three random scatters of wood (C4, C12 and C14) in the peat. A piece of alder from the trough lining returned a radiocarbon date of 1368–1132 BC, which places it in the Middle Bronze Age.

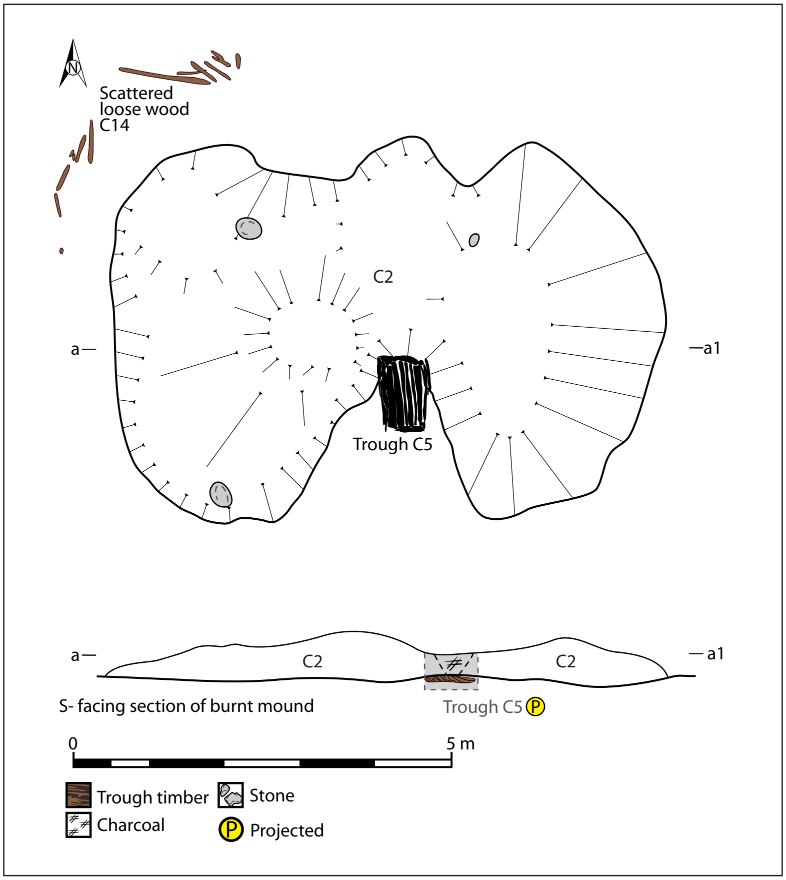


Fig. 3.20—Sonnagh IV: pre-excavation plan of mound (C2) with south-facing section and trough location.

Location

This *fulacht fiadh* was centrally located in the Sonnagh cluster, 20 m north-west of Sonnagh III, which was c. 1,500 earlier. It was constructed on a 0.40 m-thick peat layer (C3) and was covered by an upper layer of peat (C1).

The mound

The mound (C2) was crescent-shaped (Fig. 3.20) with a hollow to the south that overlay the trough. It measured 11 m east–west by 8 m north–south and had a maximum thickness of 1.1 m. It consisted of burnt and heat-fractured stone in a matrix of peat, sand and charcoal and had loose stone at the top and very compact stone at the base. Deposits of unburnt stone were on the two highest points of the mound. The mound rested on the underlying peat (C3), which was densely compacted and dark reddish-brown, and it was covered by firm, dry peat. The mound (C2) overlay four features: a rectangular wood-lined trough (C5) to the south of the centre, a small scatter of timber (C4) to the south-east, a small amount of worked wood (C12) immediately north of the trough and a scatter of worked timbers to the north-west (C14).

The trough

This trough was the largest excavated during this scheme. The sides were lined with large roundwoods and split timbers, and the base was of large split timbers. As with the troughs at Sonnagh I and V, it had a layered base consisting of a two-tier wood base separated by and resting on moss. Naturally occurring boulders (C11) lay at the east side of the trough, and some may have been removed to accommodate the trough (Fig. 3.21). The boulders may have acted as a solid base on which to work around the trough. Alder from the trough lining was radiocarbon-dated to 1368–1132 BC (GrN-30755), placing it in the Middle Bronze Age.

The trough was rectangular with overall dimensions of 2.5 m north–south by 1.6 m east–west and internal dimensions of 2.2 m by 1.25 m by 0.5 m deep to the upper floor level, giving a capacity of 1,375 litres. A total of 31 pieces of timber were used in the construction (Pls 3.16–17; Figs 3.21–2). The basal floor layer consisted of two large split timbers and three small timbers resting on moss and boulder clay (C13). The horizontal base timber and posts were of alder and oak, and the side timbers were for the most part split alder roundwoods. One ash and one

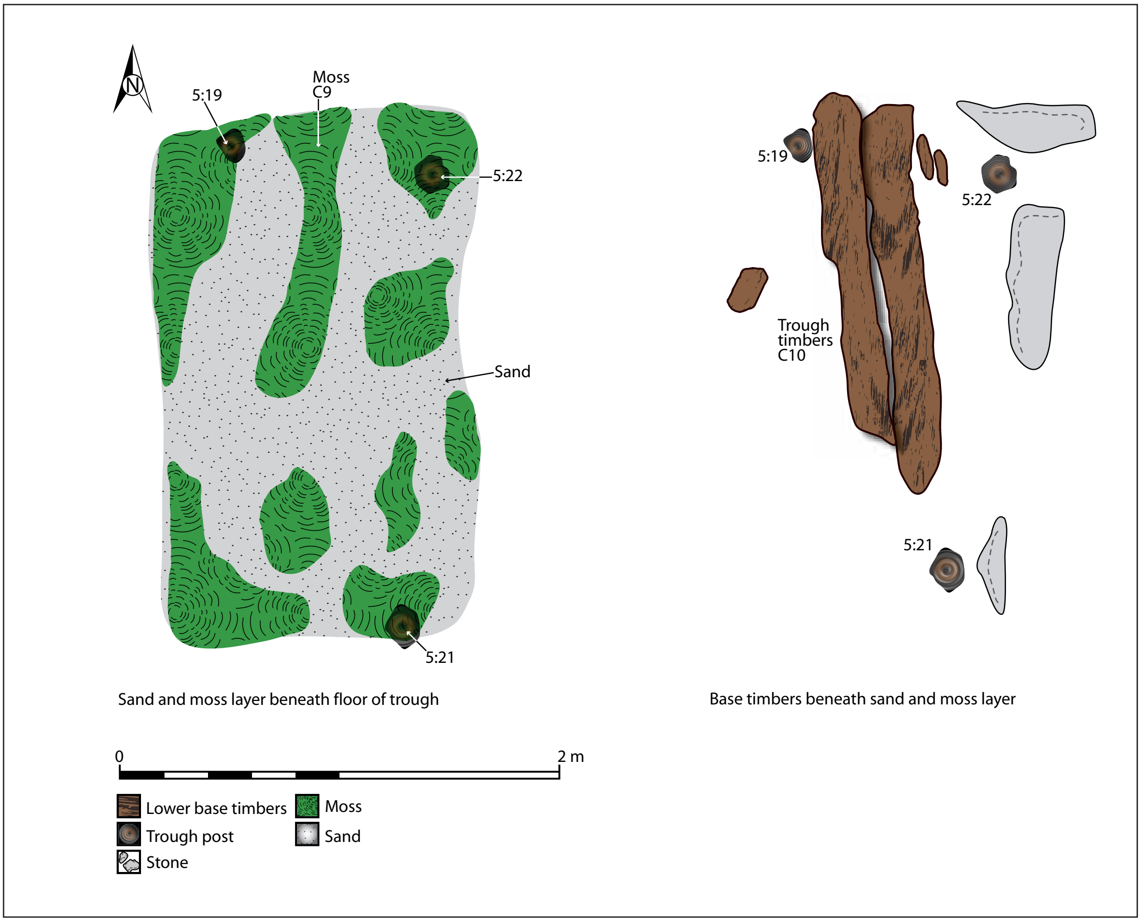


Fig. 3.21—Sonnagh IV: moss and sand layer below trough floor (left), lower base timbers of trough and adjacent flat stones (right).

Pl. 3.16 (above)—Sonnagh IV: general view of wood-lined trough, looking north-east.

Pl. 3.17 (left)—Sonnagh IV: worked side timber from trough.

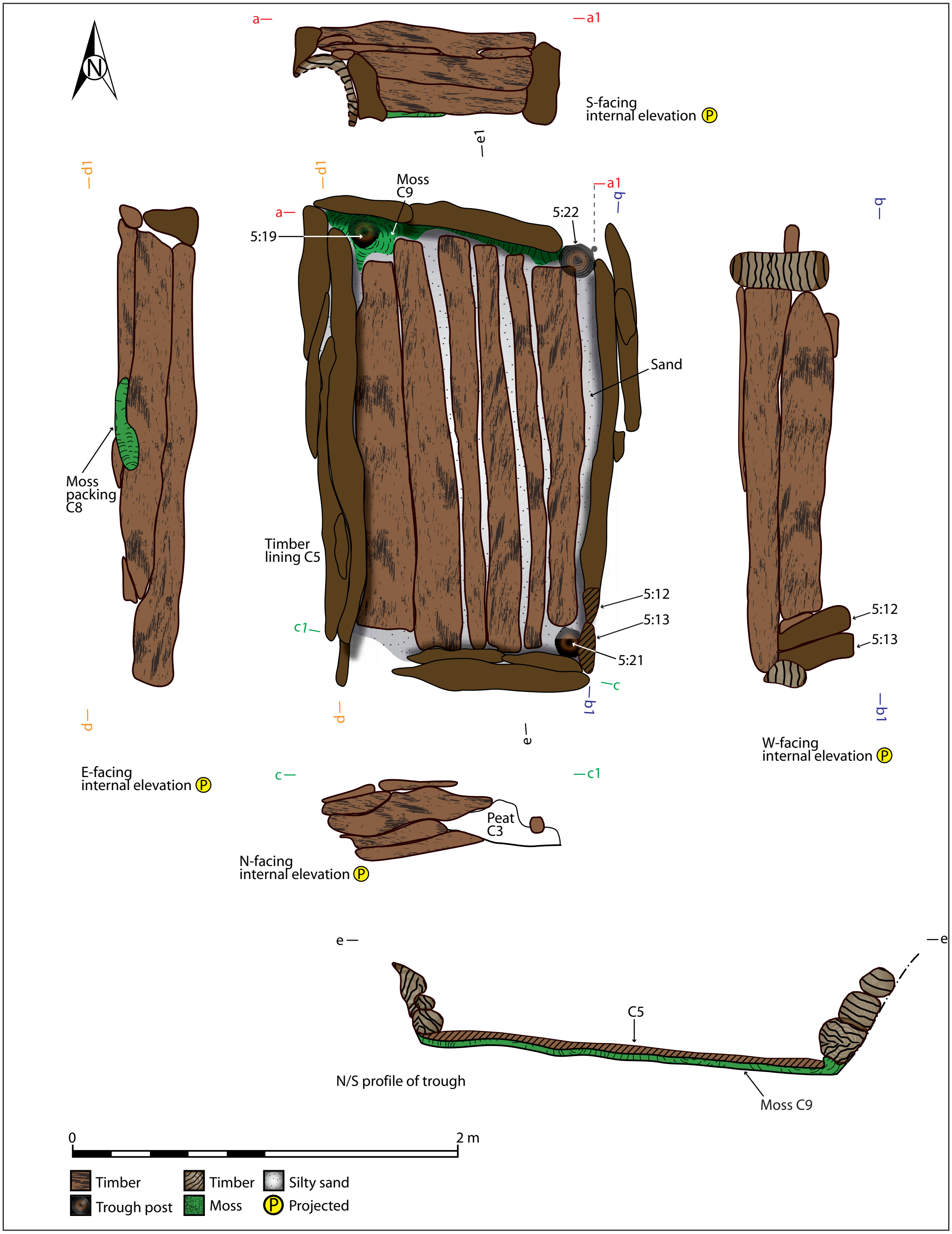


Fig. 3.22—Sonnagh IV: plan and internal elevations of wood-lined trough (C5) showing upper floor level, inner side elevations and profile.

blackthorn timber were also identified. The large timbers were dressed on all surfaces. The larger one was 1.62 m long and 0.21 m wide, and the smaller one was 1.55 m long and 0.2 m wide. The facets recorded on the timbers were long, thin and slightly dished, 36–42 mm wide and 60–90 mm long; they were most likely made by Middle and later Bronze Age flanged axes, palstaves and socketed axes (Appendix XI).

A layer of moss (C9) was placed between the lower and upper floors of the trough (Fig. 3.21). This was loose, green moss that covered the basal area of the trough (2.4 m north–south by 1.3 m east–west and 0.06 m thick). This moss layer directly underlay the upper trough floor, which consisted of six split timbers (Pl. 3.16; Fig. 3.22). These timbers were similar in size, the largest being 2.51 m long and 0.28 m wide. These floor timbers were dressed on all surfaces.

The east side of the trough consisted of two large split timbers laid on top of each other (Fig. 3.22). They were 2.3 m long, 0.24 m wide and 0.11 m thick and did not reach the full length of the trough. The gap between these timbers and the south-east corner was filled by two large upright timbers, the larger of which was 0.69 m long, 0.16 m wide and 0.11 m thick. These upright timbers filled a gap and required a significant amount of additional packing material (moss etc.) to ensure that the trough was fully lined. There was no evidence that these two uprights were a later addition to the side of the trough. The western side-wall had a large split plank at the base, with large roundwoods forming the upper part. One of these roundwoods was pared to a point, suggesting that it may have been a re-used post.

The northern side consisted of three roundwoods with the ends cut vertically and wedged between vertical corner-posts. The smallest of these three pieces was 0.94 m long and 0.14 m in diameter, and the remaining two were 1.18 m long and 0.16–0.18 m in diameter. The similarities between the pieces suggest that they were cut from the same branch. The sides were held in place by three corner posts. The southern side of the trough was poorly preserved. There was probably a fourth post in the south-west corner originally, but this did not survive. The largest post, at the north-east, measured 0.81 m long and 0.14 m in diameter. All three posts were pared to points. Compacted green moss (C8), which had frequent inclusions of charcoal, was packed between all of the timbers used in the side-walls, and a large amount of this moss was densely packed behind the north wall. The moss was clearly used to plug gaps in the trough walls.

The fill

The trough fill (C6) consisted of a compact mix of burnt stone, charcoal and peat. Charcoal was dominated by alder (55 g), with willow (2.8 g), holly (2 g) and oak (1 g) also present. The fill measured 2.16 m north–south by 1.2 m east–west and was a maximum of 0.50 m thick. The stone had inclusions of unburnt stone at the base of the trough, indicating that this fill had slumped into the trough after it went out of use. The peat was more concentrated to the south of the slumped mound material, away from the mound.

A deposit of four pieces of charred timber (C7) rested on top of the fill in the north-east corner of the trough. The largest of these measured 0.7 m long and 0.18 m in diameter. These may have been fuel from a fire that were not fully burnt.

A partly charred rib fragment of a small to medium-sized mammal was recovered from the moss layer (C9) between the trough floors. This provides evidence that cooking took place in the vicinity of the *fulacht fiadh*, as the ribs of an animal are among those parts bearing reasonable quantities of meat and marrow for consumption (Appendix IX).

Ancillary features

Two pieces of cut timber or possible stakes (C4) with diameters of 0.055 m and lengths of 0.4 m and 0.5 m were recorded 1.4 m south-east of the mound. One of these stakes was inserted into the peat; the other was lying on the surface. Five small pieces of worked timber (C12), possibly used as fuel or discarded from trough construction, were found 0.25 m north of the trough. Only one piece was well preserved, and this was 0.28 m long and 0.05 m in diameter.

The larger scatter of worked timbers (C14) at the north-west edge of the mound consisted of random timbers covering an area measuring 2.2 m south-west/north-east by 0.6 m north-west/ south-east. The timbers were covered by a thin layer of the burnt-mound material (C2). Ten of these pieces were worked. They ranged from 0.07 m to 1.8 m long and from 0.04 m to 0.15 m in diameter. These timbers may have been either fuel or part of a temporary *tóchar*, or trackway, laid down to enable a wet area to be traversed.

An oak dowelled artefact (E3346:2:2) was retrieved from the burnt mound. It measured 180 mm by 40 mm, and the dowel was 11 mm in diameter.

Overview

The significance of Sonnagh IV is in its well-preserved, large, wood-lined trough and substantial mound. Its location gave easy access to the water table, and moss in the lining filtered the infilling groundwater. The intense working and dressing of trough tiAumbers displayed competent craftsmanship. The trough size may reflect an alternative function or larger-scale use, possibly serving a larger group of people. Trough timbers returned a Middle Bronze Age date, placing it in the generally accepted date range for *fulachta fiadh*.

Sonnagh V

Location

This *fulacht fiadh* was located on c. 1 m of peat in the Sonnagh cluster, to the west. It was immediately adjacent to Sonnagh VI. A radiocarbon date of 1401–1294 BC (GrN-30756) was returned from a birch sample from the base of the trough (C8), which places it in the Middle Bronze Age, broadly contemporary with dates from the Sonnagh II (Phase 3) and IV *fulachta fiadh*. The trough incorporated a complex lining of wood, moss and sand, which effectively filtered the groundwater. The significance of this *fulacht fiadh* is in the presence of two metal beads (E3347:5:4 and 5) from the trough lining, finds that are unique in an Irish prehistoric context.

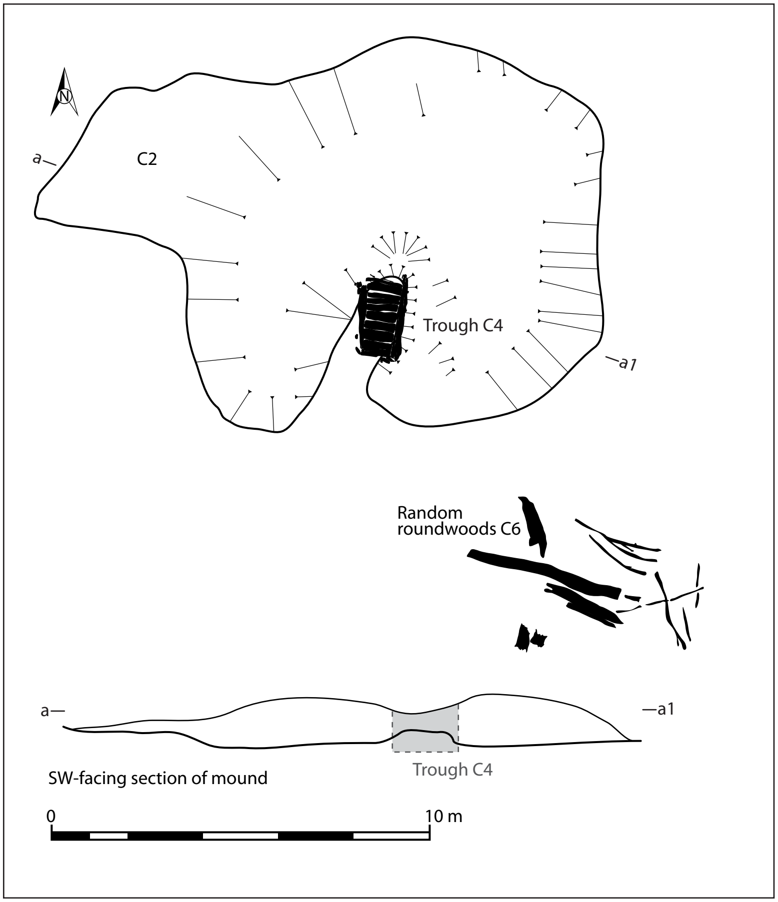


Fig. 3.23—Sonnagh V: plan and section of mound (C2) with location of trough and randomly deposited roundwoods.

The mound

The mound (C2) was situated in an area of very wet peat (C1). It was crescent-shaped, measuring a maximum of 13.5 m east–west by 11.5 m north–south, and 1.5 m thick (Fig. 3.23). It consisted of small, burnt and heat-fractured sandstone in a matrix of peat with inclusions of charcoal, most of which was concentrated toward the bottom of the mound. Thin lenses of peat occurred throughout the mound. Three heavily burnt and calcined flakes of indeterminate material (E3347:2:1, E3347:1:2 and E3347:2:3), owing to the intensity of burning, were the only lithic finds (Appendix III).

The trough

A pit (C13) was cut into the underlying peat. It was sub-oval, measuring a maximum of 2.2 m north–south by 1.2 m east–west, and 0.45 m deep. It had concave sides gradually sloping to a flat base (Fig. 3.24). The east edge was cut through a layer of carr woodland roots, indicating the possible presence of raw material for the trough construction, as well as a former forested environment. The original depth of the pit was at least 0.9 m to accommodate the whole trough, and the soft peat closed in around the trough lining.

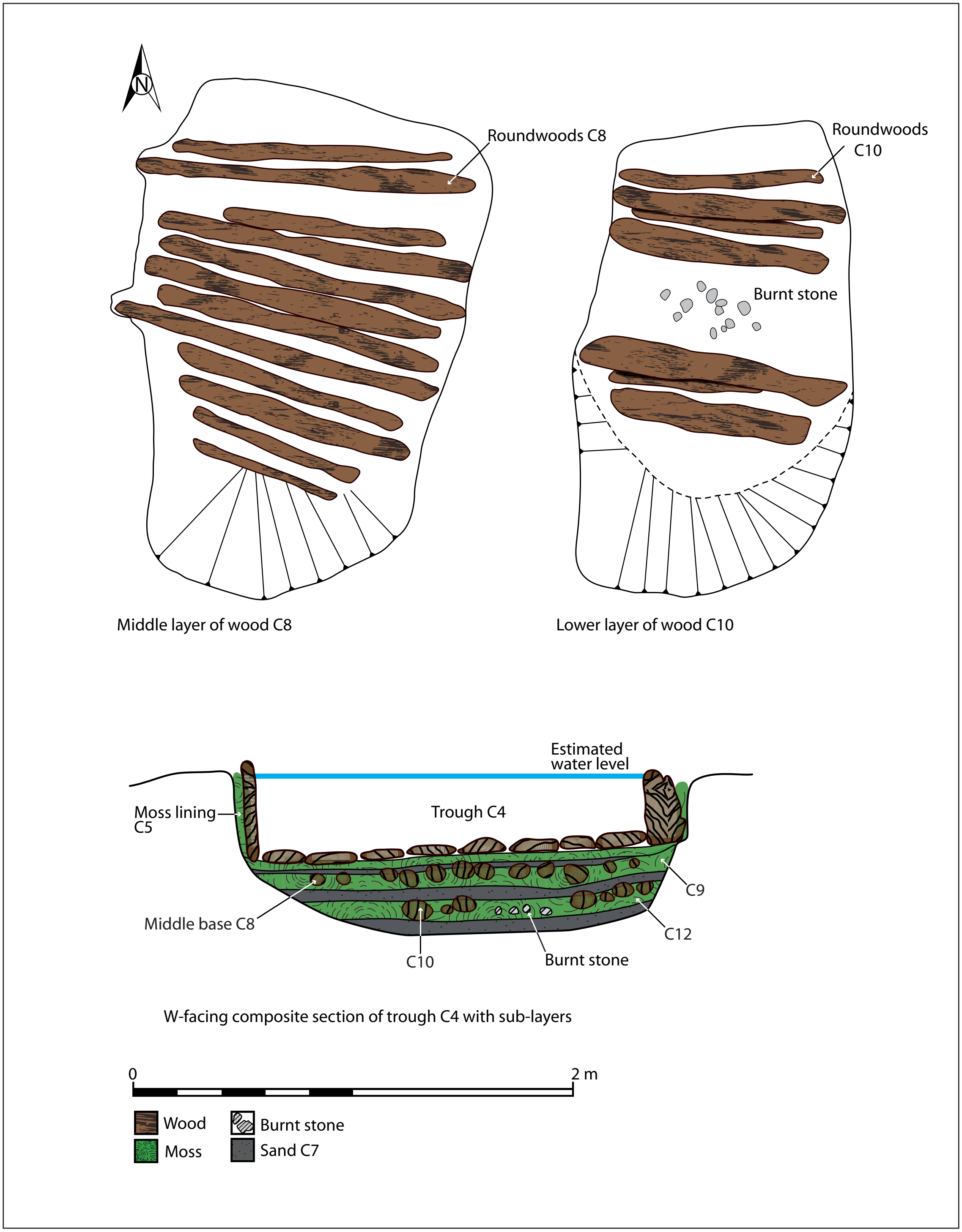


Fig. 3.24—Sonnagh V: lower and middle trough timber bases and composite section.

Pls 3.18 and 3.19—Sonnagh V: lower timbers in trough base (C10) (left) and middle timbers (C8) (right).

The trough base was made up of three separate layers of sand, moss and timbers (Fig. 3.24). The primary layer was a 0.06 m-thick deposit of fine, sterile, grey sand (C7). A 0.06 m-thick layer of green–brown moss (C12) rested on this and measured 2 m north–south by 1.15 m east–west. This moss underlay a row of seven well-preserved alder roundwoods (C10) (Pl. 3.18). These timbers were laid parallel along the short axis of the trough and were grouped toward the north and south ends of the trough with a gap in the centre. Four of the roundwoods were at the north end, and three at the south, but the overall area covered by the wood was 1.3 m by 1.3 m and 0.14 m thick. Occasional pieces of burnt stone were found between the timbers. This may indicate that some *fulacht fiadh* activity had taken place here before trough construction.

A second layer of the sterile grey sand (C7) overlay the timbers (C10) and was overlain by a dense moss layer (C9). The moss was green–brown on the upper side and reddish on the underside, probably owing to iron filtration from the peat; it measured 2.4 m north–south by 0.9 m east–west and was 0.06 m thick. A middle wood base of 12 roundwoods (C8; Pl. 3.19) overlay the moss layer. It comprised roundwoods, two of which had been split, aligned east–west. The largest measured 1.06 m long and 0.14 m in diameter. They comprised seven alder, two birch, one willow and one ash roundwood (one was not identified), all of which were worked with wedge and chisel points.

This middle base (C8) was overlain by a deposit of the fine grey sand (C7). The upper layer of dense, green–brown moss (C5) covered a maximum area of 2 m north–south by 1.15 m east–west and was 0.06 m thick; it overlay the upper sand layer and extended beyond the edges of the trough. A biconical tin bead (E3347:5:4) (see below) and a smaller, fragile, metal bead (E3347:5:5) were recovered from C5 (Pls 3.20–1). The wood-lined trough (C4) was constructed on this layered base (Fig. 3.24; Pl. 3.22).

The second bead was very corroded and in poor condition but appears to be a simple, circular bead with a broad, circular perforation. The bead is made from an unspecified metal. Although it was analysed by XRF (x-ray fluorescence, a non-destructive method of assessing the metal content of an object), its corroded condition did not produce a result that can be readily interpreted. However, its secure context in the dark green–brown moss layer (C5) places it in the same

Pl. 3.20—Sonnagh V: biconical tin bead (E3347:5:4) from moss layer (C5) below wood-lined trough (C4) (maximum diameter including tabs: 123 mm; diameter of bead excluding tabs: 91mm) (photos: © National Museum of Ireland).

Pl. 3.21—Sonnagh V: metal bead (E3347:5:5) from trough lining.

Pl. 3.22—Sonnagh V: wood-lined trough (C4) with moss lining (C5) in foreground.

stratigraphical position as the tin biconical ribbed bead. It may be assumed that it is of similar date. It had an estimated external diameter of 6.5 mm and an internal diameter of 3.5 mm (Appendix VII).

The wood-lined trough (C4) was rectangular, measuring a maximum of 2.4 m north–south by 1.3 m east–west, and 0.45 m deep. It consisted of 41 timbers: 10 floor timbers, 10 internal corner stakes and three external posts, seven side timbers and 11 end timbers. It had internal dimensions of 1.8 m by 0.9 m and was 0.4 m deep, with a capacity of 648 litres. It is likely that the trough sides were 0.10 m higher when in use, which would give it a capacity of 810 litres.

The floor timbers were split alder planks, aligned east–west across the short axis of the trough (Figs 3.24–5; Pl. 3.22). The largest was 1.33 m long, 0.25 m wide and 0.05 m thick. The corner stakes were well preserved, with five in the north-east corner, two each in the south-east and south-west corners, and one in the north-west corner. Each of the stakes was cut to a pencil point and inserted directly into the peat. The largest was 0.73 m long and 0.06 m in diameter. Six of these stakes were hazel, with one ash and three unidentifiable.

Three timbers of split alder were placed vertically outside the trough at the north-west, south-west and south-east corners as corner posts. They were driven into the peat and helped to maintain the side timbers in position. The largest of these supports was 0.3 m long, 0.13 m wide and 0.06 m thick, and all had cut-marks with wedge-shaped ends.

There were two side timbers of ash and one of alder on the east side, and two each of alder and ash on the west side, the largest 2.22 m long, 0.21 m wide and 0.05 m thick. There was an additional, charred timber on the west side.

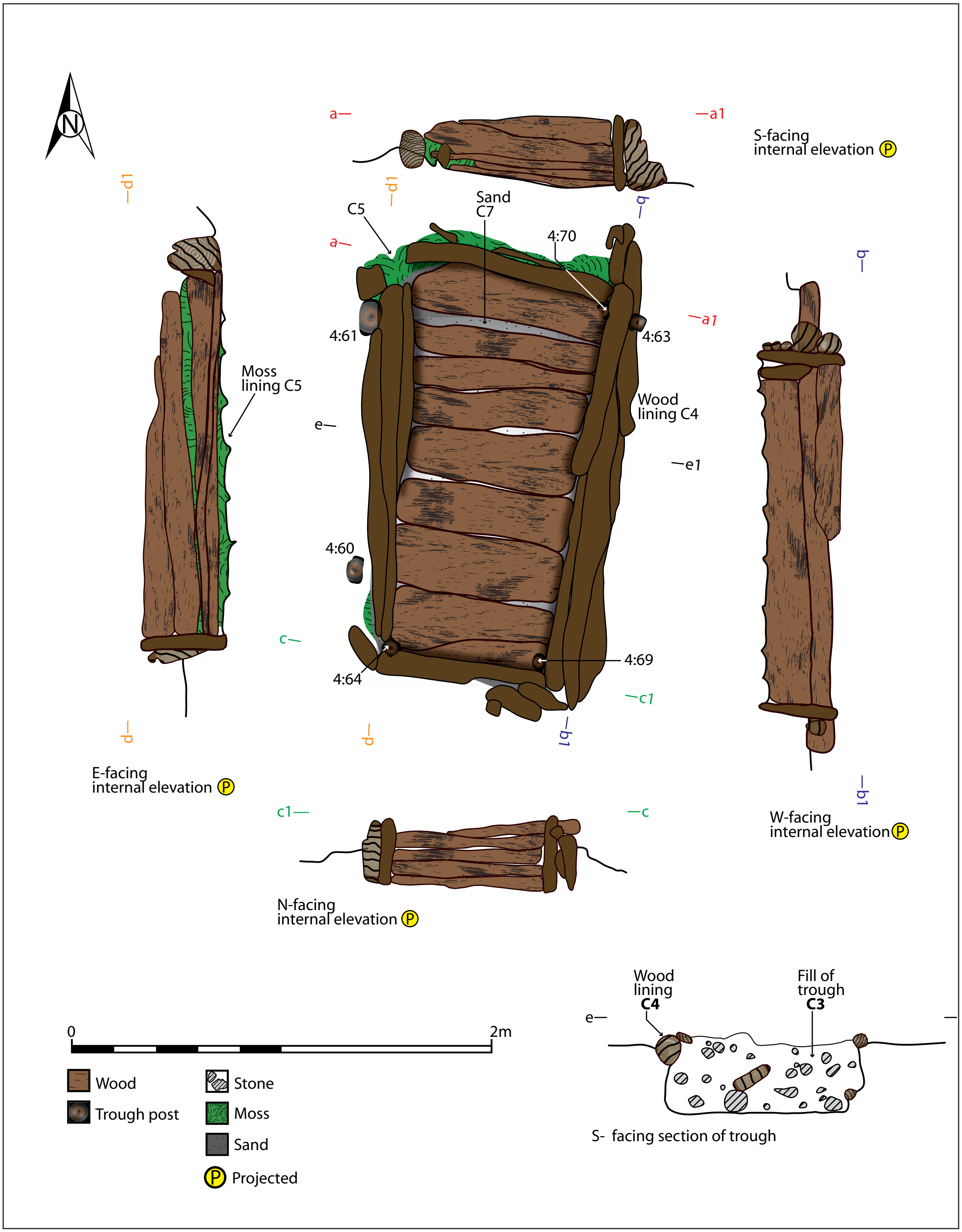


Fig. 3.25—Sonnagh V: plan and internal elevations of wood-lined trough (C4) and sectional profile of trough fill.

The north side had one split alder timber and an alder roundwood resting on three hazel roundwoods; most of these were cut to wedge-shaped points. The largest measured 1 m long and 0.15 m in diameter. The south end consisted of five ash timbers and one half-split alder timber. The largest timber measured 1 m long and 0.13 m in diameter. Most of these timbers were cut to chisel points.

The trough (C4) fill was dense, compact, heat-fractured stone with inclusions of charcoal, charred wood and detritus including hazelnut shells and holly leaves (C3); it measured 1.8 m long, 0.9 m wide and 0.4 m thick. Charcoal from this fill and the lining (C4) included alder, ash, oak, acorns and hazelnut shells. The burnt stone filling the trough was larger and more compact than that of the mound, indicating less use.

Ancillary features

A random deposit of brushwood (C6) occurred in the peat 8 m south-east of the trough (Fig. 3.23). It covered an area measuring 4.2 m east–west by 3 m north–south and was dominated by the remains of a large tree trunk. A total of 21 pieces of well-preserved roundwood with cut-marks were found scattered in the peat. The largest measured 1.78 m long and 0.09 m in diameter. Most of the wood had wedge- or chisel-shaped cut ends. The trunk measured 4.1 m long and 0.3 m in diameter and also had toolmarks at one end. The species present included hazel, ash, alder, willow and apple-type. A further random deposit of wood (C11) underlay the upper deposit (C6). It consisted of seven well-preserved roundwoods of alder, hazel and birch, with a mix of wedge and chisel points, and one split timber. The largest roundwood was 1.06 m long and 0.13 m in diameter. The wood covered an area measuring 4.2 m east–west by 2.2 m north–south. Some wide, raised signatures (raised ridges left on chopped wood by imperfections in the axe blade, which can be compared to show which cuts were from the same axe) were recorded on the alder wood from the lower trough base (C10), and these signatures were replicated on one of the timbers from C11 (Appendix XI). This shows that the same tool was used for both the trough construction and the wood pile, which suggests that the wood piles may comprise offcuts from the trough members or fire wood collected soon after.

A tin bead from Sonnagh V: extract from specialist report by Mary Cahill and Paul Mullarkey (Appendix VII)

The tin bead E3347:5:4 (Pl. 3.20) was found in a sealed context in a layer of moss (C5) that lined the sides and underlay the trough floor (C4) of a *fulacht fiadh*. The bead is of truncated biconical form externally and cylindrical internally. The outer surface of each half of the bead is decorated with slightly raised ribs that radiate from the centre to the perforations. The ribs meet where the two halves of the bead join and form a slightly thickened line around the circumference of the bead. The rims of the perforations are also slightly thickened. The perforations are not quite circular. One half of the bead is very uneven compared to the other half. Diametrically opposite one another are two small tabs of metal projecting from the circumference. Some wear is visible around the rims of both perforations, possibly caused by stringing. The bead has a maximum diameter of 123 mm (including tabs) and a minimum diameter of 91 mm (excluding tabs), and the maximum diameters of the perforations are 42 mm and 43 mm.

There is a visible difference in colour between the raised areas of the bead and the recessed areas between the ribs. The raised areas are quite light in colour, while the recessed areas are very dark. Initially, it was thought that this might be some form of inlay, but it was not possible to confirm this absolutely as the results of analysis of this area were exactly comparable to other areas examined on the bead. Water lodging in the narrow spaces between the ribs may have caused localised surface corrosion.

The metal was identified as tin using XRF analysis by Dr Paul Mullarkey in the laboratory of the National Museum of Ireland, Collins Barracks, Dublin. The artefact was analysed intact in the sample chamber, and the measurement spot, which was highlighted by a laser, was viewed on an adjacent screen, thus allowing for accurate positioning of the sample site. Analyses were taken from relatively clean, smooth surfaces. Results can be affected by the surface conditions of the object, such as curvature, indentations, pitting and the presence of contaminants, surface dirt and corrosion products. The surface of the Sonnagh bead is, however, in very good condition with little corrosion product.

Three separate analyses were carried out: two on the bead and one on an area between the ribs. The mean of these results was as follows: tin (Sn) 99.37 %; copper (Cu) 0.1 %; iron (Fe) 0.42 %. The analyses give very high values for the tin content of the objects described, indicating that the tin has been smelted. Metallic tin is soft and malleable, with a low melting point and silvery appearance. It is, perhaps, surprising that it has not been used more often to produce objects, given its attractive appearance.

Discussion

Although tin was one of the most important commodities in terms of the Bronze Age industrial economy, as it was essential for the production of bronze, objects made of metallic tin are extremely rare. In Ireland there are no known objects of tin from the Early Bronze Age, although tin has been used occasionally in Britain and on the Continent to make beads and also as an inlay in a jet button found in a dagger grave at Rameldry, Fife, Scotland (Baker et al. 2003, 105; Cahill 2009).

Likewise, there are very few objects of tin recorded during the Late Bronze Age in Ireland. They include three tin rings found in a hoard at Rathinaun, Lough Gara, Co. Sligo (Eogan 1983, 151–2; NMI E21:464, 561, 562). The tin rings are c. 100 mm in external diameter and may have been worn as armrings. Of the many gold-foil-covered, base-metal, penannular rings, only one has been positively identified as tin, although cores of copper, bronze and lead are known. A Late Bronze Age fragmentary, thick, penannular ring was recovered from gravels underlying burnt-mound debris during the excavation of a *fulacht fiadh* at Rathmore, Co. Wicklow (McLoughlin 2003). The object consists of several very poorly surviving sections of a tin core covered in thin gold foil.

There is also a hoard of three tin bar-twisted torcs found in a bog at Kilsallagh, Co. Longford (Cahill 2009). These torcs are closely similar to gold bar-twisted torcs of the Bishopsland phase and conventionally dated to the period c. 1200 BC.

The bead from Sonnagh is very similar in form to a number beads found at Flag Fen, Norfolk, England, although it is more elaborate, as the Flag Fen beads are not ribbed. Flag Fen is the only site in either Britain or Ireland to have, so far, produced a range of object types in tin. The biconical beads were found with other objects of tin, some of which are of extremely unusual type (e.g. small tin wheels that can be paralleled with objects known from Switzerland). All are dated to the Late Bronze Age. Analysis of the tin artefacts has produced tin values varying from 96 % to 99.9 %. By analogy with the closely comparable objects from Switzerland, the tin assemblage from Flag Fen has been dated to the 'peak in activity at Flag Fen, from late 11th century BC through the tenth century' (Pryor 2001, 291, 302, 306–8).

Beads of truncated biconical form made from sheet gold are also known from Ireland. These include seven beads with lattice decoration (NMI W34–40) found with seven tubular sheet-gold beads, three decorated with ribbing and the others with lattice patterns (NMI W41–7). These were found with amber beads at Cruttenclough, Co. Kilkenny. There are also nine undecorated, sheet-gold, biconical beads (NMI 1885:175–84) from a bog near Malin, Co. Donegal (Armstrong 1920, 90–1, pl. XIV). None of these discoveries of gold beads is easily dated in itself, but the association of the amber beads with the gold beads from Cruttenclough points to a Late Bronze Age date.

There are, however, several hoards found in Britain that contain biconical beads of sheet gold together with other, well-known Middle/Late Bronze Age types. These have been listed recently by Roberts (2007, 157, 166). They include seven undecorated sheet-gold beads found with, among other objects, two portions of a flange-twisted gold torc from Beerhackett, Dorsetshire, and three undecorated sheet-gold biconical beads from an important hoard from Burton, Wrexham, Wales, which also included two bronze palstaves and a gold flange-twisted torc. Roberts (ibid., 165) also mentions the discovery of a rapier and another biconical gold bead at Ogof yr Esgryn Cave, Glyntawe, Powys, Wales. The objects in these hoards are dated broadly to the period c. 1300–1100 BC by Roberts (ibid., 141), although a more refined dating of the hoard from Burton and the rapier from Ogof yr Esgryn Cave may be possible in due course. A radiocarbon date from the trough at Sonnagh of 1401–1294 BC suggests that the date of the tin bead falls well within the range of dates proposed for similar beads in gold and is considerably earlier than the biconical tin beads from Flag Fen.

Conclusion

The discovery of a bead of almost pure metallic tin is highly unusual. The fact that it was found in a datable context is important in enabling the bead to be dated and also provides a context for other biconical beads from Ireland that have no reliable dating evidence.

Sonnagh IX

Location

This *fulacht fiadh* was located on 0.4 m of peat between and adjacent to Sonnagh III, IV, V and VI. It consisted of a trough (C9) cut into the underlying peat and marl and an overlying burnt mound (C2).

The mound

The mound (C2) was crescent-shaped with the central hollow to the SSE. It measured 11 m east–west by 9.5 m north–south and had a maximum thickness of 0.5 m. It consisted of burnt and heat-fractured sandstone in a matrix of peat and charcoal (Fig. 3.26). A coarse, grey, chert blade (E3358:2:1) was retrieved from the mound (Appendix III). The site was covered by a black peat (C1) with rough grasses and reeds.

The trough

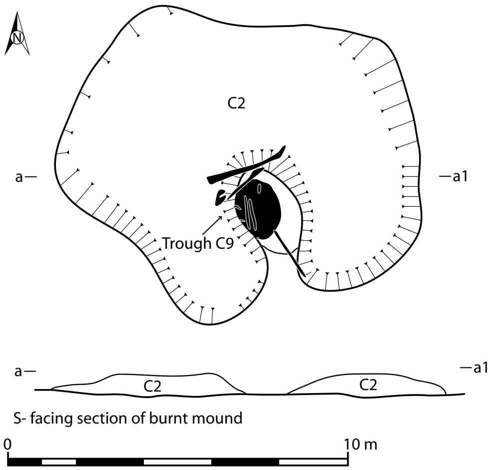
The trough (C9) was oval with vertical sides and a flat base, measuring 1.8 m north–south by 1.1 m east–west and 0.4 m deep (Fig. 3.27). It was cut through the peat (C3) and into the marl (C10). The base (C7) was partly lined with two split alder timbers aligned NNW–SSE, which were 1.22 m and 1.2 m long. Two hazel posts and one willow post were driven into the marl in the north, south and north-west. Two of the stakes had preserved points, one of which was buckled (Appendix XI).

The fills

The lower fill of the trough (C6) consisted of a 0.10 m-thick layer of grey–black silt with burnt stone and charcoal and rested on the floor timbers. Alder charcoal from this fill was dated to 2134–1919 BC (GrN-30759), placing it in the Early Bronze Age and quite early in the Sonnagh *fulacht fiadh* sequence. This basal fill was overlain by collapsed lining that consisted of a 0.04 m-thick layer of moss (C4), including 22 hazel wicker rods, 0.06–0.24 m long and 0.01–0.03 m in diameter, possibly the remains of wickerwork that lined the trough (Appendix XI). Ten of these were cut to chisel-shaped points, and one had a triangular perforation cut through it.

Six fragments of pig jawbone were recovered from the trough, all of which contained teeth. Analysis of these showed that they could all have come from a single male individual aged 17–19 months. The size of the teeth was in line with those of domestic rather than wild pig (Appendix IX).

The only other feature was a deposit of eight pieces of wood (C8) to the north and south of the trough. The largest was a split pine log that extended south-west from the trough and was 1.73 m long. It was held in place by a stake at either side of its southern end.



Looking east to burnt mound (C2)

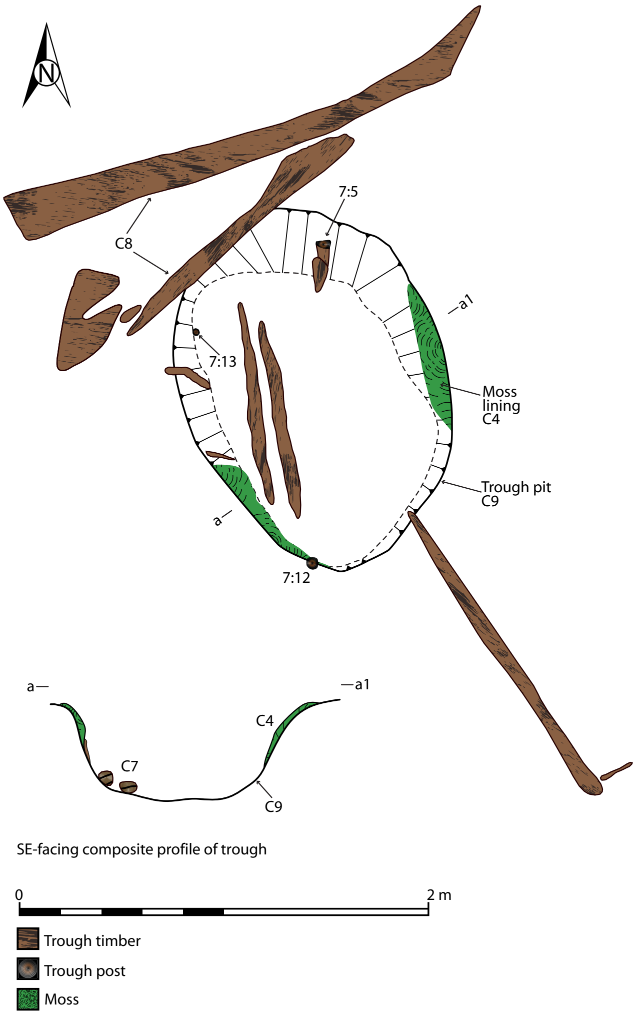


Fig. 3.26 and Pl. 3.23 (above)—Sonnagh IX: plan and section of burnt mound (C2) and pre-excavation view of mound from the west.

Fig. 3.27 (left)—Sonnagh IX trough.

Overview

Sonnagh IX consisted of a substantial burnt mound located on peat, with an associated circular trough cut through the peat to access the water table. The trough fill contained the collapsed remains of a wicker and moss lining, which would have filtered infilling water and provided suitable conditions for cooking. Animal bone and the chert blade suggest food processing, specifically domestic pig. Its Early Bronze Age date reflects the extended period of use for *fulachta fiadh* in the area.

Sonnagh X

Location

This *fulacht fiadh* was on the north side of the peat basin, adjacent to an east–west-running stream (Figs 3.10 and 3.28). Sonnagh X was 33 m east of a small burnt spread, Sonnagh XI, and 136 m north-west of another burnt spread, Sonnagh VI.

The mound

The *fulacht fiadh* mound (C4) had been covered by a 1 m-thick layer of brown peat (C3). The mound had been cut into three spreads by modern disturbance. The main mound was a 0.38 m-thick layer of heat-shattered sandstone in charcoal-rich, black, silty clay. It was circular, measuring 4.75 m east–west by 4.68 m north–south (Fig. 3.28). The two associated spreads were to the west of the main mound. The eastern spread was irregular in plan, measuring 1.40 m east–west by 0.38–0.72 m north–south, and 0.06 m thick. The western spread was 2.60 m west of the main mound. It was irregularly shaped, measuring 4.40 m east–west by 1.56 m north–south, and 0.16 m thick. The main mound and the two smaller spreads measured 12.08 m east–west by 4.80 m north–south in total.

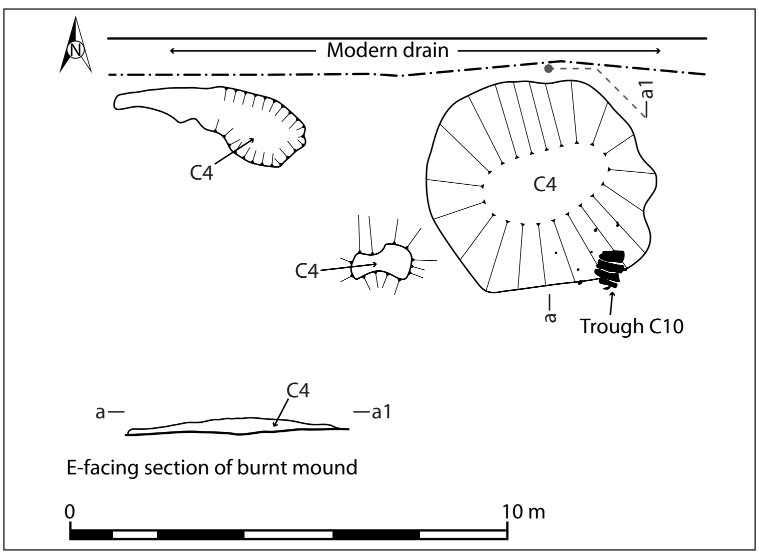


Fig. 3.28—Sonnagh X: composite plan of fulacht fiadh *mound (C4), showing location of wood-lined trough (C10) and east-facing section of mound (the area between the sections of mound was disturbed).*

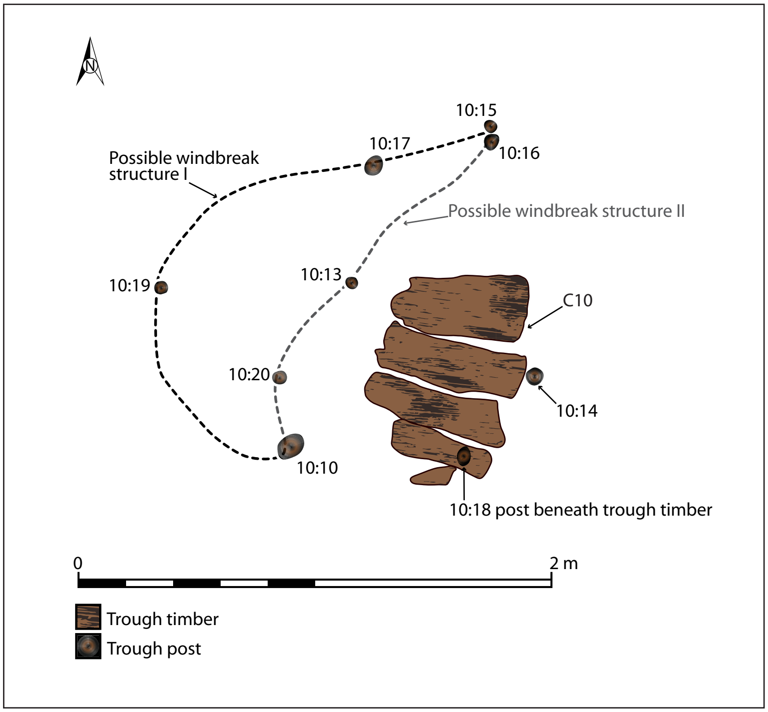


Fig. 3.29—Sonnagh X: plan of wood-lined trough (C10) and surrounding posts with projected lines of windbreaks.

The trough

The trough pit was rectangular, measuring 2 m east–west by 0.80 m north–south, and 0.30 m deep; it was dug into the underlying peat layer (C11). The poorly preserved remains of a timber trough (C10) and a single fill (C9) were sealed by the main mound (C4).

Horizontally placed planks (10:5–10:9), oriented east–west, with a number of associated posts/stakes (10:10, 10:13–10:20), formed the wood-lined trough (C10). The planks were split roundwoods, 0.19–0.69 m long, 0.09–0.26 m wide and 0.02–0.05 m thick, and had evidence of axe/adze marks on their upper and lower surfaces (Fig. 3.29; Pl. 3.24). Two of the five timbers were identified as ash, and two as alder; one was unidentifiable (Appendix XI). One of the base timbers (10:5) was radiocarbon-dated to 1660–1527 BC (GrN-30774), which places it in the Middle Bronze Age.

Ancillary features

Nine posts/stakes were associated with the trough. Several had distinct working, including chisel and pencil ends. The posts/stakes were 0.08–0.55 m long and 0.02–0.07 m in diameter. They were set vertically, and one (10:18) was under the southern base timber (10:8), while another (10:14) was recorded on the mid-point of the east side of the trough structure. Five posts/stakes (10:10, 10:13, 10:15, 10:16 and 10:20) formed a rough semicircular pattern, curving south/north-east. Two posts (10:17 and 10:19) were 0.60 m north-west of the first line of posts/stakes. Six of the nine posts were identified as ash (three), hazel (two) and alder (one) (Appendix XI). The seven uprights may represent the remains of two windbreak structures.

Pl. 3.24—Sonnagh X: view of wood lining of trough (C10), looking west.

The fills

The trough fill (C9) was a 0.04–0.20 m-thick layer of a heat-shattered stones in charcoal-rich, silty clay and measured 1.90 m east–west by 0.80 m north–south. It probably represents slumping into the trough after the site was abandoned.

Overview

This *fulacht fiadh* comprised a disturbed mound and the base of a wood-lined trough, which returned a Middle Bronze Age date. Seven associated uprights may represent the remains of two windbreaks.

Sonnagh *fulachta fiadh* discussion

The Sonnagh cluster included seven *fulachta fiadh* and four burnt spreads on or at the edge of a large peat basin that grew in what was formerly an inter-drumlin lake. These sites produced a broad overall radiocarbon date range of 1700 years, although most of the activity centred on the period 1000–1700 BC (Appendix A). This date range points to opportunistic use of a suitable location rather than a coherent complex or succession of sites. Similarities, particularly in mound composition and trough morphology, reflect a more general practice evidenced elsewhere, such as Fauleens and Currinah (described above), and Attireesh and Gortaroe (Gillespie, forthcoming), rather than a locally developed process employed by one group in a confined area.

Similar timber, moss and sand linings were recorded in troughs at Sonnagh I, II, IV and V, and three had layers of wood, moss and sand in the bases (Sonnagh I, IV and V). These troughs dated from the Middle to the Late Bronze Age. The trough at Sonnagh I and adjacent platform/trough base were of smaller, interlocked roundwoods and brushwood, similar to that in Currinah. The troughs in

Sonnagh II, IV and V were of fewer, large, split timbers. This trough construction technique gave access to the natural water table, filtering the infilling groundwater, and the layered bases helped to stabilise the lining and levelled the trough floor. The collapsed oval trough at Sonnagh IX included a collapsed moss and wicker lining and, although less substantial in construction, would have functioned on the same principle. The oval trough at Sonnagh III was unlined, apart from a single split timber secured to the base. This unusual arrangement may be explained by a different functional interpretation, such as bathing rather than cooking. The single split timber may have been a platform to keep food above the trough floor or could have been used as a seat for bathing.

The Sonnagh V trough was in extremely wet peat that, despite modern drainage and repeated pumping out at the excavation stage, was continuously flooded. Ground conditions must have been drier when the site was constructed, and the trough was dug to the water-table level. As the pit did not reach the solid subsoil, successive basal layers were built to provide a firm foundation and to filter the percolating water. The sand, moss and timbers performed both functions. After the fill was removed from the trough during excavation, the infilling water was clear until the upper layer of moss and sand were removed, at which point it became discoloured by the peat. The clean water was suitable for bathing, cooking or other domestic processes. The size of the mound indicates that the process was successful, and the site was used numerous times over a lengthy period. It is possible, given the presence of occasional burnt stone in the basal layer of timbers (C10), that part of the site pre-dated the extant trough and that burnt stone collapsed into this pit during trough construction. No evidence for an earlier trough survived *in situ*. The metal beads from this trough lining are unique items of personal ornament in an Irish archaeological context and are likely to be the result of accidental loss rather than deliberate deposition (Appendix VII). These beads indicate a complex community with developed trade or at least indirect interaction with a much broader population.

Animal remains from two of the Sonnagh *fulachta fiadh* support their interpretation as cooking places. A small assemblage of 10 pig teeth, some still attached to the mandible, from Sonnagh IX is possibly the remains of a single male domestic pig aged 17–19 months. The presence of the pig bones may suggest the use of the *fulacht fiadh* for cooking or for some aspect of processing of carcasses, such as preservation of meat or hide processing. A piece of singed or charred bone from Sonnagh IV was probably a rib fragment from a small to medium-sized mammal and may also relate to cooking (Appendix IX).

The large lithic assemblage from Sonnagh II (88 pieces) cannot be definitely ascribed to a specific phase of activity but may be related to the adjacent *fulachta fiadh*. Occasional lithic tools from Sonnagh I (two chert flakes), V (three calcined pieces), VII (one chert flake), VIII (four chert flakes) and IX (one chert blade) are likely to have been used in carcass or hide preparation and confirm a domestic function for these *fulachta fiadh*.

One carefully constructed platform was built adjacent to the trough in Sonnagh I, within the mound, and was probably a working surface for food preparation before submerging in the trough or, alternatively, may have been the base of a second trough. Additional rough platforms and random deposits of timbers probably situated under the mound or adjacent to the trough occurred at Sonnagh I, IV, V and IX. These may have facilitated passage across soft, wet peat. The split timber protruding from the trough at Sonnagh IX allowed direct access to the trough. Some of these timbers may have been offcuts from trough construction or remnants of chopped wood for fuel. The conditions selected for access to the water table may have been suitable for cooking in the trough, but it is likely that preparation and consumption occurred in more conducive circumstances elsewhere.

The only secondary structure associated with a *fulacht fiadh* in this group was at Sonnagh X, which included a wood-lined trough that appeared to have been partly dismantled in antiquity and a series of posts/stakes that may have formed two small, semicircular windbreaks, with four posts forming an outer windbreak running west/north-east on the north-west side of the trough. The second windbreak on the west side of the trough may have been formed by five posts/stakes running north–south (Fig. 3.29).

The mounds were predominantly of heat-affected sandstone and would have been suitable for boiling water for cooking. Generally, the volume of the mound was large relative to the capacity of the troughs in the Sonnagh *fulachta fiadh*, indicating prolonged use or, more likely, multiple uses, suggesting that this practice was a component of daily life in the Sonnagh area, from the Late Neolithic to the end of the Bronze Age.

Cloonmeen West

Location

This isolated *fulacht fiadh* was in well-drained, level pastureland (Fig. 3.30). A stream flowed from north to south 11 m east of this *fulacht fiadh*, which was close to two enclosures (MA063-010 and MA063-023) and a possible enclosure (MA063-051). This *fulacht fiadh* consisted of a trough, a pit and a post-hole that were overlain by a mound of burnt stone and charcoal.

The mound

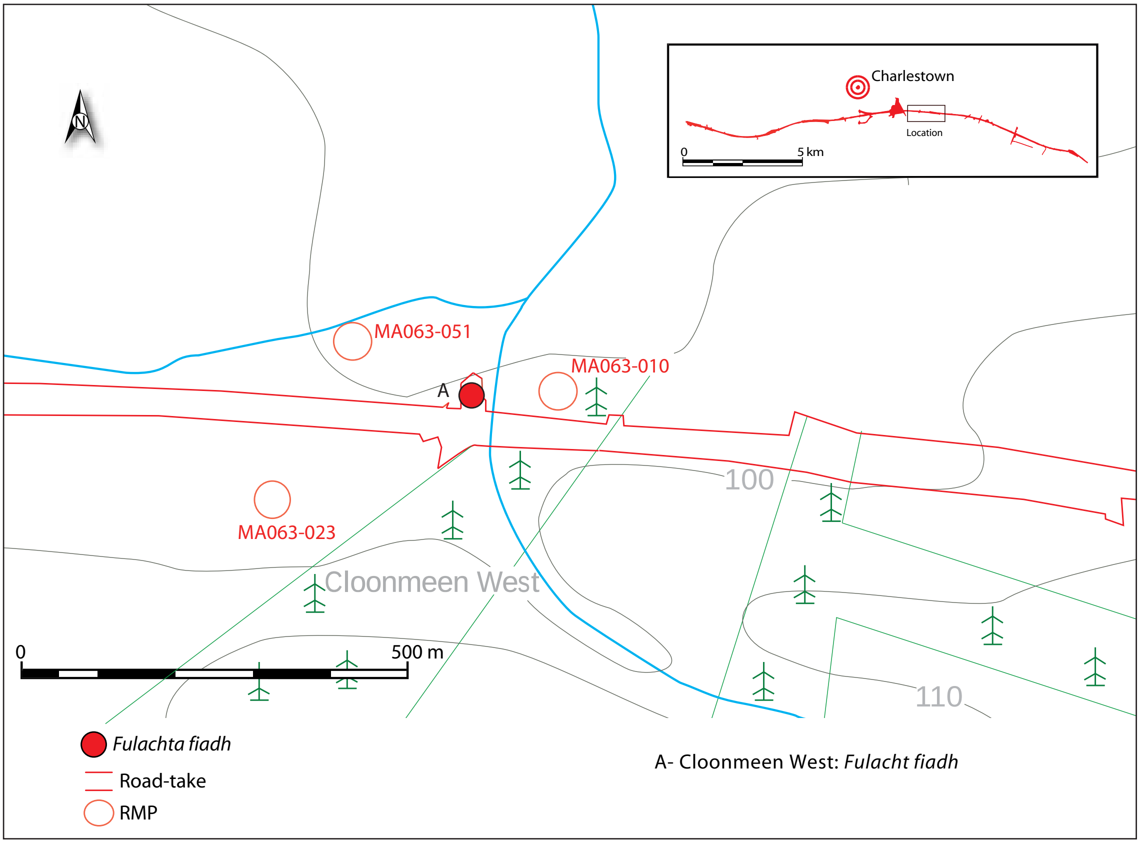
The mound (C2) was crescent-shaped, measuring a maximum of 12 m north–south by 10 m east–west, and 0.25 m thick, continuing beyond the limit of excavation. It consisted of compacted, burnt and heat-fractured sandstone in a matrix of charcoal-flecked, gritty, sandy soil. It was covered by brown, silty topsoil and sod (C1).

The trough

The trough (C5) was on a slight east–west slope and was rectangular, with steep to vertical sides and a flat base cut into the boulder clay. It measured 2.6 m east–west by 1.8 m north–south and was 0.45 m deep, partly lined with large, flat stones to the west. Naturally occurring boulders formed part of the eastern side. The northern and southern sides were unlined.

The fill

The trough fill was compacted, burnt and heat-fractured stone in a matrix of charcoal-flecked, grey silt. Charcoal from this matrix included ash, alder, elm, hazel and oak, and the non-oak timbers produced a Middle Bronze Age radiocarbon date of 1390–1054 BC (GrN-30747).



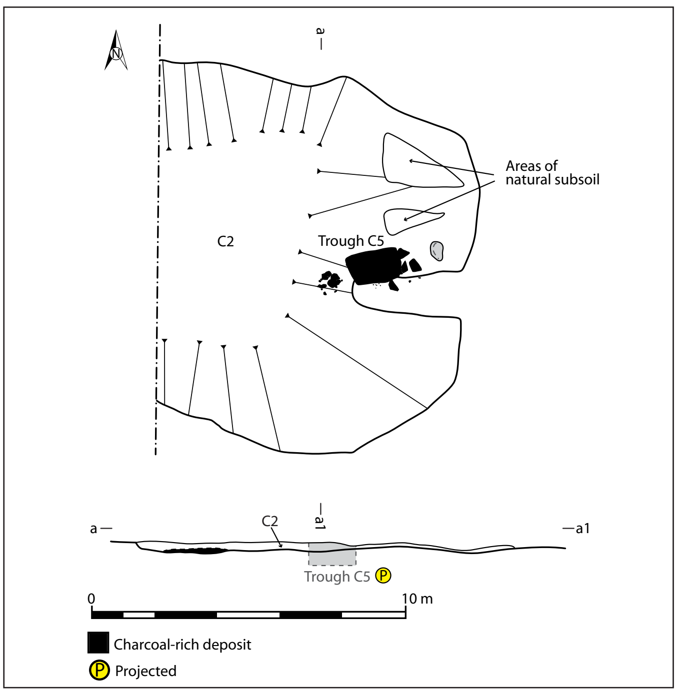


Fig. 3.30 (above)—Cloonmeen West site location map.

Fig. 3.31 (left)—Cloonmeen West: plan and west-facing section of mound (C2) with location of trough indicated.

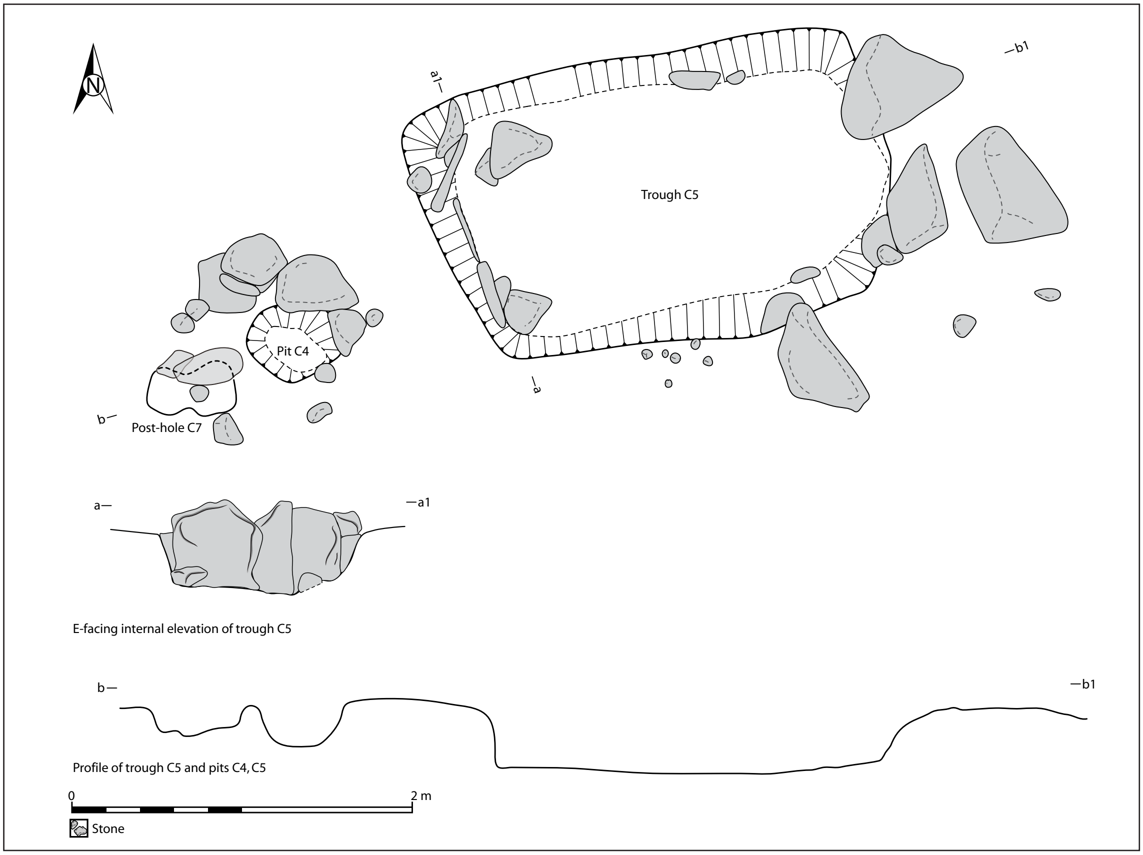


Fig. 3.32 (above)—Cloonmeen West: plan and profile of trough, post-hole and pit.

Pl. 3.25 (right)—Cloonmeen West: looking west to trough (C5) with stone lining in situ.

Pl. 3.26—Cloonmeen West: west-facing section of pit (C4).

Redeposited boulder clay lay on the outer north edge of the trough (C5), likely spoil from the construction of the trough.

Ancillary features

Pit C4 was 0.8 m west of the trough. It was sub-circular with steep sides and a flat base, measuring 0.5 m east–west by 0.48 m north–south and 0.3 m deep. It was surrounded by 14 flat stones laid horizontally around the edge. There was some evidence of scorching on the stones, suggesting that they may have enclosed a small hearth in the pit. The lower pit fill consisted of burnt and heat-fractured stone in a matrix of charcoal-rich, grey, silty soil overlain by dark grey to black, charcoal-rich, silty soil.

A possible post-hole (C7) was situated 0.28 m west of pit C4. It was sub-oval with steeply sloping sides and a flat base, measuring a maximum of 0.2 m east–west by 0.24 m north–south and 0.12 m deep. It was filled with charcoal-rich, black silt with occasional inclusions of heat-fractured stone. There was a large stone socket at the west side.

Overview

This *fulacht fiadh* consisted of a partly stone-lined, sub-rectangular trough (C5) with an associated pit or possible hearth (C4), immediately to the west. Although the trough was cut directly into the subsoil, it did not fill naturally with groundwater. This suggests that either the water table lowered since the Bronze Age or the trough was filled manually from the nearby stream. The scorching at the surface of the pit (C4) suggests that it may have functioned as a hearth; however, the pit is likely to have had an earlier function, before the hearth. A post held in C7 may have had a related function, such as part of a meat-rack.

Three other stone-lined *fulacht fiadh* troughs were excavated during this scheme. The closest parallel was Currinah II, 6.5 km to the east, which included flat stone paving adjacent to the trough and had a very similar radiocarbon date range. The stone-lined troughs at Cashelduff IV and Currinah I were later and lay 3.3 km and 6.5 km east of the Cloonmeen West *fulacht fiadh*.

The Cloonmeen West trough was partly lined with flat stones, and naturally occurring boulders were also incorporated. It is possible that the remainder of the sides and base was originally stone- or wood-lined, with additional lining having been removed or having rotted away after abandonment.

Fauleens, Co. Mayo

Location

The general topography of Cloonfane and Fauleens was small drumlin hills and gravel ridges to the south and west that sloped into a deep peat basin. Drainage was provided by a west–east-flowing stream that formed the townland boundary between Fauleens and Cloonfane and flowed into the

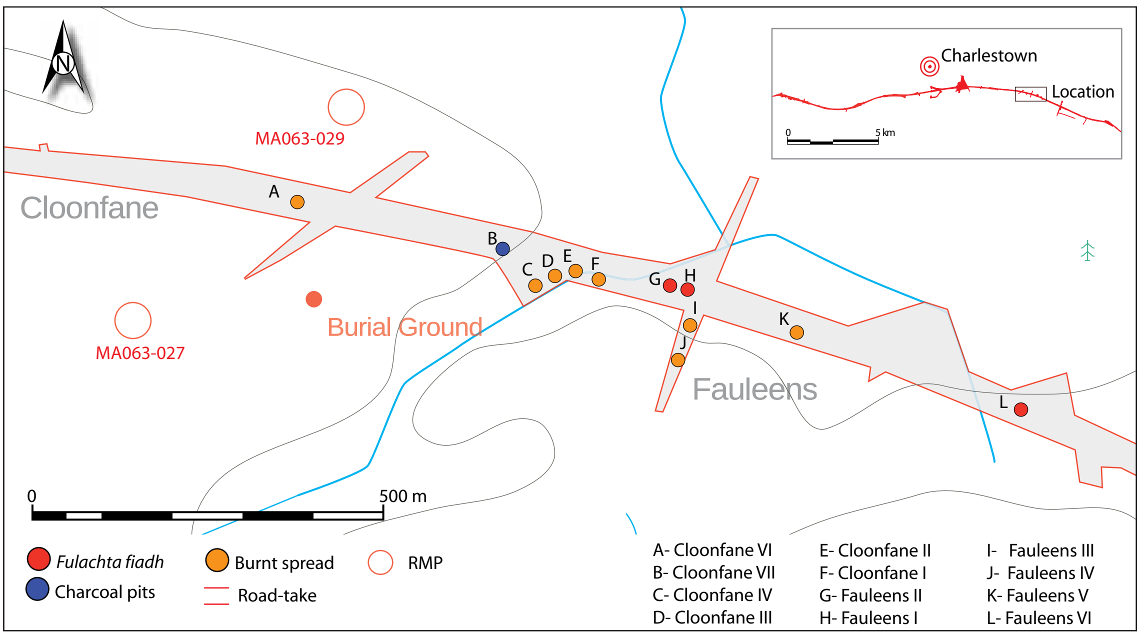


Fig. 3.33—Distribution of fulachta fiadh*, burnt spreads and charcoal-production pit in townlands of Cloonfane and Fauleens.*

Coarse River, c. 2.5 km to the north. Three *fulachta fiadh* were excavated in Fauleens (Fig. 3.33): Fauleens I had two wood-lined troughs; Fauleens II had a wood-lined trough; and Fauleens VI had a circular trough pit. Fauleens I and II were in a peat basin that was up to 1.50 m deep and extended west, before merging into higher, well-drained ground to the north. Fauleens I was 29 m east and 6 m south of Fauleens II; Fauleens VI was c. 430 m east of Fauleens I and II, at the edge of a deep peat basin on a gently descending slope from the north. Three burnt spreads (Fauleens III–V) were excavated in this townland. In Cloonfane, five burnt spreads (Cloonfane I–IV and VI), a pit (Cloonfane V) and a charcoal-production pit (Cloonfane VII) were excavated (Fig. 3.33).

Fauleens I

The mound

The mound (C4) was irregular in plan and sealed two well-preserved, wood-lined toughs (C11 and C27) dug into the underlying peat (C87). The mound was truncated by a modern drainage ditch on the west and south-west sides (Fig. 3.34). The mound had been covered by a 0.10–12 m-thick layer of brown, silty clay (C1). A 0.10–0.30 m-thick peat layer (C3) marked the location of Trough A (C11) and partly sealed the burnt-mound material in this area.

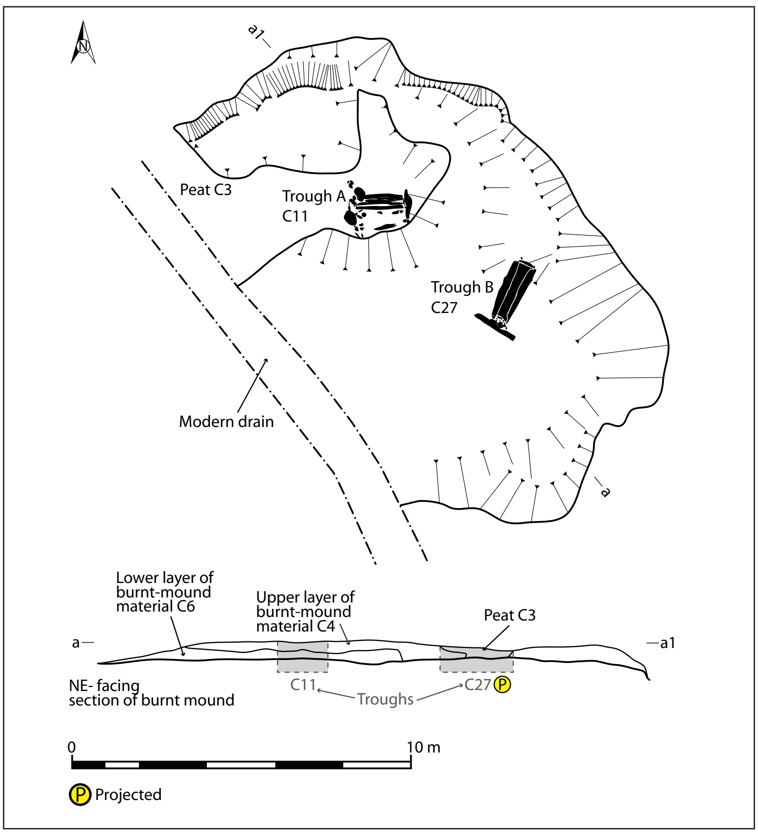


Fig. 3.34—Fauleens I: pre-excavation plan of fulacht fiadh *mound showing location of Troughs A and B and north-east-facing section of mound.*

The mound comprised two layers (C6 and C4) of heat-shattered sandstone and granite in charcoal-rich, silty clay; it measured 16.30 m south-east/north-west by 9.50 m north-east/south-west and was 0.10–0.48 m thick. The lower deposit (C6) underlay C4 on the south-east side of the mound (Fig. 3.34). The two layers of burnt-mound material may represent two phases of activity on the site associated with the two wood-lined troughs.

Trough A

Trough A was sealed by the peat layer (C3) and slumped mound material (C4). It was sub-rectangular and had a U-shaped profile. The trough pit (C36) measured 1.98 m east–west by 0.98 m north–south and was 0.35–0.50 m deep. It increased in depth from south to north by up to 0.10 m (Fig. 3.35). The trough was constructed of wood (C11) and stone (C44), with horizontal timbers partly lining the base and sides and held in position by posts/stakes and three stones. The wood lining was sub-rectangular, wider at the west end than the east, with a U-shaped profile and measured 1.98 m east–west by 0.98 m north–south (Fig. 3.35; Pl. 3.27).

The wood lining was mainly of split roundwoods, which were 0.13–1.53 m long and 0.025–0.16 m in diameter. Four corner posts (11:46, 11:47 11:52 and 11:57) were recorded in the trough, with smaller stakes/wedges supporting the main posts. The wood species used for the posts included alder (three), ash (two), oak (two) holly (one) and hazel (one), and one was unidentifiable. The north-east corner post (11:57) was masked by 11.32, an irregularly shaped timber, on the east side of the trough (Fig. 3.35). The base of the trough was lined with only three timbers on the north side. The timbers used were of ash (two) and alder (one). The north side of the trough had four main wood components (11:26, 11:31, 11:35 and 11:36), which were split horizontal timbers of ash (one), alder (one) and oak

Pl. 3.27—Fauleens I: view of Trough A with wood lining (C11) and stones (C44) in situ, *looking east.*

(one). The fourth timber (11:36) was unidentifiable. The south side comprised four timbers, two horizontal and two vertical (11:41–2, 11:45 and 11:49); two were alder, one was ash, and the fourth was unidentifiable. The structure may have been dismantled in antiquity along the south side. The west side was constructed of eight timbers, six horizontal (11:25, 11:28, 11:30, 11:33–4 and 11:48) and two vertical (11:29 and 11:53). Six of these timbers were identified as ash (two), alder (two), oak (one) and hazel (one).The east side had one main horizontal timber (11:32) identified as alder, which was well preserved, with a slight charred appearance on the surface (Appendix XI).

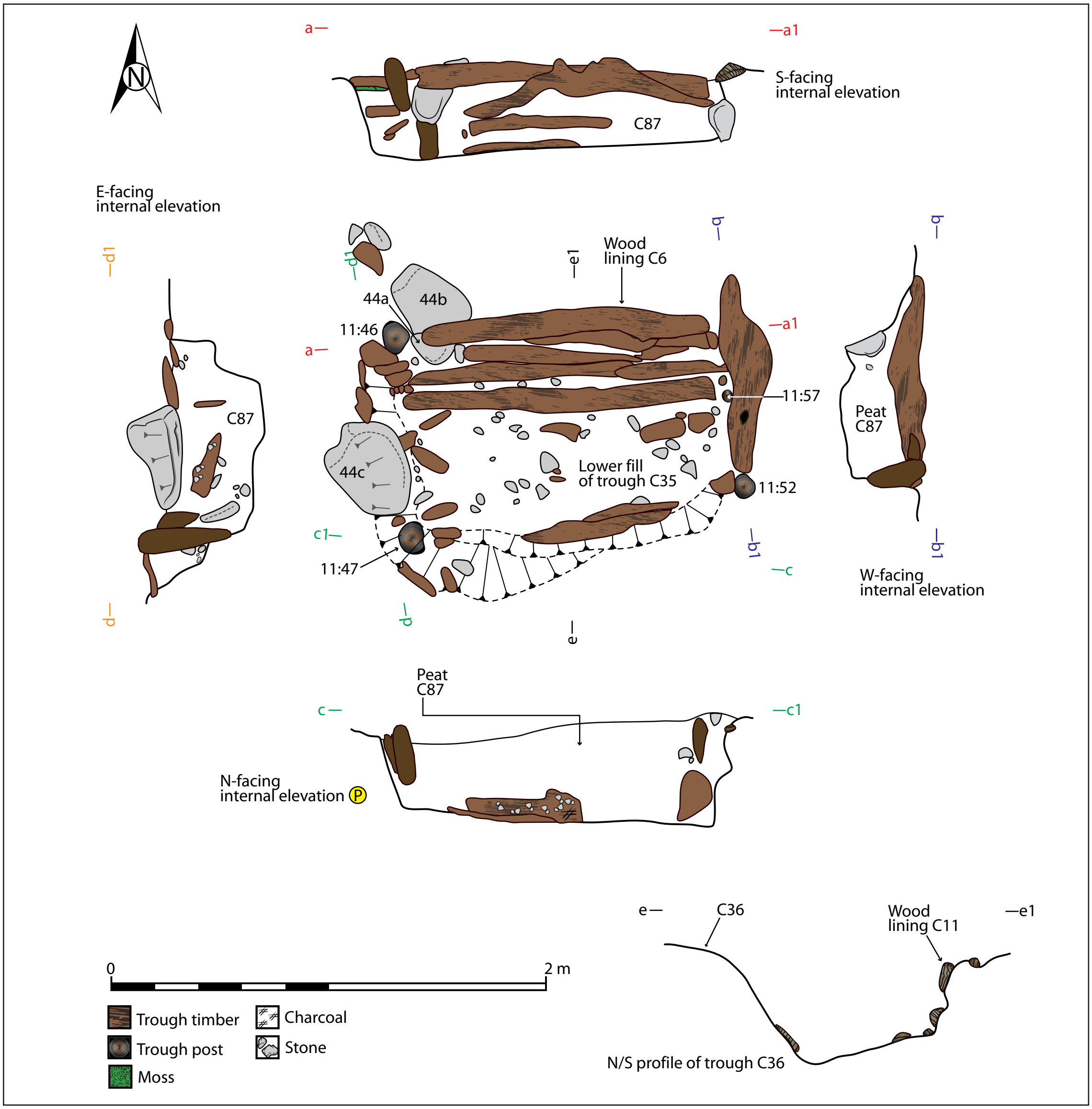


Fig. 3.35—Fauleens I: plan of Trough A, showing wood lining (C11) and stone (C44); internal elevations of trough; and profile of trough pit (C36).

Three quartzite pad stones, (44A–C) supported the wood lining on the west and north sides (Fig. 3.35; Pl. 3.27). Stone 44A was set into the trough side on the north-west corner. Stone 44B was at the north-west corner of the trough, partly under the split timber (11:35). The upper surface of the stone had evidence of burning, and it may have functioned as a hearth. Stone 44C sloped into the trough on the west side and was over a small split timber (11:34).

Ancillary features

Seven posts on the western exterior of the trough were offset to the north of the centre of the trough. The easternmost one (11:76) was c. 0.40 m from the trough edge, and the westernmost one (11:64) was c. 1.18 m from the edge. Four of the posts (11:62, 11:66, 11:67 and 11:76) were grouped together in a very tight cluster; the remaining three (11:64, 11:65 and 11:71) were in a small arc curving east–west. Two additional posts (11:61 and 11:63) were c. 0.12–0.20 m from the eastern edge of the trough and were not part of the main structure. The posts/stakes were identified as alder (three), oak (two), ash (two), holly (one) and hazel (one) (Appendix XI). All were driven vertically into the peat, some up to 0.50 m deep.

The fills

The basal fill (C35) of the trough pit was a 0.15 m-thick, grey, silty sand with moderate inclusions of charcoal (Fig. 3.35). It underlay an intermittent moss layer (C31). The 0.02 m-thick moss layer was concentrated around and under the timbers in the north-west corner of the trough. The greenish-brown moss was hypnoid (or coarse, branching) with a matted texture, and the most abundant species were *Neckera crispa* and *Thuidium tamariscinum*, indicative of a woodland environment (Appendix XIII).

The lower trough fill (C30) was a 0.20 m-thick layer of heat-shattered stones in charcoal-rich clay silt. This fill may represent the last use of the trough and was concentrated in the eastern half. The upper fill (C12) was a 0.15–0.30 m-thick layer of brown peat, which had occasional inclusions of heat-shattered stones and roots. The heat-shattered stones slumped into the trough and were enveloped in peat after the abandonment of the site.

Overview

A radiocarbon date from a hazel post (11:19) from Trough A of 774–521 BC (GrN-30831) was obtained and places the use of this trough in the Late Bronze Age period and contemporary with Fauleens II (see below).

The wood lining of the trough was not very substantial or well crafted along the sides or base, with stones used to secure the timber in place on the north and west sides. The base was poorly lined, and the trough may have been partly dismantled in antiquity before its final abandonment. The seven exterior posts/stakes on the west side of the trough did not form any obvious pattern but may have functioned as a basic windbreak.

The wood assemblage was dominated by alder (32 %), followed by ash (27 %), hazel (22 %), oak (15 %), holly (2 %) and Pomoideae, or apple-type (2 %), with the woodland species of oak, ash, holly and hazel suggesting a wooded, dry landscape, and alder indicating wetland conditions. The charcoal identified from the basal fill (C35) was oak (47 %), hazel (32 %), alder (10 %), ash (8 %) and apple-type (3 %), showing a marked preference for oak and hazel as fuel in contrast to the structural wood used in the trough. Oak and hazel may have been more suitable and easily combustible wood than alder and may have been collected deliberately for firewood (Appendix XI). Insect remains were recovered from the moss layer (C31) and included common ground beetle (*Nebria* sp.) and common water beetle (*Agabus bipustulatus*), again typical of a wetland environment (Appendix XIII).

Trough A filled quickly with groundwater and had to be bailed constantly during excavation. The trough was ideally placed to exploit the water resources in the area, and the earlier date of Trough B (see below) suggests that this location was favoured over the course of the Bronze Age for such activity.

Trough B

Trough B (C27) was in the south-east quadrant of the mound, underlying the burnt-mound material (C6) c. 2.20 m south-east of Trough A (Fig. 3.34). The trough pit (C32) was irregularly shaped, measuring c. 3.30 m north-east/south-west by 2 m north-west/south-east, and 0.60– 0.88 m deep but was difficult to plan accurately owing to the waterlogged conditions.

The wood lining (C27) consisted of oak planks and posts/stakes of varied wood species. The trough was rectangular, with internal dimensions of 1.96 m north-east/south-west by 0.28–0.38

Pl. 3.28—Fauleens I: mid-excavation view of Trough B, showing fill (C112) at south-west end of trough, looking south-west.

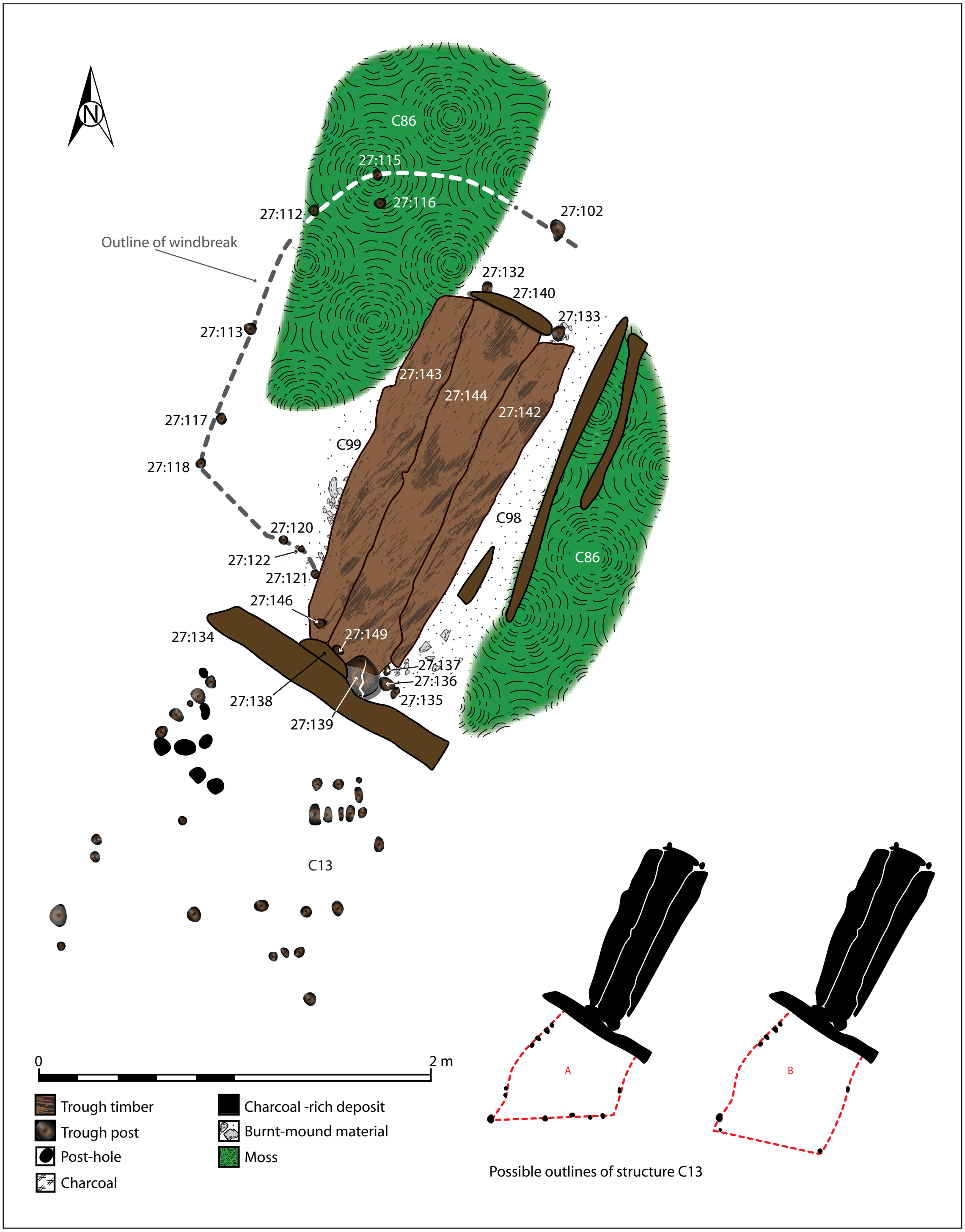


Fig. 3.36—Fauleens I: composite plan of Trough B, showing windbreak, projected line of structure C13, moss layer (C86) and deposits of burnt-mound material (C98 and C99).

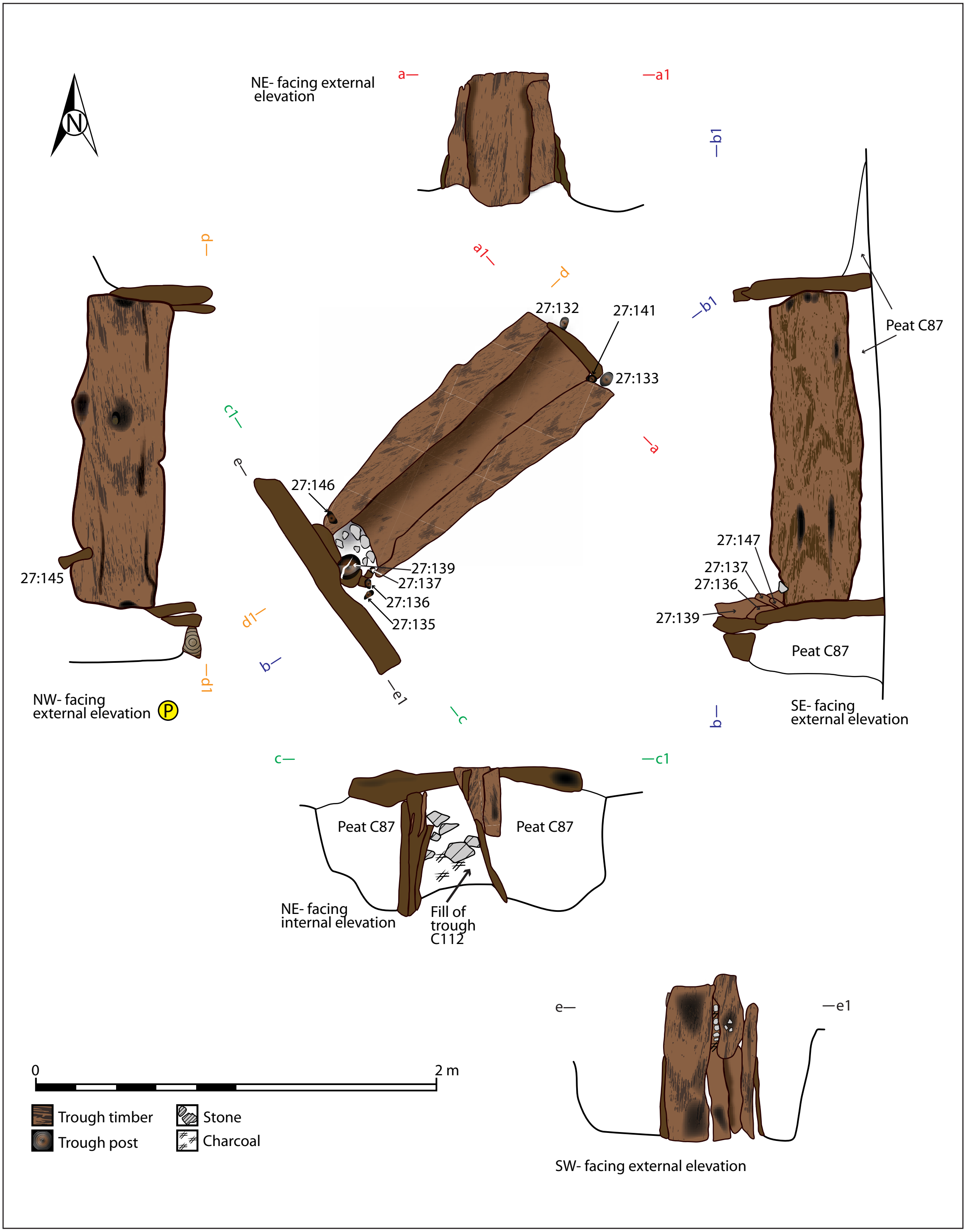


Fig. 3.37—Fauleens I: plan and internal/external elevations of Trough B, showing fill (C112) in situ *on north-east-facing internal elevation.*

m north-west/south-east, and was 0.40 m deep (Figs 3.36–7; Pl. 3.28). The trough pit appeared to have been stepped and narrowed to accommodate the timbers. The upper 0.20 m of the trough pit had been packed with burnt-mound material between the pit sides and trough lining to stabilise the timbers. The end timbers of the trough extended c. 0.24 m below the base timber into the underlying peat (C87).

The sides and base consisted of three tangentially split oak planks, possibly from the same tree (27:142–4), averaging 1.95 m long, 0.50 m wide and 0.05–0.08 m thick. The underside of the base timber (27:144) had knots and some intact bark, indicating that it was hewn from the outer tree surface.

The south-east side timber (27:142) had an internal wedge (27:141) and several posts/stakes supporting it. A stone had been used as a wedge on the interior of the north-west side timber (27:143). There was a small wooden wedge (27:145) on the exterior face of the north-west timber, and a wooden post (27:146) at the south-west end held the timber in position (Fig. 3.37). There was a small V-shaped notch at the mid-point of the north-west side timber (27:143).

The south-west end of the trough had an elaborate construction, with an end timber (27:138) and a series of posts/stakes (27:136, 27:137, 27:147 and 27:149) that propped up a split post (27:139), sealed the gaps between the end timber and the side timber (27:142) and stabilised the end timber (Fig. 3.37). The split post was supported internally by a burnt-stone deposit (C112) and externally by a horizontal timber (27:134) placed to the back of the post and notched to allow it to fit flush. The end timber projected 0.28 m above the level of the side timbers (Fig. 3.37; Pl. 3.28). The north-east end timber (27:140) was held in place by two rectangular posts (27:132 and 27:133) (Figs 3.36–7; Pl. 3.28). The timber completely closed the end of the trough and projected 0.20 m above the level of the side timbers.

Ancillary features

Ten small posts/stakes (27:102, 27:112–13, 27:115–18, 27:120–2), with an average diameter of 0.06 m, in an arc formation, were situated 0.80 m from the north-west side timber. These may have supported a windbreak starting adjacent to the southern end of the north-west side timber and curving north and then north-east (Fig. 3.36).

A group of 28 posts/stakes (C13) were at the south-west end of Trough B and may represent the remains of a structure. The posts occurred individually and in groups and encompassed an area measuring 1.54 m north–south by 1.60 m east–west (Fig. 3.36). Most of the stakes and posts were driven into the peat at an angle of between 45 º and 60 º, with the tops angled north. Nine wooden posts/stakes were grouped in two rows, oriented east–west, with a distance of 0.05 m between the rows in places. The posts/stakes were driven in contiguously, with less than 5mm between them, and several were side by side. Eleven posts/stakes extended from the end timber (27:134) in a south-west direction, turning sharply east and then north-east back to the end timber; these would have enclosed the two rows of posts described above, eight other extant post/stakes and five of the seven post-/stake-holes. Seven original post-/stake-holes were also recorded to the west of the south end of Trough B (Fig. 3.36). These posts/stakes appeared to have been removed in antiquity, and the cavities were infilled with slumped burnt-mound material. The seven post-/stake-holes were associated with the extant wooden posts/stakes, and their posts/stakes may have been removed in an attempt to realign the windbreak or may have broken and required replacement.

During excavation of the trough, 12 timbers were identified overlying, adjacent to and within the trough structure. The timbers ranged from large split roundwoods, c. 1.20 m long, to smaller pieces of wood, 0.40 m long. One timber (27:111) had been placed in the trough after the peat had reached a thickness of 0.30 m and the trough had been abandoned. The external timbers (27:105, 27:106 and 27:108) on the south-east side of the trough were partly covered in moss and may have been displaced timbers from structural components forming a working platform adjacent to the trough along this side.

A total of 77 pieces of wood were identified from Trough B, the north-west windbreak and the structure (C13). Seventeen structural components from the main trough were analysed and identified as oak (eight), alder (seven) and hazel (two). Twenty-seven posts/stakes from the possible structure (C13) were analysed and identified as hazel (16), alder (seven), ash (two) and holly (one), with one unidentifiable. The 10 posts/stakes forming the north-west windbreak were of hazel (six), oak (one), alder (one) and apple-type (one), and one was unidentifiable. Of the 12 timbers around the trough structure, 11 were identified as alder (seven), ash (two), holly (one) and apple-type (one) (Appendix XI).

Two layers of charcoal-rich, black, gritty clay silt with inclusions of moss were evident on the north-west (C98) and south-east (C99) sides of the trough, and both were packed tightly against the exterior of the side timbers. C98 underlay timbers 27:105, 27:106 and 27:108 and the moss layer (C86). Both C98 and C99 were likely to have been contemporary with the trough and may have been used to firm up the peat adjacent to the sides. Perhaps the first few clean-outs of the trough were packed in and around the trough to provide stable footing (Fig. 3.36).

An irregularly shaped layer of moss (C86) was recorded partly overlying C98 and C99 (Fig. 3.36). It was a hypnoid (or coarse, branching) moss, greenish-brown with a matted texture. The most abundant species were *Neckera crispa* and *Thuidium tamariscinum*, indicative of a woodland environment (Appendix XIII) and identical to those found in Trough A. Moss had been used to caulk the north-east end timbers of the trough and was also wrapped around the exterior timbers (27:105, 27:106, 27:108) on the south-east side of the trough.

The fills

Trough B had four fills. The basal fill (C114) was a 0.10 m-thick layer of grey silt with heat-shattered stone (10 %) and moss in the north-east end of the trough. A sub-rectangular, 0.05–0.12 m-thick layer of grey, sandy silt (C113) with occasional inclusions of moss and bark overlay C114 and was in the north-east of the trough. The moss probably originated from the caulking material between timbers 27:140 and 27:143. The silt fills (C113 and C114) may have been the result of in-wash from the surrounding mound, which accumulated at the north-east end, where the ground was 0.02 m lower than at the south-west end.

An irregularly shaped, 0.50 m-thick layer (C112), comprising heat-shattered stones in charcoal-rich, black, silty clay with wood inclusions (27:124–5), was recorded in the south-west half of the trough (Fig. 3.37). The two pieces of alder had toolmarks and were roughly pointed. The worked wood may have been infilled with C112 in an attempt to stabilise the split post (27:139) at the south-west end. The thickness of the layer at the south-west end suggests that it was deliberately packed in, as it was 0.10 m higher than the level of the side timber and rested against the south-west end timber (27:138). Alternatively, it could represent the last use of the trough, which was only partly cleaned out.

The upper fill (C85) was a 0.05–0.40 m-thick layer of brown peat with inclusions of heat–shattered stone and wood fragments. The wood was identified as alder (four), ash (two) and yew (one); some of it was charred (27:126–31 and 27:150), and the yew piece (27:130) has been identified as a possible artefact (Appendix XI). A small amount of charcoal in C85 was washed into the peat from the surrounding burnt-mound material (C6). The peat (C85) had accumulated naturally in the trough after abandonment and covered remnants of several *in situ* charred timbers.

Overview

A radiocarbon date of 1898–1746 BC (GrN-30833) was returned from a hazel post (27:117) from the windbreak around Trough B. One post/stake from C13 (hazel; 13:98) was radiocarbon-dated and to 2022–1785 BC (GrN-30832), which suggests that the trough and possible structure area were in contemporaneous use in the Early Bronze Age. The two layers of burnt-mound material represent two phases of activity associated with the two wood-lined troughs. Trough B was used in the Early Bronze Age, and Trough A was constructed in the Late Bronze Age. The re-use of this site suggests that it was ideally located to exploit the primary resources required for *fulacht fiadh* activity and remained an attractive site for such activity in the Bronze Age.

The elaborate and careful construction of Trough B was unusual. The side timbers were deliberately angled inward and had not been displaced from their original position by the pressure of growing peat or the slumping of mound material. The trough would have been unsuitable for cooking, as the opening was narrow and awkward for the insertion of large hot stones. Other activity may have taken place at the trough, such as curing and processing hides and dying textiles.

The purpose of the 10 small wooden posts/stakes in an arc formation along the north-west side of the trough was probably to support a windbreak/shelter. The function of the 28 extant stakes and posts and the seven backfilled post-/stake-holes is unclear, but they possibly formed windbreaks also, which were realigned over a period of time. They could also have been part of a larger structure, perhaps the foundation for a platform of wooden planks. If planks or brushwood had been placed across these posts/stakes, they would not have been preserved as they would have lain directly under the burnt-mound material. The seven post-/stake-holes were associated with the extant wooden posts/stakes, and their posts/stakes may have been removed in an attempt to realign the windbreak or may have broken or rotted and required replacement. The array of posts may also have served as drying racks for cured skins or as a temporary shelter.

The predominance of alder (41 %) in the wood assemblage suggests the exploitation of wetland species. Alder is an easily worked and split timber and suitable for use in a wet environment. The high percentage of hazel (32 %) may indicate the deliberate use of coppiced hazel stands for trough construction. The hazel, oak (12 %), ash (5 %), holly (5 %) and apple-type (4 %) in the wood assemblage are typical of a dryland wooded environment (Appendix XI). Charcoal identified from

Pl. 3.29—Fauleens I: view of base timber 27:144 showing adze marks on the upper surface.

fill C112 came from a variety of species, with the high proportions of hazel (43 %) and oak (24 %) showing a preference for these wood types as a fuel source. Alder (18 %), ash (11 %) and apple-type (4 %) were also present, but alder was used considerably less as fuel and more for trough construction. The charcoal reflects the same wood species used in the trough construction and indicates the exploitation of the same woodland resource for both fuel and structural material (Appendix XI). The charcoal may even have been derived from the detritus of wood left after trough construction was completed.

The tool facets recorded from Trough B were 15–60 mm wide, and some complete toolmarks (jam curves) were recorded on the base and side timbers (Pl. 3.29). The jam curves were 60–80 mm wide and were probably made by an adze. The likely scenario was that a woodcutter tangentially split the tree, pared it of bark, using a bronze adze hewed the planks to the requisite size in a standing position, and trimmed the edges with a smaller bronze axe (Appendix XI).

There were extensive toolmarks on the side and base timbers and a variety of worked end types on the posts and stakes, including wedge, chisel and pencil ends. There were extensive adze toolmarks on the interior and exterior faces of the timbers. These were especially noticeable on the internal face of the base timber (Pl. 3.29).

Insect remains recovered from the moss (C86) included shieldbug (*Acanthosoma haemorrhoidale* [Linnaeus]), commonly found on hawthorn, and forest bug (*Pentatoma rufipes* [Linneaus]), associated especially with oak (Appendix XIII). Hawthorn may have been part of a hedgerow from where the moss was gathered and, similarly, a shady oak forest would have provided suitable conditions for abundant moss growth. This evidence, along with the use of planks in the trough, suggests that there had been an oak stand in the vicinity, probably on the higher, dry ground to the south and west.

One piece of burnt flint (E3353:1:1) was retrieved from Fauleens I during the testing phase of the scheme. It is an edge-retouched flake fragment and could possibly be a fragment of a symmetric plano-convex form, dating to the Late Neolithic/Bronze Age period (Appendix III).

Fauleens II

The mound

A 0.10 m-thick layer of brown, silty clay covered both the mound (C3) and a 0.10–0.25 m-thick layer of peat (C12) that overlay the trough. The mound was sub-rectangular and comprised a 0.08–0.50 m-thick layer of heat-shattered sandstones in charcoal-rich, black, silty clay. It measured 9.64 m north-east/south-west by 5.40 m south-east/north-west (Fig. 3.38). The mound (C3) overlay the primary fill of the trough (C4) and sealed a well-preserved, wood-lined trough, with moss lining and evidence for a hearth (C10) on the south-west side.

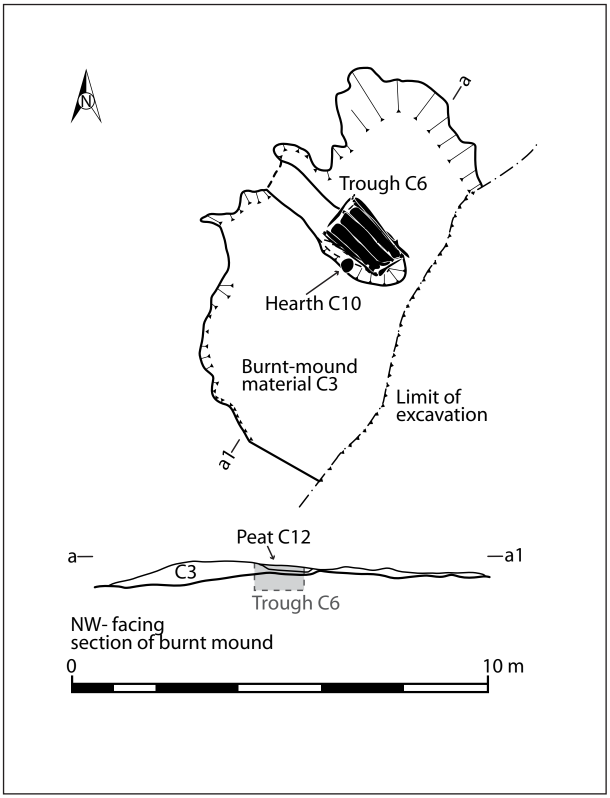


Fig. 3.38—Fauleens II: composite plan of fulacht fiadh *mound (C3), showing location of wood-lined trough (C6) and hearth (C10) and north-west-facing section of mound.*

The trough

The trough pit (C34) was sub-rectangular, measuring 2.10 m north-west/south-east by 1.44 m south-west/north-east, and was 0.30 m deep. The trough pit was dug through the underlying peat (C87) and into the subsoil. There was evidence for three small deposits of material on the base of the trough pit, which had been laid down before the insertion of the wood lining. An irregularly shaped, 0.05–0.10 m-thick deposit (C7) of charcoal-rich, gritty sand with small round stones was located at the north-west end of the trough pit and may have been the remnants of a sand layer. An irregularly shaped, intermittent layer of hypnoid moss (C33) was recorded between and below the wood lining (C6) and may have functioned as part of a filtration layer. The moss was greenish-brown with a matted texture. The most abundant moss species were *Neckera crispa* and *Thuidium tamariscinum*, indicative of a woodland environment (Appendix XIII). The moss was identical to that recorded in Troughs A and B in Fauleens I, suggesting that the wood was sourced in the same general area. An irregularly shaped deposit of charcoal and moss (C9), with inclusions of bark and sand, was recorded below the trough timbers at the north-west end.

A large alder tree root was recorded in the northern half of the trough pit along the north-east side and may have been used to support the wooden base timbers (6:34 and 6:35). The tree root appeared to have been *in situ* before trough construction and was incorporated into the trough structure.

The trough was wood-lined (C6), sub-rectangular and oriented north-west/south-east (Fig. 3.39; Pl. 3.30). The trough structure consisted of planks and posts/stakes. The timber was mostly well preserved, except the uppermost side timbers of the trough, which were in contact with the burnt-mound material. The wooden trough measured 2.02 m north-west/south-east by 1.18 m north-east/south-west and was 0.25 m deep. The trough had three fills, C17, C5 and C4, and was partly sealed by slumped burnt-mound material (C3).

There were three well-preserved basal timbers of oak (6:33–5) (Fig. 3.39; Pl. 3.30). The base timber on the south-west side (6:33) was 1.47 m long, 0.27 m wide and 0.06 m thick. The central plank (6:34) was 1.55 m long, 0.32 m wide and 0.06 m thick. It was worked on the south-east end and had an incised, small, faint ‘X’ mark on the underside, which is possibly a deliberate toolmark and may have identified the central plank for the trough builders. The plank (6:35) on the north-east side was 1.50 m long, 0.35 m wide and 0.06 m thick. It was worked on the north-west end and decreased in width by 0.02 m at the south-east end. Planks 6:34 and 6:35 overlay two pieces of worked wood (6:38 and 6:39), which may have been used to level the base planks in the trough pit.

The main side timbers on the north-east side (6:7, 6:16 and 6:21) were laid horizontally and held in place by the northern and eastern corner posts (6:29 and 6:31). One timber (6:21) was worked on the north-west end and had a natural V-branch on the south-east end, which was wedged against the post (6:31) (Fig. 3.39). The south-west side was constructed using three horizontal timbers (6:13–15). One timber (6:15) was hewn on the north-west end to fit around the west corner post (6:23) (Fig. 3.39). The timbers were secured in place by posts/stakes (6:23–5).

The north-west end of the trough had three main timbers (6:9–11), which did not extend to the west corner post (6:23), falling short by 0.10 m. The bottom timber (6:11) had a wedge-shaped

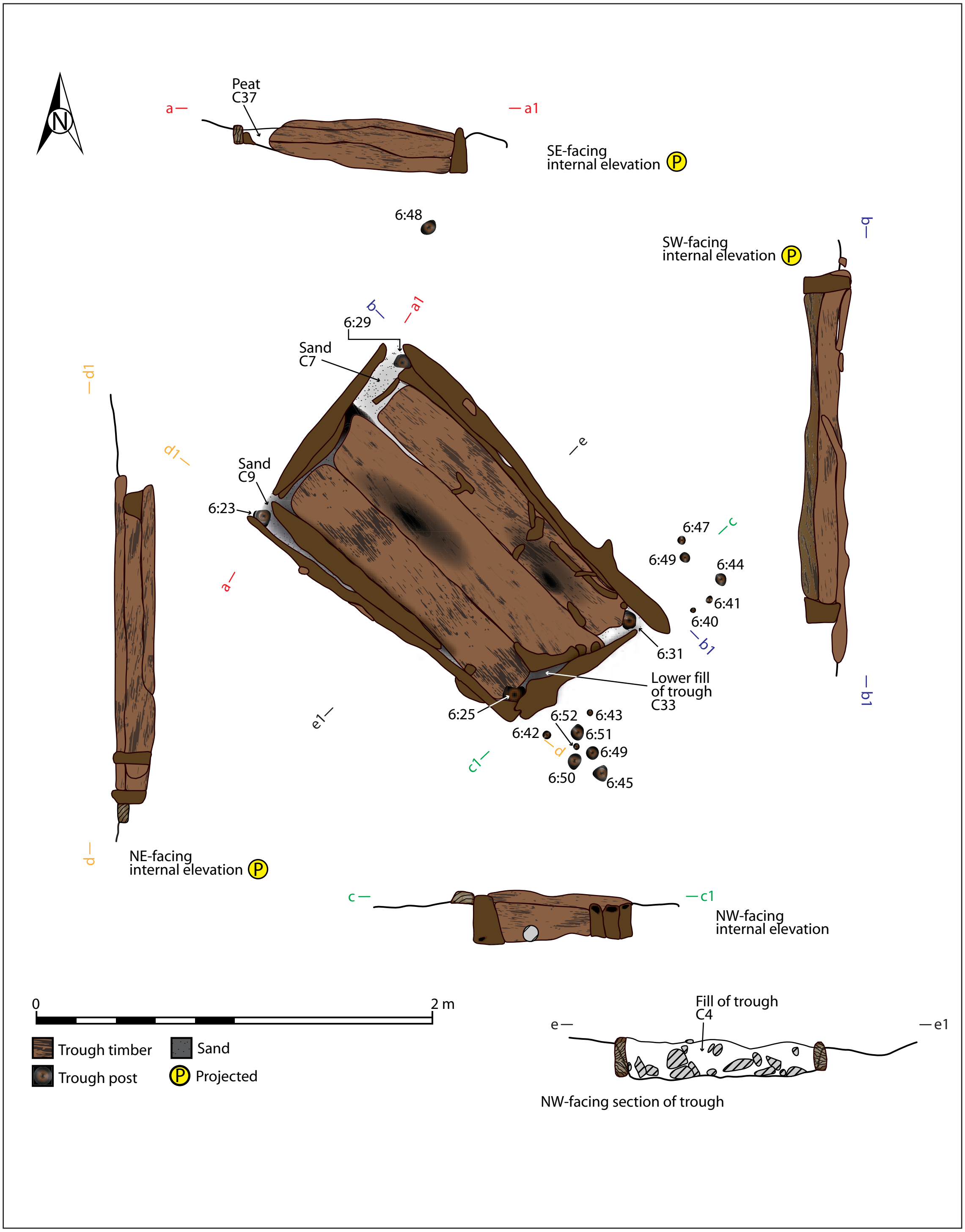


Fig. 3.39—Fauleens II: plan and internal elevations of wood-lined trough (C6) and north-west-facing section of the trough showing fill (C4).

Pl. 3.30—Fauleens II: view of wood-lined trough (C6), looking south-east.

north end, which was jammed into the north corner post (6:29) (Fig. 3.39). The south-east end of the trough had two main timber components (6:18 and 6:20), one (6:20) with adze facets on both ends. The side timbers were held in place by four posts (6:25–7 and 6:31).

A total of 28 wood elements were identified from the trough structure: alder (nine), ash (seven), oak (six), apple-type (two), hazel (two), holly (one) and willow (one), similar to the species found in Trough A and B of Fauleens I and evidence for the exploitation of dryland and wetland species in the vicinity of the trough. Willow is uncommon, as it does not occur in the other two troughs, and may have not been that readily available in the area (Appendix XI).

Ancillary features

Thirteen wooden stakes/posts were situated around the perimeter of the trough, with a concentration on the south-east side. Seven (6:42–3, 6:45, 6:49–52) were clustered c. 0.12 m south-east of the south corner post (6:25). A further five (6:40–1, 6:44, 6:47 and 6:49) were clustered 0.35 m north-east of the east corner post (6:31). All of the posts/stakes were at a 30 º angle toward the trough, suggesting that they supported a windbreak or a superstructure for covering the end of the trough. An isolated post (6:48) was recorded c. 0.40–0.45 m north of the trough structure (Fig. 3.39). Ten of the 13 posts were identified as hazel (four), alder (two), holly (three) and apple-type (one) (Appendix XI).

The fills

The lower fill (C5) was a 0.02–0.10 m-thick, irregularly shaped deposit of charcoal-rich, black, clayey silt at the south-east end of the wood-lined trough (C6). The fill overlay and was between the crevices of the base timbers, and there was a higher concentration in the western corner.

Two sub-angular stones, one sandstone and one quartzite (C17), were recorded from the south-east end of the trough. The stones were used in the construction of the trough and functioned as chocks for the wood lining of the trough.

The upper fill (C4) was a 0.04–0.25 m-thick layer comprising heat-shattered stones in charcoal-rich, silty clay (Fig. 3.39). The heat-shattered stones in C4 indicate that the trough may not have been cleaned out after its final use and was subsequently abandoned or became infilled by slumped mound material.

An irregularly shaped, 0.03–0.06 m-thick charcoal deposit (C10) was recorded outside the south-west side of the trough, adjacent to side timber 6:13. The deposit measured 0.62 m north-west/south-east by 0.23 m south-west/north-east. It may indicate the location of a hearth (Fig. 3.38).

Overview

A radiocarbon date of 786–545 BC (GrN-30830) was returned from a hazel post (6:27). This places the trough as broadly contemporary with Fauleens I, Trough A (774–521 BC).

The predominance of alder (47 %) in the wood assemblage suggests the exploitation of wetland species similar to Fauleens I, Trough B. Ash (17 %), oak (13 %), holly (13 %) hazel (11 %) and apple-type (7 %) in the wood assemblage are typical of a dryland, wooded environment (Appendix XI). Ash occurred more frequently in Fauleens, Trough A, and in Fauleens II, accounting for 27 % and 17 % of the wood assemblage, while only 5 % of the wood from Trough B was ash. This may reflect that ash had expanded into land that had been cleared earlier and was now more readily available as a building and fuel source, while oak may have diminished in quantity in the surrounding area. The charcoal identified from the fill (C4) was ash (90 %) and oak (10 %) and would seem to confirm this trend (Appendix XI).

The toolmarks on the wood had longer and narrower facets than those on timber from the earlier trough (Trough B) at Fauleens I. These toolmarks may represent later Bronze Age tools such as palstaves, flanged axes and socketed axeheads (Appendix XI).

The trough (C6) did not fill naturally with groundwater, possibly indicating that water was brought to the trough and that the moss lining may have caulked the trough timbers to prevent water leaking. Alternatively, the trough may have filled with water in antiquity but, owing to modern drainage activity, the water table in the area may have lowered.

Fauleens VI

The mound

This levelled mound was roughly horseshoe-shaped, opening to the west, and comprised a 0.085 m- thick layer of heat-shattered sandstones in charcoal-rich, silty clay. The mound measured 5.96 m north–south by 4.80 m east–west. The *fulacht fiadh* mound (C3) was covered by a 0.30–0.50 m-thick layer of brown peat (C1). The peat was more substantial on the lower, southern extent of the site. This peat layer sealed the trough, which suggests that the trough had been partly cleaned out before abandonment.

The trough

A circular trough (C4) lay beneath the peat layer (C1). The trough pit was oriented east–west and had a concave profile. It measured 1.65 m east–west by 1.52 m north–south and was 0.18 m deep.

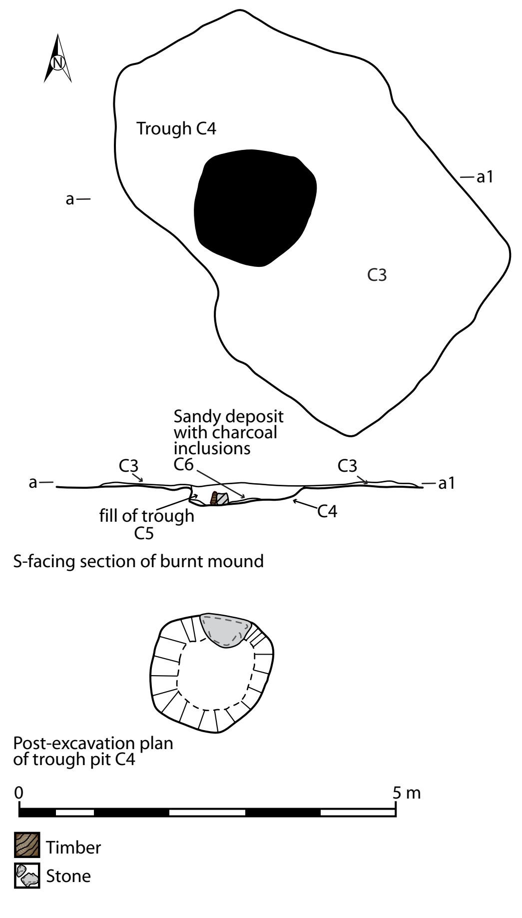


Fig. 3.40—Fauleens VI: composite plan of fulacht fiadh *mound (C3), showing location of trough (C4), south-facing section of mound and post-excavation plan of trough pit (C4).*

The pit had an irregular, flat base with rounded corners and increased in depth toward the middle. Three sides of the trough had a sharp break of slope at the top, and the north side had a large boulder *in situ*. The break of slope at the base was sharp on the north and east sides and imperceptible on the west and south sides. The northern and western sections of the pit had almost vertical sides, while the southern and eastern portion had a gently sloping, concave side (Fig. 3.40).

The fills

The trough (C4) had two fills (C5 and C6). The basal fill was a 0.05–0.10 m-thick sandy layer (C6) with frequent charcoal inclusions and occasional small angular stones. The upper fill (C5) was a 0.05 m-thick layer of heat-shattered stones in black silty clay with medium-sized angular stones. It was recorded only on the north-west and north-east sides of the base of the trough pit over the lower fill (C6) and was not visible in section. The upper fill was a result of mound slump, after abandonment of the site, which was then sealed by the peat layer (C1).

Overview

A radiocarbon date of 1270–910 BC (Beta-231647) returned from charcoal retrieved from the lower fill (C5) places the use of this *fulacht fiadh* in the Middle Bronze Age and contemporary with Sonnagh II, IV, V and X, Cloonmeen West, Cloonaghboy IV, Currinah I, II and IV, and Cranmore I (see below). Charcoal retrieved from fill C5 was identified as hazel (71 %), alder (19 %) and blackthorn (10 %). These species are reflective of wetland and dryland environments, with hazel being favoured as a fuel source on this site (Appendix XI). The trough filled naturally with groundwater and required constant bailing during the excavation.

Cashelduff, Co. Mayo

Location

Cashelduff IV was on the southern edge of a deep peat basin that was aligned east–west (Fig. 3.41). The peat was cut by modern drains flowing into a stream along the southern side of the site, which drained into the Coarse River, 3 km north of the site. Higher, dry land bounded the site to the south-west, and a modern forestry plantation lay to the north. A small *fulacht fiadh* with a circular trough was recorded 286 m west of the site, at Fauleens VI.

Cashelduff IV was associated with two small, disturbed burnt spreads, Cashelduff II–III. The southern extent of the Cashelduff IV mound was partly covered by dark brown peat (C12), concentrated on the western extent and the extreme south of the site. Cashelduff III was 2.50 m east of Cashelduff IV, with Cashelduff II 3 m east of Cashelduff III. The identification of these sites suggests that other, unrecorded *fulachta fiadh* may exist in the marshy environment to the south, beyond the road corridor.

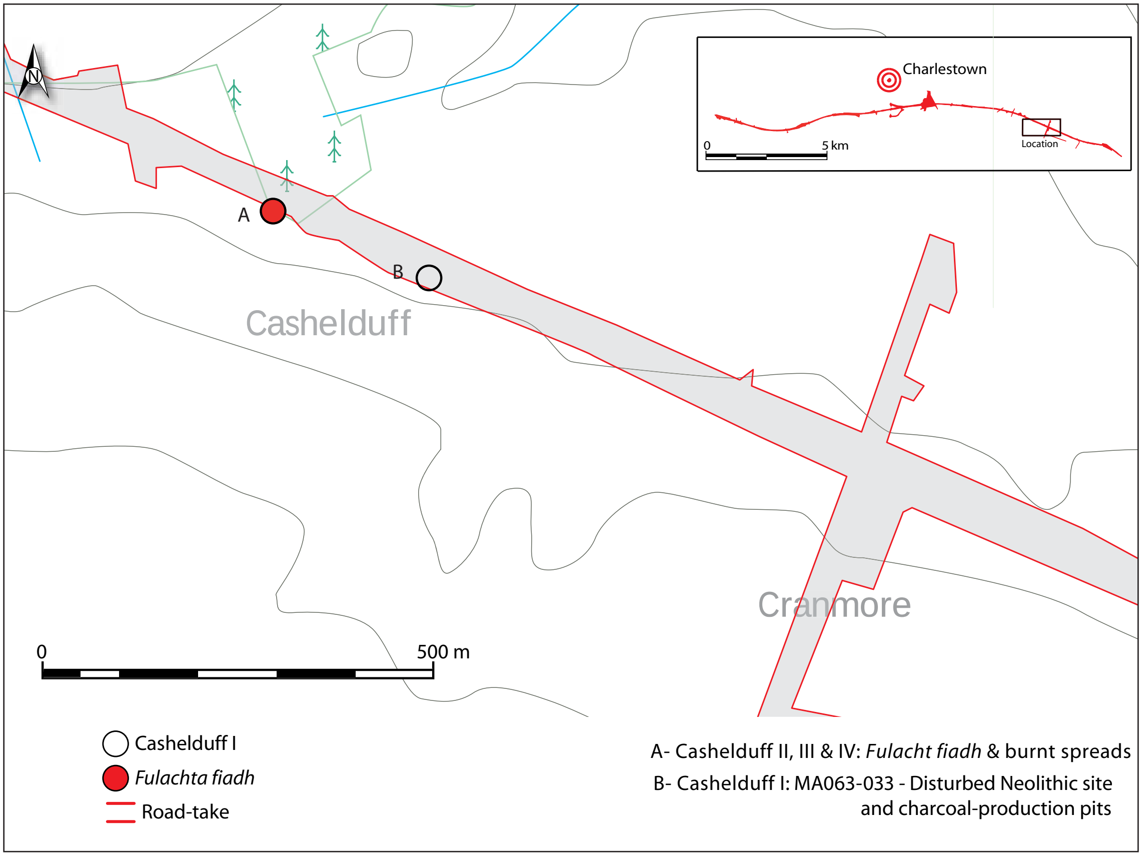


Fig. 3.41—Cashelduff location map.

The mound

The mound was circular and consisted of heat-shattered sandstones in charcoal-rich, black, silty clay (C3). It measured 10.50 m north-west/south-east and was 0.28–0.60 m thick (Fig. 3.42).

The mound was disturbed by a modern drainage ditch at the southern extent of the site and by a north–south-aligned, stone-lined drain on the western side.

The trough

The mound overlay a stone-lined trough, which was sub-rectangular and oriented north–south. The trough (C5) had a U-shaped profile and measured 3 m north–south by 2.41 m east–west and 0.24–0.38 m deep. The trough pit was stepped to accommodate the stone setting of the trough, with reduced dimensions of 1.82 m north–south by 0.86 m east–west and 0.24–0.35 m deep. The trough had a flat, even base with rounded corners, and the trough pit was 0.02 m deeper at the southern end than the northern end (Fig. 3.43). The trough was lined with stone slabs (C6) along the sides and the base (Fig. 3.44; Pls 3.31–2). The stones varied in size from 0.20 m to 1 m and were mainly quartzite and sandstone derived from the vicinity; similar stones were evident

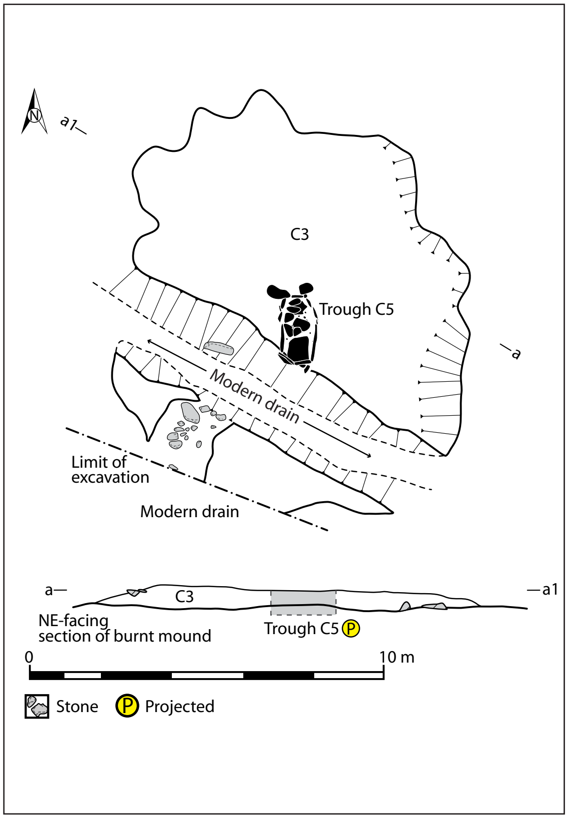


Fig. 3.42 (left)—Casheldu∬ IV: composite plan of fulacht fiadh *mound (C3), showing location of stone-lined trough (C5) and north-east-facing section of mound.*

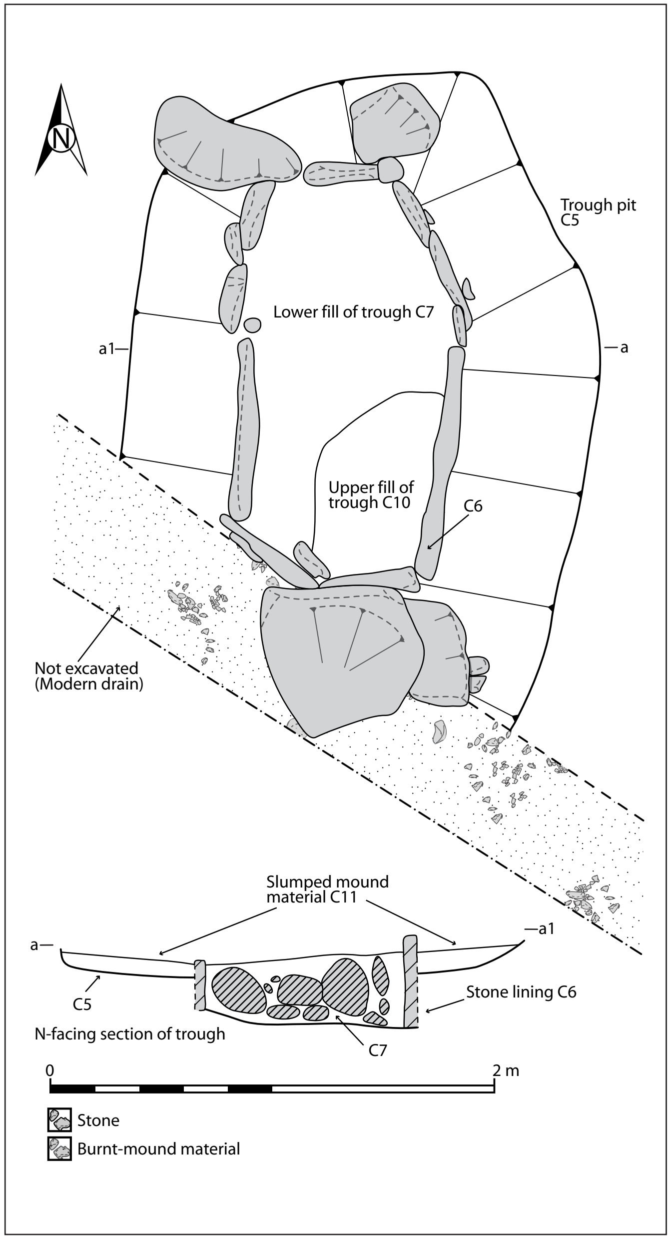


Fig. 3.43 (right)—Casheldu∬ IV: pre-excavation plan and north-facing section of stone-lined trough (C5), showing fills (C7 and C10) and stone lining (C6).

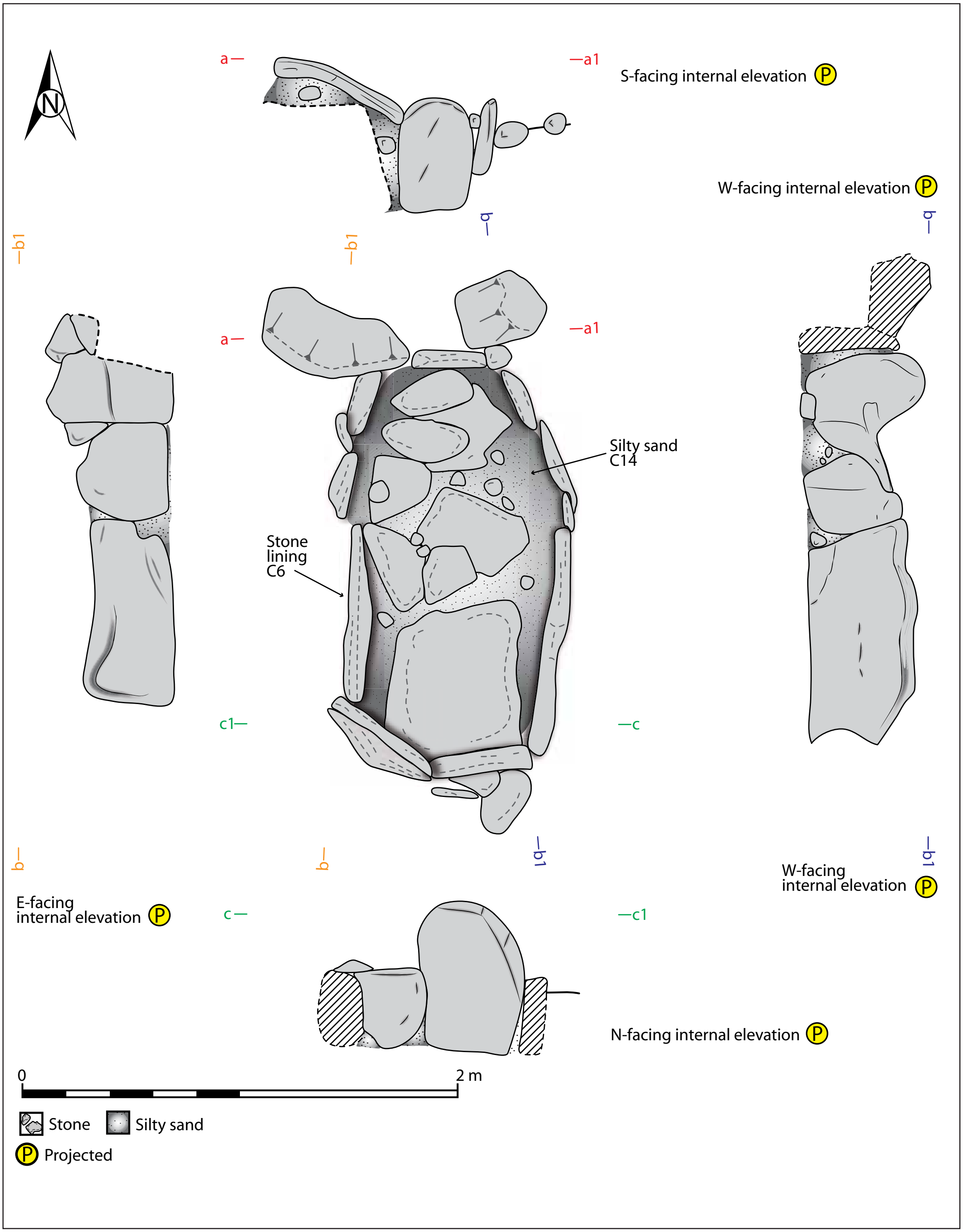


Fig. 3.44—Casshelduff IV: plan of trough pit (C5) showing stone lining (C6), internal elevations and silty sand deposit (C14).

Pl. 3.31—Cashelduff IV: view of stone-lined trough (C5) showing large base and side stones (C6), from the north.

Pl. 3.32—Cashelduff IV, looking south to stone-lined trough (C5), with fill half-sectioned.

protruding from the subsoil. The side stones were set into natural boulder clay, which provided structural support for the trough sides. A 0.05 m-thick layer of grey, silty sand (C14), probably deposited by groundwater, was recorded between and below the base stones (Fig. 3.44). The trough filled naturally with groundwater.

The fills

The stone-lined trough had two fills (C7 and C10). The basal fill (C7) was a 0.21–0.35 m-thick layer of black, charcoal-enriched, silty clay with frequent inclusions of large, sub-angular stones, some heat-shattered (Fig. 3.43; Pl. 3.32).

The upper fill (C10) was a 0.05–0.14 m-thick layer of charcoal-flecked, black peat, with medium-sized to large, sub-angular stones. The peat (C10) overlay the southern end of the basal fill (C7), perhaps indicating that the trough was not cleaned out after use, and a layer of peat grew over the basal clay fill (Fig. 3.43). An irregularly shaped, 0.08–0.30 m-thick layer of heat-shattered stones in charcoal-enriched, silty clay (C11) had slumped into the upper part of the trough pit outside the stone lining (Fig. 3.43).

Overview

Charcoal retrieved from the lower fill (C7) of the trough yielded a radiocarbon date of 793–553 BC (GrN-30772) and places the *fulacht fiadh* in the Late Bronze Age. Charcoal from C7 was mainly oak, ash, holly, alder, elm and willow, reflecting the exploitation of both a dryland and a wetland wooded environment for fuel resources (Appendix XI).

The *fulacht fiadh* trough filled rapidly with groundwater once the large stones in the fill (C7) were removed. The large stones may represent the last heating of water in the trough or, alternatively, may have been backfilled into the trough. The quantity of mound material suggests prolonged use of this *fulacht fiadh*.

Currinah, Co. Roscommon

Location

The general topography was low-lying peat basins rising to small hills, ranging between 160 m and 190 m OD, and intermittent valleys. Drainage was provided by a series of streams that drained into the Owenlobnaglaur River, 1.5 km to the north-east (Fig. 3.45). Three *fulachta fiadh* were excavated in this townland: Currinah I and II had stone-lined troughs, and Currinah IV had a wood-lined trough. Currinah I, a disturbed *fulacht fiadh*, was situated on well-drained, low-lying pastureland adjacent to the bank of a west–east-flowing stream, which marked the townland boundary between Gortanure to the west and Currinah to the east. Currinah II, a small, heavily disturbed *fulacht fiadh* mound was 50 m north-east of Currinah I on a gentle, north-facing aspect of an east–west ridge of well-drained pastureland. The west–east-flowing stream was 5 m north of Currinah II. It was truncated by a north–south-aligned field boundary, which was constructed of sod and stone and topped by a hedgerow and hawthorn trees. Currinah IV lay 0.5 km south-east of Currinah I–II and a charcoal-production pit (Currinah III). The site was adjacent to an

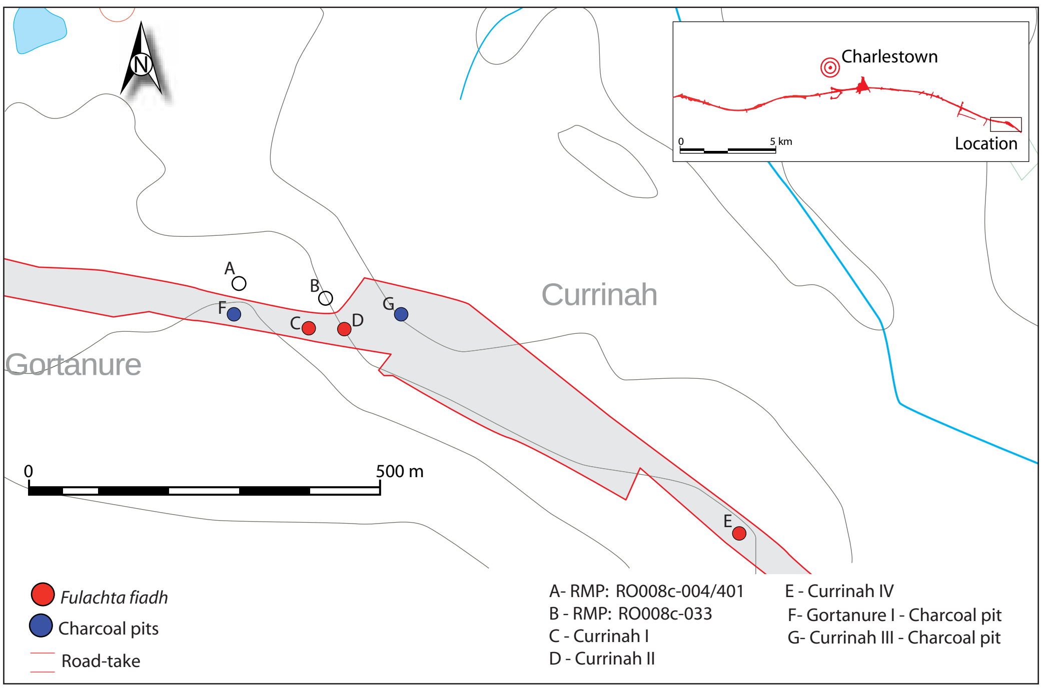


Fig. 3.45—Distribution of fulachta fiadh*, including RO008c-033 and RO008c-004/401, and charcoal pits in Currinah and Gortanure townlands.*

east–west-flowing stream in a peat basin that had been drained and used as rough pastureland. A previously recorded *fulacht fiadh* (RO008c-033) is situated 15 m north of Currinah I–II.

Currinah I

The mound

The *fulacht fiadh* mound (C3) was covered by a 0.20–0.35 m-thick, brown, clayey silt (C1) that had frequent stones (Fig. 3.46). The irregularly shaped mound was a 0.14–0.38 m-thick layer of heat-shattered sandstones in charcoal-rich, black, silty clay. It measured 13.20 m north-east/south-west by 9.30 m north-west/south-east. The mound was truncated at the northern extent by the west–east-flowing stream.

The trough

The mound (C3) overlay the primary fill (C16) of the stone-lined trough (C14) and a group of five boulders (C45). The sub-rectangular trough pit (C14) was partly stone-lined and oriented north-west/south-east. The trough was 2 m long, 1.34 m wide and 0.32 m deep. The base of the trough pit was flat with rounded corners (Fig. 3.47; Pl. 3.33).

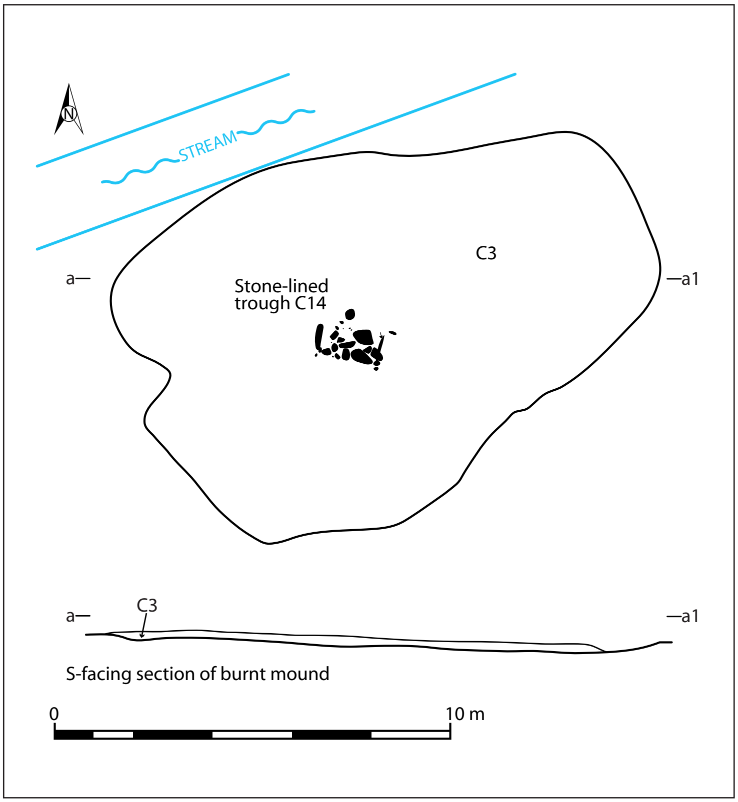


Fig. 3.46—Currinah I: composite plan of fulacht fiadh *mound (C3) showing location of trough (C14) and south-facing section of mound.*

The two end stones (C15) protruded c. 0.10 m over the fill (C16) at the south-east and north-west ends of the trough (Fig. 3.47) and were identified as sandstone. The end stones were placed vertically on their long axes and had similar dimensions: 0.73 m long, 0.32 m wide and 0.06–0.13 m thick.

Eleven post-holes and one stake-hole were cut into the trough pit at the four corners; all were filled by burnt-mound material. These occurred in clusters in each corner, and all were driven vertically into the ground (Fig. 3.48). One circular post-hole (C21) and one sub-circular post-hole

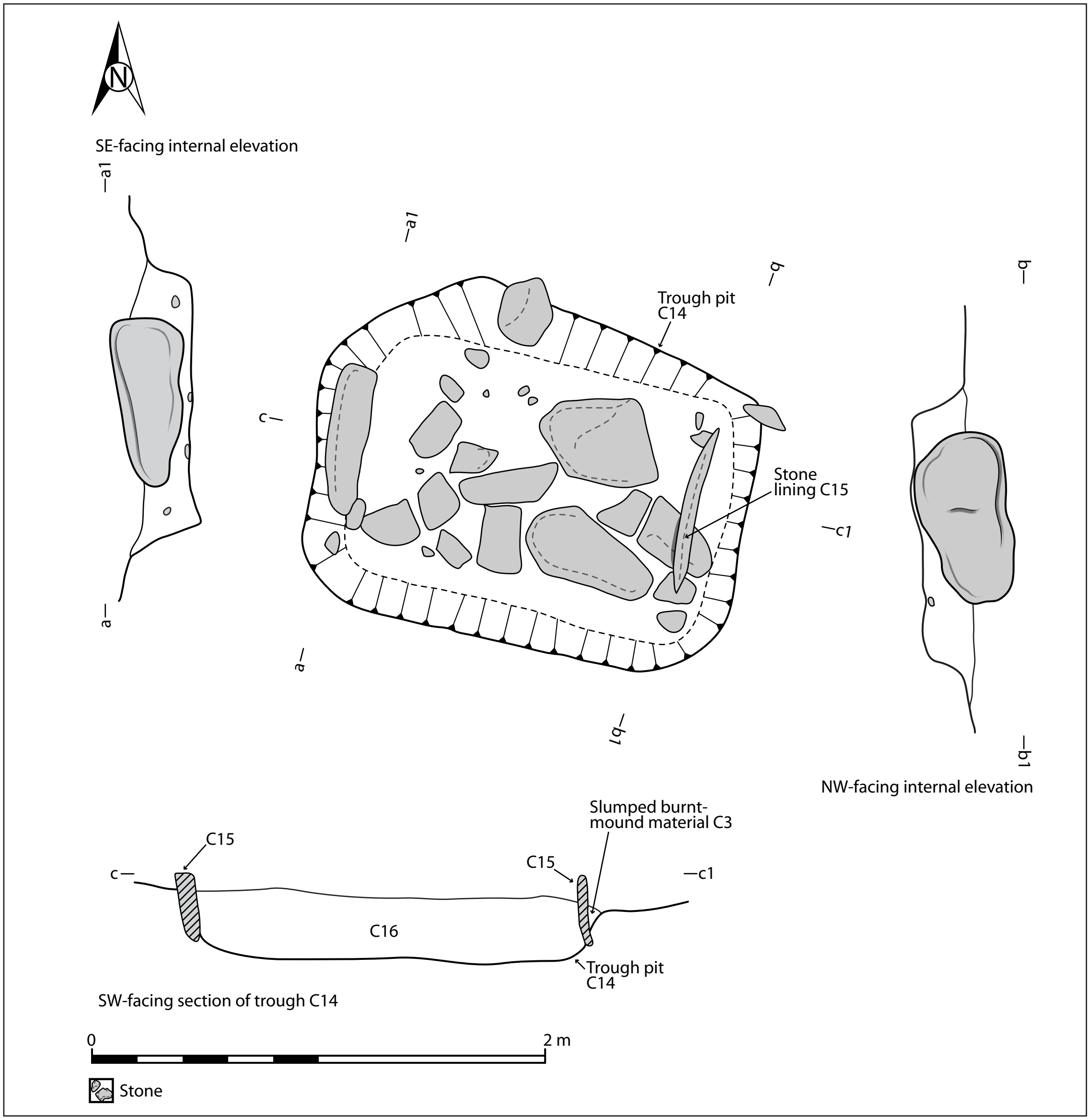
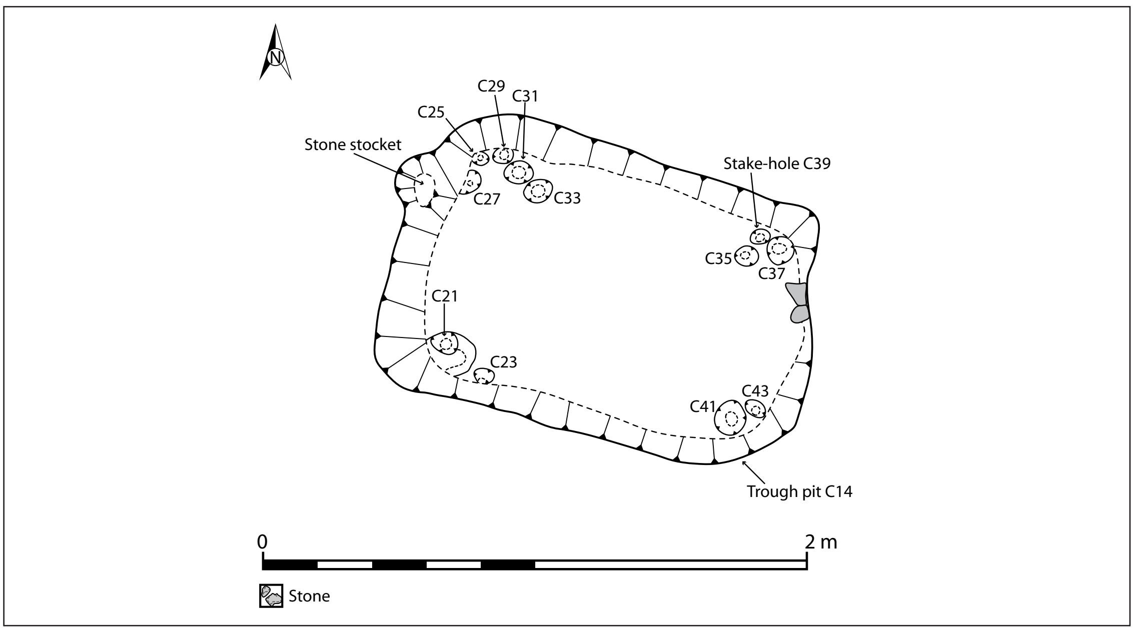


Fig. 3.47—Currinah I: plan and elevations of trough (C14), showing stone lining (C15), and south-west-facing section of trough, showing fill (C16).

Pl. 3.33 (right)—Currinah I: view of stone lining (C15) in trough (C14), looking north-west.

Fig. 3.48 (below)—Currinah I: post-excavation plan of trough pit (C14), showing location of post-holes and stake-hole.



(C23) were positioned in the south-west corner. The north-west corner had five circular post-holes (C25, C27, C29, C31 and C33) clustered in a semicircle. Two circular post-holes (C35 and C37) and one stake-hole (C39) formed a rough triangular pattern in the north-east corner. Two post-holes (C41 and C43) were recorded in the south-east corner.

The basal stone lining (C15) was a mixture of large and medium-sized stones, 0.10–0.50 m thick. The stone lining measured 1.66 m north-west/south-east by 0.86 m north-east/south-west and consisted of basalt and dolerite. The stones were laid horizontally on the base of the trough but did not completely cover it, being set 0.12–0.18 m from the south side of the trough. This suggests that the sides may have accommodated plank lining along the edges. The slumping of burnt-mound material (C3) resulted in the inward displacement of the south-east end stone (Fig. 3.47).

The fill

The fill (C16) of the trough (C14) comprised a 0.32 m-thick layer of heat-shattered stones in charcoal-rich, silty clay (Fig. 3.47). The fill was probably the remnants of the last use of the trough and slumped material from the surrounding mound.

Overview

A radiocarbon date of 839–799 BC (GrN-30770) was returned for charcoal retrieved from the fill (C36) of post-hole C35, placing the use of this *fulacht fiadh* in the Late Bronze Age and contemporary with Currinah IV (see below).

The function of the 11 post-holes and one stake-hole in the trough must have been to secure a wood lining along the sides of the trough pit. The wooden features/elements did not survive *in situ* owing to unfavourable ground conditions.

Groundwater that filtered into the trough during excavation was retained better when the stone lining (C15) was *in situ*. On removal of the stone lining, the water level increased at a slower rate. The stone lining along the base may have functioned almost as a sealing agent, helping to retain water in the trough.

Charcoal retrieved from post-hole C35 was identified as alder (72 %) and blackthorn (28 %). Alder is a widespread native tree growing in wet habitats and is one of the main species found in *fulacht fiadh* material. Blackthorn is as durable as oak and found in all soil types in wood- and scrublands. In woods, blackthorn tends to grow in clearings and on the wood edge, and it is likely that the blackthorn here came from such an environment (Appendix XI).

The mound had also sealed five small boulders (C45) (Pl. 3.34). The boulders were set in a roughly semicircular arrangement, curving from the south-west to the south-east. They may have been the remnants of a mound revetment that subsequently slumped over them, a preparation area for butchering, or for supporting some type of wooden bench or table.

The *fulacht fiadh* mound was overlain by an alluvial deposit (C6) that was cut by seven agricultural furrows. The mound was flattened, probably by agricultural activity.

Pl. 3.34—Currinah I: view of boulders (C45) that were sealed by fulacht fiadh *mound (C3).*

Currinah II

The mound

The mound had been covered by a 0.20–0.35 m-thick, stony, brown, clayey silt (C1). The irregularly shaped, disturbed mound (C46) was a 0.16 m-thick layer of heat-shattered sandstone in charcoal-rich clay silt and measured 5.58 m north-east/south-west by 4.20 m north-west/south-east. (Fig. 3.49). It overlay the trough (C12) and had slumped between the trough pit and the stone lining (C47).

The trough

The trough pit/platform pit (C12) was irregularly shaped with a U-shaped profile. It measured 1.94 m south-west/north-east by 1.88 m north–south and was 0.38 m deep. The pit containing the stone platform measured 1.64 m north–south by 1.46 m south-east/north-west and was 0.06 m deep. The total extent of the trough pit and the platform pit was 3.40 m south-west/north-east by 1.64–1.88 m north–south and 0.06–0.38 m deep. The northern side of the trough pit had a sharp break of slope at the top, with a concave side, and a sharp break of slope at the base. The southern and eastern sides of the trough pit had sharp breaks of slope at the top, with vertical sides, and a sharp break of slope at the base. The trough pit had small projections on the northern and

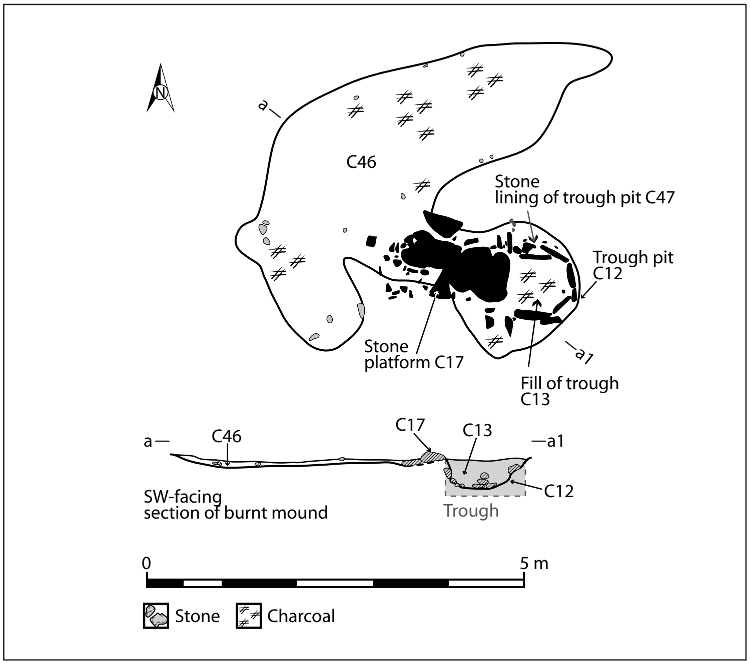
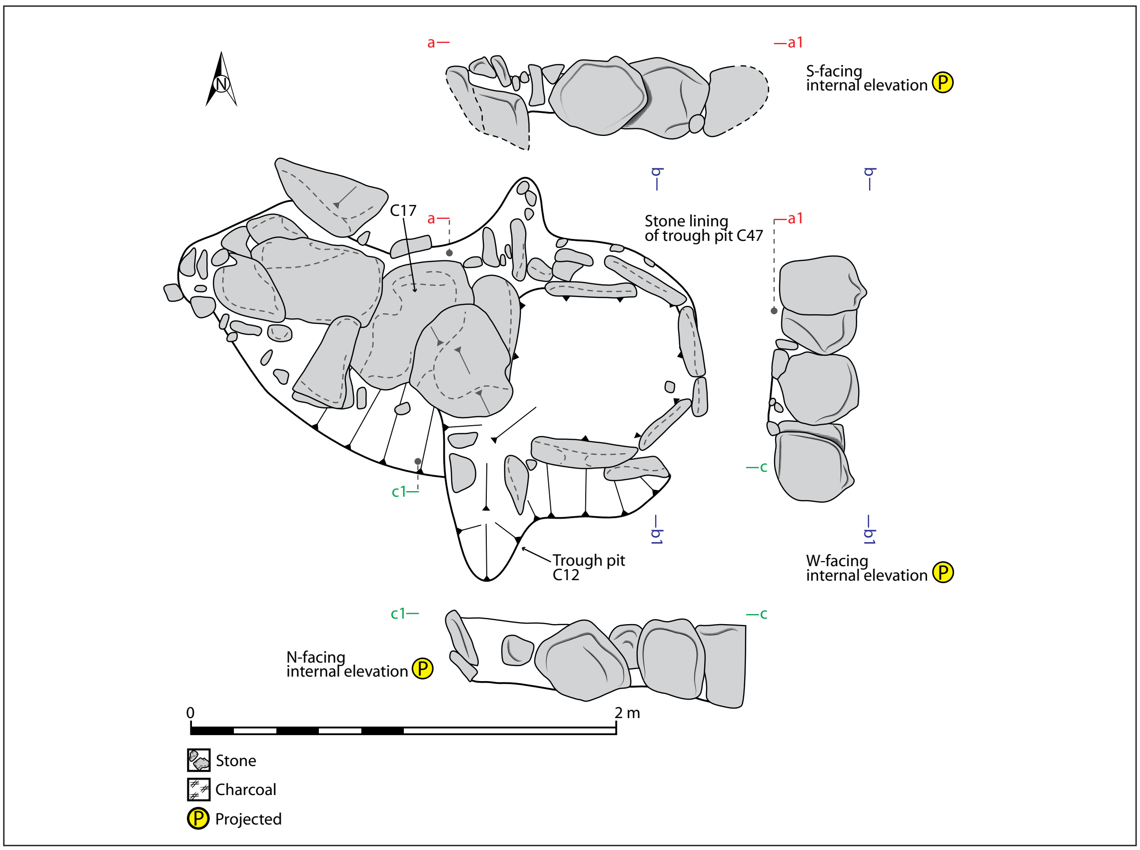


Fig. 3.49 (left)—Currinah II: composite plan of fulacht fiadh mound (C46), showing location of stone-lined trough (C47) and stone platform (C17); and south-west-facing section of mound and trough, showing fill of trough (C13).

Fig. 3.50 (below)—Currinah II: plan and elevations of stone-lined trough (C47) and stone platform (C17).



Pl. 3.35—Currinah II: view of stone-lined trough (C47) showing stone platform (C17) in foreground, looking east.

southern sides. The western side of the trough pit had a sharp break of slope at the top, with a vertical side, and an imperceptible break of slope into a concave base (Fig. 3.50; Pl. 3.35).

The trough pit (C12) had a stone lining (C47) and a stone platform (C17). The stones were both flat and sub-angular and were of sandstone and quartzite. The sides of the trough pit were lined with a single course of upright stones, and the stone platform was composed of a horizontally laid single layer of stones (Fig. 3.50; Pl. 3.35).

The fill

The trough fill (C13) had a U-shaped section and comprised a 0.38 m-thick layer of heat-shattered stones in charcoal-rich, black, silty clay (Fig. 3.49). This fill was probably the result of the trough not being cleaned out after the last use or the slumping of the surrounding mound material.

Overview

Charcoal from C13 yielded a radiocarbon date of 1306–1005 BC (GrN-30769), placing the use of this *fulacht fiadh* in the Middle Bronze Age, contemporary with the wood-lined trough at Currinah IV (see below). On the evidence from the radiocarbon dating, Currinah II was used in the Middle Bronze Age, whereas Currinah I was used in the Late Bronze Age, demonstrating the continued use of the landscape for a similar purpose.

Charcoal retrieved from C13 was identified as hazel (35 %), alder (22 %), oak (14 %), blackthorn (11 %), willow (11 %) and holly (7 %). Oak charcoal was excluded from the species sent for dating. These species reflect both wetland and dryland environments, which were exploited for fuel during the use of the *fulacht fiadh* (Appendix XI). This suggests that hazel was used abundantly as a fuel source, in contrast to Currinah IV (see below), where it was used in the trough construction and not evident in the charcoal assemblage. Hazel as a construction material may have been superseded by stone, and hazel was subsequently used as a fuel source. The trough did not fill naturally with groundwater and may have had to be filled manually from the nearby stream.

Currinah IV

The mound

The irregularly shaped mound consisted of a 0.20–0.33 m-thick layer of heat-shattered sandstone in charcoal-rich, silty clay, measuring 8.40 m east–west by 3.80 m north–south. The mound opened to the south, with a peat-filled (C4) central depression, measuring 3.50 m north–south by 1.20 m east–west and 0.04–0.22 m thick, marking the area of the trough. The mound material extended north beyond the excavation limits and was visible in the south-west-facing section of the cutting (Fig. 3.51).

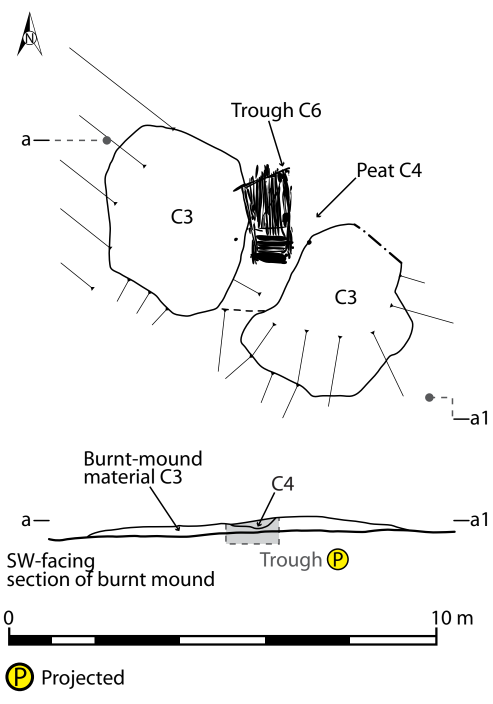


Fig. 3.51—Currinah IV: composite plan of fulacht fiadh *mound (C3), showing location of trough (C6), and south-west-facing section of mound.*

The trough

The mound overlay a well-preserved wood- (C6) and stone-lined (C8) trough, which had a single fill (C5). The trough pit (C7) was rectangular with a U-shaped profile, vertical sides and a flat base. It measured 2.28 m north–south by 1.50 m east–west and was 0.25 m deep. The trough pit had been dug into the underlying peat (C2). The north, east and west sides were constructed of wood, and the south side was enclosed by a large stone (C8). The trough had internal dimensions of 1.70 m north–south by 0.70m–0.90 m east–west and was 0.18–0.25 m deep. The external dimensions were 2.28 m north–south by 1.50 m east–west and 0.30 m deep (Pl. 3.36).

A 0.05 m-thick moss layer (C9) lined the base of the trough pit. It was a coarse, branching moss with a matted texture, and the most abundant species were *Neckera crispa* and *Thuidium tamariscinum*, indicative of a woodland environment (Appendix XIII). The moss was overlain by a similarly sized sandy layer (C10). The two deposits probably acted as a filtration layer for the groundwater welling into the trough. Moss was also packed between the brushwood timbers on the eastern, external side, possibly to act as a caulking agent.

The sides and the northern part of the base were constructed mainly of hazel, with intact bark and a variety of worked ends. The brushwoods at the base were oriented north–south and projected 0.10–0.35 m beyond the north end. They were 1.30–1.80 m long and 0.035–0.05 m in diameter, with similar dimensions for those forming the sides. Eighteen lengths of brushwood

Pl. 3.36—Currinah IV: view of wood- (C6) and stone-lined (C8) trough, looking north.

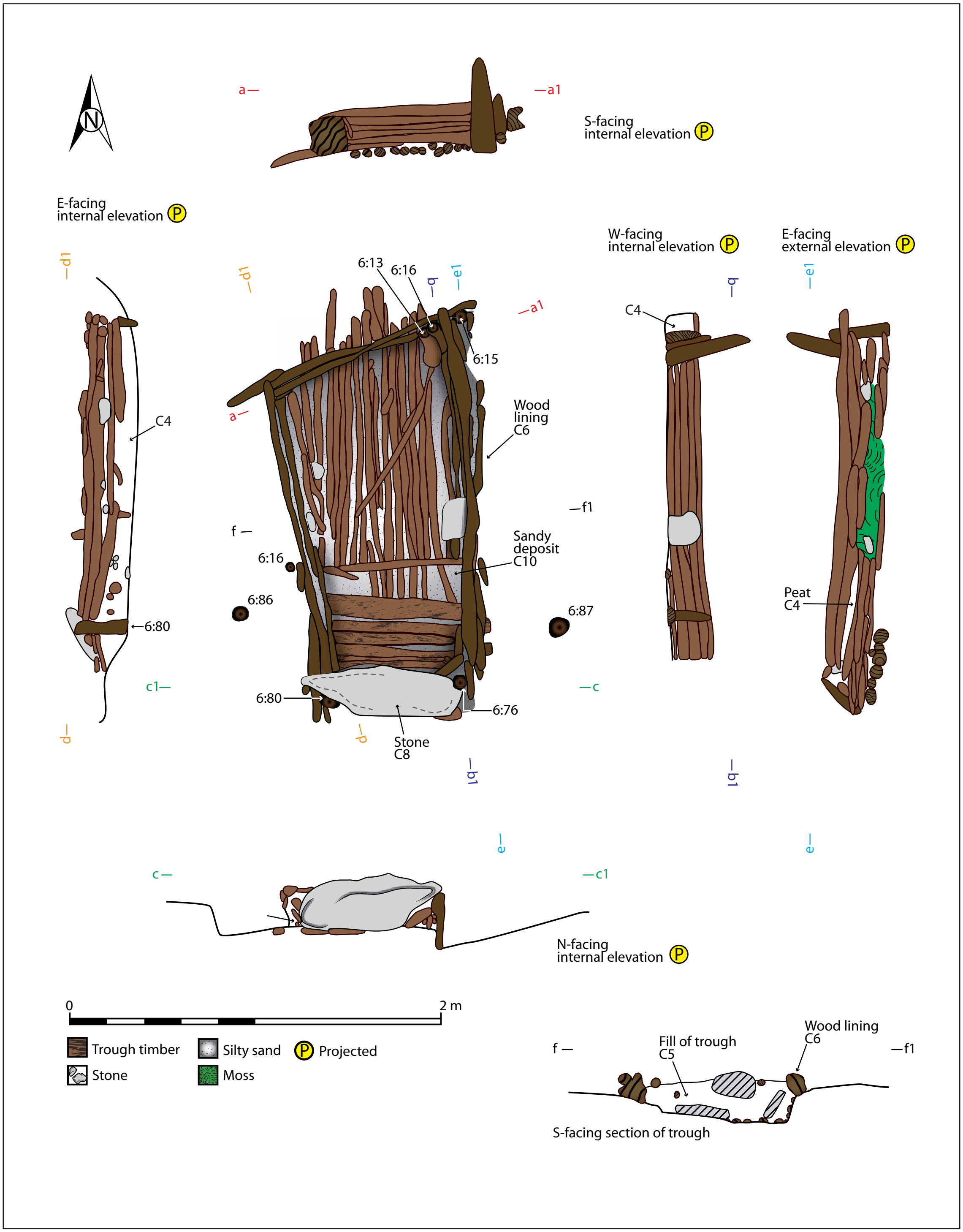


Fig. 3.52—Currinah IV: plan and elevations of wood-lined trough (C6) and south-facing section of trough showing fill (C5).

were used in the construction of the base. The southern part of the base had nine timbers: six split roundwoods (6:62–3, 6:67–8, 6:71 and 6:88) oriented east–west and three hazel rods (6:69–70 and 6:82). The split roundwoods ran perpendicular to the brushwood base timbers and extended under the east and west sides of the trough by 0.10 m (Fig. 3.52; Pl. 3.36).

The sides were constructed of mainly hazel brushwood, laid horizontally north–south on the east and west sides and east–west on the north side. The sides of the trough on the east and west had some double layers of brushwood with intermediary moss lining. Twigs were placed between the brushwood in north-west corner to seal any crevices. The sides were kept in place by carefully arranged posts/stakes, which were placed in the interior or exterior of the corners of the trough (6:15) or along the middle of the east and west sides (6:16). Additional stakes were recorded in the sides, placed in position during construction of the sides and then masked by the upper brushwood layers.

The corner posts were substantial, the largest (6:13) 0.89 m long and 0.10 m in diameter, located on the internal north-east corner. The post had a pencil point and was driven c. 0.50 m into the peat. The south-east exterior corner post (6:76) was 0.59 m long and 0.07 m in diameter, with a pencil point, and was driven c. 0.45 m into the underlying peat. The south-west corner post (6:80) was 0.85 m long and 0.06 m in diameter and was driven 0.50 m into the underlying peat.

The flat end stone (C8) measured 0.60–0.80 m east–west by 0.38 m north–south and was 0.08 m thick. It formed the southern end of the trough and lay at a 45 º angle to the base of the trough. The top of the stone pointed north and rested on the timber sides. It was held in place by two wooden stakes (6:76 and 6:80). The stone was a greyish-white limestone (Fig. 3.52; Pl. 3.36).

Other features included two posts that lay directly opposite each other c. 0.40 m from the external east and west sides of the trough. The west post (6:86) was 0.58 m long and 0.07 m in diameter. The east post (6:87) was 0.36 m long and 0.07 m in diameter, with a pencil point.

A total of 86 wood samples were identified as hazel (66), willow (seven), alder (seven), birch (four), apple-type (one) and oak (one). Hazel comprised 55 horizontal brushwoods and 11 vertical posts/stakes and was by far the most numerous wood type. Willow was used for three posts and four horizontal timbers. Alder was used for two posts/stakes and five horizontal timbers. Birch was used for one post and three horizontal timbers. Oak and apple-type were used for one vertical and one horizontal timber. The nine timbers in the southern compartment of the trough comprised alder (two), hazel (three), birch (one), apple-type (one) and willow (one), and one was unidentifiable (Appendix XI).

The fill

The fill of the trough was a 0.18–0.25 m-thick brown peat (C5) with inclusions of wood, charcoal and occasional heat-shattered stones and larger stones. The large stones were both flat and sub-angular and 0.08–0.31 m long. The fill had evidence of root intrusion, and some of the wood lining of the trough had collapsed over the fill.

Overview

A radiocarbon date of 1208–1049 BC (GrN-30768) was returned from a hazel post (6:86). This places the trough construction and *fulacht fiadh* use in the later part of the Middle Bronze Age, contemporary with Currinah II (1306–1005 BC) and earlier than Currinah I (839–799 BC).

The trough was well constructed, with two different techniques used at the north and south parts, changing from hazel rods to split roundwoods lying perpendicular to the rods. The location of the two posts (6:86–7) either side of the trough was unusual, and they may have been used to support a horizontal timber as part of a spit feature.

The wood assemblage was dominated by hazel (77 %), followed by alder (8 %), birch (8 %), willow (8 %), apple-type (1 %) and oak (1 %). The hazel rods were 0.03–0.05 m in diameter and between six and 12 years old. The hazel samples analysed had evidence for coppicing, as they were straight rods with few side branches, and the tree-rings indicated optimum growing conditions in coppiced woodlands. Hazel trees can be naturally or artificially coppiced to provide straight rods of the same age by cutting the tree down to the base. The hazel used in the trough construction was selected deliberately from coppiced woodland for its size (Appendix XI). The slight change of wood species in the southern part of the trough was also reflected in the different construction from the north end.

Charcoal analysed from the fill (C5) consisted of oak (42 %), ash (23 %), alder (16 %), apple-type (7 %), birch (7 %) and holly (5 %). Oak, alder, birch and apple-type occurred in the wood assemblage, but ash and holly were not present, and oak was only 1 % of the overall wood assemblage (Appendix XI). Hazel and willow were also absent from the charcoal record. This may reflect a very deliberate selection of wood species for use as fuel, with emphasis on the dryland species (oak, ash, birch and holly), larger trees from which wood burned longer; the wetland species of willow and alder were selected for construction as they are more easily worked. This may suggest that fuel was sourced at a distance from the site, while the trough was constructed using species readily available in a wetland environment and from hazel coppices. Hazel usually grows in stands in oak-dominated woods and may have been considered too valuable a resource in its coppiced state to be used as fuel.

A total of 55 pieces of wood showed evidence of woodworking, mainly worked ends (Appendix XI). Over 50 % of the posts had a pencil point end, with an average cutting angle of 35 º achieved by the use of a metal tool. Three complete toolmarks were identified on the worked ends, with an average blade width of 320 mm.

The moss lining (C9) was mainly underneath the base timbers and along the east, external side of the trough. The purpose of the moss lining was potentially two-fold: firstly, to act as a caulking agent and ensure that water was retained in the trough structure and, secondly, to filter the groundwater from the adjacent peat, ensuring that twigs and debris did not enter the trough. The function of the moss lining therefore largely depended on the method used for filling the trough.

After heavy rain, the trough retained water and had to be bailed manually. The trough did not fill with groundwater, but it is possible that it was filled manually from the nearby stream and then allowed to drain over a period of a few days. Alternatively, the water table may have changed substantially owing to agricultural reclamation of the surrounding land in the recent past.

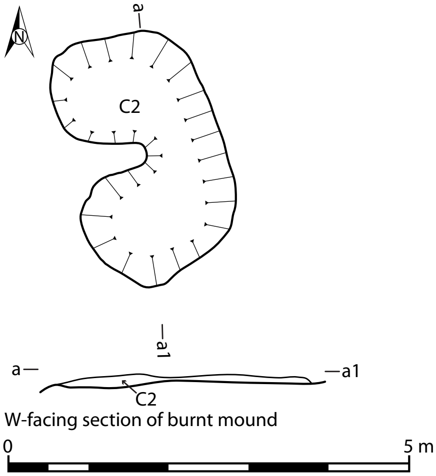
Burnt spreads

One previously recorded site and all newly identified burnt spreads and mounds were initially identified as *fulachta fiadh*; upon excavation, 19 of these lacked any definite trough and were reclassified as burnt spreads. Eleven of the burnt spreads were radiocarbon-dated (Appendix A). The oldest was in Ballyglass West (Chapter 2) and was radiocarbon-dated to the Neolithic period: 3491–2921 BC (GrN-30744). The radiocarbon date ranges for the Tomboholla and Fauleens V spreads straddle the Late Neolithic period and the Early Bronze Age. Cloonaghboy III (Chapter 5), Cloonfane IV and VI and Sonnagh VIII were dated to the medieval period, and the remainder were dated to the Bronze Age.

Burnt spreads remain a problematic site type. The lack of diagnostic finds or features makes interpretation difficult. The broad date range of up to five millennia for the Charlestown spreads suggests a variety of activities carried out in different periods, which coincidentally survive physically as similar remains in the archaeological record. The majority of spreads excavated on the N5 were very shallow and may represent only one or two episodes of burning. These may have been used to heat stones as potboilers or inserted into an animal carcass to cook the meat, or indeed to heat water in the stomach of the carcass, a process used by some Native American Indian tribes. Some of these spreads may have been *fulachta fiadh* that did not retain evidence for a trough owing to later disturbance, or they may comprise mound material redeposited at a remove from the trough. Alternatively, a portable trough made of leather or wood to hold water for heating may have been used on these sites, leaving no trace in the archaeological record. The burnt spread at Sonnagh VI was of identical composition to the adjacent *fulacht fiadh* mound (Sonnagh V) and retained the classic horseshoe-shaped plan, but the central hollow did not contain a trough. The medieval burnt spreads may be the remains of the elusive *fulachta fiadh* referred to in the early Irish texts (Kelly 2000, 337: Ó Néill 2003–4).

Sonnagh burnt spreads

Three burnt spreads occurred in the Sonnagh *fulacht fiadh* cluster, and a fourth was 400 m to the west, in Tomboholla (Fig. 3.10). Two of these sites, Sonnagh VI and VII, were centrally located in the cluster and were dated from alder charcoal to the Middle Bronze Age,1725–1612 BC (GrN-30757) and 1528–1214 BC (GrN-30758). Sonnagh VI consisted of an intact horseshoe-shaped mound of burnt sandstone and charcoal, measuring 6.3 m by 4.2 m and 0.3 m thick and set in peat (Fig. 3.53; Pl. 3.37). Sonnagh VII consisted of two deposits of burnt sandstone and charcoal within 8 m of each other, measuring 12 m by 5.5 m and 0.45 m thick and 10 m by 4.8 m and 0.15 m thick. It is likely that both of these sites were *fulachta fiadh*. Troughs, which did not survive *in situ*, may have been present when in use and subsequently removed or destroyed. As the peat was very wet and soft, it is possible that a pit cut into it would have filled in naturally, leaving no trace. The Tomboholla burnt spread was of similar morphology—oval (4.6 m by 3 m and 0.35 m thick)—and was dated from alder and ash charcoal to the Final Neolithic period, 2831–2299 BC (GrN-30760), roughly contemporary with the Sonnagh III *fulacht fiadh* (see below), which was dated from alder charcoal to 2867–2497 BC (GrN-30754). The fourth burnt spread, Sonnagh VIII,




Looking east to burnt mound (C2)

Fig. 3.53 and Pl. 3.37—Sonnagh VI: burnt spread (C2).

was at the eastern edge of the cluster and produced a substantially later, early medieval date from oak charcoal that was probably from subsequent, unrelated activity. The site included three earth-cut pits and a shallow spread of burnt stone and charcoal.

Sonnagh VIII

Sonnagh VIII was on a gravel rise at the eastern edge of the Sonnagh peat basin, at an altitude of 72 m OD, 20 m east of the Early Neolithic structures and *fulachta fiadh* at Sonnagh II, at the eastern edge of the Sonnagh group (Fig. 3.10).

This site was classified as a burnt spread and comprised a small spread of burnt stone (C5) and charcoal, with three adjacent pits (C3, C4 and C6) cut into the subsoil, in an area measuring 15 m north–south by 10 m east–west. Charcoal from one of the pits that was dated to the early medieval period may relate to later disturbance.

The spread (C5) was at the southern limit of the site. It was irregular in plan and measured 5.5 m north–south by 4.4 m east–west, with a maximum thickness of 0.1 m. It consisted of loose charcoal and burnt stone that rested directly on boulder clay (C2). A shallow, modern field drain cut the southern side.

The three pits (C3, C4 and C6) were to the north of the burnt spread (C5). The largest (C3) was a circular, 1.25 m in diameter and 0.26 m deep. It was filled with loose charcoal and burnt stone resting on a thin layer of sand at the base. Oak charcoal from the fill of this pit produced a radiocarbon date of AD 982–1150 (GrN-30786). This charcoal may be intrusive, or the pit may be a later feature unrelated to the burnt spread.

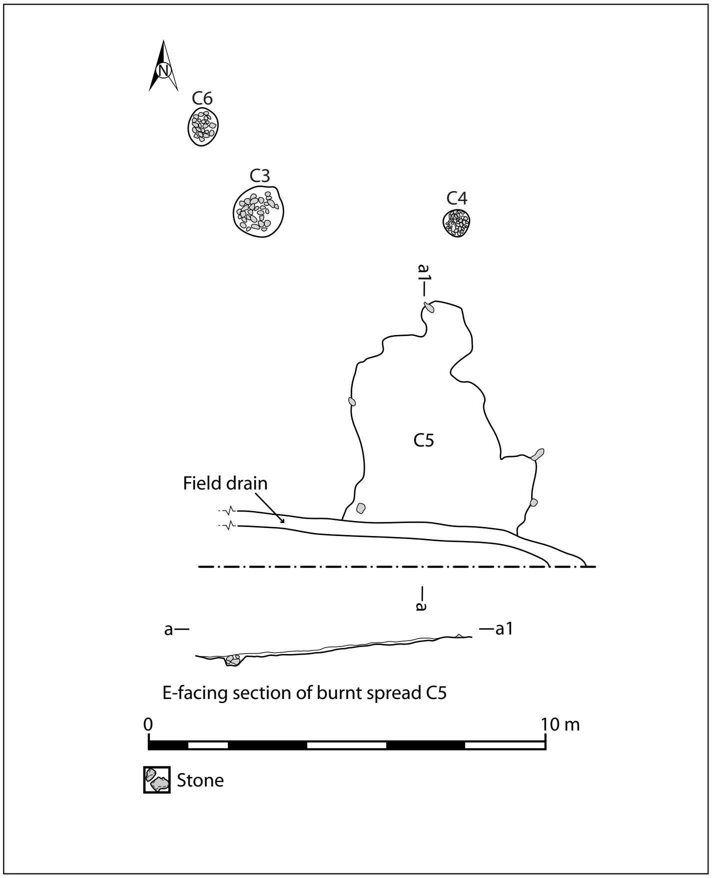


Fig. 3.54—Sonnagh VIII: plan of spread and pits.

Pl. 3.38—Sonnagh VIII: post-excavation view of pit (C3).

The eastern pit (C4) was 4 m east of C3 and 1.5 m north of the burnt spread (C5). It was circular, 1.3 m in diameter and 0.11 m deep, and filled with loose charcoal and burnt stone, with sand at the base, similar to C3. A chert blade (E3526:4:2) was retrieved from the fill of this pit. An outlying pit (C6) occurred at the north-western limit of the excavation, 1.5 m north-west of C3. It was an irregular, concave, circular pit, 0.95 m in diameter and 0.06 m deep, and was filled with dark brown, sandy soil with charcoal and some burnt and unburnt stone. The overlying topsoil was loamy clay, 0.45 m thick, and three chert flakes (E3526:1:1, 3 and 4) were recovered from this (Appendix III).

Sonnagh VIII, despite the much later radiocarbon date returned from one of the features, may have been a prehistoric burnt spread or *fulacht fiadh*, with the adjacent pits a later, intrusive element. The pits were undiagnostic and could have been the result of a variety of functions from cooking to charcoal production. The presence of extensive contemporaneous ironworking nearby in Lowpark suggests charcoal production as a function for the pits. The struck chert artefact from the topsoil was not diagnostic of a particular period. The lithic form could be contemporary with the nearby *fulachta fiadh* or Early Neolithic structures at Sonnagh II, implying redeposition of earlier material that was obscured by later disturbance.

Wood and charcoal analysis: extract from specialist report by Ellen OCarroll (Appendix XI)

A total of 81 charcoal samples were identified to species from excavations along the N5 Charlestown Bypass. The samples were from trough fills, pit fills, post-holes, burnt mounds, burnt spreads, two hut sites, a ringfort/enclosure, a kiln, charcoal-production pits and the multi-period site at Lowpark, Co. Mayo. The date range of the analysed charcoal spans the Neolithic to the later medieval period. In addition, 594 wood samples from 12 *fulacht fiadh*, mainly dating to the Bronze Age, were identified to species and recorded for woodworking evidence.

Thirteen taxa/families were present in the wood and charcoal samples: alder (*Alnus glutinosa*), oak (*Quercus* sp.), ash (*Fraxinus excelsior*), hazel (*Corylus avellana*), blackthorn/cherry (*Prunus* spp), holly (*Ilex aquifolium*), willow (*Salix* spp), heather (Ericaceae), Pomoideae (apple-type), birch (*Betula* sp.), elm (*Ulmus* sp.), pine (*Pinus sylvestris*) and yew (*Taxus baccata*). Alder, along with oak, ash and hazel, dominates the charcoal assemblage, while alder, hazel, ash and oak are present in that order in the wood assemblage. Three artefacts identified as made from yew, oak and ash from the assemblage were also analysed and are discussed elsewhere.

Alder, hazel, ash and oak were more commonly used for the construction of wooden *fulacht fiadh* troughs. Oak, alder and ash were preferred for planks, while a variety of species were used as vertical posts. Alder planks were more apparent in the Sonnagh area, and oak in Fauleens. Hazel dominated in the construction of the probable windbreaks, which were small, wooden (possibly wattle) screens surrounding the working areas of the *fulachta fiadh*, and ash, hazel and alder were mainly used to construct the platforms. Platforms found in association with troughs at *fulacht fiadh* sites may have been for food preparation or other activities. Other taxa available to the inhabitants of the area were willow, birch, Pomoideae, elm, yew, pine, holly, heather and blackthorn. The wood species results show a localised pattern of wood selection whereby certain species dominated at particular sites based on supply at a specific period in time.

Hazel appears to have been used for constructing troughs rather than as fuel for the *fulachta fiadh*, although there was an increase in hazel charcoal in the later Bronze Age periods. Wetland taxa such as alder dominate the firewood used at the *fulachta fiadh*, which is not surprising as alder occurs naturally in wetland conditions close to streams and rivers, and this is where most of the *fulachta fiadh* are sited. There is a definite increase in ash charcoal and wood in the later Bronze Age, which is most likely a reflection of earlier land clearance, with ash subsequently growing in the areas cleared. This phenomenon is also replicated in the annual tree-rings analysed from ash at Sonnagh V, which show that the trees initially grew in relatively good, open conditions but, as they matured, there was competition for light and space.

All of the wood taxa identified from the excavations were native. The wood assemblage analysed here is indicative of a mixed wetland and dryland environment, which is typical for *fulacht fiadh* or burnt-spread sites.

The analyses and recording of the woodworking evidence show that the inhabitants of the area, particularly in the Bronze Age, were accomplished and skilled in the use of metal axes and wood-splitting techniques. Comparison between facets or tool imprints of particular axe types on wood from Early and Late Bronze Age troughs shows that, on average, the facets were wider and shorter in the Early Bronze Age and longer and narrower in the later Bronze Age. The facets in the Early and Middle Bronze Age were concave in profile, whereas the later Bronze Age marks were typically flat to concave, with clean facet junctions. Some stepped facet junctions were recorded from the Middle Bronze Age sites, of which some were ragged, particularly at Sonnagh V. This may suggest an inefficient axe. The evidence above represents the different axe types in use during these periods. The early metal axes and adzes used at the Charlestown Bypass sites were probably akin to the flat bronze axe of the Killaha style, with a slightly splayed edge and only a very slight curvature in the centre (O'Sullivan 1996, 313). The reflection of this axe type can be seen in the jam curves recorded from Fauleens I, Trough B. Base timbers were generally of tangentially split oak and alder planks, which compares well with other trough sites investigated in Ireland. In comparison with the alder and oak planks, the ash timbers were generally half-splits. The ash timbers were possibly of smaller girth, and half-splits would have been the best way of using these timbers in the trough and platform construction.

Chisel points, whereby wood is pointed on one side only, were the dominant end type on the analysed samples from all Bronze Age periods and probably a reflection of basic woodworking and felling techniques rather than a particular trend. Pencil points, where a point is sharpened all over the end, were more dominant in the Early Bronze Age, whereas wedge points (two-sided pointed ends) were more apparent in the Middle Bronze Age. Jam curves from Early Bronze Age axes and adzes were wider and shorter than the Middle and later Bronze Age. Similar signatures on timbers recorded from within a trough and at a woodpile excavated at Sonnagh V indicate that the wood for use in the troughs was manufactured and sharpened at a site closeby.

A triangle, with each side 60 mm in maximum length, was carved into the side of a hazel timber rod from Sonnagh IX. This may be a woodworker's mark. Another possible woodworker's signature, from Fauleens II, was an 'X' mark recorded on an oak base timber. The triangular and 'X' grooves appear to have no obvious function, and a possible explanation for these deliberate marks are that they are symbols denoting a certain woodcutter's work or the mark on the Fauleens II timber may have been to identify the middle timber. Triangular markings were recorded on an Early Bronze Age trackway excavated at Derrindiff, Co. Longford (Moloney et al. 1993, 39).

General discussion

A widespread national distribution of *fulachta fiadh* was identified in the mid-19th century, including crescent-shaped heaps of small burnt stones and various trough types (Hackett 1854–5, 59). This assessment of the national distribution of *fulachta fiadh* has been borne out by more recent archaeological survey, testing and excavation. The database of Irish excavation reports lists 546 *fulachta fiadh*, 120 of which are multiple entries, 204 burnt mounds and 90 burnt spreads (www.excavations.ie: accessed in May 2010). Quinn & Moore (2009, 43) suggest that there are up to 5,000 *fulachta fiadh* in Ireland. Almost 170 additional recently found *fulachta fiadh* have been entered in the NRA Archaeological Database to date (early 2010) (www.nra.ie/Archaeology/NRAArchaeologicalDatabase). Power (1997) put the total at over 7,000.

They comprise mounds of heat-shattered stones and troughs that can be earth- or peat-cut and may have been lined with wood, stone, or occasionally moss or sand. Troughs with combined wood and stone linings also occur. Some *fulachta fiadh* had hearths, pits, platforms and structures such as huts, windbreaks and meat-racks. This extract discusses the excavated *fulachta fiadh* on the Charlestown Bypass with reference to comparable Irish sites on the basis of trough types and associated features.

Rectangular wood-lined troughs

There were 10 wood-lined troughs, rectangular or sub-rectangular, excavated on the N5 scheme. These ranged from the intricate brushwood linings in Currinah IV and Sonnagh I to large, split-timber and plank-built troughs in Fauleens I and Sonnagh IV. Similar-style wood-lined troughs have been excavated in Knockaun, Co. Clare, where a plank-lined trough, measuring 2 m by 1.50 m, was recorded and yielded a date of 1300–930 BC (Murphy 2003). A partly wood-lined rectangular trough was uncovered in Kilmartin, Co. Wicklow, with eight stake-holes at the north-west and south-east corners (Doyle 2003). The wood-lined trough at Currinah IV, with two compartments, was very similar to a trough in Ballycroghan, Co. Down, excavated by Hodges in the 1950s and constructed of oak logs, but no radiocarbon dates are available for this site (Mallory & McNeill 1991, 109).

Fulachta fiadh in the Attireesh–Gortaroe peat basin near Westport, Co. Mayo (Gillespie, forthcoming), provide the closest parallel to the Sonnagh group. The Westport sites were at the edge of or on an inter-drumlin peat basin, with associated wood-, moss- and sand-lined troughs, including both rectangular and oval ones.

Three rectangular wood-lined troughs excavated in Attireesh closely parallel the Sonnagh I trough. Attireesh Areas 1 and 3 had rectangular wood-lined troughs and yielded dates of 1187–971 BC and 2757–2351 BC. A trough in Attireesh Area 2 was lined with moss, sand and interlocking timbers, predominantly of alder and hazel, and was dated to 1256–1050 BC. The Sonnagh I trough measured 1.50 m by 0.85–1.00 m and 0.30 m deep internally, and the Attireesh Area 2 trough measured 1.50 m by 0.90 m and 0.18 m deep internally. If the sides had been higher on the Attireesh trough when in use, their capacities would have been the same. The Sonnagh I *fulacht fiadh* was later (761–414 BC). The Attireesh sites were 50 m apart, and this spatial clustering is similar to that found at Sonnagh.

A Late Bronze Age sub-rectangular trough held in place by corner posts in Farrandreg, Co. Louth (Danaher 2007, 38), can be broadly paralleled in form and structure with Currinah I. Other examples of sub-rectangular troughs include one excavated at Mell 5, Co. Louth, which had dimensions of 2.60 m by 1.80 m and 0.60 m deep (Campbell 2002). A sub-rectangular trough with wood lining was excavated at Drumbo Site 2, Co. Cavan, and yielded a dendrochronological date of 959±9 BC (Murphy 2000b). A sub-rectangular trough partly lined on the base with three alder planks was excavated at Cahiracon, Co. Clare, and had been rebuilt using oak as base and side planks; it measured 2.20 m by 1.44 m and 0.20 m deep (Dennehy & Macleod 2004). In the study area, sub-rectangular troughs were recorded at Cashelduff IV, Currinah I and Fauleens II, fitting in with the general typology of these sites and representing slight variations on the more regular, rectangular troughs.

Trough B, Fauleens I, was of unusual construction. It comprised three large oak planks, one each at the sides and base, with smaller end timbers. A poorly preserved trough in Gortaroe 1, Co. Mayo (Gillespie, forthcoming), with an oak plank over 2 m long forming the base and an upright stone forming the north end, may have had a similar morphology to the well-preserved Trough B.

Circular and sub-circular troughs

Troughs that were circular, sub-circular or oval occurred in association with *fulachta fiadh* less frequently than either rectangular or sub-rectangular troughs. Several examples occur in the wider region, with three circular troughs, at Fauleens VI, Sonnagh III and IX, and one sub-circular trough, at Cranmore II, included in this volume. The earth-cut trough at Fauleens VI is similar to one excavated at Killoran 304, Co. Tipperary, which was an unlined circular trough dating to 2138–1935 BC (Cross May et al. 2005a, 276), putting it earlier than the example at Fauleens, which dates to 1270–910 BC. A circular trough was excavated at Ballyvass, Co. Kildare, with cladding or redeposited subsoil to retain water (Gregory 2001). An oval trough was excavated at Killulla, Co. Clare, and charcoal from the *fulacht fiadh* returned a date of 1400–1300 BC (Murphy 2003).

A sub-circular trough associated with the Gortaroe II *fulacht fiadh* (Gillespie, forthcoming), dated to 2459–2147 BC, provides a slightly later parallel for Sonnagh III, which produced a radiocarbon date of 2867–2497 BC. The troughs had similar dimensions, and both comprised bowl-shaped pits with flat, partly wood-lined bases. These troughs may have had similar functions or methods, differing from the larger, rectangular troughs, or may simply represent smaller-scale activity.

Stone-lined troughs

Four stone-lined or partly stone-lined troughs were excavated at Cloonmeen West, Cashelduff IV, Currinah I and Currinah II. Several stone-lined troughs have been excavated elsewhere in Ireland. A stone-lined trough at Shannakea Beg, Co. Clare, where a sub-rectangular trough was lined with flag stones along the base and side, was dated to 761–393 BC (O'Donovan 2003). The trough at Cashelduff IV had a similar construction and was dated to 793–553 BC. Currinah II, with a stone-lined trough and platform, is similar to the layout of the trough and stepping stones at Ballyvourney I, Co. Cork (O'Kelly 1954, 113). It is unlikely that Currinah II required stepping stones for access as it was sited on dry ground. The platform could also have functioned as a hearth, although the lack of oxidisation or scorch marks on the stone militates against this. The Ballyvourney I trough had a combined lining of wood and stone (ibid., 106–8). The Cloonmeen West trough was partly lined with large flat stones and may originally have been lined fully with stones or partly with wood. Currinah I had stones at both ends and evidence for a wood lining along the sides.

The wood-lined troughs were generally preserved in low-lying peat areas such as the Sonnagh basin and Fauleens, with evidence for wood lining surviving in drier areas, such as Mullenmadoge I and II, in the form of corner stake-holes in the trough bases; stone linings were confined to boulder-clay areas. This probably reflects the practicalities of working in soft peat rather than functional differences.

Moss and sand layers

Sand layers were recorded from Fauleens I, Trough A, Fauleens II, Currinah I and IV, Casheldufff IV, Cloonaghboy IV and Sonnagh V. The base of the Sonnagh V trough contained three distinct layers of sand, between and underlying moss and wood layers, which comprised an effective filter and stable base in soft, wet peat. Sand layers have been recorded in other *fulachta fiadh*, either separately or interspersed with moss. The base of an oval trough in Rathbane South, Co. Limerick, was lined with sand and had an arrangement of 35 stake-holes in the base, which may suggest the presence of wicker lining (O'Donovan 2002). A sand layer was noted between and beneath the wood lining of a trough excavated at Killeens, Co. Cork, and may have been a foundation layer for the trough (Coughlan 2001). A trough excavated at Ballinaspig More 6, Co. Cork, had a layer of pinkish sand on the base that may have acted as part of a waterproof lining, as the trough was cut into gravel (Danaher 2004). A sand layer at the base of a truncated wood-lined trough at Bofeenaun, Lough More, Co. Mayo, was interpreted as exfoliation of heated sandstone rocks on contact with the water (McDermott 1995, 188).

Moss layers and plugging were found in the troughs at Fauleens I–II, Currinah IV and Sonnagh. Moss layers were present in the troughs at Sonnagh I, II, IV and V, three of which had layered bases of wood and moss (Sonnagh I, IV and V). The fill of the circular trough at Sonnagh IX contained a layer of moss that included 22 wicker rods of hazel, which were interpreted as a collapsed lining of moss that had been retained in position by an inner wickerwork lining. Moss as an element of *fulacht fiadh* trough linings was originally identified in Ballyvourney I, where it was interpreted as a coarse filter that prevented the peat from oozing between the timbers but allowed water to run into the trough (O'Kelly 1954, 108). Moss layers have been recorded from other excavated troughs, including Killoran 253, Co. Tipperary, where moss had been used to plug the sides of a wicker-lined trough dating to 1305–940 BC (Cross May et al. 2005b, 273). Moss at the sides and base of a wooden trough at Bofeenaun, Lough More, Co. Mayo, included a moss layer at the base and caulking small gaps between the side timbers. This was also interpreted as a water filter (McDermott 1995). The three troughs at Attireesh, Westport, had moss lining interspersed with sand, which may have functioned as a filter (Gillespie, forthcoming). Similar moss/sand layers were evident at Fauleens I, Trough A, Fauleens II, Currinah IV and Sonnagh I, IV, V and IX. The interpretation of these layers as water filters is tenable, and sand found in trough fills may also be derived from heated stones.

Observations on trough types

It was noted on the Lisheen Archaeological Project that, generally, with some exceptions, circular/sub-circular troughs dated to the Early Bronze Age, square and sub-rectangular troughs to the Middle Bronze Age, and rectangular troughs to the Late Bronze Age (Cross May et al. 2005b, 218). Of the 21 *fulachta fiadh* and 22 troughs excavated on the Charlestown Bypass, four were dated to the Late Neolithic/Early Bronze Age: two circular troughs at Sonnagh III and IX, one oval trough at Cloonaghboy V and the rectangular Trough B at Fauleens I. Thirteen troughs were dated to the Middle Bronze Age. Ten of these were rectangular/sub-rectangular, at Sonnagh II, IV, V and X, Cloonmeen West, Cloonaghboy IV, Currinah IV, Mullenmadoge I and II, and Cranmore II. One, at Fauleens VI, was circular, and two, at Currinah II and Cranmore I, were sub-circular. Five troughs were dated to the Late Bronze Age: rectangular troughs at Sonnagh I, Cashelduff IV and Fauleens I and II, and a sub-rectangular trough at Currinah I.

There is a general trend of circular/sub-circular and oval troughs being early in the chronological sequence, with sub-rectangular and rectangular troughs being later, although there are exceptions. It is possible that the variations in the trough types reflect different functions. The construction of wood-lined/stone-lined troughs in rectangular or sub-rectangular cuts is a great deal easier than in a circular cut, and this may have influenced the type of trough used, although Currinah II had a sub-circular trough lined with upright stones. O'Kelly (1954) in his reconstruction of Ballyvourney I established that trough construction was not an onerous task relative to the projected life and use of a *fulacht fiadh*.

Fulachta fiadh *with stakes/posts*

Stakes and posts were associated with several of the Charlestown *fulachta fiadh*. *In situ* posts and stakes were recorded at Fauleens I, where a windbreak was associated with Trough B on the north-west side, separate from the possible structure at the south end of the trough, and there were random posts/stakes around Trough A. At Fauleens II there may be evidence for a possible covering at the south-east end of the trough, where clustered posts/stakes were recorded. At Sonnagh X there was evidence for one if not two windbreak-type features to the north of the small, disturbed trough. The rectangular platform preserved in the mound at Sonnagh I may have been similar to the butcher's block at Ballyvourney. Other than the above, no evidence for contemporaneous structures occurred in the Sonnagh group. This, combined with a paucity of finds, suggests that most of the activity such as butchery and consumption was carried out away from the *fulacht fiadh*, possibly owing to wet ground conditions. Mullenmadoge II provided the most structural evidence in the form of stake-holes adjacent to the trough; however, no definite structure could be extrapolated from the extant remains.

Many *fulachta fiadh* had associated stake/post formations presenting a variety of structural interpretations. Numerous examples have been excavated across the country. Both Ballyvourney I and II had associated flimsy hut structures, with post-holes interpreted as the remains of a meat-rack and a bed or butcher's block in the hut in Ballyvourney I (O'Kelly 1954). A total of 101 stake-holes were identified in association with Troughs 1 and 2 at a *fulacht fiadh* in Carrowntriela, near Ballina, Co. Mayo. These may represent up to eight successive flimsy hut sites, windbreaks and meat-racks. Smaller arrangements of stake-holes may have held rods for basket weaving (Gillespie 2004). An arrangement of two parallel lines of stakes in association with a pit was uncovered at Coldwinter Site 5, Co. Dublin, which may have formed a fence line or light structure associated with the pit (Campbell 2003). At Ballinaspig More 6, Co. Cork, there was a linear arrangement of stake-holes that may have functioned as a screen (Danaher 2004). A possible windbreak feature was noted at Carstown, Co. Louth, consisting of eight stake-holes adjacent to a trough (Murphy 2000a).

Hearths

Although ephemeral features, some *fulachta fiadh* have yielded definitive evidence of a hearth, such as at Clashroe, Co. Cork (Hurley 1987), and Lecarrow, Clare Island, Co. Mayo (King 2007, 264). Generally, the most convenient place to locate a hearth was on the mound of heat-shattered stones, which provided the driest area around a *fulacht fiadh* site. This is likely to have been the case for the *fulachta fiadh* discussed in this volume, as no definite hearths were present, but charcoal interspersed through the mounds must have come from fires laid on them as they accumulated.

Artefacts

The number of artefacts recovered from excavated *fulachta fiadh* is generally sparse, and a similar pattern emerges with the Charlestown *fulachta fiadh*. A decorated biconical tin bead, unique in an Irish context, and a smaller, degraded metal bead were found in a moss layer below the floor in the Sonnagh V trough. One other item of personal ornament, a bronze ring covered with gold foil, was retrieved from below the trough floor at Killeens I, Co. Cork (O'Kelly 1954, 131). It is likely that these artefacts were lost during trough construction rather than deliberately deposited. The Sonnagh biconical tin bead reflects trade or at least indirect contact between the west of Ireland and Great Britain or possibly continental Europe in the Middle Bronze Age.

The bone and teeth remains, particularly from Sonnagh IX, are indicative of animal husbandry and economy and support a cooking function (see below).

A worked yew rod recovered from Fauleens II may have been used as a mallet or a beater. A much-degraded sub-circular ashwood artefact with a gap on one side, tentatively identified as a handle, rested on the trough base at Sonnagh II. A dowelled oak rod was retrieved from Sonnagh IV.

Lithic artefacts are rarely found at *fulacht fiadh* sites, where other classes of artefacts are also generally scarce, and there are issues of residuality (Cherry 1990) and multi-period use to consider. The small number of undiagnostic lithic finds could derive from a broad chronological timespan. Of note are the single, simple, edge-retouched pieces or 'knife' forms found at Sonnagh V and Fauleens, where the heavily burnt piece may be a plano-convex knife fragment. The presence of these and unmodified pieces at other sites signals cutting and processing activities. While metal was available, stone was still being used for certain tasks or by certain elements of the population at these sites (Appendix III).

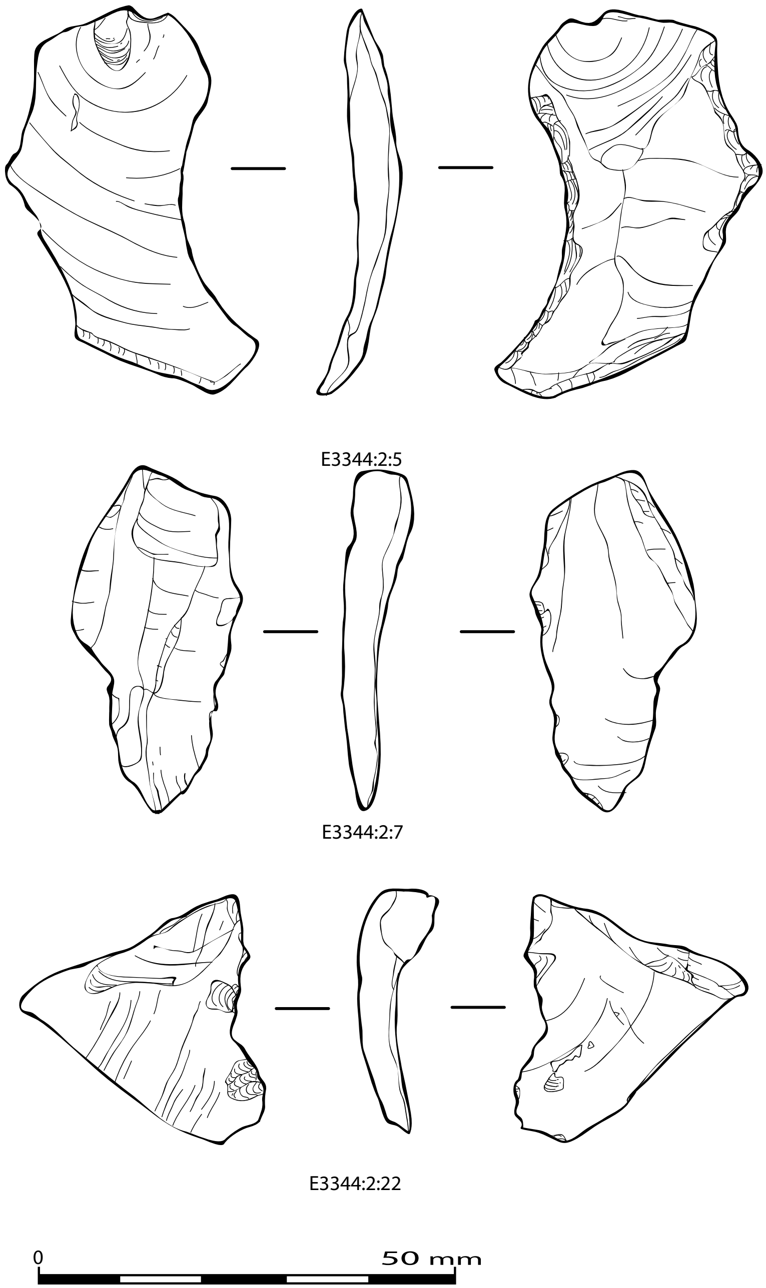


Fig. 3.55—Sonnagh II: lithic artefacts.

Fulachta fiadh *in Irish literature*

The term *fulacht* appears in early Irish texts, but the addition of *fiadh* seems to be a modern, 19th- or 20th-century literary invention (Ó Drisceoil 1990, 158). The word *fulacht* and its derivatives, including *fulucht*, *fulocht*, *folucht*, *inadh fulacht* (cooking place), are found in 59 passages in early Irish literature, ranging from the ninth to the 18th century and encompassing genres such as law-tracts, glossaries, saints' lives, histories, annals and poetry written in Old, Middle and Modern Irish. The term *fulacht* originally meant 'recess' or 'cavity' but later seems to have referred to a cooking place. The language makes translation difficult, and tales may have had a long oral tradition before being committed to paper and may have been embellished and fanciful, not an accurate reflection of the contemporaneous activities that they claim to describe (Ó Drisceoil 1990, 157–8). The term *fulacht* denotes cooking methods, such as a spit, in a cauldron or on a griddle. Further documentary evidence for the use of this method is found in the *Yellow Book of Lecan*, where the terms *fulacht* and *bir* are used for a spit (Ó Néill 2003–4, 80). These methods would not necessarily produce mounds of heat-shattered stone, nor would they require a trough filled with water (Ó Drisceoil 1990, 158).

Geoffrey Keating's 17th-century text *The history of Ireland* describes the Fian (Fianna) using heated stones and water to cook meat and to bathe. This source is much later than the others, and the author has fused the mythical Fianna (Fionn Mac Cumhail), hunting and bathing into an explanation for the use of the most common site types in the landscape (Ó Drisceoil 1990, 161). This is the only text that associates the term *fulacht* with the process of heating stones to boil water. Keating was mainly concerned with creating an origin myth to suit the political climate of the day, with the Old English attempting to forge a separate, 'Irish' identity from the newly arrived English plantation settlers (Ó Néill 2003–4, 81). Another text, *The romance of Mis and Dubh Ruis*, written in the 18th century but based on older material, describes a cooking method also using heated stones and a bathing ritual; it may have been borrowed from Keating or part of an original text, now lost (Ó Drisceoil 1990, 162).

The main problem with literary sources is that they are so much later than the scientifically dated sites, and thus such sources, while colourful, cannot give an adequate or complete explanation for burnt mounds. The medieval burnt spreads at Sonnagh VIII, Cloonaghboy III, and Cloonfane IV and VI are more likely to reflect the historical sources; however, they lack diagnostic features and artefacts.

Pyrolithic technology

There are four aspects to pyrolithic technology: production, apparatus, by-products and produce. Production refers to the process used to achieve the product, in this case the heating of stone to boil water. The apparatus required would be a trough or pit. The by-product of the production is heat-shattered stone and charcoal; and the produce can be cooked meat or heated water. Only the apparatus and by-products of such activity survive on archaeological sites, such as heat-shattered stone, charcoal and troughs. The produce resulting from the production sequence rarely survives (Ó Néill 2003–4, 82) and is absent from the archaeological record except for the occasional finds of animal bone with butcher marks.

The basic processes involved in *fulachta fiadh* were the digging or construction of a trough that was filled naturally or manually with water. Stones were heated in a fire and then placed in the trough to heat a large volume of water. Wooden shovels or implements fashioned from cow/deer scapulae were probably used to remove the stones from the fire. One such wooden shovel was recovered from a *fulacht fiadh* at Balltbar Lower, Co. Carlow (Hackett 2006, 7). Stones were periodically added to maintain the water temperature required.

Petromorphology experiments were carried out on different rock types to record the number of heatings/dowsings required for the stone to shatter completely. Several tentative conclusions were inferred from these experiments, including that sedimentary rock types, such as limestone and sandstone, produced more waste than either igneous or metamorphosed rock (Buckley 1990a).

It has been noted that limestone shatters on contact with hot water, forming calcium hydroxide, and leaves a scum on the water surface, making it unsuitable for cooking (Cross May et al. 2005b, 219). The presence of limestone in mounds would therefore suggest that an activity other than cooking may have occurred on these sites, although O'Kelly (1954, 117–22) wrapped the meat joint in sugan in his experiment to keep it clean, and this method may have been used in limestone areas. The excavation of a *fulacht fiadh* at Fahee South, Co. Clare (Ó Drisceoil 1988), was in the Burren, and limestone was used here. The presence of animal bone from this site suggests that the use of limestone and cooking on a site were not mutually exclusive. The heat-shattered stone from the *fulachta fiadh* excavated on the Charlestown Bypass was almost exclusively sandstone and quartzite, with no limestone present. This supports a cooking-site interpretation.

Functions of fulachta fiadh

The widespread interpretation of *fulachta fiadh* as temporary cooking or camping places of hunting groups was based on an examination of literary sources and experimental reconstruction of the cooking methods carried out by O'Kelly (1954). This was the first attempt to recreate the cooking methods and proved to be highly successful. The excavation of a *fulacht fiadh* at Ballyvourney I, Co. Cork, yielded a trough, a hut site and other features, which were reconstructed to allow the experiment to take place. The trough was relined with new wood and filled with water. It took 35 minutes to bring 454 litres of water to the boil, and three hours and 40 minutes to cook a 4.5 kg leg of lamb, wrapped in straw (ibid., 117–22). Other, similar experiments have taken place, with similar results (Lawless 1990; Lawless et al. 1995, 47–51).

Faunal remains from excavated *fulachta fiadh*, though known, are limited. A large assemblage of animal bone was associated with wood from a possible trough sealed by a burnt mound in Ballinrobe demesne, Co. Mayo. Of the 200 pieces of bone retrieved, 49 were identified to species, mostly cattle, but pig, horse and red deer were also represented (Walsh 1995a). A *fulacht fiadh* at Coolroe, Co. Mayo, yielded some animal bone, including deer, pig and cow, with butcher marks providing evidence for the cooking interpretation (Gillespie 1998). Another site, at Fahee South, Co. Clare, yielded five cattle teeth and two bone fragments, one deer tooth, two deer antlers, one horse mandible and tooth, and over 30 unidentifiable animal remains. The horse mandible had chop-marks, and two other bones showed similar markings (Ó Drisceoil 1988, 675–6). More recently, two *fulachta fiadh*, Caltragh 1 and 2, excavated on the Sligo Inner Relief Road, yielded animal bone, some with butchery marks (Danaher 2007, 21–2). Animal bone was retrieved from Sonnagh IV and IX. A single charred piece of bone was recovered from the moss layer beneath the basal timbers of the trough of Sonnagh IV. The fragment is likely to be a partial rib of a small to medium-sized mammal. This provides evidence that cooking took place in the vicinity of the *fulacht fiadh*, as the ribs of an animal are among those parts bearing reasonable quantities of meat and marrow for consumption. Pig jawbone fragments and teeth were retrieved from the Sonnagh IX trough. Analysis of these showed that they could all have come from a single male individual aged 17–19 months. The size of the teeth was in line with those of domestic rather than wild pig (Payne & Bull 1988). As pigs are kept only for meat, the majority are usually slaughtered as they approach full size, with only a few sows and even fewer boars retained for breeding. Piglets were normally born during the spring, and relatively few needed to be retained, compared to cattle and sheep, because pigs will produce a litter of eight or 10 piglets at a time, compared to one or two calves and lambs per year. The age of 17–19 months would suggest that the pig was slaughtered during the autumn of its second year. A pig of this age would be approaching full size and therefore the optimum age for slaughter. The presence of the head of a pig may suggest the use of the *fulacht fiadh* for cooking or some aspect of the processing of carcasses, such as preservation of meat or hide processing (Appendix IX).

Elsewhere, there is a paucity of faunal remains recorded from excavated *fulachta fiadh*, but this may be the result of acidic environmental conditions or the ritual disposal of the bones after consumption (Waddell 1998, 177). Furthermore, as ground conditions around these sites were not attractive for outdoor eating, the food may have been consumed elsewhere, and the remains were unlikely to have survived scavenging by dogs or wild animals (Grogan 2005, 41).

The fact that cooking can take place successfully on these sites is not conclusive evidence that it was the only process carried out at *fulachta fiadh*. The use of the troughs and heated water as part of a bathing ritual involving dry heat or water to produce steam has ethnographical and historical parallels (Barfield & Hodder 1987, 374). Dry bathing involves the heating of stones in a fire, which are placed in a tented structure, or the stones may be heated in a pit, the ashes removed and a small superstructure erected over the spot. Steam baths are documented in southern Europe during the first millennium BC, with the addition of various herbs and hallucinogens for increased enjoyment. Such baths may have both a practical cleansing function and a ritual function in a society (ibid., 373–5).

The small hut sites recorded at Ballyvourney I and II (O'Kelly 1954) and Drombeg (Fahy 1960) are not sufficient evidence in an Irish context to infer the function of excavated *fulachta fiadh* as sauna/steam-bath sites, although this may have been a secondary function (Ó Drisceoil 1988, 678–9). One oval arrangement of stake-holes at the Early Bronze Age *fulacht fiadh* in Carrowntriela, Co. Mayo, supported a flimsy structure that partly covered a trough and could have functioned as a sweathouse (Gillespie 2004). An adjacent, deeper pit, interpreted as a well, could also have been used as a pool for bathing. *Fulachta fiadh* with sweathouses and associated pits and pools were excavated in Rathpatrick, Co. Kilkenny (Eogan 2007), Ballykeoghan, Co. Kilkenny (Laidlaw 2008), and Scartbarry, Co. Cork (O'Neill 2005).

The concentration of stakes/posts adjacent to Trough B at Fauleens I, which may have supported a lightweight superstructure made of animal skins or branches, is suggestive of such bathing practices. The majority of excavated *fulachta fiadh*, however, have no evidence of such structures, except rudimentary windbreaks. Of the 21 *fulachta fiadh* excavated on the Charlestown Bypass, only Trough B at Fauleens I and Mullenmadoge II had evidence for any structure other than windbreaks. The elaborate nature and construction of some of the troughs would also suggest that producing steam was a secondary consideration, with the main function of the trough being to retain water. Probably the most efficient method to produce steam is to pour water over hot stones, which would not require a trough.

Large quantities of heated water or stone would also have been required for various processes, including fulling, dyeing, leather-working and brewing (Barfield & Hodder 1987, 371). Fulling cloth results in a thicker, semi-waterproof cloth and requires both heated and cold water and a detergent. Dyeing cloth involves immersing it in hot water with the dyeing agent, which could be berries, mosses or bark, producing dyes when boiled. The necessities of water, both hot and cold, a tub or receptacle, and a heat source are all characteristics of a *fulacht fiadh* site (Jeffrey 1991, 97–102). Again, conclusive evidence for these processes occurring on *fulacht fiadh* sites is lacking, as such activity would leave little trace in the archaeological record. Quinn & Moore (2009) established that *fulachta fiadh* could have functioned in the brewing process, with the trough used as a vat to heat a grain mash to prepare it for fermentation. This is unsupported by archaeobotanical evidence but is a legitimate theory.

A recent theory has been proposed that *fulachta fiadh* would have functioned effectively as a means of separating fat from meat during cooking. Fat would have been used for leather processing, waterproofing woollen garments, and making soaps and candles. Fat would have been a hugely important dietary component in prehistory, returning 39,000 joules of energy per gramme, as opposed to a yield of 17,000 joules per gramme for carbohydrate or protein (Monk 2007, 22). Therefore, the collection of fat from cooked meat would have been of vital importance. Boiled meat results in the fat forming a layer on the surface of the water, and it could have been skimmed off, stored in receptacles (Monk 2007, 23) and used for the purposes discussed above.

In summing up the results of the five sites excavated at Ballyvourney and Killeens, O'Kelly (1954, 137) noted that, despite the variations in detail and different dates, there was 'an essential sameness' about them all. Succeeding decades of excavations have added different details and expanded the chronology considerably, but this essential sameness has remained. The use of the *fulachta fiadh* described in this volume continued over a period, possibly intermittently, of c. 2,000 years This enduring continuity of practice must reflect a relatively stable society, as well as the effectiveness of this technology. The later, medieval burnt spreads left a similar residue but must represent a different activity.

Despite extensive excavations of *fulachta fiadh* across Ireland in the last decade or more, no definitive function can be attributed to them. Now shown to be part of a rich Bronze Age landscape, their interpretation as transitory camps seems to have lost credibility. The cooking hypothesis remains strong but has been challenged in recent years with theories on their use for textile processing, brewing, leather-working and a myriad of other functions. Most likely, they were part of everyday life in the Bronze Age, used for the preparation and cooking of communal feasts, ritual bathing, purification rituals and many other activities. The prevalence of this site type in the Irish landscape supports the idea of daily or seasonal use, with a rotation from site to site, as some became unusable owing to rising water tables or the expansion of wet peat, and the re-use of such sites repeated through the millennia.

Artist's reconstruction of cooking at a fulacht fiadh *based on the excavations at Sonnagh IV (Fergus Niland).*

4
A MULTI-PERIOD ARCHAEOLOGICAL COMPLEX AT LOWPARK

Richard F Gillespie

Introduction

The multi-period site at Lowpark, Co. Mayo, was discovered during test-trenching of the road corridor in 2005, in an area devoted to pasture on a small prominence. There were no above-ground indications of the complex that was to be revealed through subsequent excavation, a site that was to show settlement and ritual activity from the Early Neolithic period through the Bronze Age, Iron Age and medieval periods.

Located 600 m east of the Neolithic structures at Sonnagh II (Chapter 2), Lowpark's earliest phases of activity also belonged to that period, with a series of Early Neolithic pits that produced pottery and lithic assemblages (Lowpark, Phase 1 (i)) and part of a Late Neolithic timber circle and a large assemblage of Grooved Ware pottery (Lowpark, Phase 1 (ii)).

Bronze Age features in Lowpark (Phase 2) consisted of a single cremation burial associated with fragments of three Food Vessels, one of which is a characteristic Vase form. This burial was a later insertion through an Early Neolithic pit, and their fills were intermixed. A second large pit in this area also returned a Bronze Age date.

The subsequent phases ranged from the Iron Age to the end of the early medieval period. Phase 3 comprised ironworking features including three to four workshop structures and several ironworking pits with anvil/crushing stones, tuyères and a large quantity of iron slag. The main

Pl. 4.1—Lowpark, during excavation, from the west.

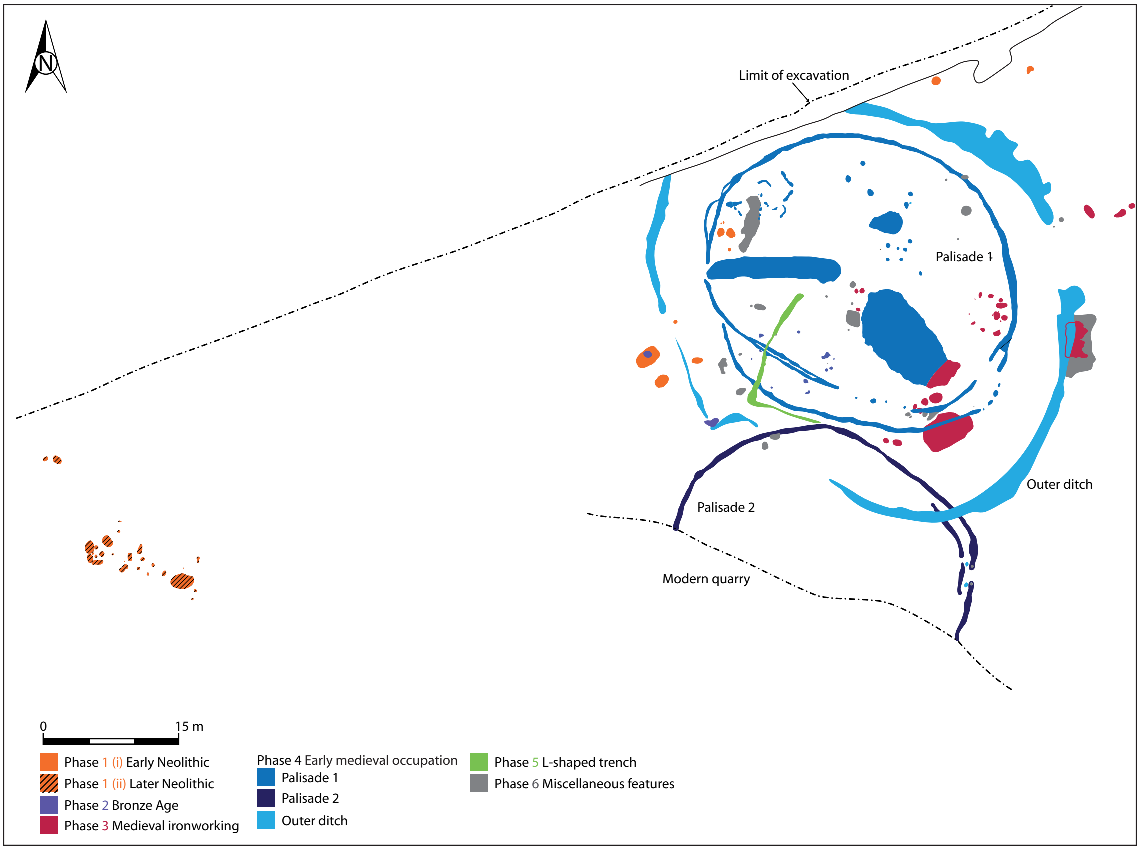


Fig. 4.1 (above)—Lowpark: plan of archaeological Phases 1–6.

Pl. 4.2 (right)—Lowpark: aerial view of excavations (photo: Markus Casey).

phase of occupation, Phase 4, overlapped with Phase 3 and ranged in date from the later Iron Age to the end of the early medieval period. This phase included two palisade trenches, a poorly preserved ditch, two souterrains, a stone-lined, keyhole-shaped pit, a roundhouse and a smaller, rectangular structure. Phase 5 was stratigraphically later and consisted of an L-shaped slot-trench, which may represent a large, rectangular structure. Phase 6 included several miscellaneous pits, some of which may have been the remains of an oval structure. A medieval cereal-drying kiln in Ballyglass West was 250 m east of the Lowpark enclosures and may have been contemporary with the final occupation at Lowpark.

The previously unknown archaeological complex at Lowpark chronicles the use of the landscape and its resources over roughly five millennia.

Phase 1: the Neolithic period

The Neolithic remains at Lowpark identified during this excavation can be divided into two separate phases based on radiocarbon dates and pottery types: the Early Neolithic Phase 1 (i), and later Neolithic Phase 1 (ii). These divisions were reflected on the ground as two distinct groups of features. The Early Neolithic features, a series of pits that contained pottery and lithics, occurred to the east and are likely to have been part of a once-larger Neolithic site that was disturbed by the subsequent phases of activity and that may, indeed, extend beyond the limit of excavation. A burnt stone spread (Ballyglass West I), 300 m east of Lowpark, produced a Middle to Late Neolithic date range, placing its use between the Neolithic phases evident at Lowpark.

The later Neolithic features at Lowpark consisted of a close grouping of pits and post-holes that survived in a confined area 40 m west of the main enclosures. These included two arcs of post-holes that were probably part of a timber circle and a series of larger pits. The artefact assemblage from this area included a large assemblage of Grooved Ware pottery, lithics, a polished stone axehead, burnt bone and some charred plant remains, all of which parallel artefact assemblages from other timber circles (see discussion, below).

Phase 1 (i): the Early Neolithic period

This phase of the Lowpark archaeological remains consisted of two pits and a small scatter of lithics north-east of Palisade 1 and two large pits within the Palisade 1 enclosure in the north-west quadrant that were dated to the fourth millennium BC. Four pits south-west of Palisade 1, in the general area of the large Bronze Age pit (C546), are also included in Phase 1 (i). A similar date was also returned from the fill (C528) of a pit containing Neolithic and Bronze Age pottery (Phase 2), indicating probable disturbance of a Phase 1 Neolithic pit.

These features were probably part of a larger Neolithic site. Further contemporaneous features may be extant beyond the limit of excavation or may have been destroyed by later activity. There was intensive disturbance in the excavation area by medieval and modern activity. These later phases included enclosures, early ironworking structures and substantial souterrains. There was a relatively modern boundary ditch immediately to the north of the site, frequent cultivation

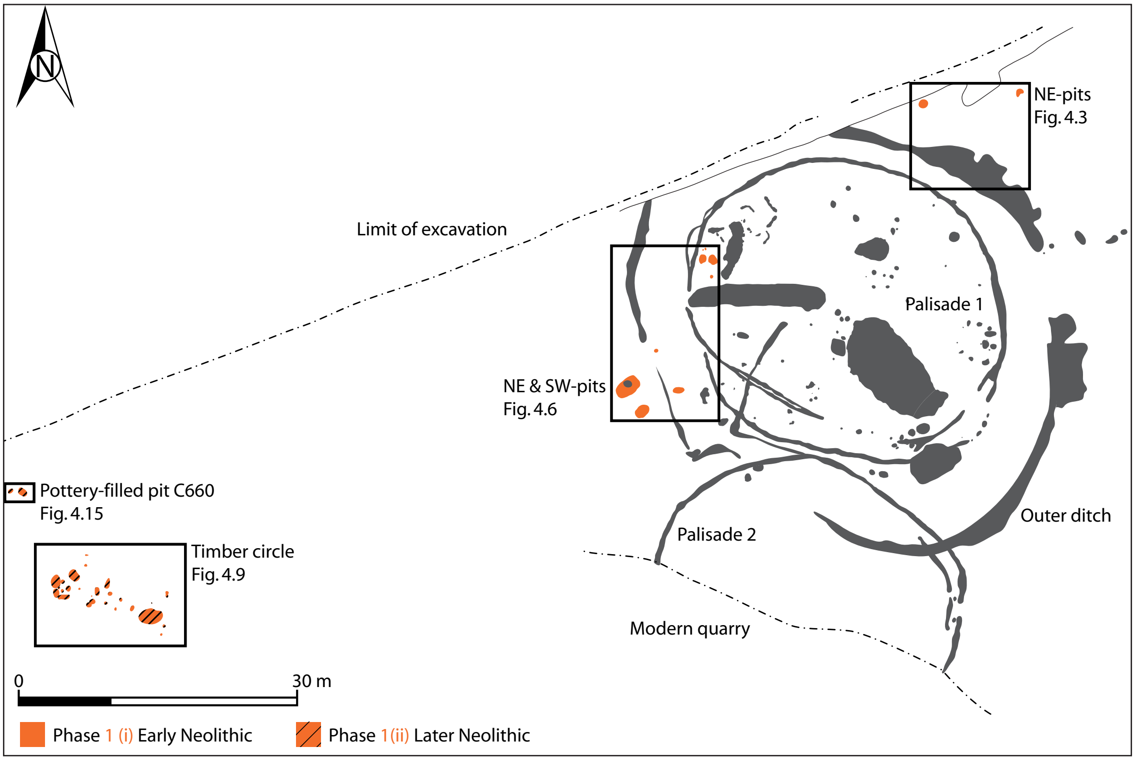


Fig. 4.2—Lowpark: plan of Neolithic phase.

Pls 4.3 and 4.4—Lowpark: lithics from general area of Phase 1 Early Neolithic features (photos: Jonathan Hession).

furrows, and rabbit burrows in the northern part of the excavation area. Displaced lithics and a miniature polished stone axehead found in later features and topsoil suggest more extensive Neolithic features that were subsequently destroyed.

The north-eastern pits

Two pits (C107 and C112; Figs 4.2–3), 8.6 m apart, containing Early Neolithic artefacts were excavated adjacent to the northern boundary ditch (C105), which was also the northern extent of the road corridor. The construction of the boundary ditch and relatively modern agricultural activity must have disturbed additional Neolithic features in this area, as *ex situ* lithic artefacts were recovered from the boundary ditch (C105) fill adjacent to these pits and further *ex situ* lithics were recovered throughout the excavation area. A radiocarbon date of 3701–3641 BC (GrN-30846) was returned from hazel and alder charcoal from the upper fill (C108) of the western pit (C112).

The eastern pit (C107) was sub-circular, measuring 0.53–0.47 m in diameter, and 0.12 m deep. It had gradually sloping, irregular sides and an uneven, concave base. It contained a single fill of charcoal-rich, mid-brown, silty sand with moderate inclusions of small stones and pebbles (0.03 m in diameter). A leaf/lozenge-shaped, slightly weathered, chert arrowhead (E3338:107:34; Appendix III) was retrieved from the surface of the pit fill.

The western pit (C112) was sub-circular, measuring 0.85–0.9 m in diameter, and 0.36 m deep. It had gradually sloping, concave sides and a flat base. The lower fill (C111) was charcoal-rich, yellow, silty sand, 0.14 m-thick, interspersed with small stones and inclusions of charred hazelnut shell fragments. This fill contained a lithic assemblage of eight pieces, including a distinctive, green–brown, chert double side-scraper (E3338:111:38), a convex scraper on a black chert core tablet and another end-scraper. There was also a core fragment of matt-black chert and a thick,

Pl. 4.5—Lowpark: pit (C112) with fills (C108 and C111).

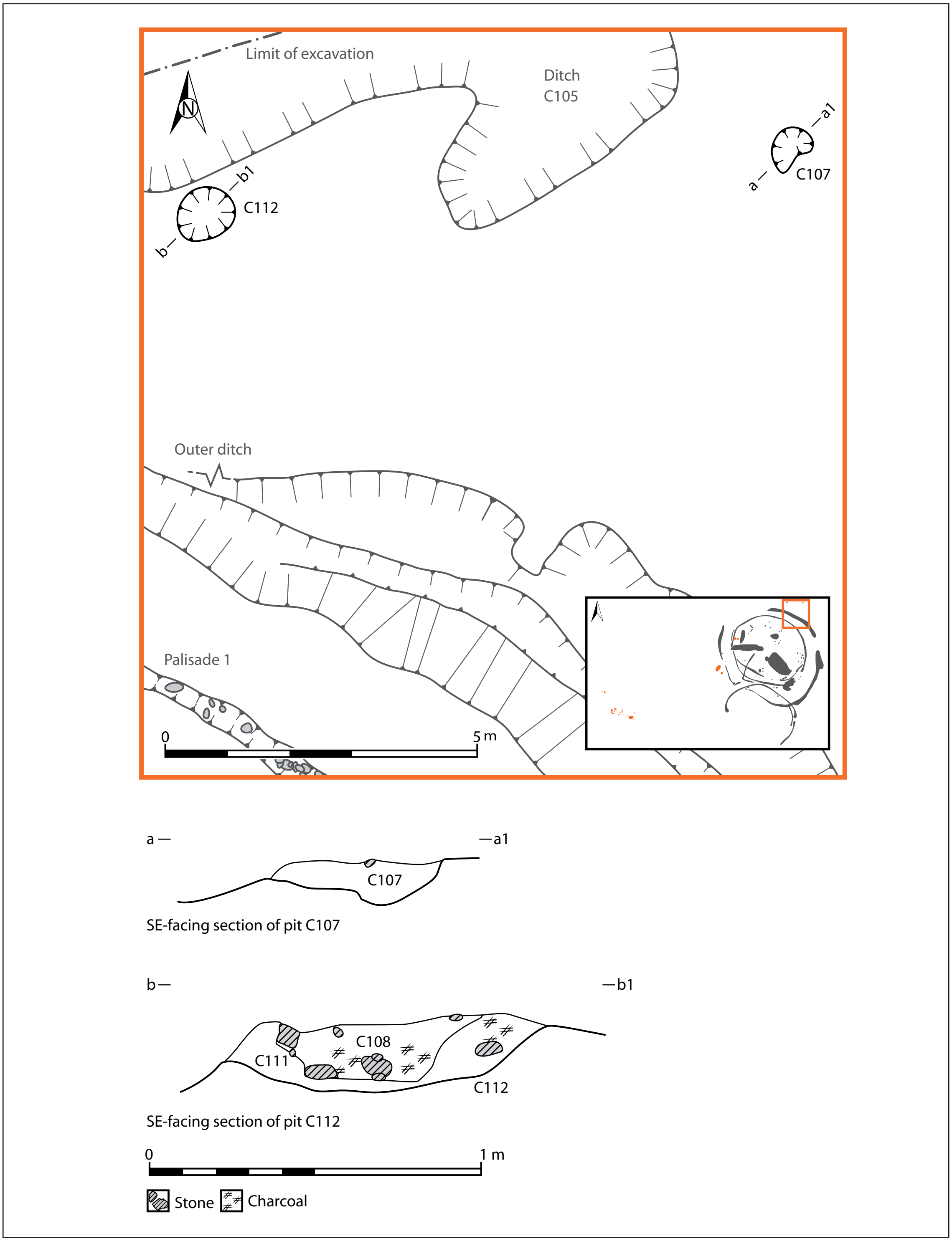


Fig. 4.3—Lowpark: pits (C107 and C112).

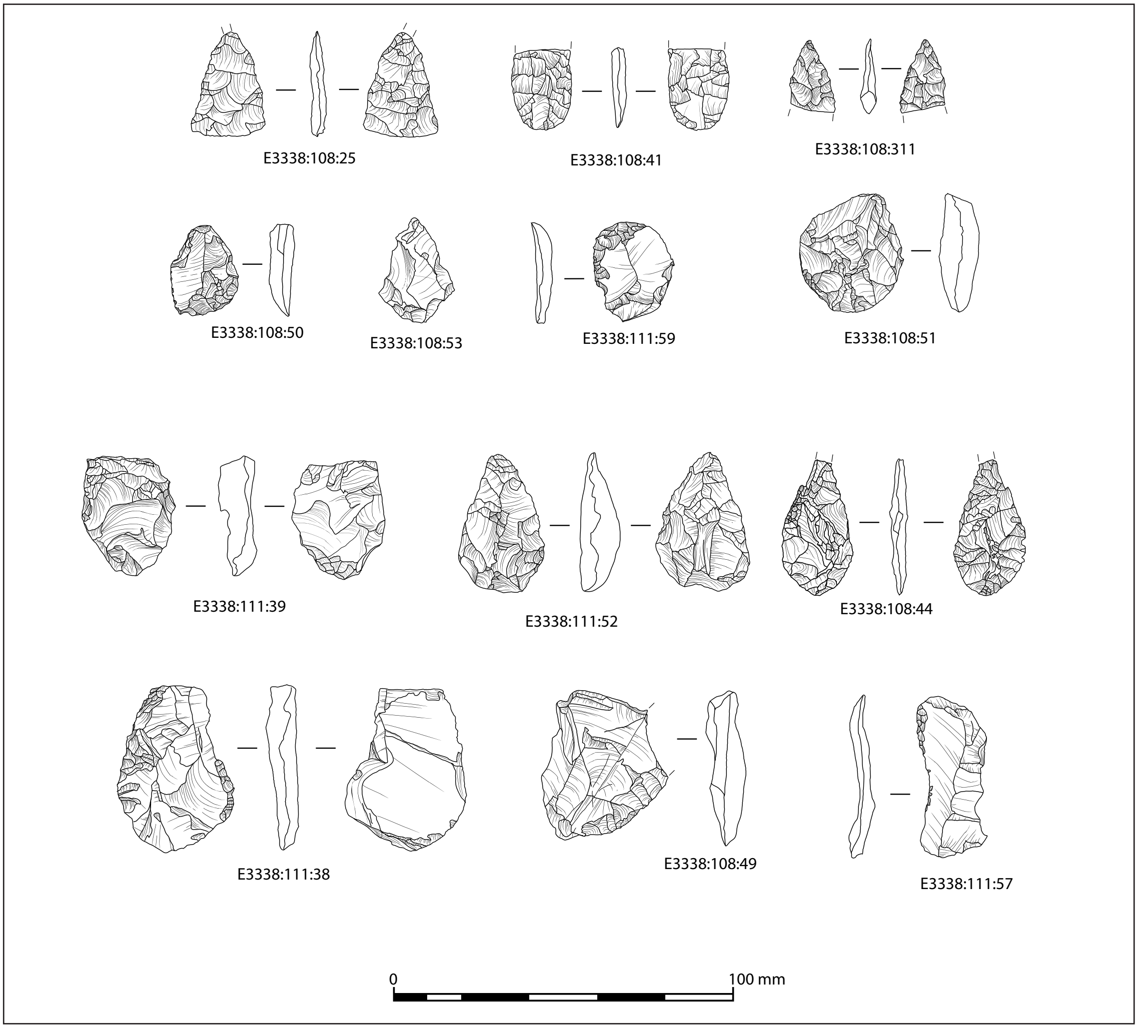


Fig. 4.4 (above)—Lowpark: lithics from north-eastern Early Neolithic pit (C112).

Pl. 4.6 (left)—Lowpark: selection of lithics from Early Neolithic pit (C112) (photo: Jonathan Hession).

bifacial, triangular form that is a probable practice piece for arrowhead production (E3338:111:52), an edge-damaged blade and unmodified chert and quartz flakes. The upper fill (C108) had a diameter of 0.55–0.60 m and a maximum thickness of 0.22 m and was set into the lower fill (C111). C108 was charcoal-rich, dark brown, silty sand with occasional charred hazelnuts and was rich in lithic finds. The charcoal was predominantly oak, with small amounts of alder and hazel. The lithics included four black chert arrowheads: a triangular form with cortex at the base (E3338:108:25), a leaf-shaped arrowhead with an impact fracture (E3338:108:44), a round-based arrowhead (E3338:108:41) and the tip of a different arrowhead (E3338:108:311). This fill also contained an edge-retouched flake, a disc scraper, five tertiary flakes, a secondary, unmodified, black chert flake, a piece of small fraction débitage and a possible crested blade, as well as two further, unmodified chert flakes. The only flint find was a distal end-scraper in translucent brown flint (Appendix III).

This upper fill (C108) also contained 36 sherds of pottery from a single vessel, a Carinated Bowl with a pronounced shoulder. The sherds were weathered, perhaps in a midden before their deposition, although soot accretions remained internally (Appendix IIa). Both pits appeared to have been backfilled, indicating deliberate deposition rather than natural silting up. The very weathered surface of the pottery vessel indicates that it was left exposed to the elements before being sealed in the pit, unlike the pottery from other areas of the site.

The north-western pits

Two large pits (C126 and C167), 0.30 m apart, lay in the area enclosed by the north-west side of Palisade 1 (Figs 4.2 and 4.6). They were undisturbed but were surrounded by substantial later features, including an early medieval structure to the north, a large, elongated pit (C117) to the west, Souterrain 2 to the south and Palisade 1 to the west. Three smaller features of indeterminate date (C113, C185 and C188) occurred to the north and south.

Neolithic pottery recovered from pits C167 and C126 was of diagnostic bone-tempered fabric with porous surfaces where the temper had dissolved out. These included sherds with the characteristic profile of a Carinated Bowl (Western Neolithic Round-Bottomed Shouldered Bowl), which dates to c. 4500–3000 BC. Bone-tempered pottery has been recovered from the Carrowmore passage tombs and from Lough Gur, Co. Limerick. (Appendix IIa). Hazel charcoal from the secondary fill (C154) of the western pit (C167) produced a radiocarbon date of 3931–3662 BC (GrA-30848). The charred remains of a whole crab apple were also recovered from C154, including endocarp (core) and mesocarp (fleshy fruit) fragments (Appendix XII).

The eastern pit (C126) was roughly circular with gradually sloping sides and a concave base. It was 0.85–1 m in diameter and 0.29 m deep. The bulk fill (C125/C133) was charcoal-flecked, reddish-brown, sandy silt with a maximum thickness of 0.18 m. It contained a moderate amount of charred hazelnut shells and five sherds from a single vessel of Early Neolithic bone-tempered pottery, which had been coil-built using the ‘U’ technique and fired very dark, with a black core (Appendix IIa). Two 0.06 m-thick charcoal-rich lenses (C127) occurred in this fill. The upper fill (C115) was 0.55 m in diameter and 0.13 m thick and was set into the lower fill (C125) (Fig. 4.7). C115 consisted of charcoal-rich, greyish-brown, sandy silt with charred hazelnut shell fragments.

Pl. 4.7—Lowpark: Carinated Bowl, rim (above) and shoulder (below) from pit (C167) (photo: Tomás Tyner).

Pl. 4.8—Lowpark: Carinated Bowl, rim (above) and shoulder (below) from pit (C167) (photo: Tomás Tyner).

Pl. 4.9—Lowpark: rim sherd of Carinated Bowl from pit (C167) (photo: Tomás Tyner).

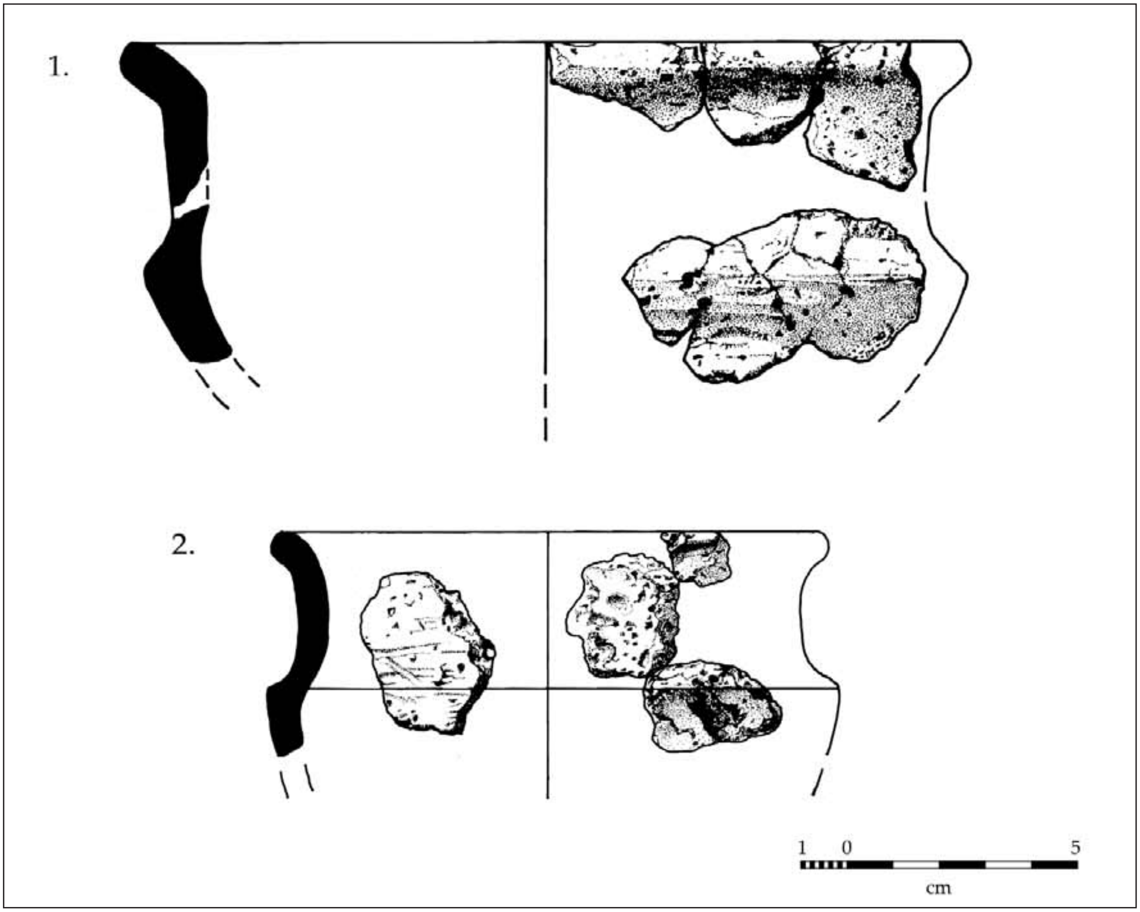


Fig. 4.5—Lowpark: 1. Carinated Bowl from pit C167 (from fills C144, C154 and C170); 2. Vessel 1, pit C112 (fill C108).

The western pit (C167) was sub-rectangular, measuring 0.93 m by 0.50 m, and 0.30 m deep. It had gently sloping, concave sides and a flattish base. The basal fill (C170) was 0.10 m thick and consisted of charcoal-flecked gravel and sand. This was overlain by a 0.05–0.10 m-thick layer of charcoal-rich, sandy silt with occasional gravel (C154). Hazel charcoal from this deposit produced the above radiocarbon date. Oak and charred hazelnut shell fragments were also present. The upper fill (C144) was a 0.06 m-thick deposit of charcoal-rich, dark brown, sandy silt with charred hazelnut shell fragments. The remains of a single vessel (Pls 4.7–9; Fig. 4.5) were recovered from the three fills. The vessel is represented by 115 sherds (192 g), of which one came from C170, 62 from C154 and 52 from C144. The vessel is a Carinated Bowl with a pronounced shoulder. The estimated rim diameter was 180 mm; the shoulder was 175 mm; and the height was probably c. 110–120 mm. The rim is out-turned and rounded with an internal bevel. The external surface is burnished with visible striations from a burnishing tool (Appendix IIa). The upper fill of the pit was overlain by 0.04 m of topsoil (C2).

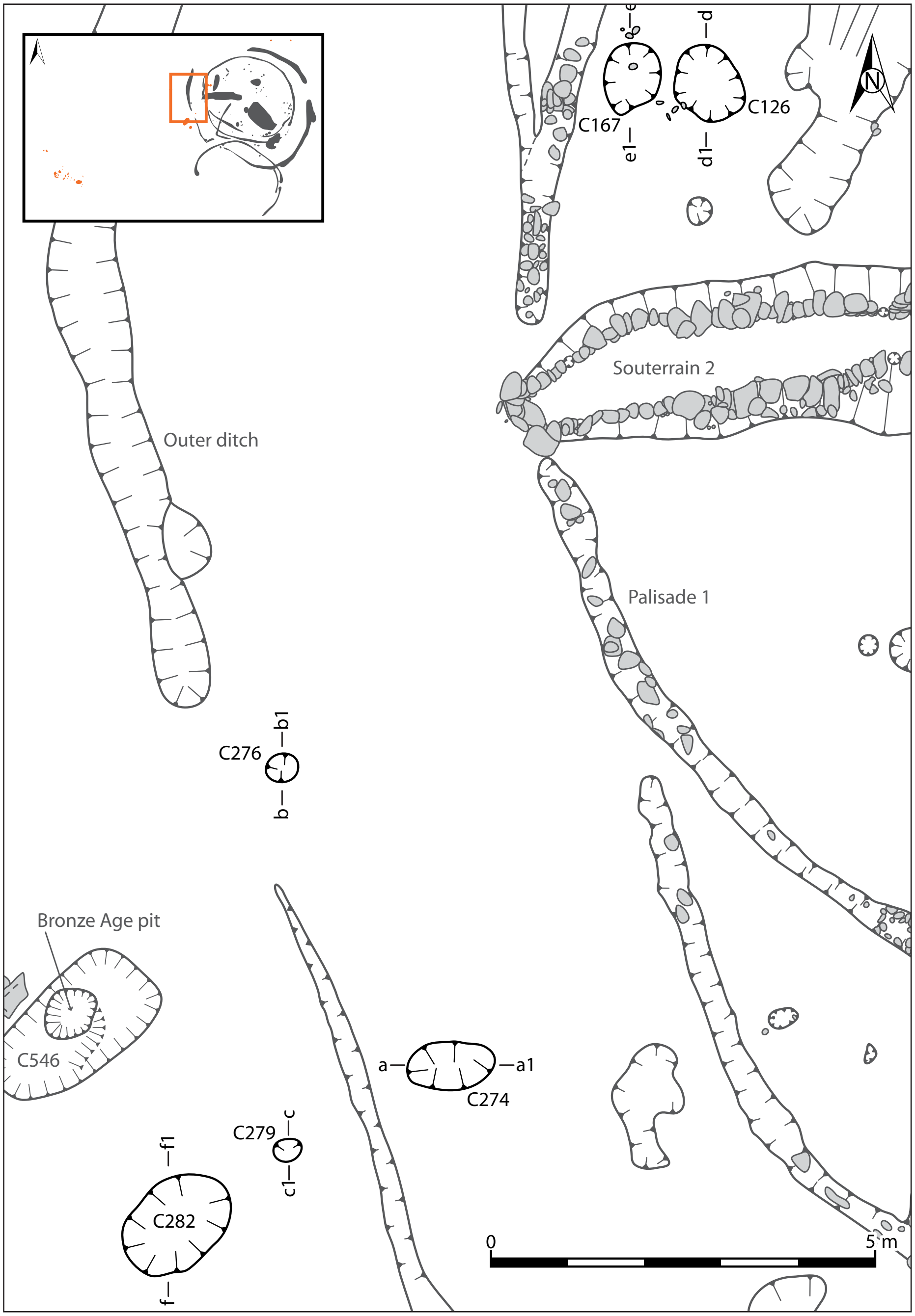


Fig. 4.6—Lowpark: north-western and south-western Neolithic pits.

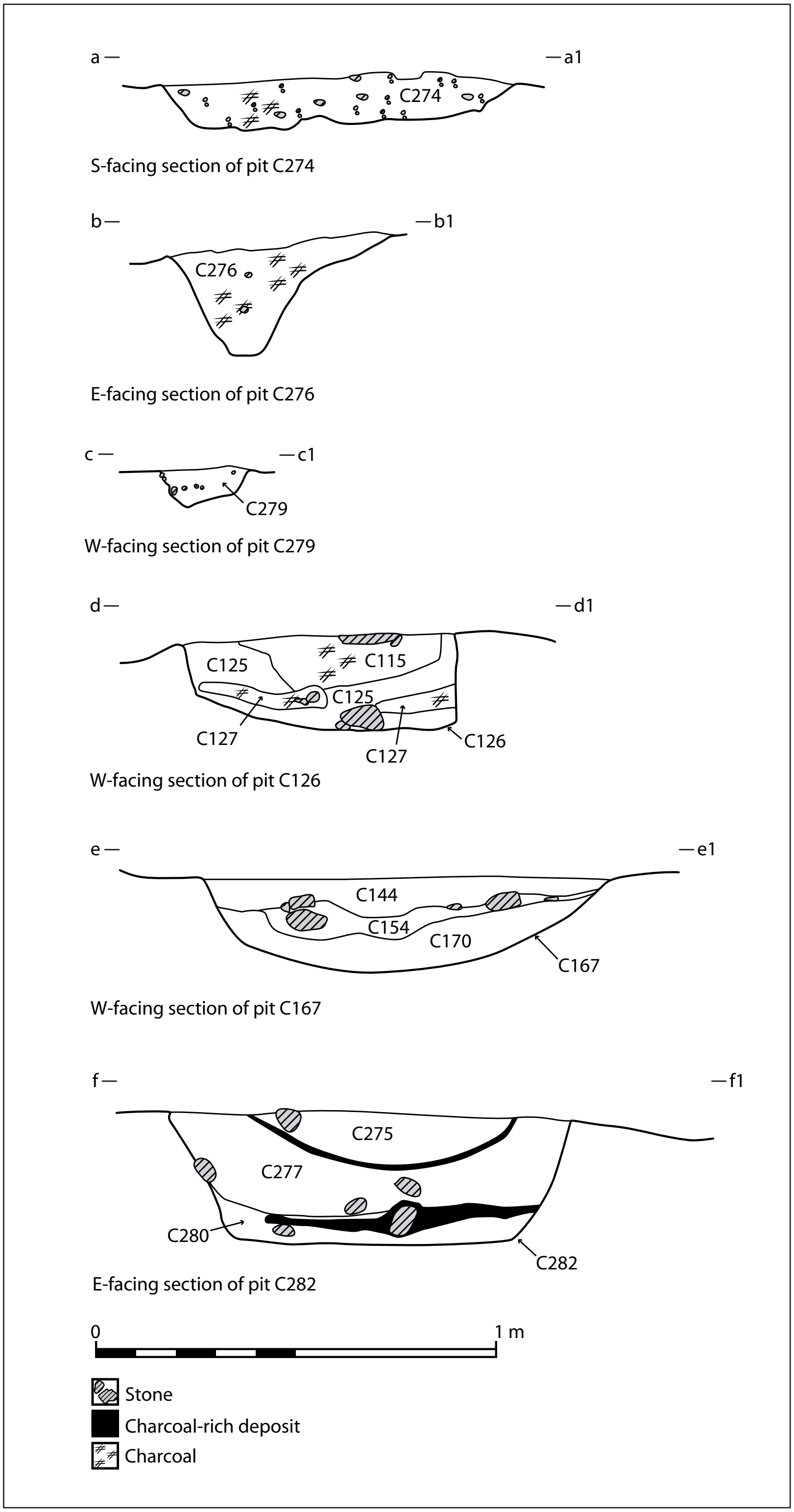


Fig. 4.7—Lowpark: sectional profiles of north-western and south-western Neolithic pits.

The south-western pits

Four pits to the south-west of Palisade 1, 9.40 m south-west of C167 and C126, are also likely to date to the Early Neolithic period. Two of these (C276 and C282) contained Neolithic artefacts, and the other two pits (C274 and C279) contained charcoal-flecked silt, sand and gravel. These pits were within 6 m of the pit (C546) from which hazel and alder charcoal produced a Neolithic date of 3700–3520 BC (Beta-231661). A Bronze Age cremation burial with an associated Food Vessel was inserted through this pit. These pits may have held structural timbers, but the surviving evidence was insufficient to extrapolate a building plan.

The largest pit (C282) was 1.27 m south-east of a Bronze Age pit (C546). It was oval, measuring 1.10 m by 1 m, and was 0.35 m deep, with steep sides and a flat base. The 0.11 m-thick basal fill (C280) consisted of charcoal-rich, brownish-grey, silty sand with medium-sized and large stones. It contained three black chert pieces: an unmodified flake, a bipolar/discoidal core and a triangular arrowhead (E3338:280:135–7). The secondary fill (C277) was a 0.25 m-thick layer of charcoal-rich, light to mid-brown, silty sand. This fill contained eight black chert pieces (five

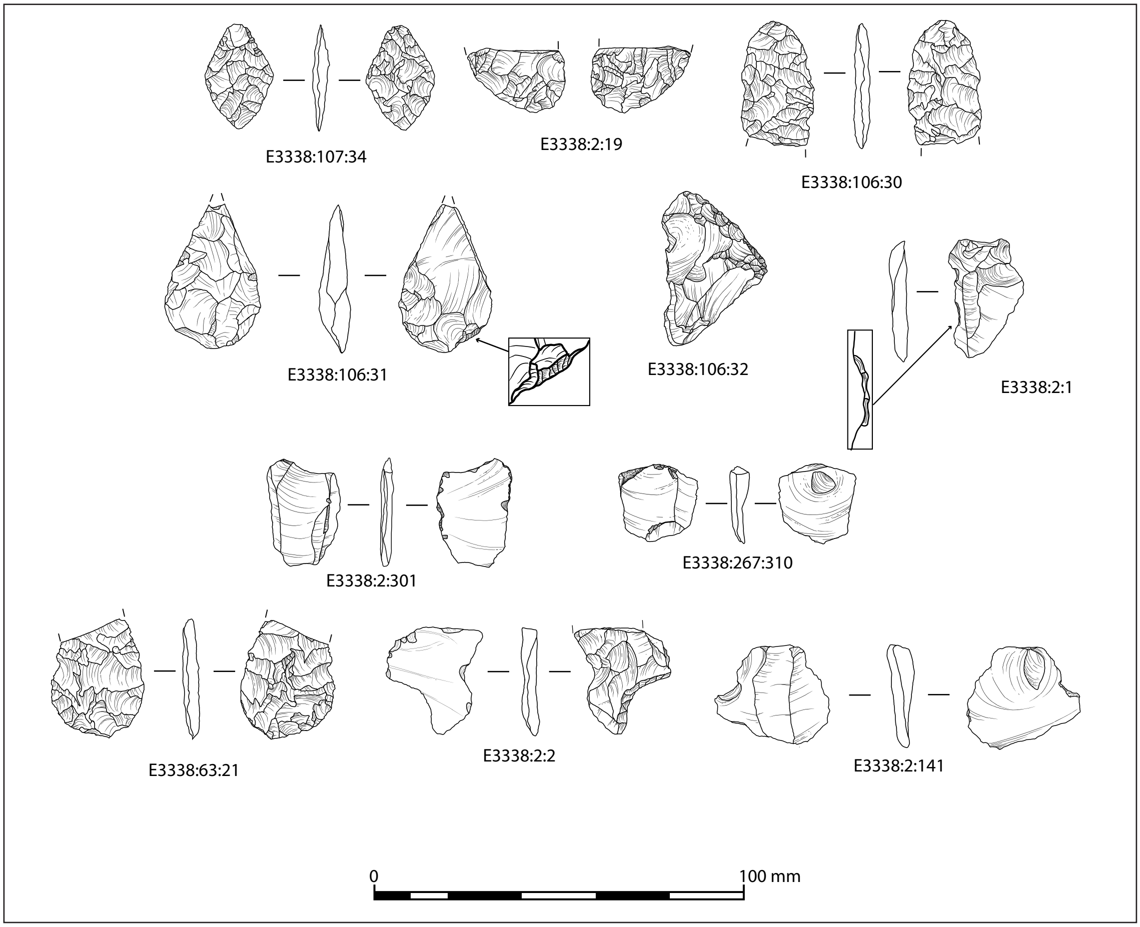


Fig. 4.8—Lowpark: Phase 1 (i) lithics from topsoil (C2), modern furrows (C63 and C106), one of the north-eastern pits (C107) and a fill of Souterrain 2 (C267).

unmodified flakes and three splintered flakes, with further evidence of bipolar reduction) and some burnt, unidentifiable bone. The upper fill (C275) was a 0.09 m-thick deposit of charcoal-rich, greyish-brown, silty sand, with moderate inclusions of small stones. It contained a thick, bifacial, edge-retouched piece (E3338:275:121) that is a possible practice piece for arrowhead production, five unmodified chert flakes and a quartz flake (Appendix III).

A smaller pit (C276) was 5.2 m north of C282. It was circular, with a diameter of 0.35 m and a depth of 0.23 m, and had steep sides and a flat base. It was filled with charcoal-flecked, dark brown, silty sand and contained a fine, black chert, triangular arrowhead (E3338:276:134), an unmodified chert flake (E3338:276:123; Appendix III) and the remains of at least two Carinated Bowls. Vessel 1 was represented by one shoulder fragment and two body sherds, and Vessel 2 was represented by one rim sherd, one shoulder fragment and one body sherd of corky-textured fabric, owing to the dissolution of limestone temper (Appendix IIa).

Phase 1 (ii): Late Neolithic Grooved Ware timber circle

This phase of activity was situated on a relatively flat natural terrace on the west side of a glacial ridge in Lowpark townland. There were no surface indications of the site, which was detected during monitoring of construction. The timber circle was c. 500 m east of, and on the same ridge

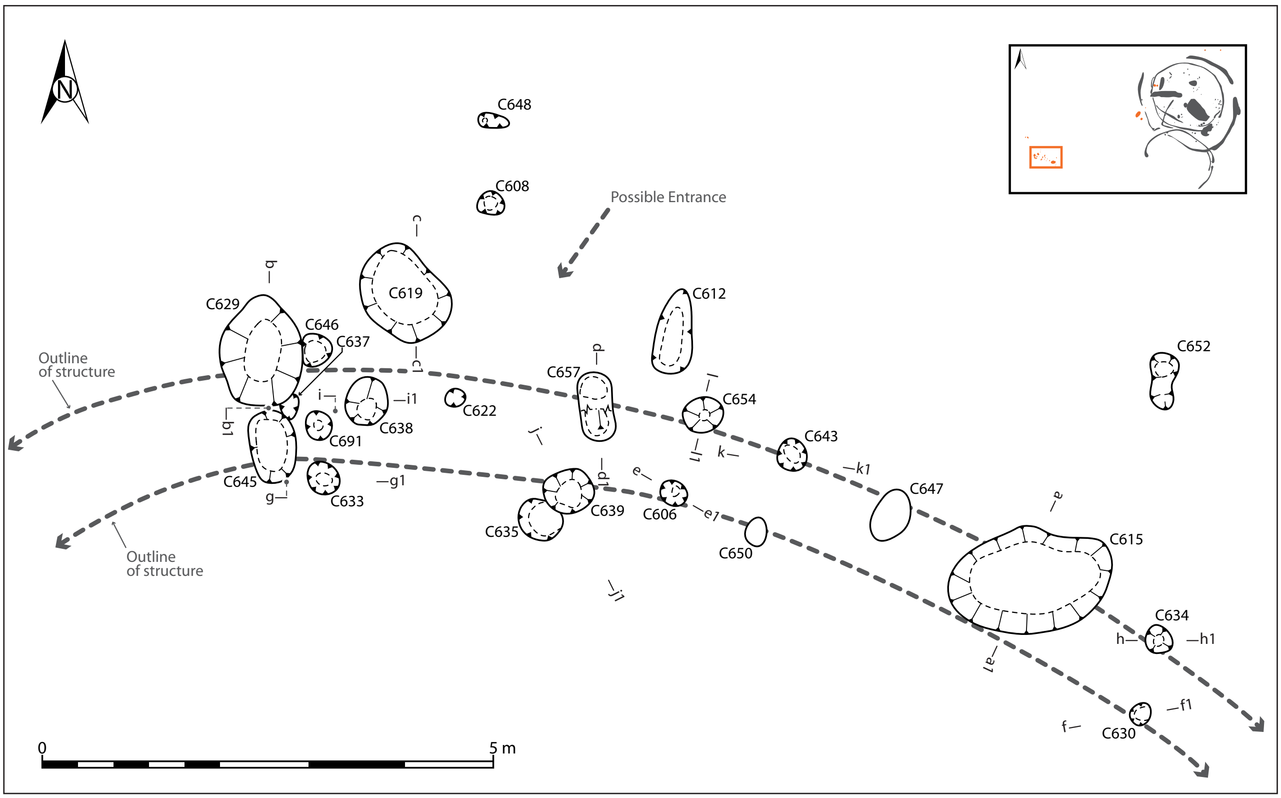


Fig. 4.9—Lowpark: plan of the Phase 1 (ii) Late Neolithic timber circle with projected outline of structural arcs of post-holes.

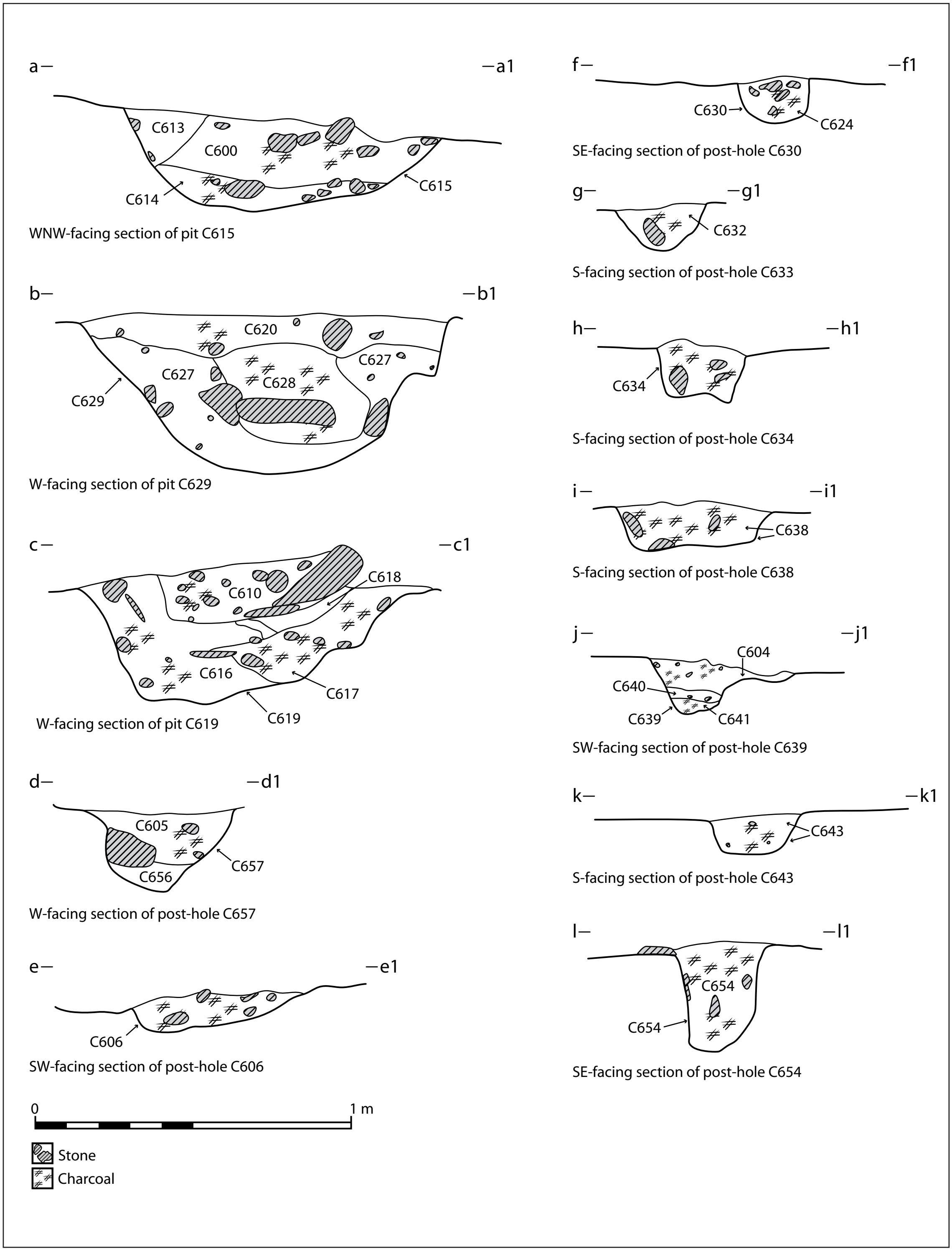


Fig. 4.10—Lowpark: sectional profiles of the Phase 1 (ii) Late Neolithic pits and post-holes.

as, the Early Neolithic structures in Sonnagh and c. 40 m east of the main concentration of archaeological remains at Lowpark.

This later Neolithic phase comprised a concentration of 24 pits and post-holes cut into natural sand and gravel. They were in an area measuring 12 m by 5 m and were aligned WNW–ESE, with an outlying pit (C660) 10 m north of the main group. These pits and post-holes were oval, circular or sub-rectangular, and they generally had concave profiles with sloped sides owing to the loose nature of the subsoil. Their fills varied from charcoal-rich to charcoal-flecked, silty sand and gravel.

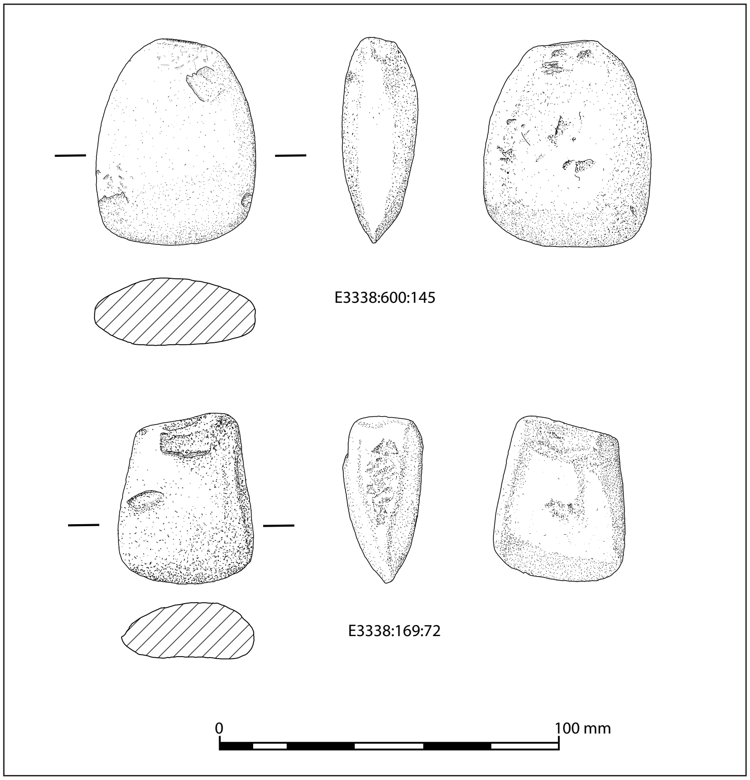


Fig. 4.11—Lowpark: polished stone axeheads.

Pl. 4.10—Lowpark: lithics from Phase 1 (ii) Late Neolithic timber circle (photo: Jonathan Hession).

Artefacts associated with these features included numerous sherds of Late Neolithic Grooved Ware pottery, with a minimum number of 28 vessels, an assemblage of flint and chert artefacts, a porcellanite axehead and small fragments of burnt bone. One pit (C660) was exceptional as it contained a minimum of nine vessels, comprising over 6,390 sherds of Grooved Ware pottery from an overall Phase 1 (ii) total of 6,909 sherds. The Grooved Ware assemblage was fresh in appearance and likely to have been deposited immediately after it went out of use. None of the vessels was complete when buried, which suggests some kind of ritual practice and structured deposition where the vessels were broken before or during deposition.

The radiocarbon dates obtained from Lowpark correspond with the general dating of Grooved Ware pottery and associated timber circles. Three samples produced an overall date range of 2630–2470 BC (Beta-231665) to 2580–2460 BC (Beta-231666), placing this phase generally in the later Neolithic. A fourth date range of 2550–2290 BC (Beta-231664) straddles the Late Neolithic and the Early Bronze Age, although the close association with the other dated features implies that the actual date lies in the earlier part of the range. Although these pits represent a single phase, there was some evidence for successive sub-phases. The large pit (C629) truncated and post-dated two smaller pits (C637 and C646) occurring in the line of the outer arc of post-holes.

The structural features

The main concentration of features can be divided into two arcs of pits and post-holes c. 1 m apart (Fig. 4.9). Four larger pits and five smaller pits occurred to the north of these arcs. Several permutations of possible structural arrangements or phases can be projected from the surviving evidence. The arcs are likely to have been part of a circular structure similar to timber circles associated with Grooved Ware pottery in Knowth, Co. Meath (Eogan & Roche 1994), Rathmullen, Co. Meath (Stafford 2001), Ballynahatty, Co. Down (Hartwell 2001), Bettystown, Co. Meath (Eogan 2000), Whitewell, Co. Westmeath (Phelan 2007), Kilbride, Co. Mayo (Cotter 2008) and possibly Fourknocks Ridge, Co. Meath (King 1999). A projected overall diameter of 10–20 m is possible from the extant remains.

The outer arc to the north included six post-holes and two pits that were circular or oval, 0.20–0.75 m in diameter and 0.06–0.55 m deep. They were 0.50–3.50 m apart, and a large pit (C615) was situated between the easternmost post-holes (C647 and C634). This large pit may have destroyed additional post-holes. The central four post-holes were evenly spaced at 1 m apart, and the eastern post-holes were closer together (Fig. 4.9). These were filled with charcoal-flecked, sandy silt and small stones, with occasional lithics, pottery, burnt bone and charred nut shells in some of the fills. The upper fill (C605) of one feature (C657) contained eight pottery sherds from the lower portion of a Grooved Ware vessel, including base and wall fragments. It also included 72 fragments of burnt animal bone (0.3 g) not identified to species and small amounts of charred hazelnuts.

Six of the features included in the outer arc contained lithics. An assemblage of 22 pieces was recovered from fill C605, including eight chert flakes, two chunks, a hard-hammer blade, six flint flakes, a poorly fashioned, small, convex end-scraper, a small débitage flake and a calcined heat spall. The technology in both chert and flint is characterised by hard-hammer and bipolar reduction strategies. A single flint convex end-scraper was the only find from post-hole C622. A grey flint flake and a heavily burnt convex scraper of indeterminate material were recovered from post-hole C638. A weathered, mottled, grey flint end-scraper was recovered from post-hole C643. A grey flint bipolar core, a secondary flint flake and two small débitage flakes were recovered from post-hole C654. Two bipolar cores, one in black chert and the other in light grey flint, were recovered from post-hole C657 (Appendix III).

The inner arc comprised six possible post-holes c. 1 m south of the outer arc. These were generally circular, 0.22–0.55 m in diameter, 0.05–0.34 m deep and 0.75–5 m apart. These post-holes were generally filled with charcoal-flecked sandy silt and small stones, with occasional burnt bone and charred nut shells occurring in some of the fills. One feature (C639) contained three lithics, a calcined bipolar core, a burnt flake fragment and a heat spall (Appendix III), and 155 fragments (9 g) of animal bone (Appendix IX). A surface deposit (C625) associated with post-hole C633 contained a flint bipolar core and flake, three burnt flint flakes, three pieces of small fraction débitage, two grey flint flakes, a weathered, grey chert flake (Appendix III) and a small amount of charred hazelnuts.

A pair of abutting post-holes (C635 and C639) occurred at the centre of the inner arc, and an adjacent, substantial post-hole (C657) in the outer arc may represent a structural feature requiring extra support, such as an entrance feature or perhaps repair. One post-hole (C635) contained burnt animal bone (5.9 g), two mottled, grey flint flakes, a weathered end-scraper (similar to pit C643, below), a medial fragment, a grey flint chunk and a flint platform-rejuvenation flake. Two features (C647 and C650) were 0.05–0.06 m deep but, despite the shallowness, were likely to have been the truncated remains of post-holes. The 5 m gap between the eastern post-holes in the inner arc was likely to be the result of disturbance that may have been related to the large pit (C615). Charred remains of crab apple were also recovered from C635 (Appendix XII).

Pl. 4.11—Lowpark: worked chert found in topsoil including flake (E3338:2:9), arrowhead fragment (E3338:2:19), concave scraper (E3338:2:2) and arrowhead fragment (E3338:2:119) (photo: Jonathan Hession).

Four smaller pits/post-holes (C608, C646, C648 and C652), which occurred less than 2 m north of the outer arc of post-holes, were 0.18–0.62 m in diameter and 0.09–0.25 m deep. One of these (C646), which may have been part of the outer arc, contained burnt bone (<0.1 g), and two (C608 and C648) contained lithics. C608 contained a flint bipolar core, two unmodified flakes and a burnt flake fragment, and C648 contained a grey flint, distal end-scraper (E3338:648:245). A small isolated pit/post-hole (C658) 10 m to the north-east contained eight sherds of at least one well-made pottery vessel, with evidence for internal and external surface smoothing and soot accretions.

There was no evidence for *in situ* burning in these features, suggesting that charcoal, burnt bone, lithics (some of which were burnt) and pottery were deposited deliberately together. The posts did not leave definite traces or post-pipes, suggesting that they did not rot *in situ* but rather were removed in antiquity, possibly to facilitate artefact deposition. The larger pits appeared to represent a continuation of this ritual deposition after removal of the structure.

Large pits

There were five large pits in this area, three of which (C615, C619 and C629) contained quantities of pottery sherds, lithics and burnt bone. One larger pit (C645) was immediately west of the two arcs of post-holes and had very gradual sides and an almost sterile fill, with one unidentifiable burnt bone. Another pit (C612) contained some burnt animal bone (0.8 g), charred nut shells and one fragmented rim sherd of Neolithic pottery (from fill C607).

The largest of these pits (C615; Pl. 4.12) was roughly oval, measuring 1.4 m by 2.3 m, with a maximum depth of 0.3 m. It was aligned east–west and had sloping sides and a relatively flat base. The basal fill (C614), a 0.10 m-thick deposit of thin, charcoal-rich, silty sand, contained a small amount of burnt bone (<0.1 g), a tertiary flint flake and a burnt small débitage flake (Appendix III). The main fill (C600) was a 0.14 m-thick deposit of charcoal-rich, mottled, grey–brown, silty sand. Apple-type, alder and hazel charcoal from the fill produced a radiocarbon date of 2610–2460 BC (Beta-231663). The pit contained 55 pottery sherds from at least one vessel, 52 pieces of flint, two black tertiary chert flakes, a porcellanite axehead (E3338:600:145; Pl. 4.22) and some small fragments of unidentifiable burnt bone (1 g). An upper fill of charcoal-flecked, orange–yellow, coarse sand (C613) partly overlay the main fill (C600) and filled the northern side of the pit. This may have been a deliberate backfill of the pit after the main deposition was completed. A total of 80 unidentifiable burnt bone fragments (1 g) were recovered from this pit.

The pottery vessel (Pl. 4.13; Fig. 4.13) is a small, fine bowl with a slightly in-turned, rounded rim, with a diameter of 130 mm and an estimated height of 105 mm. The internal rim is decorated with impressed fibrous cord, and there are applied external cordons (Appendix IIa).

The flint assemblage from the main fill (C600) of pit C615 comprised predominantly unmodified flakes, of which there were six secondary and 21 tertiary. Colours ranged from translucent brown to light grey. There were seven pieces of small fraction débitage (mostly complete flakes, some less than 5 mm in size) and four larger chunks. There was a single bipolar core, and several of the flakes displayed signs of bipolar and hard-hammer platform reduction. There were two scrapers, both distal end-scrapers with steep retouch (E3338:600:146 and E3338:600:154), as well as another perfunctory form and a possible burin, which are likely to be

Pl. 4.12—Lowpark: partly excavated pit (C615), which contained lithics, Grooved Ware pottery and a porcellanite axehead.

Pl. 4.13—Lowpark: Vessel 1 from main fill (C600) of C615: base (above); lower rim section with applied cordons (below) (photo: Tomás Tyner).

a product of bipolar spalling rather than deliberate manufacture. There were a further nine burnt pieces, all probably flint, comprising a calcined scraper fragment, two chunks and six flakes. On the basis of colour and cortex type, a number of separate reduction episodes were represented, with the technology comprising a combination of bipolar and platform-reduction strategies (Appendix III).

Another large pit (C619) lay in the north-west of the area. It was sub-oval, measuring 0.85 m by 1.1 m, and 0.5 m deep, with steep to vertical sides and the base sloping from south to north. The bulk fill (C616) filled the north half of the pit from top to base, abutting and partly underlying the other fills (C617 and C618). This 0.38 m-thick fill was charcoal-flecked, mottled, yellow and light brown, silty sand and gravel, which was darker toward the base. C616 contained a light grey, secondary flint flake (E3338:616:171). The secondary fill (C617; maximum: 0.22 m thick) was

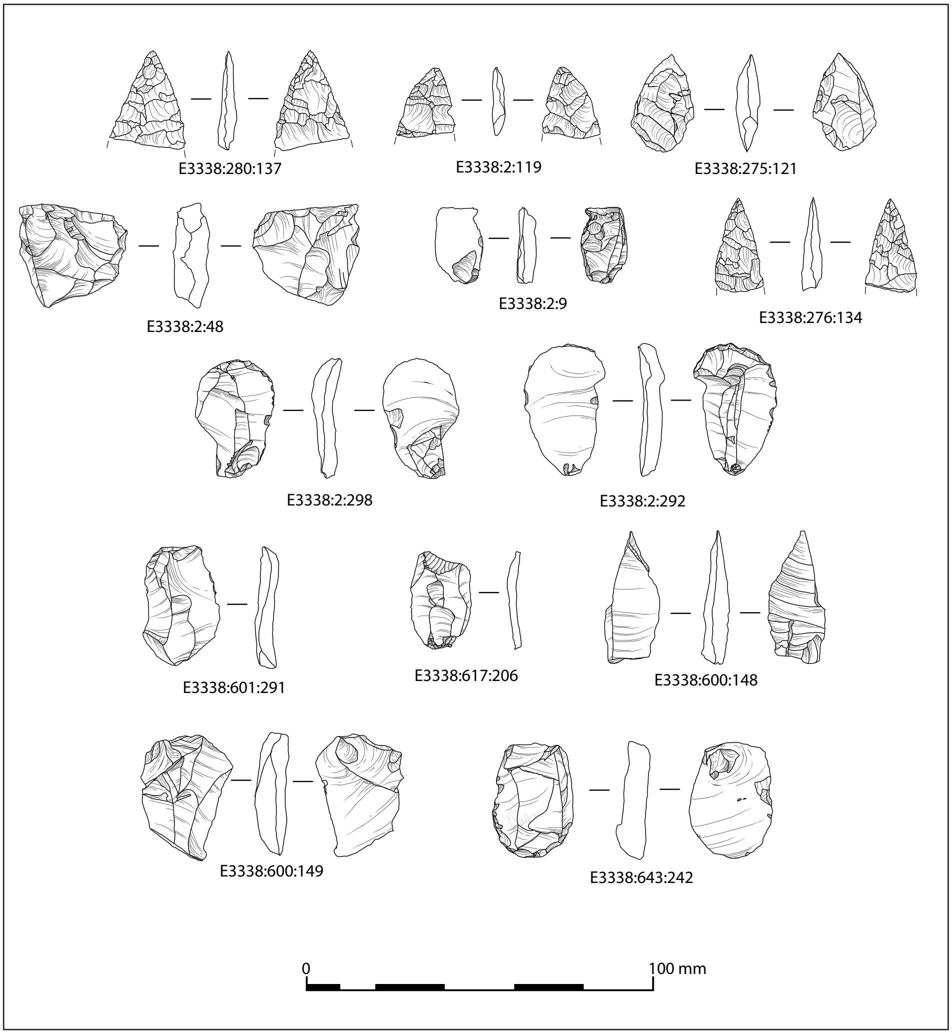


Fig.4.12—Lowpark: Phase 1 (i) and (ii) lithics.

concentrated in the southern half of the pit and consisted of charcoal-rich, dark brown–black, sandy silt. Alder charcoal from this context produced a radiocarbon date of 2550–2290 BC (Beta-231664). Fill C617 contained 12 flint pieces and a single black chert bipolar flake. The flint included a bipolar core, a chunk and a convex scraper fragment in translucent brown flint. A further bipolar core, a chunk with four flakes and fragments in light grey flint, an inverse scraper and a single, mottled, grey flint flake were also recovered from this context. It also contained a small amount of unidentifiable burnt bone (<0.1 g). A lens of light yellowish-brown, silty sand (C618) occurred between the bulk fills (C617 and C610), measuring 0.3 m by 0.45 m and 0.1 m thick. A partially backed flint bladelet (E3338:610:192) was recovered from C618.

The upper, charcoal-rich fill (C610) of pit C619 was a 0.17 m-thick mix of silt and sandy gravel with frequent small pebbles throughout. The fill contained the remains of at least five Grooved Ware pots, lithics and unidentifiable burnt bone (0.7 g). The lithics included six light grey flakes, including a platform-rejuvenation piece, an orange flint blade fragment and a brown bipolar

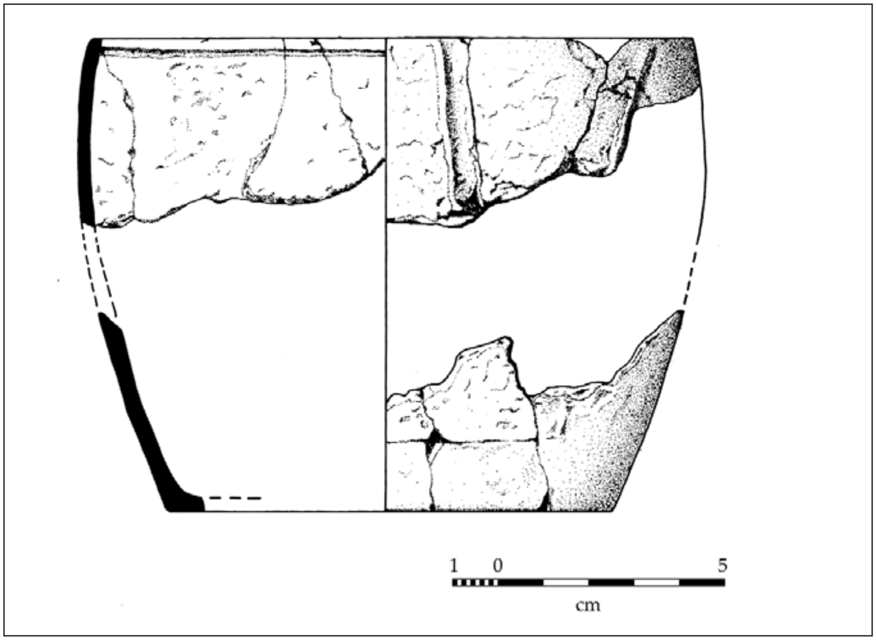


Fig. 4.13—Lowpark: Vessel 1 from pit C615 (fill C600).

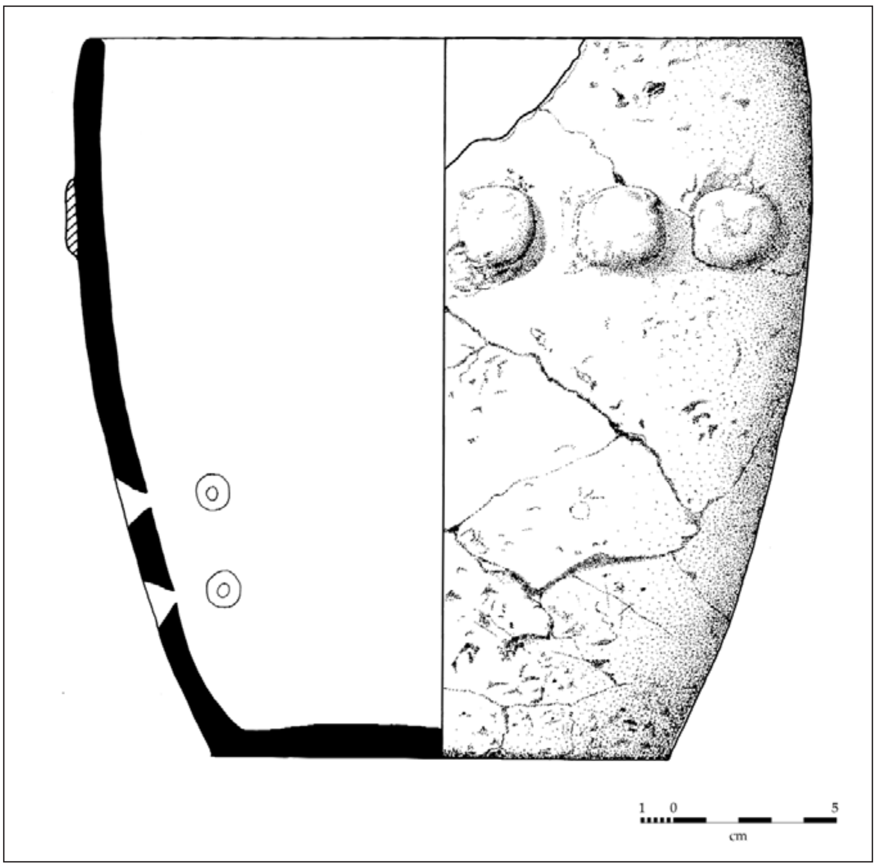


Fig. 4.14—Lowpark: Vessel 1 from pit C629 (fill C628).

flake. A burnt tertiary flake, an angled flint scraper and two chert convex end-scrapers were also recovered from this deposit.

The Grooved Ware pottery from this fill (C610) included a minimum of five vessels. All were coil-constructed and well manufactured. Vessel 1 comprised 55 body sherds and a rim fragment with a faint internal horizontal line that may be an internal groove. Most of the sherds were very weathered. Vessel 2 comprised seven sherds including three tiny rim fragments with rounded profiles. Vessel 3 included nine body sherds, one of which had the remains of an applied vertical cordon with a D-shaped profile. One sherd had internal soot accretions. Vessel 4 was represented by six body sherds including decoration of closely set incised lines and cross-hatched motifs. Vessel 5 included 11 body sherds from C610 and three sherds from C617 and was a thin-walled vessel with an applied cordon visible on one sherd. It was very fresh in appearance, with internal sooty accretions (Appendix IIa). The ceramic assemblage from this pit included sherds that were fresh in appearance and others that were weathered. This may suggest that some vessels were deposited in the pit immediately after they were broken, while other, weathered fragments may have been retrieved from a midden and placed in the pit with the freshly broken pottery.

Pit C629 (Fig. 4.10) was to the north-west of the outer arc of post-holes. It was cut by a smaller post-hole (C637) and abutted a smaller pit (C646). It was sub-rectangular, measuring 1.15 m by 1.2 m, and had a maximum depth of 0.46 m. It was aligned north–south and had steep sides and a flat base. The secondary fill (C628) consisted of charcoal-flecked, dark brown, silty sand. It measured 0.4 m east–west by 1.1 m north–south and had a maximum thickness of 0.20 m. Hazel and alder charcoal from this context produced a radiocarbon date of 2630–2470 BC (Beta-231665). It contained a predominantly flint assemblage, with a single chert flake, an edge-damaged pebble, an unmodified quartz pebble and a secondary quartz flake. Grey and light brown flint predominated, and the flint assemblage comprised seven flakes, four small débitage flakes, a burnt heat spall and a small pebble. There are also three bipolar pieces: two cores and a *pièce esquillée* (a pillow-shaped bipolar piece that may have functioned as a chisel-type tool; Appendix III). Fill C628 also included fragments from a minimum of three vessels (113 sherds) and a small amount of unidentified burnt bone (0.5 g). The primary fill (C627) underlay and was packed around fill C628. It consisted of 0.14 m-thick, compacted, light orange–brown, silty sand with small stones similar to the natural subsoil in the area and contained the remains of at least one vessel (16 sherds), fragments of unidentifiable burnt bone (<0.1 g) and two unmodified, tertiary, grey flint flakes. Pottery from these two contexts included a minimum of four vessels (Vessels 1–4).

The upper fill (C620) of pit C629 consisted of a 0.12 m-thick, compacted, charcoal-flecked, mottled, light and dark brown, silty sand and overlay both lower fills. It contained 14 sherds of Grooved Ware pottery, representing a minimum of three vessels (Vessels 5–7), lithics and burnt animal bone (2.3 g). A combined total of 138 fragments (2.8 g) of burnt bone were recovered from this pit, including faunal and unidentifiable bone. The lithic assemblage from C620 included 22 pieces, a chert distal end-scraper and two flakes, one in black and the other in green chert. The rest of the assemblage was flint, in which grey and light grey flint predominated. The flint assemblage comprised a multi-platform core fragment, 13 flakes (nine tertiary and four secondary), a bipolar blade and a complete, small débitage flake. Two flakes related to the same reduction, but there were

Pl. 4.14 (right)—Lowpark: Vessel 1 from fill (C628) of Late Neolithic pit (C629).

Pl. 4.15 (above, left)—Lowpark: Vessel 1, showing applied pellets (photo: Tomás Tyner).

Pl. 4.16 (above right)—Lowpark: base of Vessel 1 from fill (C628) of Late Neolithic pit (C629) (photo: Tomás Tyner).

Pl. 4.17 (left)—Lowpark: side wall of Vessel 1 from fill (C628) of Late Neolithic pit (C629) (photo: Tomás Tyner).

no re-fits. The only retouched flint piece was a distal end-scraper with quite light removals (E3338:620:210). There were also two burnt pieces: a heat spall and an indeterminate fragment.

Pit C629 contained a minimum of seven Grooved Ware vessels. Vessel 1 (Pls 4.14–17), from fill C628, consists of 35 sherds, roughly one-third of the vessel. It is a large, bucket-shaped vessel with an estimated height of 220 mm and diameters of 220 mm at the rim and 140 mm at the base. The rim is rounded and decorated with applied pellets c. 50 mm below it, including a group of three pellets on one fragment. There are sooty residues internally and externally, and repair holes also occur. Vessel 2 (C627/C628) comprises 81 body sherds, five base sherds and one rounded rim sherd. The base has an estimated diameter of 120 mm. Soot residue adheres to the internal surface, and the external surface is fresh in appearance. Vessel 3 is represented by two basal sherds from C628 and three wall sherds from C627. The base is pinched out into shape, and the walls exhibit the U-shaped fracture pattern of coil construction. Vessel 4 comprises two flat, weathered sherds that may be from a separate pot, or at least they were not buried soon after discard, similar to other vessels in this group. Vessel 5 (C620) includes five body sherds, one of which has soot accretions. Vessel 6 (C620) includes one rim fragment and six body sherds. It is decorated internally with an impressed cord motif 4 mm below the rim. A U-shaped fracture suggests that the coils were joined by pushing the clay down on the inner and outer surfaces, suggesting an inexperienced potter. Vessel 7 includes two rounded rim fragments and 24 body sherds, with N-shaped coil fractures from coil construction and internal soot accretions (Appendix IIa).

A large pit (C660), almost completely filled with pottery sherds, lay 10 m north-west of the main concentration of features included in this phase. This pit was sub-oval, measuring 0.8 m by 1.26 m, and was 0.45 m deep. It was aligned north-west/south-east and had gently sloping, concave sides and a flattish base. It was filled with charcoal-flecked, light brown, silty sand interspersed around a high concentration of prehistoric pottery. A rolled chert flake was the only lithic find from C660 (Appendix III).

Alder charcoal from this context produced a radiocarbon date of 2580–2460 BC (Beta-231666). This fill contained one hawthorn fruit stone, which may be intrusive. The pit (C660) contained 6,390 pottery sherds, 4,618 of which were minute, with an estimated minimum of nine vessels.

Vessel 1 is a 230 mm-high, tub-shaped pot with estimated diameters of 220 mm at the rim and 140 mm at the base. It has a slight foot and a slightly in-turned, rounded rim, with an internal incised line 2.2–3.6 mm below the top of the rim. Pellets of similar fabric probably belong to this vessel. Sooty accretions occur internally but not on the basal sherds. These may be the vestiges of food remains. Dark accretions on the rim area may be from smoke. The pottery is well preserved and fresh in appearance, without any evidence of weathering, and striations from the potter's fingers are visible on the outer surface. The remains of Vessel 1 comprise 5,939 sherds (5705.4 g) and include large fragments and minute sherds. A further 550 small sherds (1560.4 g) may belong to this vessel, based on the similarity of the fabric. The vessel was not complete, as large sections of the base and rim areas, and probably the body, are absent, and it is also probable that the vessel was smashed and perhaps pounded to fragment it before deposition in the pit.

Vessel 2 is represented by 13 sherds that differ from Vessel 1 in that the external surface is gritty owing to protruding temper. Soot is visible on the inner surface, and the pottery is fresh or

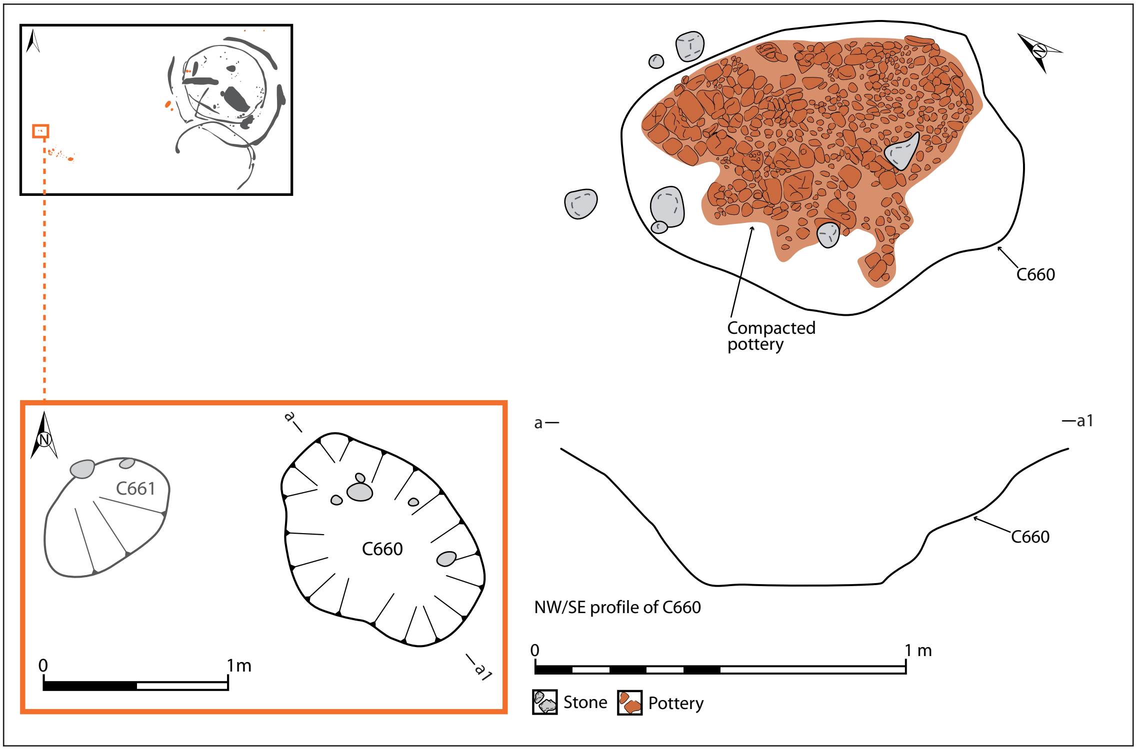


Fig. 4.15 (above)—Lowpark: plan and profile of Late Neolithic pit (C660).

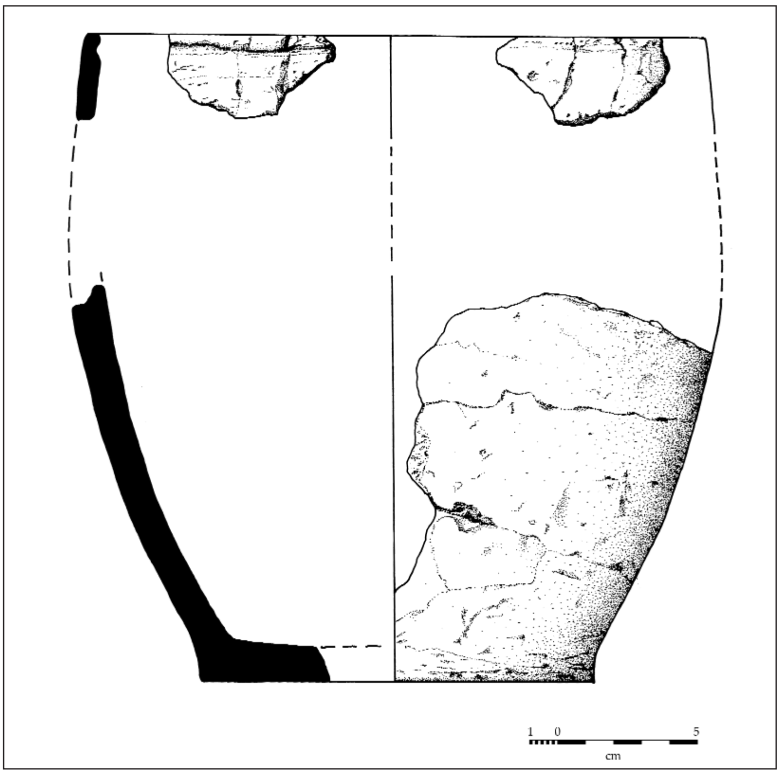


Fig. 4.16 (right)—Lowpark: Vessel 1 from Late Neolithic pit (C660).

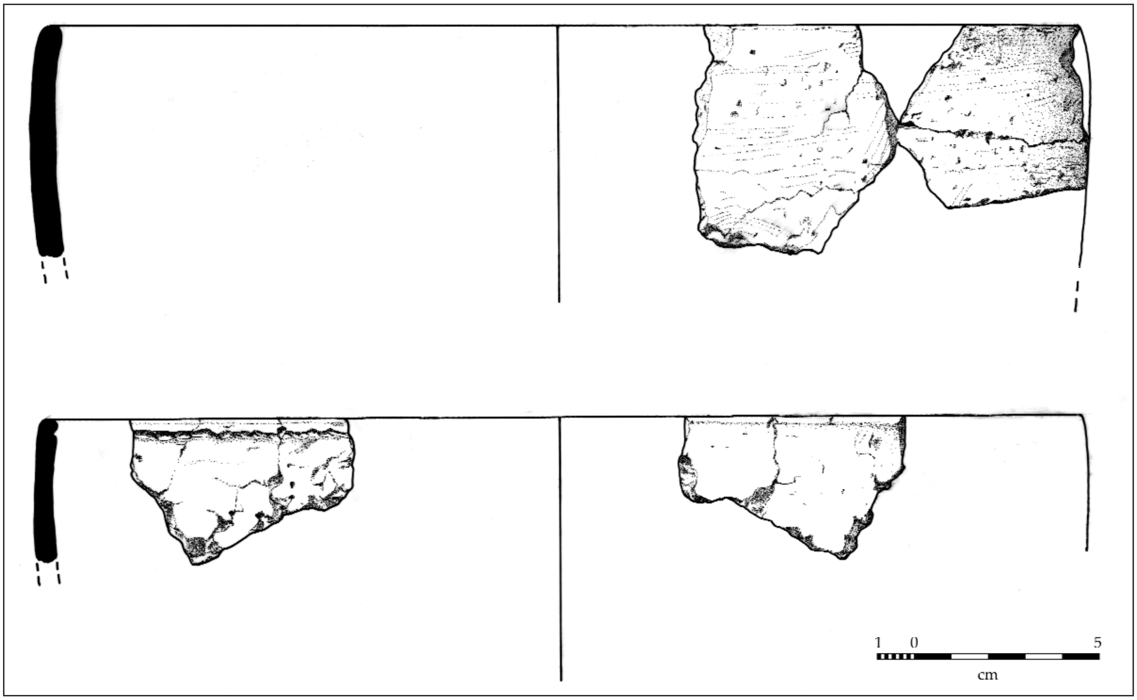


Fig. 4.17—Lowpark: Vessels 4/5 from pit C660.

unweathered. Vessel 3 is represented by a single base sherd, giving an estimated basal diameter of 140 mm, and has a fracture indicative of coil construction using the U-technique. The pottery is fresh in appearance and smooth in texture, with striations from the potter's fingers visible on the inner surface.

Vessels 4 and 5 (Fig. 4.17) comprise a group of 210 pottery sherds representing a minimum of two vessels with two rim types, including 68 rim fragments of similar fabric and body sherds of similar fabric that cannot be assigned to either vessel. The rims are slightly inturned and rounded. One rim has a 3.8 mm-wide, internal, impressed twisted-cord motif 4.8 mm below the rim, and the other rim fragments are undecorated. The estimated rim diameter is 280 mm. The pottery is fresh in appearance, with potter's finger striations just below the rims. Soot is visible internally near the rim and on the body sherds.

Vessel 6 is represented by a single, flat, basal sherd similar to Vessel 1 but of different fabric. The sherd was probably manufactured by kneading it into shape, and soot is visible on the internal surface.

Vessel 7 (Pl. 4.19; Fig. 4.18) comprises 145 sherds including 26 fragments of the rim and neck. The vessel is bucket-shaped with a simple, rounded rim and an estimated rim diameter of 220 mm. Striations on the external surface suggest that the vessel wall may have been scraped to reduce the wall thickness. The vessel is decorated with a double row of impressed twisted cord, 4 mm below the internal rim. The motif is 4.7 mm wide and is of loosely twisted cord. The external decoration is a 130 mm-long, 9 mm-wide applied cordon 45–47 mm below the rim that tapers to a point at

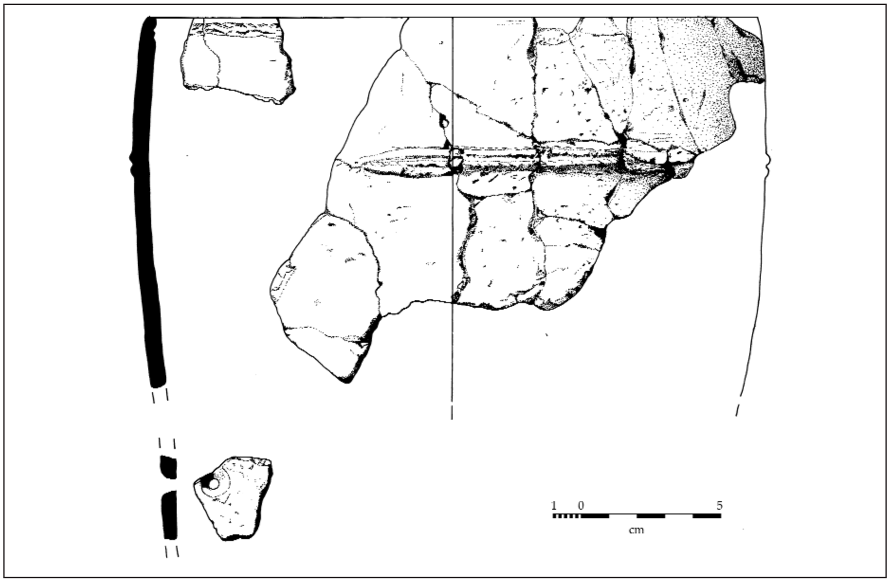


Fig. 4.18—Lowpark: Vessel 7 from pit C660.

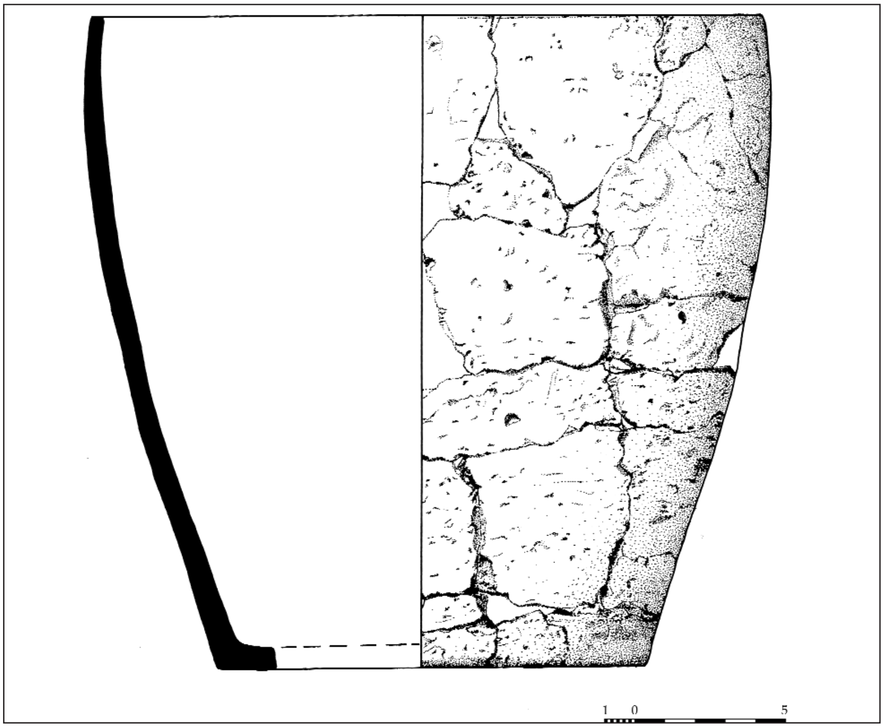


Fig. 4.19—Lowpark: Vessel 8 from pit C660.

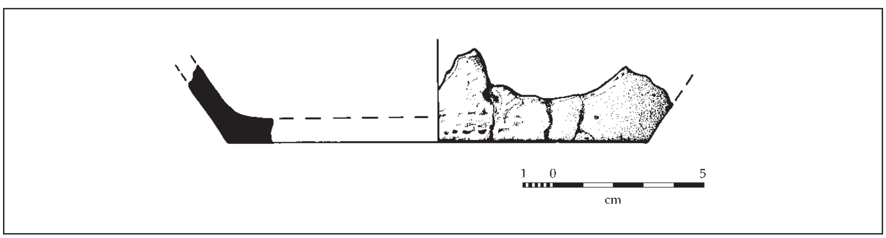


Fig. 4.20—Lowpark: Vessel 9 from pit C660.

Pl. 4.18 (right)—Lowpark: pit C660 with Grooved Ware pottery in situ.

Pl. 4.19 (above left)—Lowpark: Vessel 7 from pit C660 (photo: Tomás Tyner).

Pl. 4.20 (above right)—Lowpark: rim and upper body sections of Vessel 8 from pit C660 (photo: Tomás Tyner).

Pl. 4.21 (left)—Lowpark: rim section of Vessel 8 from pit C660 (photo: Tomás Tyner).

the terminals. The upper and lower ends of the cordon and the centre section have twisted-cord impressions that are more tightly twisted than the internal cord impressions. Soot is visible externally below the rim and on the internal surfaces of the sherds. A 10.1 mm-wide perforation occurs on one body sherd. This tapers inward to 4 mm, and a sooty accretion is visible externally. This hole was probably drilled after firing and may be interpreted as a repair hole.

Vessel 8 (Pls 2.20–1; Fig. 4.19) comprises 69 sherds representing c. one-third of a bucket-shaped vessel with an estimated height of 220 mm, rim diameter of 220 mm and base diameter of 140 mm. Striations on the lower section, above the base, suggest that the vessel was scraped to reduce the wall thickness.

Vessel 9 (Fig. 4.20) includes 13 sherds, which comprise the basal section, with an estimated diameter of 140 mm. The vessel is very fresh in appearance and has a thick, sooty deposit on the inner basal area.

A shallow depression (C661) adjacent to pit C660 was filled with moderately compacted, light brown, silty sand that included 187 sherds of prehistoric pottery representing a minimum of two vessels. This fill is likely to have been redeposited material disturbed from the larger pit (C660), and so these vessels may be part of vessels recovered from C660. Vessel 1 includes a single minute base fragment and 183 body sherds. The wall sherds are 8.4 mm thick, and only the outer surface of the base sherd survives. The surfaces are smooth, and soot accretions occur internally. Vessel 2 is represented by three body sherds from a thin-walled vessel. The sherds are flat and very smooth externally, with soot accretions both internally and externally.

Discussion: Neolithic Lowpark

The Lowpark Neolithic features were on the same glacial ridge c. 500 m east of the Sonnagh Neolithic structures. The earliest features at Lowpark were near the top of the eastern portion of the ridge, with clear views to all sides except the north-west, where the ground was slightly higher. This earliest Neolithic phase consisted of a series of pits that contained varying amounts of Early Neolithic pottery, lithics and charcoal and a small amount of burnt bone, dispersed over an area measuring c. 50 m north-east/south-west by 20 m north-west/south-east. This area was extensively disturbed by subsequent activity, including a Bronze Age burial, successive phases of medieval activity and modern tillage and quarrying. It was not possible to establish the presence of defined prehistoric structures, but domestic material in these pits implied some form of habitation, and the unstratified lithics were probably displaced from disturbed features. Additional remains may survive *in situ* beyond the excavation area to the north.

The Early and Late Neolithic material survived owing to deliberate and structured deposition in pits. The pits may, of course, also have contained perishable, organic material that did not survive. As individual features, most of the remains can be related to domestic activities, although their combined deposition raises the possibility of ritual activity. The evidence for Neolithic storage pits is limited, and where they have been found they are generally shallow features (Gibson 2005, 19), as at Lowpark, making them impractical for storage or disposing of rubbish. While broken pottery, charcoal, hazelnuts, and waste or broken lithics may be seen as discarded rubbish, complete projectile heads, scrapers and polished stone axeheads were viable tools that must have

Pl. 4.22—Lowpark: porcellanite axeheads from large Late Neolithic pit (C615) (E3338:600:145) and from keyhole-shaped pit (C232) (E3338:169:72; Phase 4) (photo: Jonathan Hession).

been deposited for some reason other than disposal. Stone axeheads were deposited in sacred places in Ireland and Britain during the Neolithic period (Cooney 2000, 189). The inclusion of pottery fragments rather than complete vessels may represent token deposits. The Early Neolithic pit (C112) contained several lithic artefacts, including complete scrapers and arrowheads and weathered sherds of a Carinated Bowl. This weathering indicates exposure before deposition, which would normally be associated with midden material, and the vessel may have been retrieved from waste to be deposited formally in the pit. There was no human bone from Phase 1 (i), and the ritual deposition appears to have been unrelated to human burial rites.

The Late Neolithic features belonging to Phase 1 (ii) contained similar deposits, including lithics, with more flint represented than the preceding phase and a minimum of 28 Grooved Ware pottery vessels. Grooved Ware in Britain and Ireland tends to occur more in ceremonial than in domestic contexts outside Orkney (ibid., 17–18). The large pit (C660) outside the timber circle perimeter was filled with pottery, which included sherds from at least nine vessels, some of which had been deliberately broken *in situ*. As there were no silt layers or intermediate deposits between the pottery sherds, this can be viewed as a single event that was probably a ritual. Almost 500 minute fragments were also recovered from this pit, and perhaps this indicates a deliberate pounding of the pottery vessels for inclusion in the deposit. The pit had a similar date range and pottery assemblage to the nearby timber circle, suggesting contemporaneous use. The Kilbride timber circle, 2 km south of Mayo Abbey and 30 km south-west of Lowpark, included an external pit that contained 47 sherds of Grooved Ware (Roche & Grogan 2008), possibly representing similar ritual deposition on a smaller scale. Ritual deposition was also a feature in the Knowth timber circle in County Meath, where c. 400 sherds of Grooved Ware pottery, c. 600 lithic artefacts, mostly flint, and a porcellanite axehead were carefully deposited in the timber-circle post-pits (Eogan & Roche 1994). Similar ritual deposition also occurred at a circular structure at Phoenixtown 3B, Co. Meath, including a stone bowl or lamp in the entrance area and Grooved Ware pottery in the structural features and concentrated in an external pit. A pit in the entrance area of a similar structure at Kilmainham 1A, Co. Meath, contained a saddle-quern and a possible grinding stone; a polished stone axehead was deposited at the base of a post-hole in the corner of an adjacent rectangular structure (Lyne 2008, 23–4).

The landscape of Ireland would have been perceived as alive until quite recently (Cooney 2000, 20). Raw materials, stone and clay, were extracted from the ground, processed, used and finally returned to the ground in these pits. King (1999, 176), citing Thomas (1991, 59–63, 75–6), presents an interpretation of such deposition in pits as follows:

> Thomas notes that isolated pits seem to have been dug specifically for the burial of particular material, and backfilled afterwards and that these materials generally include a matrix that has been subject to the action of fire. He comments that the occurrence of this type of pit in Britain seems to peak with the use of Grooved Ware and goes on to say that some of the material placed in these pits may have been derived from middens or the debris from feasts.

Wainwright & Longworth (1971, 249) conclude that Grooved Ware is more often found in domestic, ceremonial and communal contexts than accompanying burial, and the perception appears to be that the occurrence of Grooved Ware in pits in southern Britain is evidence of ritual activity. This interpretation can be applied to both Neolithic phases at Lowpark, with more evidence for burnt bone, lithics and pottery in Phase 1 (ii).

Objects gain significance from the way they are perceived by people and may stand for or symbolise many different kinds of social realities and relationships (Cooney 2000, 174). The Lowpark deposits brought a variety of different artefacts together: both lithic waste and finished artefacts, implying local reduction of imported flint; an imported porcellanite axehead, which, because of its small size, may have been a symbolic item rather than a working tool; Grooved Ware pottery manufactured from local raw materials but in a style current on other sites, including Kilbride, south Co. Mayo, the Boyne Valley, Co. Meath, and northern Britain; and charcoal and burnt animal bone. The combinations of deposited material at Lowpark may have been symbolic of an individual event or specific belief, such as an offering, with deposition continuing after the structure was built and possibly after it went out of use, reflecting the ritual significance of the site. A similar combination of lithic waste, finished artefacts, unidentifiable burnt bone and Grooved Ware pottery occurred at Kilbride, Co. Mayo (Cotter 2008). This implies a broader cultural basis and probably much wider distribution of this site type than has been identified or recognised to date.

The Ballyglass West I burnt spread, discussed in Chapter 2, fits between the earlier and later phases of Neolithic activity at Lowpark. The lithic evidence at Ballyglass West I reflects domestic activity, and the presence of an accumulation of burnt stone on low-lying ground near a water source suggests activity similar to the processes on *fulachta fiadh*; however, there was no trough to confirm function. Dating and proximity to Lowpark suggest a temporal and spatial connection between the areas, with both sites components of a broader Neolithic landscape.

The faunal and archaeobotanical remains in the Late Neolithic pits at Lowpark suggest domestic deposits. Some charred hazelnut shell fragments and crab apple suggest seasonal food waste, as no whole fruit were present. The burnt bone, where identifiable, was faunal, again suggesting food waste. The loose, well-drained, sandy soil was not conducive to organic preservation, and unburnt remains were not preserved.

Timber circles in Britain and Ireland come in a variety of sizes, from small post settings indistinguishable from ordinary houses to more grandiose structures that were probably specialised buildings (Bradley 2007, 120–1). The structural layout of a circle enclosing a square of large posts with a porch or façade feature at the entrance occurs in Britain and Ireland, with well-preserved examples at Knowth, Co. Meath (Eogan & Roche 1994), Whitewell, Co. Westmeath (Phelan 2007), Rathmullen, Co. Meath (Stafford 2001, 4), and Kilbride, Co. Mayo (Cotter 2008). Two undated structures, Phoenixtown 3B and Kilmainham 1A, between Navan and Kells, Co. Meath (Lyne 2008), were very similar in plan and are likely to represent timber circles.

The Lowpark Phase 1 (ii) features included two arcs of post-holes that are likely to have formed the entrance to a timber circle with a projected diameter of 10–20 m. The remainder of the projected circle to the south did not survive *in situ*, owing to later agricultural activity and animal burrowing. The larger pits contained similar pottery and were roughly contemporaneous or slightly later, indicated by the disturbance of the arcs of post-holes by at least one of the larger pits. The presence of frequent Grooved Ware pottery sherds in these pits is in keeping with a Late Neolithic date but is significant in its west of Ireland distribution. Sometime before 2700 BC, Grooved Ware pottery, characterised by bowl-, tub-, barrel- or bucket-shaped vessels with flat bases and often highly decorated surfaces, appeared in Britain and it 'marks the style of pottery most commonly associated with large Wessex henges and more complex timber circles'(Gibson 2005, 20).

A sizeable gap in the archaeological record between the end of the Middle Neolithic c. 3000 BC and the appearance of Beaker Culture elements in Ireland c. 2400 BC was noted by Brindley (1999, 23). She identified 13 sites that produced Grooved Ware dating to this period. More recent excavations have expanded this group. Assessing radiocarbon dates for this period has an inherent difficulty arising from three plateaux in the calibration curve, producing a wide date spread (ibid., 30). In Lowpark, charcoal samples of short-lived wood species (hazel and alder) directly associated with Grooved Ware were submitted for radiocarbon dating and produced date ranges of 120–160 years, and one sample that included hazel, alder and Pomoideae had a date range of 260 years. Brindley (ibid.) also noted that, of the 30 dates from Grooved Ware sites, few could be related with complete certainty to the pottery and may relate to later phases; sites with Beaker activity can be particularly difficult to differentiate. In Lowpark, charcoal from four pits that contained Grooved

Ware pottery were dated, and the post-holes of the possible timber circle were dated by association with the pottery pits and may be slightly earlier.

The appearance of Grooved Ware, possibly early in the third millennium BC, demonstrates that flat-bottomed, tub-shaped pots, some with decoration formed by parallel grooved lines, were part of the ceramic repertoire (Waddell 1998, 45). Bradley (2007, 98–122) traces the parallel development of passage tombs and circular wooden structures with associated Grooved Ware pottery in Ireland, Orkney and northern Britain. He lists six structures with associated Grooved Ware, two of which, Knowth, Co. Meath, and Balgatheran, Co. Louth (Ó Drisceoil 2003), are in the east of Ireland. These comprised square structures within circular arrangements of post-holes, 8–10 m in diameter, with entrance features (Bradley 2007, 98–122). Three 'Grooved Ware timber circles' occurred in the Boyne Valley, Co. Meath, one at Ballynahatty, Co. Down, (Hartwell 2001), and one at Whitewell, Co. Westmeath. A Late Neolithic arc of post-holes with associated Grooved Ware occurred at Fourknocks, Co. Meath (King 1999). The Whitewell site is significant as it marks a dramatic westward extension of the distribution of timber-circle sites beyond the Boyne Valley region (Grogan et al. 2007, fig. 6.5, 136–9). This eastern geographic distribution of timber circles is probably a reflection of more archaeological excavation in the eastern part of Ireland rather than a true distribution of the monument type, as evidenced by the recently discovered site at Kilbride, to the south of Lowpark. The Whitewell timber circle was relatively small, with an internal diameter of 5.5 m (Phelan 2007). Its overall date range overlaps significantly with that of Lowpark Phase 1 (ii), and similar artefacts, including Grooved Ware pottery, flint tools and porcellanite axeheads, were retrieved from both sites. Late Neolithic sites containing Grooved Ware in the south-west include Lough Gur, Co. Limerick, and Longstone, Cullen, Co. Tipperary, in the north-west Kiltierney, Co. Fermanagh, and in the midlands the Heath, Co. Laois (Grogan et al. 2007, fig. 6.5, 138–9). Pottery similar to Grooved Ware was deposited with flint and animal bone during the Late Neolithic at Caltragh 2A, Co. Sligo, and may represent ritual deposits (Danaher 2007, 133). The Kilbride timber circle was dated to 3010–2470 BC (Cotter 2008). Kilbride and Lowpark have established previously unknown, significant Late Neolithic activity associated with Grooved Ware in County Mayo, offsetting its previous eastern bias and clearly suggesting a more widespread distribution.

The recently excavated sites at Phoenixtown 3B and Kilmainham 1A, Co. Meath, were both post-built circular structures, 8.5–10 m in diameter, with entrances facing south-east (Lyne 2008). Kilmainham 1A contained a fairly definite rectangular arrangement of internal post-holes and stake-holes (ibid., 25), which fits the classic arrangement of a square structure or screened area within a circular structure, as presented by Bradley (2007, 119, fig. 3.16). The internal structure at Phoenixtown 3B was an incomplete square; however, it still constitutes a likely timber circle. A large external pit 10 m south-east of the entrance contained at least 500 sherds of pottery provisionally identified as Grooved Ware (ibid., 24); this closely parallels the position of the large pottery-filled pit (C660) 10 m from the Lowpark structure.

The Kilbride timber circle comprised a well-defined circle of post-holes, c. 8 m in diameter, which enclosed a rectangular arrangement of post-holes similar to other timber circles (Cotter 2008, 9). The Kilbride lithic, burnt bone and charcoal assemblage is similar to the Lowpark assemblage although smaller. A similar Grooved Ware assemblage, comprising 97 sherds representing 15 vessels, was also recovered from Kilbride. The pots were coil-built and flat-based, with sides splayed out from the base and then curving in toward the rim, broadly similar to those from Lowpark, although the Kilbride assemblage was weathered, indicating that it had been exposed for some time before deposition, unlike the Lowpark assemblage, which was mostly fresh. Of the four rim sherds recovered from Kilbride, three were rounded and one was flat, with decoration, as at Lowpark, confined to the surface just below the rim and consisting of horizontal grooves. One vessel was unusual and unparalleled in Ireland in that it was decorated with six irregularly placed horizontal to oblique grooves. Carbonised matter was present on ten of the Kilbride vessels, indicating that they had been used for cooking (Roche & Grogan 2008, 29–30). Similar accretions were noted in Lowpark. The Kilbride assemblage was characterised by relatively few, weathered sherds per vessel and must be token sherds deposited significantly after the vessels went out of use. This represents a variation in practice or ritual between the two known Grooved Ware sites in County Mayo. The larger scale of the Lowpark assemblage may reflect a longer or more intense period of use, with deposition in the larger pits continuing after the structure went out of use. Almost half of the pottery at Kilbride, 48 sherds, was found in a single pit, 6.5 m south-west of the entrance to the timber circle (Cotter 2008, 12), again similar to the Lowpark and Phoenixtown 3B sites.

The Lowpark Grooved Ware assemblage clearly fits Brindley's Dundrum–Longstone type, the most recognisable, definable and widespread group. It is characteristically well made, with some thin-walled vessels with rounded rims and sparse, controlled decoration, including horizontal grooves, impressed cord and small applied bosses. This pottery type was identified at the Dundrum Sandhills, as well as Ballynahatty, Co. Down, Fourknocks, Knowth, Loughcrew and Newgrange, Co. Meath, and Longstone, Co. Tipperary. Similar pottery is known from Britain, although it appears to be relatively uncommon (Brindley 1999, 24). The Kilbride pottery is also of this type. The other four types identified by Brindley were represented at Lowpark by relatively few sherds and are paralleled in Britain rather than Ireland.

The appearance of Grooved Ware with distinctive monuments and artefacts in Ireland indicates a new archaeological culture rather than an indigenous development. All aspects of the Knowth structure are paralleled in Grooved Ware sites in Britain (Eogan & Roche 1999, 109). By extension, the other Irish Grooved Ware sites are part of an introduced culture, and the predominance of the Dundrum–Longstone type, which is rare in Britain, can be seen as a regional variation on this Late Neolithic archaeological complex.

The loose, sandy nature of the Lowpark subsoil and subsequent disturbance resulted in partial preservation of the site. It was not possible to establish the original depth or extent of the features. The Lowpark structure, south-west of the main site, is likely to have been a timber circle similar to those at Knowth, Whitewell and Kilbride. A diameter of 10–20 m has been extrapolated from the two arcs at Lowpark.

Timber circles are monuments in their own right and can occur in isolation or incorporated into larger, usually later complexes, most notably at Newgrange, Co. Meath. Sarn-y-bryn-caled, Wales, was an example of a freestanding timber circle that was deliberately unenclosed, subsequently destroyed and not replaced by another monument. About 1,000 years later, metalworking took place in the settling cone of the central pit (Gibson 2005, 35). This suggests that the monument may have been marked in some way and retained an element of significance. The Lowpark timber circle may have been partly dismantled, which explains the absence of the remainder of the circle. If posts were removed from the loose, sandy subsoil, it is possible that no archaeological impression would survive. The presence of the later, larger pits indicates that the site remained important after its destruction, with substantial assemblages of lithics and pottery deposited in the area of the structure. Gibson (ibid., 43) also notes that the Grooved Ware at timber circles tends to be from secondary contexts. The significance of the general area may be reflected in the presence of the Bronze Age cremation burial nearby (Phase 2). The medieval settlement may also have been deliberately sited in a locally significant place.

The incomplete survival of this site made it difficult to determine the original morphology. Intercutting pits and post-holes in the extant part of the site further complicated interpretation. Timber circles such as Kilbride, Ballynahatty, Knowth and Balgatheran had similar plans, with circular or oval arrangements of post-holes enclosing roughly square internal structures. They were generally unenclosed and would have been prominent in the landscape, with a recurring feature of screened interiors, possibly for hidden ceremonies. Gibson (ibid.) noted similarities to circular henge monuments and later stone circles, indicative of continuity of tradition. There is little doubt that Lowpark was part of a broader Late Neolithic tradition practised in Britain and Ireland. In conjunction with the Kilbride timber circle, Lowpark has filled a western gap in the distribution map, suggesting the possibility of a much more widespread distribution of Late Neolithic timber circles and Grooved Ware pottery than previously thought.

Neolithic pottery from Lowpark: extracted from specialist report by Rose M Cleary (Appendix IIa)

The Lowpark Neolithic ceramic assemblage consists of 7,165 sherds, or 11,650.5 g. The assemblage is largely in good condition, and it is possible to calculate the minimum number of vessels as being in the region of 38. The Early Neolithic component of the assemblage comprises 172 sherds, or seven vessels, and this pottery is generally sturdy domestic ware manufactured to withstand use over a fire. The later Grooved Ware remains comprise 28 vessels. The Grooved Ware pottery was deposited mainly in pits associated with a timber circle and, to a minor extent, in the structural post-holes of the circle. This part of the assemblage was in good condition and unweathered, suggesting that it was deposited in the features immediately after discard or as part of a rite relating to the function of the site. The vessels were incomplete and probably broken at the time of burial. The remains of four vessels were also recovered from a two-phase pit (C546): one of these was Neolithic, while the other three were Bronze Age Food Vessels.

Fabric

The clays used in the manufacture of the Neolithic Grooved Ware and Food Vessels are local to the site, and the temper fragments are volcanic, from the Charlestown Inlier, and local crushed limestone. Bone temper was used in some of the Early Neolithic vessels.

Manufacturing techniques

The pottery from Lowpark was built from coils and exhibits the characteristic fracture pattern. The majority of the assemblage was manufactured using the N-technique. Where apparent, the bases were flat discs that were pulled into shape, and generally the fracture between the base and the wall indicates that the lower section of the wall was pulled up from the basal disc and thereafter coils were added to build up the wall. The cordons and pellets in the Grooved Ware pottery were applied to the vessel surface, as opposed to being pinched up from the surface. There is some indication that the wall thickness was reduced by scraping the vessel, evident as a series of tooling marks. Most of the Grooved Ware assemblage appears to have had no other treatment than smoothening, while burnishing is apparent on almost all of the Early Neolithic assemblage.

The mottled surfaces of the assemblage indicate a rapid firing, relatively low temperatures and poor draught. Colour changes occur only on the vessel surfaces, and the cores remain grey.

Decoration occurs on only ten of the Grooved Ware vessels. The Grooved Ware decoration is on the upper areas of the vessels, below the rim and on the body. The techniques of decoration are incised, impressed and plastic, and the motifs are incised lines, twisted-cord impressions, and applied cordons and pellets. The use of cordons may have been functional as well as decorative.

Surface condition

The condition of the pottery has implications for the understanding of deposition practice on the site. The assemblage is generally well preserved, and this suggests that it was deliberately buried in features. Soot is common internally and is on most of the Early Neolithic and Grooved Ware vessels.

Discussion

Neolithic

The Early Neolithic pottery from Lowpark comprises seven vessels, which were recovered from contexts dated to between 3931–3662 BC and 3680–3662 BC. The vessels are round-based with pronounced shoulders and out-turned rims and are undecorated (Fig. 4.5). Five vessels are burnished. This pottery can be classified as Sheridan's (1995) Early Neolithic 'classic' Carinated Bowls. This terminology incorporates Case's 1961 Dunmurry and Ballymarlagh style of his 'Western Neolithic Ware'. The available radiocarbon dates presented by Sheridan in 1995 place the classic Carinated Bowls in her Phase 1, dated to c. 4650–3650 BC. The Lowpark dates fall within the latter end of this date range.

Excavation of a site at Magheraboy, Co. Sligo, has recently been published as part of the N4 Sligo Inner Relief Road project, and the remains of 36 Carinated Bowls were recovered from a causewayed enclosure with a date range of 4240–3500 BC (Danaher 2007). These were generally in a fragmentary condition, and the majority are open bowls with mainly simple, out-turned rims. One group from Magheraboy has a corky texture with angular voids and may have been bone-tempered, similar to two vessels from Lowpark. Other Neolithic pottery from

County Mayo includes a recently excavated vessel from Carrowkeel townland, which is undecorated, has an out-turned rim with a diameter of c. 280 mm and may be bone-tempered.

Grooved Ware

There are two main types of Grooved Ware vessels from Lowpark: large, tub-shaped vessels or jars (Figs 4.14, 4.16–20) and a small bowl from pit C600 (Fig. 4.13). Both types are relatively thin-walled, with wall thicknesses of c. 7–10 mm.

Brindley's (1999) typology for Irish Grooved Ware pottery has five groups. The larger vessels from Lowpark are morphologically the closest in terms of shape and decoration to Scottish and Yorkshire parallels for her Dundrum–Longstone group. The bowl from Lowpark is closely paralleled with vessels from Newgrange, Co. Meath, that are included in Brindley's Dundrum– Longstone group. The difference between the Lowpark bowl and those from Newgrange is that, while the bowls from both assemblages have internal grooving, the Lowpark bowl also has applied vertical cordons.

The decorated sherds from Lowpark (Vessel 4 from pit C619; Fig. 4.21) are finely incised and do not conveniently fit into any of Brindley's groups, the closest parallel being the Grange–Geróid Island type, where the decoration is externally incised but much more crudely executed than at Lowpark.

In general terms, the Lowpark Grooved Ware belongs to Brindley's later stages of the Grooved Ware tradition, 'associated with pit and post enclosures and circles' (ibid., 23). The Lowpark assemblage differs, however, from other assemblages in that the decorated vessels include cordons and applied pellets, which are not easily paralleled in the published literature. The limited amount of decoration places the Lowpark assemblage in what Brindley terms Horizon 6, where ornament is restricted, and the apex of the horizon is dated to c. 2600–2500 BC. The Lowpark radiocarbon dates are generally within the range proposed for this phase of Grooved Ware in Ireland. Horizon 6 is also a northern British development, and the Mayo region is within reach of the west coast of Scotland

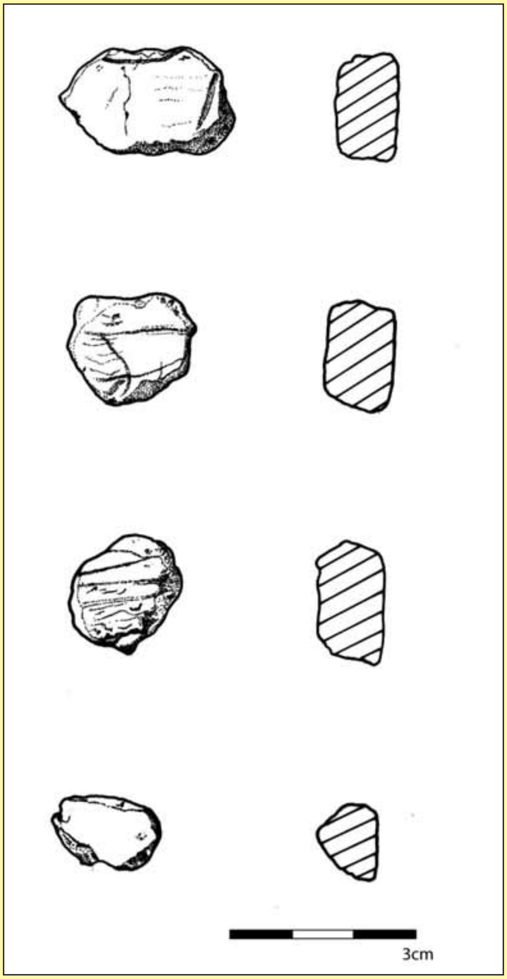


Fig. 4.21—Lowpark: Vessel 4, C619.

A typological division of Irish Grooved Ware proposed by Roche (1995) is based on Grooved

Ware from the Boyne Valley, principally the passage tomb at Knowth. The Lowpark assemblage is thin-walled, and decoration is confined to the upper body and may be equated to Roche's Style 1. A subsequent review of the Knowth assemblage from a timber circle divides the pottery into two fabric groups—fine, thin-walled and thick-walled vessels. Decoration is limited in both to internally below the rim, and one vessel has three external grooved lines and an applied pellet. The pellet motif at Knowth is comparable to those on the bowl and tub-shaped vessels (Fig. 4.14) from Lowpark, albeit the vessels from Lowpark are approximately twice as large, with pellets up to 25 mm in diameter. Grooved Ware from other areas at Knowth was abraded and appeared to have been discarded rather than deposited deliberately in pits. Similar to Lowpark, the Grooved Ware from Knowth also had carbonised remains, suggesting use as cooking pots. The Lowpark assemblage is comparable in vessel size to some of the Knowth assemblage, where rim diameters of up to 280 mm are recorded.

The Grooved Ware fine wares from Knowth were recovered mainly from the post-pits of a circular wooden structure and are described as being 'placed in an ordered and significant fashion around the circumference of the post' (Eogan & Roche 1999, 98). This contrasts with the Lowpark material, which was largely recovered from pits probably associated with the timber circle, mainly by spatial distribution and similarity of the ceramic finds. The Knowth assemblage is dated to 2882–2459 BC and 2588–2457 BC.

Grooved Ware from Newgrange, Co. Meath, was recovered mainly from the south and east side of the main passage tomb. There was a marked distribution of small bowls just north of the multiple arc of pits rather than as pit backfill. The Newgrange assemblage is more fragmented than that at Lowpark, primarily owing to deposition circumstances, whereby the Newgrange material was recovered from occupation layers rather than pits or post-holes. The bowls from Newgrange are comparable in form to the bowl from Lowpark, although the Newgrange material has up to four internal grooves and external applied pellets and does not have external applied cordons. The Newgrange assemblage also includes a range of flat-based vessels that were described as coarse domestic pottery. Much of this is decorated externally with incised lines, twisted cord and impressed pits, and the decoration appears to have been all over the surface or zoned. Heavy cordons were recorded on some vessels, but these differ from those on the Lowpark pottery. Repair holes were also recorded on a bowl from Newgrange, similar to those on Vessel 1 from Lowpark.

Excavation of a henge at Monknewtown, Co. Meath, produced one large vessel that may be Grooved Ware and is of comparable size to the large vessels from Lowpark. Some of the Monknewtown pottery has cordons and 'knobs'. These are similar to the applied pellets on Vessel 1, which are grouped, and perhaps those on the Lowpark bowl, which have become detached.

A Grooved Ware assemblage was recovered from a timber circle dated to 3010–2880 BC, 2900–2850 BC and 2870–2470 BC at Kilbride, Co. Mayo. The assemblage comprises an estimated 15 vessels and, as at Lowpark, the vessels were fragmentary when deposited. Unusually, much of the pottery from Kilbride was weathered, suggesting that it was not deposited immediately after discard and may have been strewn on an occupation surface or midden before deposition in the timber-circle pits. This contrasts to the Lowpark material, which was unweathered and probably deposited in the pits immediately after being broken. Apart from internal grooving, the decorative element of the Kilbride assemblage is dissimilar to that at Lowpark. Both assemblages had internal soot accretions, suggesting use as cooking pots.

A possible Grooved Ware assemblage was recovered from Caltragh, Co. Sligo, with a radiocarbon date range of 2890–2500 BC (Danaher 2007). The pottery was fragmented, and the majority was abraded, suggesting a different depositional history from that at Lowpark. The Caltragh pottery is thick (up to 10 mm; average 7 mm), has no diagnostic (rim or base) fragments and is undecorated; it may not be Grooved Ware, as such, although the timeframe is within the Grooved Ware ambit. Similar to Lowpark and other Grooved Ware assemblages, the Caltragh pottery has soot accretions.

British parallels for the Lowpark assemblage are probably best sought in the Scottish region. The Lowpark assemblage is paralleled by McSween's Types 5 and 6, where the vessel form is bucket-shaped and decoration is incised (Type 5) or applied cordons or bosses (Type 6) and confined to the upper body (McSween 1995). Scottish sites have also produced undecorated Grooved Ware, similar to some of the Lowpark assemblage.

Southern British Grooved Ware is, in contrast to the Irish material, very decorative, and the smaller vessels appear chronologically earlier. The small bowl from pit C600 at Lowpark has an associated date of 2610–2460 BC and, although the date span is wide, it is at the latter end of the sequence of ^{14}C determinations from Lowpark. Similar small vessels were recovered from Newgrange and Knowth, Co. Meath, and, although not closely associated with radiocarbon determinations, may also be late in the Irish Grooved Ware sequence. The small bowls from Irish Grooved Ware sites contrast with the vessel form sequence in British Grooved Ware sites.

The Lowpark Grooved Ware assemblage was apparently deposited as some type of ritual act. The deposition was of incomplete vessels, freshly broken and unweathered, and, in the case of pit C660, nine vessels were placed in the pit, with possibly two further fragmentary vessels that were recovered from an upcast layer. Fragments of minutely crushed pottery from the pit fill suggest deliberate grinding of vessels to produce several fragments. The selection of parts of broken vessels has also been recorded on many Irish Grooved Ware sites, and this deliberate deposition pattern must be linked to some type of esoteric symbolism or belief. The timespan between vessel use and deposition is problematic, as there is evidence of vessel repair by drilling holes and vessels must have been curated or at least not deposited immediately after use. The use is indicated by soot accretions, which are common on Grooved Ware assemblages and suggest that the contents were linked to some rite. The simplest concept for this type of deliberate deposition of pottery in pits could be returning the clay to the earth, the earth being seen as the progenitor of all of the material. Placing pots in pits external to the timber circle may also be a symbolic act in order that the spirit of the pot could somehow guard the enclosure. Much of Irish Grooved Ware pottery, including the Lowpark assemblage, has traces of carbonised matter internally, and the vessels were used for cooking. They may have contained some special substance or food used in a ritual and been subsequently broken and placed in pits. The absence of weathering on the Lowpark assemblage indicates that the time between use in a cooking process and burial was minimal.

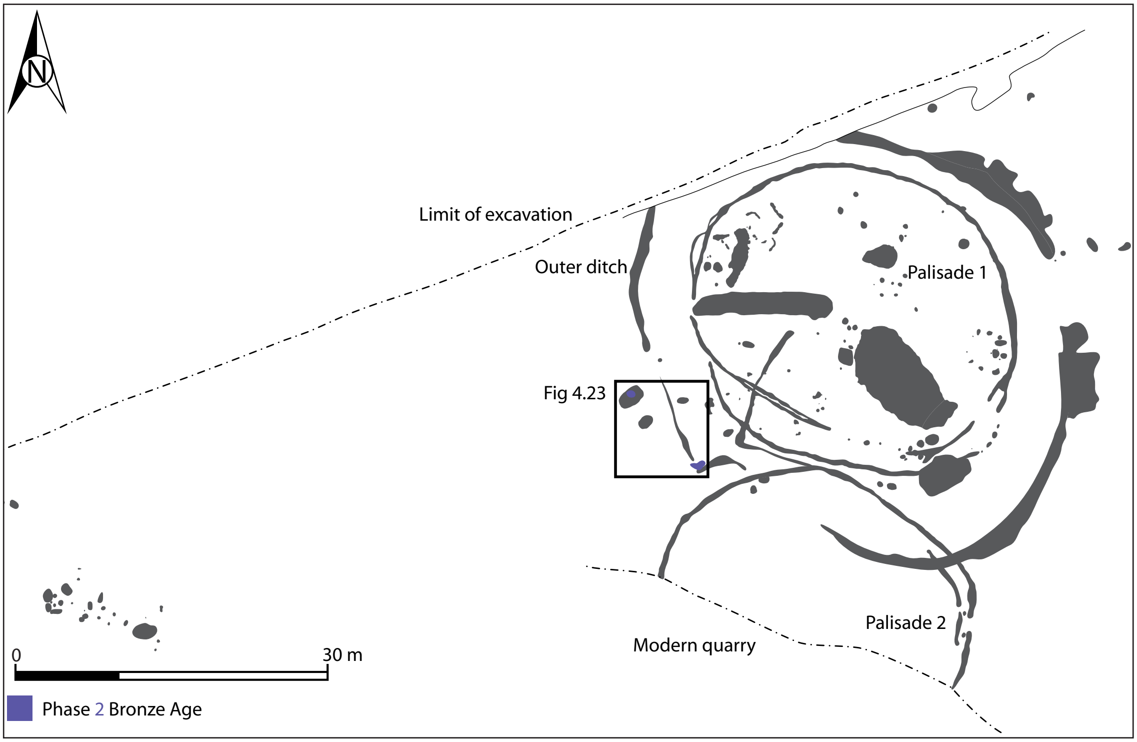


Fig. 4.22—Lowpark: plan of Bronze Age features.

Phase 2: The Bronze Age

A large pit (C546) 2 m west of the western edge of the outer ditch (Phase 4) was initially dug in the Neolithic period. This was cut by a secondary, Bronze Age burial that included human bone and fragments of three Food Vessels. Hazel and alder charcoal from the basal level of the secondary pit produced a radiocarbon date of 3700–3520 BC (Beta-231661) and must relate to the earlier pit. Eight pits occurred within a 5 m radius of C546, and these either contained Neolithic material or could not be assigned to a particular period.

The cremation burial pit (C546)

The pit (C546) was a two-phase feature dug into the natural sand and gravel. The primary pit, dug in the Neolithic period, was sub-rectangular with rounded corners, narrower and deeper to the west and slightly broader to the east, and measured 2.40 m east–west by 1.28 m north–south, with a depth of 0.20–0.35 m. The secondary, Bronze Age pit was roughly circular, 0.80 m in diameter, with an overall depth of 0.89 m and was dug through the centre of the earlier, sub-rectangular pit. It was difficult to distinguish between the fills of the two features, particularly in the basal area, and the radiocarbon date obtained from charcoal relates to the Neolithic phase, although it appeared to be from the Bronze Age pit fill. There must have been some displacement of the Neolithic pit

Pl. 4.23—Lowpark: post-excavation view of Bronze Age burial pit (C546).

Pl. 4.24—Lowpark: lens of stones in main fill (C528) of pit (C546).

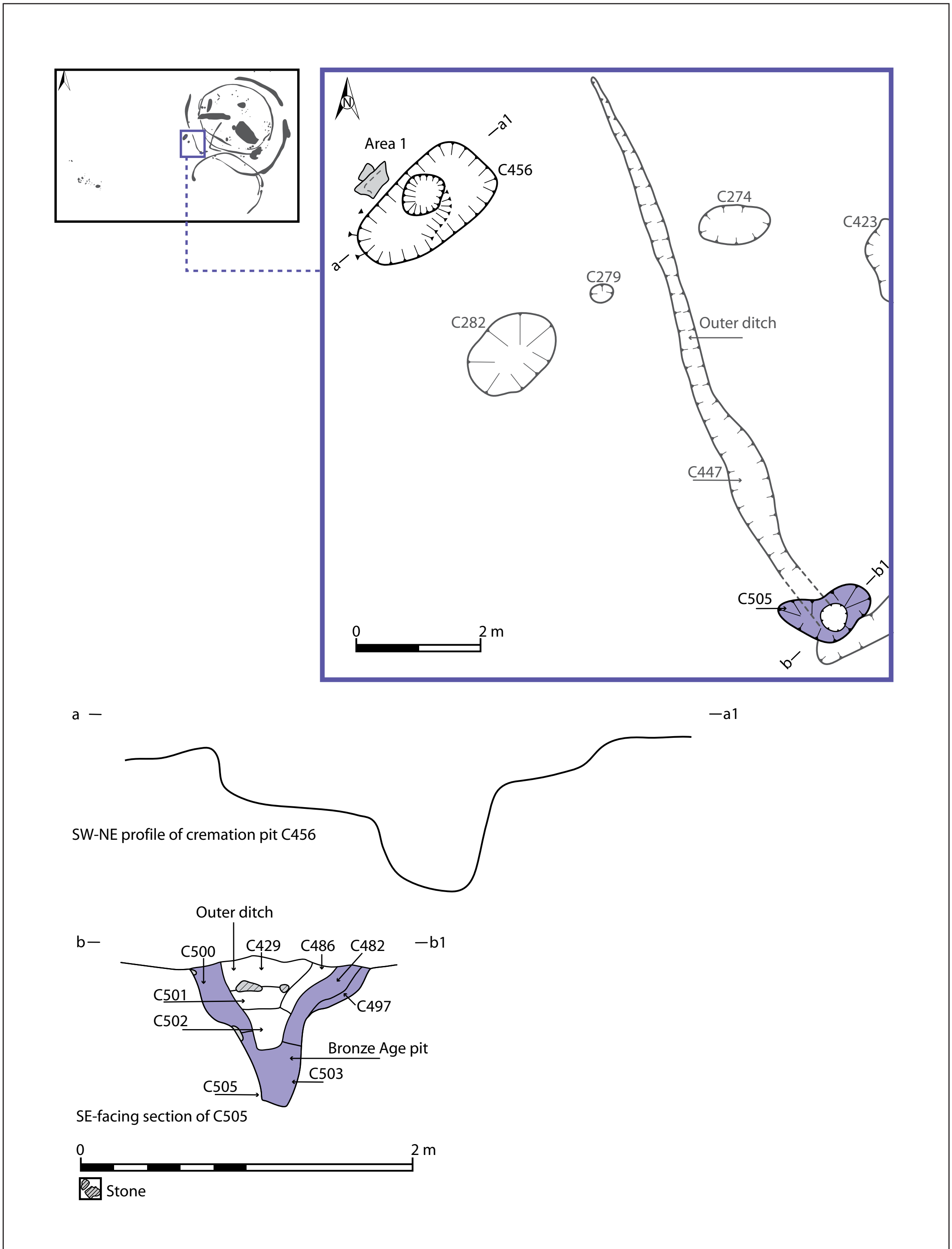


Fig. 4.23—Lowpark: plan and section of Bronze Age pits (C546 and C505).

fill when the Bronze Age burial was inserted. Five sherds of Neolithic pottery representing a single vessel were also recovered from the secondary pit. Several Neolithic deposits occurred in this area, and the presence of Neolithic pottery here complements the evidence from nearby (Phase 1) pits.

Pit C546 contained four fills. The main fill (C528) was 0.60 m thick, rested on the base and consisted of charcoal-flecked, dark brown, silty sand. Cremated human bone (378.7 g) occurred throughout the main fill but was less frequent toward the base. Hazel and alder charcoal in the fill produced the Middle Neolithic radiocarbon date. A lens of small stones (0.05–0.10 m in diameter) covering an area of 0.51 m by 0.57 m occurred toward the centre of this fill but appeared to be a random deposit. A 0.13 m-thick layer of similar, mid-brown silt (C507) overlay C528 in the west. A sterile, 0.19 m-thick layer of redeposited subsoil (C529) occurred in the east of the upper part of the pit. The upper fill (C281) consisted of charcoal-rich, dark brown, sandy silt with frequent cremated bone fragments (587.9 g). It contained four quartz pieces: a bipolar chunk, a flake, a small débitage flake and a rolled, splintered flake (E3338:281:247, 248, 260 and 264). These lithics are undiagnostic of a specific period and could be contemporary with either phase of deposition. The pit contained the remains of a minimum of four pottery vessels, including five fragments of a Neolithic vessel and three Bronze Age Food Vessels (Appendix IIa). All of the vessels are

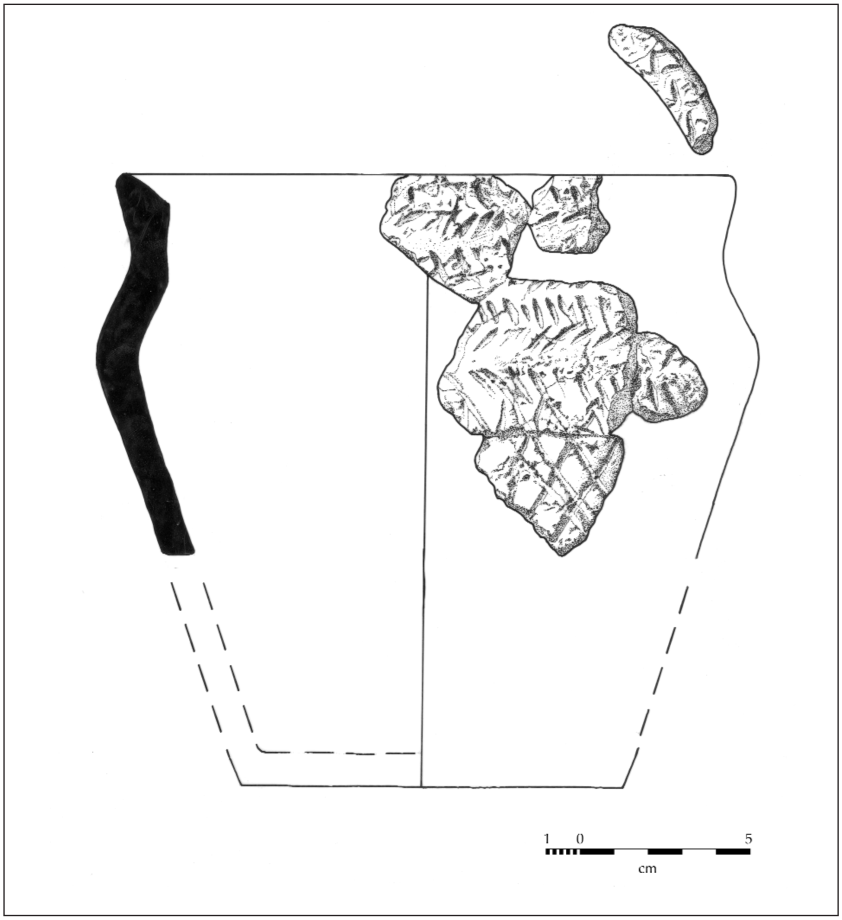


Fig. 4.24—Lowpark: Vessel 2, Vase Food Vessel from pit C546.

fragmentary and represent token deposits. Vessel 2 comprises 22 sherds of a Vase Food Vessel with a rim diameter of 180 mm, a shoulder diameter of 195 mm and an estimated height of c. 180 mm. Decoration consists of incised herringbone motifs in zones below the rim, on the neck and in the shoulder areas. The rim also has a band of herringbone decoration. The surface below the shoulder is decorated with an irregular, cross-hatched design. Vessel 3 was represented by three sherds from the upper section of a small vessel with an estimated diameter of 140 mm. The rim is decorated with a central incised line and small triangular pits on the outer lip and has an internal bevel. The rim edge is scored with short lines extending to the outer surface. The external surface decoration is zoned, with incised lines and intermediary triangular pits. Vessel 4 was represented by three undecorated rim sherds, giving an estimated rim diameter of 140 mm, and 56 body sherds of similar fabric. The body sherds have small impressed pits, both randomly spaced and in lines made with a point that had rounded corners.

Almost 1 kg of burnt human bone suggesting a relatively complete single cremation was recovered from pit C546. Dental remains indicate that, if one individual is represented, it is likely that he was aged c. 13–17 years. The remains suggest that the body was male, although the determination of sex in the adolescent skeleton is problematic (Appendix X; see extract below).

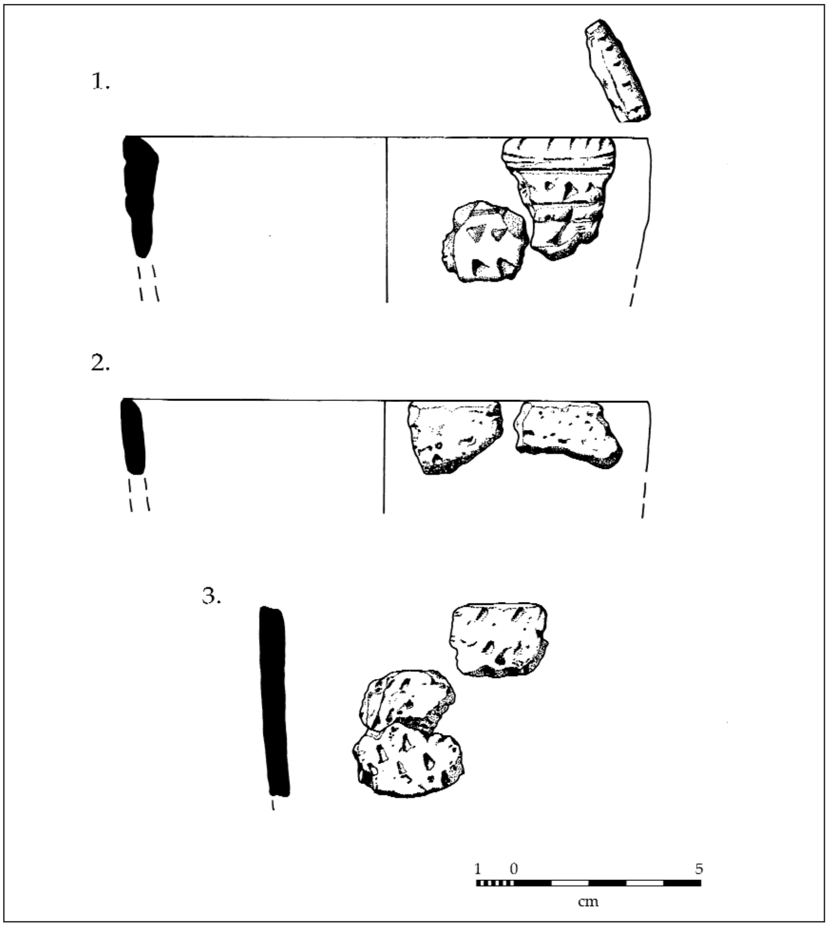


Fig. 4.25—Lowpark: three body sherds from Vessel 4, all from pit C546.

Late Bronze Age pit (C505)

One large pit (C505), 8 m south-east of pit C546, was dated to the Late Bronze Age. It measured 1.4 m east–west by 0.7 m north–south and was 0.9 m deep. It was irregular in plan at the surface, owing to later disturbance by the outer ditch (C429, C486, C501 and C502). It was a more regular oval shape below the disturbance, at a depth of 0.04 m, where it measured 0.45 m by 0.50 m. This pit had steep to vertical sides and a flat base. It was filled with successive mixed layers of silt, sand, clay and small stones with varied levels of charcoal inclusions. Hazel and oak charcoal from a lower fill (C503) produced a radiocarbon date of 1210–940 BC (Beta-231660). Oak charcoal from the upper fill (C429) produced a radiocarbon date of AD 664–855 (GrA-35964).

Pl. 4.25—Lowpark: south-facing elevation of fills of pit C505.

Pl. 4.26—Lowpark: post-excavation view of pit C505.

Discussion: Bronze Age Lowpark

Pit C546 was in a prominent position on the southern side of a glacial ridge, near its eastern end, with clear views to the south-west, south and east. The ground was more elevated to the north and north-west, restricting views. Other archaeological remains in the area included a Late Neolithic Grooved Ware timber circle, 40 m to the west. This pit was in an area of Early Neolithic activity. It was a two-phase feature, with an initial Neolithic pit being re-cut in the Bronze Age when a cremated burial was interred with fragments of three Food Vessels. Fills of Neolithic and Bronze Age date were mixed, and Neolithic pottery was found in the same fill as the Bronze Age Food Vessel pottery, with its associated cremated human bone. Charcoal from the fill produced a Middle Neolithic radiocarbon date (3700–3520 BC). The lithic assemblage was undiagnostic of any period.

The three Bronze Age vessels identified were partly represented. There were 22 sherds of Vessel 2, c. 13 % of a 180 mm-high Food Vessel. Vessel 3 was represented by three sherds from the upper section of a small Food Vessel, and Vessel 4 was represented by three rim sherds and 56 body sherds. All are interpreted as partial or token deposits, with less than one-fifth of each vessel present. This is not typical of deposition practices in the Food Vessel tradition. Decoration included incised lines in herringbone and cross-hatched designs, and impressed triangular pits in keeping with Food Vessel motifs present elsewhere. Vessel 4 is atypical of Food Vessels and may be an anomalous type from the same cultural milieu (see Appendix IIa).

The care with which the cremated bones were gathered from the funeral pyre, the associated pottery and the location may suggest either familial high status or the esteem in which the individual was held by his community. An adolescent burial may suggest that his high status was familial rather than due to personal achievement. The Bronze Age burial record in Ireland with high-status associated grave-goods suggests selective burial of perhaps an élite group rather than being the burial record of the entire population. The association of a Vase Food Vessel and burnt bone is in keeping with the general tradition. Unlike bowls, only a very small number of vases were found in association with unburnt bones (Waddell 1990, 10). The presence of an adolescent is not unique. Several Vase Food Vessels have been found with the cremated bones of one adult, but in Ballinchalla, Co. Mayo (ibid., 114), and Cloonshannon, Co. Wicklow (ibid., 159) the burnt remains of those were adolescents.

The form of the second large pit (C505), dated to the later Bronze Age, suggests that it held a post, but it was not possible to assign it to a particular structure. The radiocarbon evidence indicates that the pit post-dated the cremation burial by several hundred years. This feature was surface-truncated by the medieval outer ditch and was in an area of intense early medieval activity. The pits (C505 and C546) may have been part of a larger Bronze Age complex that was disturbed by later activity. Other, undated features in the area may have been contemporaneous, and further features may have been removed by later activity, including medieval occupation and subsequent agriculture and quarrying.

Bronze Age pottery from Lowpark: extracted from specialist report by Rose M Cleary (Appendix IIa)

Pit C546 was a two-phase feature, with an initial, Neolithic pit containing pottery (Vessel 1) having been re-cut in the Bronze Age, when a cremated burial was interred with fragments of three Food Vessels (Vessels 2–4). The Food Vessel remains were fragmented at the time of deposition. The decorative elements on the Food Vessels are carelessly executed, incised and impressed, mainly zoned, with incised lines, horizontal herringbone and lattice pattern motifs.

Vessel 2 is ascribed to the vase tradition. The profile is a short-necked with a sharp angle to the shoulder, and the rim is bevelled internally. This type of pot is dated to 2150–1700 BC (Brindley 2007, 101). The vessel is decorated all over with short incised lines forming herringbone patterns on the upper body, including the rim, and a carelessly executed cross-hatched motif below the shoulder. The short, vertical neck, sloping shoulder and almost equal length of neck and sloping shoulder (25 mm) suggest that the vessel belongs to Ó Ríordáin & Waddell's (1993, 25–6) tripartite vase tradition, although decorated internal rim bevels are a feature of the bipartite style. The profile of the Lowpark vessel is angular, as opposed to the curving profile of bipartite vases. The distinction between tripartite and bipartite vases can be blurred, and the only clear difference appears in the angular profile of tripartite vases and the curved profile of bipartite vases. The known distribution of tripartite Vase Food Vessels is largely in the south-east and north, and the only site in the west of Ireland is Ballyogan, Co. Sligo, where the vase was recovered from a polygonal cist grave and associated with a cremated burial. Bipartite vases are, however, relatively common in counties Mayo and Galway, with six examples from north Mayo. Most of these vessels were recovered from cist graves, with the exception of a single sherd from Bilberry Island, Lough Conn. Herringbone motifs are common on the Mayo Vase Food Vessels and are recorded on pots from cemetery sites at Ballinchalla, Cashel and Letterkeen, a single cist grave at Stonepark and a kerbed cairn at Knock, where the cist grave may be a secondary insertion. The Letterkeen site was on a low ridge occupied by a ringfort, a similar location to Lowpark. The use of herringbone is recorded widely in the Mayo–Galway region on both Bowl and Vase Food Vessels (Sheridan 1993, fig. 18).

Vessels 3 and 4 from pit C546 are fragmentary, although it is possible to reconstruct the profiles partly. Vessel 3 is a fine, thin-walled vessel decorated with incised lines and triangular pits on the rim and neck. The decoration is in zones divided by the incised lines. Too few fragments survive to reconstruct the vessel form, although the rim diameter is estimated at 140 mm, and the wall thickness of 6 mm suggests a relatively small pot. Bipartite vases occasionally have impressed triangles or dots (Ó Ríordáin & Waddell 1993, 29), but no comparable motif appears on tripartite vases, although the motif may emulate on a smaller scale the common filled triangle motif on tripartite vases. Similar to Vessel 4 (below), this vessel does not easily fit into the Food Vessel classification proposed by Ó Ríordáin and Waddell (ibid.) but, because of their association with the Vase Food Vessel, both must belong to the same cultural milieu.

Vessel 4 is very fragmented, and it is possible only to reconstruct a rim diameter of 140 mm.

The rim area and neck are undecorated, and the body sherds have small triangular pits. The vessel is atypical of Food Vessels and may be an anomalous type.

The Food Vessels from Lowpark were a token deposit, and less than one-fifth of Vessel 2 and less of Vessels 3 and 4 were buried. This contrasts with what can be considered the norm for deposition of Food Vessels, as complete vessels associated with either inhumed or cremated burials, in either cist or pit graves. Some burials, such as Moneen (O'Kelly 1952a) and Ballynahow (O'Kelly 1946), both in County Cork, had fragments of Food Vessels interred with the burials. The deposition of vessel fragments, similar to Grooved Ware deposition practice, must be related to a rite whereby the vessels were symbolic of some belief rather than functional.

An analysis of the burnt human remains from Lowpark: extracted from specialist report by Denise B Keating (Appendix X)

A total of 966.6 g of burnt human bone was recovered from pit C546. This represents the remains of at least one individual, and the bone weight suggests a relatively complete cremation. Dental remains indicate that, if one individual is represented, it is likely that he was aged c. 13–17 years. The remains suggest that the body was male, although the determination of sex in the adolescent skeleton is problematic.

Time spent collecting the bones of the deceased may reflect the individual's status, and it is noted of some cultures that cremation rituals can be used as public theatre in order to assert status (Metcalf & Huntington 1999). The bones were successfully calcined, reflecting high temperature or prolonged burning. The colour may simply be a by-product of a larger or perhaps longer-burning pyre used to represent the status of the individual.

The main fill of the deposit (C528), weighing 378.7 g, contained 39.2 % of the weight of the entire deposit, while the upper fill (C281), weighing 587.9 g, contained 60.8 %. The lower fill yielded 7,042 burnt bone fragments (44.8 % of the total), while the upper fill produced 8,665 fragments (55.2 %).

The most commonly identified bone fragments in cremations are those from the skull. Just over one-quarter of all identified fragments in this burial were cranial. Of the identified fragments in the lower fill, 31.6 % were cranial vault fragments, and in the upper fill that figure was a little lower, at 23.4 %. The high prevalence of skull fragments in cremations is usually due to its preferential survival and ease of recognition to those collecting the remains for interment. The slightly higher rate of cranial fragments in the lower level may be a reflection of this, with their position in the fill illustrating their earlier retrieval.

Analysis of the different bone types found in the pit fills appears to show that there was no deliberate choice of elements for deposition in one or other part of the burial. McKinley (2002) notes that the majority of cremations show random deposition, with just a few rare cases of ordered deposition being known. This is inclusive of animal fragments, which are often seen in cremations burials. It has been suggested that these represent the deposition of grave-goods or are, perhaps, indicative of a funerary feast. There were just two identified animal bone fragments in this deposit, however, and it would seem inappropriate to attempt to interpret the presence of animal inclusions based on two fragments.

It is common in cremations to see a range of colours throughout the burnt bone fragments, from fire-blackening or charring to full white oxidation. This reflects the different temperatures reached in various parts of the pyre, as well as across the corpse. Generally, a uniform temperature is not gained across the body owing to its differing soft-tissue density distribution. It has been noted that 'bone with dense soft tissue cover will not cremate as fully as bone with less cover' (McKinley 2002, 405). However, in this case, the majority of fragments, including those from bones with substantial overlying soft tissue, were white.

Just four fragments exhibited patches of other colouration in this burial, all tooth roots. They ranged from dark greyish-blue to light blue, suggesting incomplete oxidation. It is likely that incomplete oxidation occurred because of their sheltered position in the jaws, where transmission of higher temperatures to their surfaces would take longer than for areas directly exposed to the pyre. However, when incomplete oxidation occurs, it is also possible that the location of the fragment within the pyre was a factor. For example, after the flesh has been burned away, the teeth, particularly single-rooted teeth, may become loose and may, as the body and pyre collapse, fall in a cooler, more peripheral part of the fire.

Overall, however, the bones of this individual were very successfully calcined. It is not necessarily the case that this pyre reached a very high temperature in order to have produced these results. The same effects, with the majority of the bone being white, would be seen if the pyre could be made to burn for a prolonged period (Mays 1998). Neither is it necessarily the case that there was a desire to achieve white colouration. The colour may simply be a by-product of a larger or perhaps longer-burning pyre having been used to represent the status of the individual.

McKinley (2002) notes that the typical weight of a modern adult cremation is between 1,000 g and 3,600 g, depending factors such as sex, age and stature. With a total bone weight of 996.6 g, it would seem that this was a relatively complete cremation. It should be remembered that completeness of a skeleton depends on the level of completeness that is cognitively required for a burial, this seems to vary among cultures (ibid.). Time spent collecting the bones of the deceased may reflect status and, as noted of some cultures, cremations can be used as public theatre to assert status (Metcalf & Huntington 1999).

It initially appeared, from the majority of the bone fragments that were identifiable, that these were the remains of an adult. Complete phalanges and the apparently fused distal radius (C281) indicated a typical adult cremation. There were three cases, however, where the complete profile of a tooth crown was preserved. These were the right maxillary first molar, the left maxillary first molar and the right maxillary canine crown. All crowns were unworn.

Dental attritional aging schemes have been devised by Brothwell (1981) and others and, although created for determining age from a full complement of molar teeth, can be useful in the estimation of age in individuals where a complete set is not available. According to Brothwell's scheme, some dentine exposure should be expected in even the youngest of the scheme's adult categories (17 to 25 years). There appeared to have been no reduction of cusp height or exposure of dentine in either of the molars from the Lowpark cremation, however. It is possible that some enamel polishing, also seen in Brothwell's first age period, had taken place, but its expression is difficult to judge, given the tooth's altered surface morphology as a result of burning. It is also possible that this individual had reached adulthood but that lack of wear in the preserved molar dentition did not reflect this.

Tooth crowns are often poorly represented in cremated remains, as they are prone to shattering in the heat of the pyre. Where they survive, it is often in the remains of juveniles, where the unerrupted tooth is afforded protection in the alveolus from heat in the crypt. However, this appeared not to have been the case in the Lowpark cremation. The presence of a maxillary molar root-group illustrated that the first maxillary molars, at least, had erupted. Furthermore, the root-group appeared to be complete, showing that the individual had attained at least 9 or 10 years (van Beek 1999).

There were a number of instances where complete distal manual phalanges were preserved. The proximal epiphysis of this bone is known to begin fusion at as early as 13 years. The distal radius also was preserved. Although the fragments did not survive well enough to indicate that the bone had definitely fused distally, its morphology presented the strong possibility that it had. This bone is known to fuse at as early as 14 (female) or 16 (male) years (Scheuer & Black 2004). If this cremation represents the calcined remains of a single individual, it is likely that the individual was aged between approximately 13 and 17 years.

It is extremely rare, owing to the infrequent recovery of sexually dimorphic bones in cremations, that sex is determinable. In this case, the pubic symphysis was recovered. Its lack of concavity at the sub-pubic angle suggests that the individual was male (Buikstra & Ubelaker 1994; White & Folkens 2000; Schwartz 1995). However, the lack of reliable sexual dimorphism before the completion of puberty makes the determination of sex in the adolescent skeleton problematic and may render any results erroneous.

These discussions of sex and age have been based on the assumption that the remains represent a single individual. The MNI (minimum number of individuals) calculated for this deposit was one. There was no evidence, such as the doubling of elements, for the presence of a second individual.

Phase 3: early medieval ironworking

The evidence for iron-processing is among some of the earliest medieval archaeological remains at Lowpark. The radiocarbon date range from five features spans the period AD 560–970 and encompasses most of the medieval occupation of the site. This evidence constitutes some of the most important archaeological remains at Lowpark, where there were at least four discrete iron-processing workshops (Areas 1–4). Good survival of iron workshops from the early medieval period is rare in the archaeological record. Palisade 1 (Phase 4) was adjacent to Ironworking Area 1 in the east, and the southern, outer arc truncated it. The outer ditch (Phase 4) overlay Ironworking Area

Fig. 4.26—Lowpark: general plan showing Ironworking Areas 1–4 and additional ironworking features.

3, and Souterrain 1 abutted and appeared to have been cut by Iron-working Area 2. Most of the 1.36 tonnes of iron slag recovered during the excavation had been deposited in adjacent features (748 kg), particularly in Souterrain 1, or spread by subsequent ploughing (177 kg) (Appendix VIIIa). Slag was also re-used as packing material in the palisade trenches. In addition to the four ironworking areas, there were eleven pits with ironworking residues in the south-east quadrant of the site. Redeposited slag was also concentrated in this portion of the enclosure, and a spread of unstratified slag continued downslope to the south-east for a further 20–30 m. The metallurgical evidence suggests that pits in Ironworking Areas 1–4 were the remains of smithing workshops for primary and secondary smithing activities (Appendix VIIIa–b). Metalworking artefacts re-used in Phase 4 were likely to have had their primary use in Phase 3. These included a granite anvil base (E3338:467:262) re-used as packing in Palisade 1, a complete rotary grind stone (E3338:512:239), a fragment of a second rotary grind stone (E3338:512:270) incorporated into the walls of Souterrain 1, and a hone/sharpening anvil and an anvil (E3338:240:267) incorporated into Souterrain 2.

Ironworking: a background

The first stage in the ironworking process, which involved smelting ore, is likely to have been carried out elsewhere, with the products transported to or traded at Lowpark. Pleiner (2000, 141) defines smelting features as follows: 'The bloomery furnace in which iron ores were converted to metallic iron and siliceous slags was a metallurgical installation comprising an enclosed space filled with charges of ore and charcoal fuel and with provision for an air supply'. The evidence from Lowpark includes several pits with ironworking residues, although neither ore nor diagnostic smelting slags were present. The process of separating slag from metallic iron involved raising the temperature to 1100–1400 °C, melting the slag and separating it as much as possible from the metallic ore. As the metal did not melt, an inhomogeneous solid bloom of metal was produced. Plain iron was the main product of these furnaces, but other alloys were commonly produced as well (Bayley et al. 2001, 9).

Iron bloom required further reduction, and there was evidence for this primary smithing at Lowpark. The bloom was hammered while hot to consolidate the metal and expel the trapped slag (ibid., 13). Tuyère blocks and large anvil stones found at Lowpark Ironworking Areas 3 and 4 suggest the use of bellows for reaching the required temperature and solid surfaces for hammering out partly processed iron. While still hot, the iron stock or billet produced then required secondary smithing or forging to produce artefacts (ibid., 2001, 9). It is likely that secondary smithing was the main (or, if iron billets were brought in, the only) ironworking activity carried out at Lowpark.

Ironworking at Lowpark

At least three of the ironworking areas in Lowpark included evidence for structures. Shelter was necessary to keep both the metallurgical structures and the raw materials as dry as possible. A shelter protected the hearth and the smith from the elements and also created dim lighting round

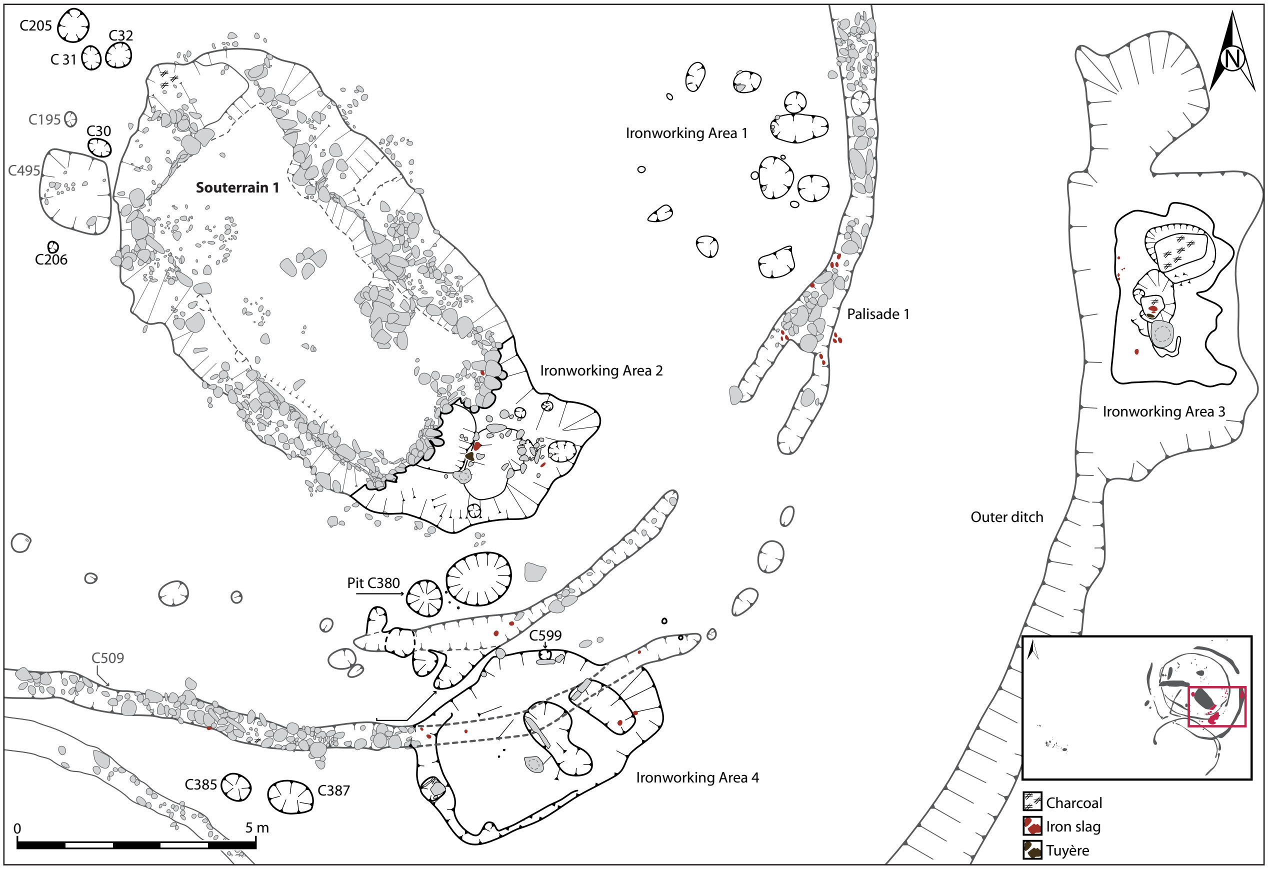


Fig. 4.27—Lowpark: Ironworking Areas 1–4 and features associated with ironworking.

the hearth, allowing the smith to judge the temperature of the iron from the colour. Shelter was particularly important at the exposed location of Lowpark. Scott's (1990, 187–9) overview of the blacksmith's forge from language and literature itemises the tools and installations but does not describe the structure that housed them. Interpretation of the structures at Lowpark can only be on the basis of the surviving remains.

Pleiner (2006, 123–34) describes the various features or installations in the early medieval European blacksmith's workshop. The basic requirements were a hearth or fireplace, a bellows and an anvil. A supply of water and fuel and waste deposit were also required. The hearths were circular, square or elongated, burnt-red fire pits dug in the floor of the workplace, sometimes lined with clay, stone or tiles and filled with charcoal, ash and smithing iron slag. They varied in diameter from 0.30 m to 1.50 m and were 0.15–0.40 m deep. A bellows was required to provide a forced draught to reach the necessary heat of 700–1200 °C to make iron malleable for further working. Except for one example made of leather and wood from the smithy at the Russian Belaya Vezha-Sarkel (eighth–10th century AD), early medieval bellows do not survive in Europe (ibid., 132). The three tuyère blocks from Lowpark confirm the use of bellows, and stone and vitrified clay from Areas 2 and 3 may have acted as protection for the bellows from the intense heat of the fire. A medieval iron anvil fixed on a wooden block would be unlikely to leave any trace in the archaeological record and may have been anywhere in the floor areas of the ironworking structures at Lowpark. The anvil base (E338:467:262) re-used in Palisade 1 could have been used in any of the workshops. The anvil morphology suggests that it was partly sunk into the ground (Appendix VIb), which may account for some of the shallow pits at Lowpark. Some of the stones set in these ironworking areas may equally have been used as anvil stones. The large, flat stone in Ironworking Area 3 was the most substantial example. Some sort of water container was also required to cool the implements, quench hardened iron or sprinkle charcoal to develop a hardened crust on the surface to keep the centre red hot. Traces of these elements of ironworking would survive only if they were housed in features cut into the ground. The same applies for charcoal storage and waste disposal, i.e. dumps of slag. It is likely that the iron artefacts found on site, mainly small knives, were produced in the Lowpark ironworking areas (Appendix VI). Other agricultural artefacts, such as plough shares, sickles, shears and domestic implements (keys, locks, bolts, nails etc.), were likely to have been produced at Lowpark also, but no such items were recovered. Excavations at Garryduff, Co. Cork (O'Kelly 1963), exemplify the range of implements used on early medieval domestic sites, and sites such as Lowpark produced the requirements of the community. Slag and magnetic dust were the main by-products, and the fuel, charcoal (generally oak), was well represented at Lowpark.

Three of the four ironworking areas were defined by concentrated layers of charcoal and slag (Areas 2–4) and were deliberately sunk into the subsoil to a depth of 0.4–0.7 m. Two of these sunken areas (Areas 2 and 4) had associated structural evidence, including a slot-trench and post-holes, probably representing plank walls back-built against a pit edge with supporting posts and roofed with some allowance for expelling fumes and smoke.

Finds associated with iron processing at Lowpark included ironworking waste, three tuyère blocks, large anvil stones with flat or worked, concave surfaces, an anvil base, grind stones, hone stones, hammer-scale (small particles of iron dust produced during ironworking), vitrified clay, iron slag and iron artefacts.

Ironworking Area 1

Ironworking Area 1 was delimited by a series of seven post-holes and two stake-holes enclosing two ironworking pits. It was immediately adjacent to the eastern side of and within Palisade 1. The radiocarbon date for pit C8 within the structure (AD 660–870; Beta-231648) overlaps significantly with that of Palisade 1 (AD 690–900; Beta-231657), confirming their close temporal relationship. However, the risk of fire from an iron workshop to an adjacent wooden palisade suggests that they may not have been in contemporaneous use.

The circular arrangement of seven post-holes (C9, C10, C237, C247, C244, C268 and C226) and two stake-holes (C256 and C261) had an internal diameter of 3.5 m. These post-holes had an average diameter of 0.4 m and depth of 0.25 m below the surface of the subsoil. As the subsoil was loose and sandy, further support would have been required to hold them in place. Packing stones remained *in situ* in one post-hole (C10). The irregular contours and the various stepped

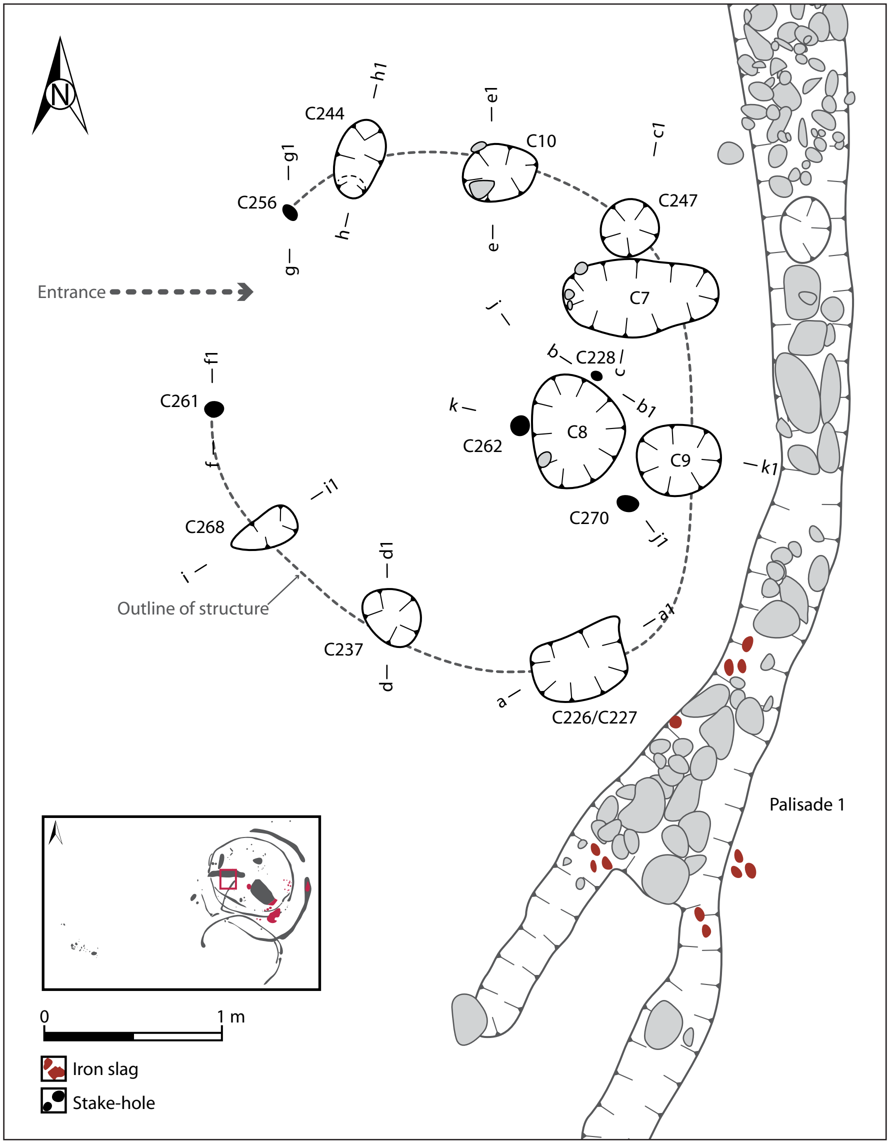


Fig. 4.28—Lowpark: Ironworking Area 1 and adjacent section of Palisade 1.

sides of the other post-holes may have been due to the removal of packing stones and the posts for re-use elsewhere. Substantial posts secured in these holes with packing material may have supported a circular structure measuring 3.4–4 m in diameter with a 1.5 m-wide opening to the west, flanked by two stakes housed in C256 and C261.

The structure enclosed three pits with evidence for ironworking. They were in the eastern side of the structure, opposite the entrance. The main pit (C8) measured 0.9 m by 0.7 m by 0.26 m deep. It contained iron slag (2.86 kg), magnetic dust, charcoal, oxidised soil and two flat stones. Three evenly spaced stake-holes (C228, C262 and C270) flanked the edge of the pit and must have been functionally related. The surrounding sandy subsoil was reddish-orange, indicating *in situ* burning in an oxidising environment. This, combined with the presence of magnetic dust and

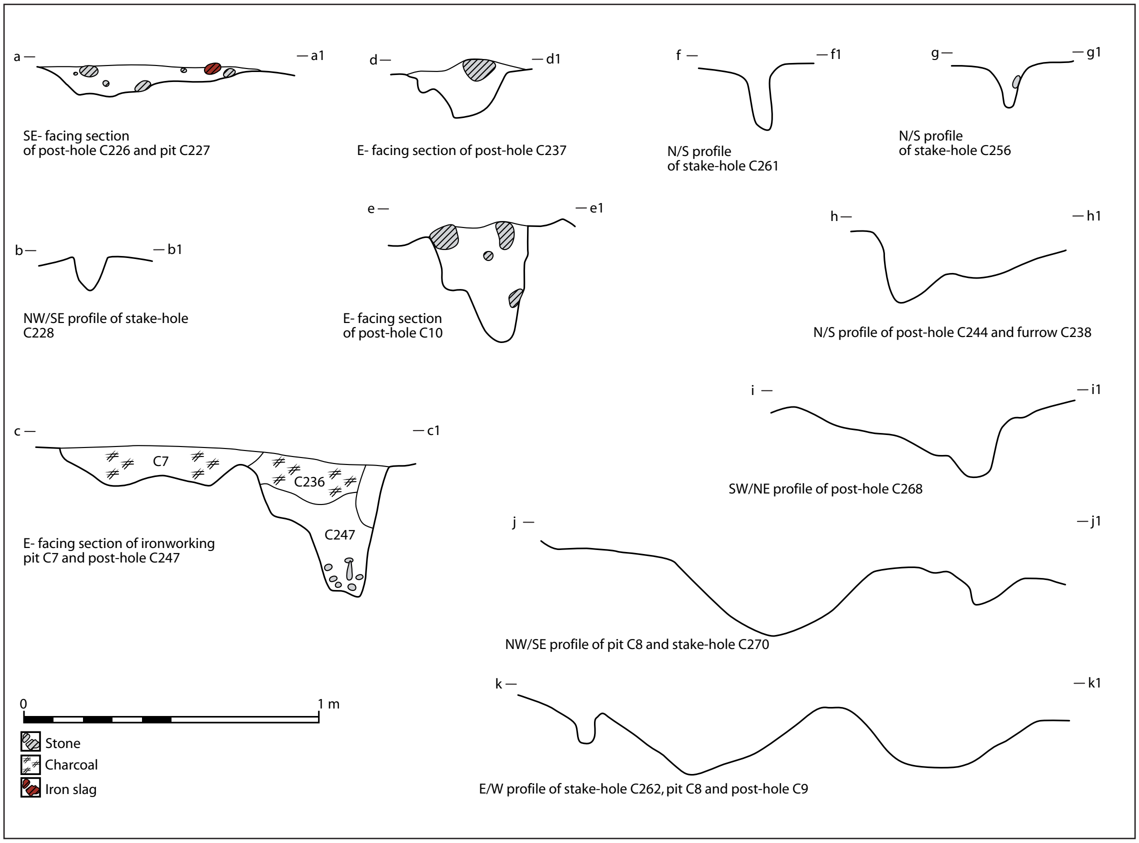


Fig. 4.29—Lowpark: sectional profiles of Ironworking Area 1.

other ironworking debris, suggests that it was an ironworking pit. The presence of two smithing hearth cakes (regular, concentrated lumps of slag that form at the base of smithing hearths) in this pit indicates iron smithing. The second pit (C7) had a distinctive oval shape with a concave profile. It was 1.19 m long, 0.7 m wide and 0.14 m deep. There were many irregularly shaped slags (9.9 kg) from this pit, including some small, grey, brittle fragments that may indicate primary smithing (Appendix VIIIa–b). The pit was adjacent to the central pit (C8/C229) and between two of the post-holes (C247 and C9). The third pit (C227) was conjoined with the post-hole (C226). It was circular, with a diameter of 0.3 m and a depth of 0.13m. It had uneven sides and an irregular base and contained 5.7 kg of iron slag, including five distinctive, rounded smithing hearth cakes with an average weight of 1.4 kg and three rounded pieces of vitrified clay, which are possible tuyère block fragments (Appendix VIIIa). There was significantly more hammer-scale in the area defined by the post-holes than externally around the structure.

This structure was probably an iron workshop. Magnetic dust suggests the shaping or reworking of iron objects. The largest, most central pit (C8/C229) displayed evidence for intense burning and contained two flat stones at the top that may have been used as a solid working surface or anvil stones. The primary function of the other two pits was probably charcoal storage or as waste pits

Pl. 4.27—Lowpark: post-excavation view of Ironworking Area 1.

Pl. 4.28—Lowpark: ironworking pit (C8).

Pl. 4.29—Lowpark: post-hole (C10).

to store ironworking by-products while cooling, and the secondary fills contained the final waste from the workshop. The remaining space was large enough to allow two people to work at the smithing hearth or pit, one operating a bellows, probably to the south as the possible tuyère fragments were in the southern pit (C226/227), and the blacksmith (*gobae*) to the north-west, working the iron. Space for water and fuel storage or an anvil block was limited. Aside from the post- and stake-holes, there was no evidence of the type of superstructure, although a wattle-and-daub walled construction with a thatched reed roof is possible, as reeds are relatively resistant to heat and sparks. The Old Irish written sources emphasise the use of reeds for thatch (Kelly 2000, 240). Wooden shingles are also referred to in the early Irish texts (ibid., 385). The position of the ironworking pit or hearth away from the entrance placed it in the dimmest part of the structure, allowing the blacksmith to judge the temperature of the iron from its glow. The floor level of the structure was slightly sunken and at the surface of the subsoil, unlike the other ironworking areas, where the workshops were constructed in large pits and consequently large amounts of slag did not accumulate on the floor and residues were confined to the pits. Furrows at floor level indicate that modern ploughing had removed any surface deposits.

Ironworking Area 2

This ironworking area (C589) was in the south-east quadrant of the area enclosed by Palisade 1. It abutted Souterrain 1 (C587), and a radiocarbon date of AD 540–650 (Beta-231655) from charcoal from a lower fill of Souterrain 1 confirms that the souterrain was slightly earlier than the ironworking, which returned a date of AD 720–970. One of the ironworking pits (C307) abutted the south-east wall of Souterrain 1, opportunistically incorporating the redundant souterrain wall into the ironworking structure. The ironworking remains were recorded in an area that had been lowered deliberately to create a sub-rectangular sunken floor. The upper level of this area measured 3.80 m by 2.60m. The sides sloped steeply to an irregular base that measured 2 m by 1.65 m and had an average depth of 0.83m. Structural posts stood at the base, and a porch-like feature appeared to extend from the south side.

Five post-holes (C288, C290, C299, C302 and C305) were situated in the sunken floor and probably held structural timbers. Packing stones survived *in situ* in two post-holes (C305 and C299). It is likely that the other post-holes also had packing stones, as the sandy subsoil must have required additional support to hold the structural posts in place. Four of the post-holes were evenly spaced to the east of the area and may have held posts flanking a rectangular entrance or porch feature. Other post-holes may have been destroyed by later truncation. No definite evidence for the type of walls or roof survived, but this structure was semi-underground, set into a large pit with a lowered working surface and back-built plank walls within the pit that were secured by posts, with most likely a rush-thatched roof.

Two ironworking pits (C306 and C307) were cut into the floor. One pit (C306), adjacent to post-hole C305, was sub-rectangular and aligned north–south, measuring 1.61 m by 0.67 m and 0.2 m deep. It contained a large quantity of iron slag (29.46 kg) in charcoal-flecked soil and magnetic dust. This fill must have accumulated after the pit went out of use. The second pit (C307) was to the

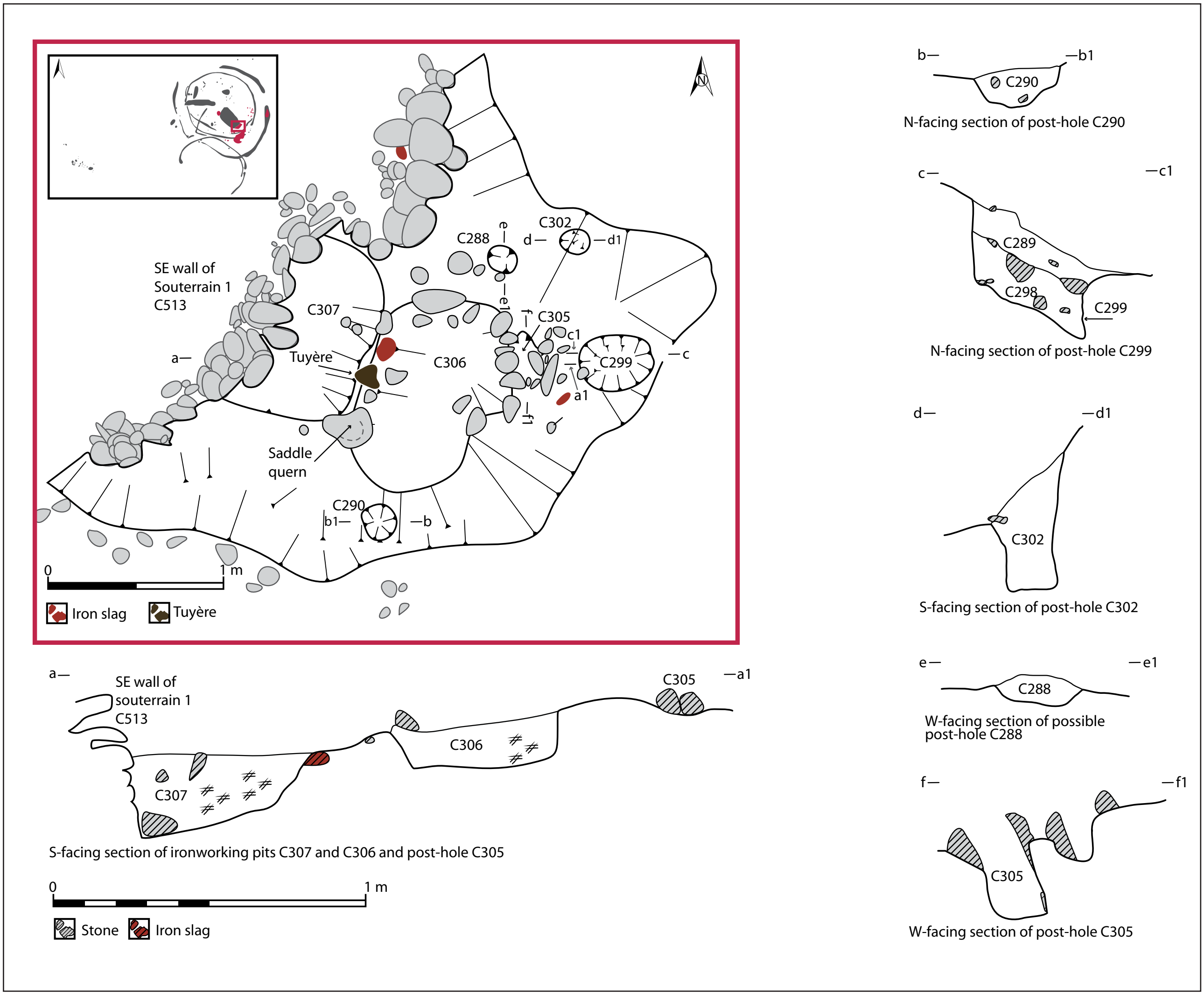


Fig. 4.30—Lowpark: Ironworking Area 2.

north-west and abutted the souterrain wall (C513). It was sub-circular, measuring 1.52 m by 0.72 m, and 0.31 m deep. It was filled with a loose, charcoal-flecked, dark brown mix of gravel and sandy silt that had moderate inclusions of iron slag (1.32 kg). A stone (E3338:258:140) with a worn concave surface, interpreted as a re-used saddle quern, occurred in the lower fill (C258) between the two pits and may have been used as an anvil stone or for grinding or breaking up iron bloom or re-used metal. A clay tuyère block (E3338:258:138) occurred at a similar level directly over the north-west side of pit C306, and a radiocarbon date of AD 720–970 (Beta-231651)was returned from young oak charcoal from this pit.

This sunken ironworking structure was filled by three distinct deposits (C224, C257 and C258), each of which contained a substantial amount of iron slag (145.7 kg). The bulk of this slag

Pl. 4.30—Lowpark: Ironworking Area 2, post-hole (C305).

Pl. 4.31—Lowpark: Ironworking Area 2, post-excavation.

Pl. 4.32—Lowpark: Ironworking Area 2, ironworking pits (C307 and C306) with fills half-sectioned.

Pl. 4.33—Lowpark: Ironworking Area 2, mid-excavation view.

(128 kg) came from the upper fill (C224) and was probably ironworking debris re-used as backfill. The slag may also have been waste from one of the other ironworking areas.

If these pits were in contemporaneous use, they would have occupied most of the floor area of the structure. This would have left little room for fuel or water storage, waste deposition or working space unless the workshop extended into the area of Souterrain 1. The northern pit (C307) may have fulfilled some of these functions. C306 is likely to have been the ironworking pit or hearth, as it contained the tuyère block, and C307 may have held the charcoal supply. A

Pl. 4.34—Lowpark: Ironworking Area 2, possible saddle quern (E3338:258:140) re-used in metal processing (photo: Jonathan Hession).

smith working at the concave 'anvil' stone could have knelt to the side of and adjacent to the pit. If the location of the tuyère relates to its working position, the bellows operator would have been to the north-west of pit C306, in or adjacent to pit C307. It is possible that one person in this confined space alternated between bellows and hammering. Slag from within the fills of Souterrain 1 may be waste from this workshop.

Ironworking Area 3

Ironworking Area 3 was set into a sunken rectangular pit (C594), with associated ironworking features in the eastern portion of the site. The pit was aligned roughly north–south, measured 6 m by 4.1 m and had an overall depth of 0.4 m below the surface of the subsoil. Unlike in the other ironworking areas, there was no structural evidence such as post-holes, stake-holes or slot-trenches. The absence of structural remains may be due to poor survival in the loose, sandy subsoil and later disturbance by the outer ditch (Phase 4). The deliberately sunken floor was similar to Ironworking Areas 2 and 4. Area 3 included three ironworking pits (C319, C320 and C321) and a large flat stone interpreted as a working surface or anvil stone. Oak charcoal from the fill of pit C319 returned a radiocarbon date of AD 650–770 (Beta-231653), which is earlier than but overlaps the date range of Areas 1 and 2.

The central pit (C319) was circular with steep sides. It had a diameter of 0.47 m and depth of 0.21 m. The fill was a solid, almost concrete deposit to the south but looser to the north. It consisted of charcoal-blackened, baked clay, mottled with grey specks and including magnetic dust. There were also remnants of some grey clay lining bordering the cemented and looser fills. A tuyère block (E3338:313:371) occurred at the southern edge of this pit, adjacent to the large flat stone. Sand at the base of this pit represented an interface between the pit fill and a sandy natural layer.

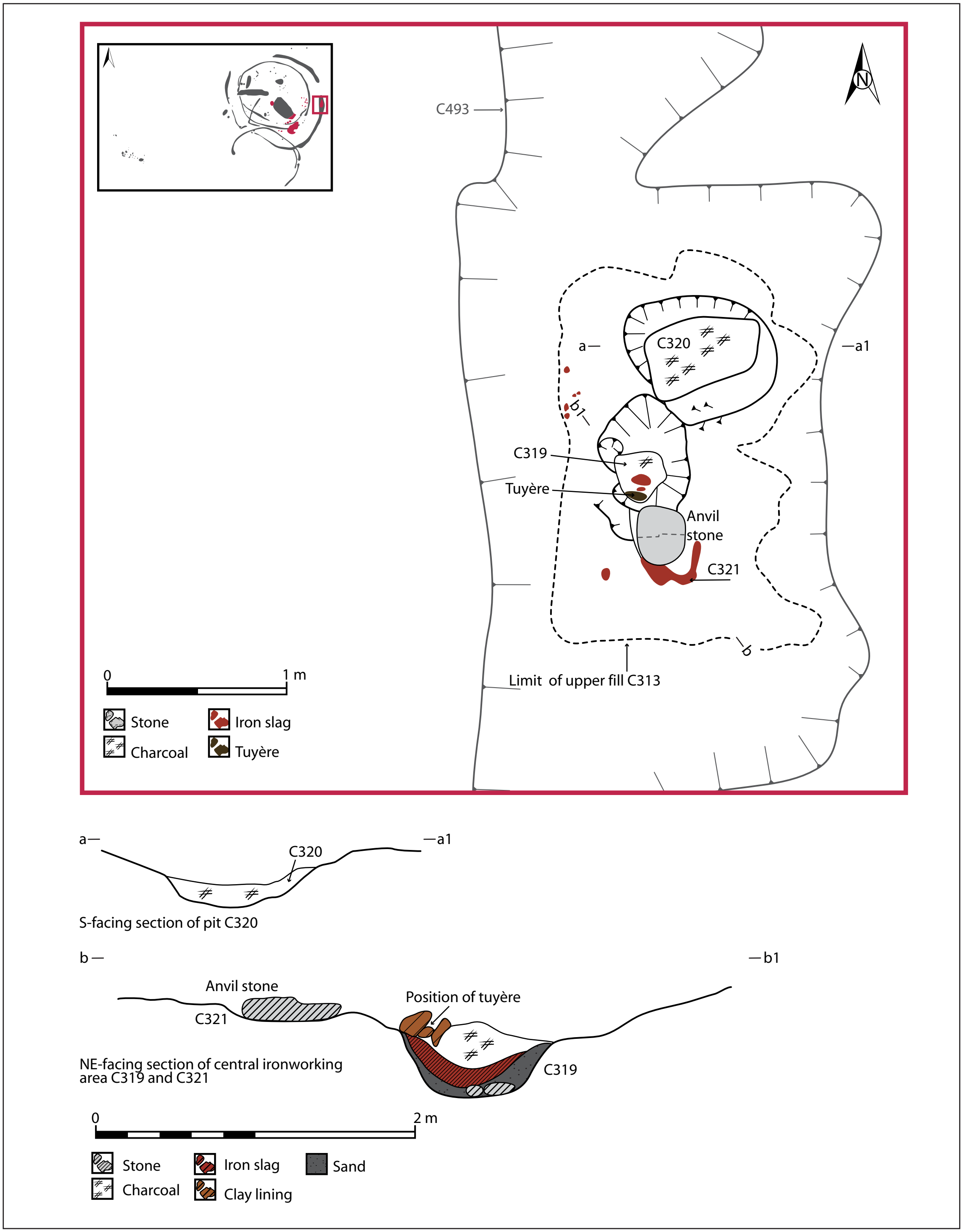


Fig. 4.31—Lowpark: Ironworking Area 3.

Pl. 4.35—Lowpark: Ironworking Area 3, half-section of pit C319.

A large rectangular pit (C320) was situated to the north of the main ironworking pit (C319). It was a shallow depression, 0.15 m deep, and measured 1.1 m east–west by 0.63 m north–south. The fill included iron slag (4.4 kg), vitrified clay and charcoal. In contrast to the central ironworking pit (C319), it was unlined and the fill was much looser.

The third pit (C321) was oval, measuring 0.45 m by 0.44 m, and 0.09 m deep. The large flat stone interpreted as a working surface or anvil stone was set into and filled most of this pit, protruding a further 0.15 m above its surface. The pit may have been dug to house the stone, and repeated heavy hammering on the surface probably embedded it further. The stone was roughly square, measuring 0.42 m by 0.42 m and 0.24 m thick, and had a flat, stepped upper surface. It extended to the edge of the pit, almost abutting the adjacent pit (C319), containing the tuyère block. There was some vitrified clay lining to the south and east of the stone, which was L-shaped, measuring 0.90 m east–west by 0.18 m north–south, and 0.05 m thick (Fig. 4.31; Pl. 4.37).

Metallurgical residues from Lowpark, Co. Mayo: extracted from specialist reports by Angela Wallace and Lorna Anguilano (Appendix VIIIa and VIIIb)

Introduction

A total of 1,364.50 kg of metallurgical waste was retrieved from the early medieval phases at Lowpark, Co. Mayo. Residues were recovered from various ditches and features on the site: four distinct ironworking areas with hearths and pits were identified during excavation. The residues were sorted and classified at the post-excavation stage and were associated exclusively with ironworking activities; there was no evidence for non-ferrous metalworking.

The ironworking process is quite complex and involves several stages:

- Sourcing of ore (bog ore or local mineral resources may have been exploited) and fuel (charcoal and pollen analysis can help to identify fuel sources);
- Ore preparation for smelting (this often involves sorting, crushing and roasting of the ore);
- Furnace construction for smelting (these vary in shape and size). The superstructure was usually clay-built and often destroyed by the smelting process or by weathering;
- Furnace construction for smithing (this could involve slight changes and re-use of the smelting furnace);
- Bloom refining or primary smithing (surviving evidence may include a charcoal patch, hammer-scale, slag and evidence for an anvil in the form of a large, flat stone or a post-hole that may have held a wooden block). Iron blooms can appear very similar to slag cakes;
- Artefact manufacture or secondary smithing (also repair and recycling: scraps and offcuts of waste material may be found).

No evidence for ore processing or smelting was found in the residues from Lowpark. The evidence points to substantial smithing furnaces and charcoal pits associated with primary and secondary smithing activities.

Metallurgical material from the site

There was a large quantity of distinctive, rounded smithing hearth cakes, which varied in size and morphology. Some had a rounded pancake shape, flat on the top and bottom; some were plano-convex, concave–convex and convex–convex in cross-section. Some were quite obviously denser than others. The surface appearance of many was an orange–brown, rusty colour, while some had a dark grey, brittle appearance, especially on the upper surface. Many had baked clay fragments attached or sandy material adhering to the base.

Slag cakes identified from the site were categorised into three different size ranges: 75–100 mm, 100–150 mm and >150 mm. In each of the ironworking areas the >150 mm size range dominated the weight of each assemblage. The overall average weight for the 75–100 mm slag cakes was 0.232 kg, for the 100–150 mm slag cakes 0.682 kg, and for the >150 mm cakes 1.838 kg. The fact that all three size ranges were well represented in each ironworking area suggests that a variety of functions were probably being carried out in each and that there was no clear spatial demarcation of different stages of the refining/manufacturing process. A combination of artefact manufacture, repair and/or recycling is probably represented by the smaller cakes. Larger cakes would most likely represent bloom refining, or manufacture of large iron objects from poorly consolidated blooms.

There were many amorphous fragments that had broken off the rounded smithing hearth cakes. There was a small quantity of small, grey, brittle slags, some of which had a distinctive flow structure. This type of slag can be indicative of smelting; only very small quantities were found in the Lowpark material, suggesting that it was a by-product of the smithing process.

There were occasional small fragments of vitrified clay and fuel ash slags throughout the collection. Two contexts produced relatively large quantities of baked clay fragments: a pit (C381) in Ironworking Area 2 produced 2.05 kg; a pit (C572) in Ironworking Area 4 produced 3.6 kg; and a shallow pit (C321) in Ironworking Area 3 produced 0.75 kg.

Clay tuyères

Three well-preserved tuyères or tuyère blocks were identified in the collection. These are circular pieces of baked or vitrified clay with a central hole, which were pre-manufactured and inserted into the clay wall of the smithing or smelting furnaces. The bellows used to blow air onto the fuel in the hearth were inserted through the hole in these circular clay blocks. The tuyère blocks were pre-manufactured to make them as heat-resistant as possible to protect the bellows, and they are also known as 'bellows protectors'. The silicate material in these clay blocks also contributed to the chemical reaction taking place in the furnace. Similar tuyères have been identified from ironworking sites at Cathedral Hill, Co. Armagh (Brown & Harper 1984), Ballyvollen, Co. Antrim (Williams 1986), and Ballyvourney, Co. Cork (O'Kelly 1952b), and are illustrated by Scott (1990, 166).

Pl. 4.36—Lowpark: three tuyères (photo: Jonathan Hession).

E3338:258:138: Ironworking Area 2

This tuyère is 120–140 mm in diameter; its outer sides are almost vertical and are deliberately smoothed. It has a depth of c. 80 mm, and the central perforation is 25 mm in diameter on the underside and 50 mm on the outer side. On the underside the block is mainly encrusted with clay; a small portion shows a pronounced dip, and extensive vitrification has taken place in this area. There is a slight angle on the central hole through this block. It is quite likely that this tuyère was associated with pits C306 and C307.

E3338:381:370: south-west of Ironworking Area 2

The tuyère measures 120–140 mm in diameter and is 26 mm thick, with a c. 20 mm perforation. It is heavily vitrified to a grey–greenish colour on the underside; some bloating pores are visible, and the clay also shows distortion. The outer side is oxidised orange, with some grey patches around the edges.

E3338:313:371: Ironworking Area 3

A complete tuyère from pit fill C313 is 140–150 mm in diameter. The central perforation is 70 mm in diameter on the outer edge, narrowing to 25 mm at the inner edge. The edge on one side is only 40 mm thick; it is quite likely that a portion has crumbled away. Most of the tuyère was up to 85 mm thick. On the outer surface the clay is an ashy, whitish-grey. The outer edges are almost completely vertical and show evidence of careful preparation. There is black, sooty material and encrusted slag stuck on the lower portion of the outer edges. The underside of this piece is heavily encrusted with fuel ash and slag. The area around the opening is vitrified green/grey and has a very glassy appearance.

Discussion and conclusions

The analysis of samples from the Lowpark slags has highlighted the possibility that certain phases within smithing slags can be closely linked to certain stages in the smithing process. The evidence for variation in chemical composition between the top and bottom portion of slag cakes is considered important, as it is indicative of a change in the smithing activity in the cycle that produced each slag cake. The chemical data also suggest iron from different ore sources, which points to refining, recycling or repair of iron artefacts from various sources.

The iron-rich material identified in some slag samples may come from consolidating an iron bloom or could also be linked to welding, which would represent the end of the manufacturing cycle. The silica-rich material characterising the top of some of the samples can be linked to three possible activities using sand: as a flux during welding operations, during steel production (the metal surface would have been covered with sand/clay to minimise decarburisation) or after the fashioning of an object is completed (sand would be used to minimise the oxidation of iron).

The artefactual evidence suggests production, repair or recycling of small, everyday artefacts such as knives, nails, buckles and shears. The large slag cakes at Lowpark suggest production of larger objects or perhaps refining of iron blooms.

The analyses carried out cannot be seen as representative of the entire collection, but the results provide useful clues to the technology used and types of activity being carried out. The analysis of the clay-lining sample shows that hearths were deliberately lined and that high-silica materials such as crushed quartz were added to the lining to make it more heat-resistant.

Lowpark provides important evidence in documenting increasing technological complexity and demarcation of industrial activities from domestic settlement areas toward the end of the Iron Age and into the early medieval period. The overall characterisation of the size and weight of collections of smithing hearth slags provides useful data on the quantity and extent of activity being carried out on ironworking sites.

The pits were cut into the natural, sandy subsoil at the base of this ironworking area and overlain by two fills (C311 and C313). The larger fill (C313) was roughly rectangular, measuring 3.8 m by 4.6 m, and 0.16 m thick. It consisted of a loose, black mix of sand, charcoal and large pieces of iron slag (116.38 kg), which made up almost 50 % of the deposit. The upper fill (C311) was rectangular, measuring 6 m by 2.5 m, and 0.3 m thick. It consisted of loose, charcoal-flecked, mid-grey, fine, silty sand with frequent iron slag (26.78 kg) and medium-sized to large stones. It underlay the outer ditch (C591) and occurred directly below the fill of the palisade trench (C103).

These features can be interpreted as a central ironworking pit that may have been a smithing hearth. Bellows were used to force air into the pit to bring the charcoal fuel to the required temperature for iron processing. The tuyère block of baked clay was inserted into the top of the smithing hearth. The find-spot of the tuyère indicates the position of the bellows to the SSE of the pit (C319), close to the anvil stone. Here the bellows could have been operated without obstructing the blacksmith, who worked to the east of the pit. This position gave him easy access to the anvil stone, the smithing hearth and the rectangular pit (C320), which was probably for storing charcoal during the process. There was also adequate space in this area for a water container. Fuel and raw materials were probably stored to the west, but no evidence of this survived. There was room for at least one other ironworker near the anvil stone to hammer out bloom or process iron. The area adjacent to the anvil could have been used in any part of the ironworking process and was probably protected by some form of structure. The natural subsoil in this area was fine sand that did not retain the edges of the pit or any structural features. It is likely that this area was of similar construction to Ironworking Areas 2 and 4, with a deliberately sunken smithing area, a superstructure of plank-built walls, supported by posts, and a thatched reed roof. Use of ditches incorporating ironworking areas is recorded at Clogher, Co. Tyrone, and Rathgall, Co. Wicklow (Scott 1990, 160–1); however, radiocarbon dating confirms that the outer ditch (Phase 4) post-dated Ironworking Area 3 in Lowpark.

Pl. 4.37—Lowpark: Ironworking Area 3, general view of ironworking pits (C329, C319, C321) and anvil stone.

Pl. 4.38—Lowpark: Ironworking Area 3, during excavation.

Pl. 4.39—Lowpark: Ironworking Area 3, anvil stone in C321 and ironworking pit C319.

Ironworking Area 4

Ironworking Area 4 consisted of a sub-rectangular sunken area (C524) aligned north-east/south-west, with irregular rounded corners, cut into the natural subsoil. It had maximum dimensions at the surface of 5.20 m by 3.40 m and at the base measured 4.50 m by 3 m; the floor area was deliberately lowered to a depth of 0.40–0.75 m below the surface of the subsoil. Including the depth of the central pit (C580), which was dug into the base, the overall depth was 1.2 m.

The northern and western sides of the sunken area had an irregular outline and sloped steeply from the north and moderately from the east. The sides were steeper and straighter to the south and east. The superstructure was represented by a slot-trench (C582), traces of which remained on the west and south sides, but it is likely to have continued around the perimeter of the building. This slot-trench defined the perimeter along the south-east, south-west and north-east sides and probably held a plank wall. It had a maximum depth of 0.6 m and was generally 0.14–0.2 m wide, expanding to 0.44 m wide near the western corner. Two post-holes (C581 and C583), at the south-west and south ends of the slot-trench, measured 0.25–0.44 m in diameter and were 0.1–0.65 m deep. The more substantial post-hole (C581) contained three large and several smaller packing stones. A third circular post-hole (C599) occurred near the northern corner. It was 0.22 m in diameter and 0.2 m deep and contained one large packing stone. These features probably held roof and wall support posts. As there were only three unevenly spaced posts, the walls may also have been load-bearing. There was no surviving evidence for an entrance, but it is likely to have been in the less well-preserved and more sheltered, eastern side.

The base or floor of Area 4 was relatively flat and slightly sloped at the middle toward ironworking pit C580 and associated rectangular pit C578. There were two stake-holes (C584 and C585) to the west, near the centre of the floor. The main ironworking feature (C580) consisted of two conjoined pits, one 0.9 m in diameter and 0.55 m deep and the other measuring 0.8 m by 0.62 m by 0.14 m deep. The larger pit (C580) was lined on one side by a large, upright, flat stone, which gave it a D-shaped plan. This stone measured 0.55 m by 0.85 m by 0.08 m and had a heat-affected notch on the upper surface. Burnt clay occurred along this stone lining, and its surface was blackened from intensive burning (Pl. 4.45). The lower 0.14 m of the pit was filled with a dense charcoal layer (C579). The upper fill (C572) consisted of a loose, black, charcoal-rich deposit with frequent inclusions of clay lining and iron slag (7.24 kg). This fill was irregular in shape and continued beyond the limit of the pit (C580) on the surface. It measured 3.4 m by 2.2 m and was 0.23 m thick, aligned south-west/north-east. A radiocarbon date of AD 560–660 (Beta-231662) was returned from oak charcoal from C572.

A hollowed stone (E3338:424:303/304; Appendix VIa) was placed near the edge of the slope, adjacent to pit C580, 0.24 m south-west of the large, upright lining stone. It was of fine-grained granite and had four straight sides and an irregular, possibly damaged side, with overall dimensions of 0.58 m by 0.35 and 0.14 m thick. These straight sides are likely to be related to natural faults in the rock rather than deliberate manufacture (Appendix VIa). An oval, concave hollow, measuring 0.25 m by 0.22 m and 0.05 m deep, was cut into the top of stone and was probably related to the ironworking in this area.

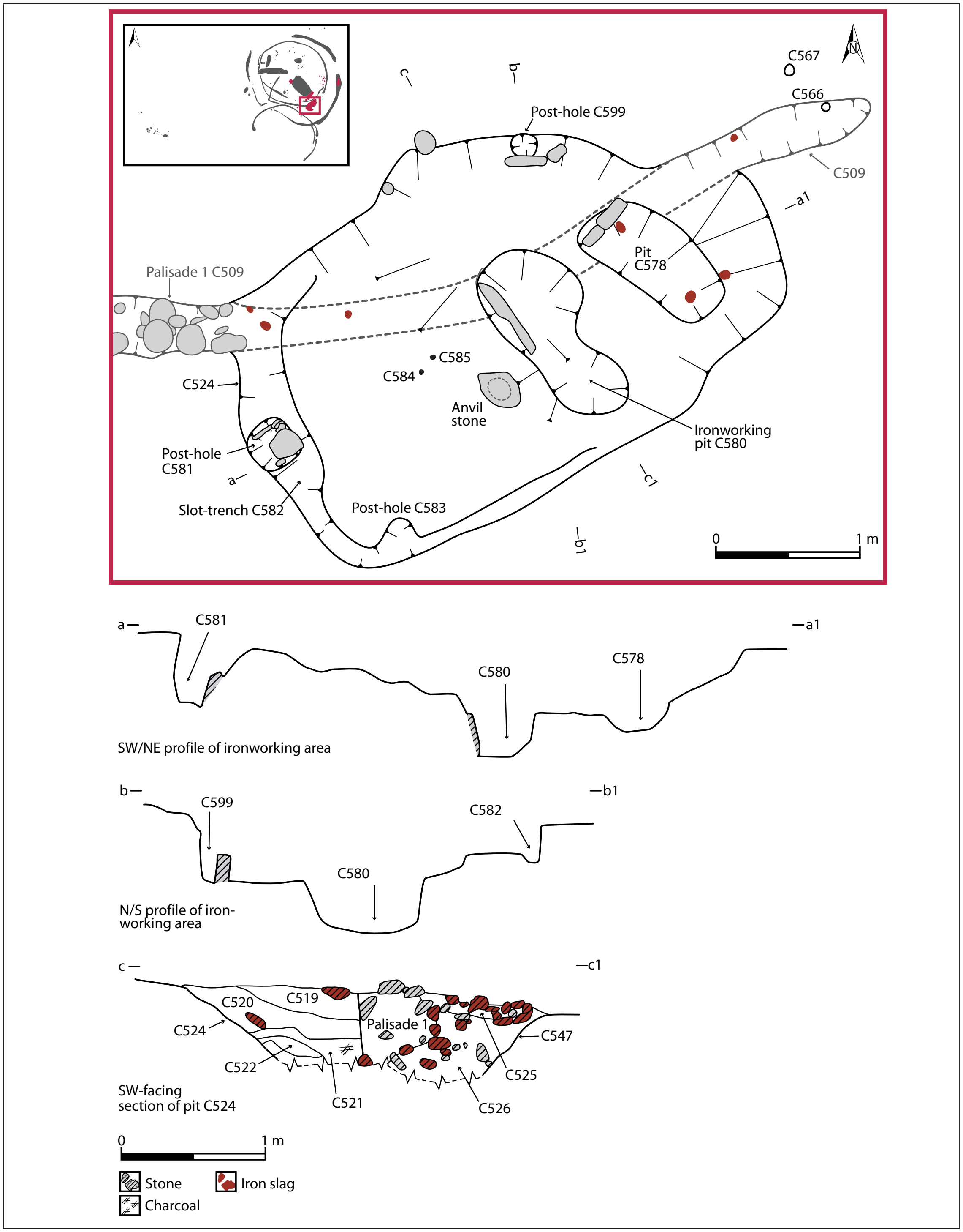


Fig. 4.32—Lowpark: Ironworking Area 4.

Pl. 4.40—Lowpark: looking west to Ironworking Area 4, with Palisade 1 in background.

Pl. 4.41—Lowpark: Ironworking Area 4, structural post-hole (C581).

Pl. 4.42—Lowpark: Ironworking Area 4, hollowed stone during excavation.

Pl. 4.43 (above)—Lowpark: hollowed anvil stone (E3338:424:303/304) from Ironworking Area 4 (photo: Jonathan Hession).

Pl. 4.44 (rght)—Lowpark: Ironworking Area 4, charcoal and clay lining in central pit (C580).

The central pit (C580) was dug into loose, sandy subsoil, and the south-west side was lined with a large, flat stone, possibly for support. It was the centre of intense activity, with high temperatures evidenced by scorched and oxidised clay and a heat-affected notch broken out of the upper surface of the lining stone. Baked clay along this stone may be the remains of a superstructure incorporating a tuyère and bellows on the west side of the pit for iron smelting or smithing.

A second ironworking pit (C578) was 0.30 m south-east of the central pit (C580). It was rectangular and aligned north-west/south-east, measuring 1.4 m by 0.70 m and 0.20 m deep. Two upright, flat stones lined the north-western end of the pit and may have also been placed to withstand high temperatures during the ironworking process. The fill (C576) included iron slag (1.36 kg).

Pl. 4.45—Lowpark: Ironworking Area 4, large stone lining western side of central pit.

The south-western half of the area was relatively featureless but may have served a number of functions from storage to metalworking. An anvil block for ironworking would not leave any trace in the floor area other than hammer-scale. The fills of these ironworking pits (C578 and C580) contained slag, charcoal and vitrified clay. The lower fills (C556, C571, C574 and C575) of the sunken area may have been material cleaned out of ironworking pits. One of these deposits (C556) contained a Type C (Goodall 1990) iron knife (E3338:556:280; Appendix VIa), which is characterised by a parallel blade and back that both taper to the tip. Larger deposits (C519–22, C525, C526, C545 and C547) filled the sunken area after it went out of use. These fills contained almost 74 kg of iron slag. After being backfilled, the area was cut by Palisade 1 (C508), which contained 10.52 kg of iron slag.

This metalworking area was broadly similar to Ironworking Areas 2 and 3 and had the most definite evidence for a structure or workshop. The slot-trench suggests that the lower walls were back-built against the pit sides, while the upper section may have extended above ground level to form a low wall that was reinforced by three substantial posts. Both the posts and the wall were likely to have supported a rush-thatched roof. The roof must have had some form of smoke-hole or ventilation. The sunken floor provided a solid, dark workshop suitable for judging the temperature of the iron from the glow and a secure, dry environment for fuel storage. Both of the pits are likely to have been used for iron processing, probably at different times, with bellows extending from the stone-lined sides. The stake-holes (C584 and C585) may have helped to secure the end of the bellows in place. The ironworking pits and associated hollowed stone and ironworking waste imply a function related either to smithing or to smelting. The hollowed stone was probably used for crushing iron, and a flat anvil stone or an iron anvil set in a block of wood was probably used to shape the artefacts. The south-western half of the structure is the most likely position for an anvil block, fuel storage, water supply and raw material, including iron bloom or scrap iron. The north-eastern pit (C578) appears to have been used for collecting waste slag, and the central pit was subjected to the most intense heat and contained a lower fill of almost pure charcoal, which may have been prepared for future use.

Pl. 4.46—Lowpark: iron slag in upper fill (C508, C509) of Ironworking Area 4.

Additional features related to ironworking

Eleven pit or hearth features that may be related to ironworking were not directly linked to the four ironworking areas but may have been contemporaneous. These pits occurred in two main clusters, with a further three pits at a slight distance from them.

There was a cluster of four ironworking pits/hearths (C22, C380, C389 and C394) to the west of Ironworking Areas 2 and 4 (Fig. 4.33). The most significant of these (C380) was circular, with a diameter of 0.95 m, and was 0.24 m deep. It was filled by two distinct deposits (C21 and C381) containing iron slag (0.4 kg), hammer-scale and vitrified clay lining. The lower fill (C381) contained a well-preserved clay tuyère block. An adjacent pit (C22) was quite large, measuring 1.32 m by 1.06 m and 0.24 m deep, and contained some charcoal. Pit/hearth C389 was 0.8 m in diameter and 0.1 m deep. The fill included charcoal and hammer-scale. Pit C394 measured 0.90 m by 0.35 m by 0.17 m deep and included charcoal in the fill.

An arrangement of three stake-holes (C390, C391 and C392) occurred in this cluster, between two iron-working pits (C380 and C22). The stake-holes were 0.05–0.06 m in diameter and 0.10–0.12 m deep and were set 0.20–0.32 m apart. An arrangement of three stake-holes occurred around an ironworking pit in Ironworking Area 1. The stake-holes are likely to have been functionally related to pits C380 and C22.

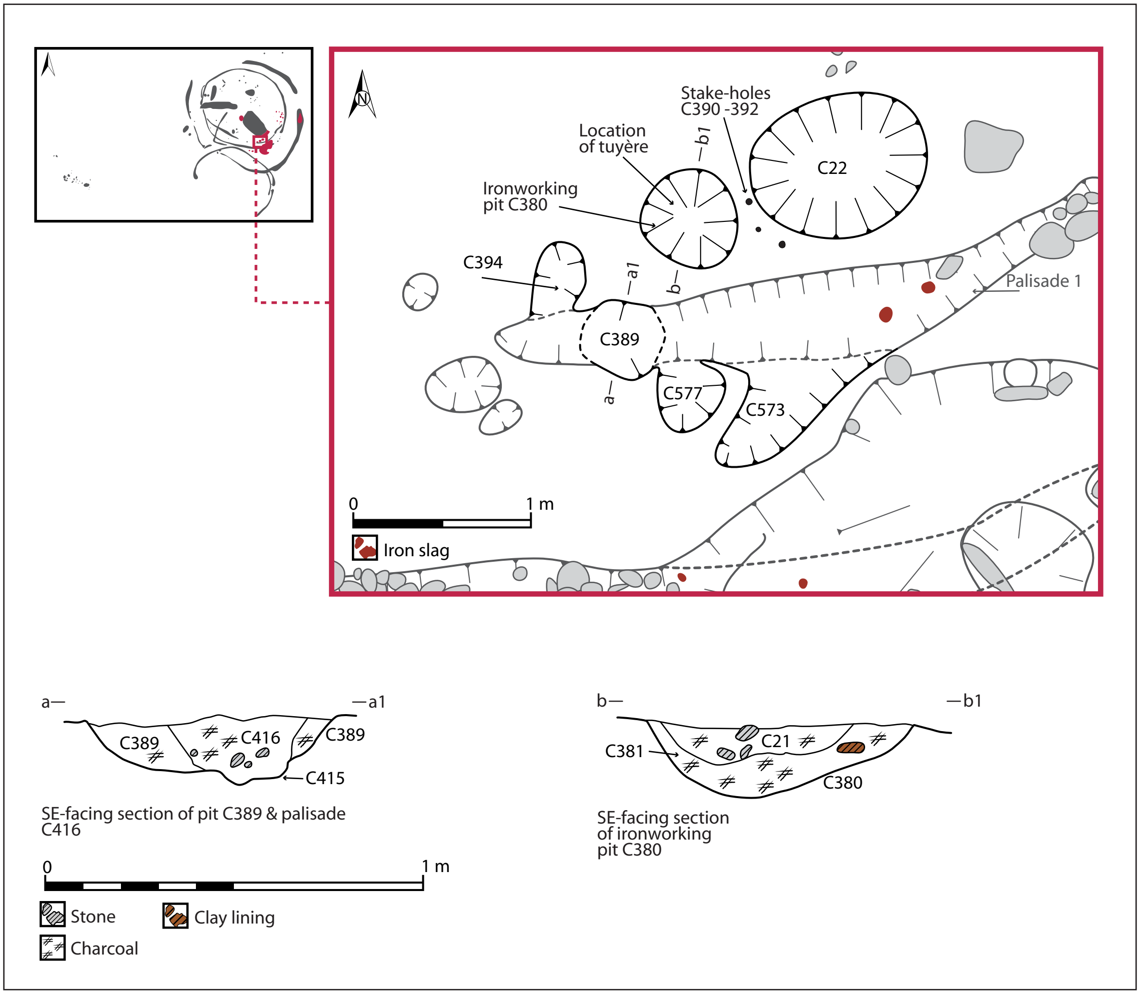


Fig. 4.33—Lowpark: ironworking pits.

This cluster of features included the basic elements of another ironworking area; C380 was the main ironworking pit or hearth with a clay tuyère block (E3338:381:370) that would have facilitated bellows and baked clay lining. The adjacent pits included ironworking debris; however, no other associated features or structural remains were present. Oak charcoal from the lower fill (C381) of pit C380 produced a radiocarbon date of AD 710–960 (Beta-234461), an almost identical date range to Ironworking Area 2.

A second cluster of five ironworking features was located near the centre of the area enclosed by Palisade 1, between Souterrains 1 and 2 (Fig. 4.26). They included two substantial ironworking pits/hearths (C30 and C31) and three shallow pits/depressions (C32, C205 and C206) that contained charcoal in their fills (Fig. 4.27).

One pit/hearth (C30) was sub-oval with a relatively flat base. It measured 0.37 m by 0.45 m by 0.1 m deep and was filled with loose, charcoal-flecked, mid-brown, sandy silt with some orange

Pl. 4.47 (above)—Lowpark: Palisade 1, outer arc and ironworking pit (C380) with three stake-holes in foreground.

Pl. 4.48 (right)—Lowpark: tuyère from ironworking pit (C380) (photo: Jonathan Hession).

and black, mottled soil. It had frequent inclusions of iron slag (0.12 kg) and hammer-scale, and scorching and oxidisation of the surrounding subsoil suggested burning. A second pit/hearth (C31) at this location was a sub-circular, bowl-shaped pit with a diameter of 0.45 m and a depth of 0.3 m. The fill consisted of moderately compacted, charcoal-flecked, silty sand, which was black with some orange and red, mottled soil with frequent inclusions of hammer-scale and iron slag (0.5 kg). The oxidisation of the surrounding subsoil suggested *in situ* burning.

Two further pits (C385 and C387) were situated 3 m south-west of the first cluster. One charcoal-rich burnt pit (C385) was circular, 0.6 m in diameter and 0.11 m deep. It contained

Pl. 4.49—Lowpark: looking east to southern part of Palisade 1, including Souterrain 1, Ironworking Area 4 and surface spread of iron slag.

oxidised, silty sand with hammer-scale inclusions. There was an ironworking pit/hearth (C387) 0.40 m east of C385. It was sub-oval, measuring 1 m by 0.62 m, and 0.11 m deep but was disturbed. The fills included charcoal and hammer-scale.

Three outlying ironworking pits/hearths (C17, C18 and C19) occurred 20 m north of Ironworking Area 4. These were large, shallow depressions in the subsoil, with frequent charcoal and oxidised clay indicating *in situ* burning. The main pit (C17) was sub-rectangular, measuring 1.53 m by 0.56 m, and 0.075 m deep. The charcoal-rich fill contained frequent iron slag (11.8 kg), and there was a scatter of iron slag in the environs of these features.

These ironworking pits lacked well-defined structural remains but show the extent of ironworking in Lowpark outside the four main workshops. They may be the partial remains of additional workshops or single-use hearths or pits. Ironworking was an integral part of the life of this site, both making and repairing iron implements. Small artefacts such as knives and blades were retrieved during the excavation. Larger farm implements and possibly weapons are likely to have been produced or at least repaired on site, playing a vital role in the day-to-day life of the settlement.

Phase 4: early medieval settlement

This period of medieval activity at Lowpark was the most intense building phase on the site. A broadly contemporaneous range of features are described in this section, most of which were in use over a prolonged period and may have had different uses and alterations over time. The main features were Palisade 1, with a number of associated pits and post-holes, Palisade 2, the outer ditch, Souterrains 1 and 2, a stone-lined, keyhole-shaped pit, a roundhouse, a rectangular structure and an oval structure. It is likely that ironworking was carried out throughout this

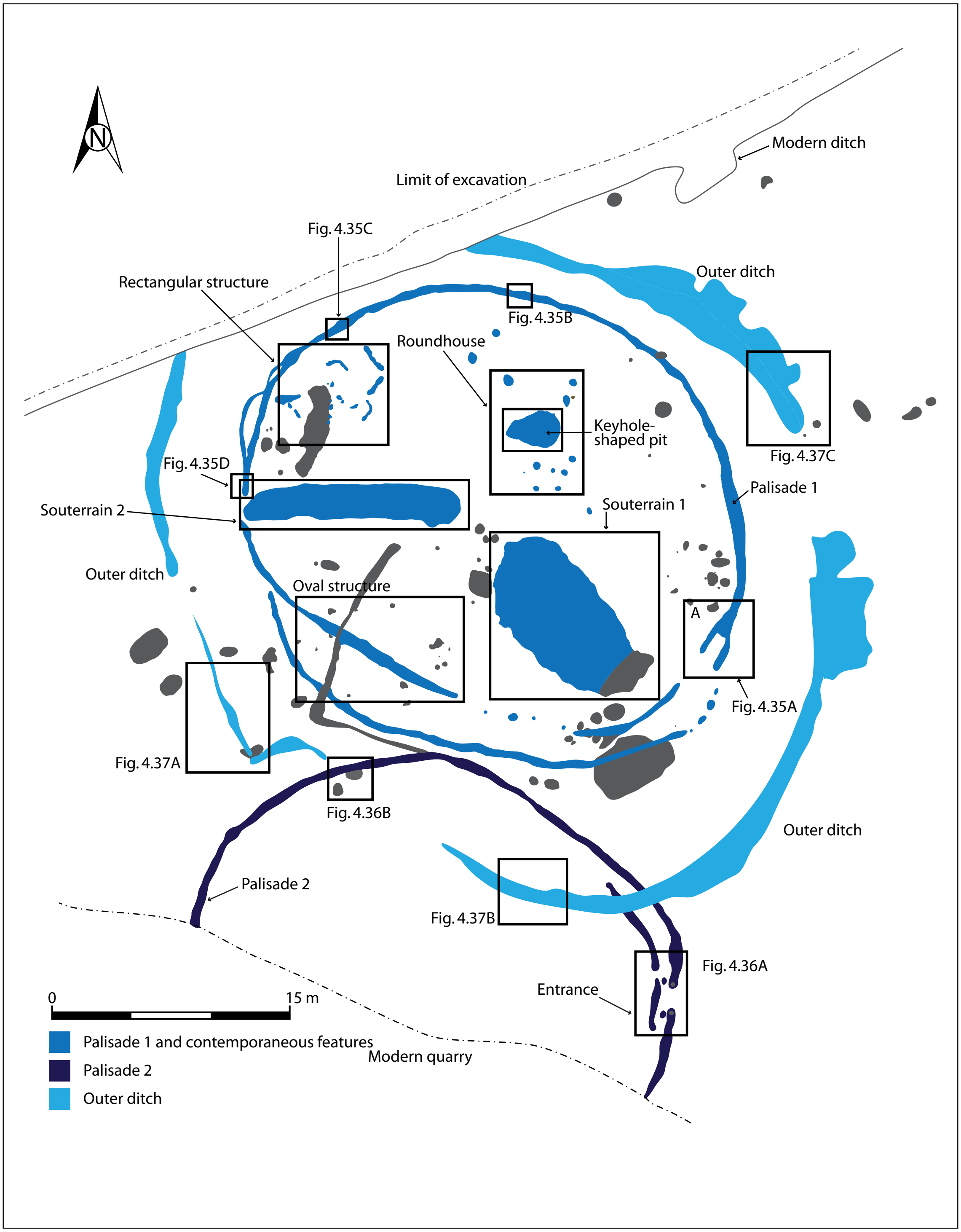


Fig. 4.34—Key plan of early medieval features in Lowpark.

Pl. 4.50—Lowpark: aerial view of site under excavation.

period in a succession of workshops (Phase 3), and there was a significant overlap between Phase 3 and Phase 4.

The earlier phases of Palisades 1 and 2 were roughly contemporaneous and had complementary functions. Palisade 1 enclosed the habitation area, and Palisade 2 may have functioned as a livestock pen. The southern side of the outer arc (C509) of Palisade 1 was constructed along a straight line, and elsewhere the trench was curved, indicating that Palisade 2 was in place when the outer arc of Palisade 1 was constructed. At this stage Palisade 1 and 2 had entrances to the south-east and east, respectively, allowing easy access between the two. Palisade 1 was subsequently realigned on the south, evidenced by an inner arc. This inner arc included a bifurcated section or double trench to the south-west, which probably represents later repair or reinforcement (Pls 4.53–4; Fig. 4.48). Charcoal from a narrow band of subsoil (C433) between these trenches (C539 and C540) returned a date of AD 690–900 (Beta-231657), and charcoal from the fill (C537) of another section of the inner arc returned the latest date in the radiocarbon sequence, AD 990–1160 (Beta-234463). It is likely that the outer ditch was contemporary with the second building phase of Palisade 1. The radiocarbon date range for the features enclosed by Palisade 1 is AD 540–1020, reflecting the maximum date range of the medieval occupation of the site.

Palisade 1

Palisade 1 was the best preserved and most complex enclosing element at Lowpark. The enclosed area was oval, with maximum dimensions of 34.6 m north-west/south-east by 30.4 m north-east/south-west, enclosing a maximum area of 826 m^2. The inner (C456) and outer (C509) arcs along the southern portion were represented by two separate trenches, indicating different phases of construction or replacement of the palisade during occupation of the site. The northern section of the palisade consisted of a single trench, indicating that, if the palisade had been replaced or repaired, the same line of foundations was used. Palisade 1 enclosed the main structures and probably delimited the domestic area of the site. The internal buildings/structures comprised two souterrains, a stone-lined pit, a possible roundhouse, an outhouse and iron workshops (Ironworking Areas 1 and 2). Some other elements of ironworking on the site included in the Phase 3 discussion overlapped with Phase 4. Miscellaneous Phase 6 features may also have been in use during Phase 4.

Oak charcoal from the northern section (C488) of Palisade 1 and the inner palisade arc at the south-west (C433) produced identical date ranges of AD 690–900 (Beta-231659 and 231657). Oak charcoal from another section of the outer arc of Palisade 1 (C444) produced a Late Iron Age date of AD 340–540 (Beta-231658). This charcoal from Palisade 1 and charcoal from the entrance to Palisade 2, which also returned an Iron Age date (discussed below), may represent residual older wood rather than a discrete Iron Age phase of occupation. The radiocarbon date may, however, represent an Iron Age phase before the enclosing of the site, of which little trace survived in the archaeological record. The fill (C514) of a larger section of the outer arc to the south and south-west produced a similar date range to that in the north, AD 770–980 (Beta-234462). Oak charcoal from the inner arc of Palisade 1, to the south-west, which comprised a double trench, produced a relatively late radiocarbon date of AD 990–1160 (Beta-234463), suggesting later repair to the palisade or perhaps an intrusive deposit. Charcoal from the context between the double trenches (C433) produced a date of AD 690–900 (Beta-231657) and probably reflects the main use of this palisade (Appendix I).

The Palisade 1 trench (C456 [northern section] and C509 [outer arc]) had a U-shaped profile, 0.30–0.75 m wide at the surface and 0.10–0.30 m wide at the base, and ranged in depth from 0.24 m to 0.72 m. It retained a substantial stone lining or packing (C465 and C469) throughout. These stones were of assorted shapes and sizes, including flat, angular and rounded stones measuring up to 0.2 m by 0.2.5 m by 0.4 m in the northern half and 0.16 m by 0.75 m by 1.5 m in the southern half. One large worked stone (E3338:467:262; Appendix VIb) was re-used as a packing stone in the south-west. An oval hollow on one side may have been used for grinding or processing iron. The opposing surface had a stepped, circular socket used to house a portable anvil.

The packing stones were wedged tightly into the sides of the trench and were frequently slightly displaced. Some iron slag was also re-used as packing material. Where a central slot representing the imprint of the palisade timbers was visible, it was 0.10–0.25 m wide. The remainder of the fills consisted of charcoal-flecked, mid- to dark brown, silty sand with inclusions of small stones. This fill was interspersed through the packing stones and filled the intermediary slots between them. A large iron nail (E3338:484:250; Appendix VIa) was recovered from the trench fill on the eastern

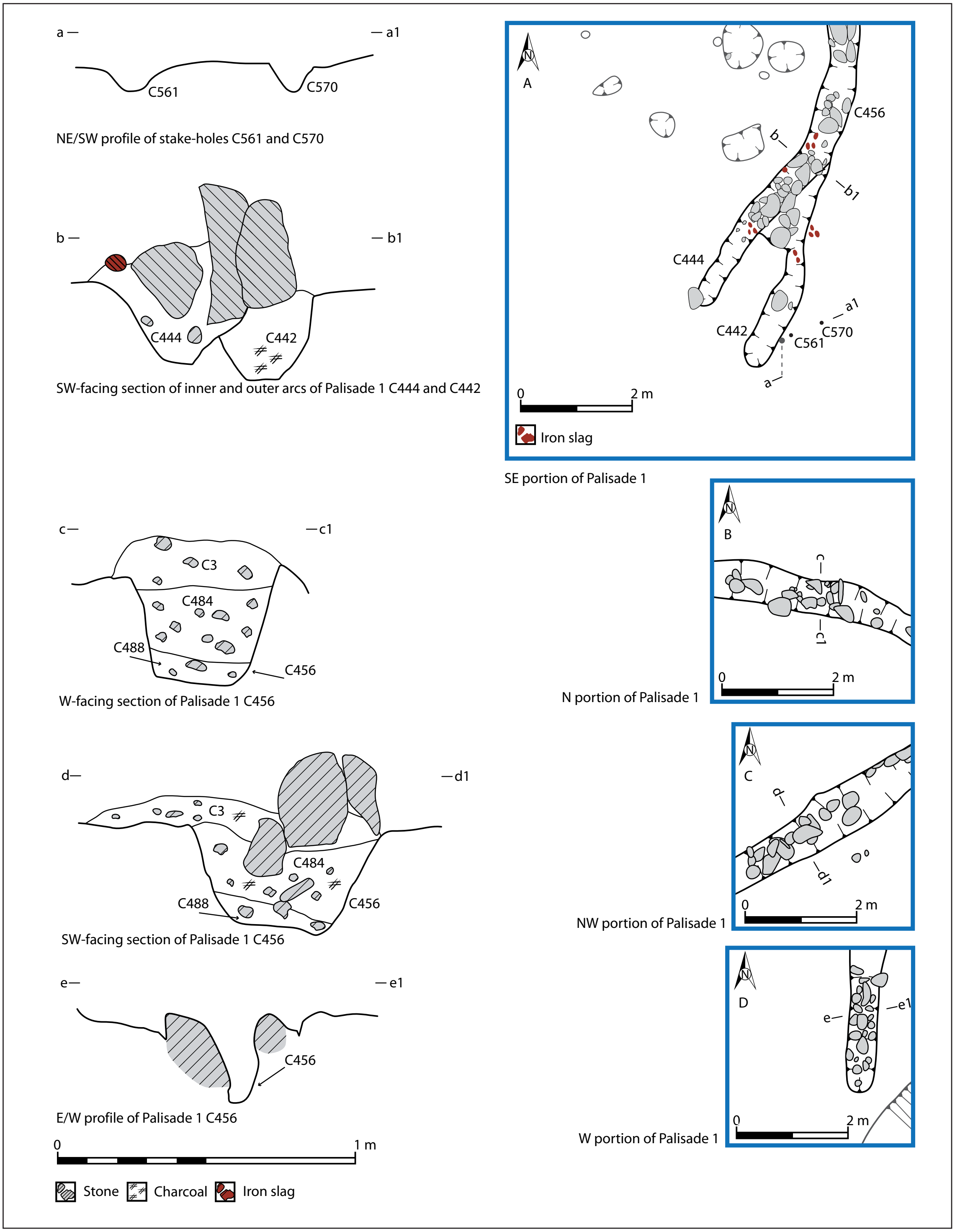


Fig. 4.35—Lowpark: sectional profiles of Palisade 1.

Pl. 4.51—Lowpark: eastern section of Palisade 1.

Pl. 4.52—Lowpark: northern sections of Palisade 1.

side. A second nail (E3338:508:602; Appendix VIa) was retrieved from the fill of the outer arc of Palisade 1, where it cut through the upper levels of Ironworking Area 4.

The entire palisade trench was encompassed by the excavation area and was extant for most of its 102 m circumference. Three breaks occurred in the main trench: two in the west and one in the south-east. A 1.8 m-wide break in the west coincided with the western end of Souterrain 2. This gap was clearly to accommodate the souterrain trench. The palisade trench stopped short of the souterrain to the north and south, suggesting that Souterrain 2 was extant, planned or already under construction when the palisade was constructed.

The southern arc of the palisade was replaced by an inner arc, up to 3 m north of the original, and this obscured any evidence for a possible western entrance. A 4 m-wide gap in the south-east was a more likely entrance before the construction of the inner arc. Four oval pits with concave bases were spaced across this gap, with c. 0.90 m between the centres of each pit and a 1.10 m gap between the northernmost pit and the palisade terminus. These pits measured 0.15–0.71 m in diameter and were 0.05–0.25 m deep. The posts may have supported a hurdle, which could have been removed for access and egress. Two stake-holes at either side of the gap may have had a related function. There was a corresponding 2.2 m-wide gap in the inner fork of the palisade, which may imply some contemporaneous use or continuity of use of this location as an entrance.

The inner arc of Palisade 1 was complete for a distance of 19m from the western end of Souterrain 2. It had a U-shaped profile and was 0.80 m wide and 0.20 m deep. It was shallower 4 m to the south of Souterrain 2, where it approached the outer fork, had an uneven base, 0.10–0.20 m

Pl. 4.53—Lowpark: inner and outer arcs of Palisade 1, from the west.

deep, and was 0.35 m wide. A further 4.2 m to the east, the trench bifurcated into two trenches (C539 and C540) for a length of 5.35 m. Both trenches were 0.30 m wide and 0.40 m deep; they abutted each other and contained fairly dense stone packing interspersed with charcoal-flecked, mid- to dark brown, silty sand with gravel and small stones in the basal layers. The trenches were separated by a narrow band of charcoal-flecked subsoil (C433).

A 7 m-wide gap in this arc to the east of the terminus had four fairly evenly spaced post-holes (C454, C449, C552 and C554) set 1–1.4 m apart. These measured 0.20–0.51 m in diameter and 0.18–0.42 m in depth. The westernmost post-hole (C454) was the best preserved and retained *in situ* packing stones. A 7.6 m-long section of Palisade 1 (C416) to the east of these post-holes was 0.44 m wide and 0.28–0.39 m deep and filled with charcoal-rich, dark brown, silty sand with some iron slag. This section of the palisade trench occurred between Ironworking Areas 2 and 4 (see Fig. 4.27) and truncated several ironworking pits from Phase 3. There was a 2.2 m-wide gap between this section of Palisade 1 and the inner arc eastern fork (C444), which was probably the entrance. The inner arc (C444) cut through the outer arc (C442) here (Fig. 4.35) and joined the main trench at this point adjacent to Ironworking Area 1, indicating that the inner fork was a later phase. The

Pl. 4.54—Lowpark: bifurcated section of inner arc of Palisade 1 from the west, showing intersection with L-shaped trench in foreground.

Pl. 4.55—Lowpark: Palisade 1, section of fill and packing stones.

inner arc was more substantial, 0.40 m wide and 0.40 m deep; the outer arc was 0.30 m wide and 0.30 m deep.

Two smaller curved trenches abutted Palisade 1 in the north-west. The northern trench (C457) was 2.6 m long, 0.21 m wide and 0.4 m deep. It had a U-shaped profile and was filled with light brown, silty sand. The southern trench (C504) was 4 m long, 0.3 m wide and 0.2 m deep. It had a U-shaped profile and was filled with charcoal-flecked, mid-greyish-brown, silty sand and small stones. These trenches may represent repair or reinforcement of the palisade.

Three post-holes were cut into the base of Palisade 1 (C436, C517 and C527), one in the north-west and two in the east. They measured 0.20–0.50 m in diameter and 0.3–0.6 m in depth and were filled by charcoal-flecked, silty sand. They may have delimited main sections of the palisade or positions that required extra support. Gaps in the outer and inner arcs of the palisade trenches to the south and south-east had evenly spaced post-holes, which may have contained posts to support the palisade as an alternative to the slot-trench present elsewhere or may represent entrance features.

Two large, irregular spreads of charcoal-rich, black, silty sand (C23 and C25) overlay and post-dated the palisade. Both spreads occurred in the south-east. The western spread (C23) measured

4.5 m east–west by 3.7 m north–south and was 0.31 m thick. It contained frequent iron slag and magnetic dust, two pieces of flint (E3338:23:35 and 157) and an iron blade fragment (E3338:23:46; Appendix VIa). This spread overlay the palisade trench and Ironworking Area 4. The eastern spread (C25) was irregular in plan, measuring 5.35 m by 7.25 m and 0.15 m deep, and had the same composition as C23. It contained a lignite armlet fragment (E3338:25:26; Appendix V) and an intrusive clay-pipe stem (E3338:25:36). Three *ex situ* lignite armlet fragments (E3338:2:24, 209 and 282) were also recovered during the excavation, two of which are conjoining fragments of the same armlet, with an old break (Appendix V).

There were frequent cultivation furrows throughout the site. These truncated the upper levels of some of the archaeological features and spread iron slag and occasional artefacts across the site but caused minimal damage to the palisade trench and the other main features.

Discussion

Palisade 1 constituted the main enclosing feature at Lowpark and probably held a plank fence in place for most of the circumference, which enclosed a settlement and protected it primarily from animals and the elements. It would also have acted as a legal boundary, or *lios*. Packing stones were required to hold the palisade fence firmly in place because the subsoil was loose and unstable. The random nature of the stones, re-use of the anvil base (E3338:467:262) and large lumps of iron slag suggest that all available packing material in the general area was brought in, possibly including stones from the outer ditch. This also suggests that ironworking was of diminished importance during this period compared to Phase 3.

The northern part of the palisade comprised a single slot-trench with evidence for minor repair or reinforcement in the north-west and substantial rebuilding and reinforcement in the southern part. The outer arc of the palisade to the south was the primary trench. It was dated to AD 770–980 and appeared to have been constructed respecting the presence of Palisade 2, which suggests later construction, although it is likely that they were in contemporaneous use. The close

Pls 4.56 and 4.57—Lowpark: two views of anvil socket stone re-used as packing stone in Palisade 1 (displaying broken, worn side, concave surface and anvil socket) (E3338:467:262) (photo: Jonathan Hession).

proximity of the entrance features in both palisades suggests ease of access between the two. The inner arc of Palisade 1 clearly cut the outer arc in the south-east, indicating later construction and resulting in a reduction in size of the enclosure. Charcoal from the inner trench produced a slightly earlier radiocarbon date than the outer arc—AD 690–900—but this is not overly significant as there was a large overlap in the date ranges. The later date of AD 990–1160 returned from the inner trench of the double trench in the south-west, while possibly the result of an intrusive deposit, probably reflects final repair to the palisade.

The repair and realignment of Palisade 1 to the south and south-west may have been a response to deterioration due to exposure to the prevailing south-westerly winds. Higher ground to the north and north-west offered some protection from northerly winds, possibly supplemented by trees, but the land sloped down to the south and south-west, open to the prevailing south-westerlies. The larger outer ditch was concentric with Palisade 1, probably contemporaneous with the inner arc and constructed after Palisade 2 went out of use (see below).

Palisade 2

Palisade 2 was 0.36 m south of and almost abutting the southern arc of Palisade 1. The southern half of this enclosure had been destroyed by modern quarrying. The projected line of the enclosure was sub-circular, with a diameter of 31 m, enclosing an area of c. 750 m^2. The palisade trench was generally curved, with a relatively straight 18 m section on the north side adjacent to Palisade 1 and on the eastern side to the north of the entrance. The entrance feature on the east side was flanked by four post-holes with a parallel inner trench. Aside from this, no contemporaneous features survived in Palisade 2. Two pits occurred in the north-west (Phase 6), one of which (C371) was cut by and pre-dated Palisade 2. The outer ditch cut through and post-dated Palisade 2. Two large, modern pits in the north-west quadrant of the area enclosed by Palisade 2 were probably related to the recent quarrying.

Oak charcoal from a basal fill (C304) of the Palisade 2 trench to the north produced a date of AD 670–880 (Beta-234460), placing it relatively early in the sequence of palisades but overlapping the date ranges for Palisade 1 and the outer ditch. Oak from post-hole C318, which was at the same stratigraphic level as the Palisade 2 trench, was dated to AD 230–410 (Beta-231652), possibly reflecting the re-use of old timbers or residual charcoal from an earlier feature destroyed by the construction of this palisade (Appendix I).

The palisade trench (C364) had an overall surviving circumference of 49 m and was 0.30–0.60 m wide and 0.38 m deep. It had a U-shaped profile with steeply sloped sides. Assorted packing stones, 0.14–0.20 m in diameter, were tightly packed into either side of the trench, with displaced stones occurring throughout the fill. The lower fills included various layers of charcoal-flecked sand, silt and gravel, reflecting variations in the underlying, natural substrata. The upper 0.26 m-thick fill was charcoal-flecked, dark grey–brown, sandy silt. The stone packing (C303) in the Palisade 2 trench contained 13 fragments of cattle molar teeth, and a calcinated shaft fragment of a long bone from a small mammal or bird was recovered from fill C304 (Appendix IX).

There was a well-defined entrance in the east side of Palisade 2. It consisted of a 1.18 m-wide break in the slot-trench, a post setting in the trench at either side of the break and two post-holes

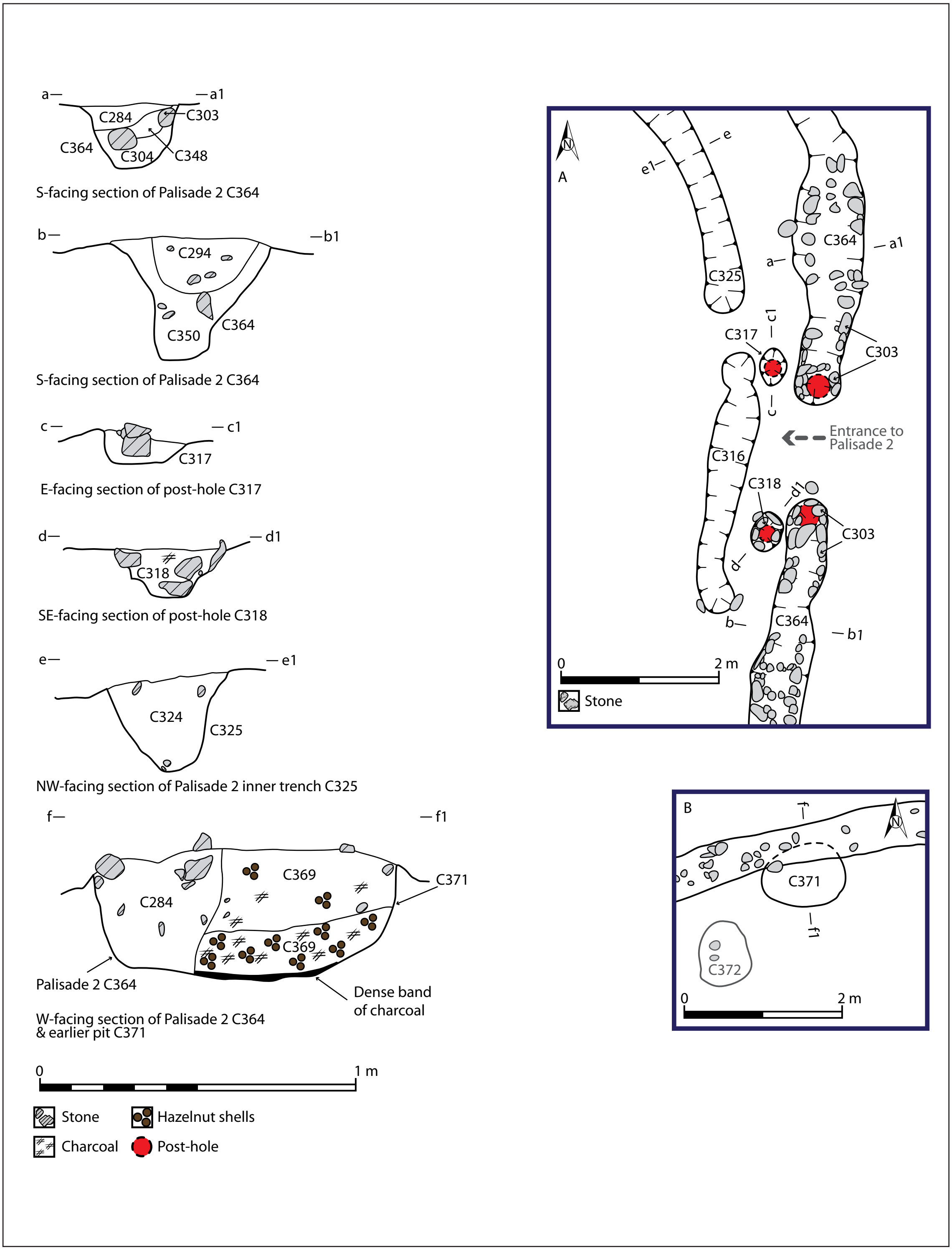


Fig. 4.36—Lowpark: plan of entrance and sectional profiles of Palisade 2.

Pl. 4.58 (above)—Lowpark: Palisade 2 entrance feature.

Pl. 4.59 (right)—Lowpark: Palisade 2 with packing stones in situ *and internal post-hole (C318) in foreground, from the north.*

(C317 and C318) flanking the entrance internally. A small, curved slot-trench (C316) was inside and parallel to the entrance.

The post settings in the trench were 0.35–0.47 m in diameter and 0.45–0.50 m deep and probably held posts 0.20–0.25 m in diameter secured with tightly packed stones. The northern internal post-hole (C317) was circular, with a diameter of 0.21 m, and 0.11 m deep. The southern post-hole (C318) was 0.35–0.4 m in diameter and 0.15 m deep. Both were filled with dark brown–black, charcoal-flecked, silty sand with definite packing stones lining the southern post-hole. These post-holes occurred between the trenches.

The internal curved trench was irregular and had a maximum length of 10.20 m. The trench was roughly parallel to Palisade 2 and at a distance of 0.40–1.20 m. It had a U-shaped profile and was 0.37 m wide and 0.22–0.39 m deep. There was a 0.50 m-long gap in this trench adjacent to the northern side of the entrance. The trench fill was charcoal-flecked, mid-brown, silty sand with small stones and some redeposited subsoil. There was a notable absence of packing stones in the fill of this trench.

Discussion

The absence of any contemporaneous features in the area enclosed by Palisade 2 suggests that it may have been an animal stockade rather than a domestic enclosure. The substantial entrance feature supports this interpretation. Later quarrying had removed roughly half of the enclosure, and this, together with the extensive later agricultural activity as evidenced by cultivation furrows across the site, no doubt contributed to the loss of archaeological evidence, including the shallow footings of any small structures that may have existed.

The outer ditch

This ditch enclosed an area that was oval except to the south-east, where it curved slightly inward. Three breaks were recorded along the perimeter of this ditch in the excavated area. The break on the east side was interpreted as an entrance. The ditch appeared to have continued outside the excavation area in the north-west, where it was cut by the modern boundary ditch. The projected maximum dimensions of the area enclosed by the ditch, allowing for some continuation of it outside the excavated area, were a 48 m north-west/south-east by 40 m north-east/south-west. Oak charcoal from the upper ditch fill (C103) produced a radiocarbon date of AD 780–980 (Beta-234459), placing it later than Palisade 2 and in the same date range as Palisade 1. The outer ditch post-dated Ironworking Area 3 and intersected and was stratigraphically later than Palisade 2.

The ditch survived in various sections with breaks at the east, south-south-west and west. An entrance on the east side measured 6.4 m between the termini. The other breaks may have been subsidiary entrances or a result of poor preservation of the circuit. The ditch was not well preserved in the west, and it was not clear whether a break of 2.5 m was deliberate or the result of later disturbance. The trench truncated an earlier, Bronze Age pit (C505). The SSW section was poorly preserved owing to loose subsoil, the lack of stone lining or packing and subsequent disturbance,

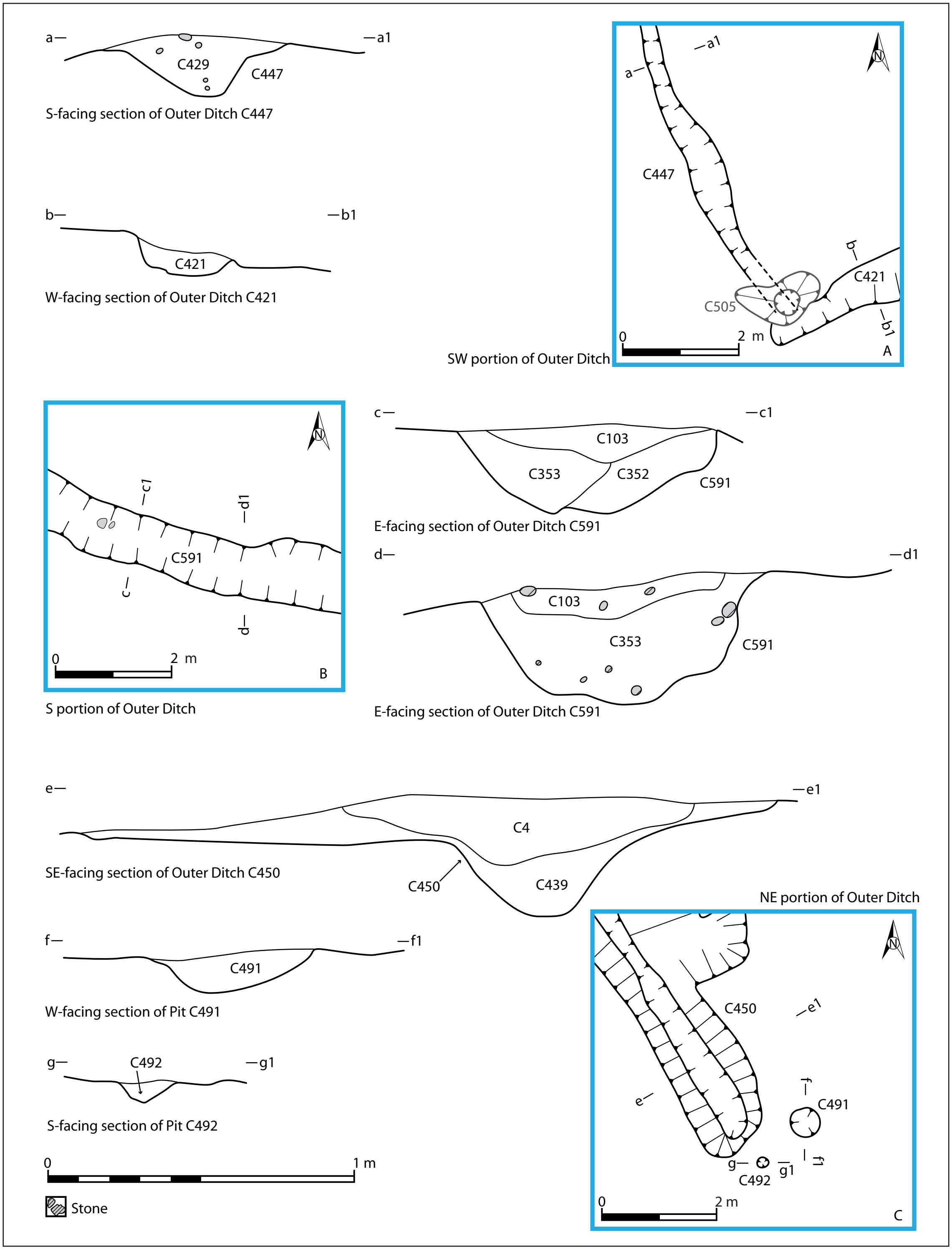


Fig. 4.37—Lowpark: sectional profiles of outer ditch to the south-west, south and north-east.

Pl. 4.60—Lowpark: outer ditch, cutting Palisade 2 and its internal trench north of Palisade 2 entrance, from the south-east.

and the intersection between the outer ditch and Palisade 2 was not apparent. A gap of 8.70 m in the outer ditch in this area was probably due to poor preservation rather than deliberate.

The north-eastern section of the outer ditch (C450) measured 25 m from the northern limit of excavation to the eastern gap. It was 0.80–2 m wide and 0.30–0.45 m deep. The profile was an irregular V-shape, with a 45 ° slope and a relatively narrow slot at the base to the south. It was filled with charcoal-flecked, silty sand with coarser gravel toward the base and some small to medium-sized stones throughout. Two shallow pits (C491 and C492) lay immediately south of the terminus and may have been part of an entrance feature (Fig. 4.37). The pits measured 0.58 m in diameter and 0.12 m deep (C491) and 0.18 m in diameter and 0.07 m deep (C492) and had charcoal-flecked, silty fills.

The south-eastern part of the ditch (C591) was constructed in fine, sandy subsoil and gravel. It was c. 41 m long with a definite terminus in the east and an ill-defined terminus in the west, where it intersected Palisade 2. It was 0.75–1.95 m wide with an uneven base and a maximum depth of 0.70 m. The sides were steep, at a 75 ° angle. The base was 0.10–0.40 m wide except in the east near the terminus, where it cut through Ironworking Area 3. It was filled with charcoal-flecked, dark grey, sandy silt with occasional small stones, animal bone and iron slag. The upper fill (C103) contained 13 small fragments of cattle molar teeth. Lenses of orange–brown clay and iron-pan also occurred in this trench. It cut through Palisade 2 to the south and is thus stratigraphically later than it.

The western side of the ditch was not well preserved. The main trench (C447) was 25 m long and was interrupted by a 2.5 m break. It was 0.6 m wide and 0.10–0.40 m deep, with a roughly U-shaped profile and sloping sides. It was filled with charcoal-flecked, dark grey, clayey sand with occasional small, angular stones. The western side of the ditch cut through the upper part of a large Bronze Age pit (C505) at the southern end. A short section of the ditch (C421) was aligned east–west, almost at a 90 º angle to the western section (C447). It was 5.3 m long, 0.9 m wide and 0.09–0.27 m deep. The west and south sides were steep, with a more gradual slope to the north, and the feature was shallower and gradually sloped at its eastern end. It was filled with charcoal-flecked, dark brown, silty sand. This may have been an in-turned entrance feature.

Discussion

The outer ditch was roughly oval, measuring 48 m by 40 m, and enclosed an area of 1,536 m^2. The ditch was substantial where it survived well, up to 2 m wide and 0.9 m deep. It was poorly preserved on the west and south sides. There was a clearly defined entrance on the east side, and associated pits may have held a barrier or gate. This also suggests that some type of structure stood at both sides of the gate, and there may also have been a palisade in the ditch. A break in the south-west circuit is perhaps indicative of a subsidiary entrance on that side.

This ditch may also have acted as a *lios*, defining the occupation area of the enclosure rather than acting primarily as a defensive or containment feature. The outer ditch was stratigraphically later than both Ironworking Area 3 and Palisade 2, and this chronology is supported by the later radiocarbon date obtained for the feature. It is possible that the outer ditch was contemporary with

Pl. 4.61—Lowpark: sectional profile of outer ditch.

Ironworking Areas 1 and 2. It was roughly concentric with Palisade 1 and, if contemporaneous, the site may be interpreted as a double enclosure similar to a higher-status bivallate ringfort. This is discussed further below.

Souterrain 1

This drystone structure was in a large, rectangular pit (C587) that was 9.53 m long, 6 m wide and 1.93 m deep. The sides sloped gently for 0.50–0.70 m at the upper levels and then steeply to a fairly flat base. The souterrain was oriented north-west/south-east and was lined by four drystone walls, with a 1.18 m gap in the north-west side. Ironworking Area 2 was constructed abutting the south-east wall of the souterrain, possibly incorporating the wall into the ironworking structure. This stratigraphical relationship between the two is supported by radiocarbon dates: oak charcoal from a lower fill (C377) of the souterrain produced a radiocarbon date of AD 540–650 (Beta-231655), compared to a date of AD 720–970 (Beta-231651) for Ironworking Area 2. The combined length of the souterrain pit and the ironworking area was 12.15 m, and they were difficult to distinguish at the upper levels. The dated sample from Souterrain 1 was from a well-sealed lower fill of the interior. A similar date from a charred structural timber from Souterrain 2 (see below), which was of similar construction, supports this as an accurate date for Souterrain 1. It is earlier than the Cloonaghboy souterrain (see Chapter 5) and early in the national chronology of souterrains (Clinton 2001, 65–95).

The souterrain consisted of four drystone walls laid out in a rectangular plan, with a gap in the northern wall. The walls were not keyed into each other but were built abutting each other in the north, west and south corners. The masonry was randomly coursed, with up to 15 courses surviving intact. The inner sides of the walls were even and acted as facing for these back-built walls, constructed against the pit sides. They comprised various-sized stones, both roughly shaped and rounded, with larger stones generally but not exclusively used in the lower courses. There were two cavities in both the north-west and the south-east wall that probably formed recesses for structural timbers, possibly roof supports. Cavities in the western corner and south-east wall may also have held timbers. The walls bulged in places and had partly collapsed in the north-west and particularly in the south-east.

The north-west wall (C510) was well preserved and was 2.2 m long, 1.64 m high and 0.18–0.40 m thick. It was randomly coursed, with a maximum of 14 courses present. The upper levels were 0.34–0.60 m below the surface of the subsoil. It was built up against and abutted the south-west wall (C511). There was a 1.18 m gap between its north-east end and the north-east wall (C512), interpreted as the entrance area. A curved section of wall facing continued from the north-east end of the wall section to the north-west for a further 1 m. It was 0.50–0.70 m high and was roughly constructed of rounded, unshaped stones. It retained the fill behind the north-east wall but was not as solid as the main walls. This may have facilitated a ramped entrance possibly with access via a ladder or wooden steps. Ramp entrances have a widespread distribution in souterrains across Ireland, with most examples occurring in drystone-built souterrains (Clinton 2001, 99). Animal remains from the interstices of the stones included fox, small mammal and a pig canine tooth from a male aged over c. 9 months.

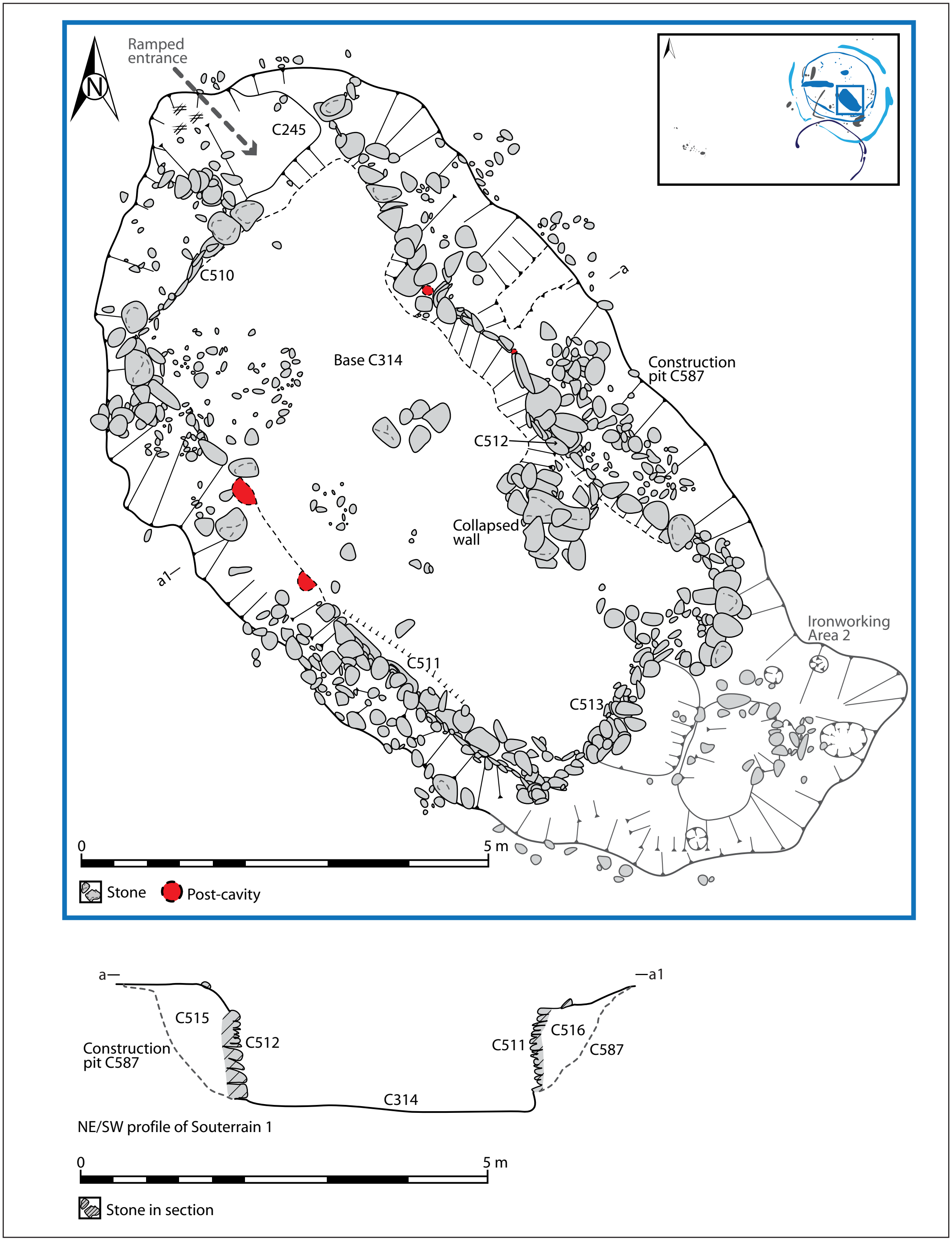


Fig. 4.38—Lowpark: Souterrain 1, plan and profile.

Pl. 4.62—Lowpark: Souterrain 1 from the south-east.

The south-west wall (C511) was of similar construction to the north-west wall and was 7.42 m long, 1.60 m high and 0.34 m thick. It was randomly coursed, with a maximum of 14 courses surviving *in situ*. Two vertical recesses or post-cavities in the masonry suggested structural or reinforcing timbers. One cavity was at the centre of this wall, inclined slightly to the south-east, and was 0.15–0.20 m wide and 1.40 m high. The second cavity was 1.10–1.30 m to the north-west and was inclined toward the north-west at an 85 ° angle. It was not as well preserved and was 0.20 m wide and 1.2 m high. Similar cavities occurred almost directly opposite these in the north-east wall (C512). The gap between the wall and the construction pit was filled by mid-brown, silty sand, with inclusions of small stones (C516).

The south-east wall (C513) was in a poorer state of preservation than the other walls, possibly owing to activity centring on Ironworking Area 2 (Phase 3). It had maximum surviving dimensions of 3.65 m long by 0.8 m high and was 0.54 m thick. The lower course rested on relatively loose sand and was affected by Ironworking Area 2, resulting in less stable ground conditions. There was a gap of 0.10 m between the walls in the southern corner that may have been a post-cavity; a second 0.10 m-wide gap in the masonry toward the centre was less well defined owing to subsequent collapse. This wall was not keyed into either of the adjacent walls. Dark, charcoal-rich fills south-east of this wall were related to the adjacent ironworking.

The upper parts of the north-eastern wall (C512) had also collapsed at either end, while the middle section was relatively intact. It was a maximum of 7.96 m long and 1.6 m high, with up

Pl. 4.63—Lowpark: Souterrain 1, post-cavities in south-west wall (C511).

to 12 irregular courses surviving in the central section. A 0.16 m-wide, 1.35 m-high vertical gap or post-cavity in the masonry also occurred in the centre of this wall. A second post-cavity occurred 1 m north-west of this, but here the wall had largely collapsed and only two stones remained *in situ* at the base. The south-eastern side survived to a height of 1.2 m, with eight courses in place. A small post-hole (C498) occurred at the base of this, measuring 0.20 m by 0.12 m and 0.10 m deep. This wall bulged toward the centre and was relatively poorly preserved. The north-western end continued 0.7 m beyond the inner face of the north-western wall. A 1.18 m gap between the south-western and the north-western walls formed part of a ramped entrance. This entrance feature was at the closest point to Souterrain 2, 3.7 m to the north-west.

Three stone artefacts—a grinding stone (E3338:395:236) similar in appearance to a bullaun stone, a rotary grindstone (E3338:512:239; Pl. 4.64) and a rotary grindstone fragment (E3338:512:270; Fig. 4.656)—were incorporated into the fabric of the north-eastern wall (Appendix VI).

The walls were constructed on subsoil that included a layer of compact boulder clay (C314) and sloped gradually from north to south. The southern one-third of the souterrain was bedded on a natural sand layer that rested on top of the boulder clay. This may account for the generally poorer preservation of the souterrain walls to the south.

This natural surface formed the floor of the structure and contained several shallow, natural hollows but no further archaeological features. These hollows were filled with charcoal-flecked silt, sand and some gravel. The features were too shallow to represent post-holes, but upright timbers set in these hollows could have added support to the roof as props. A deposit of stones near the centre could have been the base of a pillar or packing for a roof support prop, and several shallow depressions in the souterrain floor may have been the location of supporting props. Freestanding

Pl. 4.64—Lowpark: rotary grindstone (E3338:512:239) from wall of Souterrain 1 (photo: Jonathan Hession).

pillar supports for souterrain roofs occurred in Roovesmore and Carhoovaauler, Co. Cork, Straid (Glencolmcille), Co. Donegal, and Stickillin and Demense, Co. Louth (Clinton 2001, 162–3).

The main, post-use basal fill of the whole structure (C273) was 0.26 m thick and consisted of charcoal-flecked, reddish-brown, coarse, gravelly sand with occasional stones. It contained burnt bone, iron slag and the carbonised remains of seven timbers. These timbers occurred at 0.55 m above the base of the souterrain and were 0.48–1.33 m long, 0.05–0.20 m wide and 0.01–0.03 m thick. Occasional fragments of cattle teeth, a pig scapula and a partial foot bone (astragalus) possibly from a pig or sheep were recovered from the fill (Appendix IX).

Six distinct layers of fill occurred in the northern entrance feature of Souterrain 1, including varied layers of silt and sand with concentrations of charcoal, burnt bone and iron slag. A lower fill (C377) in this area contained oak charcoal that produced the radiocarbon date of AD 540–650 (Beta-231655). An upper, charcoal-rich deposit (C235) contained three artefacts: a copper-alloy ring-pin, an iron knife, which may have been a folding knife, and an iron nail (E3338:235:104; Pl. 4.86; Fig. 4.60). The ring-pin is of the plain-ringed, looped-headed type, which dates from the fifth to the 11th century (Appendix VIa), and the radiocarbon date places it relatively early in this date range. Animal remains from C235 included 20 small fragments of cattle molars, 12 small fragments

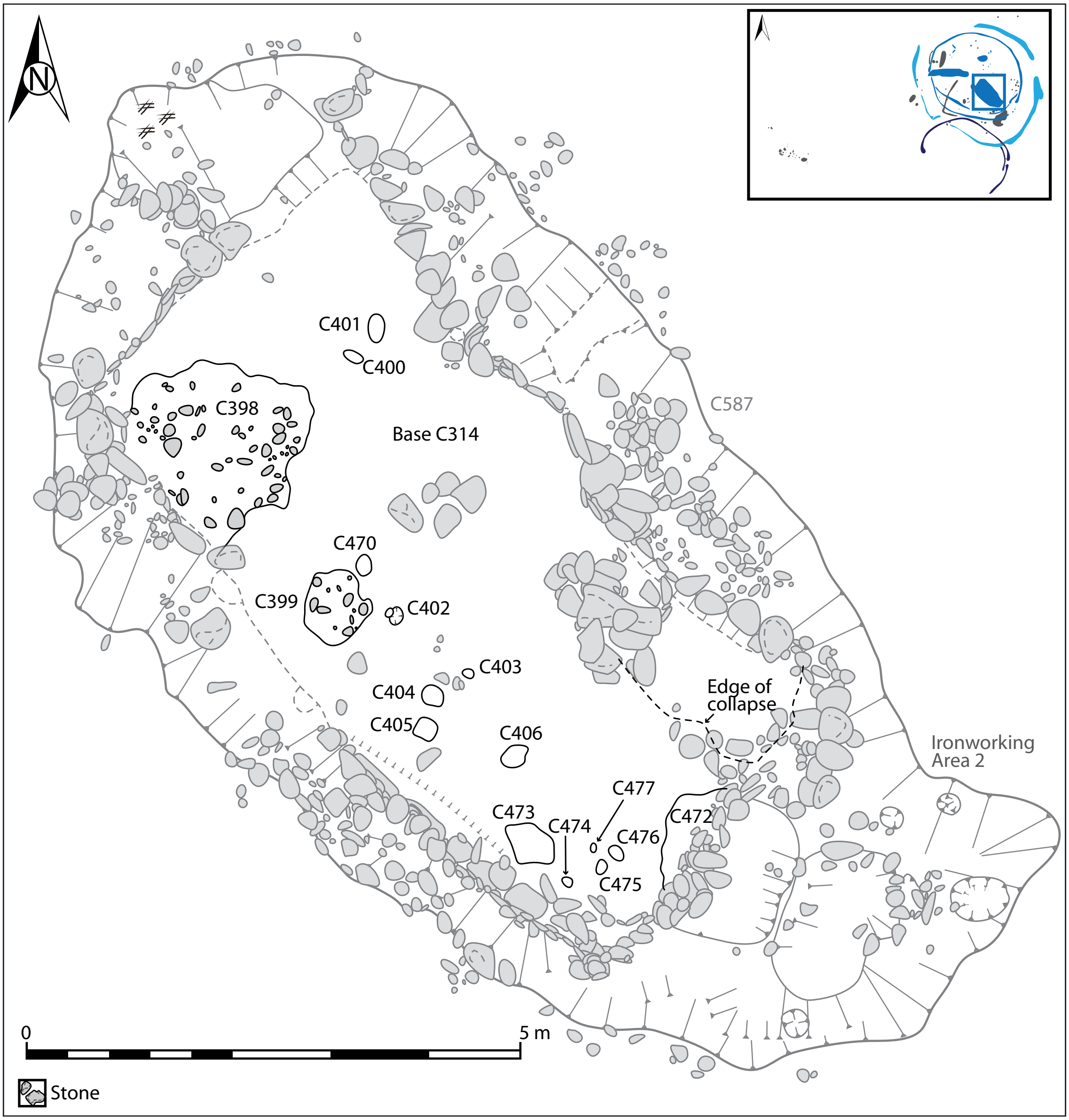


Fig. 4.39—Lowpark: floor plan of Souterrain 1 showing basal features.

of pig molars or premolars, a pig medial metapodial (foot bone), eight rib fragments from a small mammal, the left ulna of a rabbit or a hare, a possible scapula of a small dog and a calcinated partial orbital of a medium-sized mammal (Appendix IX).

These fill layers reflect re-use of the souterrain as a midden or dump after its primary function had ceased but while it was still intact. Subsequent layers in the souterrain derived from more general backfilling and included clay, sand, silt and stone. One large stone deposit (C230), measuring 8.20 m by 3.50 m and 0.6 m thick, constituted a deliberate dump of stones measuring

Pl. 4.65—Lowpark: Souterrain 1 during excavation, with Ironworking Area 2 in foreground, from the east-south-east.

up to 0.18 m by 0.35 m by 0.38 m. This backfill (C230) contained 15 fragments of cattle teeth (Appendix IX). The upper fill (C6) of this area, which was indistinguishable from the upper fill of Ironworking Area 2, comprised charcoal-rich, dark grey to black, silty sand with frequent small stones and also contained iron slag, bone and larger stones that may have been displaced from the upper courses of the stone walls. Loose, sandy material (C234) around the upper layers of the stone walls of Souterrain 1 contained a tanged iron knife fragment (E3338:234:111; Appendix VIa) similar to knives from Garryduff I, Co. Cork (O'Kelly, 1963, 41–4, fig. 4), particularly find no. 512.

Souterrain 2

Souterrain 2 was built in a construction trench (C241) that was 13.8 m long, 2.25 m wide and a maximum depth of 1.76 m. The trench profile, of sloping sides, was largely determined by the loose, natural, sandy ground. The souterrain was aligned east–west between the west side of Palisade 1 and the centre of the site, and was 3.7 m from Souterrain 1. The western end, which incorporated a chamber, was the widest. The souterrain was of drystone construction, stepped at both ends, with nine post-cavities and a small section of roof intact. It contained a variety of fills, indicating both natural silting and deliberate infill (Figs 4.40–1).

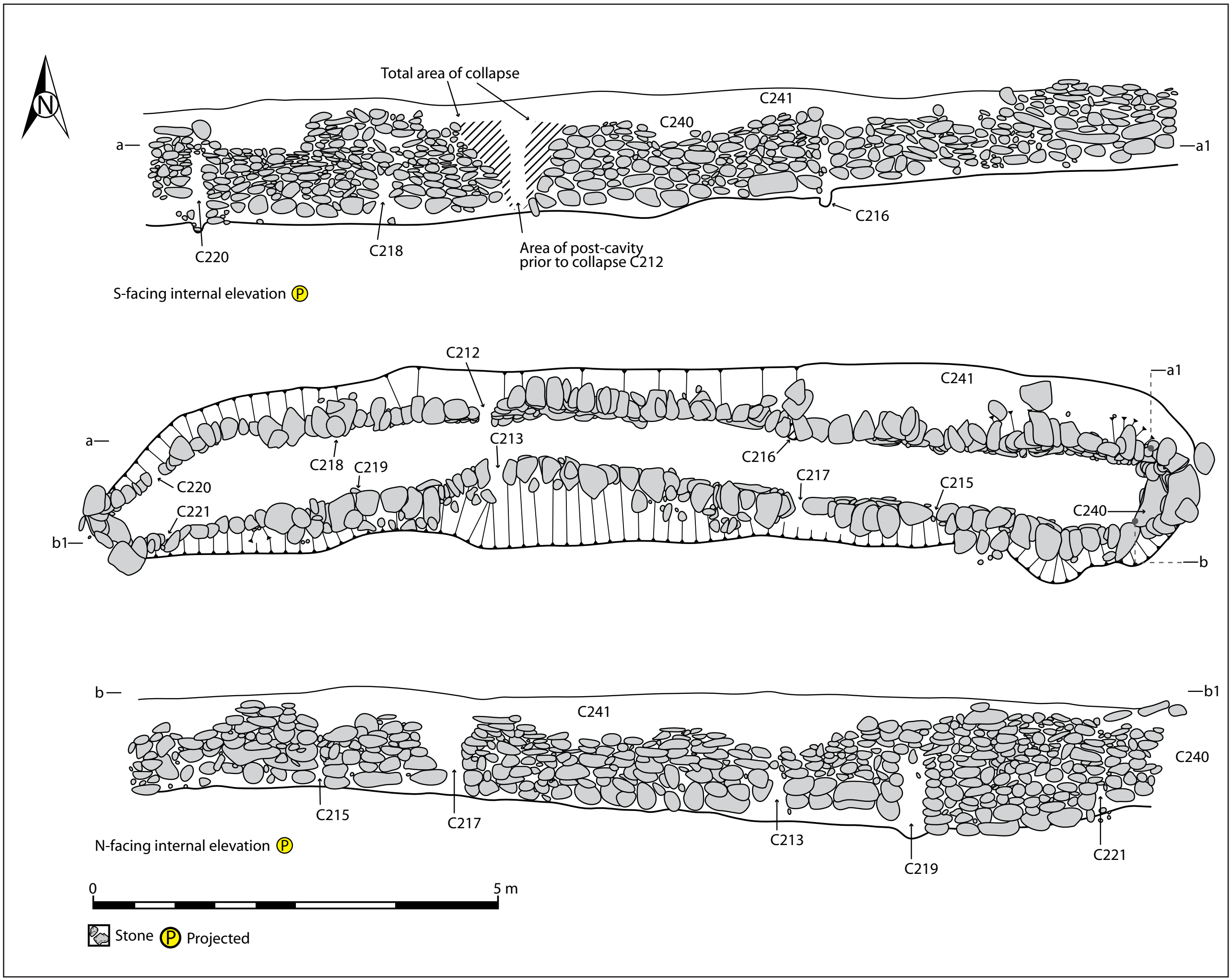


Fig. 4.40—Lowpark: Souterrain 2.

The souterrain comprised a linear passage opening to a slightly wider chamber at the western end, lined with drystone walls (C240). The passage was 8 m long and had an average internal width of 0.8 m. Its base was 1.1–1.4 m below the top of the subsoil. The walls had an average height of 1 m and included up to eight courses of drystone masonry. The chamber was 4.6 m long internally, a maximum of 1.05 m wide and 1.4 m deep. The side-walls reached the top of the pit at a height of 1.4 m and included up to 15 courses. The walls consisted of irregularly coursed, finely built, drystone masonry of flat, roughly shaped building stones, which were predominantly of sandstone (maximum dimensions: 0.6 m by 0.23 m by 0.2 m).

There was no surviving roof to the passage, but at the eastern end the chamber side-walls were stepped in toward the centre, suggesting at least partial corbelling, and capstones would have formed the roof, although it is also possible that wood formed part of the roof.

Pl. 4.66 (left)—Lowpark: Souterrain 2 from the west; Souterrain 1 during excavation in background.

Pl. 4.67 (below)—Lowpark: grinding stone (E3338:240:266) re-used in wall of Souterrain 2 (photo: Jonathan Hession).

There were steps at either end of the souterrain, seeming to indicate access points, although the western end was covered by two lintels. A small, rectangular gap, 0.08 m by 0.12 m, at the western end, which was in line with the palisade, could have acted as a vent or spy-hole. The eastern step was larger and more solid than the western step and would have been more accessible.

The side-walls had nine gaps or post-cavities recessed into the walls. They included four pairs of opposing post-cavities and a single post-cavity in the south wall 2.6 m from the east end (Fig. 4.40; Pls 4.68–70). These cavities were 0.65–1 m high and 0.11–0.35 m in diameter. Four overlay definite post-holes, which had a maximum depth of 0.2 m below the floor of the souterrain. Three pairs of post-cavities occurred in the chamber, and one pair (C212 and C213) marked the division between the passage and the chamber at their narrowest point. Here a band of charcoal, most likely the remains of a structural timber, occurred across the passage between the post-cavities (Pl. 4.70). Pairs

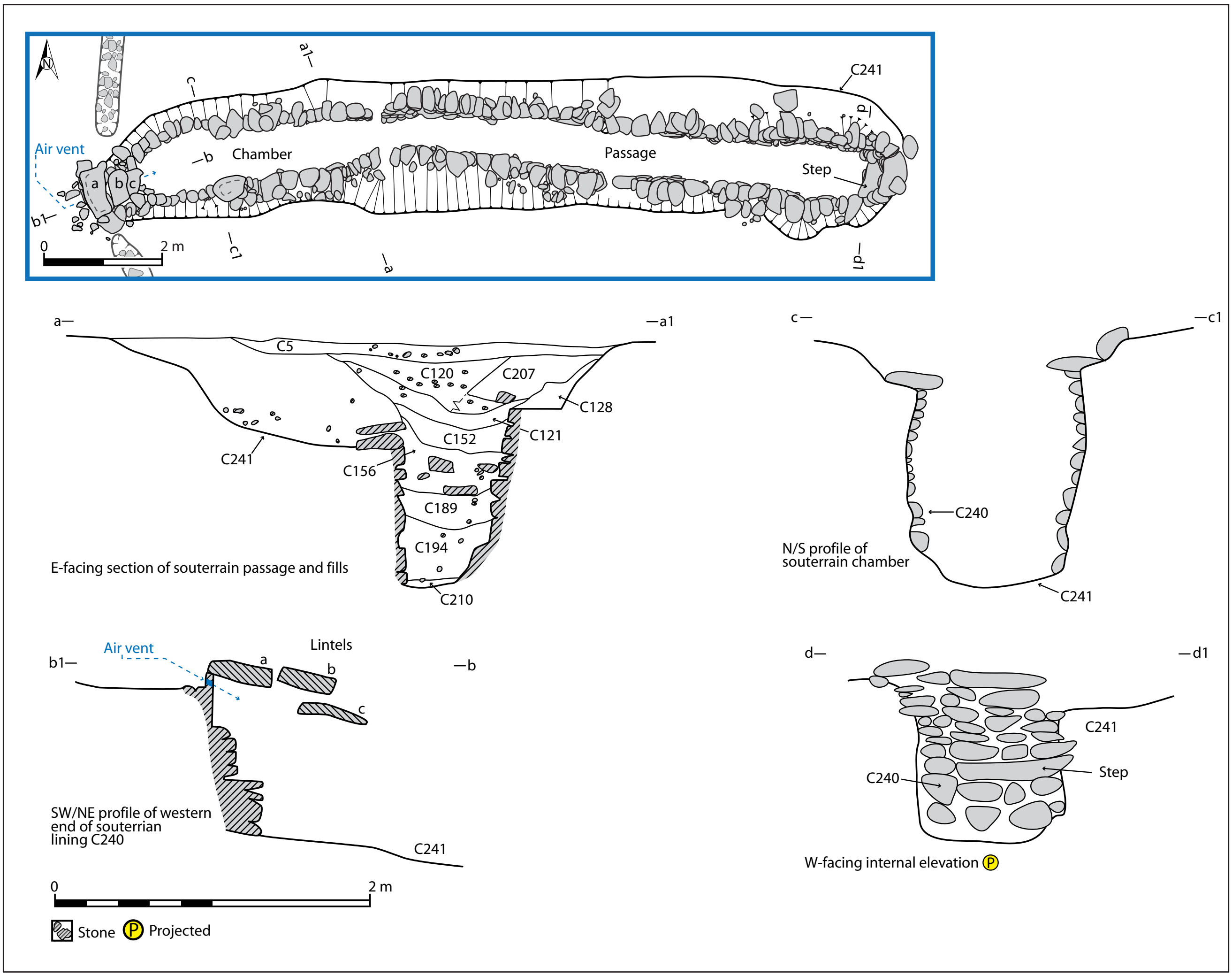


Fig. 4.41—Lowpark: plan, section through fills, profiles and west-facing internal elevation.

Pl. 4.68—Lowpark: Souterrain 2, post-cavity (C216).

Pl. 4.69—Lowpark: Souterrain 2, post-cavity (C218).

Pl. 4.70—Lowpark: Souterrain 2, post-cavity pair (C213 and C212) with band of charcoal.

of cavities occurred in the centre of the chamber (C218 and C219) and at the east of the chamber, adjacent to the step (C220 and C221), but did not continue to the full height of the walls. The remaining pair (C216 and C217) occurred near the centre of the passage. Charred oak timbers were present in three of the post-cavities, and charcoal was associated with all of the cavities. Charred remains of an oak post, which extended the full height of cavity C213, yielded a radiocarbon date of AD 550–660 (Beta-231649), almost the same as the date obtained from Souterrain 1. The charring of the wood in the souterrain may be related to its destruction or its subsequent use as a midden.

A grinding-stone fragment (E3338:240:266; Appendix VIb), a multi-purpose stone used as an anvil, with evidence for use also as a whet-/sharpening and pounding stone (E3338:240:267; Appendix VIa), and a highly corroded iron object (E3338:240:272; Appendix VIb) were incorporated into the fabric of the souterrain walls.

There were 25 distinct fills in the souterrain, including various silt, sand and gravel deposits interspersed through the rubble fill. This rubble included two flat stones that may have served as lintels or capstones. Evidence of burning or dumping of burnt material was apparent at the middle and lower levels of the eastern 1.1 m of the fill. There were also occasional fragments of burnt bone, including a calcinated rib fragment from a small mammal, 15 small fragments of unburnt cattle horn cores (Appendix IX) and charcoal deposits in the fills. Occasional iron slag occurred in the middle and upper fills. A copper-alloy pin shank, with possible remains of a looped head at the top (E3338:182:75; Appendix VIa), was retrieved from the middle level of the fill. This pin is of a similar form to the complete pin retrieved from Souterrain 1 and has a broad date range of the fifth to the 11th century. A corroded iron knife (E3338:129:62) was recovered from a well-sealed upper fill at the eastern end of the souterrain. It is broadly similar to an iron knife from Garryduff, Co. Cork (O'Kelly 1963, 43, fig. 4, find 598).

Souterrains 1 and 2 were both constructed with similar, drystone, back-built walls that had distinctive post-cavities incorporated into their fabric. Almost identical radiocarbon date ranges from a basal fill in Souterrain 1 and from a post-cavity in Souterrain 2 and similar artefacts from their fills point to contemporaneous construction, use, abandonment and post-use deposition.

Keyhole-shaped pit

This pit was in the north-east quadrant of the area enclosed by Palisade 1 (Fig. 4.34). It underlay the roundhouse (see below) and must have been infilled before construction of the roundhouse. Charcoal-rich layers (C172–6) probably represent a hearth at the centre of the roundhouse.

This large, keyhole-shaped pit (C232) had maximum dimensions of 3.42 m by 2.34 m and was 1.56 m deep. It was aligned east–west with steep sides that were lined by large, irregularly coursed boulders (C178). The narrower, western part of the base sloped down to the wider, circular, eastern base. A series of flat stones set into the lower base formed a box-like feature (C222). Hazel charcoal from the fill (C214) of this stone 'box' produced a radiocarbon date of AD 670–880 (Beta-231650). The keyhole-shaped pit contained 20 distinct fills that overlay the stone box and included deliberate deposits and natural silt layers that contained artefacts related to post-use deposition, as well as disturbed earlier deposits.

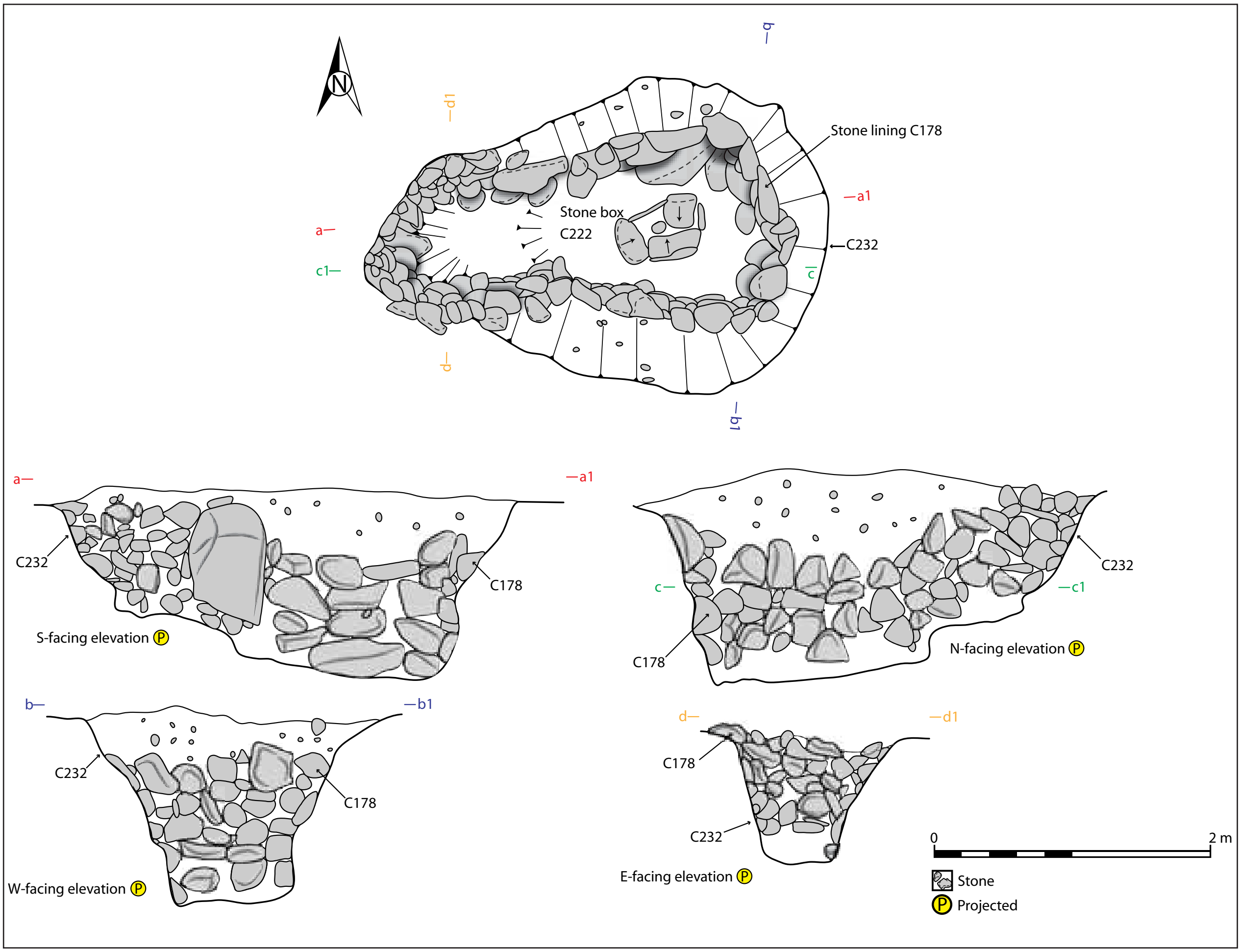


Fig. 4.42—Plan and elevations of keyhole-shaped pit (C232).

The box (C222) comprised six flat stones and was set into a sub-rectangular pit (C223) at the centre of the lower base of the keyhole-shaped pit. It measured 0.64 m by 0.42 m and was 0.30 m deep. It was filled with charcoal-flecked silt and gravel that was partly covered by a horizontal flat stone. All of the artefacts (see below) from the keyhole-shaped pit were deposited as part of the post-use backfilling process, so there was no evidence, apart from the morphology, for its function.

The drystone lining of pit C232 was built continuously around the sides of the pit, from the base to the upper course, 0.30 m below the surface of the subsoil. It consisted of randomly coursed, large sandstones and mudstones (maximum size: 0.30 m by 0.3 m by 0.18 m). There was one especially large, vertically placed sandstone boulder, which was 0.84 m long, 0.62 m wide and 0.21 m thick. The coursing ranged from 0.6 m to 1 m high and included some charcoal and small fragments of animal bone in the interstices of the stones. As with the souterrains, this stone lining retained the sides of the pit, which was dug into unstable sand and gravel, creating an accessible,

Pl. 4.71—Lowpark: keyhole-shaped, stone-lined pit, from the west.

Pl. 4.72—Lowpark: stone box (C222) at base of keyhole-shaped pit.

functional chamber with maximum internal dimensions of 2.54 m east–west by 1.1 m north–south and 1.2 m deep.

The fills consisted of silt, sand, gravel and small stones with inclusions of iron slag, magnetic dust, burnt bone and varying concentrations of charcoal flecks and lumps (Fig. 4.33). Animal remains from the fills included a second phalanx (toe) from a pig or sheep (C183), part of a phalanx from a sheep or goat (C36) and 50 fragments of cattle teeth (C184). Artefacts from these fills included an iron knife (E3338:191:102; Appendix VIa) from a lower fill, a miniature, polished stone axehead (E3338:169:72; Appendix III), a burnt bone pin fragment (E3338:186:73; Appendix VIa) and a corroded iron belt buckle (E3338:179:68; Appendix VIa) from a higher stratum. A

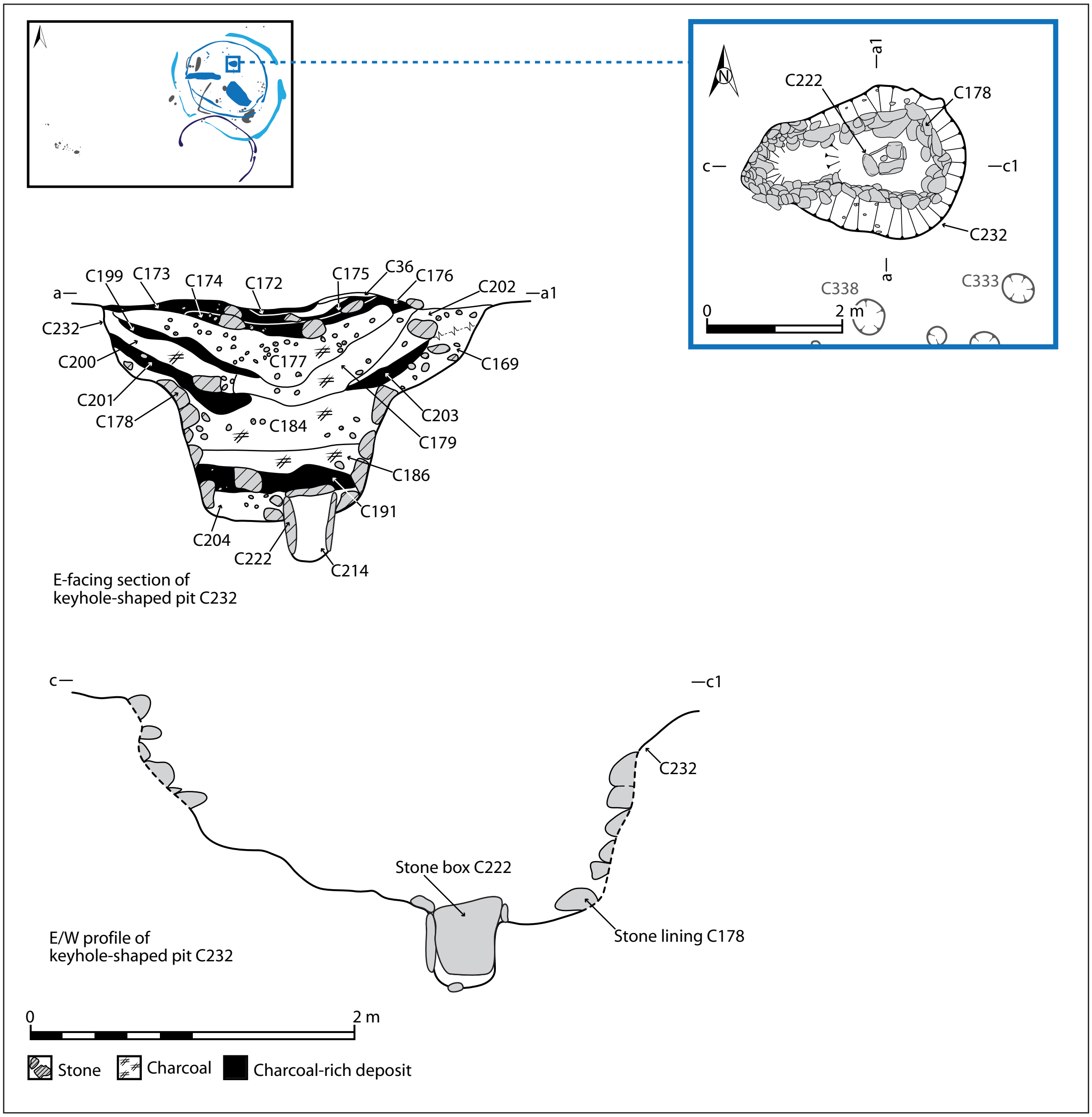


Fig. 4.43—Lowpark: east-facing section and north–south profile of keyhole-shaped pit (C232) showing box (C222).

possible buckle frame was recovered from the topsoil overlying the keyhole-shaped pit (E3338:2:8; Appendix VIa). The axehead may relate to Neolithic features disturbed by the construction of the early medieval pit or may have been an *ex situ* artefact redeposited in the pit in the medieval period. The knife is of the same type as that from Souterrain 1 and was typical of the period. The belt buckle, belt-buckle frame and pin can be ascribed only a broad medieval date and are likely to relate to dumping of waste in the pit after it went out of use; the buckle frame may relate to the habitation of the roundhouse.

Discussion

This well-built, solid-stone structure provided a secure stone chamber set into loose, natural subsoil. The coursing was not found to extend as high as ground level and may never have done so. It is likely that this pit functioned as a storage pit, or *corróc* (Kelly 2000, 367). The stone box at the base of the stone-lined pit may once have stored something of particular value. Access was probably down the narrow side of the pit, possibly using wooden steps. The roof may have been of stone lintels, which were subsequently removed, or wood. The uppermost charcoal-rich fills (C172–6) suggest that a hearth in the roundhouse above lay directly over the structure and rested on its upper fills. No roof lintels were found, and a wooden roof of planks or logs is likely. The date range for the pit is AD 670–880, later than the Lowpark souterrains but within the general occupation of the site. As the dated sample came from the primary fill in the 'box' and artefacts were derived from subsequent fills, they provide a *terminus post quem* for the use of the pit but not for its construction. The construction method and morphology of the pit were very different from that of the souterrains, as it was smaller, rounded and roughly coursed with large boulders, as opposed to the rectilinear, evenly faced walls of the souterrains. The fill pre-dates the radiocarbon date range from the adjacent post-hole (C338) from the roundhouse, suggesting that it was backfilled when the roundhouse was in use.

Roundhouse

According to the law-text *Crith Gablach*, written c. AD 700, a *mruigfer* (the most prosperous grade of *bó-aire*, or freeman) 'was expected to live in a house with a diameter of twenty-seven feet [c. 8.2 m]. His outhouse (*airchae*) had a diameter of 17 feet [c. 5.2 m]. There should be a candle in the candlestick and the fire should always be burning' (Kelly 2000, 361). The probable location of such a 'farmhouse' in this enclosure was the north-east quadrant, over the earlier, keyhole-shaped pit and associated with a central hearth. The evidence included eight post-holes and pits that may have held posts (C326–30, C333, C338 and C341), a stake-hole (C346) and a charcoal-rich hearth (C36). These features are interpreted as the remains of a structure 7.5–8 m in diameter, with at least five post-holes (C327, C328, C333, C329 and C341) marking the perimeter wall. These posts may have been load-bearing roof supports, supplemented by internal posts, although it was not possible to relate the internal posts directly to the structure and they may indeed belong to a separate phase of activity. Other structural timbers that would have been removed after the house went out of use did not leave any further archaeological evidence.

The post-holes were 0.13–0.38 m deep and 0.25–0.65 m in diameter. The better-preserved post-holes (C333 and C338) were steep-sided with flat bases and contained some stone packing. This suggests that posts were placed in prepared holes and packed with stone to keep them in position. These features were generally filled with charcoal-flecked silt, sand and small stones. Some burnt bone and iron slag were also present. Posts set in these pits are likely to have been load-bearing for a frame supporting a thatched roof.

A charcoal-rich layer (C36) was centrally located over the backfilled keyhole-shaped pit (C232) and overlay charcoal-rich layers (C172–6), residue of a central hearth in the roundhouse. The upper layer (C36) consisted of charcoal-blackened, greyish-brown, silty sand with a maximum

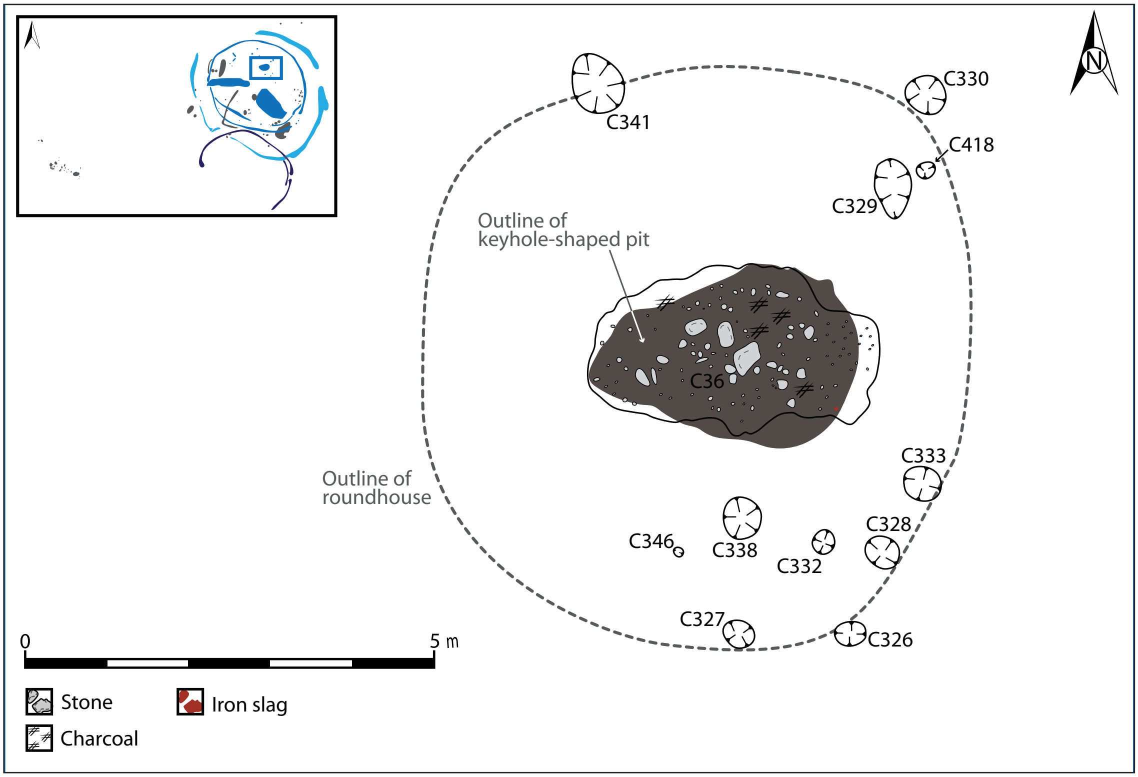


Fig. 4.44—Lowpark: plan of roundhouse.

Pl. 4.73—Lowpark: pre-excavation view of roundhouse and keyhole-shaped pit from the west.

Pl. 4.74—Lowpark: belt buckle (E3338:179:68) and buckle frame (E3338:2:8) from roundhouse/keyhole-shaped pit (photo: Jonathan Hession).

spread of 4.8 m by 2.2 m but was more concentrated in a roughly circular area, with a diameter of 1 m and a maximum thickness of 0.01 m.

A post-hole (C338) was 1 m south of this hearth. It was roughly circular, with a diameter of 0.45–0.47 m and a depth of 0.32 m. It was flat-based and steep-sided, lined in the east and west by two flat packing stones. The post-hole fill consisted of charcoal-rich, loose, dark greyish-brown, silty sand with occasional flecks of burnt bone. Holly charcoal from this fill produced a radiocarbon date of AD 880–1020 (Beta-231654). A gold filigree panel (E3338:338:144; see below) of sixth–seventh century AD date (Appendix IV) was centrally located in this fill, and the date is consistent with much of the activity on site. The later date range associated with this post-hole may indicate that it was unrelated to the roundhouse and possibly represents a later phase of activity in the enclosure. Alternatively, the charcoal and silt fill of the post-hole may have accumulated when the post was removed and the site was abandoned.

Rectangular structure

A series of shallow trenches, pits and post-holes in the north-west quadrant of Palisade 1 were the disturbed remains of a flimsy early medieval structure. The structural remains were fragmentary slot-trenches that may represent one or two rectangular structures, with nine internal pits or post-holes. This area was truncated by a later, elongated pit (C117; see below) and plough furrows. It is likely that these features were originally more substantial and that only the lower levels survived.

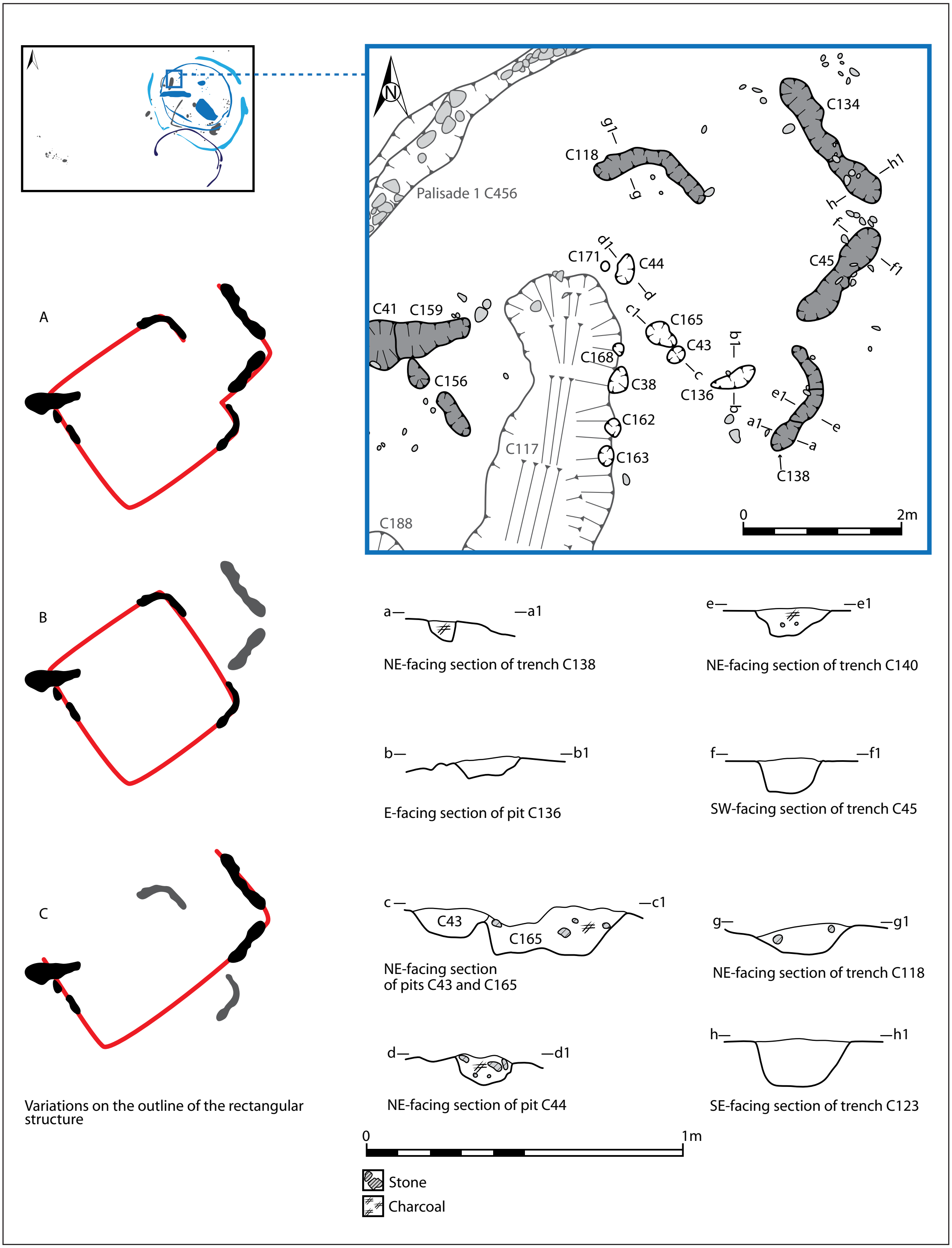


Fig. 4.45—Lowpark: rectangular structure.

Pl. 4.75—Lowpark: rectangular structure from the south.

Oak charcoal from one of the slot-trenches (C138) produced a radiocarbon date of AD 647–761 (GrN-30847), placing the structure firmly in the early medieval period, contemporaneous with the most intensive phase of medieval activity on site. A small amount of iron slag from these trenches supports this date.

Two curvilinear trenches to the north (C118) and east (C138) probably marked the rounded corners of the structure, and a linear trench (C156) delimited the south-western extent. The slot-trenches may mark the extent of a square structure with overall dimensions of 4.2 m by 4.2 m and varied in depth from 0.08 m to 0.02 m. The north-western trenches (C134/C123 and C45) may represent an annexe or porch feature, open to the west and measuring 1.80 m by 3.40 m. An alternative interpretation is that they were part of a separate building that included the shorter slot-trench (C156) and measured 6 m by 3.40 m.

Nine internal pits and post-holes could have functioned as roof supports in either structure, as these features were within the limits of both buildings. These poorly preserved internal pits and post-holes (C38, C43, C44, C136, C162, C163, C165, C168 and C171) varied in depth from 0.09 m to 0.35 m and in diameter from 0.09 m to 0.40 m. The fills of these features were generally charcoal-flecked sand.

Oval structure

Eight post-pits (C47, C49, C246, C248, C249, C252, C254 and C259) and one stake-hole (C253), forming an oval plan, were in the south-west quadrant of Palisade 1. The area enclosed by the structural post-pits was cut by the inner arc of Palisade 1 and the L-shaped trench (Phase 5). The projected outline of this structure intersected the inner arc of Palisade 1 and the L-shaped feature and almost abutted the outer arc of Palisade 1. It is likely, therefore, that it represents activity coeval with the earlier, outer arc of Palisade 1 or the primary ironworking structures.

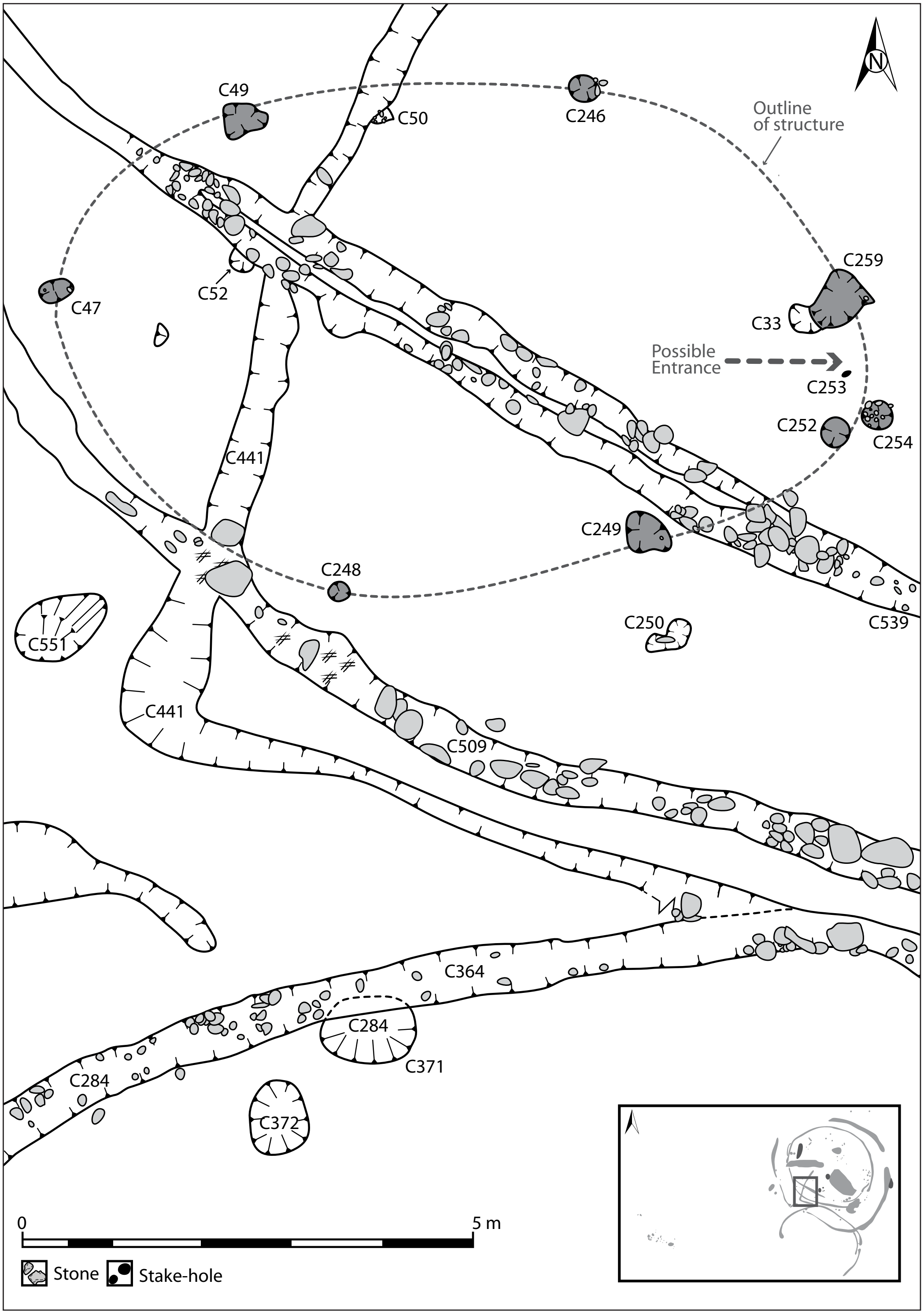


Fig. 4.46—Lowpark: conjectural outline of oval structure.

The internal dimensions of the structure were 9.3 m east–west by 5.6 m north–south. The defining post-pits were all circular or oval, with diameters of 0.25–0.65 m, and were 0.10–0.26 m deep (Fig. 4.46). They were generally steep-sided with flat or concave bases filled with charcoal-flecked, silty sand and small stones but no packing stones. The structural posts probably supported a wattle wall and a roof thatched with reeds. A 0.9 m-wide entrance on the east side was represented by paired post-holes (C252, C254 and C259) and a stake-hole (C253). Further features, notably inner roof support posts, a hearth or indeed occupation layers, are likely to have been destroyed by the later activity on the site.

The size of these structures does not preclude a domestic function. Rectangular and circular structures occur throughout the medieval occupation of Lowpark. Three of the four ironworking structures were rectangular, most notably Ironworking Area 4, which was the earliest and best defined. The possible rectangular building defined by the large L-shaped slot-trench (see below) occurred at the end of the sequence and was stratigraphically later than the palisade trenches. Three circular or sub-circular structures—Ironworking Area 1, the roundhouse and the oval structure—were enclosed by and broadly contemporary with Palisade 1.

Phase 5: subsequent early medieval activity

An L-shaped trench (C441) in the south-west quadrant of Palisade 1 truncated both the inner and the outer arc of Palisade 1. The long axis was aligned roughly north-east/south-west, and there was

Pl. 4.76—Lowpark: site during excavation, from the west.

a shorter, north-west/south-east extension to the south. This feature may have been a wall-footing trench for either a rectangular structure or an enclosure. Oak charcoal from the main fill (C430) in the feature produced a radiocarbon date of AD 680–890 (Beta-231656), suggesting that it was rather late in the occupation sequence at Lowpark. The western side was 12 m long, and the short section at the south was 7 m long, with an average width of 0.45 m and steeply sloping sides. It reached a maximum depth of 0.3 m below the surface of the subsoil. The profile varied from V- to U-shaped.

The fill (C430) was moderately compacted, charcoal-flecked, light brown, coarse-grained, silty sand with frequent small stones. Randomly placed, sub-angular stones (C432), 0.21 m long, 0.1 m wide and 0.1 m thick, underlay C430 in the south-east of the southern section and may have been displaced packing stones.

Discussion

This feature post-dated Palisade 1 and was late in the Lowpark stratigraphic sequence and radiocarbon date chronology. It may have been the vestiges of a footing for a rectangular building or open-ended shelter that was contemporaneous with other occupation evidence in the

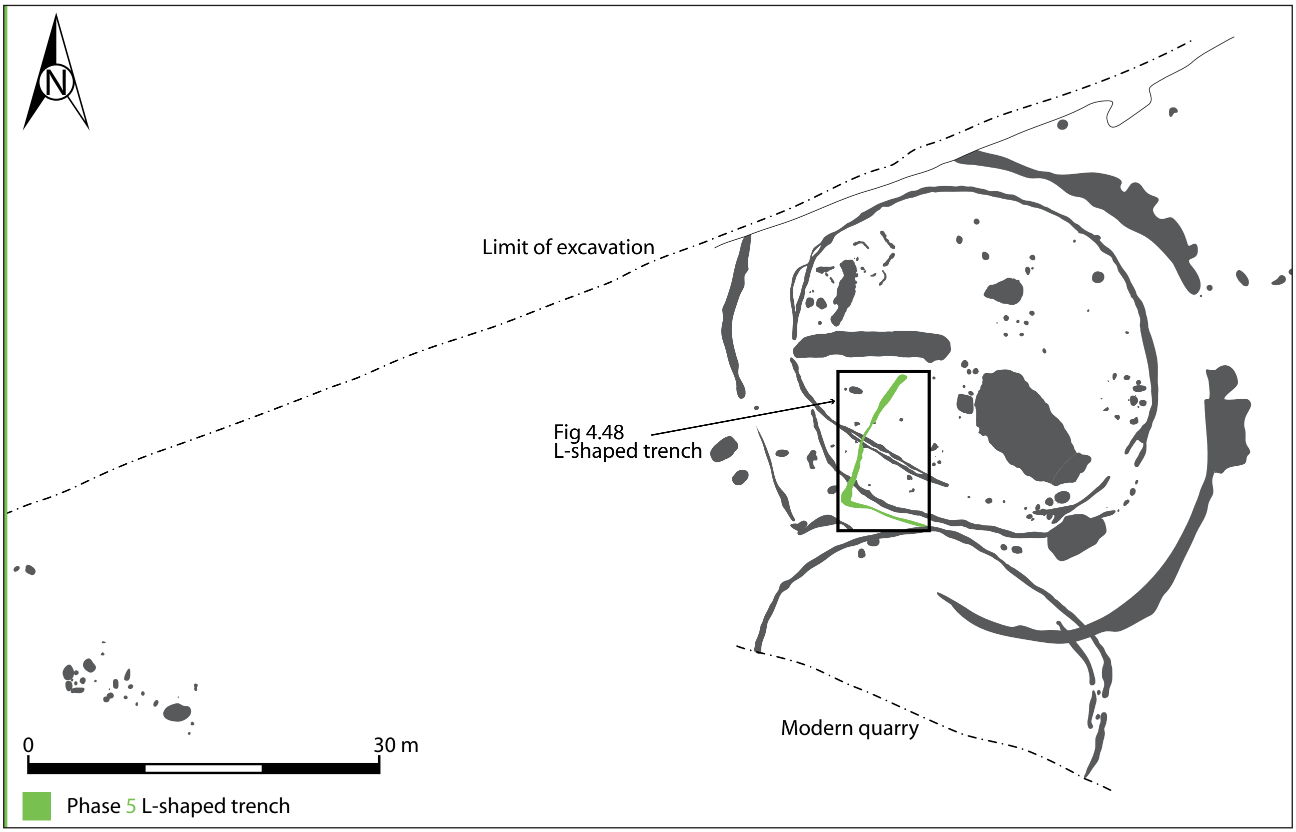


Fig. 4.47—Lowpark: site plan and location of L-shaped trench.

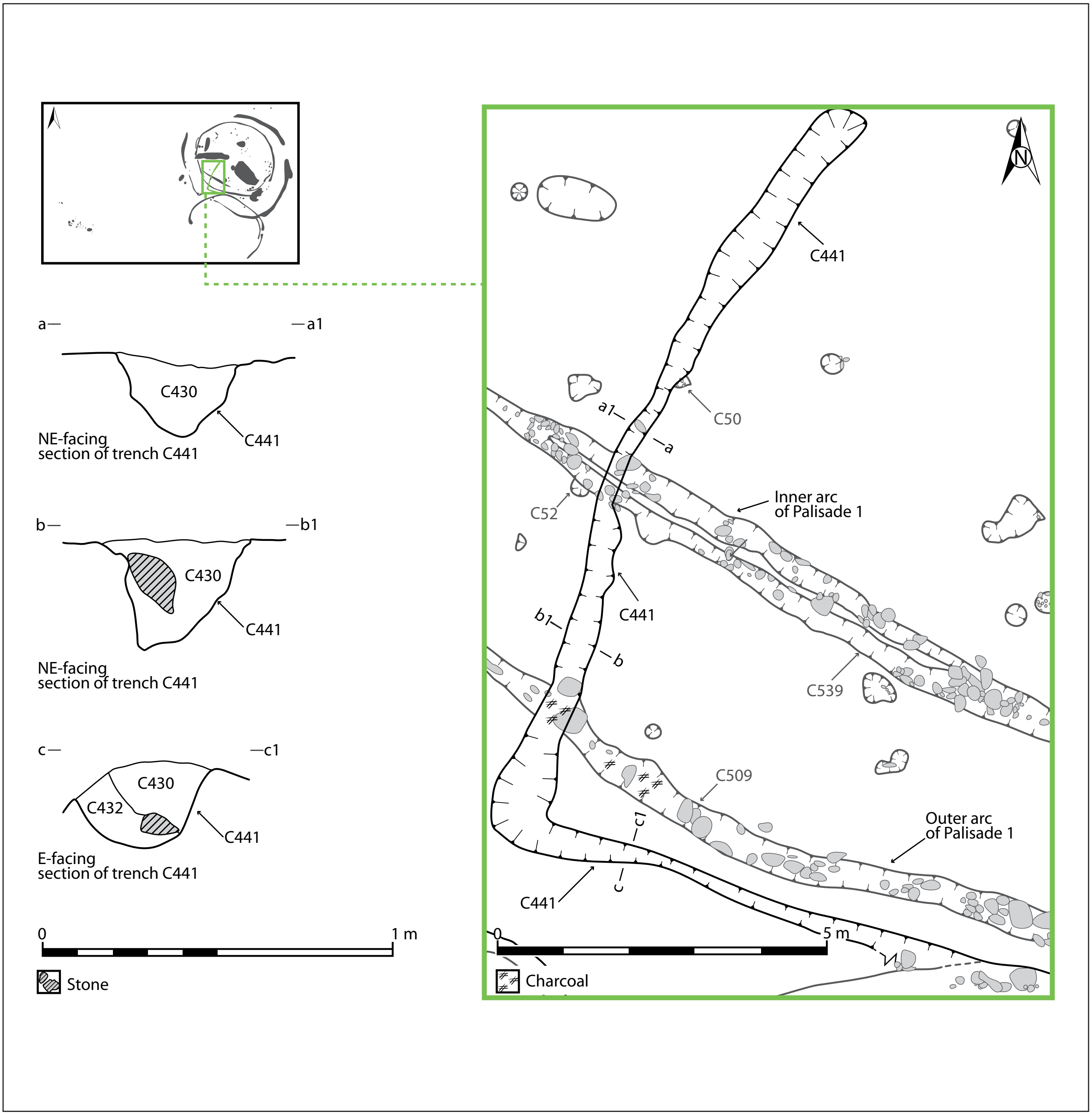


Fig. 4.48—Lowpark: plan and profiles of L-shaped trench.

miscellany of features in Phase 6 (Fig. 4.48). An alternative interpretation as an unroofed enclosure that was partly preserved is also possible. The slot-trench is quite shallow to hold a load-bearing wall for such a large structure.

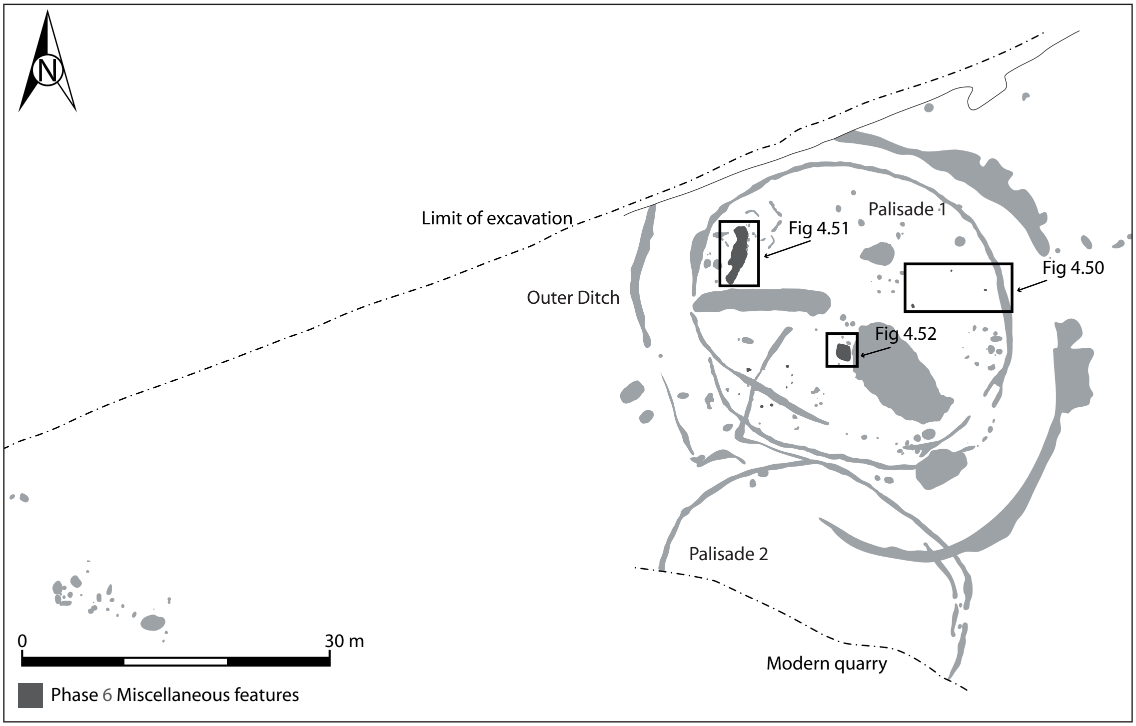


Fig. 4.49—Lowpark: location of miscellaneous features.

Phase 6: miscellaneous features

Phase 6 includes several features in the enclosures that for various reasons cannot be definitely assigned to any particular phase and may have been associated with any period of occupation and use of the site. These included two pits filled with charred hazelnut shells in the north-west quadrant of Palisade 2, three isolated post-holes in the north-eastern quadrant of Palisade 1, a large pit in the north-western quadrant and occasional unassociated deposits, shallow pits and hollows.

Pits with charred nut shells

Two adjacent pits (C371 and C372) were recorded in the north-west of the area enclosed by Palisade 2. C371 was oval with a concave profile, measuring 1.10 m by 0.60 m by 0.4 m deep, and was truncated by Palisade 2. The upper fill (C369) was charcoal-flecked, orange–brown, silty sand containing a large amount of carbonised, complete hazelnuts and hazelnut shell fragments. The basal fill (C370) was heat-affected, orange–black, mottled, sandy silt with frequent carbonised hazelnut shells and charcoal and had a dense band of charcoal at its base (Fig 4.36).

The second pit (C372) was 0.60 m south-west of C371. It was circular with vertical sides and a concave base and measured 0.73 m in diameter and 0.21 m in depth. It was filled with

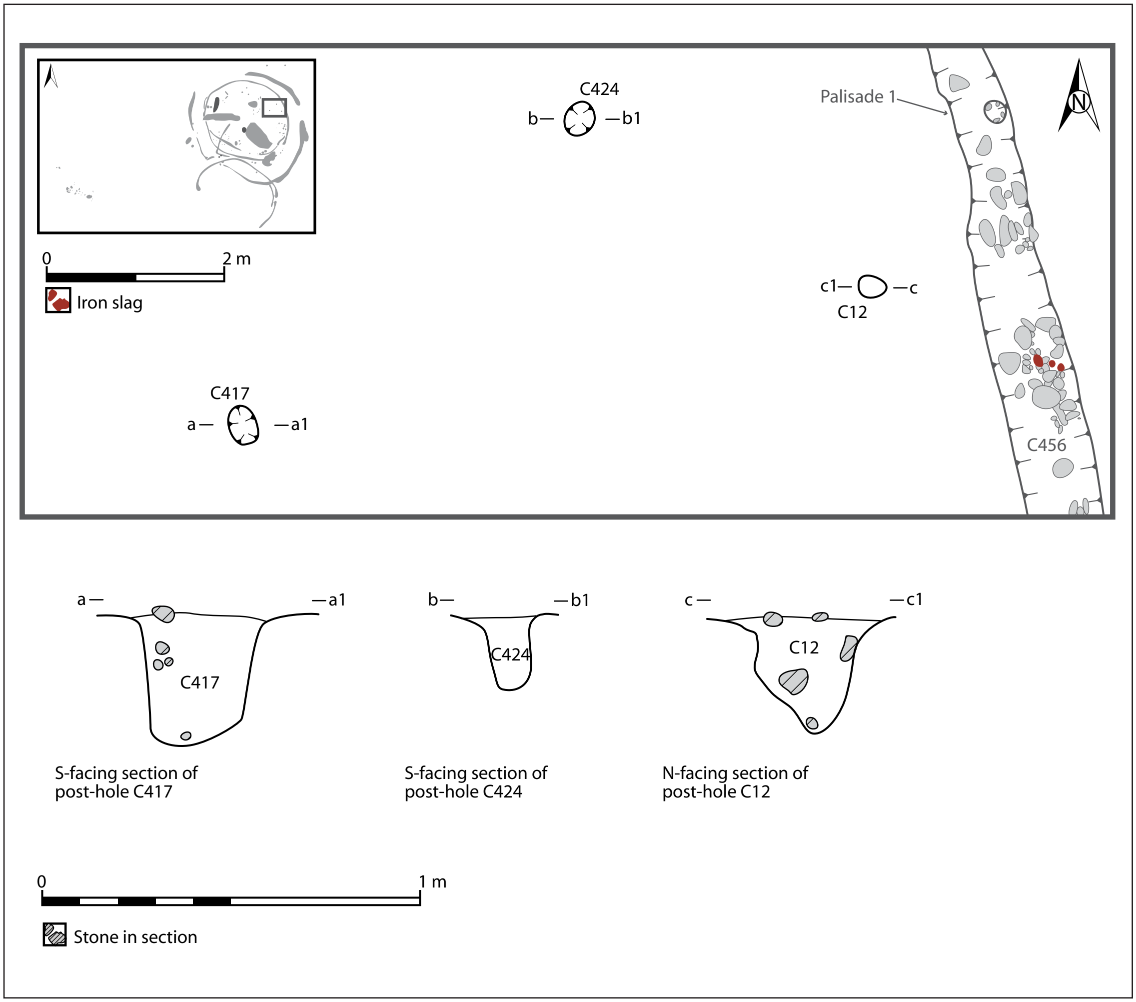


Fig. 4.50—Lowpark: miscellaneous pits in north-east of site.

charcoal-rich, orange–brown, silty sand (C368) with small stones and a 0.05 m-thick band of charcoal running through this fill, 0.09 m from the top.

Unassociated features: north-east

Three isolated post-holes (C12, C417 and C424) occurred in the eastern side of Palisade 1, all filled with silty sand and none with packing stones (Fig. 4.50). Post-hole C12 was 3.5 m north of Ironworking Area 1 and 1 m west of the palisade trench. It was circular, 0.37 m in diameter and 0.22 m deep. It had vertical sides with a slight 'step' to the south, 0.18 m from the surface, and a flat base. Post-hole C424 was 3.6 m north-west of C12. It was sub-oval, measuring 0.45 m by 0.30 m, and 0.28 m deep with steep sides and a flat base. Post-hole C417 was 4.8 m south-west of C424. It was circular, 0.19 m in diameter and 0.17 m deep, with steep sides and a concave base. These

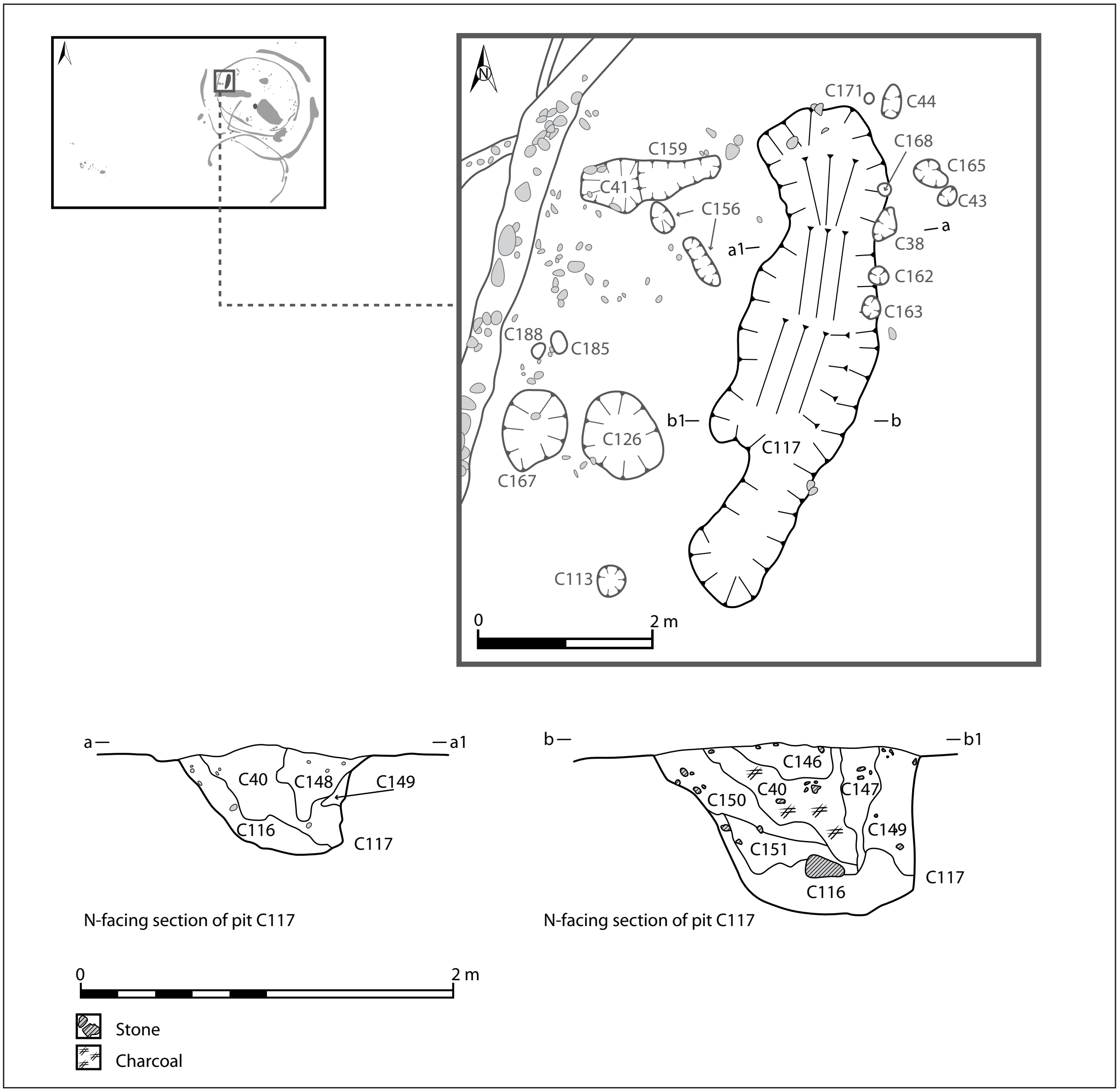


Fig: 4.51—Lowpark: large pit (C117).

features were well-defined post-holes but could not be seen to represent part of a cohesive structure. They may represent internal roof supports of structures where nothing survives of associated features or perhaps the remains of tethering posts or racks. The post-holes cannot be assigned to any specific phase of occupation.

North-western pit (C117)

This pit was in the north-west quadrant of Palisade 1, adjacent to the Early Neolithic pits C126 and C167, and cut the rectangular structure to the north of Souterrain 2. It was 5.8 m long and

1.45 m wide, with a maximum depth of 0.9 m. It had steeply sloping sides and an irregular, concave base and was filled with irregular layers of sterile and charcoal-flecked, silty sand, which varied from light brown to dark brown and grey. This pit did not contain diagnostic dating evidence and may have been relatively late.

The pit was unlined and, although dug into loose, sandy subsoil, had retained its steep sides, suggesting that it was not open for a prolonged period. The absence of any stone lining contrasts with the retaining walls of the keyhole-shaped pit and souterrains. It is possible that the pit was used for storage, and the post-holes to the east (Fig. 4.51) could have supported a cover of sorts. The steep sides and irregular shape of the pit suggest a short period of use, as the loose, sandy subsoil would have slumped if it had been left open for a prolonged time. One interpretation is that it was a small quarry pit. The adjacent post-holes either pre-dated or were contemporary with the pit. The lower pit fills (C116 and C151) represented initial silting and subsequent deliberate backfill (C147–50). The upper fills (C40 and C146) were darker, charcoal-flecked deposits that may represent a final, deliberate backfill. This feature is undated but is likely to have been late in the Lowpark sequence as it cut through the rectangular structure of Phase 4.

Pit

One large pit (C495), measuring 2 m by 1.6 m and 0.61 m deep, was immediately north-west of Souterrain 1. It had sloped sides, which were steep to the north, and a flat base. The basal, stony fill was 0.13 m thick and overlain in the south by a 0.1 m-thick layer of charcoal-flecked, mid-brown, sandy silt (C496) and a 0.5 m-thick layer of charcoal-flecked gravel, silt and sand. The function and dating of the pit are unknown.

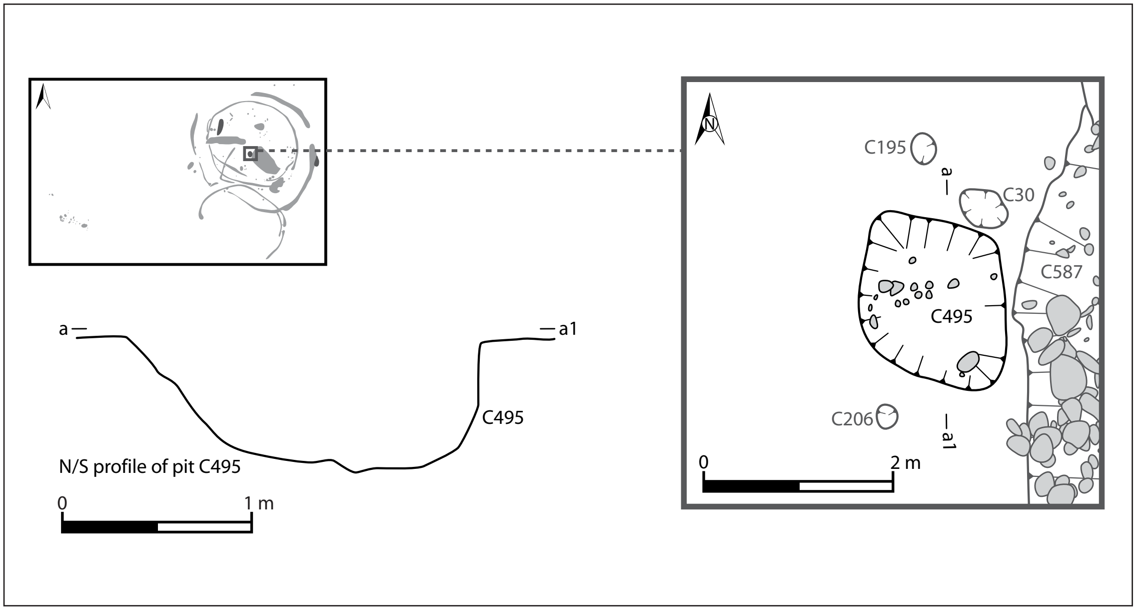


Fig. 4.52—Lowpark: pit (C495).

Later features

Several features identified during the excavation were unlikely to be archaeological in origin. The entire area of the excavation was traversed by agricultural furrows, which caused limited disturbance to the main archaeological features but may have removed upper layers and more ephemeral features. A large quarry to the south had removed the southern half of Palisade 2, and the field boundary ditch had destroyed the northern extent of the outer ditch and probably additional Early Neolithic pits in the north-east. It is also likely that further archaeological remains occur beyond the northern field boundary.

Medieval cereal-drying kiln and pit: Ballyglass West II

This cereal-drying kiln was 250 m east of the Lowpark enclosures, on the same drumlin ridge. It overlooked the Ballyglass West burnt spread 30 m further east, at the base of the ridge and near the Bracklagh River. This site is described here because of its close proximity and dating to the Lowpark enclosures.

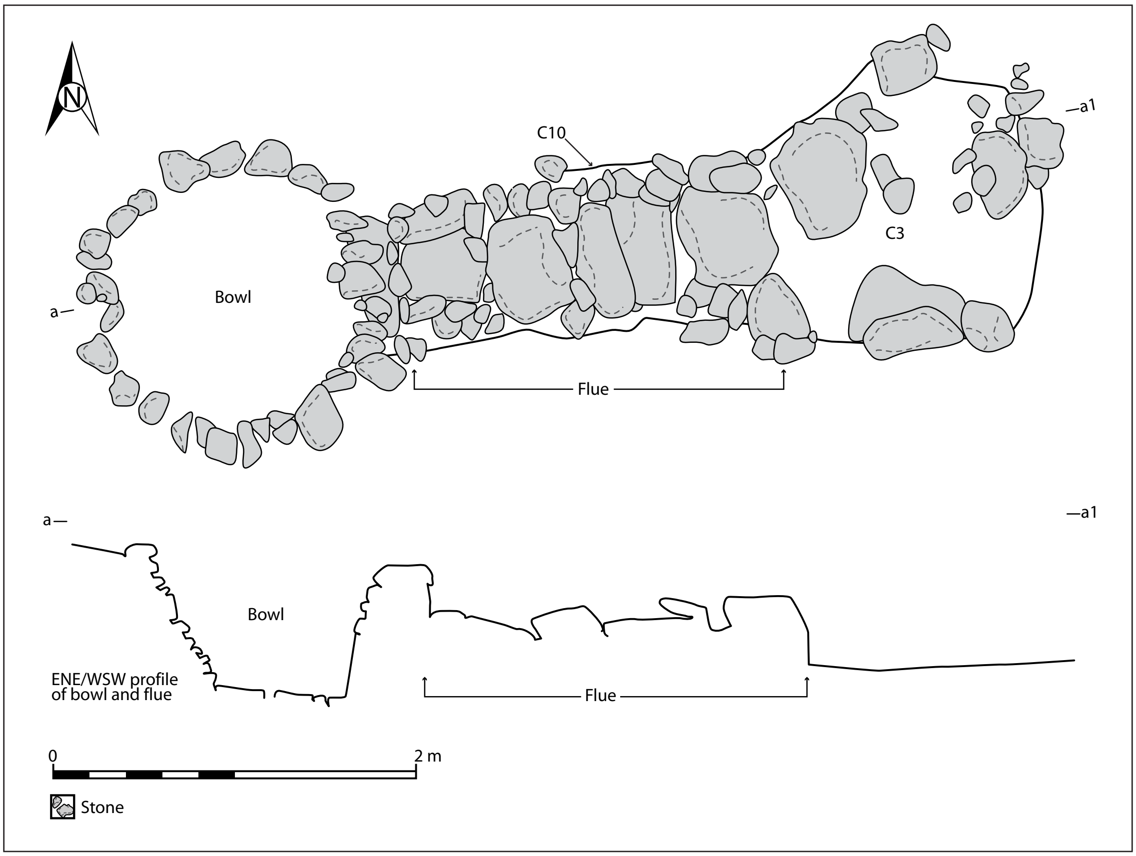


Fig. 4.53—Ballyglass West II: plan and elevation of kiln.

The kiln comprised a bowl and a flue. The bowl measured 1.75 m in diameter at the top and 1.3 m at the base and was 1 m deep. The lining was built with regular courses of tightly packed, rough cobbles and angular, wedge-shaped stones, mostly limestone with occasional sandstone. It is likely that cereal, possibly corn or wheat, was dried at this site. Fresh cereal grains were placed on removable trays or hurdles, and heat from a low fire was directed along the flue to the bowl, drying the grain. The bowl was open in modern times, as the fill (C8) was loose and contained modern finds and a corroded shears blade (04E1507:7:15; Appendix VIa). Oak charcoal from the kiln fill (C8) produced a radiocarbon date of AD 901–1181 (GrN-30745), placing it in the later early medieval period, contemporary with the later date range for the occupation of Lowpark.

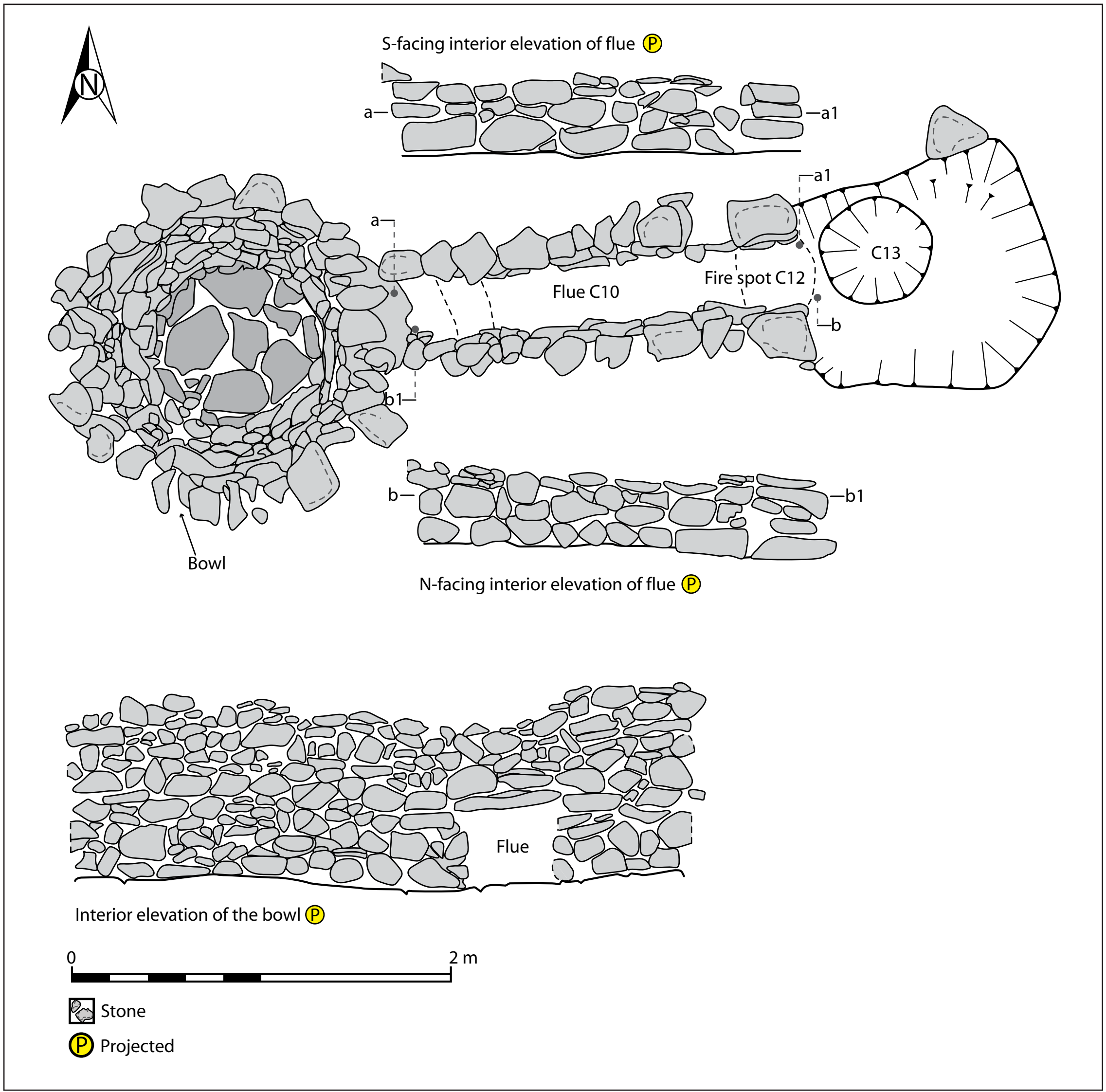


Fig. 4.54—Ballyglass West: cereal-drying kiln with lintels removed from flue and side-wall elevations.

Pl. 4.77—Ballyglass West II: kiln with bowl and flue exposed.

Pl. 4.78—Ballyglass West II: kiln, looking south.

Pl. 4.79—Ballyglass West II: detail of kiln bowl.

The flue was 2.8 m long, 0.9 m wide and 0.4 m deep. The side-walls consisted of three courses of angular, flat slabs capped with larger flags. The interior of the flue, especially the underside of the flags, was blackened by soot, and the stones at the mouth of the flue were fire-cracked and reddened, indicating the position of the fire spot. An ash deposit (C12) was also present here (Fig. 4.54). A pit (C13) on the east side was probably related to the fire (C12). The fire was set at the end of the flue, 2.8 m from the bowl, to enable a constant low heat to pass through the grain without charring it. Kiln flues often contained baffle stones to inhibit sparks from reaching the bowl, but none was *in situ* here.

Charcoal-production pit: Ballyglass West III

A circular, bowl-shaped pit (C11) was 5 m west of the kiln. It was 1.9 m in diameter and 0.52 m deep and contained concentrated charcoal in the fills, suggesting that it functioned as a charcoal-production pit. Oak charcoal from one of the fills (C9) produced a radiocarbon date of AD 1305–1421 (GrA-35581). This pit was similar to other features excavated during this scheme, in Cloonaghboy, Sonnagh, Ballyglass East and Cashelduff, as discussed in Chapter 6. Charcoal-production related to ironworking, as evidenced in the Lowpark enclosures, albeit this pit post-dated the early medieval ironworking at Lowpark.

Early medieval Lowpark: discussion

The population distribution in early medieval Ireland was one of dispersed rural settlement. There were no towns in Ireland before the Viking trading ports of the ninth and tenth centuries (Edwards 1990, 6). From the late 11th century to the second half of the 17th century c. 95 % of the population lived outside true towns (O'Conor 1998, xi). This settlement pattern was similar in the early medieval period. Historical and archaeological evidence 'indicate a pattern of dispersed farmsteads in the more fertile parts of the country, with considerable uncultivated areas (*díthreb*) of mountain, woodland and marsh' (Kelly 2000, 360). These settlements or farmsteads (*les* [*lios*]) are generally equated with ringforts or raths. The Cloonaghboy bivallate rath (Chapter 5) fits the generally accepted definition of a ringfort: 'a space most frequently circular, surrounded by a bank and fosse or simply a rampart of stone' (Ó Ríordáin 1979, 29–30). The initial activity at Lowpark may have been unenclosed, and subsequent enclosed occupation included many of the characteristics of ringforts, although the primary enclosing elements were palisades rather than the typical banks and fosses. The palisades were either supplemented or superseded by the more typical outer ditch. Kelly's (2000, 363) description of the Irish farmyard, based on the early text *Crith Gablach*, suggests that a lord's house (*dún*) was much the same as that of a prosperous commoner. The main difference was that the lord had defensive earthworks, the digging of which was among the duties owed by a client to his lord. The Lowpark palisaded enclosure is best interpreted as the farmyard of a prosperous commoner (*mruigfer*) and the equivalent of a ringfort. Enclosures without banks and ditches leave no surface traces and are difficult to identify in the landscape. Consequently, these early medieval enclosures can only be placed in the larger context and distribution of ringforts.

Pl. 4.80—Lowpark: aerial view of Lowpark under excavation.

North-east Connacht has the highest density of ringforts in Ireland. The Moy River valley became a focus of secular settlement during the early medieval period, especially in the Swinford/Killasser area in the barony of Gallen in Mayo (Stout 1997, 93). Cloonaghboy and Lowpark are at the south-eastern edge of this concentration of ringforts. The position of Lowpark in the overall settlement distribution pattern for the period can best be examined in relation to visible ringforts and sites cartographically recorded. The first-edition OS 6-inch scale maps and the RMP maps identify a dense distribution of 'enclosures', with a total of 162 enclosures and raths and 19 souterrains in the area covered by sheets MA062 and MA063. There are four enclosures within 1.5 km of the Lowpark site, and a further 12 enclosures are depicted on higher ground to the north and south along the 5 km stretch of the Mullaghanoe River valley on map MA063. This distribution shows a network of enclosed farmsteads in a confined geographic area, which used the adjacent arable land. The inhabitants of these settlements were probably related by kinship and connected by legal obligations and agreements as set out in the early Irish law-tracts. These early texts generally include idealised or subjective views of early medieval society but also provide a valuable insight into the period and aid the interpretation of archaeological evidence.

Most ringforts functioned primarily as farmsteads, and suitable agricultural land was a major factor in their location. Ringforts are typically sited on drumlins or other small hillocks and promontories (Edwards 1990, 19). Both the Cloonaghboy and the Lowpark site were near the summits of low glacial ridges or drumlins on well-drained, fertile agricultural land. The sites presented evidence for extensive cultivation up to modern times and were under pasture before excavation. Their locations on elevated ground provided commanding views over the surrounding countryside. The Cloonaghboy ringfort had steeper approaches, imposing banks and ditches, and

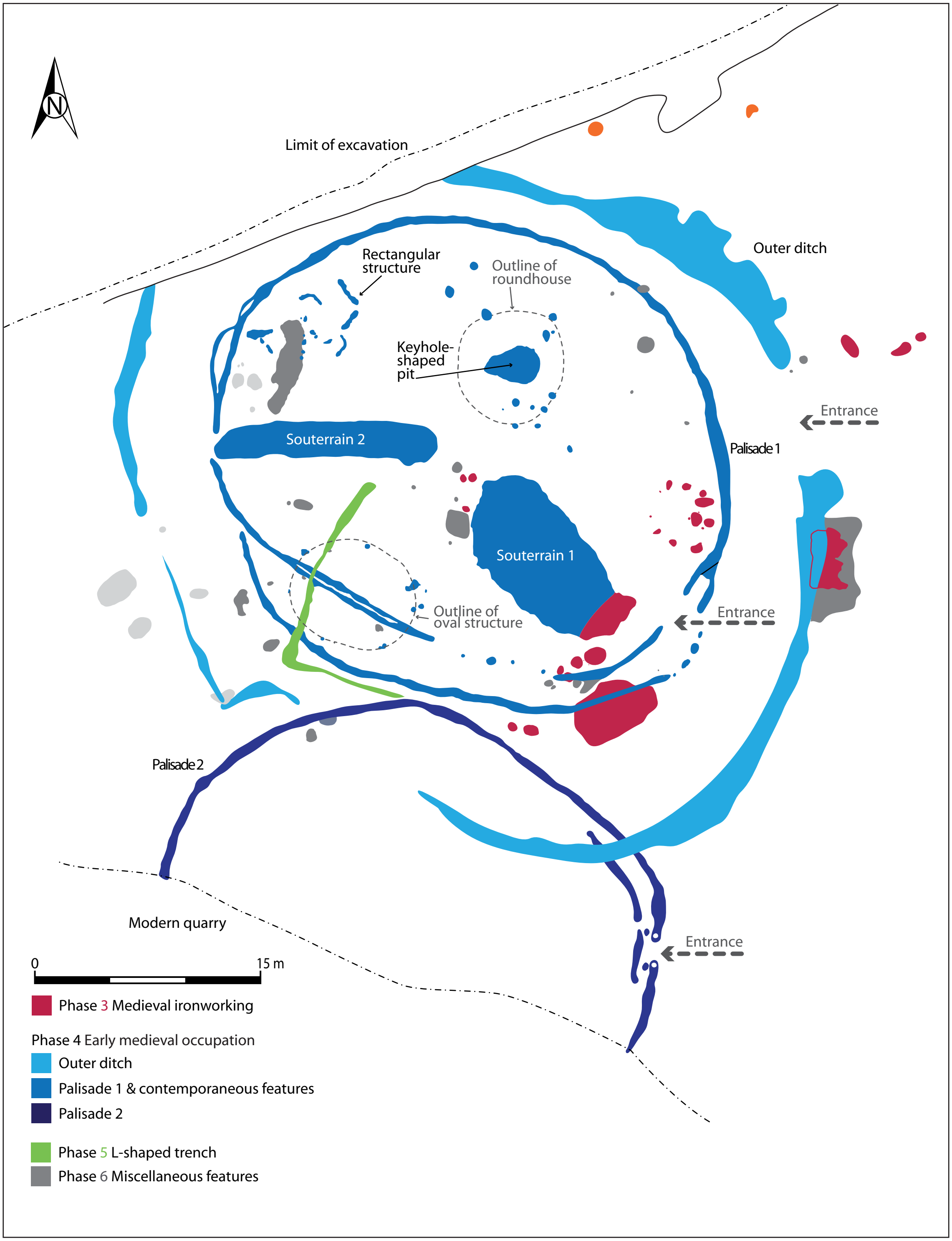


Fig. 4.55—Lowpark: early medieval phases.

a more defensive position (Chapter 5). As at Cloonaghboy, the Lowpark enclosure was below the hill summit, on the break of slope, which is typical of ringfort location, and this provided the best possible view and drainage, given the nature of the landscape (Stout 1997, 93).

The site at Lowpark was a focus of human activity in the Neolithic period and Bronze Age; the Iron Age was represented by two radiocarbon dates. Early medieval activity (Phases 3–6) dated from the sixth to the 12th century. Ironworking evidence, including four structures and associated pits dating from the sixth to the 10th centuries, was grouped together as Phase 3. The main occupation evidence from the site (Phase 4) was dated to the sixth to the 12th century. Charcoal from the L-shaped trench (Phase 5), which post-dated the palisaded enclosures (Phase 4), was radiocarbon-dated to AD 680–890. Phase 6 included various undated features that may have been in use at any stage during the occupation of Lowpark. These date ranges and stratigraphic relationships allow for considerable overlap of the medieval phases.

Ironworking

There were few well-defined stratigraphic relationships between the main ironworking features discovered at Lowpark. Small-scale ironworking (Phase 3) appears to have been carried out throughout most of the early medieval lifespan of the site, with a date span from five charcoal samples of AD 560–970. The earliest medieval activity at Lowpark, centred on the use of the site for metalworking and ironworking, appears to have been carried out before the construction of the palisaded enclosures. Ironworking Area 4 was stratigraphically earlier than all of the enclosing elements in Lowpark, and the radiocarbon chronology confirms this early period of activity. Oak charcoal from a pit (C580) at the base of Ironworking Area 4 was dated to AD 560–660, and the outer arc of Palisade 1, which cut across the pit, was dated to AD 770–980. Similarly, Ironworking Area 3 pre-dated the outer ditch. Oak charcoal from the base of Ironworking Area 3 was radiocarbon-dated to AD 650–770, and the outer ditch was radiocarbon-dated to AD 780–980. Either these workshops were unenclosed or contemporaneous enclosing features did not survive. Ironworking Area 3, outside the palisaded enclosures, may have been contemporary with them as there is an overlap in their date ranges. These wooden structures, which housed hearths or furnaces, involved high-temperature processing with an inherent risk of fire that could easily spread to any wooden houses and palisades. This may explain the location of Area 3. Ironworking Areas 1 and 2 were radiocarbon-dated to AD 660–870 and AD 720–970, respectively, and may have been contemporary with Palisade 1 and associated features. Ironworking Area 1 almost abutted Palisade 1 (AD 600–900) and had similar radiocarbon date ranges. It is probable, given the hazards of fire, that the palisade was not contemporary with the ironworking. The relatively short lifespan of wooden structures and a radiocarbon date range of 200–300 years allow for sequential use within this period. Ironworking Area 2 and the pit (C381) had similar radiocarbon date ranges (AD 720–970 and AD 710–960) and also overlapped with the Palisade 1 date range. Ironworking Area 2 was stratigraphically later than Souterrain 1 and must have been constructed after the souterrain had gone out of use, as it appears to have disturbed the south-east wall. A large quantity of slag in the fills of Souterrain 2 indicated its use as a dump for ironworking waste after it had ceased to function as a souterrain. The construction of Souterrains 1 and 2 may coincide with the earlier ironworking structures, but they are also likely to have continued in use after the construction of the Phase 4 palisades.

The iron artefacts found on site may have been produced or at least repaired in the smithing workshops (Ironworking Areas 1–4). *Crith Gablach* states that a farmer of *mruigfer* rank should always have a sack of charcoal in his house for use in the manufacture or repair of iron implements (Kelly 2000, 379). This supports the idea of constant or regular ironworking associated with early Irish farmsteads. Kelly (ibid., 62–3) lists the blacksmith (*gobae*) as the second most prominent craftsman after the wright, with a special status and supernatural aspect to his craft, as he produced the tools of food production and weapons of death. The later workshops in Areas 1 and 2 were therefore prominent features in the Lowpark area and, if contemporary with the outer ditch, their positions near the entrance may have been deliberate, to impress visitors. The noise and heat from these small, dark structures would have been a sign of status and prosperity in pre-industrial rural society. Scott (1990, 190–1) cites the early texts *Betha Brennain Clúana Ferta* and *Imram Curaig Maele Dúin*, which portray blackened smiths hurling flaming ingots and bloom at St Brendan. The element of danger from their craft added to the status and presence of the smith. The earlier, unenclosed workshops (Areas 3 and 4) appear to have been outside the settlement, probably owing to safety concerns, and this may have enhanced their mystical aspect. Unenclosed early medieval structures are unusual in the published Irish archaeological record. Examples are known from the earliest phases of settlement at Dromthacker, Co. Kerry, dated to AD 530–610 (Cleary 2008, 37), the 'Spectacles', Lough Gur, Co. Limerick (Ó Ríordáin 1949), and Knockea, Co. Limerick (O'Kelly 1967).

Other excavated early medieval enclosure sites have produced some evidence for ironworking, although none has produced comparable evidence of clearly defined sunken areas used specifically for ironworking and associated with a large volume of metallurgical material. The ironworking at Lowpark was confined mainly to the south-east portion of the enclosure; the location may have been planned to take advantage of the prevailing south-westerly winds to fan the flames of smithing hearths. Careful control of fuel supply and draught must have been important skills for the smith. Analysis of samples from the Lowpark slags has highlighted the possibility that some phases within smithing slags can be closely linked to certain stages in the smithing process. The evidence for variation in chemical composition between the top and bottom portion of slag cakes is considered important, as it is indicative of a change in the smithing activity in the cycle that produced each slag cake. The chemical data also suggest iron from different ore sources, which points to refining, recycling or repair of iron artefacts from various sources. The iron-rich material identified in some slag samples may come from consolidating an iron bloom or may be linked to welding, which represents the end of the manufacturing cycle. The silica-rich material characterising the top of some of the samples can be linked to the use of sand as a flux during welding operations, during steel production (the metal surface would have been covered with sand/clay to minimise decarburisation) or after the fashioning of an object was completed (sand was used to minimise the oxidation of iron). Lowpark provides important evidence in documenting increasing levels of technological complexity and demarcation of industrial activities from domestic settlement. (Appendix VIII).

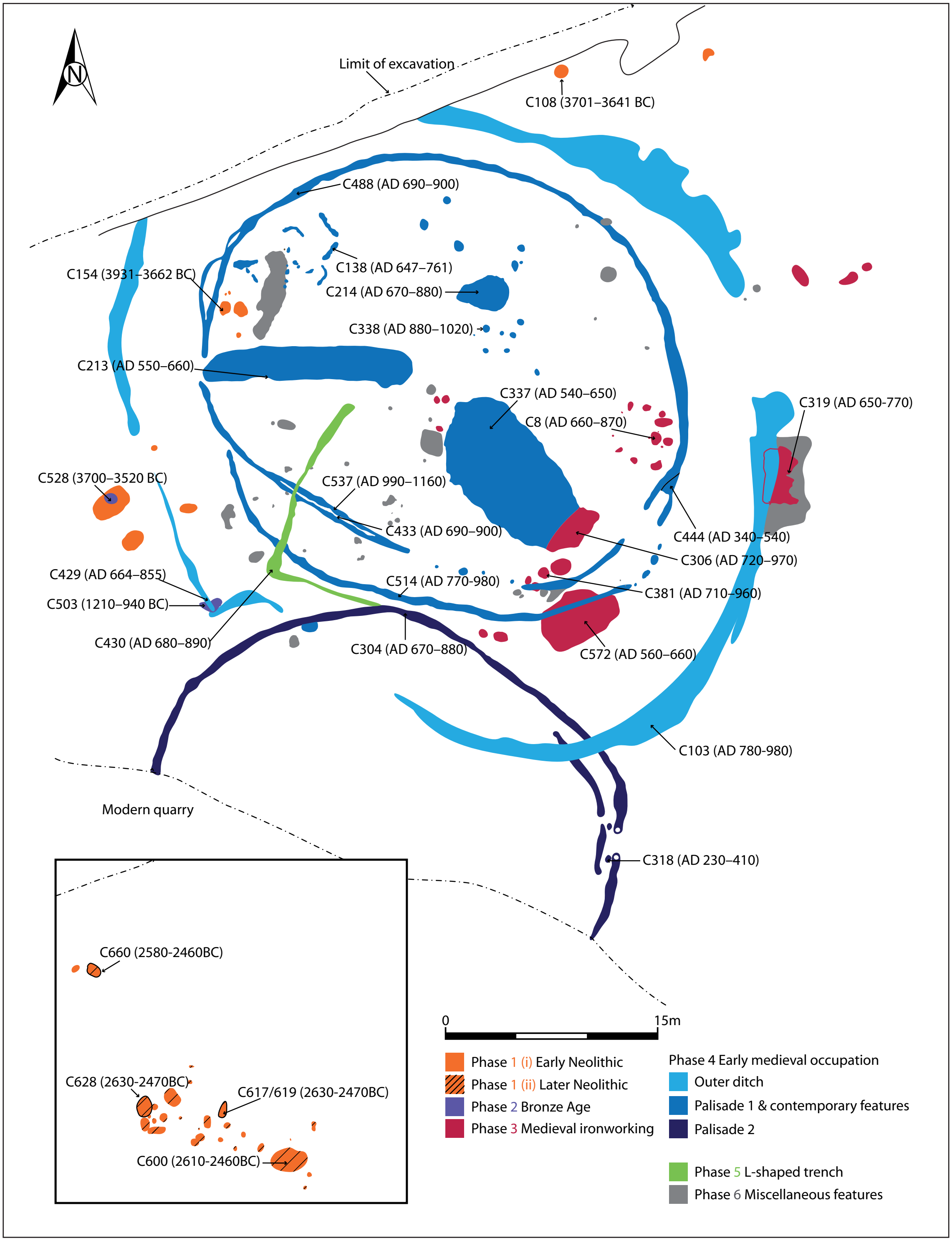
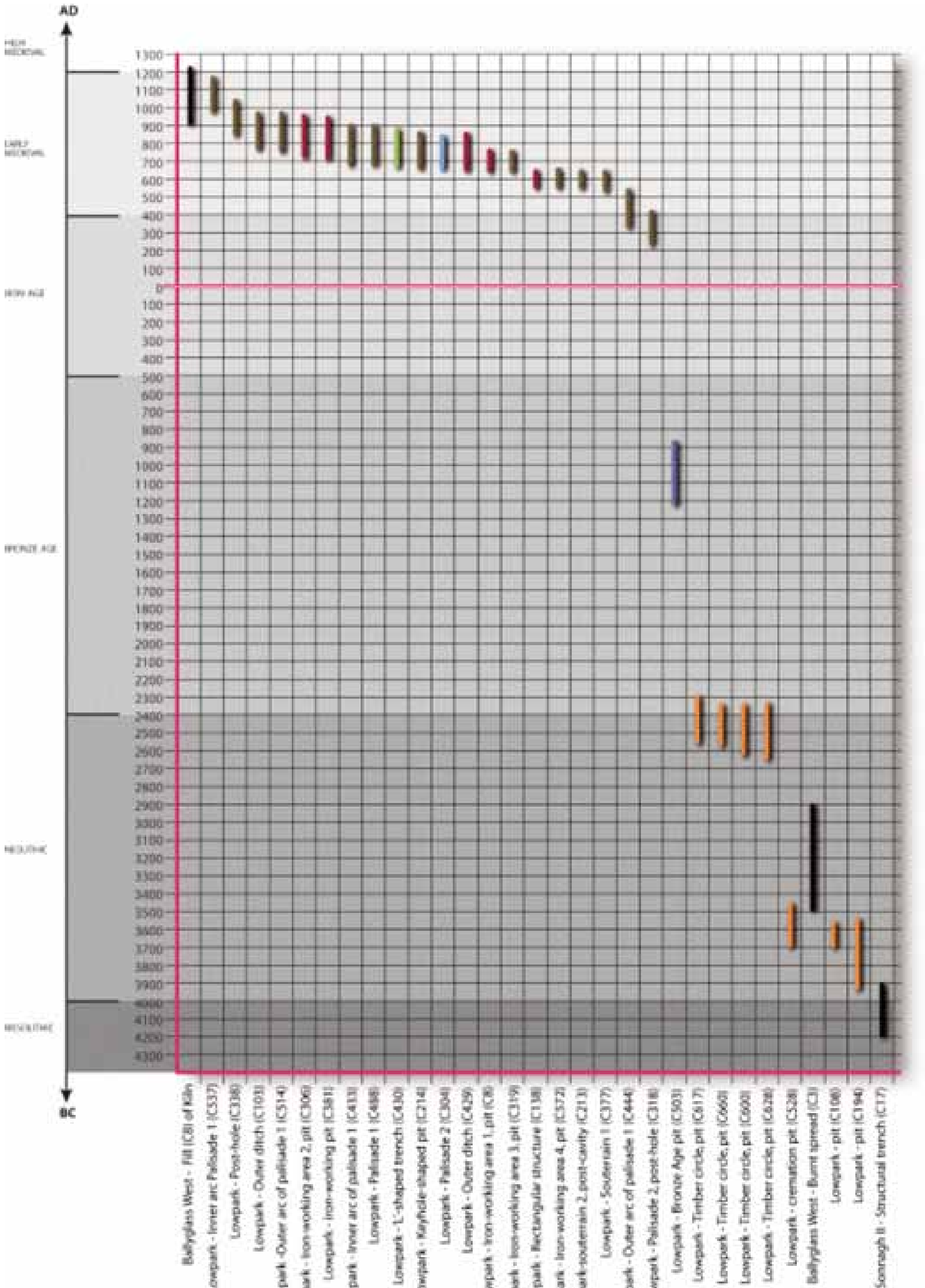


Fig. 4.56—Lowpark: radiocarbon dates, showing locations from which dated samples were retrieved.

Table 4.1—Lowpark: ^{14}C date ranges.



Phase 4

The enclosures

The three main enclosing elements in Lowpark comprised Palisades 1 and 2, which were two well-preserved slot-trenches with tightly packed supporting stones, and a poorly preserved outer ditch. The defensive capabilities of ringforts are a matter of debate and varied from ringfort to ringfort (Stout 1997). The role of the enclosing elements as an expression of status may have been more important in a structured society, as suggested in the early texts. Notwithstanding this, the enclosing bank and ditch must often have functioned just as a fence to prevent stock from straying and to keep wild animals out (Proudfoot 1961, 94; Stout 1997). The enclosing element also defined the farmyard associated with the dwelling-house. Literary and legal texts agree that a house was usually enclosed in an area known as a *les* (*lios* in modern Irish), which is translated as a 'farmyard' or 'courtyard' (Kelly 2000, 363–4). The Lowpark palisades could have fulfilled all of the functions of a livestock stockade: protection from predators and defining the boundary to the farmyard. While offering some protection from theft, they had limited defensive potential and displayed the status of the occupiers as prosperous farmers rather than kings.

Ringfort enclosures were not static features that remained unchanged during the lifetime of the site. Ditches silted up and were re-cut; banks slumped and required maintenance; and wooden palisades must have rotted and been replaced. Ringforts may also have been enlarged or reduced owing to social or political changes such as population fluctuations and increase or decrease in status. In the later phases of occupation in Lisleigh I Ringfort, Co. Cork, the ditch was allowed to silt up partially, the palisade decayed and there was little evidence for renewal of gate features (Monk [no date]). Lisleigh II, Co. Cork, began as a large ringfort that was partly demolished; a shallow ditch and a substantial external palisade were then constructed, which cut across the early entrance and reduced the size of the enclosure (Monk 1998, 41). Several alterations to the enclosing elements at Lisleigh II were identified that may have been a response to changing social pressures. The phases represented in the Lowpark palisade trenches and outer ditch showed that these were changing boundaries; wooden palisades that decayed quite rapidly required repair and replacement, and a ditch dug into loose, sandy subsoil also required maintenance. The reduction in the size of Palisade 1 from the outer to the inner arc to the south may also be a response to social pressures. The addition of the outer ditch indicates the continuity of use of the site after the abandonment of Palisade 2, and the formation of a double enclosure and the increase in size of the area enclosed may have been an expression of increased status of the occupants. There are other sites where the enclosing banks and ditches of a ringfort have been enlarged during their occupation, such as Millockstown, Co. Louth (Manning 1986).

Palisaded enclosures are uncommon in the Irish archaeological record for the early medieval period although not unknown. Evidence for palisades is recorded on at least five ringfort excavations in Ireland, including Lissachiggel, Doolargy, Co. Louth, Rathmullan, Co. Down, Killyliss, Co. Tyrone, Knockea, Co. Limerick, and Lisleigh I and II, Co. Cork (Stout 1997, 20). Two contemporaneous concentric palisades were identified at Ballynagallagh, Co. Limerick (Cleary 2006, 33), and an external palisade concentric to the fosse and bank acted as an outer defence that would at least have prevented animals from falling into the ditch at Letterkeen, Co. Mayo (Ó Ríordáin & MacDermott 1952, 97).

Edwards (1990, 21) noted that almost two-thirds of recorded entrances face approximately east. The three main entrances through the palisades and ditch at Lowpark generally faced east or south-east. The outer ditch had a well-defined gap facing almost directly east, and two stake-holes on the north side of the entrance may have been part of a gate. Both the inner and the outer arc of Palisade 1 displayed definite gaps in the south-west, and the outer gap had four evenly spaced post-holes. This provided easy access through the centre of the enclosure to the houses in the northern half. Other, less well-defined gaps in these palisades may also represent entrance features but were more likely the result of subsequent disturbance.

A very well-defined entrance in the east side of Palisade 2 was flanked by four posts, represented by post-holes, one in each terminus of the palisade and one internally at each side. This entrance was mirrored by an internal, shallow slot-trench parallel to the main palisade entrance. This arrangement of posts at the entrance to Palisade 2 could have supported a substantial hurdle secured between the posts while the inner trench held a subsidiary fence to keep stock away from the entrance. This substantial entrance and the lack of internal structural features suggest that Palisade 2 was an animal stockade, and its position and stratigraphy suggest that it was in place when Palisade 1 was constructed. Wooden or iron field gates were not present on early Irish farms, and the word *geata* for gate is a late borrowing from English. Livestock was probably kept in a field or enclosure by a moveable hurdle secured by some sort of tie (Kelly 2000, 378). Kelly's interpretation of early Irish 'gates' as removable hurdles suits the evidence from Palisade 2 at Lowpark. Gated entrances were suggested for Garryduff I and II, Co. Cork (O'Kelly 1963, 21, 124), and Carraig Aille I and II, Co. Limerick (Ó Ríordáin 1949, 42, 53), and it is possible that hung gates were in use in Lowpark in the early medieval period. The 2.5 m-wide entrance at Lisleigh II, Co. Cork, included shallow post-holes and a spud stone, indicating a simple gate structure (Monk 13.4, www.heritagecouncil.ie). A complex entrance feature, including a gap in the bank and ditch, an outer palisade trench and a five pairs of post-holes, occurred at the ringfort at Letterkeen, Co. Mayo (Ó Ríordáin & MacDermott 1952, 98). The two outer pairs of post-holes flanking the entrance to the Letterkeen palisade were dated to the earliest occupation phase and were interpreted as gate posts but equally could have supported a removable hurdle. These closely parallel the Palisade 2 entrance at Lowpark. In Letterkeen, as in Lowpark, the inner post-holes were more widely spaced than the outer post-holes, with a slightly wider entrance at Letterkeen (1.5–1.73 m at Letterkeen and 1.19–1.6 m at Lowpark).

Oak charcoal from the Palisade 1 foundation trench and a post-hole in Palisade 2 produced radiocarbon dates that are anomalous and unsupported by the excavated evidence and the suite of radiocarbon dates from similar stratigraphic levels. An Iron Age radiocarbon date (AD 230–410) from the southern, internal post-hole of the Palisade 2 entrance and a slightly later date (AD 340–540) from the inner arc of Palisade 1 are unlikely to date these features accurately. Despite the early dates, the extant remains at Lowpark were unlikely to date to the Iron Age. The charcoal dated in these contexts may have been disturbed from earlier features that did not survive intact, and charcoal can survive on archaeological sites even when there is no evidence for phasing (Ashmore 1999, 124). The dating of old wood can give misleading results, and its occurrence may be more common than previously believed, particularly as charcoal is more likely to survive on archaeological sites where preservation conditions are favourable (Cleary 2007, 56). If the possibility of the survival of old wood and anomalous radiocarbon dates is allowed for, it is possible that an Iron Age phase of occupation occurred at Lowpark. Charcoal from three house sites in a ringfort at Lislackagh, Co. Mayo, produced Iron Age dates of 200 BC–AD 140 (Walsh 1993, 106–14), and it is possible that Iron Age settlement, now manifest only in the radiocarbon evidence, existed at Lowpark.

The circularity of Palisade 2 deviated in the north-east (AD 670–880), possibly to avoid Ironworking Area 4 (AD 560–640) or the adjacent pits. There was significant overlap of the date ranges of Palisade 1 and 2 and the outer ditch, although their relative stratigraphy provides a construction sequence. A fill of Palisade 2 was radiocarbon-dated to AD 670–880 and was stratigraphically earlier than Palisade 1 and the outer ditch. The circularity of the earlier, outer arc of Palisade 1 was altered to avoid Palisade 2, indicating that Palisade 2 was probably upstanding when Palisade 1 was built. A later radiocarbon date range of AD 770–980 for this outer arc supports this chronology. It is likely that the two palisades were, for some time at least, contemporaneous and had complementary functions. Palisade 2 lacked internal features and may have functioned as an animal stockade. Palisade 1 enclosed the main occupation evidence in Lowpark. The souterrains and possible houses appeared to be evenly laid out in the palisade, occupying most of the interior, and were probably in contemporaneous use rather than sequential phases of building. The inner arc of Palisade 1 cut through the oval structure (Phase 4) in the south-west, placing this structure relatively early in the sequence, possibly contemporary with the outer arc of Palisade 1 or a pre-enclosure structure associated with ironworking. The possible roundhouse in the north overlay the keyhole-shaped pit, suggesting that it was relatively late in the sequence. This is supported by dates of AD 670–880 from the fill of the pit and AD 880–1020 from a post-hole associated with the roundhouse. Souterrains 1 and 2 had roughly contemporaneous radiocarbon date ranges that pre-dated the palisades. The western end of Souterrain 2 coincided with the western side of Palisade 1, which deliberately terminated at either side of the souterrain. This suggests that the souterrain was originally unenclosed, pre-dated the palisade and was still in use when the palisade was built. This confirms Clinton’s (2001, 45) assertion that an apparently unassociated souterrain is indicative of an otherwise superficially undetectable unenclosed settlement. Buckley (1988–9, 64) also suggests, from preliminary research in Ireland, that up to 60 % of souterrains may have been associated with unenclosed settlement. It is possible, therefore, that the Lowpark souterrains were originally unenclosed features, possibly contemporary with Ironworking Areas 3 and 4 and later enclosed by Palisade 1 in Phase 4 of the occupation sequence. The later ironworking structures (Areas 1 and 2) were within the Palisade 1 enclosure, but their close proximity to the wooden palisade and the inherent risk of fire suggest that they may not have been in use at the same time.

Alternatively, the wooden palisades held in place by packing stones would have been prone to decay and exposed to the elements and must have been regularly replaced to maintain functional integrity. Consequently, the date ranges for the palisades may represent the final phase of repair or rebuilding along the same line rather than their overall use period. The actual date range for Palisade 1 may be earlier than that represented in the radiocarbon chronology. Two dated samples from the inner arc of Palisade 1 support this interpretation. A lower sample of charcoal from the edge of the palisade trench was dated to AD 690–900, and charcoal from a subsequent fill was dated to AD 990–1160. These dates probably represent initial construction and final repair of the palisade at this location. If the construction of the palisades post-dated the souterrains, they are still likely to have been in coeval use. If Palisade 1 and Souterrain 2 were contemporaneous, the vent or spy-hole at their intersection may have been inserted deliberately to see beyond the enclosure from within the souterrain.

The outer ditch was the latest enclosing feature. It was roughly concentric with Palisade 1 and cut through Palisade 2 and Ironworking Area 3, which must have gone out of use at this stage. The outer ditch and Palisade 1 had similar date ranges, and the ditch represents either a double enclosure or an expansion of the main enclosure. Two radiocarbon dates were returned from the outer ditch, AD 664–885 and AD 790–980, and the overall date range for Palisade 1, including four separate dates, was AD 690–1160, which suggests contemporaneity of the palisade and ditch. It is also possible that the later ironworking structures (Areas 1 and 2) post-dated Palisade 1 and were associated with the outer ditch.

Souterrains and stone-lined pit

Three evenly spaced, sub-surface, stone-lined structures occurred in the Palisade 1 enclosure. Souterrain 1 was a large sunken chamber in the south-east quadrant; Souterrain 2 was linear and extended from the centre of the enclosed area to the western side of Palisade 1; and a keyhole-shaped pit that underlay the possible roundhouse was recorded in the centre of the north-east quadrant. The radiocarbon date ranges (AD 540–650 and AD 550–660) and construction techniques for the souterrains are almost identical. The keyhole-shaped pit was slightly later (AD 670–880), smaller and of different construction. Souterrain 2 was dated from oak charcoal from a post-cavity probably from a structural timber that had been burnt *in situ*. Souterrain 1 and the keyhole-shaped pit were both dated from charcoal in the lower fills, probably reflecting their abandonment and backfilling. Clinton (2001, 25) places souterrain construction in the latter half of the first millennium and the earliest centuries of the second millennium. Approximately six souterrains have been scientifically dated out of a known number of c. 3,500. Clinton's main period for construction and use of souterrains based on scientific dates and associated finds ranges from c. the sixth century AD to the coming of the Anglo-Normans in the 12th century. The dates from the Cloonaghboy souterrain (Chapter 5) are relatively early but post-date Lowpark and fit into Clinton's date range. Three charcoal samples from the construction trench of a souterrain at Liscahane, Co. Cork, indicated a date in the sixth century AD for construction. Clinton (ibid., 92) suggests that some souterrains in the south of Ireland may pre-date those on other parts of the island. The Lowpark souterrains have similar dates to Liscahane for the construction and use of souterrains and confirm a sixth-century date for souterrains in the west of Ireland. The souterrain at Lismullin 1 was radiocarbon-dated, from cattle bone retrieved from its fill, to AD 980–1080, in the middle of Clinton's date range. Clinton (ibid., 94) notes that 'at proven multiphase enclosed sites the souterrain will appear late in the sequence of development', as at Deerpark Farms, Co. Antrim, Rathmullan, Co. Down, and Knowth, Co. Meath. The two souterrains at Raytown, Co.

Meath, were clearly later additions to this early medieval settlement site. One of these cut a pit that was radiocarbon-dated to AD 660–890 (Seaver 2006, 80), and radiocarbon dates from Kilcloghans souterrain, Co. Galway, ranged from the seventh to the 12th century AD, placing them within Clinton's date range also (Kyle et al. 2009, 73, 167). Again, the Lowpark evidence contradicts this interpretation as the souterrain date ranges were contemporary with the early settlement phases and pre-dated the roundhouse and rectangular structure in the north of the site.

Souterrains are usually interpreted as places of refuge and storage (Edwards 1990, 30), activities that would leave little or no evidence in the archaeological record. Finds in the Lowpark and Cloonaghboy souterrains may be from surface deposits that collapsed into the souterrains after they went out of use, dumped midden material or deliberate backfill. Burning at the Lowpark souterrain entrances may indicate either an attack or post-use burning of midden material. The unusual features of the Lowpark structures included the massive size of Souterrain 1, use of structural posts housed in cavities in the walls of both souterrains, incorporation of earlier stone artefacts in the masonry and the stone 'box' at the base of the keyhole-shaped pit.

The souterrain entrance is a good indication of the primary function. Both ramped entrances and stepped entrances suggest ease of access, and in these instances storage may have been the main use (Clinton 2001, 60). Souterrain 1 had an almost 1.2 m-wide opening and a steep ramped entrance in the north with direct access to the chamber, suggesting ease of access for storage. The large floor area and high roof were ideal for storage of items either piled up on the floor or suspended from roof timbers. The souterrain could have provided only limited protection during a raid and would have been difficult to defend if directly attacked. Souterrain 2 was easily accessible via steps at the eastern end, although the passage was constricted toward its centre and the lowest and narrowest point was at the entrance. This chamber was suitable for a limited number of people or goods and was more defendable. Post-cavities set along this passage may have held door jambs restricting access further. The opening to the west was suitable for ventilation and must have been concealed when in use. Radiocarbon dating and similar structural features suggest that the two souterrains were contemporaneous. Perhaps Souterrain 1 was used as a store while Souterrain 2 was a refuge.

The keyhole-shaped pit returned a slightly later radiocarbon date than the souterrains but may have had a similar function. It was too small to hold any more than one or two people for a limited time, and access was via the narrow, relatively shallow end. This sloped down to the wider, circular area and probably housed wooden steps. It may represent a *corróc*, or pit, mentioned in legal commentary on Heptad 64, which probably refers to a souterrain for keeping dairy products and other perishable foodstuffs (Kelly 2000, 367). It has been suggested that, as a *corróc* maintained a constant temperature, it was ideal for the storage of food such as meat, possibly smoked or salted, and dairy products (Lucas 1973). The basal stone 'box' feature may have held valuable items. The gold filigree panel discovered during the excavation suggests that the inhabitants of Lowpark were wealthy, and additional precious objects were possibly stored on site.

These three sunken features were of drystone construction with the side-walls back-built against the pits sides. Souterrain 1 and 2 were of similar construction with unusual post-cavities set into the walls. Posts may have been necessary to retain the pit sides during wall building and were incorporated into the walls as the sides were raised or may also have served as roof supports. The opposing pairs in Souterrain 2 probably held door jambs. A similar arrangement of opposing post-holes with recessed post-slots occurred in Letterkeen, Co. Mayo (Ó Ríordáin & MacDermott 1952, 102), and Souterrain B, Ballycatten, Co. Cork (Ó Ríordáin & Hartnett 1943), where they were interpreted as wooden roof supports. Opposing post-cavities may reflect construction techniques used in wood-lined, or at least wood-roofed, souterrains. The only close parallel for these post-cavities occurred in a drystone-built souterrain with door-jamb slots and associated post-holes at Donaghmore, Co. Louth (Clinton 2001, 151). Construction of the keyhole-shaped pit was different and on a smaller scale. Large boulders were used in the pit lining and were solid enough to retain the pit sides without additional support. Three flagstone lintels survived *in situ* at the western end of Souterrain 2, and the chamber sides were slightly corbelled; elsewhere, lintels were absent, indicating either that they were removed or that alternative material was used in the roof. Stone or wood was adequate to roof Souterrain 2 and the keyhole-shaped pit. It is unlikely that the wide span (3.3–3.6 m) of Souterrain 1 was stone-roofed, as the span would have required some corbelling, which was not evidenced on the upper levels of the walls. It is more likely that the roof was made of wood of either large planks or complete logs laid both on the walls and the pit sides; additional support may have been provided by internal props. Several hollows noted in the floor of Souterrain 1 may represent the vestiges of roof props or pillars.

A lintelled ope at the western end of Souterrain 2 is interpreted as an air vent or spy-hole and was 0.08 m high and 0.12 m wide. This vent opened directly from the west end of Souterrain 2 to the external edge of Palisade 1. This ope was relatively small and provided a limited external view to the west from inside Souterrain 1. A step in the western end of this souterrain was overlain by the two upper roof lintels and, if these were removed, an opening of 0.39 m by 0.48 m was created, allowing for an escape route if the chamber was breached or serving as a concealed exit to surprise attackers.

Structures

Edwards (1990, 22) noted that many of the domestic dwellings in ringforts were round, wicker or post-and-wattle buildings with no separate roof supports. The plan and layout of buildings at Lowpark can only be suggested from concentrations of pits and post-holes, and a number of possible configurations can be extrapolated. Four iron workshops (Phase 3) and the souterrains (Phase 4) were the most definite structures at Lowpark. Three iron workshops were rectangular, semi-subterranean and consequently well preserved; the remaining one (Ironworking Area 1) was delimited by a circle of post- and stake-holes. The roundhouse and rectangular structure in the north-east and north-west quadrants (Phase 4) may have been the main dwelling-house and an outbuilding. Another oval post-built structure (Phase 4) in the south-west was relatively large and may also represent a roundhouse. Random pits/post-holes throughout the site were probably the vestiges of buildings of which little other structural evidence survived. Lynn (1978) notes a transition from round to rectangular houses in the eighth or ninth century. The Phase 5 L-shaped trench, dated to AD 680–890, may represent the partial survival of a rectangular building or an open-ended structure.

The roundhouse identified near the centre of Palisade 1 had a projected diameter of 8 m (c. 27 ft), equivalent to the diameter of a lord's house as recorded in early Irish sources (Kelly 1988, 28). One post-hole, off-line but associated with this structure, contained a small, gold filigree panel (E3338:338:144) of possible sixth/seventh-century date. Holly charcoal from this post-hole was radiocarbon-dated to AD 880–1020 and is likely to date the structure and the deposition of the artefact rather than the manufacture or use of the gold panel. There was no evidence for floor levels or internal features apart from a charcoal-flecked spread in the roundhouse that may have been a disturbed occupation layer. This spread overlay the keyhole-shaped pit and was possibly part of that phase rather than related to the occupation of the house. Artefacts from this layer included a belt buckle and a belt-buckle fragment (E3338:179, 68 and E3338:2:8; Appendices IV and VI) and may relate to either the roundhouse or the keyhole-shaped pit fill. Kelly (2000, 161–2), quoting from the *Crith Gablach* of c. AD 700, describes the contents of a house of a *mruigfer* (prosperous commoner) as containing:

> every household item in its proper place, including a cauldron with a spit, a vat for brewing beer, mugs, kneading troughs, a tub, washing-vessels, and various tools and pieces of farming equipment. There should be a candle in the candlestick, and a fire should always be burning. The house has a thatched roof—we are not told what material is used but probably of reeds—and the floor is strewn with rushes.

This gives some insight into the utensils used in a dwelling-house similar to the Lowpark roundhouse. Many of the items described in the *Crith Gablach* were of wood, which do not generally survive on dryland sites. Metal objects were probably removed for use elsewhere when the site was abandoned.

An oval arrangement of pits in the south-west quadrant of Palisade 1 may represent a post-built structure (Phase 4), possibly a roundhouse coeval with the outer arc of Palisade 1 or earlier ironworking activity. The inner arc of Palisade 1 and an L-shaped trench (Phase 5) constructed in this area made temporal and spatial association difficult.

The oval structure and roundhouse are typical of early medieval houses identified in ringforts. An approximately circular roundhouse at Letterkeen, Co. Mayo (maximum diameter: 5.2 m) was constructed of large timber posts (Ó Ríordáin & MacDermott 1952, 103). A circular 'hut' with an internal diameter of 10–11 m was situated within an unexcavated ringfort at Bellataleen, Co. Mayo (Morahan 2001, 100). At least two sub-circular early medieval buildings were excavated within a ringfort in Dromthacker, Tralee, Co. Kerry (Cleary 2008, 30–3). A similar house was excavated in an early medieval enclosure at Ballynagallagh, Co. Limerick, which had an estimated diameter of 8 m and a possible entrance feature represented by a cluster of post-holes on the west side (ibid.). There was no extant hearth in the Lowpark house or in the excavation area in Ballynagallagh, although it is probable that the buildings had an internal hearth, as the longevity of a timber building was dependent on an internal heat source in order to prevent rapid decay of the structural timbers and roof (Cleary 2006). This archaeological evidence supports the early sources and confirms the sizes of farmhouses and outhouses and the generally circular plan.

The rectangular structure in the north-west of Palisade 1 was radiocarbon-dated to AD 647–761 and may be the earliest domestic structure on site. It had minimum dimensions of 4.2 m by 4.2 m and may have been up to 6 m long. A Middle Irish text provides dimensions for the main house of the lowest grade of adult freeman, the *ócaire*, of 16 feet (4.87m) in length and a larder (*airecal*) of 12 feet (3.65m) in length. These measurements may refer to the long sides of rectangular structures (Kelly 2000, 361). These dimensions closely mirror the Lowpark rectangular structure. There may have been a progression in status of the inhabitants of Lowpark from unenclosed settlement focused on ironworking to *ócaire*, with souterrains and palisades possibly including a large stockade, to higher-status freemen, with an outer ditch, access to gold and personal ornaments and less emphasis on ironworking. This may have culminated in the abandonment of the palisades and the subsequent construction of a rectangular building evidenced by the Phase 5 L-shaped trench.

Kelly (ibid., 362), also citing the *Crith Gabhlach*, notes that the *ócaire* 'has a house with a diameter of nineteen feet'. Ó Ríordáin's (1949) Lough Gur excavations at Carraig Aille and the 'Spectacles', Co. Limerick, uncovered a sequence of house building. Relatively insubstantial roundhouses occurred at the lower levels of the Carraig Aille II fort and were overlain by more substantial, rectangular houses in the upper levels. The best-preserved house measured at least 6.09 m (20 feet) internally. The rampart at Carraig Aille II became redundant, and a rectangular structure was built over the enclosure; rectangular houses were also constructed outside the rampart, along the ridge between Carraig Aille I and II. This sequence of houses at Carraig Aille presents a development from roundhouses to rectangular house and a move from enclosed to unenclosed settlement. Caulfield (1981) reinterpreted the dating of Carraig Aille II on the basis of sub-Roman-type artefacts to the fourth century AD for the roundhouses and the seventh–eighth century for the rectangular houses. A similar, slightly later progression appears to have occurred at Lowpark, where the Phase 5 L-shaped trench truncated the palisades and may represent the final structure on site. The earlier rectangular structure in the north-west does not fit this sequence, although the plan may reflect an alternative function, perhaps as an outhouse or store.

Phase 5

The L-shaped slot-trench was dated to AD 680–890 and was stratigraphically later than Palisade 1. It may be the remains of a slightly later, rectangular structure or enclosure and confirms Lynn's (1978) sequence of earlier, circular structures being replaced with rectangular structures. Lynn concluded that rectangular buildings were introduced and used at a time when many of the enclosures in which they were built were becoming redundant; thus, the houses indicate a social and economic continuity but not a specific desire to continue living in ringforts (ibid.; Stout 1997, 32). The Lowpark L-shaped trench was not substantial enough to be classed definitely as a domestic building or indeed even as a structure. It may have been the foundation trench for an open-ended structure such as House D at the 'Spectacles' at Lough Gur (Ó Ríordáin 1949, 61).

Economy

Soil conditions at Lowpark were not conducive to the preservation of organic material, other than charred remains. Occasional calcinated bone and teeth fragments, wood charcoal and some charred hazelnuts were recovered from the early medieval layers in Lowpark. Occupants of ringforts practised mixed agriculture; however, cattle rearing was their main economic pursuit (McCormick 1983; Stout 1997, 35). Domestic animal species identified included cattle, pig, sheep and possibly dog (Appendix IX) and reflect farming practices and diet typical of the period.

Tillage played an essential role in the economy of early medieval Ireland, and cereals were a conspicuous part of the diet (Edwards 1990, 60). There was no archaeobotanical evidence of cereals in Lowpark, which may be due to poor preservation. The radiocarbon date range for the cereal-drying kiln (AD 901–1205) 250 m to the east in Ballyglass West overlaps with the later date ranges from within Palisade 1 and is likely to reflect the last use of the kiln. A smaller kiln at Drumreevagh, Ballina, Co. Mayo, 100 m south-west of a large, bivallate ringfort (RMP no. MA039-079), was radiocarbon-dated to AD 1214–1272. It comprised a bowl with an internal diameter of 0.8 m and a 1.4 m-long flue and was less substantial and less well preserved than that at Ballyglass West (Gillespie 2006). Cereal-drying kilns are commonly found associated with later medieval settlements and were used to harden damp grains before milling or grinding, typically following wet harvests. Kiln drying also prevented sprouting during storage, loosened chaff around oat grains to facilitate grinding and was part of the malting process (Tierney 1993, 67). The occupiers of the Lowpark enclosures are likely to have used this kiln for cereal processing as part of the overall economy of the enclosure. The Drumreevagh kiln contained cereal grains and chaff fragments, predominantly wheat, with traces of oats, rye barley and pulses (Giorgio 2004). Keyhole-shaped kilns are known mainly from the north and north-west of Ireland (Gailey 1970) and served other functions as well as cereal-drying, such as malting before the distillation of poitín (ibid., 54). Corn-driers may also have been used for drying pulses and possibly for flax and hemp, and their functions may indeed have changed over time (Giorgio 2004). It is likely that the Ballyglass West kiln, or one like it in the environs of the site, was used for processing cereals for the inhabitants of Lowpark.

The Drumreevagh and Ballyglass West flues were aligned roughly east–west on east-facing slopes, with access to an even breeze to facilitate the draught to the drying chamber and sheltered from stronger, north and west winds. Despite fine preservation of the kiln structure, the fill of the bowl in Ballyglass West was disturbed and contained modern finds, and sealed samples of macro-remains were not recovered.

Artefacts

The early medieval artefacts from the excavation at Lowpark included both decorative and functional items. The gold filigree panel (Appendix IV) was the most decorative artefact, suggesting high status of its owner. That it had been rolled up ready for the melting pot suggests that it was the property of a goldsmith, prized for the metal itself rather than the original decorative value. The copper-alloy ringed-pins found on site implied a degree of status, although they were relatively common items of dress dating broadly to the early medieval period. Brooches seem to have been universally worn and vary considerably from humble brooch pins of copper alloy to elaborate examples of silver set with gold filigree, glass and enamels (Ó Floinn 1989, 72). The bone pin had a similar function. Other decorative/dress items included a blue glass bead, a horn/antler bead, two buckles (Appendix VI) and three lignite armlet fragments (Appendix Va). The iron knives, hone stones and grinding stones were related to the daily life of the early medieval farmstead. There were no larger iron artefacts such as agricultural implements or ironworking tools. These must have been in use in Lowpark but were both too valuable to be discarded and too large to be misplaced. The majority of the larger stone artefacts were re-used in the early medieval structures, and it was not possible to establish where or when they were used for their intended function.

Gold filigree panel

This artefact, recovered from a post-hole (C338) associated with the possible roundhouse near the centre of Palisade 1, is the only known parallel for a gold panel recovered from the foundation levels of Lagore crannóg, Co. Meath, dated by Hencken (1950) to the sixth/seventh century AD (Appendix IV). Holly charcoal from the Lowpark post-hole was radiocarbon-dated to AD 880–1020 (Beta-231654), and this later date reflects the deposition of the artefact rather than the

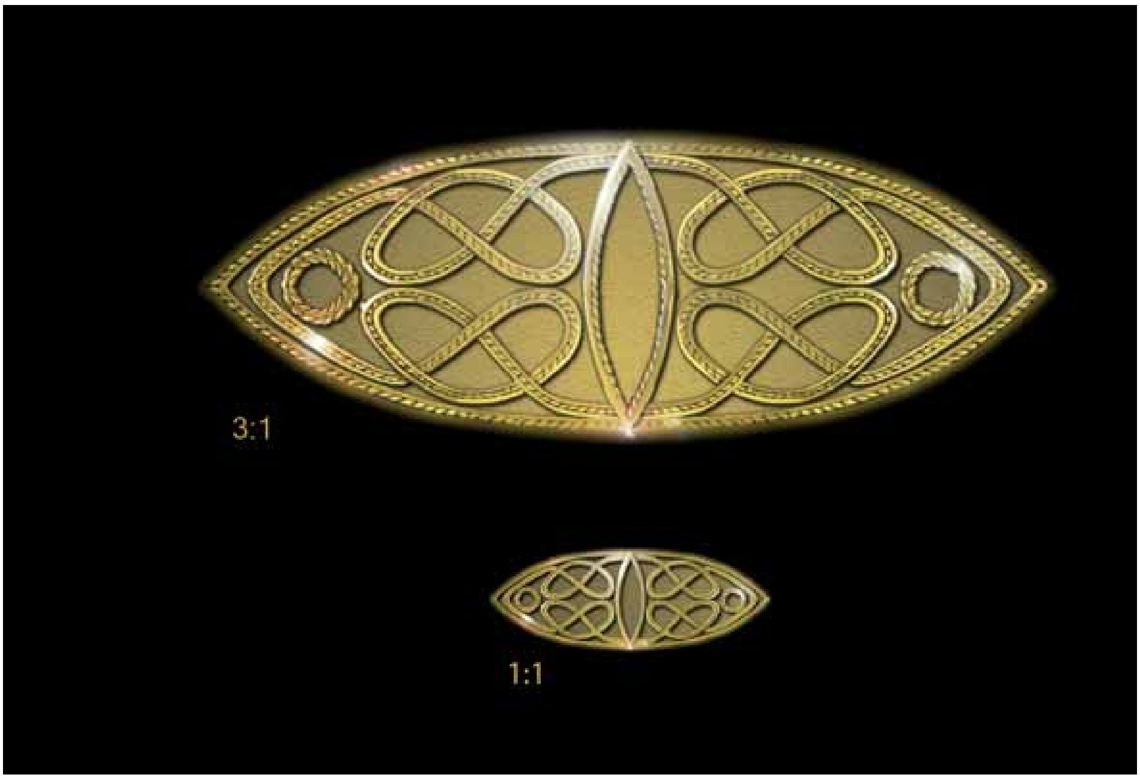


Fig. 4.57—Lowpark: artist's reconstruction of the gold filigree panel (E3338:338:144) (est. 37.5 mm long).

period of manufacture or use. The panel is a very rare find from an Irish archaeological context. Gold was so significant in the early medieval period that 'only a king, a church dignitary or lord could pledge an object of gold' (Kelly 1988, 164). Gold was relatively rare in the eighth and ninth centuries. Only one brooch made entirely of gold is known, that from Loughan, Co. Derry, the use of gold being otherwise confined to surface gilding or as panels or filigree (Ó Floinn 1989, 72). Little evidence of goldworking survives on archaeological sites simply because the metal was too precious to be wasted or lost. Tiny fragments of gold filigree wire have been found at Moynagh Lough crannóg, Co. Meath, and Movilla Abbey, Co. Down (Edwards 1990, 92). The Lowpark panel provides an example of early medieval gold prepared for re-use, indicating either local goldworking or an itinerant goldsmith with some connection to the Lagore region.

The gold filigree panel: specialist report by Niamh Whitfield

This small filigree panel, made entirely of gold (NMI reg. no. E3338:144; context no. C338) is bent and curled up, suggesting that it had been removed from a larger object with the intention of melting the gold and recycling it.

It was discovered in the fill of a post-hole, which produced a radiocarbon date of AD 800–1020, near a keyhole shaped pit within Palisade 1. Five post-holes were excavated there, four of which formed an arc, which may have been part of the wall of a circular house. The gold filigree panel was discovered near the centre of the fill of the fifth post-hole (0.45–0.47 m in diameter and 0.32 m deep) associated with this arc but not in line with it. The pit for the post had steep sides and a flat base, with two large, flat packing stones at the sides. The gold filigree panel was in the centre of the post-pit c. 0.1–0.15 m from the base, in loose, sandy silt. It may have been concealed deliberately by the side of the post and never retrieved or could equally well have been lost nearby and redeposited in the soil used to backfill the pit after the post itself was no longer *in situ*.

Description

The panel is now bent and rolled into an irregular shape (current maximum dimensions: c. 13.5 mm by 10 mm; weight: 0.41 g) (Pls 4.81–2). However, it was originally lozenge-shaped with a central, pointed oval, or vesica-shaped, cell, which is now empty but is similar to cells in *cloisonné* work designed to hold garnet or glass. The cell is flanked on either side by patterns outlined in filigree, and the entire panel is framed by a filigree border (Figs 4.57–8).

The back-plate

The gold sheet supporting the ornament is very thin. It was impossible to measure accurately but seems to be c. 0.01 mm thick.

Pls 4.81 and 4.82—Lowpark: gold panel (E3338:338:144), obverse (left) and reverse (right) views (10 mm by 13.5mm). (a) The side that has been folded back three times from the central cell. On the first fold is a pair of back-to-back, heart-shaped, interlaced knots. On the second fold, foreshortened in this image, is a rivet-hole ringed by filigree. The extreme tip of the panel is folded back and out of sight. (b) The central vesica-shaped cell with the pointed tip of the opposite end of the panel poking up through the cell floor. Note the rivet-hole ringed by filigree at the panel tip and part of the, now bent, filigree collar surrounding the central cell (scale: c. 5:1) (photos: © National Museum of Ireland).

Unravelling the pattern

Each end of the panel is bent back in a different way.

At the end shown in Pl. 4.81 (obverse), a small section by the central cell is torn, while the rest of this side is bent back from the central cell and folded back three times. Under the microscope the filigree pattern there can be seen in its entirety. It consists of a pair of back-to-back, interlaced, heart-shaped knots (maximum width: c. 7 mm). Using Adcock's terminology, the motif may be described as a simplified version of complete interlace pattern E (cf. Cramp 1984, xxx, xxxiii, figs 14, 15). The knots were originally linked to each tip of the vesica-shaped cell. At the opposite end of the panel each knot leads, via a V-bend, to a loop at the panel tip. This loop encloses a rivet-hole ringed by a pair of minute concentric circles by the panel tip (maximum diameter: c. 2.5 mm).

The other end of the panel, shown in Pl. 4.82 (reverse) curls back on itself to allow the pointed panel tip to come up through the floor of the empty vesica-shaped cell. A rivet-hole surrounded by a pair of concentric filigree circles can be seen on the portion of the panel poking through the cell floor. It matches the rivet-hole ringed by the concentric circles at the opposite end of the panel.

Dimensions

The length of the end of the panel shown in Fig. 4.58 can be calculated by adding the length of each of the three folds, c. 9.5 mm, 5.5 mm and 1.5 mm. The distance from the edge of the central cell to the tip of the panel is thus c. 16.5 mm. The panel appears to be symmetrical, so the other end is probably the same length. Given that the central cell is c. 3.5 mm to 4 mm wide, the original total length of the panel is likely to have been c. 37.5 mm.

The vesica-shaped central cell

The cell is c. 12.25 mm wide and 2 mm high. It is made a single strip of gold set on edge (Pl. 4.82, reverse). The join is at one end of the pointed oval, where two ends of the strip overlap.

Type of filigree wire used

Two types of ornamental wire are found: (a) a twisted ribbon, made by twisting a taut, flat strip of gold, and (b) a far finer, round, block-twisted wire (probably c. 0.1 mm in diameter), made by twisting a rectangular-sectioned length of wire, which was then (in this case, poorly) smoothed by rolling between two plane surfaces.

These two types of filigree wire are combined in different ways:

- The border surrounding the perimeter of the panel consists of an outer twisted ribbon inside which lies an inner, fine round wire, both directly attached to the back-plate (Pl. 4.81, obverse; Fig. 4.58).
- Surrounding the vesica-shaped cell is a filigree collar (Pl. 4.82, reverse) consisting of two superimposed wires, an upper, twisted ribbon and a lower, fine round wire.
- Each of the two concentric circles surrounding the rivet-hole at the panel tip is delineated by a single twisted ribbon (Pls 4.81–2; Fig. 4.58).

The construction of the knotwork interlace pattern is more complex (Pl. 4.81, obverse). It is ‘drawn’ by a three-wire band (not always fully intact) composed of a central twisted ribbon flanked on either side by a fine round wire, which in fact consists of a single strand bent to loop around one end of the twisted ribbon.

Mounting of the filigree on the back-plate

The border and pairs of concentric circles appear to be soldered directly to the back-plate. However, the attachment of the three-strand wire bands delineating the interlace is more complex (Pl. 4.81, obverse). The central twisted ribbons rest on horizontal gold strips. These in turn are propped up on the edges of small cells soldered to the back-plate and placed in the spaces between the outline of the pattern, each formed of a single strip of gold (c. 1 mm wide) set on edge. These may be described as ‘false cloisons’, because they are too shallow and too irregular to hold garnet or glass insets, and serve only to support the filigree. It is clear that the three-strand bands delineating the pattern were not assembled as one unit, because in some cases the loops composing the fine flanking strands can be seen to be soldered to the outer edges of the ‘false cloisons’ rather than to the flat ribbon supporting the twisted ribbons.

Discussion

This is an extremely interesting find, not only because it is such a high-status piece but also because it provides a very close parallel for another filigree panel hitherto considered something of an oddity, which was discovered in the earliest level (period 1a) during Hencken's excavations at Lagore crannóg, Co. Meath (Hencken 1950, 7, 86–7; Whitfield 2001, 142–7) (Fig. 4.59; Pls 4.83–5). While not absolutely identical, the Lowpark panel is extraordinarily like that from Lagore (Figs 4.58–9). Many of the elements they share occur elsewhere in early medieval Irish filigree, e.g. block-twisted round wire, the use of twisted ribbon and the 'false cloison' technique. However, the particular combination of features common to the Lowpark and Lagore panels is not found elsewhere. The list of shared features is very long. It includes:

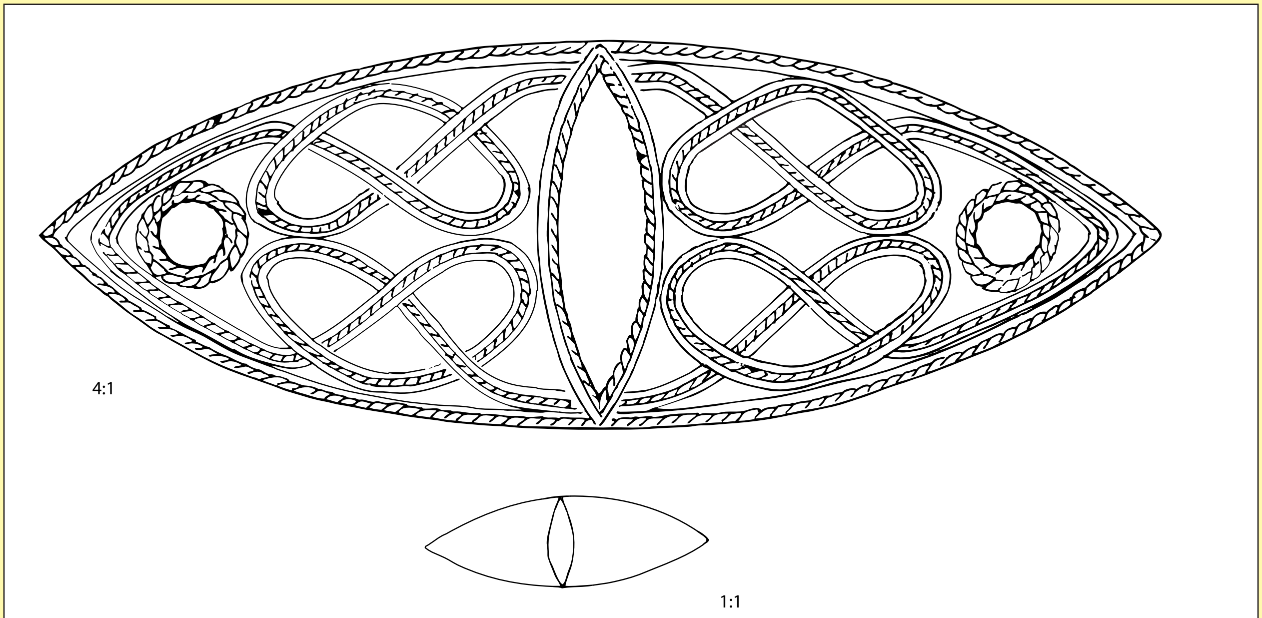


Fig. 4.58—Schematic drawing of Lowpark filigree panel much as it would have appeared before being rolled and bent. There has been no attempt to include details such as the way that the wires in the three-strand bands are laid out (scales: c. 4: 1 and c. 1:1) (drawings: Nick Griffiths).

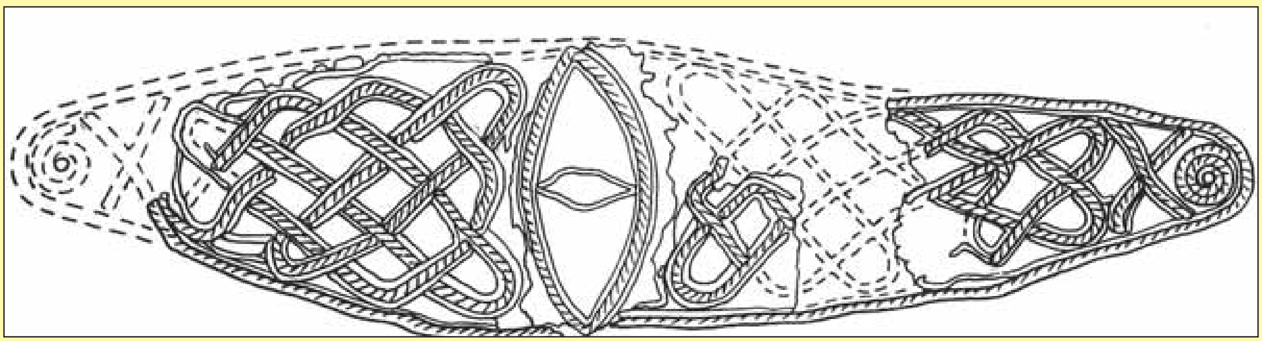


Fig. 4.59—Gold filigree panel from Lagore, Co. Meath (National Museum of Ireland, E14:216); reconstruction of the panel as a whole (scale c. 1.4:1) (drawing: Nick Griffiths).

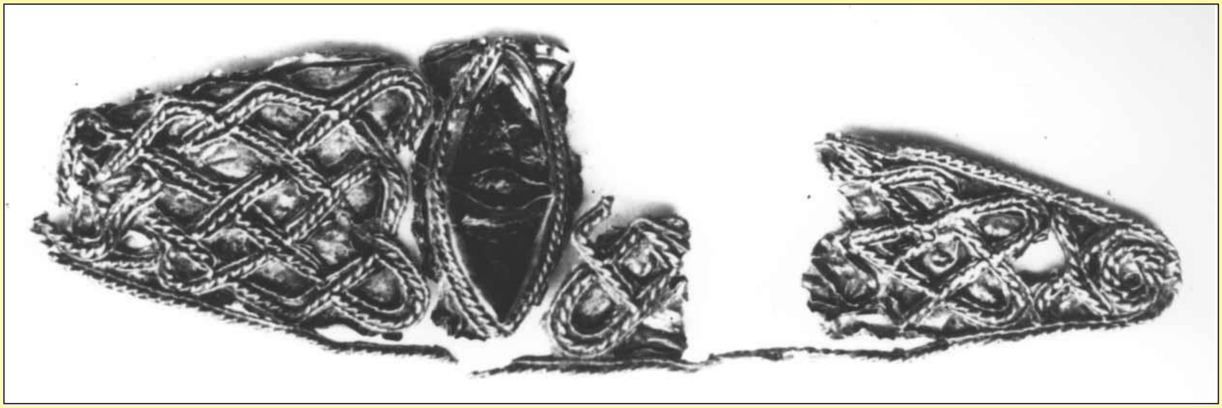
The overall design of the panel (Figs 4.58–9). In each case the panel is elongated (lozenge shaped at Lowpark; more elliptical at Lagore). It has a central vesica-shaped, now empty, gold cloisonné cell for a garnet or glass inset (damaged at Lowpark; subdivided by an empty transverse cell at Lagore). The cell is flanked on either side by filigree interlace with V-bends (knotwork at Lowpark; plaitwork at Lagore). This in turn is flanked by rivet-hole surrounded by a minuscule circular filigree motif (a pair of concentric circles at Lowpark; a spiral linked by an X-shaped link to the interlace at Lagore).

- Dimensions. The Lagore panel was relatively long, probably originally 48–50 mm, in contrast with the Lowpark piece, which originally seems to have been c. 37.5 mm long. However, in each case the central cell is c. 12 mm wide.
- Filigree wires. The two panels have exactly the same range of decorative wires that appear to be about the same width: (i) twisted ribbon and (ii) far finer, block-twisted, round wire, which is not well finished. Furthermore, these two types of decorative wire are deployed in an almost identical way on each panel (Pl. 4.82). In each case there is:
  - a two-wire border, consisting of an outer twisted ribbon inside which lies an inner fine round wire;
  - a collar of superimposed wires around the base of the central cell (one twisted ribbon above a fine round wire at Lowpark; two twisted ribbons above a fine round wire at Lagore);
  - a minuscule circular motif at each panel tip delineated in twisted ribbon;
  - an interlace pattern delineated by a three-strand band composed of a central twisted ribbon flanked on either side by a fine round wire (in fact, a single strand bent round the end of the twisted ribbon in each case).
- Mounting of filigree wires. In each case the three-strand bands delineating the interlace pattern rest on flat strips of gold, while the 'false cloisons' are used to prop up the bands as a whole (although at Lowpark this technique is confined to the interlace, while at Lagore the border is also raised) (Pls 4.82, 4.84 and 4.85).
- Mounting of the back-plate. In each case the panel as a whole was attached to the object it decorated by a rivet at either end of the panel. The rivet-holes in each case are ringed by circular filigree patterns (Pls 4.82 and 4.84; Figs 4.58–9).

These parallels are so close as to indicate that the two panels are at the very least from the same phase of design, and they may even be from the same workshop or from two very closely related ones.

How are they to be dated? As discussed in greater detail elsewhere (Whitfield 2001, 142–7), E-ware pottery imported from western France was found in the same layer as the Lagore filigree panel. This type of pottery has a dating span of the later sixth to the later seventh century, with a *floruit* in the early seventh century (Campbell 1996, 92–3). Such a date is also consistent with the central vesica-shaped gold cells on both objects of a type generally found in garnet cloisonné work, which is typical of the late sixth to the seventh century in Anglo-Saxon England, the area from where the craft of filigree seems to have been introduced into Ireland. On this basis, the Lagore and the Lowpark panel both have a dating bracket of the late sixth to the late seventh century, making them among the oldest surviving pieces of filigree from early medieval Ireland.

However, the post-hole in which the Lowpark fragment was discovered is one of the later features at the site, producing a radiocarbon date of AD 880–1020. The unusual 'false cloison' technique, found on both the

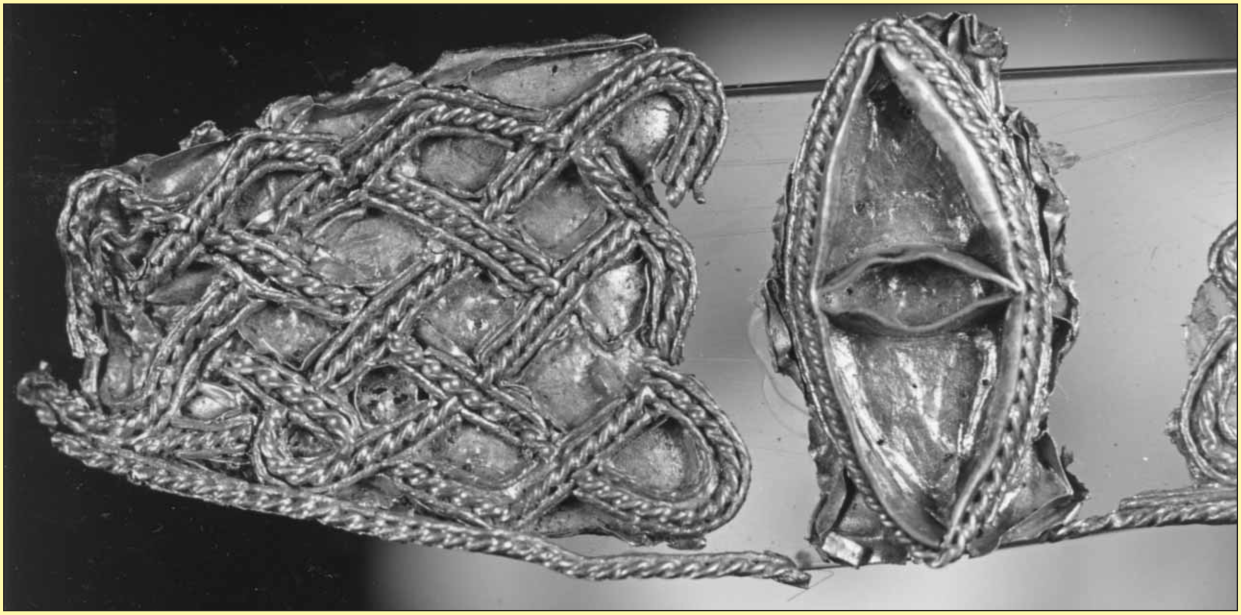


Pl. 4.83 (above)—Gold filigree panel from Lagore, Co. Meath (National Museum of Ireland, E14:216); front view (scale: 1:1) (© National Museum of Ireland).

Pl. 4.84 (right)—Gold filigree panel from Lagore, Co. Meath (National Museum of Ireland, E14:216); detail of filigree at intact tip of the narrower side showing rivet-hole in centre of spiral (scale c. 5:1) (photo: Niamh Whitfield).

Lagore and the Lowpark panel, also occurs on late ninth- to 10th-century filigree from Ireland (Whitfield 2005), so this particular feature would fit a later context. However, the similarities between the Lagore and Lowpark pieces go much further than this. In any event, as noted above, there is no certainty that the Lowpark panel is contemporary with the post-hole in which it was discovered. If the Lagore dating is reliable, as appears to be case (Warner 1985–6, 77), and if, as I suggest is likely, the two panels are contemporaneous, then the presence of the Lowpark panel in the fill of such a late post-hole can be explained in one of two ways. Firstly, the panel could have been deposited when the post was inserted but was old and out of fashion at this time. Its crushed state would support such a view. Secondly, the relatively late date of the post-hole in which it was discovered might not date it accurately, because the object could have been previously buried elsewhere and accidentally included in the fill. Indeed, radiocarbon dates for the surrounding features are all relatively early: AD 550–660 and AD 540–650 for the two souterrains; AD 643–765 for the shallow slot-trenches and stake holes; AD 670–880 for the key-hole shaped pit; and AD 660–870 for the ironworking area. Therefore, there is no reason why the Lowpark filigree panel should not also date to the start of the Middle Ages.

How do two such similar pieces as the Lowpark and Lagore panels come to be discovered on opposite sides of the country? There are a number of possible answers to this question:



Pl. 4.85—Gold filigree panel from Lagore, Co. Meath (National Museum of Ireland, E14:216); detail of filigree border on broader side with damaged tip, mounted to show breaks in back-plate (scale c. 5:1) (photo: Niamh Whitfield).

- The Lowpark panel was part of the stock-in-trade of an itinerant smith visiting the site who had acquired it in the Lagore region.
- The Lowpark and Lagore panels were manufactured by an itinerant goldsmith who worked in both locations. It is true that no evidence for goldsmithing was discovered at Lowpark. However, 30 % of the enclosure had been removed by modern quarrying, and copious evidence for ironworking was discovered during the excavations. Other metalworkers may also have been present.
- The two panels were made at one or the other site, and one panel was subsequently gifted by one ruler to another.
- Both the Lowpark and Lagore panels were made elsewhere but traded or gifted to local rulers in each locality.
- Their style of filigree was more widespread than it seems at present.

Finally, what kind of object did the Lowpark panel decorate? No such panel has been discovered to date *in situ*, so again we can only speculate. Like most surviving pieces of early medieval Irish filigree, it may have been mounted in specially prepared panels on a larger piece of metalwork, either ecclesiastical or secular. However, it is also possible that it was riveted to a wooden object, such as a sword hilt, similar to the late sixth- to seventh-century Anglo-Saxon sword hilt from Cumberland, now in the British Museum (Whitfield 2001, fig. 13.6).

Copper-alloy ringed-pins

Ringed-pins were developed in the fifth and sixth centuries and were usually of copper alloy, with a perforated or looped head that held a loose ring, and were secured to clothing with a cord wound around the pin. Fanning's (1994) classification places the spiral-ringed pin with a balustered head in the fifth to the eighth century. Similar spiral-ringed pins occurred in Rooskey, Co. Roscommon, and Co. Westmeath (Edwards 1990, 141, fig. 69). The only metal find from the ringfort at Letterkeen, Co. Mayo, was a bronze pin with an unusual twisted spiral ring. 'Armstrong dated this type of pin to the early sixth century, similar to pins from Carraig Aille [which] were unstratified and may well belong to the earliest phase of the site' (Ó Ríordáin & MacDermott 1952, 112–13). Similar pins came from the upper layer of habitation at Garryduff I (O'Kelly 1963, 34). The Lowpark spiral-ringed pin (E3338:2:27) did not come from a datable context but is likely to be from the earlier phases of medieval occupation of the site. The complete ringed-pin (E3338:235:104) and pin shaft (E3338:182:75) came from the post-use fills of Souterrains 1 and 2, placing their final deposition in the later phases of the Lowpark occupation. Both were loop-headed pins and may date from the fifth to the 11th century (Appendix VIa), which coincides with the broad date range for the medieval phases of the site.

Pl. 4.86—Lowpark: (left to right) pin and fragmented spiral ring (E3338:2:27), complete ringed-pin (E3338:235:104) and pin shaft (E3338:182:75) (photo: Jonathan Hession).

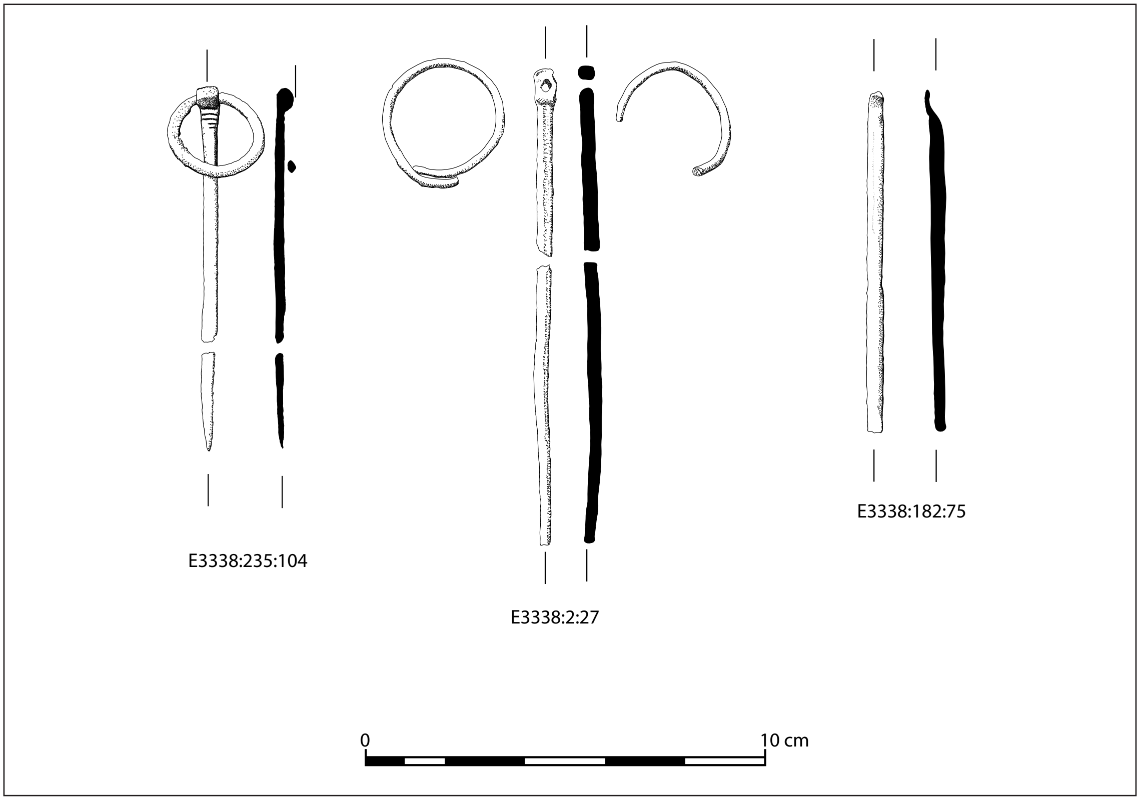


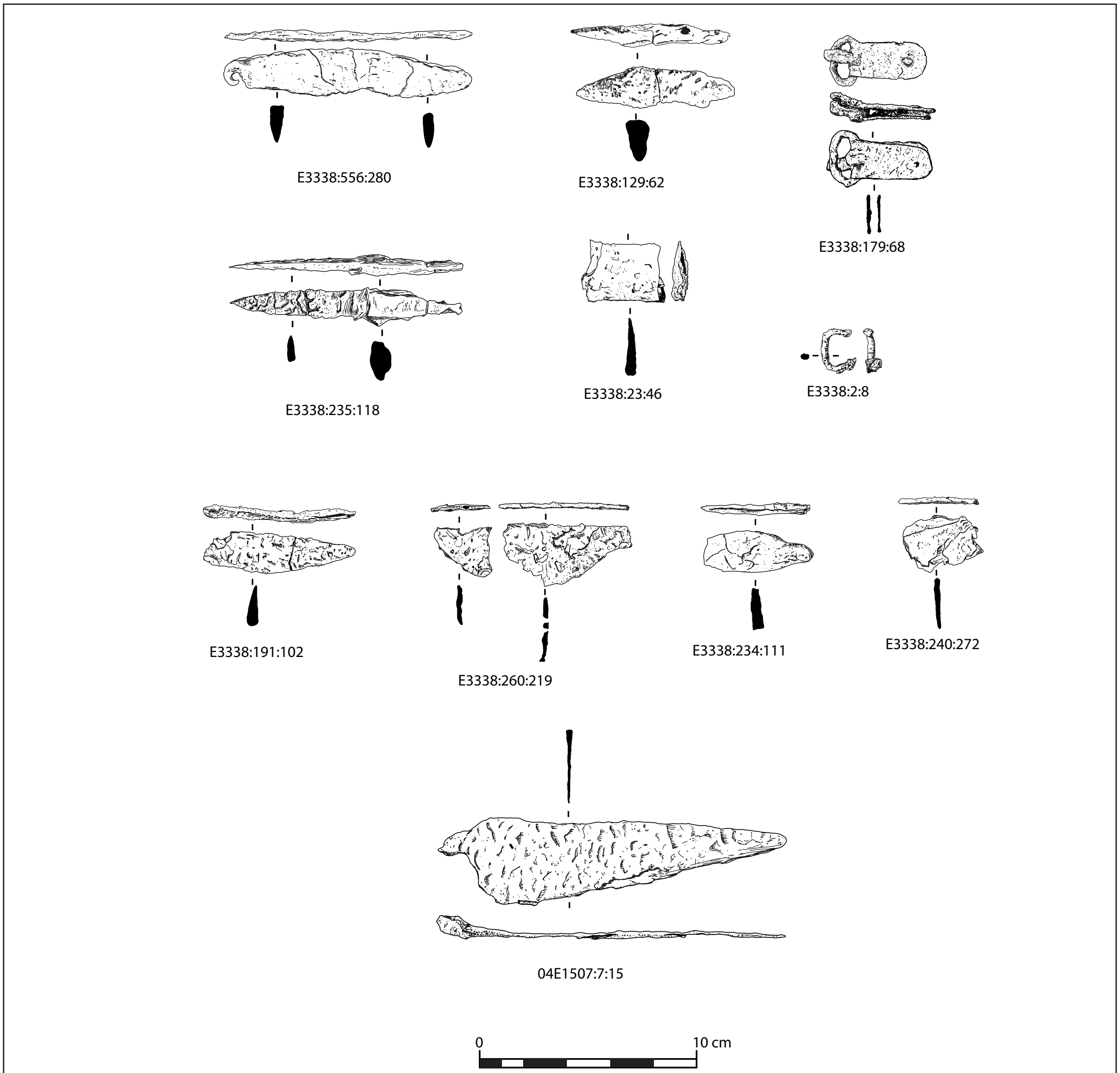
Fig. 4.60—Lowpark: copper-alloy ringed-pins.

Iron

Six iron knives and a blade fragment (Appendix VIa) were included in the Lowpark medieval artefact assemblage. Scott (1990, 2 and 30) explains the difficulty in classifying 'that ubiquitous general purpose tool, the single-edged iron knife' because it is typologically nondescript with large variations, even in relatively small areas and narrow timeframes. 'The classification of knife forms encounters the usual problem of objects that are individually hand-made, which is that no two will be identical' (Blakelock & McDonnell 2007, 41). This is complicated by drastic modifications from sharpening and re-sharpening and subsequent deterioration. The Lowpark and Cloonaghboy knives were generally tanged to house a handle. The largest excavated assemblage of early medieval iron knives was from Garryduff I, Co. Cork, and comprised 50 tanged knives or parts of knives and both straight and curved blades (O'Kelly 1963, 42). One of the Lowpark knives had a looped or hooked terminal that may have facilitated a rivet to act as a folding knife (Appendix VIa) or alternative type of mount or handle, and it is broadly similar to two knives from Garryduff I and one from Carraig Aille II, Co. Limerick (Ó Ríordáin 1949, 74–5). Knives of this size in various states of preservation were found at other early medieval enclosures such as Rinaraw cashel ,Co. Donegal (Comber 2006, 99), Rathgureen, Co. Galway (Comber 2002, 164–50), and Carrigaline, Co. Cork (Lennon 1993, 85–6).

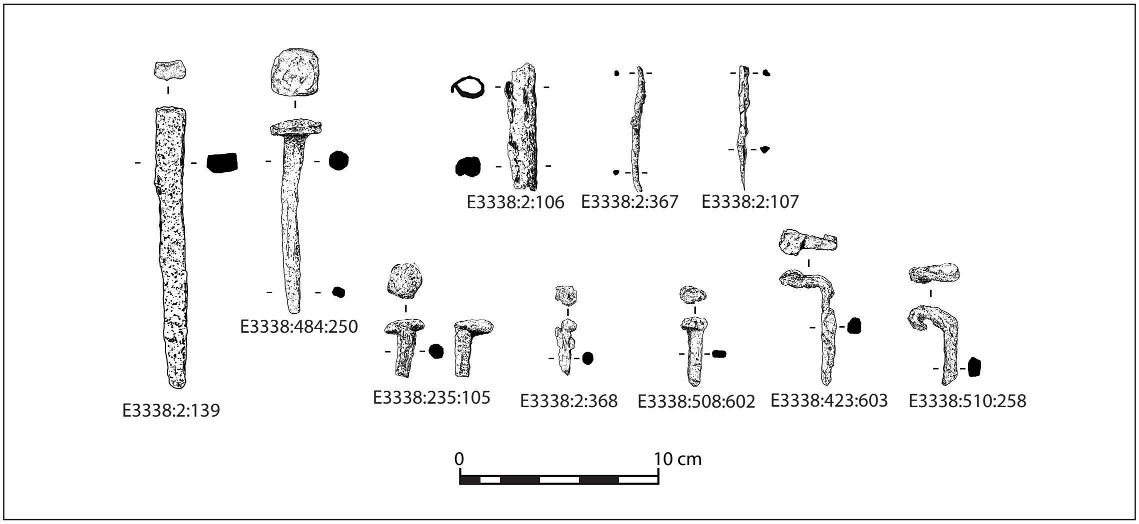
Pl. 4.87 (right)—Lowpark: a selection of iron knives (E3338:111, 29, 62, 280 and 118) resting on a sharpening stone with deep pin grooves (photo: Jonathan Hession).

Fig. 4.61 (below)—Lowpark: eight iron knives and blade fragments, buckle and buckle fragment. Ballyglass West: shears blade (at bottom).



Pl. 4.88 (left)—Lowpark: selection of iron nails and hooks (photo: Jonathan Hession).

Fig. 4.62 (below)—Lowpark: selection of iron nails and hooks.



One small buckle with an attached buckle plate (E3338:179:68) and a fragment of a possible buckle frame (E3338:2:8) were associated with the roundhouse or keyhole-shaped pit. Early and later medieval buckles varied widely in size, form and function. Smaller buckles are thought to have been used on both men's and women's clothing and as stirrup buckles. Buckle plates were attached to a strap or belt (Egan & Pritchard 2002, 50–5).

Plates may have any number of rivets, and those with only one rivet, such as the Lowpark example, are relatively common. It is likely, however, that small buckles with single rivet plates may not have been intended to be subject to significant strain or pressure (Appendix VIa). Various iron nails and hooks were also recovered from the excavation area (Pl. 4.88).

The production, repair or recycling of small, everyday items such as knives, nails, buckles and shears was evidenced at Lowpark. The large slag cakes at Lowpark suggest production of larger objects or perhaps refining of iron blooms (Appendix VIIIa). This implies that larger tools or agricultural implements may have been made, used and repaired at Lowpark, despite their absence from the archaeological assemblage. Similarly, ironworking tools, such as the anvil and tongs recovered from Garryduff I and Garranes, Co. Cork, and Cahercommaun, Co. Clare (Scott 1990, fig. 1.5.2), must have been used in Lowpark.

Lignite, glass and bone/antler

Three lignite armlet fragments (Appendix V), a blue glass bead, a bone pin fragment and a bone/antler cylinder (Appendix VIa) were recovered from Lowpark. These artefacts are related to

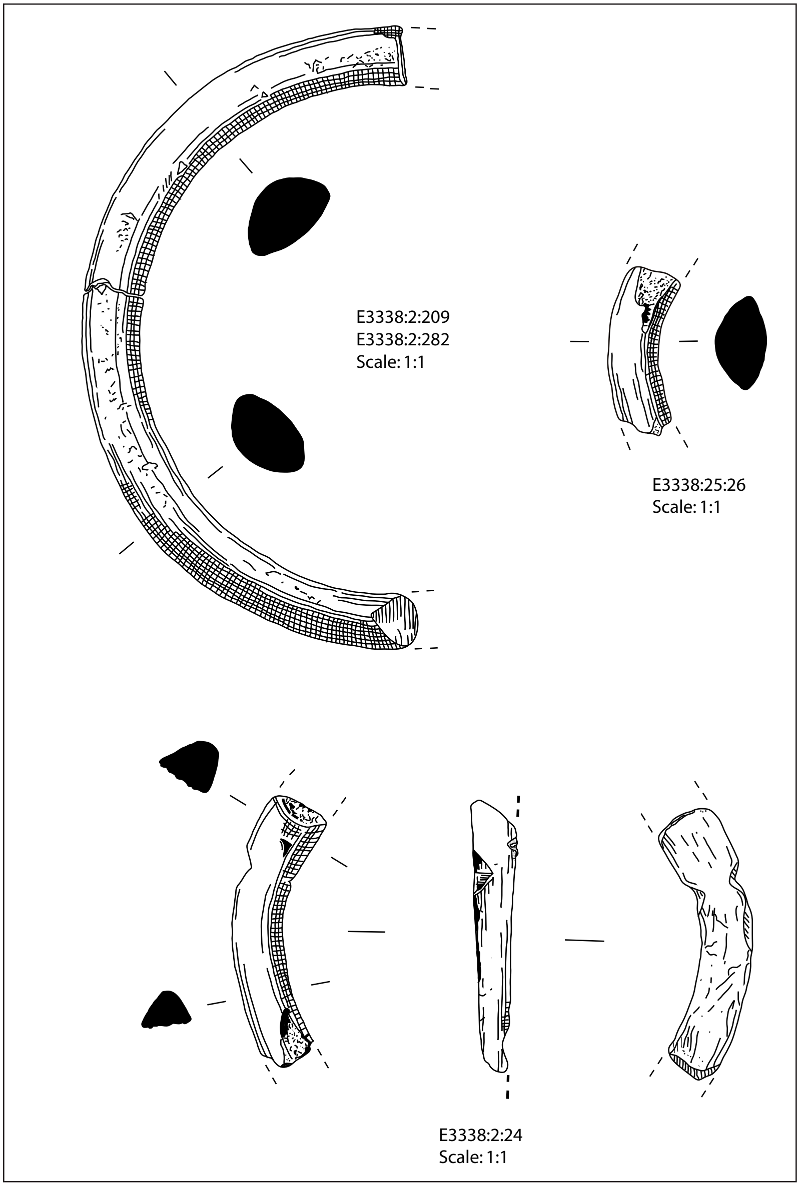


Fig. 4.63—Lowpark: lignite armlet fragments (drawing: Annika Tottenham).

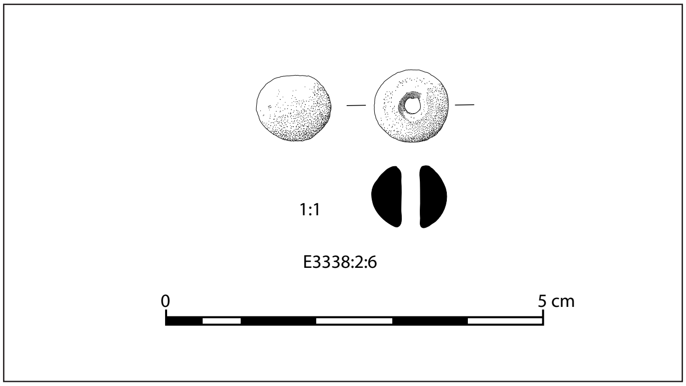


Fig. 4.64—Lowpark: blue glass bead.

Pl. 4.89—Lowpark: lignite armlets (E3338:2:209/282/ 24, E3338:25:26) and blue glass bead (E3338:2:6) (photo: Jonathan Hession).

Pl. 4.90—Lowpark: horn/antler cylinder (E3338:284:170) and bone pin fragment (E3338:186:73) (photo: Jonathan Hession).

dress or personal ornament. The lignite armlet fragments were not securely stratified and are undiagnostic beyond a broad Iron Age–medieval date. Similar lignite bracelet fragments were recovered from Lislackagh, Co. Mayo, which produced an Iron Age date (Walsh 1995b), and eight fragments were retrieved from the interior of the Letterkeen ringfort, Co. Mayo, three from its souterrain (Ó Ríordáin & MacDermott 1952, 112–14, fig. 5). Jet, lignite and shale bracelets from early medieval contexts have a wide distribution across Ireland, with examples from the Rath at Ballymacash, Co. Antrim (Jope & Ivens 1998, 119–20, fig. 9), Ballinderry I crannóg, Co. Westmeath (Hencken 1936), Carraig Aille, Co. Limerick (Ó Ríordáin 1949, 88, fig. 17), Raheens, Co. Cork (Lennon 1994, fig. 10), and Garryduff, Co. Cork (O'Kelly 1963, 88). Blue glass beads have a similar distribution, including Letterkeen, Co. Mayo (Ó Ríordáin & MacDermott 1952, 112–14, fig. 5), Carraig Aille, Co. Limerick (Ó Ríordáin 1949, 88–9, fig. 17), and Garryduff, Co. Cork (O'Kelly 1963, 74–7). Despite their wide distribution, these items of personal ornament must have been prized objects reflecting status and wealth in early medieval society.

Large stone artefacts

Most of the 12 large stone artefacts (Appendix VI) from Lowpark were used in ironworking, albeit some had secondary uses. A saddle quern (E3338:258:140; Fig. 4.65) was re-used as an anvil in

Pl. 4.91—Lowpark: hollowed grinding stone (E3338:395:236) that may have been used for pounding iron ore (photo: Jonathan Hession).

Ironworking Area 2. A saddle quern and a stone 'mortar', similar to the Lowpark hollow stones, were found in association with ironworking evidence at Lough More crannóg, Co. Mayo (Keane 1995, 176). A hollow stone (E3338:424:303/304; Fig. 4.65) was broken *in situ*, probably from pounding iron ore, in Ironworking Area 4. At least four other stones (E3338:266, 236, 262 and 274; Fig. 4.65) had hollowed surfaces that may have been used for pounding iron, although food processing is also possible. A rotary grindstone (E3338:512:239) and a rotary grindstone fragment (E3338:512:270) were incorporated into the fabric of Souterrain 1, and two hone stones (E3338:158, 381 and 267) provide further evidence for finishing and maintenance of iron artefacts. One of the sharpening stones (E3338:267) functioned both as an anvil and as a crushing stone, and one of the hollowed stones (E3338:262) also served as an anvil base. Most of these stones were re-used in the construction of Souterrains 1 and 2 and Palisade 1, possible reflecting a diminished importance of ironworking in Phase 4. A fine whetstone with a deep groove was associated with the souterrain at Letterkeen, Co. Mayo (Ó Ríordáin & MacDermott 1952, 114, fig. 5). A grindstone and 33 whetstones with smooth faces, fourteen of which had pin grooves, were recovered from Carraig Aille, Co. Limerick (Ó Ríordáin 1949, 86), and 125 hone/whet stones, 21 of which exhibited one or more pin grooves, were recorded at Garryduff (O'Kelly 1963, 91–2).

Hollowed stones often associated with ecclesiastical sites are variously referred to as bullauns, rock basins, and mortars. Price (1959, 172) describes bullauns as basins or hollows, usually bowl-shaped, in rocks, boulders or heavy blocks of stone. Kelleher & O'Brien (2008, 8–9), focusing on bedrock bullauns (hollows ground on to rock outcrop), cite ethnographic and historical references to mortars for grinding cereals and nut as parallels to interpret bullauns. In addition to food processing, bullauns, which are often associated with early church sites, have ritual or superstitious associations and little evidence for their original function. In the early text of the life of St Kevin a smith was blinded in one eye by a flying stone chip while grinding a stone in a mortella, which equates to a mortar or bullaun (Price 1959, 161–88). The Lowpark hollow stones, particularly the sandstone block (E3338:395:236; Pl. 4.91; Fig. 4.65) that was re-used as a building stone in Souterrain 1, fit this description. Hewson (1938, 150–1) described two bullaun stones from Ballynoe and Ballygill South, Rathlin Island, Co. Antrim, which had been used for bruising or pounding foodsuffs and whins. The Ballynoe bullaun stone was of sandstone and was deeply scored on one side from tool sharpening, which directly relates it to metalworking. Dolan (2009, 16–19) discussed the interpretation of bullauns as ore-processing mortars. Most of the associations are tenuous except for a hollowed stone associated with a metalworking area, of possible early medieval date, at Gallen Priory, Ferbane, Co. Offaly (Kendrick 1939, 1–20). The Lowpark hollowed stones, particularly those found *in situ* in Ironworking Areas 2 and 4 (E3338:258:140 and E338:424:303/4; Fig. 4.65; Pls 4.33–4 and 4.43–4), provide direct evidence for the use of hollowed stones in iron processing in the early medieval period. The hollowed stone (E3338:424:303/304) at the edge of the main ironworking pit in Ironworking Area 4 fulfils the basic criteria for a bullaun stone and was broken *in situ*, probably from heavy pounding of iron bloom. The fact that it was left *in situ* implies that this area went out of use when this stone was broken. Subsequent fill of the area and construction of the outer arc of Palisade 1 securely sealed this area and support the early medieval radiocarbon date.

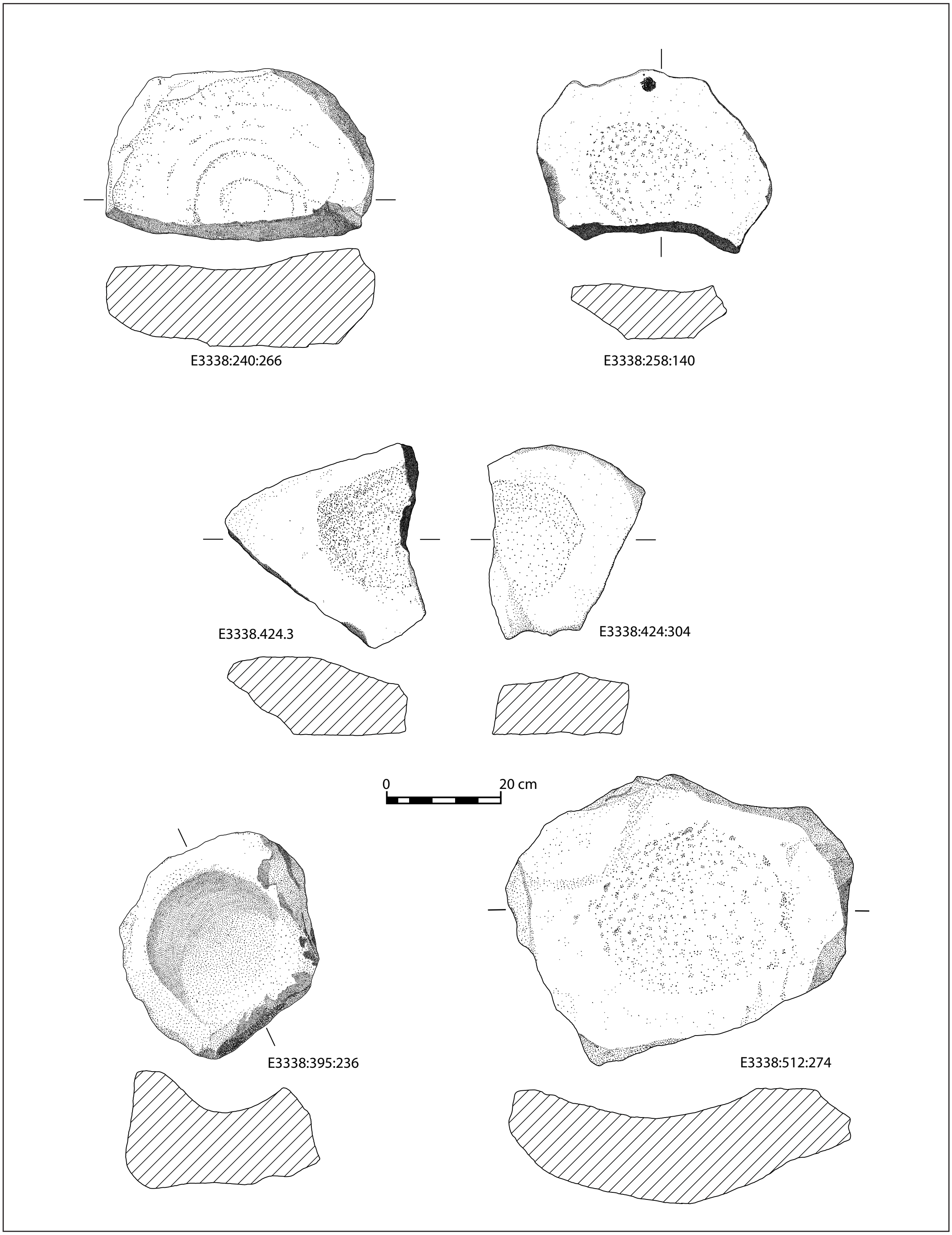


Fig.4.65—Lowpark: hollowed stone artefacts.

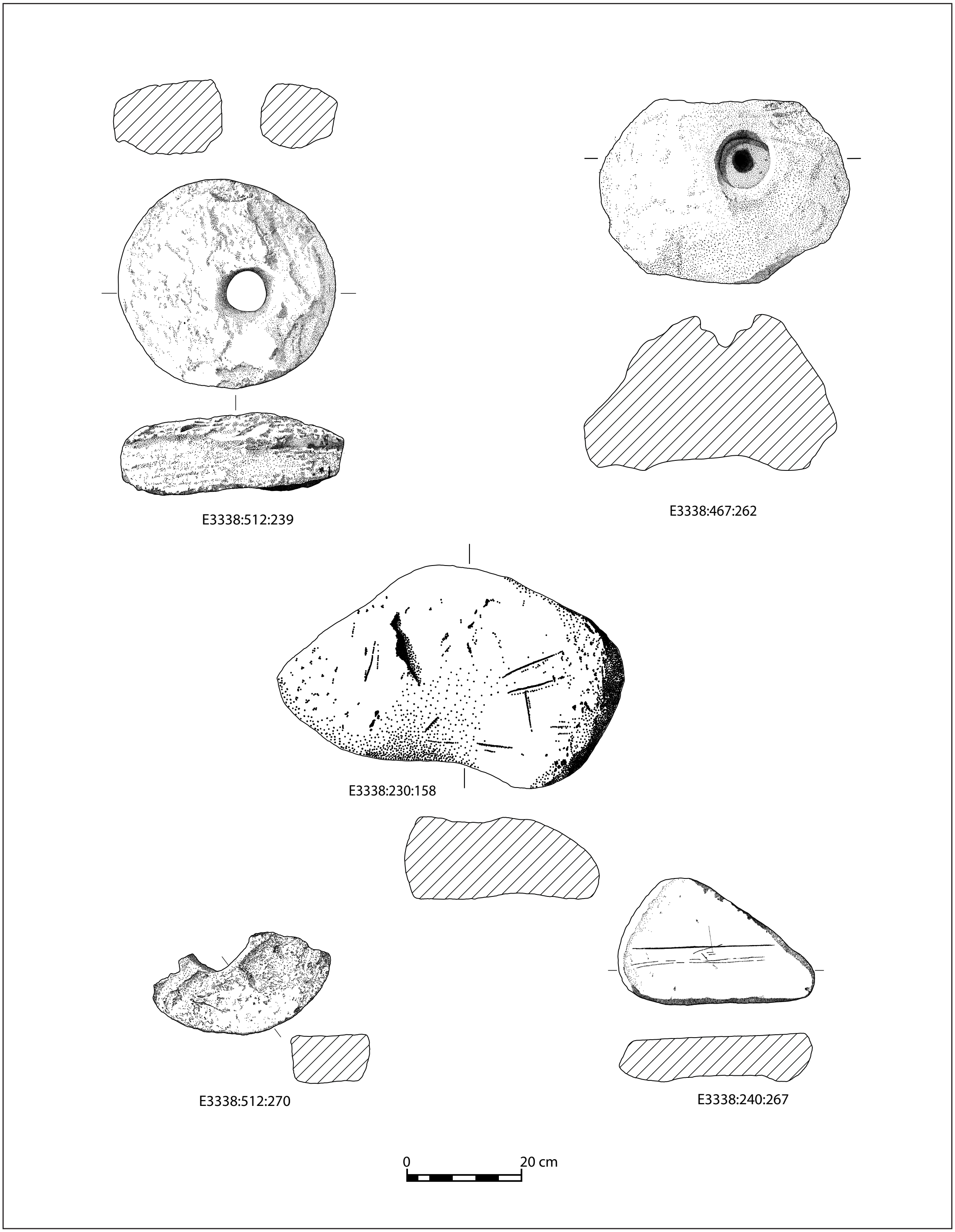


Fig.4.66—Lowpark: rotary grindstones (239 and 270), hone stones (158 and 267) and anvil base (262).

Stone artefacts from Lowpark: extracted from specialist report by Jim Higgins (Appendix VIb)

Socketed base for a metal anvil: E3338:467:262 (Fig. 4.66)

The object is undoubtedly the basal block in which a metal anvil was set. The stone had one primary and at least two secondary phases of use. The stone is broken and incomplete and seems to have been re-used at a later date as a basin-like mortar. After this, a large spall was detached from the back of the stone, which also removed part of the side edge of the ovoid basin or mortar. A groove and a worn surface occur on one side of the stone and were secondary.

The stone is a cream to yellowish granite boulder altered on several surfaces. It has been worked on its upper surface to a rough, truncated pyramid with a flattened and tooled apex, where a double sinking occurs. The sides generally taper, especially at the front, where there is much tooling, while the 'back' has mainly been broken away. The lower sides are generally unworked and were likely to have been set in the ground.

A double socket was cut in the middle of the flat-topped apex. This is circular in outline and cylindrical in shape to the depth of the first few centimetres, and below this is a further, lower sinking cut in the centre, which tapers inward to a blunt point. The overall depth is 32.2 mm. The socket was obviously intended as a housing for an object, most likely the base of a metalworker's anvil, which it would have fastened securely and immovably in the stone. Other evidence for on-site metalworking included metal slag, anvil stones, casting sand, basin-like stones in which metal or metal ore was pulverised and the presence of metalworking areas at the site.

Metalworking anvils of copper alloy and iron are known from Ireland from the Bronze Age onward. Although widely varied in design and size, metal anvils invariably have a striking or working surface below which extended a shaft or neck. The base of the anvil is often tanged or pronged, and the prong is invariably set on a temporary or permanent basis in a solid base. Some anvils are portable, and some were removed from their sockets or bases whenever the need arose. Many smaller anvils used by itinerant craftsmen were portable and set in a wooden base or simply driven into the ground. Some strake-anvils used by itinerant craftsmen of the Travelling community, especially tinsmiths, were spiked so that they could be driven into the ground. The tangs of many metalworking anvils were sometimes pointed, tapered, wedge-shaped or stepped, as is the case with the anvil in the socket stone from Lowpark .

The main requirement was that the anvil had to be immovable at the base so as to prevent swivelling. The easiest way to secure the tang or bottom of an anvil generally was to make it spiked, and the use of a double-depth socket was an excellent solution to the problem of providing stability, preventing swivelling or lateral movement and minimising the risk of injury to the metalworker or damage to the object being made or finished. As is the case with modern blacksmiths' anvils in wood on stone, the socket may have been packed or lined with a shock absorber of organic material such as leather or wood between the anvil base and socket.

Apart from the primary use of the stone as a socket, there is some burnishing and wear just below and around the socket-hole, which may be the result of periodically handling and/or removing the anvil from its base. There may have been a series of anvil blocks of varying sizes and heights, which could have been set in the same base.

A deliberately worked oval hollow on the current underside of the stone is tooled and basin-like. This is shallow toward the outer edge and deeper toward the middle. The surface is heavily worked and tooled and bears some brown staining. A large, unworked spall was detached from the side of the hollow. A short, grooved feature and a sub-rectangular, burnished and smooth area occur one side of the stone. The groove is deep, U-shaped in profile, widest toward the middle, narrowing just slightly toward the outer ends, and is the result of wear.

Fragment of a rotary grinding and sharpening stone: E3338:512:270 (Fig. 4.66)

The stone is an early example of a rotary grindstone with an off-centre perforation. It is of cream to yellowish granite and is burnished and worn along the outer edge, while the flat surfaces are crudely worked. About one-third of the grindstone survives and has crudely worked sides and a smoothed and round working edge. The estimated original diameter of the stone is 0.39–0.40 m. One of the sides is heavily encrusted with reddish-brown rust and metal residue. The working surface is inclined to one side, where it slopes slightly as a result of heavy use. The sides (the rust-stained surface in particular) are irregular. Some worn tooling made with a large point or pitcher is visible on parts of the sides. The grindstone was used for sharpening and to a certain extent re-shaping metal-bladed artefacts and was originally set in an axle, which in turn was housed in a wooden frame. It was turned using a metal 'crank handle' attached to the centrally placed axle. The central perforation is partly intact and has a slightly rounded outer edge, but the inner parts of the perforation are squared. A second and more complete example from the site may have served a similar function. Metal- and wooden-framed rotary querns are still in use in various parts of the world, and the method of mounting and setting varies greatly. Some were set in a shaped frames that resembled builder's workhorses and were propelled using a crank handle resembling a doglegged organ-grinder's handle. Others were propelled by rotary spinning on turnstiles, and others again were propelled on machines resembling lathes and potters' wheels, with either hand crank or pedal-power being used.

Rotary grinding stone: E3338:512:239 (Fig. 4.66)

The object is a complete rotary grinding stone of sandstone. The flat surfaces are roughly worked. The outer, circular rim shows wear and burnishing from use in grinding, sharpening and polishing. The perforation is slightly off-centre. Most of the wear is on the circular edge, and the flat sides, while worked, showing few traces of wear.

These are among the earliest rotary grinding stones from a dated archaeological context in Ireland. Most examples date to after the Anglo-Norman invasion, and they are common finds on later medieval excavations. Eight examples were recovered from excavations in Waterford between 1986 and 1992. Of these, one is dated to the 11th/12th century, another to the mid-12th century, two more to the mid- to late 12th century and the last to the 13th century. Another was unstratified, and its date is unknown. One of the complete examples (McCutcheon 1997, fig. 14;13, 3 [no. E527:765:3]) has a rectangular perforation set considerably off-centre, like the fragmentary Lowpark stone above.

Hone sharpening anvil and crushing stone: E3338:240:267 (Fig. 4.66)

This large, industrial-sized sharpening stone was clearly not easily portable and was probably used in the forge of a smith of metalworker. Largely trough-shaped, the tooling and wear on the stone indicate that it was used to sharpen and/or finish edged tools both on the flat surfaces and their edges. The underside has been used for crushing and pounding and has some brown staining. Two partly natural hollows have been enlarged and accentuated by this working. There is a complex network of light chisel marks caused by cutting material (perhaps sheet metal?) on this undersurface. The surface also has two or three elongated and very fine sharpening marks. These seem to have been weathered and eroded before the (re-) use of the stone as a pounding stone and later as a cutting surface. Again, this fine-grained sandstone object was an ideal multi-purpose anvil and sharpening stone that saw considerable usage.

Conclusions

Earlier prehistoric features in Lowpark reflect earlier phases of use of the site but are unlikely to have had any relevance for the early medieval inhabitants. Charcoal from a post-hole at the entrance to Palisade 2 produced a later Iron Age date. This may have been residual charcoal from previous occupation or earlier use of the site; however, it is more likely to be derived from re-used timbers or a result of the 'old-wood effect'. A fill of Palisade 2 produced an early medieval date, pre-dating Palisade 1 and the outer ditch, and the Palisade 2 enclosure was respected by Palisade 1. Most of the activity associated with the enclosures dates to the early medieval period. Although not strictly a ringfort before the construction of the outer ditch, it encompassed many of the features normally associated with ringforts and probably functioned as an enclosed farmyard with a dwelling, outhouses, storage, souterrains and, of particular interest, iron workshops. The economy was probably based on mixed farming, with an emphasis on cattle rearing and dairy and beef as the main products, but pig, sheep and crops were also important. The common factor for all phases of Lowpark was the well-drained, fertile soil, which was ideal for both agriculture and habitation.

Artist's reconstruction of ironworking structure based on the excavation of Ironworking Area 4 at Lowpark (Fergus Niland)

5
A BIVALLATE RINGFORT AT CLOONAGHBOY

Richard F Gillespie

Introduction

This enclosure was a known site recorded in the Record of Monuments and Places (Fig. 5.1, MA062-058). No surface trace of the enclosure was visible before the excavation (Pl. 5.1), but the site was recorded on the first-edition Ordnance Survey map (1838) (Fig. 5.3). The excavation uncovered the remains of a large bivallate ringfort with an internal diameter of 30–36 m. It had two substantial enclosing ditches and a drystone-built souterrain. The ringfort had been the subject of intense disturbance from pre-1830s road building, subsequent agricultural cultivation, quarrying, field boundary construction and levelling. No upstanding earthworks are depicted on the third-edition (1921) OS 6-inch map (Fig. 5.2). Consequently, finds and features associated with the enclosing ditches and the souterrain, some *ex situ* artefacts and animal bone were the only surviving remains.

Location

The site was 2.5 km south-east of Swinford, Co. Mayo, on a flat terrace near the top of an east-facing gravel hill, at an altitude of 90 m OD. This hill rose to a peak of 96 m to the west of the site and dropped away steeply to the north, east and south. The centre of the enclosure was on the highest point of the terrace. The enclosing ditches were cut into the slope to the north and south and at the base of the natural rise to the west. The terrace had a gradient of between 1:2 and 1:6.

Pl. 5.1—Cloonaghboy I: pre-excavation view of site, looking east.

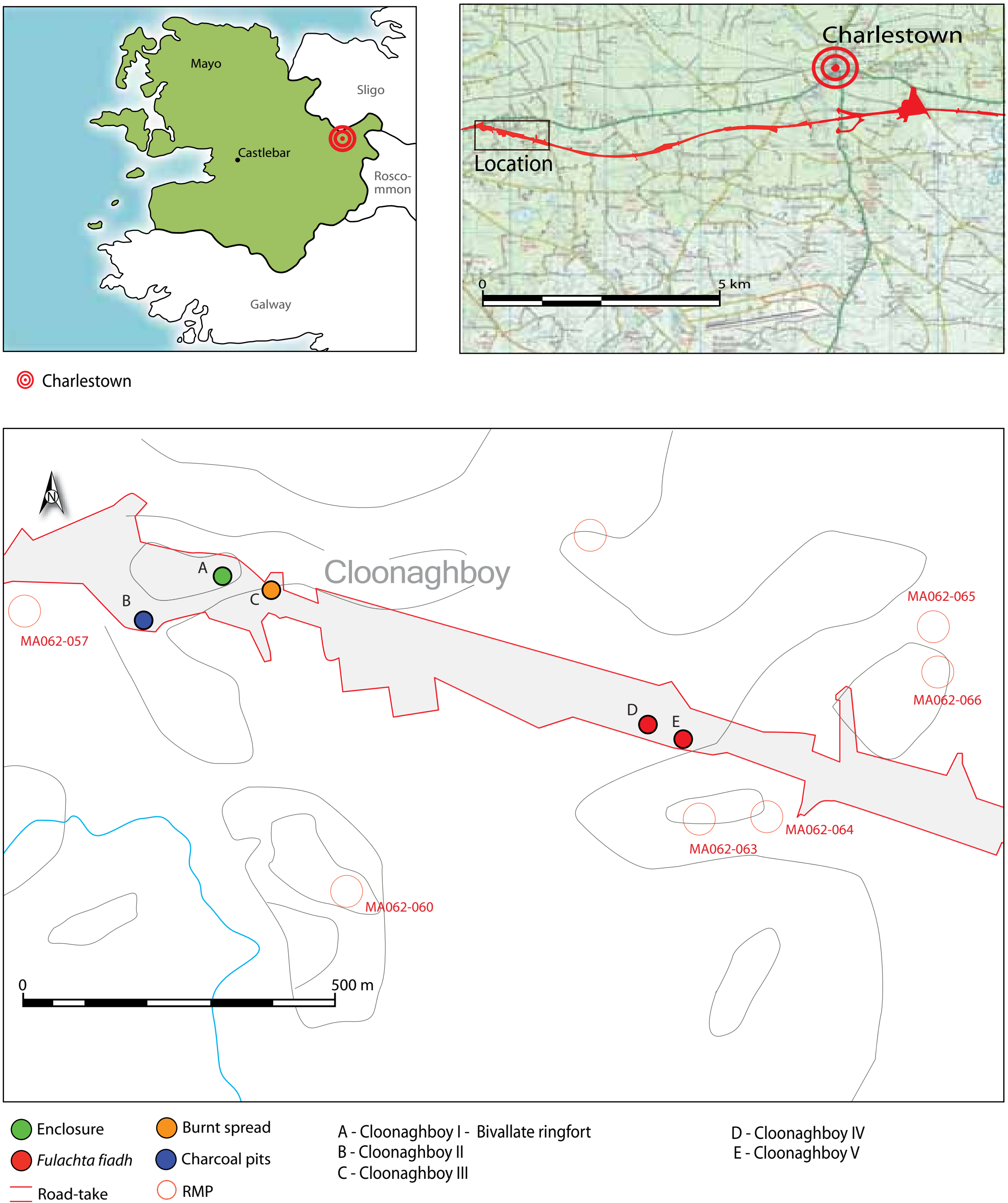


Fig. 5.1—Cloonaghboy I: site location map (extract from OS Discovery Series map).

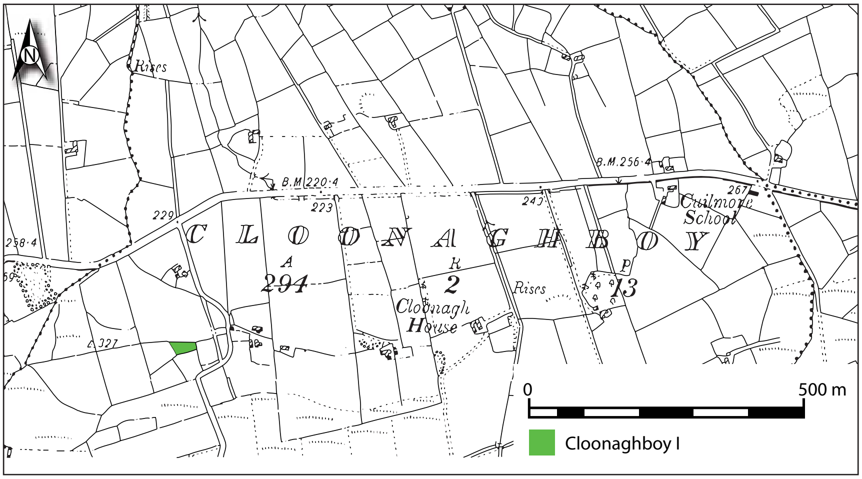


Fig. 5.2—Cloonaghboy I: site location indicated on third-edition OS 6-inch map of 1921). Note realignment of field boundaries to incorporate site as a small field.

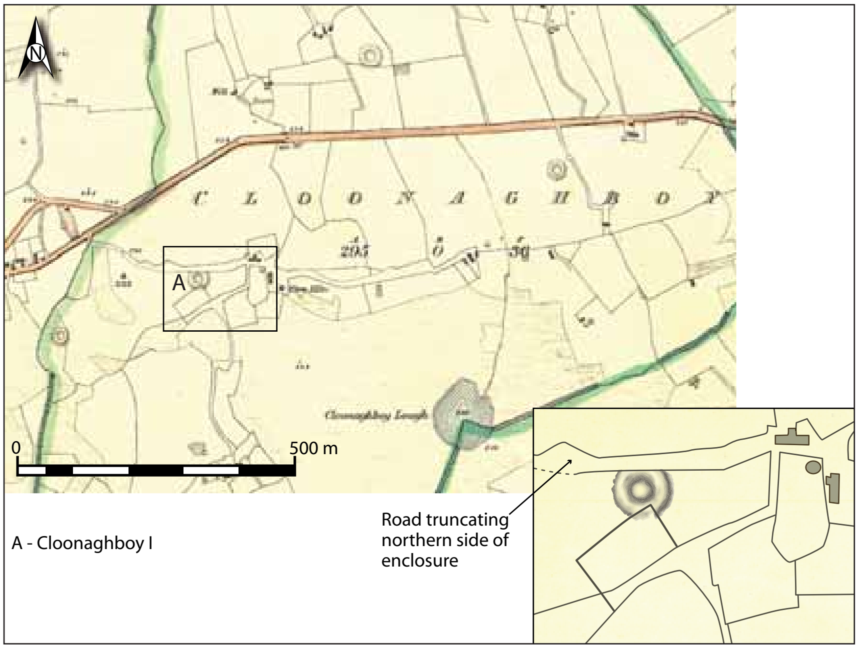


Fig. 5.3—Cloonaghboy I: site location as represented on first-edition OS 6-inch map of 1838. Note road extending from main road at Cloonlara in the west and continuing east across north side of site to Cloonaghboy house.

The enclosure was in a commanding position with panoramic views of the surrounding lowland to the north, east and south. The peaks of Knocknarea, Knocknashee and Ben Bulben, Co. Sligo, were visible to the north-east, while the peaks of Mullaghnoe and Kilgariff, Co. Mayo, were visible to the east and south-east.

The wider Cloonaghboy area has a rich archaeological heritage. There were at least seven other enclosures within a 1-km radius of the site. Two wooden vessels were recovered in 1932 from Cuilmore, 1 km east of the site. The Cloonlara shield, one of the most famous Late Bronze Age artefacts, was found in 1934 c. 1 km west of the site. The wooden shield was made of alder, just over 300 mm in diameter, and dated to c. 1200 BC (Waddell 1998, 242).

Archaeological testing before the N5 Charlestown Bypass identified two further areas of archaeological significance in Cloonaghboy. A series of pits (Cloonaghboy II) dating to AD 1418–1445 (GrN-30844) were identified at the base of the gravel hill, 175 m to the south-west. These may have been hearths or charcoal-production pits. A spread of burnt stone and charcoal (Cloonaghboy III) dating to AD 895–1148 (GrN-30845) was also found at the base of the hill, 100 m to the south-east, at the margins of the peaty lowland. This spread was of similar composition to a typical *fulacht fiadh* mound but did not have an associated trough. Brindley and Lanting (1990, 56) concluded from available evidence in 1990 that, with some exceptions, *fulachta fiadh* date to the Bronze Age and to a well-defined span within that period. Edwards (1990, 66) suggests that some early medieval use of *fulachta fiadh* cannot be ruled out. It is not possible to ascribe a definite function to the burnt spread at Cloonaghboy III, but it did involve heated stone and resembled a *fulacht fiadh* mound.

Dating

It is widely accepted that most ringforts date from the Early Christian period, despite wide date ranges produced from a few excavations (Stout 1997, 23). Radiocarbon dates were returned for four charcoal samples from the Cloonaghboy I excavation: three from oak and one from alder. The fills of the two ditches included small amounts of charcoal that produced early medieval dates. These fills may have slumped or been backfilled from the occupation of the site. Sealed samples from two post-holes at the base of the souterrain also produced early medieval dates (Table 5.1). This places the use of the ringfort in the early medieval period, within Stout's chronology for ringforts, from the beginning of the seventh century to the end of the ninth century AD (ibid., 24), and contemporary with the Lowpark enclosure 7 km to the west (Chapter 4). The burnt spread at the base of the hill produced a slightly later date but may have been contemporary with the final occupation of the site.

Table 5.1—Radiocarbon dates from the Cloonaghboy bivallate ringfort.

Context	Lab code	Radiocarbon date	Calibrated date	Species
Fill of souterrain post-hole, C83	GrA-35590	1265±30 BP	AD 666–860	Oak
Fill of souterrain post-hole, C82	GrA-35588	1365±30 BP	AD 610–762	Oak
Fill of inner ditch, C54	GrA-35570	1290±30 BP	AD 666–773	Alder
Upper fill, outer ditch, C46	GrA-35587	1430±35 BP	AD 565–660	Oak

Description

All surviving features were dug into the natural subsoil, which included boulder clay (C3), gravel (C4 and C28) and compact, grey, sandy silt (C60) in the north-west. Full stratigraphic details of these contexts are in the report and context register on the attached disk, as they are in relation to all sites discussed in this publication. The archaeological remains of this bivallate ringfort included two roughly concentric ditches, with some evidence for intermediary and inner banks. Part of a stone-built souterrain (Figs 5.4 and 5.9) was also extant. The outer (C57) and inner (C55) ditches were roughly concentric and merged in the south-east to the south of the entrance. A break in the ditches in the east represented the entrance. The remains of a pre-1830s roadway (C5), marked on the first-edition OS 6-inch scale map (Fig. 5.3), were present in the northern half of the site.

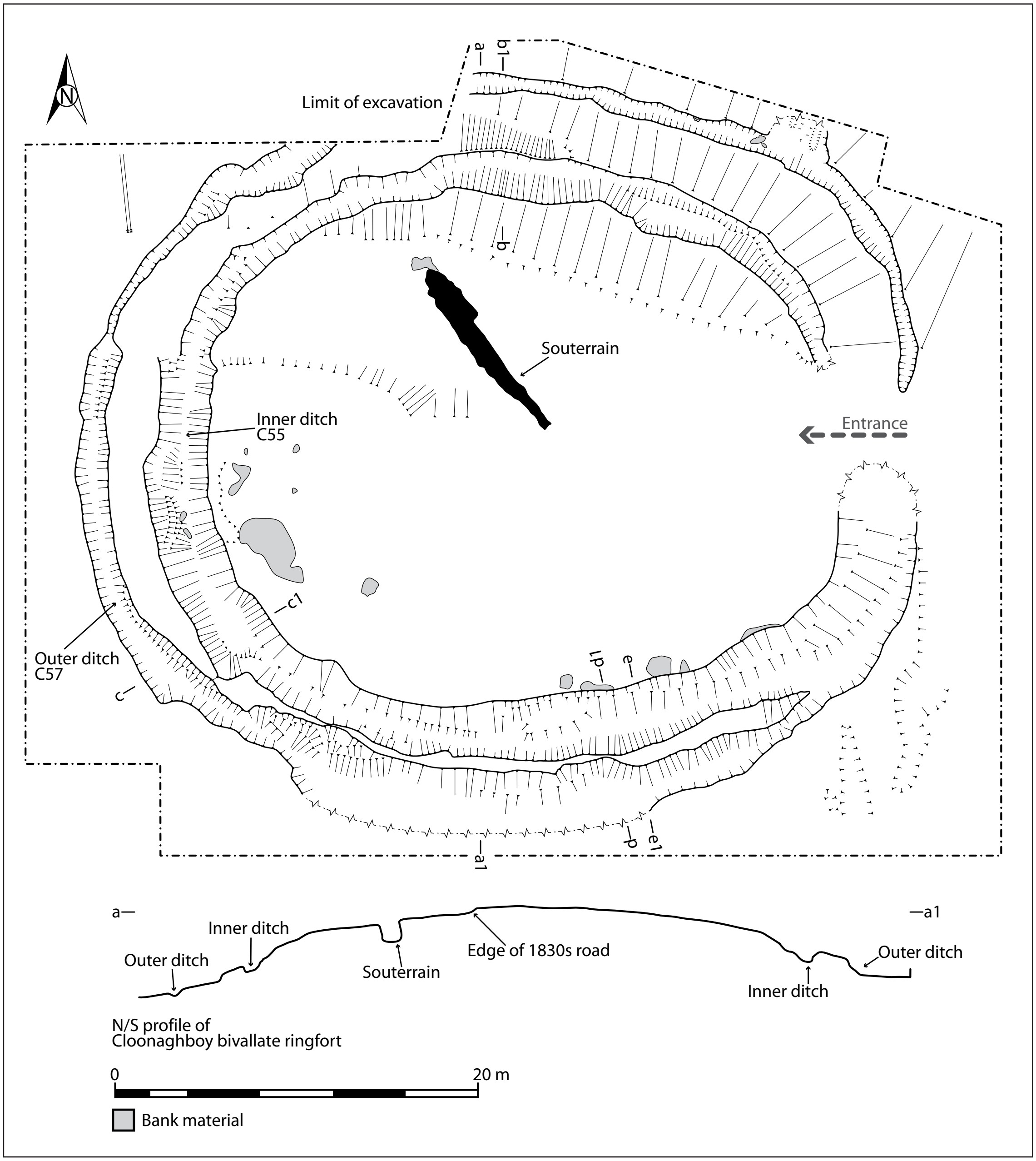


Fig. 5.4—Cloonaghboy I: general post-excavation plan and north–south profile of the ringfort.

Pl. 5.2—Cloonaghboy I: enclosure showing fully excavated ditches, looking east.

The outer ditch

The outer ditch (C57) was oval, enclosed an area measuring 1,319 m^2 (40 m north–south by 42 m east–west) and was 2.2 m wide and 1.2 m deep (maximum). It was much narrower and shallower to the east, toward the entrance. Elsewhere the ditch was consistent in dimensions and had a V-shaped profile with steeply sloping sides and a rounded base. It was extant for 90 % of its circumference, with a 4.5 m-wide break in the east, which was probably the entrance. The distance between the inner and outer ditches was 1.2–4.5 m. The maximum distance was in the north-east, where the slope was extremely steep. The outer ditch merged with the inner ditch near the south-eastern terminus. The upper levels of the ditch to the north were truncated by the later road (C5).

The outer ditch had four distinct fills (C46, C58, C59 and C65), with redeposited layers of boulder clay (C3 and C28) and slumped bank material (C19). The lower fills at the base and sides of the ditch represented collapse from the banks and sides of the ditch and comprised clay, gravel and sandy silt. The ditch was mostly filled by light brown, sandy silt (C46), which included more gravel in the west and south-west. It had a maximum thickness of 0.58 m and at its most shallow, in the north-east and east, was 0.32 m thick. Oak charcoal from this fill produced a radiocarbon date of AD 565–660 (Table 5.1). Two pieces of worked chert, including a plano-convex knife (04E1341:46:28; Pl. 5.16; Appendix III), were recovered from this fill in the north-west of the site. The ditch was truncated by the roadway (C5) and a later furrow in this location. In the west, where the outer ditch was cut into a localised gravel deposit (C28), there was a 0.28 m-thick basal fill (C58) consisting of mid- to dark brown, loose, gritty silt with inclusions of sub-rounded stones

(0.08–0.05 m diameter). This variation in the basal fill is likely to be related to the localised variation in the subsoil. The basal fill was overlain by the main, sandy silt fill (C46).

The outer ditch fills to the south had a more complex stratigraphy. Most of the various fills were the result of bank slump into the ditch due to the steepness of the slope. The basal layer was bank slump (C19) from the edge of the outer ditch; it consisted of moderately compact, silty sand and lay toward the centre of the southern section of the ditch. C19 was in turn covered by the main fill (C46). The western part of this southern section had redeposited topsoil (C2) overlying C46. The upper levels may be the result of relatively recent agriculture or reclamation. Similar stratigraphy also occurred in the south-east and east of the outer ditch.

The inner ditch

The inner ditch (C55) enclosed an area of 848 m^2, measuring 36 m east–west by 30 m north–south, and was also extant for 90 % of the circumference of the fort. It merged with the outer ditch in the south-east. The upper levels were also truncated by the 19th-century roadway (C5) in the north.

The ditch had an average width of 2.1 m (reaching a maximum of 5 m) and a depth of 1.15 m. The outer side was stepped at the top in the west, and the inner side was sloped gradually, except in the north, where, owing to the steep slope, the sides were extremely steep. The outer edge was uniformly sloped at the top and steep near the base. The break of slope to the base was gradual everywhere except in the north, where it was more abrupt and had an irregular V-shaped profile.

The inner ditch (C55) had five discrete fills (C20, C54, C61, C62, and C63) reflecting episodes of slump and backfilling. A basal fill (C63) of loose, light to mid-brown, silty sand with inclusions of small pebbles was present from the north to the east of the site for 10 m, with a thickness of 0.15 m, and was likely to have been slumped bank material. It underlay a larger deposit of yellowish-brown, sandy clay (C54) that was present throughout the inner ditch and may have been the result of deliberate infilling. Alder charcoal from C54 produced a radiocarbon date of AD 666–773 (Table 5.1). The main upper fill (C20) was moderately compact, mid-brown to yellowish-brown, silty clay, which had a maximum width of 3.8 m and a maximum thickness of 0.6 m and contained modern finds. There was clear evidence for slump from the bank to the south. A lithic fragment (04E1341:20:32) and a degraded iron knife (04E1341:20:101; Pl. 5.18) were also included in this upper fill.

This deposit was probably the result of recent infilling or levelling. Slumped bank material (C63) occurred as a basal fill in the west. This was overlain by the main (C54) and modern (C20) infills.

As with the outer ditch, the stratigraphy of the inner ditch became more complex to the south. Occasionally grey, sandy silt (C60) and small deposits of natural, orange–brown sand (C3) occurred at the base. These deposits probably collapsed from the bank before the ditch was infilled. C54 was the main lower fill of the inner ditch, with a maximum thickness of 0.90 m. There was a layer of collapsed stone (C59) in the west and south-west, which was 6 m long, 1.20 m wide and 0.25 m thick. These stones appeared to have slipped from the western side of the inner ditch or bank or, alternatively, may have been a revetment or wall on top of the inner bank related to modern field boundaries. This was overlain by the general upper fill (C20). The south-west of the site had been severely disturbed in modern times, and this impacted on the stratigraphy in the ditch. The upper fill (C20) was interspersed with redeposited topsoil (C2). A small deposit of white, sandy clay (C22) from the inner bank was slumped against the base of the ditch. The mid-brown to yellow–brown, silty clay (C20) was the only bulk fill toward the east, and a layer of stones (C59) was slumped along the inner slope of the ditch.

Banks

The evidence for a bank between the outer and inner ditches, although slight, was consistent around the circumference of the ditch. Intense modern disturbance, including modern mechanical reclamation, had removed any trace of an upstanding bank. The excavation exposed a layer of bank material consisting of light brown to white, moderately compact, silty sand (C19), which occurred in patches at the inner edge of the outer ditch. Some bank material (C19) had slumped into the base of the outer ditch, and at the east of the site it underlay the upper fills of the inner and outer ditches (C20 and C46). It is difficult to estimate the original height of this bank. Moreover, the unstable nature of the gravel subsoil would have necessitated regular re-cutting to maintain the ditch. The excavated material would have been redeposited on the bank, adding to the height. It is likely, given the dimensions of the outer ditch and slumped bank material (C19) when compared to the dimensions of the inner ditch and inner bank material (C22; see below), that the inner ditch and bank were much more substantial than the outer.

There was similarly slight evidence for an inner bank: a consistent layer of light brown, sandy clay (C22) at the southern side of the inner ditch. As with the outer bank (C19), it is difficult to gauge accurately what this bank would have looked like when the site was occupied. It must have reflected the volume of material dug out of the inner ditch, allowing for a height of c. 1–1.5 m and a width of c. 2 m. As the inner ditch was deeper and wider than the outer ditch, it is likely that the inner bank comprised a larger volume of excavated material. The space between the ditches was more confined to the north and south and was on a steeper gradient. These ditches and banks must have been visually striking in the landscape.

Pl. 5.3—Cloonaghboy I: post-excavation view of inner and outer ditches at north of site, from the south-east.

Pl. 5.4—Cloonaghboy I: post-excavation view of inner ditch from the south-west.

Pl. 5.5—Cloonaghboy I: section of fills of outer ditch in the west.

Pl. 5.6—Cloonaghboy I: section through fills of outer ditch to the south.

Pl. 5.8 (above)—Cloonaghboy I: section through fills of inner ditch to the south-west.

Pl. 5.7 (left)—Cloonaghboy I: section through fills of inner ditch to the west.

Pl. 5.9—Cloonaghboy I: section through fills of inner ditch in the south.

Pl. 5.10—Cloonaghboy I: section of inner ditch fills in the north-west.

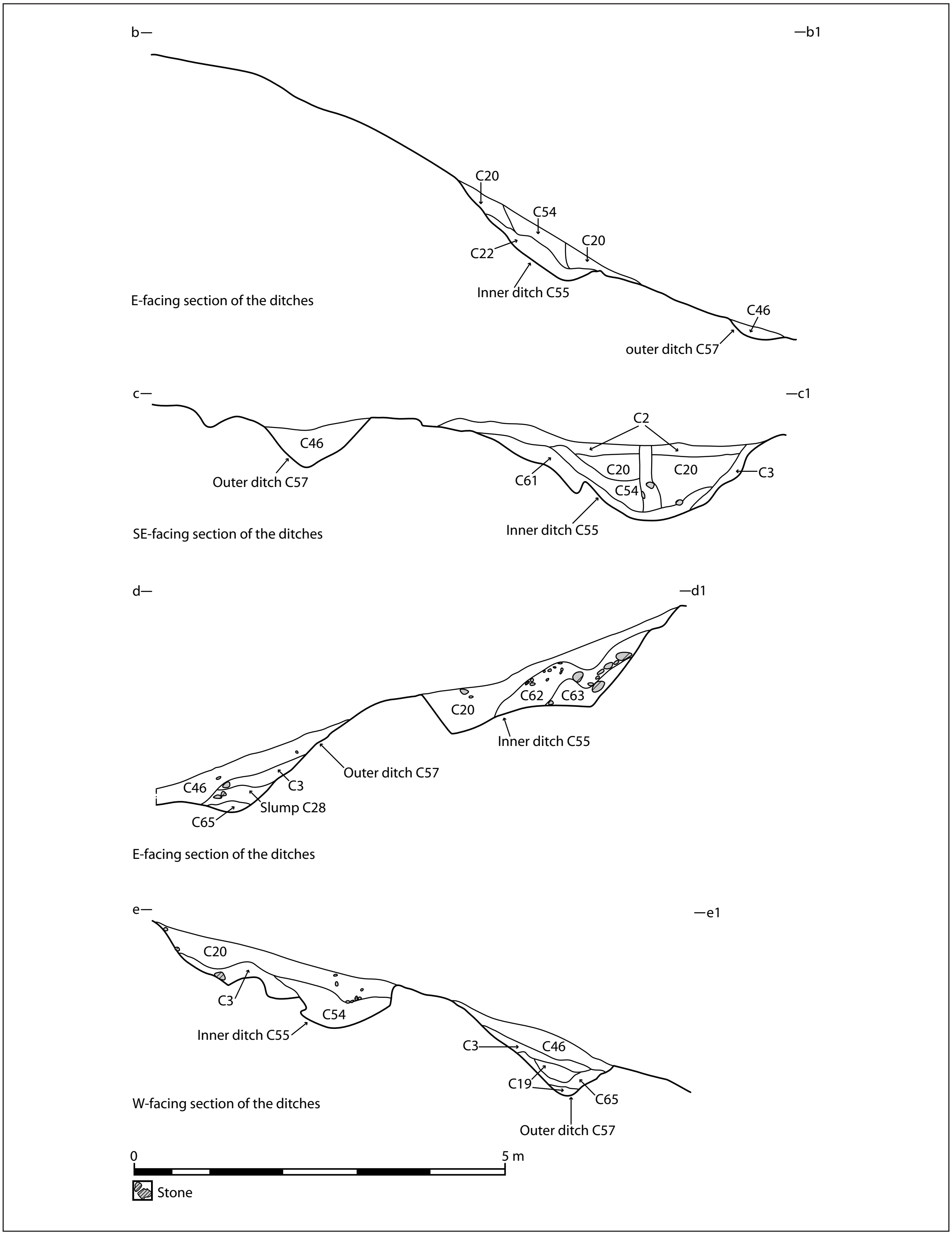


Fig. 5.5–8—Cloonaghboy I: sectional profiles of inner and outer ditches.

The interior

The area enclosed by the inner ditch, including the area taken up by the inner bank, measured 36 m east–west by 30 m north–south. The footprint of the bank had an estimated width of 2 m and would have enclosed a habitable area measuring 32 m by 26 m, or c. 653 m^2. The interior sloped slightly to the north and somewhat more steeply to the south. The main area of activity is likely to have been in the centre, at the brow of the gravel ridge. The souterrain, discussed below, extended NNW from the centre to the inner bank. There may have been one or more houses in the centre of the ringfort, with the souterrain extending northward. This would have been the primary habitation, and additional outbuildings, workshops and animal pens may have been present. As at Lowpark, it is likely that there was prolonged occupation of the Cloonaghboy ringfort, with successive phases of structures.

The interior of the site was severely disturbed by a combination of road building, quarrying, cultivation furrows and land reclamation. The roadway recorded on the first-edition Ordnance Survey map (Fig. 5.3) was identified as a metalled surface of moderately loose, rounded and sub-rounded stones (C5) set into the natural gravel (C4). The road was aligned east–west, but the main surviving portion was in the north-east quadrant, measuring 7.6 m east–west by 9.7 m north–south. The surface was 0.1 m thick and had been disturbed by later field boundaries and furrows. The topsoil (C2) immediately overlying the road included numerous modern finds, indicating continued disturbance of the area up to relatively recent times.

The centre of the site was the main area for quarrying, and large gravel deposits occurred near the surface. Quarrying had removed all archaeological features except part of the souterrain that survived because it was deep below the road surface. A quern-stone fragment (04E1341:73:67; Pl. 5.15; Fig. 5.10) was retrieved from the interior of the site, and a calcinated long-bone fragment from a medium-sized or large mammal and a gnawed and sawn long-bone shaft fragment, possibly a cow femur, were also recovered. This shaft fragment had been sawn across to remove the straight section of the shaft, and it is likely that this was a craftwork offcut (Appendix IX). Traces of early medieval domestic activity survived in this part of the site despite severe disturbance. The possibility that the site was multi-phased was suggested by dumped midden deposits in the souterrain after its abandonment.

The souterrain

The souterrain was on the north-west side of the interior of the ringfort, on a north-facing slope. It was oriented north-west/south-east and consisted of a linear trench in the natural subsoil (C3 and C4) with an opening to the north. The souterrain trench measured a maximum of 12 m north-west/south-east by 1.9 m north-east/south-west and was 1.1 m deep. The trench surface had been truncated by the roadway, and the southern 2.5 m of the souterrain was almost completely removed. The souterrain trench was linear and slightly curved at each end. In the north the west wall curved slightly to the west, and the south end curved slightly to the east. The trench was deepest and widest in the centre (1.1 m deep and 1.9 m wide) and shallowest at the ends (0.10 m deep and 0.85 m wide).

The trench sides were very steep to vertical. The base was flat and sloped down from the south

Pl. 5.11—Cloonaghboy I: souterrain during excavation, with quern-stone (04E1341:66:109) in foreground, looking north.

Pl. 5.13—Cloonaghboy I: view of the souterrain from the south.

Pl. 5.12—Cloonaghboy I: interior of souterrain, looking south.

to the centre, dropping 1 m over a length of c. 9 m to the deepest point. The base then rose gradually to the north, rising c. 0.2 m over the remaining 3 m. Two post-holes (C82 and C83) were situated at either side of the northern terminus, 0.4 m apart, and were partly covered by the stone walls (C66). The post-holes were sub-circular, measuring 0.4 m diameter, and 0.29–0.32 m deep. They had steep sides and were filled with mid-grey/brown silt with oak charcoal inclusions. The eastern post-hole (C83) had a pointed base, and the western one had a flat base; both were cut directly into the natural gravel (C4). They are likely to have held structural timbers forming an entrance feature, possibly acting as door-jambs or structural supports similar to those in Lowpark (Chapter 4).

This northern end coincided with the projected location of the inner bank of the enclosure. This suggests that the souterrain may have been partly incorporated into the inner bank. Souterrains at enclosed sites may either occur in the interior of the enclosure or be incorporated into the bank (in a ringfort) or wall (in a cashel) of the enclosure (Clinton 2001, 47). If the latter is the case, the post-holes may be a division between the sub-surface and bank elements of the structure, with an alternative entrance in the centre of the ringfort.

A thick, compact layer of mottled, grey/brown/orange, silty clay (C81) at the base of the souterrain in the north end partly overlay the two post-holes (C82 and C83). This deposit may have been placed deliberately over the natural gravel (C4) as a solid entrance; however, it is more likely to represent in-wash at the open entrance. The layer formed a step at the north end of the souterrain.

The souterrain was lined with roughly coursed drystone walls (C66), with severe disturbance to the north end of the east wall and the south end. The walls were back-built against the sides of the souterrain trench. At the deepest point, near the centre of the souterrain, the walls survived for up to 10 courses, but only occasional basal stones survived at the southern end. The coursing generally consisted of large, flat or sub-rectangular stones laid horizontally and splayed slightly outward from the base to the upper levels. Occasionally, stones were placed vertically or at an angle in the wall. The lining was narrowest at the terminals (0.4 m at the north end and 0.5 m at the south) and widest at the centre (0.75–1 m). The roof lintels did not survive in situ, although occasional stones found in the upper fill (C68) were certainly large enough to have served as lintels. The largest of these (0.85 m by 0.65 m by 0.15 m) occurred 3 m from the southern terminus. It is also possible that the roof was of timber and had rotted away.

The souterrain contained four distinct fills (C71, C70, C69 and C68) and random stone (C80). The basal fill consisted of loose, charcoal-flecked, mid-brown, gritty sand and silt (C71). One cow and one pig bone and an iron knife fragment (04E1341:71:77; Pl. 5.18) were found in this context. The layer may have been a combination of the original floor collapse and silting up after the souterrain went out of use. The subsequent fills represent various stages of souterrain collapse after its abandonment. A secondary fill of loose, mid-brown, gritty sand with occasional inclusions of charcoal (C70) overlay the basal deposit (C71). The majority of the collapsed random stone (C80) at the southern end of the souterrain was interspersed in this fill. Two pig bones and two fox bones were retrieved from C70. Loose, dark brown clay silt with moderate inclusions of small pebbles (C69) overlay the secondary fill (C70) and was concentrated mostly in the centre of the souterrain.

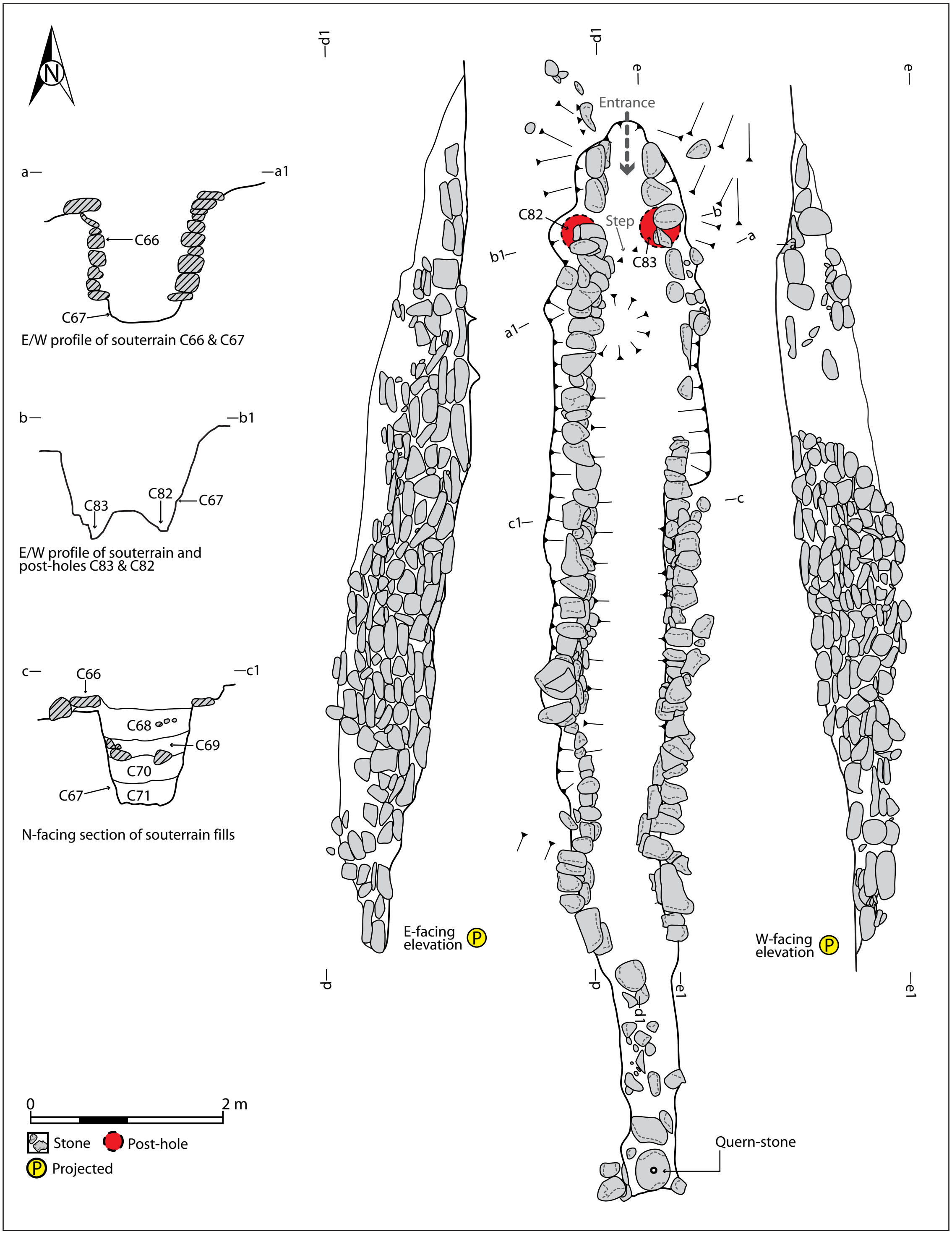


Fig. 5.9—Cloonaghboy I: plan of souterrain with wall elevations and profile.

One cow bone, two sheep/goat bones, one pig bone, one badger bone and an unidentified iron object (04E1341:69:19; Fig. 5.10) were recovered from this fill.

The upper fill (C68) consisted of moderately compact, brown, gritty silt with inclusions of small pebbles and some stone collapse (C80). A total of 14 cattle bones, six sheep/goat bones, one pig bone, one badger bone, an antler pin (04E1341:68:55; Fig. 5.10; Pl. 3.16) and a corroded iron knife (04E1341:68:70; Fig. 5.10; Pl. 3.16) were found in C80. The iron knife was between two building stones in the north end of the west wall of the souterrain. A granite quern-stone (04E1341:66:109; Fig. 5.10; Pl. 3.15) was found at the disturbed southern terminal of the souterrain, on the gravel base.

A significant number of bones were recovered from the souterrain fills. Of the countable elements from the Cloonaghboy site, 54 came from the souterrain, mainly from the upper fill (C68). This suggests that they represent a post-abandonment phase when the souterrain was used as a midden, albeit during the continued occupation of the ringfort. Badger and fox bones in the fills suggest that these animals used the souterrain as a den (Appendix IX).

Most of the finds from this ringfort were from the souterrain fill and must have been deposited after its use period. They may be part of the occupation soil from within the ringfort that collapsed or was used to infill the souterrain. Alternatively, they may relate to the later use of the souterrain as a midden while the ringfort was still occupied.

Discussion

The choice of location for the ringfort at Cloonaghboy was undoubtedly due to the desire to have access to and control fertile land, the defensive siting and possibly the position on an east–west routeway. As previously discussed in Chapter 4, the north-east Connacht region has the highest density of ringforts in Ireland (Stout 1997, 93). Cloonaghboy is at the southern edge of this concentration and must have been part of a greater network and hierarchy of early medieval settlement.

The ditches, souterrain and finds provide the basis for an interpretation of the site and how it functioned when in use. Radiocarbon determinations from the main features place the ringfort firmly in the early medieval period, with an overall date range spanning the sixth to the ninth century. The extant archaeological evidence indicates that the enclosure was a substantial bivallate ringfort. It had a drystone-built souterrain, which contained early medieval artefacts that suggest the ringfort had a domestic function. Interpretation of the position and nature of internal structures in the enclosure remains speculative, as later disturbance removed much of the evidence for occupation. This is also true for the determination of the lifespan of the ringfort.

It is generally agreed that ringforts were essentially enclosed farmsteads or homesteads. The occupants subsisted on a mixed economy dominated by cattle rearing. Limited faunal remains from both Cloonaghboy and Lowpark confirm this economy, and the cereal-drying kiln at Ballyglass West, potentially associated with the Lowpark site, indicates cereal processing. The drumlins of central Mayo were a positive attribute in the minds of ringfort builders (Stout 1997, 74). The well-drained sand and gravel hills were suitable both for tillage and for pasture. Stout (ibid., 94) also suggests that the high level of population in north-east Connacht may be based on a large prehistoric population in the Sligo area that expanded in the early medieval period. Evidence uncovered during this scheme indicates a continuity of habitation in the general area from the Early Neolithic period to the Bronze Age. It is likely that there was a substantial indigenous population that formed the basis of the early medieval occupation of the landscape.

The enclosure at Cloonaghboy was a substantial bivallate ringfort on an elevated location surrounded by numerous other enclosures. There are 11 known enclosures within a 1-km radius of Cloonaghboy. These were all on areas of dry, higher ground overlooking low-lying peat. The enclosure excavated at Cloonaghboy was at a higher altitude than any of the surrounding enclosures. Another bivallate enclosure (MA062-103) is situated just over 1 km south-east of the Cloonaghboy ringfort. It occurs in a similar location and is visible from Cloonaghboy. This may indicate a system of land organisation between groupings of the smaller, univallate ringforts in the vicinity of more prominent, bivallate examples, with the second bank and ditch acting as a recognised indicator of status. As part of a larger settlement network, the inhabitants of Cloonaghboy and those of the neighbouring ringforts would have been connected by kinship and clientship, with land owned by various family groups in this hierarchical society based on the *tuath*.

Early law-texts indicate that the basic territorial unit was the *tuath* ('tribe' or 'petty kingdom'). On the evidence of genealogies and other sources, it has been calculated that there were probably 150 kings in Ireland at any given date between the fifth and the 12th century. Each of these kings would have ruled over his own *tuath*, and many would also have been overlords of the *tuatha* of other kings. Any estimate of the total population of Ireland is, of course, highly speculative, but a figure of under half a million has been proposed. On this basis, the average *tuath* could be reckoned to have contained c. 3,000 men, women and children (Kelly 1988, 3–4). The strictly structured society evident in the early texts must reflect to some degree the society in which the Cloonaghboy ringfort existed.

Much of the surrounding landscape is now peat and would have been wetland, lake or marshland when the enclosure was occupied. This would have impeded access to the ringfort and added to the defensive aspect. The natural defences of the enclosure, sited on the crest of a steep hill, were formidable in this landscape. The ditches and associated banks were for defence but also deliberately visible in the landscape. Substantial banks, possibly topped with a palisade, probably sheltered the interior of the enclosure from the elements.

Another factor in relation to the siting of the Cloonaghboy ringfort may be its location along a routeway. It was constructed near the highest point on a drumlin ridge flanked to the north and south by low-lying ground and peat basins. Before construction of the modern Swinford–Charlestown road, this ridge is likely to have been the easiest east–west route. A roadway on a similar east–west line is indicated on the first-edition OS maps and was also identified on the northern side of the ringfort during excavation. It is possible that this road followed the course of an earlier route passing close to the ringfort. This would have strategic and economic implications for the occupiers of the ringfort and may have been a major factor in the choice of location.

The two ditches were largely intact because of their depth, and the remaining bank material

Pl. 5.14—Cloonaghboy I: stone deposit in inner ditch fill.

helped to identify the location and size of the banks. Given the depth of the ditches, it can be estimated that the outer bank would have been c. 1m high, with the inner bank more substantial, at least 1.2 m high. The numerous deposits of mixed slump material and the unstable nature of the subsoil in the ditches suggest a constant need to re-cut the ditches. Stone deposits in the ditch fill may represent a collapsed revetment. The inner side of the bank at Letterkeen ringfort, Co. Mayo, was revetted by a wall of stones (Ó Ríordáin & MacDermott 1952, 97). The loose, sandy clay excavated from the ditches to form the inner bank in Cloonaghboy must have been prone to collapse, and a revetting wall would have been useful to mitigate this.

The 11.5 m gap in the double ditch and bank arrangement at the east was the most likely entrance. The gradient to the north and south was too steep to allow access and transit across the rise to the west. The eastern side of the site was the most accessible, and this position afforded the best view of the surrounding landscape. Intense disturbance in this area removed any further evidence for an entrance.

Although the disturbance of the interior of the site makes any kind of detailed discussion difficult, evidence from the ditches and the souterrain and the finds suggest that some form of domestic structure(s) existed in the interior. Many internal ringfort structures that functioned as

Pl. 5.15—Cloonaghboy I: quern-stone (04E1341:66:109) and quern-stone fragment (04E1341:73:67) (photo: Jonathan Hession).

domestic dwellings were circular, wicker or post-and-wattle buildings, with structural posts also acting as roof supports (Edwards 1990, 22). The most likely location for such structures was near the centre of the site, to the south of the souterrain. In Cloonaghboy this location was reasonably sheltered from the rise to the west, and the central location was furthest from the perimeter of the enclosure and the least vulnerable to attack. The central area was, unfortunately, the most severely quarried part of the interior, and the remainder of the interior did not produce any archaeological features. Many excavated ringforts do not, in fact, have extensive enclosed remains. Structures may have had shallow foundations that do not survive in the archaeological record. In addition, the original surface level of the Cloonaghboy site and the extent of surface truncation by quarrying are unknown.

The souterrain was the only substantial, partly intact, internal feature, and it is possible to establish its morphology. The northern terminus adjacent to or within the inner bank may have been an entrance feature from the interior of the ringfort or a small extension or chamber constructed within the bank. The west side of the entrance curved to the west and may have been part of a chamber or entrance feature. The wall was insubstantial here, and little evidence survived to confirm an entrance or chamber. The post-holes (C81 and C82) may have held door-jambs for either an entrance or an accessway to a chamber. A similar arrangement of post-holes and a step occurred at the souterrain entrance in Letterkeen ringfort. This souterrain had similar dimensions

Pl. 5.16 (above)—Cloonaghboy I: prehistoric plano-convex knife (04E1341:46:28) and medieval iron knife (04E1341:68:70) (photo: Jonathan Hession).

Pl. 5.17 (left)—Cloonaghboy I: antler pin (04E1341:65:55) (photo: Jonathan Hession).

Pl. 5.18 (below)—Cloonaghboy I: iron knife fragments (04E1341:20:101 and 71:77) from souterrain and inner ditch fills.

but had probably been wood-lined rather than drystone-lined (Ó Ríordáin & MacDermott 1952, 100–2). It is possible that the post-holes pre-date the stone lining and were from an earlier, wood-lined phase. Disturbance to the south removed any potential entrance feature here, but its location suggests that access was from a central house. The location, extending from the centre of the enclosure to the perimeter, parallels the location of Souterrain 2 in Lowpark (Chapter 4).

The souterrain trench was lined on both sides with roughly coursed drystone walls that were back-built against the trench sides. The roof did not survive *in situ*, but collapsed stones in the fill suggest lintels or capstones. The walls were splayed outward toward the roof from the centre, possibly to prevent the sides from collapsing. It is unlikely that the souterrain was substantially

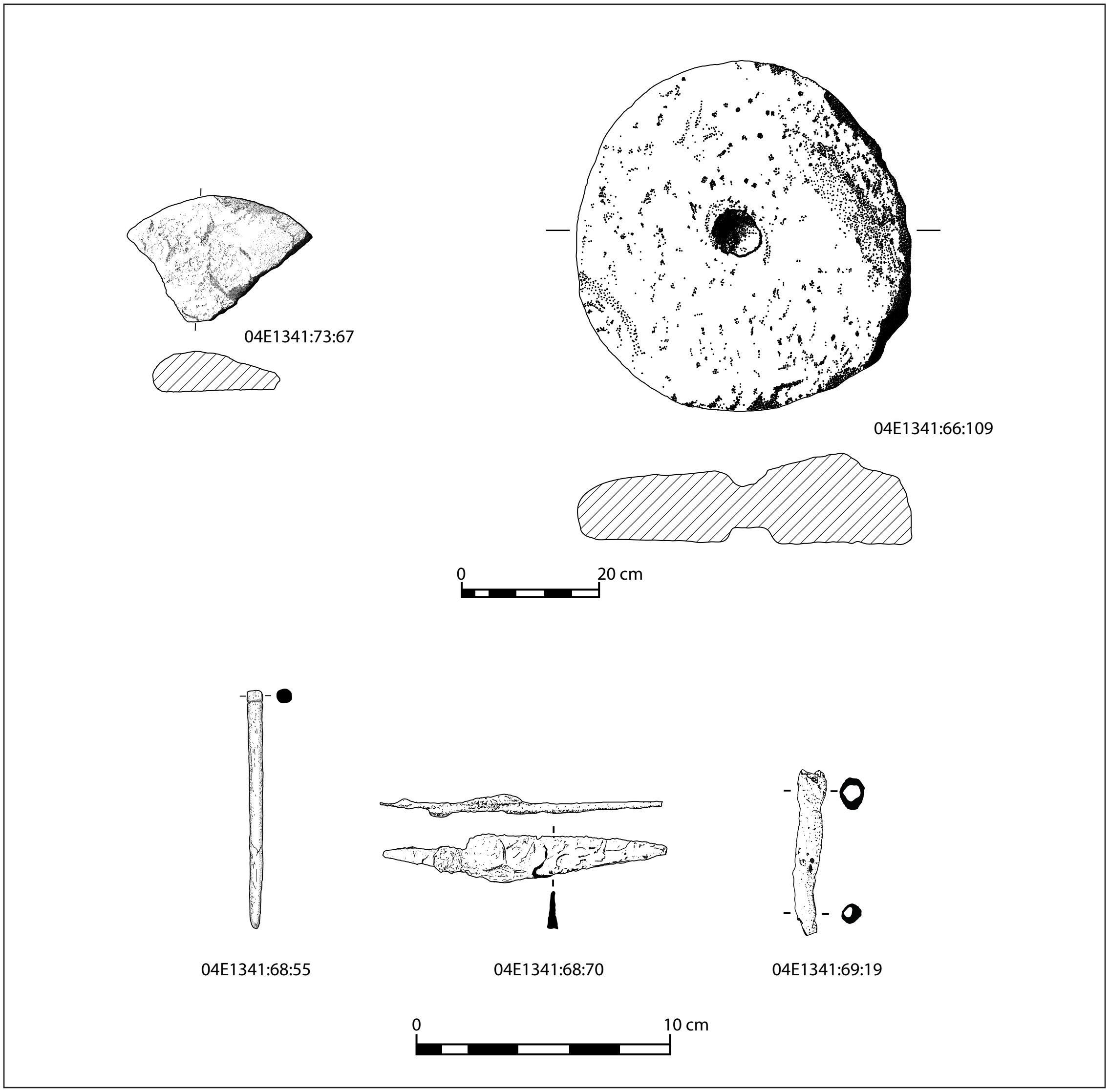


Fig. 5.10—Cloonaghboy I: (top) quern-stone fragment, quern-stone; (bottom) antler pin, iron knife and iron object.

longer than the surviving remains, and there was no further evidence for chambers or other features. The absence of a roof and the small number of suitable lintel stones in the souterrain fills suggest the possibility of a wooden roof that rotted away.

The souterrain floor followed the natural incline of the slope from south to north, with the lowest point near the centre. The floor rose from the centre to the exit in the north. If the souterrain had been used for storage, this dip in the floor would have helped to keep the south end dry. The presence of the quern-stones, an antler pin, animal bone and iron knives suggests a domestic function for the site, although these finds were in infill layers and deposited after the souterrain went out of use. The souterrain size was restricted and, if a refuge, it could have been used only by a limited number of people. This trench possibly post-dated the inner bank of the ringfort as it cut through some of the white subsoil associated with the remains of the northern end of the bank (C19). This suggests that the souterrain was a later feature cutting through an earlier phase of bank material or was extended into the bank at a higher level.

The finds, such as the antler pin, the quern-stones and the iron knives, relate to domestic activity. The presence of the souterrain indicates a need for the storage of foodstuff and possibly refuge. The faunal remains are also an indicator of diet, with cattle, sheep/goat and pig predominant and deer and horse represented. Dog/fox and badger bones are probably intrusive (Appendix IX).

There have been very few ringfort excavations in County Mayo that can be cited for comparative study. Ringfort excavations were carried out at Letterkeen (Ó Ríordáin & MacDermott 1952) and Ardcloon (Rynne 1956) in the 1950s. The Ardcloon ringfort was c. 20 km north-west of Cloonaghboy. This univallate ringfort was 40–45 m in diameter with a 4.5 m-wide entrance causeway to the east, similar to the Cloonaghboy entrance. Internal features included hearths and post-holes, and finds included iron nails, a knife fragment and a decorated bronze pin. A more extensive amount of animal bone was recovered from the site, including ox, pig, sheep, red deer, bird, dog, cat, boar and fish. This may be indicative of a slightly more varied diet than evidenced in Cloonaghboy, but better organic preservation is more likely. The site was dated to the seventh or early eighth century on the basis of available evidence (Rynne 1956).

Excavation at a cashel at Aghaluskey, near Turlough, Co. Mayo, produced a small faunal assemblage also including cattle, sheep/goat, pig and bird (Walsh 1988), and a ringfort at Lislackagh, Co. Mayo, was dated to the Iron Age (Walsh 1993). A seventh- to 10th-century date was produced from a univallate ringfort in Castlegar, near Claremorris, Co. Mayo (S. Zajac, pers. comm.), which had internal dimensions of 48 m by 40 m and contained a drystone-built souterrain. The site was partly excavated and produced a large faunal assemblage including cattle, sheep and pig from early medieval contexts (Zajac & Scully 2004).

In conclusion, location, morphology, radiocarbon dating, artefacts and faunal remains from the Cloonaghboy bivallate ringfort are all in keeping with the early medieval settlement as understood from early Irish texts and the archaeological record. The small number of ringfort excavations carried out in the general area does not allow for a localised comparative study or assessment of regional variations. Despite extensive disturbance, a representative sample of artefacts and faunal remains has provided an insight into the economy and life of the ringfort inhabitants consistent with what is currently known about settlement of the early medieval period.

6
RELICS OF THE IRISH RURAL LANDSCAPE

Agnes Kerrigan and Richard F Gillespie

Charcoal-production pits

A number of pits excavated on the N5 Charlestown Bypass (Fig. 6.1) are tentatively identified as charcoal-production pits. Although some of the more shallow ones may have been hearths, all had similar fills of charcoal and ashy layers. Ten sites were identified: six sites had one pit (Currinah III, Gortanure I, Cloonfane V and VII, Ballyglass West III and Sonnagh XII); one site had three pits (Ballyglass East); one site had four pits (Cashelduff I); one site had six pits (Cloonaghboy II); and one site had seven pits (Sonnagh XIII). Eight of the ten sites were radiocarbon-dated (Appendix

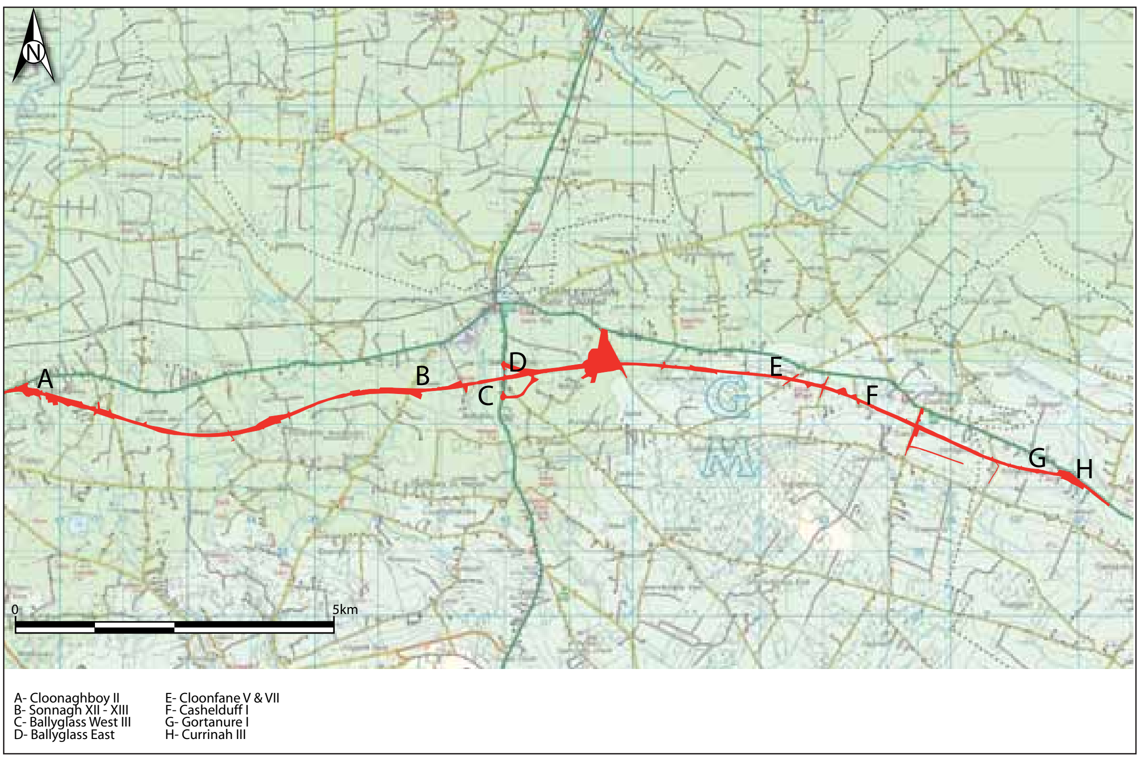


Fig. 6.1—Distribution map of charcoal-production pits along route of N5 Charlestown Bypass (extract from OS Discovery Series map).

A) to between the 11th and the 17th century AD, and nine of the sites are discussed below. The remaining site, Cashelduff I, is discussed in Chapter 2.

Cloonaghboy II, Co. Mayo

This site was 150 m south-west of the bivallate ringfort in Cloonaghboy (Chapter 5), in low-lying, well-drained pastureland. Six pits and one small burnt spread were excavated here. The area had been disturbed by agricultural furrows, resulting in truncation of the upper levels of several of the pits.

Pit 1 (C3) was sub-oval, measuring 0.50 m north–south by 0.42 m east–west, and 0.07 m deep, with concave sides and a flat base. It had a single fill of black, charcoal-rich, silty clay and was truncated by a furrow on the northern edge. Pit 2 (C6) was sub-circular, measuring 1.20 m east–west by 1.15 m north–south, and 0.17 m deep, with concave sides and an uneven base (Pl. 6.1). Oxidisation was recorded on the base, suggesting *in situ* burning. The pit had a single fill of mottled, orange, charcoal-rich, silty clay, with occasional stones.

Pit 3 (C7) was circular, measuring 0.60 m in diameter, and 0.08 deep, with a flat base. Oxidisation recorded on the base of the pit suggested *in situ* burning. The pit had a single fill of charcoal-rich, silty clay with occasional stones. The west side of the pit was truncated by modern

Pl. 6.1—Cloonaghboy II: post-excavation view of Pit 2.

disturbance. Pit 4 (C8) was sub-circular, with a diameter of 0.76–0.85 m, and 0.02 m deep, with a flat base. It had a single fill of charcoal-rich, silty clay with ash inclusions. The west side of the pit was truncated by modern disturbance. Pits 5 and 6 abutted each other and were probably part of a single feature. Pit 5 (C9) was circular, with a diameter of 0.93 m, and 0.06 m deep, with vertical to concave sides and an uneven base. Pit 6 (C10), to the east, was oval, measuring 1.60 m east–west by 0.98 m north–south, and 0.17 m deep. These pits were filled with charcoal-rich, sandy silt with occasional stones. A radiocarbon date of AD 1418–1445 (GrN-30844), was returned from oak charcoal from the fill of Pit 2 (C6).

Sonnagh XII, Co. Mayo

Sonnagh XII was 150 m west and 40 m south of Sonnagh XIII, on dry, well-drained ground that sloped south into blanket peat. A small, sub-circular pit (C3), measuring 1.54 m east–west by 1.40 m north–south and 0.26–0.38 m deep, had sides that varied from vertical to concave, with a concave base (Pl. 6.2). The pit had three fills. The basal fill (C6) was a 0.06 m-thick layer of charcoal sealed by a 0.12–0.34 m-thick layer of charcoal-rich, silty clay (C5), and a layer of stones overlay this. The upper fill (C4) was a 0.02–0.08 m-thick layer of whitish-grey ash and was concentrated on the north side of the pit. This pit may have been related to seven pits in Sonnagh XIII (see below).

Pl. 6.2—Sonnagh XII: view of west-facing section of pit (C3) and fills (C4–C6).

Sonnagh XIII, Co. Mayo

Seven pits were excavated in this area. Sonnagh XIII was 259 m west of the Lowpark complex and situated on similar ground to Sonnagh XII.

Pit 1 (C301) was oval, measuring 2.40 m east–west by 2.70 m north–south, and 0.05–0.17 m deep, with concave sides and a flat base. It had a single fill of charcoal with inclusions of sandy silt. Pit 2 (C302) was sub-circular, measuring 0.85 m north–south by 0.64 m east–west, and 0.05 m deep, with a concave profile. It had a single fill of charcoal with inclusions of silty sand. Pit 3 (C303) was sub-circular, measuring 1.90 m east–west by 1.50 m north–south, and 0.60 m deep; it extended south beyond the road-take and was only partly excavated. The basal fill (C305) was a 0.12 m-thick layer of pure charcoal with similar dimensions to the pit. The upper fill (C304) was a 0.48 m-thick layer of charcoal-rich, silty sand, with small stones recorded at the base of the fill (Fig. 6.2). A radiocarbon date of AD 1405–1460 (GrA-35151) was returned from oak charcoal from the basal fill (C305).·

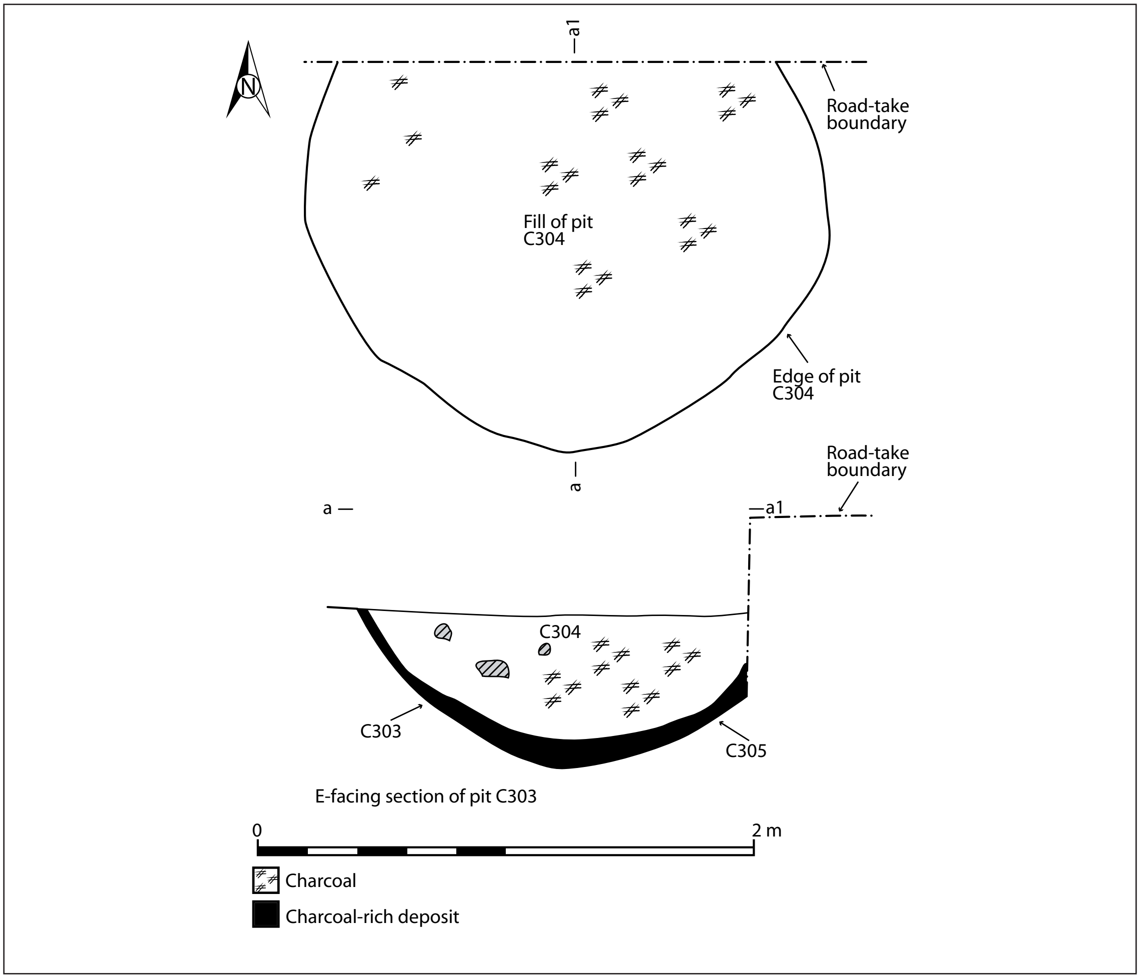


Fig. 6.2—Sonnagh XIII: pre-excavation plan and east-facing section of Pit 3.

Pit 4 (C316) was sub-circular, measuring 2.70 m north–south by 2.60 m east–west, and 0.70 m deep. It had a sharp break of slope at the top, a concave profile and a single fill (C306) of charcoal-rich, gritty, silty sand. Pit 5 (C315) was circular, measuring 1.75 m in diameter, and 0.65 m deep, with concave sides and base. It had a single fill (C307) of grey, sandy silt with occasional charcoal. There was evidence of oxidisation along the base and sides of the pit, suggesting *in situ* burning. Pit 6 (C308) was sub-circular, measuring 0.65–0.70 m in diameter, and 0.17 m deep, with concave sides and an irregular base. The pit had a single fill (C309) of grey, charcoal-rich, sandy silt with occasional small stones. Pit 7 (C310) was sub-circular, measuring 0.70–0.90 m in diameter, and 0.40 m deep. The basal fill (C312) was a 0.20–0.25 m-thick layer of compact, grey, silty sand with charcoal and stone. The upper fill (C311) was a 0.20–0.40 m-thick layer of charcoal with inclusions of sandy silt.

Ballyglass West III, Co. Mayo

A circular, bowl-shaped pit (C11) was 5 m west of a cereal-drying kiln and burnt spread (Ballyglass I and II). It was 1.90 m in diameter and 0.52 m deep, with steep sides and a concave base, giving a bowl-shaped profile. The fill (C9) was mid-brown, silty clay with charcoal, burnt clay flecks and ash inclusions (Pl. 6.3). A radiocarbon date of AD 1305–1421 (GrA-35581) was returned from oak charcoal from the fill. Charcoal identified as elm, alder, hazel, blackthorn and apple-type from the burnt spread yielded a radiocarbon determination of 3491–2921 BC. Oak from the cereal-drying kiln yielded a radiocarbon date of AD 901–1181.

Pl. 6.3—Ballyglass West III: view of south-west-facing section of pit (C11).

Ballyglass East, Co. Mayo

Three pits (C6, C7 and C9) were excavated on this site. The pits were within 150 m of each other on well-drained pastureland.

Pit 1 (C6) was 100 m east of Pit 2 (C7). It was circular, measuring 2.20 m in diameter, and 0.65 m deep, with concave sides and a flat base (Fig. 6.3). The base was oxidised, suggesting *in situ* burning. The pit had five fills. The basal fill (C5) was a 0.04–0.06 m-thick layer of black, clayey silt concentrated on the east side of the pit. This was sealed by a 0.08–0.22 m-thick layer of charcoal (C4). A 0.04–0.14 m-thick layer of black clay silt (C3) overlay C4. The main fill (C2) was a 0.32–0.38 m-thick layer of black clay silt with charcoal and stones. The upper fill (C1) was a 0.05 m-thick layer of grey clay silt with inclusions of charcoal and stones (Fig. 6.3).

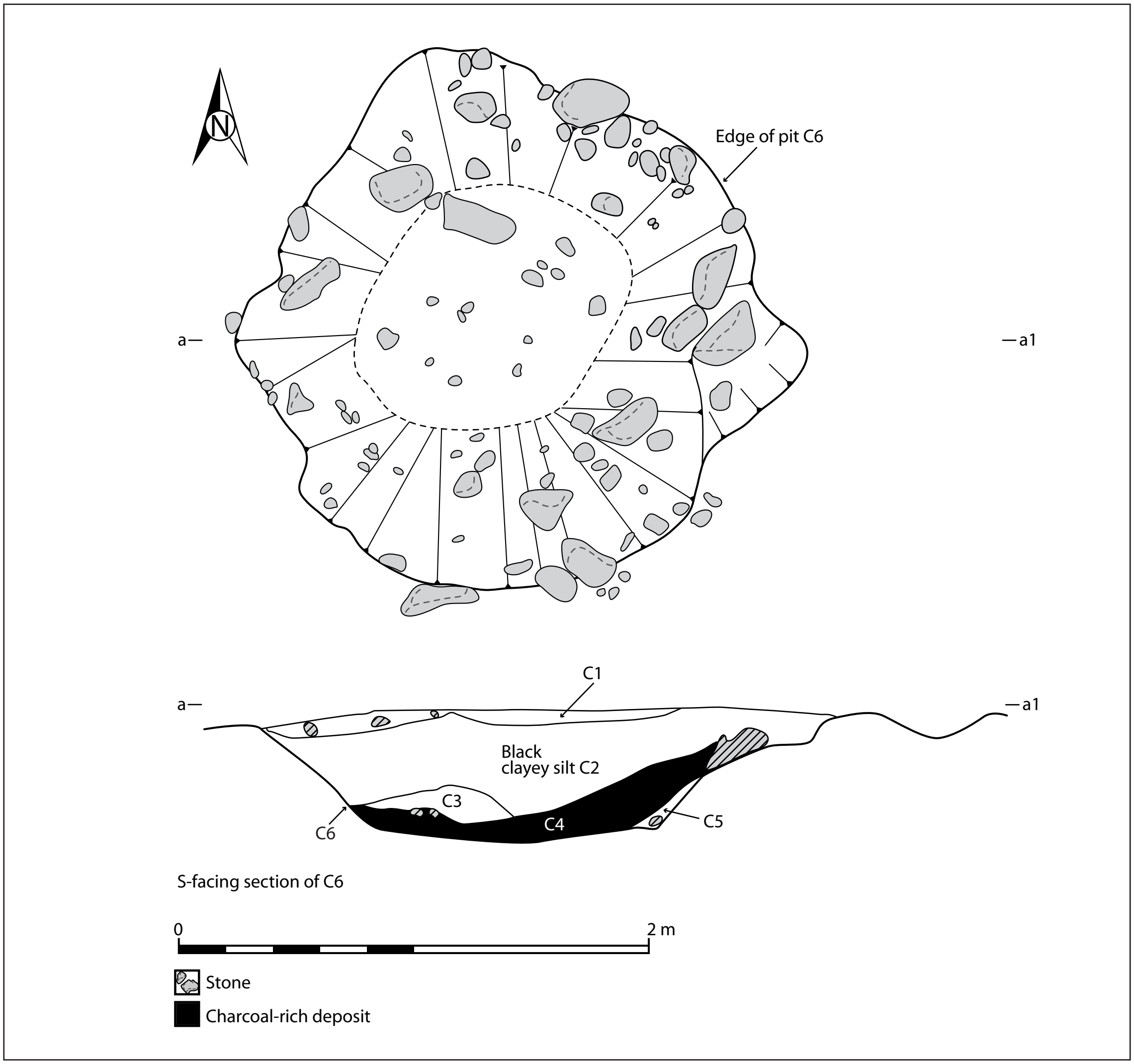


Fig. 6.3—Ballyglass East: post-excavation plan and south-facing section of Pit 1.

Pit 2 (C7) was sub-circular, measuring 2.10 m north–south by 2 m east–west, and 0.42 m deep, with concave sides and base. The pit had one fill (C8): charcoal-rich silt with frequent small stones. A clay-pipe fragment (E3335:9:01) of probable 18th- to 20th-century date was retrieved from this fill.

Pit 3 (C9) was c. 20 m east of Pit 2 and was irregularly shaped. The pit measured 1.09 m north–south by 0.54 m east–west and was 0.04–0.18 m deep, with concave sides and base. The pit had a single fill (C10): a 0.04–0.18 m-thick layer of brown clay with charcoal inclusions. A radiocarbon date of AD 1429–1631 (GrN-30746) was returned from oak charcoal retrieved from the fill.

Cloonfane V, Co. Mayo

The sub-circular pit was on the north-facing slope of a gentle, east–west ridge at an altitude of 109 m OD. Low-lying marshy ground lay to the north and east. The pit measured 1.12 m east–west by 1.08 m north–south and was 0.16–0.22 m deep. There was one fill: loose, black, silty clay with both heat-shattered and unburnt stones. It may have been associated with a vernacular house c. 20 m to the east. This pit was not dated.

Cloonfane VII, Co. Mayo

This shallow, sub-oval pit (C4) was at the base of a south-west/north-east ridge on well-drained ground. The pit measured 2.66 m north-west/south-east by 1.44 m north-east/south-west and was 0.08 m deep, with concave sides and a flat base. The basal subsoil was oxidised, suggesting *in situ* burning. The single fill was black, charcoal-rich, sandy silt with heat-shattered, sub-angular stones (Pl. 6.4).

A radiocarbon date of AD 1022–1161 (GrA-35165) was returned from oak charcoal retrieved from the pit fill (C3).·

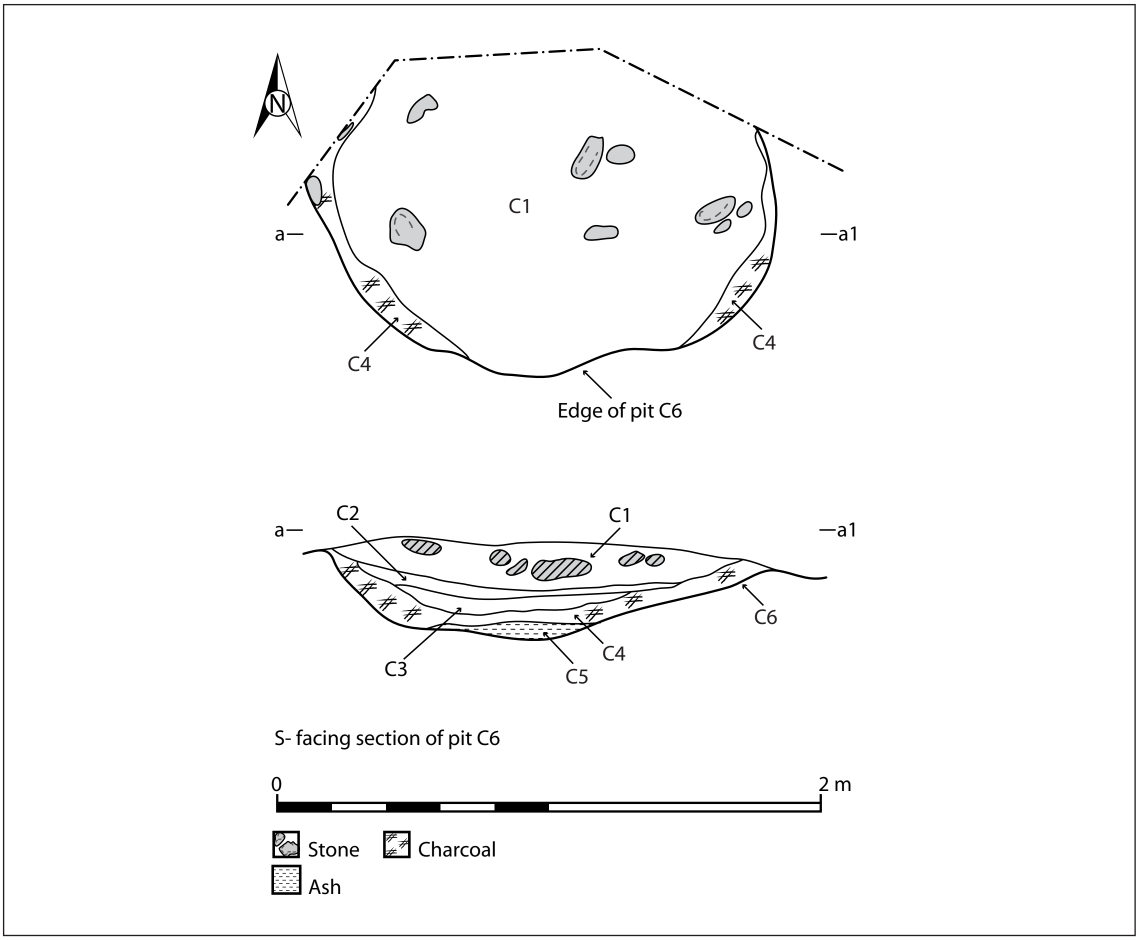
Gortanure I, Co. Roscommon

The sub-circular pit was identified during testing to the south of an enclosure/children's burial ground (RO008c-004:04–1), c. 3 m north of the road corridor. The pit had a U-shaped profile, measured 1.72 m east–west by 1.20 m north–south and was 0.36 m deep, with concave sides and base. Oxidisation on the south-east side suggested *in situ* burning (Fig. 6.4).

The basal fill (C5) was a 0.05 m-thick layer of dark, grey, silty ash with charcoal flecks. C5 was overlain by a 0.08–0.14 m-thick layer of charcoal-rich, silty clay (C4). The clay (C4) probably represented intensive *in situ* burning. C4 was overlain by a 0.04–0.08 m-thick layer of compact, reddish-brown sand (C3), and a 0.02–0.06 m-thick layer of greyish-orange, silty sand with charcoal flecks (C2) overlay C3. The upper fill (C1) was a 0.08–0.19 m-thick layer of mottled, greyish-black, charcoal-rich silt with sub-rounded stones. Oak charcoal retrieved from C4 yielded a radiocarbon date of AD 1314–1438 (GrA-35152), placing it in the later medieval period.

Pl. 6.4 (right)—Cloonfane VII: pre-excavation view of pit (C4).

Fig. 6.4 (below)—Pre-excavation plan and south-facing section of Gortanure I charcoal-production pit.



Currinah III, Co. Roscommon

This circular pit (C8) measured 2.02 m north-east/south-west by 1.66 m south-east/north-west and was 0.08–0.17 m deep. The sides were concave, and the base was irregular, with a reddish hue indicating *in situ* burning. The basal fill (C9) was a 0.01–0.04 m-thick layer of light grey, ashy silt. The upper fill (C7) was a 0.01–0.13 m-thick layer of charcoal with small, sub-angular stones. A modern furrow (C10) cut the upper fill (C7). Charcoal retrieved from this fill was identified as oak and yielded a radiocarbon date of AD 1470–1643 (GrA-35163).

Discussion

The radiocarbon determinations from the various pits show three distinct phases. The earliest group, Cashelduff I and Cloonfane VII, were in use between the 11th and the 13th century. Four pits (Ballyglass West III, Gortanure I, Sonnagh XIII and Cloonaghboy II) were dated to between the 14th and the 15th century. Two pits (Currinah III and Ballyglass East) were dated to between the 15th and the 17th century. The pits had a large geographical spread, therefore, with dates ranging from the 11th to the 17th century.

Wood, charcoal and peat were the primary fuel sources in Ireland and Europe before the Industrial Age in the 18th century. The importance of wood and woodlands to ancient populations was therefore immense: it provided the raw materials for almost all of life's necessities, including fuel, housing, fencing and agricultural equipment, as well as having a myriad of other uses. This reliance on wood and charcoal was most pronounced in the Iron Age, as charcoal was the only fuel that could produce the temperatures required for iron smelting (Muir 2005, 244).

Charcoal can be produced from bundles of hardwood stacked together in a semi-upright position around a thick stake to form a domed mound that may or may not stand in a shallow, saucer-shaped pit. Some of these mounds could be over 12.20 m in diameter (ibid., 244). These mounds were then turfed over and fired, preferably in calm weather conditions, and the burning may have lasted for a week. Wood processed in this way was converted to charcoal and used in medieval iron smelting and various other activities (ibid.).

Pits where oak was the main species identified from the charcoal remains suggest charcoal-production areas (Appendix XI). The use of quickly renewable, coppiced oak trees in an area would have been the most efficient way of maintaining a continuous supply of fuel for charcoal production. The charcoal maker or collier would have moved from area to area using coppiced woodlands and then allowing them to regenerate while he moved on to a fresh stand of coppiced woodland (Appendix XI). This pattern could be applied to the Charlestown pits, as they are widely distributed, with one cluster of seven pits at Sonnagh XIII. It is difficult to identify charcoal-production pits accurately, and it is possible that some of the shallower pits functioned as hearths rather than charcoal-production pits.

The vernacular survey

As part of the mitigation of the impact of the N5 Charlestown Bypass, a survey of ruined and

Table 6.1—Vernacular sites surveyed.

Survey no.*	Site type	Townland	National Grid reference
S0062	Vernacular house	Cloonlara	140353/300590
S0064	Vernacular house	Mullenmadoge	143542/299839
S0065	Vernacular house	Mullenmadoge	143718/299780
S0066	Vernacular house	Mullenmadoge	143704/299853
S0067	Bridge	Currinah	156001/299316
S0069	Double-walled structure	Cloonfane	152413/300758
S0070	Stepping stones	Casheldu ff	154129/300130
S0071	Stepping stones	Ballyglass West	147586/300647
S0072	Well	Cloonfane	Not located
S0073	Handball alley	Cloonfane	152592/300789
S0074	Vernacular house/shed	Cranmore	154464/300004
S0075	Vernacular house/barn	Cloonfane	155400/299573
S0076	Vernacular house	Corragooly	155401/299573
S0077	Cottage	Cranmore	152262/299907
S0078	Vernacular house	Cloonfane	152583/300764
S0079	Limekiln	Cranmore	154517/300058
S0080	Wooden box-drain	Cloonaghboy	140834/300424

*Survey no, issued by the National Monuments Section, DEHLG.

extant vernacular structures was undertaken to include stone buildings, stepping stones, river and stream crossings, wood-lined drains and a limekiln, dating from the 18th to the 20th century. This survey was carried out over six months, in tandem with the archaeological testing and excavations. A photographic and written record was compiled for each site, with scaled plans of the more unusual buildings. Fourteen structures were surveyed in the road-take, and a further three sites immediately outside the road corridor were recorded by photography and sketch plans (Table 6.1.). Six sites providing examples of the range of vernacular structures encountered on the road scheme are described below. Further details of the survey results can be found on the accompanying disk.

Vernacular architecture

The word ‘vernacular’ is defined as ‘traditional’ when applied to an architectural context and nomenclature dates back to the middle of the 19th century. ‘Vernacular’ derives from the Latin *vernaculus* (a home-born slave) and ultimately came to mean the language/culture of an ‘ordinary’ person as distinct from the élite or ruling classes (O’Reilly 2004, 11).

Two of the earliest studies of Irish vernacular architecture were based in County Mayo in the late 19th century (Browne & Haddon 1896–8; 1898–1900). The first formal survey of Irish traditional architecture was undertaken by a Swedish ethnologist, Åke Campbell, in the 1930s (Campbell 1935). Campbell classified Irish houses into two main types: firstly, the house with the hearth near the centre of the house, and not in the gable wall, allowing for bed spaces behind the fireplace at the upper end of the house, and, secondly, the house with stone-built gables and the fireplace close to the gable wall (ibid., 1935). Further studies were undertaken by Gailey (1984) on the vernacular architecture of Northern Ireland, and various surveys have been undertaken at county level in Ireland. Irish vernacular architecture studies, however, lack a comprehensive review, and localised characteristics of architecture are often overlooked in favour of general statements.

The Irish vernacular house

The linear house was the true vernacular house type in Ireland, probably from the 1600s onward, but has its origins further back, in houses of similar plans from the Hiberno-Norse and Anglo-Norman periods (Pfeiffer & Shaffrey 1990, 17). Community norms and loyalties predominated over long periods of time and kept innovation to a minimum (Gailey 1984, 27), resulting in a limited development on the initial linear house plan.

The traditional Irish house plan was one-room wide (determined by the length of the roof timbers available) and had a hearth/fireplace situated either centrally or in the gable wall (Pfeiffer & Shaffrey 1990, 17). Houses with gable hearths are recorded from the Anglo-Norman period (Cleary 1982; Barry 1987, 81). Generally, vernacular houses of the 19th and early 20th century with gable hearths were found mainly in the north and west, while those with central hearths were situated in the east and south of the country, although there were exceptions (Evans 1992, 63). Houses could be extended in a linear fashion with the addition of outhouses or additional rooms onto gables but were rarely widened. There were many variations on this plan: some houses had a central kitchen with bedrooms on either side; others were two-roomed, with a kitchen and a bedroom. Many houses had opposing doors opening directly into the kitchen at opposite sides of the house. The front door was often a half-door, serving the dual purpose of keeping animals outside and children inside while allowing light and air in (Pfeiffer & Shaffrey 1990, 18). The end or gable walls rarely had doors or windows, except for small attic lights in some houses (Gailey 1984, 8). Popular house forms changed very slowly through both time and space, providing continuity in vernacular housing right up until the 20th century (Gailey 1984, 7). The 1841 census recorded that 40.1 % of houses were two- to four-roomed, and one-roomed house accounted for 37 %, suggesting that both types were popular forms of dwelling-house (ibid., 8).

Houses differed in terms of roof types and building materials. Roofs were in general gabled in the north and north-west. On the north and north-west coast, thatched houses with rounded roofs were the norm. The rounded roof appearance was achieved by joining the rafters with a horizontal timber instead of the rafters meeting at the ridge point (Pfeiffer & Shaffrey 1990, 18). Local conditions and availability of resources determined the type of building materials and roof coverings (Evans 1992, 63). Older houses were constructed using materials such as wattle and daub, clay and straw, or sods (ibid., 64). Later houses were mainly constructed using stone, either in the drystone technique or with stone courses bonded with lime mortar. Walls were lime-rendered both inside and out. External walls were white-washed, which both cleansed and sterilised the buildings and had an obvious aesthetically pleasing appearance (Pfeiffer & Shaffrey 1990, 205).

Traditional dwellings were built by local craftsmen working in local building traditions. The craftsmen were familiar with construction techniques developed in response to local climatic, topographical, environmental and social conditions (Ní Fhloinn & Dennison 1994, 8). Local materials were used, imposing their own constraints and uniformities on the buildings (Gailey 1984, 7). The material used for thatching included flax, straw, reeds, bracken and heather. Thatched roofs were tied with a network of ropes secured at the eaves to wooden pegs or weighed down with stones to maintain them in position, especially in exposed locations (Pfeiffer & Shaffrey 1990, 18, 64). At the end of the 19th century, corrugated iron sheeting became readily available; it was light and easy to work with and gradually replaced the thatched roofs, encouraged by a government grant for conversion of roofs from thatched to corrugated iron (ibid., 65). Earlier houses were always built using local, readily available materials, but after the mid-19th century they were constructed using slates, tiles, timber and concrete (Gailey 1984, 7). Many formerly thatched houses were re-roofed using slates, tiles or corrugated iron sheets.

Two-roomed vernacular house, Cloonlara, Co. Mayo

This structure (S0062) abutted the existing N5 road to the south in a field of rough, rushy pastureland. It is recorded on the 1838 Ordnance Survey 6-inch map as part of a group of houses of which there are no other extant remains. These houses were to the north of the road, which was realigned in subsequent years.

The structure was rectangular and comprised two rooms, oriented north–south. Externally, it was 11.64 m long, 4.54–4.88 m wide and 3.14 m high, although the height varied owing to collapse (Fig. 6.5). The building was constructed with roughly cut local stone (limestone, sandstone and mudstone), with large, sub-rectangular quoin-stones at the corners. The doors were directly opposed, in the east and west walls, and the west-facing door was blocked up.

The southern part of the building measured 7.50 m by 4.54–4.88 m externally and 7.20 m by 3.32–3.68 m internally. The building technique was drystone walling with occasional use of mortar. The east doorway was 1.75 m high and 0.95 m wide and had a timber lintel. The blocked-up west doorway was 1.52 m high and 0.90 m wide and had a sandstone lintel. The west window was open, 0.50 m high and 0.45 m wide, and was set into the wall at a height of 1.75 m above the floor level. The blocked-up east window was 0.80 m wide and 0.70 m high. A rectangular recess at ground level below the window extended outside and probably functioned as a drain. Drains can be a feature of byre dwellings: one-roomed structures where both humans and animals slept generally had a drain that removed effluent and separated livestock from the living quarters (Pfeiffer & Shaffrey 1990, 17). The floor was probably earthen originally and was later replaced by cobblestones and flagstones.

The north side of the building measured 3.94 m by 4.54 m externally, with internal dimensions of 3.34 m by 3.32 m. There was a joint line in the west wall marking the two different types of stone masonry. Mortar bonding was more prominent on the north side of the building. A blocked-

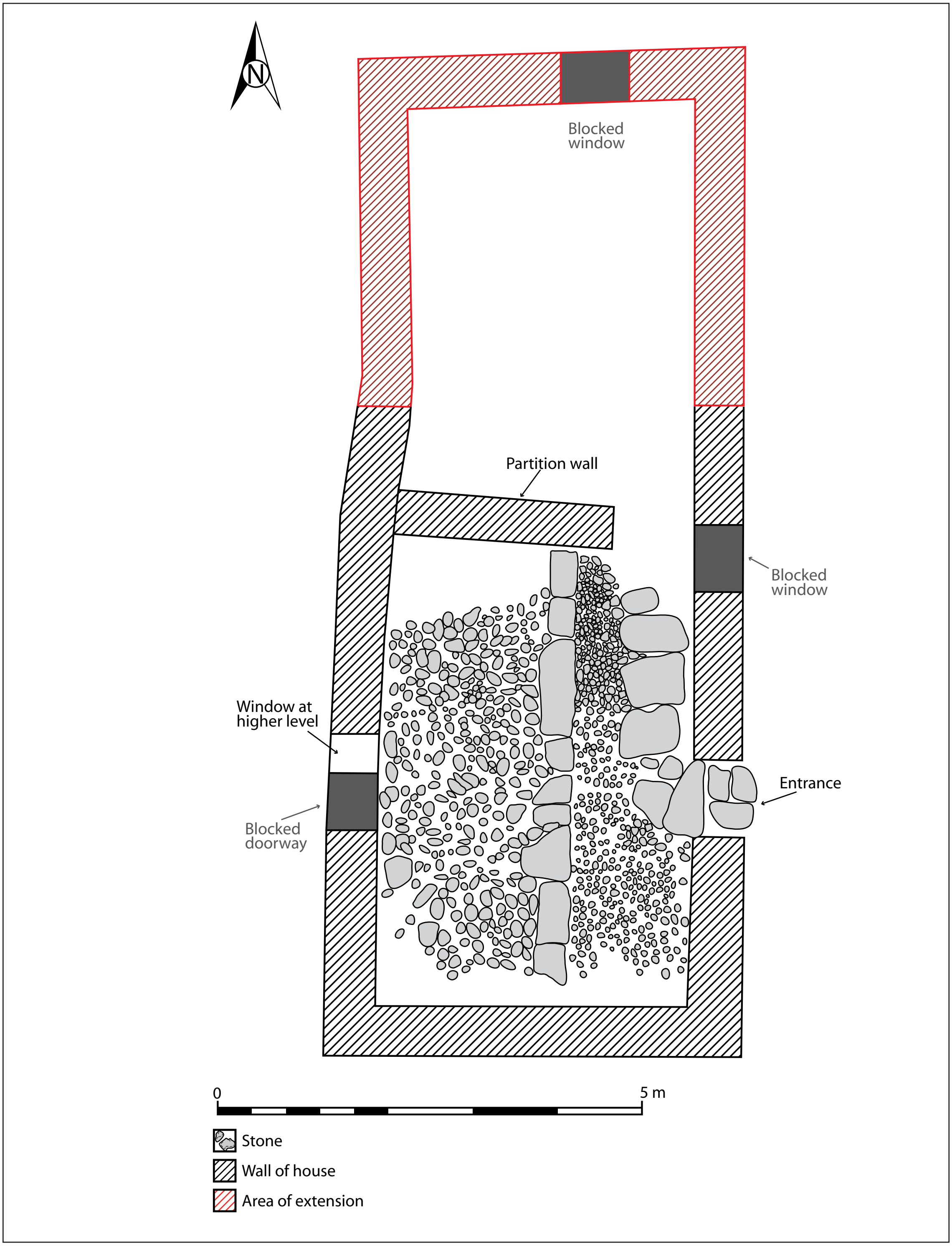


Fig. 6.5—Cloonlara: ground-floor plan of two-roomed building, with extension highlighted in red.

up window, 0.93 high and 0.85 m wide, in the north wall originally lit the room. The floor surface was earthen. A partition wall between the north and south sides of the building was not keyed into the main structure and may have been a later addition. The partition wall had a doorway on the north side, 1.10 m high, 1.83 m wide and topped with a sandstone lintel.

The different construction techniques between the north and south sides of the building were originally interpreted as representing two different building phases. The partition wall was not the original north wall of the building but a later addition. This seems to suggest that the building was completed in one phase and that there was a change in construction techniques before completion, indicating a change in economic circumstances of the owner or access to different raw materials. The narrowing of the building to the north is unusual and, coupled with the different building style, may indicate a different function in that part of the structure.

The building was eventually used solely as a livestock shed. At that stage, the cobbled floor was added. This floor was slightly higher on the western side and edged by a line of flagstones but did not extend to the wall edges on the north and south ends. The cobbling may have been to prevent 'puddling' when livestock was housed in the building. The step in the floor probably allowed effluent to drain through the aperture under the east window to discharge its contents outside. A flagged pathway extended from the eastern doorway to the doorway in the partition wall.

Although probably thatched originally, the structure had the remains of a collapsed corrugated iron roof with some *in situ* timber beams. Horseshoes were embedded in the eastern wall, and fragments of 19th-century pottery were found in a test-trench adjacent to the structure. The horseshoes may have been used to tether animals, as was common in rural parts of the west of Ireland in living memory (T. Kerrigan, pers. comm.)

The remains of a French drain with a stone capping, oriented east–west, were adjacent to the exterior of the western wall entrance.

Double-walled building, Cloonfane, Co. Mayo

This structure (S0069) was in rough pastureland c. 300 m south of the existing N5 road and 100 m west of a small secondary road, aligned north–south. The structure was on a slightly elevated terrace, which may have been the drier part of the field.

Externally, the one-roomed structure measured 6.34 m east–west by 4.98 m north–south and was 2.30 m high; internally, it measured 2.96–3.88 m by 2.32–2.58 m. The walls were on average 0.70 m thick, with a slight base batter (Fig. 6.6). The walls were constructed using random, sub-angular, local limestone and sandstone, with grey, gritty, lime-based mortar bonding.

The west gable wall was the best preserved, reaching a height of 2.30 m, which can be presumed to be very close to the original height. A second wall lay outside the original stone coursing and extended along the outside of the south wall, the west wall and partly along the north wall, although there was a great deal of collapse in this section. The outer wall, constructed of rough stone coursing, was on average 2.30 m high and 0.80 m thick. The function of this wall is unclear: it may have been an attempt to stabilise the inner wall or acted as a support for the roof timbers. The entrance was in the east wall, and the doorway was 1.40 m high, 0.80 m wide and 0.74 m thick. Both sides of the doorway tapered inward slightly from the top (Pl. 6.5). The

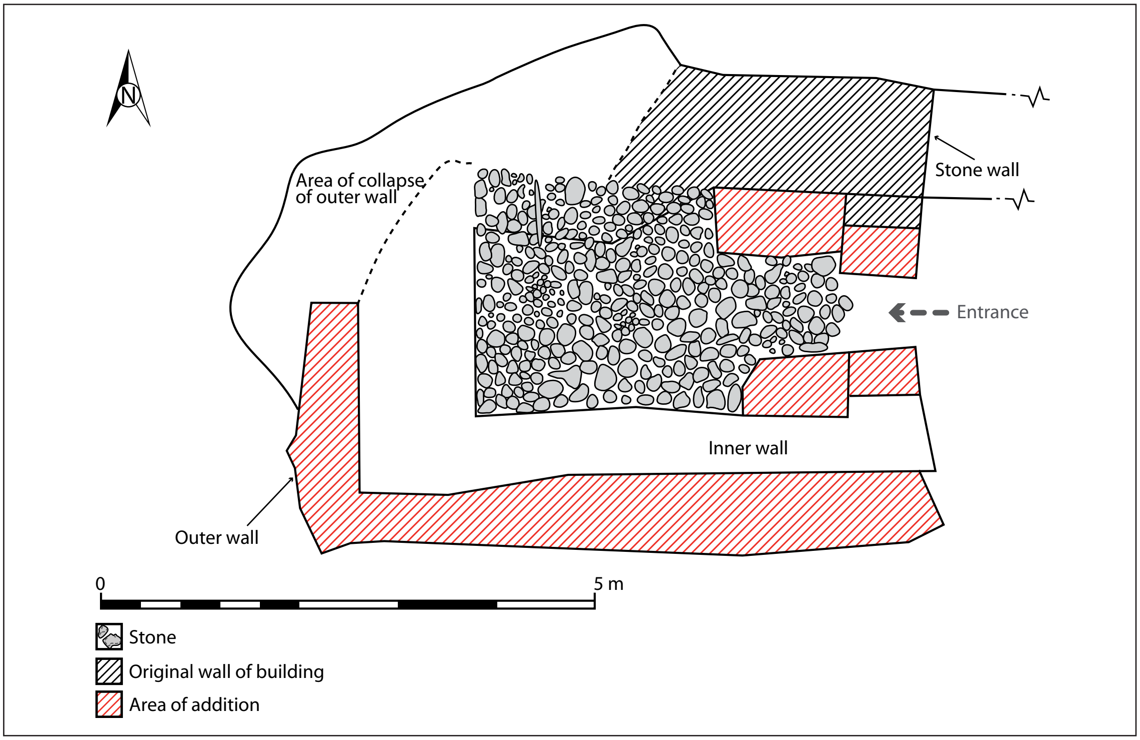


Fig. 6.6—Cloonfane: ground-floor plan of double-walled building, with additions marked in red.

Pl. 6.5—Cloonfane: view of doorway of double-walled building, looking west.

doorway was narrowed at some stage, as there was a clear line between the existing structure and stone courses added to reduce the doorway aperture. The later additions to the doorway were buttressed by stone coursing on the inside, again not keyed into the main structure wall. The extant structure was windowless. The internal floor had a very rough cobblestone surface.

Fragments of roof timbers/rafters survived in the interior. The building had a gabled west end and had been roofed by either thatch or subsequently by corrugated iron sheeting. A field wall extended from the north-east corner of the building and appeared to be the same style of construction. A metal container, a discarded iron bed frame, a head of a hayfork and a wood-plane blade were found inside the structure. A horseshoe was embedded in the west wall inside the structure, suggesting that it was used as a byre. The lack of a flagstone floor, windows or hearth and the small size of the structure suggest that it was a byre or storage shed as opposed to a domestic building. The cobblestone floor was probably overlaid with rushes or straw to provide bedding for animals.

Vernacular house, Cloonfane, Co. Mayo

This vernacular house (S0078) was c. 1 m north of the road-take and was relatively undisturbed by road construction. It was c. 35 m north-east of the handball alley (S0073) in the same townland. The house was a roofless, two-roomed structure built from a mixture of local limestone and sandstone (Pl. 6.6). The stone coursing was regular in construction, with a lime render visible on parts of the interior wall. The house was oriented east–west, measured 8.50 m east–west by 4.30 m north–south and was 0.45 m thick. The east gable stood to a height of 4.30 m, and the west gable was 4 m high. The gabled walls had concrete lintels to support corrugated iron sheet roofing. The southern wall had two blocked-up windows with the remnants of wooden sash window frames.

An unusual feature of the house was two doorways in the north wall, allowing for a separate entrance into each room. The western door was 1.75 m high and 1 m wide, with a concrete lintel and the remnants of a wooden doorframe along the eastern edge. This provided access to a large room measuring 4.90 m east–west by 3.80 m north–south, with a blocked-up fireplace set into the west side of the partition wall. A blocked-up door, 1.75 m high and 1.05 m wide, with a stone lintel was evident on the south side of the partition wall. This room had a partly blocked-up window, 0.75 m high and 0.50 m wide, in the southern wall, with the remnants of the sash wooden frame. A blocked-up window, 1.05 m high and 0.50 m wide, with a stone sill on the exterior, was recorded in the north wall, adjacent to the external door.

The eastern doorway was 1.70 m high and 1 m wide, topped with a limestone flag lintel. The door provided access into a smaller room measuring 3.80 m north–south by 3.10 m east–west. On this side of the partition wall, the blocked-up doorway had an *in situ* wooden lintel. The window in the south wall was set at a lower level than that in the western room and was 0.50 m high and 0.50 m wide. It had the remnants of a sash window, an internal wooden lintel and an external stone lintel. A fireplace set in the east-facing side of the partition wall allowed fireplaces in both rooms to use the same chimney flue.

A wall extended from the north-west gable corner for c. 2 m beyond the east gable wall and

Pl. 6.6—Cloonfane: view of front of two-roomed building, looking south.

to a height of 1.50–2 m, presumably to provide shelter for both doors. The remnant of a small wall or outhouse in a ruinous state was approximately mid-way along the exterior of the southern wall.

This house is unusual in that it has two front doors and no back door. It is possible that two families lived here, one in either room, with an interconnecting door between the two rooms set into the partition wall. It is also possible that the family who built this house simply adapted the local architecture to their needs, providing independent access to each room.

Social and historical context

Land settlement in the west of Ireland in the 19th century was mainly dispersed, although groups of houses, or *clacháns*, are evident in some townlands on the first-edition OS maps. A basic problem, especially in the poorer agricultural areas, was the cycle of land division, as landlords, farmers, labourers and cottiers pursued land subdivision as a means of providing for a growing population with increasing demands on land. Some landlords tried in vain to prevent the subdivisions of their tenants' holdings but with little effect (Boyce 1990, 100, 103). This land division resulted in fragmented holdings, with a family's holding dispersed throughout their neighbour's land and vice versa (Duffy 2007, 79–80). By the 1840s the practice of subdivision of land into small parcels to provide for family members or to rent for income was frowned upon in economic terms, but little could be done to reverse it at that stage (Boyce 1990, 103).

The population of Ireland increased dramatically in the 18th century, fuelled by a peaceful society and a steady food supply provided by the potato. In 1800 the population was five million, increasing to eight million by 1841. The 1841 census showed that only 7 % of holdings in Ireland were over 30 acres, while in Connacht 64 % of holdings were less than 5 acres. Many holdings were subdivided as families sought to provide for their male heirs, further reducing the size of farms (Green 2001, 219–20). Mayo was the second most densely populated county in Ireland, with a population largely based on small holdings and reliant on the potato as the main food source. Marginal land was reclaimed and settled by landless people, and relics on the landscape include cultivation ridges and ruined houses in areas now considered inaccessible or unsuitable for agriculture. Only 15 % of the pre-Famine population of 8.5 million were classified as urban dwellers (Oliver 1997, 1275), leaving the remaining 85 % as rural dwellers heavily dependent on the land for their survival.

The Great Famine of 1846 resulted in a sharp drop in population owing to death and migration, and by 1851 the population had fallen by two million. Farms were gradually consolidated so that holdings of more than 30 acres had risen from 7 % in 1841 to 26 % by 1851. Holdings of less than 5 acres had fallen from 45 % to 15 % (Green 2001, 220). In the latter half of the 19th and the early 20th century, both the Congested Districts Boards and the Land Commission dismantled the subdivision of land. The land was 'striped', with long, narrow sections subdivided into fields and allocated to each farmer, along with a defined acreage share in mountain commonage. Emigration or resettlement in the midlands or east allowed for the division of the land into viable farms for those who remained (Duffy 2007, 83). Farms were no longer subdivided and, for those who did not inherit the farm or marry, the options were limited. Many emigrated to Britain and America; others, if the families were sufficiently wealthy, trained in a trade or profession. For the majority of the rural population in the west of Ireland, however, poverty left emigration as the only option.

Table 6.2 includes all of the townlands impacted on by the N5 Charlestown Bypass and illustrates population decline between 1841 and 1891. Of the 24 townlands analysed, 17 show a decline in population, usually accompanied by a decline in the number of dwelling-houses; six show an increase; and Charlestown has the biggest increase in population—not surprisingly, as it was founded in 1846 and may have acted as an urban focus for rural dwellers. Lavy Beg had the largest population decrease, from 182 people and 28 houses in 1841 to a mere three people and two houses in 1891. The dramatic population decrease resulted in a landscape denuded of people and with many abandoned dwellings.

The aftermath of the Famine in rural areas resulted in a fossilised landscape to a great degree and with few changes from that period until the 1960s. Continued emigration and migration from rural Ireland into the late 20th century, as a combination of economic difficulties, unemployment, the decline of the small-holding farmer and various other factors, resulted in many leaving the countryside to seek employment either in urban areas elsewhere in Ireland or abroad. The result of emigration and abandonment of the land over the centuries is that farm holdings have been

Table 6.2—Census figures for 1841 and 1891.

Townland name	1841 census: population	1841 census: houses	1891 census: population	1891 census: houses
Ballyglass East	121	21	63	12
Ballyglass West	35	8	27	4
Bulcaun	93	14	83	13
Bracklagh	110	21	83	15
Cartron	137	23	130	23
Cashelduff	211	38	303	55
Charlestown (town)	0	0	779	152
Cloonaghboy	148	26	105	22
Cloonfane	153	32	126	27
Cloonlara	214	36	137	31
Cloonmeen West	70	12	47	8
Corragooly	102	21	139	25
Cranmore	83	12	67	12
Cuilmore	290	48	331	61
Currinah	223	42	152	26
Fauleens	215	41	210	35
Gortanure	235	42	192	36
Gowel	185	32	167	29
Hagfield/Treanacally	296	58	321	60
Killaturly	312	60	267	52
Lavy Beg	182	28	3	2
Lavy More	234	40	218	39
Lowpark	115	23	58	11
Mullenmadoge	130	22	137	25
Sonnagh	359	56	387	67
Tomboholla	162	24	154	29
Trouthill/Knockbrack	55	8	14	3

amalgamated into larger, more viable farms. The old vernacular houses survive in varying states of decay in many areas, and the pattern of severe population decline resulting in dereliction of buildings is one reflected across Ireland but more pronounced in the west of the country (Duffy 2007, 101).

Limekilns

Limekilns are the most widely distributed and numerous industrial site on the Irish landscape (Rynne 2006, 157). Many 19th-century farmsteads had their own small limekiln, or a group of farmers may have used a communal limekiln to serve their needs. Evidence from the first-edition (1838) OS maps for the Charlestown area suggests that almost every townland had at least one limekiln (Ó Hargadáin 2001). Limekilns in County Mayo are generally close to roadways, in linear patterns or in clusters along roads or near farmsteads. There appears to be a notable lack of limekilns in and around the coastal areas of the county. This uneven distribution may be explained by the use of seaweed as a fertiliser in these areas, obviating the need for lime as a fertiliser/alkaline restorer (ibid.).

Limekilns had a fairly homogeneous construction, being generally built of stone into a bank or hill that allowed easy access to the upper opening for filling with limestone and turf. Limekilns were generally circular, although rectangular or square kilns are known, 2.5–3.5 m deep and 1.5–2 m high (O'Hara 1991, 190). The inside of the kiln was gently curved to ensure that the lime did not adhere to the walls (Rynne 2006, 157–8). The inside of the kiln may have been plastered using a mix of fine sand and lime, which had to be replaced after several uses (Egan 1994, 307–8). An opening at the base of the front wall, known as a *púirín* (O'Hara 1991, 190) or a poucheen, allowed the kiln to be fired and the lime to be removed, and a stone lintel was placed over the opening to support the stone wall (ibid., 307). There were two basic forms of limekiln: the intermittent kiln and the continuous type (Rynne 2006, 157). The more common form was the continuous type, in which fuel and limestone were placed together in the kiln for burning. The fuel and limestone were constantly replenished over two to three days and then allowed to cool. The intermittent type, in which the fuel and limestone were generally separated, provided an ash-free, purer product. This was achieved by the construction of an arch or floor of limestone between the main bowl of the kiln and the firing area. The larger, intermittent type was filled only once, with the limestone/fuel fired and then left to burn, and was not replenished during the firing. The lime was then removed before the kiln was re-used (ibid.). The continuous-type kiln usually had grate or iron bars inside the kiln in a line across from the stoke-hole or poucheen opening. The grate separated the firing area from the limestone and fuel above and allowed the lime to fall through for removal (Egan 1994, 307).

The ready availability of turf made it the main fuel, although charcoal, coke and wood were also used. Temperatures inside a kiln needed to reach 900–1200 ºC, and it took up to 48 hours for all of the limestone to be reduced to lime (Rynne 2006, 159). The limekiln was filled with alternate layers of turf and limestone that had been broken into small pieces to aid the burning process. The bottom layer of turf was then lit and, as the limestone and fuel burnt, more layers were added to the kiln until the kiln was full of lime. The kiln was allowed cool for two to three days before being emptied, and the lime was placed in bags or barrels for sale or home use (O'Hara 1991, 190–1).

Calcium carbonate is the main component of limestone and, when burnt, forms calcium oxide, or quicklime. When exposed to water, lime is converted into calcium hydroxide in a process known as slaking, resulting in slake lime or hydrated lime. Lime slaked with water and mixed with sand produces mortar for stone building (O'Sullivan & Downey 2005, 21). There were a myriad of other uses for lime once it had been processed. For finer quality, the lime was slaked in pits that provided fine powder (Rynne 2006, 191). Lime was used extensively in rural Ireland for plastering and rendering under slates, whitewashing walls and rafter timbers, killing lice and preventing disease in fowl houses, aiding decomposition of animal carcasses, and spraying potatoes, when mixed with bluestone and washing soda. Other uses for lime included shaking lime over the sprouted potatoes a few days before sowing and whitewashing tree trunks to prevent slug and insect damage, and a bucket of lime was added annually to a well to purify the water (Egan 1994, 309–10). On a more industrial level, lime was used to purify the town gas supply, as a flux in blast furnaces, in the production of bleaching powder and soda, and for the de-hairing of animal hides in the tanning process (Rynne 2006, 157).

Limekiln, Cranmore, Co. Mayo

This limekiln was 5 m east of the initially proposed road corridor, 15 m east of the Kilkelly Road, and was surveyed as a result of a request by the contractors to extend the road eastward. The road corridor remained unchanged, however, and the limekiln remained intact. The limekiln is marked on the first-edition OS map and was probably associated with one of two farmsteads visible on the same map but no longer extant on the ground.

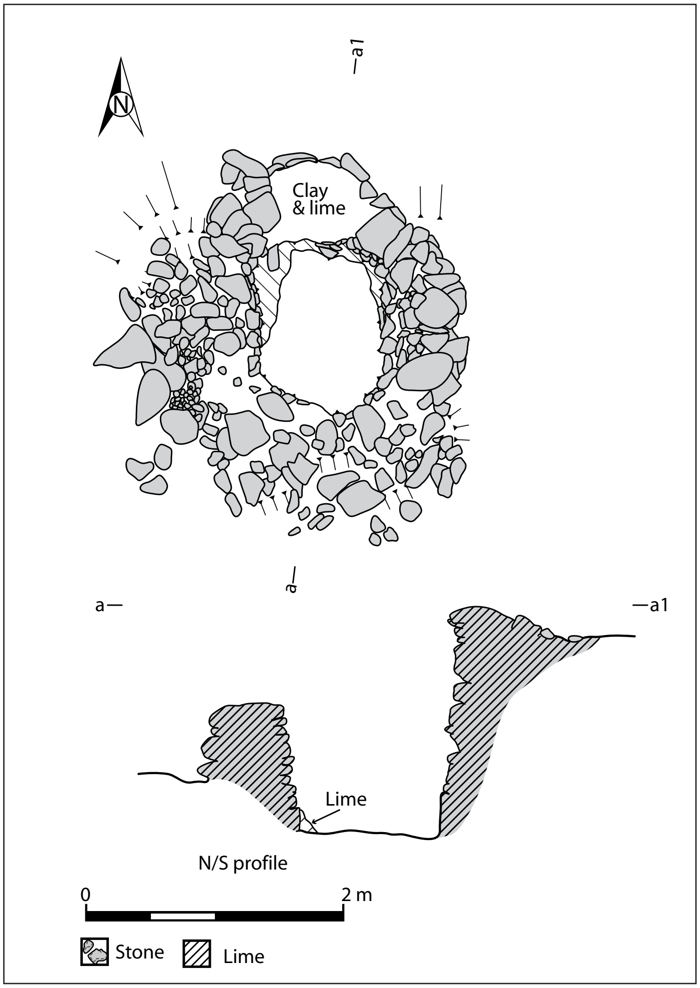


Fig. 6.7—Plan and profile of limekiln in Cranmore.

The limekiln was built into the north-facing aspect of a low, east–west hillock and was heavily overgrown. The circular kiln was constructed with sub-angular, limestone and sandstone, drystone coursing that was c. 3 m high, 1.70 m long and 1.40 m wide and lined the entire pit (Fig. 6.7). The stone coursing was 0.50–0.70 m thick, and there were 15–20 rows. Some of the upper coursing had collapsed, most noticeably on the east and south sides. The stoke-hole was on the northern side of the structure and was blocked with lime and other debris. There was a mix of lime and ash to a depth of 0.20–0.25 m on the earthen floor. The lime and ash mix was residue from the last use.

The kiln was in relatively good condition and is an example of the small, continuous type, prevalent on many farmsteads in the 18th and 19th centuries. The mechanical crushing of limestone and availability of natural and artificial fertilisers resulted in the decline of limekilns in the latter half of the 19th century (O'Sullivan & Downey 2005, 22).

Miscellaneous structures

Stepping stones, Ballyglass West, Co. Mayo

The stepping stones (S0071) were in the Mullaghanoe River, which flows north and joins the River Moy, north-west of Charlestown. The Mullaghanoe River marks the townland boundary between Ballyglass East and Ballyglass West. It is c. 3.50 m wide and bordered on each bank by low-lying trees and scrub. A site classified as a *fulacht fiadh* (MA062-053) but that on excavation proved to be a burnt spread dated to 3491–2921 BC (Ballyglass West I), a cereal-drying kiln dated to AD 901–1181 (Ballyglass West II) and a charcoal-production pit dated to AD 1305–1421 (Ballyglass West III) were c. 6 m from the west bank of the river.

The stepping stones were three large boulders positioned in a shallow part of the river, just south of a small weir (Fig. 6.8). The stones were irregularly shaped, oriented east–west and just visible above the water. The two stones to the east were relatively flat on top, while the west stone was angular. The west stone was 1 m long, 0.42 m wide and 0.60 m thick; the centre stone was 0.70 m long, 0.30 m wide and 0.40 m thick; and the east stone was 0.90 m long, 0.40 m wide and 0.50 m thick. Both outer stones were c. 0.90 m from each bank, and the centre stone was c. 0.50 m from each outer stone.

The weir was 0.50 m north of the stones, and at this point the water dropped over a ledge c. 0.85 m high. A deep and slow-running pool just under the weir was suitable as a trout and salmon spawning ground. The weir also forced the fish to leap to negotiate the cascade, and the stones may have provided a convenient platform for fishing. The weir also provided a fording point over a shallow part of the river and allowed access from one townland to the next.

Wood-lined drain Cloonaghboy, Co. Mayo

The wood-lined drain (S0080) was identified during test-trenching. The drain was cut into the underlying peat, and lengths of timber were placed along the edges to form a channel; these were then covered by horizontal lengths of timber to seal the drain. The drain was 0.50 m wide and

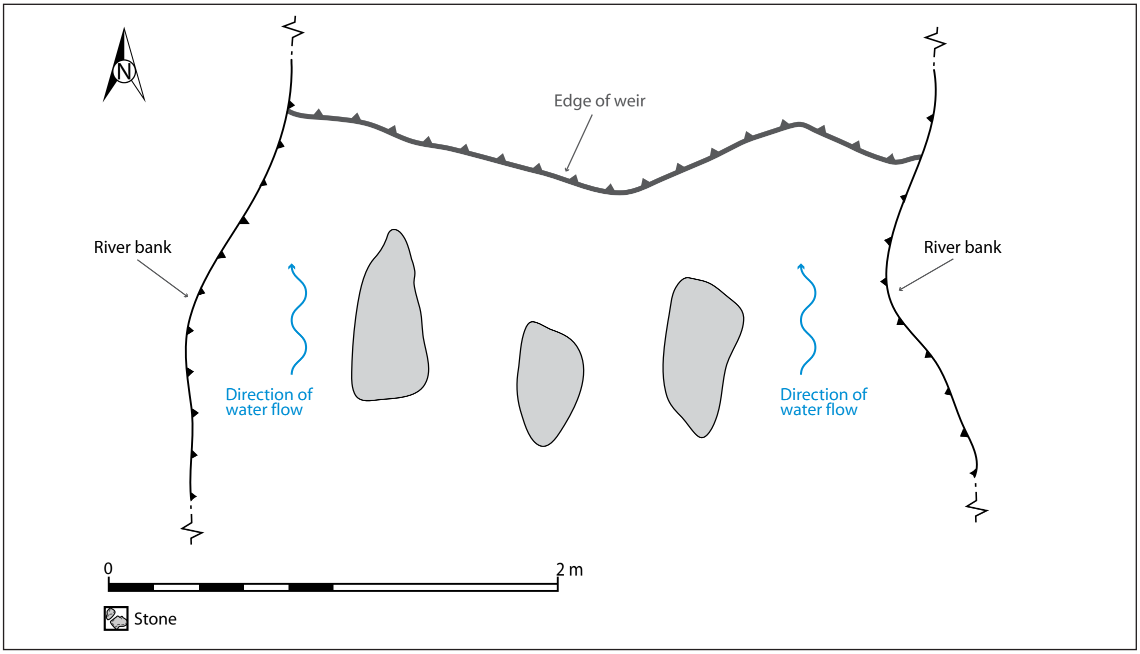


Fig. 6.8—Plan of stepping stones across Mullaghanoe River, between Ballyglass East and West.

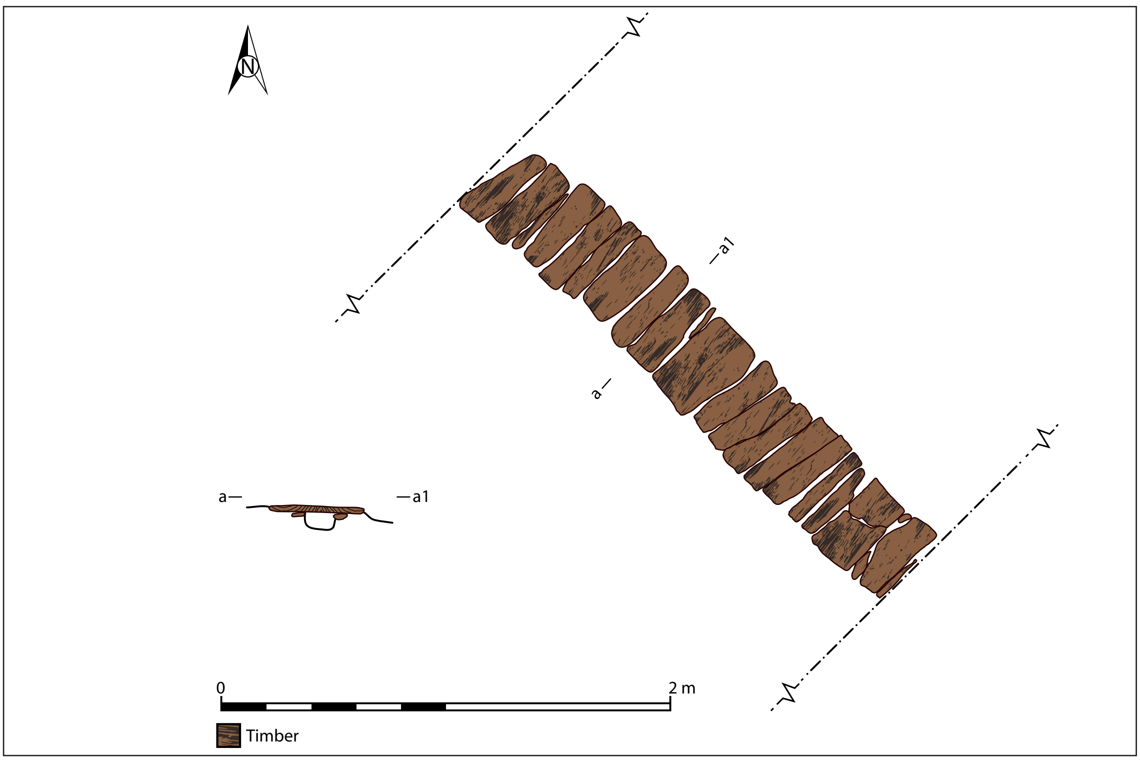


Fig. 6.9—Plan and section of wood-lined drain in Cloonaghboy.

0.12 m deep with a recorded length of 5 m (Fig. 6.9). The timber was sourced from old wooden boxes, which may have been used to hold fruit or bacon; very faint writing was visible on some pieces. The main drain was oriented south-east/north-west. This drain probably dates from the mid-20th century, as indicated by the faint date on the timbers.

Conclusions

The vernacular survey resulted in some information on traditional architecture and agricultural in the area being gathered and sheds light on rural lifestyles in 19th- and 20th-century Ireland. The survey enabled research on the land systems and divisions, vernacular architecture, population decline and the use of limekilns, providing an insight into the practices and traditions of rural Ireland.

APPENDIX A—RADIOCARBON DATES FROM EXCAVATED SITES ALONG ROUTE OF SCHEME

Standard radiocarbon dates are determined by the rate of decay of carbon atoms in organic matter. Accelerator mass spectrometry (AMS) is a more precise form of radiocarbon dating that requires much smaller samples and yields shorter date ranges. The amount of carbon in the atmosphere has fluctuated, resulting in errors in the date ranges (BP) returned from samples. These errors are corrected by reference to calibration curves based on alternative dating methods, such as dendrochronology. Occasionally, the carbon date (BP) corresponds with two or more date ranges in the calibration curve, and these are included in this appendix. An overall date range from the earliest to the latest of these is included in the text.

Radiocarbon dates are given in conventional years BP (Before Present: AD 1950) at a 1-sigma (68 % probability) level of confidence. The conventional dates are then quoted in calibrated date ranges, which correspond to the probable calendar age of the sample material. The calibrated dates included in the text are expressed at a 2-sigma (95 % probability) level of confidence, which results in a wider date range for some features.

Dates obtained from Beta Analytic laboratory (Beta lab code) were calibrated using the IntCal04 calibration dataset (Reimer et al. 2004) and the Talma & Vogel (1993) calibration program. Dates from the University of Groningen laboratory, the Netherlands (GrN and GrA lab codes), were calibrated using IntCal04 (Reimer et al. 2004).

Registration/ excavation no.	Townland	Site type	Context	Lab no.	Years BP	Calibrated dates (2-sigma)	Species type
E3335	Ballyglass East	Charcoal-production pit	Fill of charcoal pit	GrN-30746	405±40	AD 1429–1631	Oak
04E1507	Ballyglass West I	Burnt spread	C3; spread	GrN-30744	4500±85	3491–2921 BC	Oak, elm, alder, hazel, blackthorn, Pomoideae
04E1507	Ballyglass West II	Kiln	C8; fill of kiln	GrN-30745	985±55	AD 901–1181	Oak
04E1507	Ballyglass West III	Charcoal-production pit	C9; fill of pit	GrA-35581	570±30	AD 1305–1421	Oak (AMS)
E3336	Cashelduff I	Charcoal-production pit	C14; fill of pit	GrA-35582	1430±30	AD 579–656	Oak (AMS)
E3336	Cashelduff I	Charcoal-production pit	C28; fill of pit	GrA-35585	835±35	AD 1055–1270	Oak (AMS)
E3336	Cashelduff I	Charcoal-production pit	C18; fill of pit	GrA-35583	945±30	AD 1026–1156	Oak (AMS)
E3343	Cashelduff IV	*Fulacht fiadh*	C7; fill of trough	GrN-30772	2540±25	793–553 BC	Elm, alder, holly, willow, ash
04E1341	Cloonaghboy I	Bivallate ringfort	C83; post-hole in souterrain	GrA-35590	1265±30	AD 666–860	Oak (AMS)
04E1341	Cloonaghboy I	Bivallate ringfort	C82; post-hole in souterrain	GrA-35588	1365±30	AD 610–762	Oak (AMS)

Registration/ excavation no.	Townland	Site type	Context	Lab no.	Years BP	Calibrated dates (2-sigma)	Species type
04E1341	Cloonaghboy I	Bivallate ringfort	C54; fill of inner ditch	GrA-35570	1290±30	AD 666–773	Alder (AMS)
04E1341	Cloonaghboy I	Bivallate ringfort	C46; upper fill, outer ditch	GrA-35587	1430±35	AD 565–660	Oak (AMS)
E3333	Cloonaghboy II	Charcoal-production pits	C6; fill of pit	GrN-30844	480±20	AD 1418–1445	Oak
E3334	Cloonaghboy III	Burnt spread	C7; spread	GrN-30845	1035±40	AD 895–1148	Birch, alder, willow, blackthorn, hazel
E3357	Cloonaghboy IV	*Fulacht fiadh*	17:6; wood	GrN-30762	2925±25	1253–1043 BC	Oak
E3357	Cloonaghboy IV	*Fulacht fiadh*	19:6; wood	GrN-30763	2980±20	1289–1128 BC	Alder
E3357	Cloonaghboy V	*Fulacht fiadh*	C9; fill of trough	GrN-30773	3960±30	2568–2347 BC	Oak
E3407	Cloonfane I	Burnt spread	C3; spread	GrN-30764	3565±30	2014–1778 BC	Alder, birch, willow
E3388	Cloonfane IV	Burnt spread	C3; spread	Beta-231646	690±40	AD 1260–132, AD 1350–1390	Ash (AMS)
E3412	Cloonfane VI	Burnt spread	C3; spread	GrN-30765	1130±40	AD 781–991	Willow, alder, birch
E3413	Cloonfane VII	Charcoal-production pit	C3; fill of pit	GrA-35165	945±35	AD 1022–1161	Oak
E3351	Cloonmeen West	*Fulacht fiadh*	C5; fill of trough	GrN-30747	2995±50	1390–1054 BC	Ash, alder elm, hazel
E3410	Cranmore I	*Fulacht fiadh*	C5; fill of pit	GrN-30766	3360±60	1867–1499 BC	Ash, alder, willow, holly
E3433	Cranmore II	*Fulacht fiadh*	C5; fill of pit	GrN-30767	3305±50	1729–1458 BC	Ash, alder
E3356	Currinah I	*Fulacht fiadh*	C36; fill of post-hole	GrN-30770	2670±20	839–799 BC	Alder, blackthorn
E3356	Currinah II	*Fulacht fiadh*	C13; fill of trough	GrN-30769	2940±50	1306–1005 BC	Holly, hazel, alder, willow, blackthorn
E3356	Currinah III	Charcoal-production pit	C7; fill of pit	GrA-35163	330±35	AD 1470–1643	Oak (AMS)
E3355	Currinah IV	*Fulacht fiadh*	6:86; wood	GrN-30768	2925±20	1208–1049 BC	Hazel
E3353	Fauleens I	*Fulacht fiadh*, Trough A	11:19; wood	GrN-30831	2500±30	774–521 BC	Hazel
E3353	Fauleens I	*Fulacht fiadh*, Trough B	27:117; wood	GrN-30833	3505±30	1898–1746 BC	Hazel
E3353	Fauleens I	*Fulacht fiadh*, C13	13:98; wood	GrN-30832	3575±30	2022–1785 BC	Hazel
E3353	Fauleens II	*Fulacht fiadh*	6:27; wood	GrN-30830	2520±25	786–545 BC	Hazel
E3406	Fauleens III	Burnt spread	C3; spread	GrN-30787	3380±50	1867–1526 BC	Alder, ash, holly
E3352	Fauleens V	Burnt spread	C3; spread	GrN-30771	3865±20	2458–2286 BC	Alder, hazel, willow
E3390	Fauleens VI	*Fulacht fiadh*	C5; fill of trough	Beta-231647	2890±60	1270–910 BC	Hazel, alder, blackthorn (AMS)
E3354	Gortanure I	Charcoal-production pit	C4; fill of pit	GrA-35152	540±35	AD 1314–1438	Oak (AMS)
E3338	Lowpark, Phase 1 (i)	Early Neolithic pits	C108; fill of pit	GrN-30846	4890±25	3701–3641 BC	Alder, hazel (AMS)
E3338	Lowpark, Phase 1 (i)	Early Neolithic pits	C154; fill of pit	GrN-30848	4985±35	3931–3874 BC, 3804–3692 BC, 3680–3662 BC	Hazel (AMS)
E3338	Lowpark, Phase 1 (ii)	Possible timber circle	C617; fill of pit	Beta-231664	3920±40	2550–2540 BC, 2490–2290 BC	Alder (AMS)
E3338	Lowpark, Phase 1 (ii)	Possible timber circle	C628; fill of pit	Beta-231665	4020±40	2630–2470 BC	Hazel, alder (AMS)
E3338	Lowpark, Phase 1 (ii)	Possible timber circle	C660; fill of pit	Beta-231666	3990±40	2580–2460 BC	Alder (AMS)
E3338	Lowpark, Phase 1 (ii)	Possible timber circle	C600; fill of pit	Beta-231663	4000±40	2610–2600 BC, 2590–2460 BC	Pomoideae, alder, hazel (AMS)

Registration/ excavation no.	Townland	Site type	Context	Lab no.	Years BP	Calibrated dates (2-sigma)	Species type
E3338	Lowpark, Phase 2	Cremation pit with Bronze Age pottery	C528; fill of pit	Beta-231661	4840±50	3700–3620 BC, 3600–3520 BC	Hazel, alder (AMS)
E3338	Lowpark, Phase 3	Palisaded enclosure	C8; Ironworking Area 1, pit	Beta-231648	1270±40	AD 660–870	Oak (AMS)
E3338	Lowpark, Phase 3	Palisaded enclosure	C306; Ironworking Area 2, pit	Beta-231651	1180±40	AD 720–740, AD 770–970	Young oak (AMS)
E3338	Lowpark, Phase 3	Palisaded enclosure	C319; Ironworking Area 3, pit	Beta-231653	1320±40	AD 650–770	Oak (AMS)
E3338	Lowpark, Phase 3	Palisaded enclosure	C572; Ironworking Area 4, pit	Beta-231662	1430±40	AD 560–660	Oak (AMS)
E3338	Lowpark, Phase 3	Palisaded enclosure	C381; fill of ironworking pit	Beta-234461	1190±40	AD 710–750, AD 760–900, AD 920–960	Oak (AMS)
E3338	Lowpark, Phase 4	Palisaded enclosure	C138; internal rectangular structure	GrN-30847	1345±25	AD 647–690, AD 752–761	Oak (AMS)
E3338	Lowpark, Phase 4	Palisaded enclosure	C213; post-cavity in souterrain wall	Beta-231649	1450±40	AD 550–660	Oak (AMS)
E3338	Lowpark, Phase 4	Palisaded enclosure	C214; fill of stone-lined keyhole-shaped pit	Beta–231650	1250±40	AD 670–880	Hazel (AMS)
E3338	Lowpark, Phase 4	Palisaded enclosure	C318; post-hole adjacent to entrance to Palisade 2	Beta-231652	1720±40	AD 230–410	Oak (AMS)
E3338	Lowpark, Phase 4	Palisaded enclosure	C338; roundhouse post-hole with gold filigree panel	Beta-231654	1100±40	AD 880–1020	Holly (AMS)
E3338	Lowpark, Phase 4	Palisaded enclosure	C377; fill of Souterrain 1	Beta-231655	1460±40	AD 540–650	Oak (AMS)
E3338	Lowpark, Phase 4	Palisaded enclosure	C433; fill of Palisade 1, inner arc	Beta-231657	1210±40	AD 690–900	Oak (AMS)
E3338	Lowpark, Phase 4	Palisaded enclosure	C444; outer arc of Palisade 1	Beta-231658	1630±40	AD 340–540	Oak (AMS)
E3338	Lowpark, Phase 4	Palisaded enclosure	C488; fill of Palisade 1	Beta-231659	1210±40	AD 690–900	Oak (AMS)
E3338	Lowpark, Phase 4	Palisaded enclosure	C503; lower fill of pit C505 cut by outer ditch	Beta-231660	2890±40	1210–970 BC, 960–940 BC	Hazel, oak (AMS)
E3338	Lowpark, Phase 4	Palisaded enclosure	C103; outer ditch	Beta-234459	1150±40	AD 780–980	Oak (AMS)
E3338	Lowpark, Phase 4	Palisaded enclosure	C304; fill of Palisade 2	Beta-234460	1250±40	AD 670–880	Oak (AMS)

Registration/ excavation no.	Townland	Site type	Context	Lab no.	Years BP	Calibrated dates (2-sigma)	Species type
E3338	Lowpark, Phase 4	Palisaded enclosure	C429; fill of outer ditch where it cut C505	GrA-35964	1270±30	AD 664–855	Oak (AMS)
E3338	Lowpark, Phase 4	Palisaded enclosure	C514; outer arc of Palisade 1	Beta-234462	1170±40	AD 770–980	Oak (AMS)
E3338	Lowpark, Phase 4	Palisaded enclosure	C537; inner arc of Palisade 1	Beta–234463	980±40	AD 990–1160	Oak (AMS)
E3338	Lowpark, Phase 5	Palisaded enclosure	C430; fill of L-shaped trench	Beta-231656	1230±40	AD 680–890	Oak (AMS)
E3337	Mullenmadoge I	*Fulacht fiadh*	C9; fill of stake-hole	GrN-30849	2850±35	1117–922 BC	Hazel
E3339	Mullenmadoge II	*Fulacht fiadh*	C26; fill of stake-hole	GrN-30850	2815±50	1115–841 BC	Oak, alder, hazel, Pomoideae
E3340	Sonnagh I	*Fulacht fiadh*	C5; fill of trough	GrN-30748	2470±30	761–414 BC	Alder
E3344	Sonnagh II	Structure	C17; fill of circular ditch	GrA-35591	5275±35	4233–3991 BC	Blackthorn (AMS)
E3344	Sonnagh II	*Fulacht fiadh*	C11; fill of pit	GrN-30749	3070±45	1431–1212 BC	Alder
E3344	Sonnagh II	*Fulacht fiadh*	C13; fill of pit	GrN-30750	2760±60	1044–805 BC	Hazel
E3344	Sonnagh II	*Fulacht fiadh*	10:5; wood	GrN-30751	3170±20	1492–1413 BC	Ash
E3345	Sonnagh III	*Fulacht fiadh*	C4; fill of trough	GrN-30754	4100±40	2867–2497 BC	Alder
E3346	Sonnagh IV	*Fulacht fiadh*	5:18; wood	GrN-30755	3005±20	1368–1132 BC	Alder
E3347	Sonnagh V	*Fulacht fiadh*	8:95; wood	GrN-30756	3065±20	1401–1294 BC	Birch
E3348	Sonnagh VI	Burnt spread	C2; spread	GrN-30757	3360±20	1725–1612 BC	Alder
E3349	Sonnagh VII	Burnt spread	C2; spread	GrN-30758	3130±65	1528–1214 BC	Alder
E3526	Sonnagh VIII	Burnt spread	C3; fill of pit	GrN-30786	1005±30	AD 982–1150	Oak
E3358	Sonnagh IX	*Fulacht fiadh*	C6; fill of trough	GrN-30759	3645±40	2134–1919 BC	Alder
E3359	Sonnagh X	*Fulacht fiadh*	10:5; wood	GrN-30774	3320±20	1660–1527 BC	Alder
E3528	Sonnagh XIII	Charcoal-production pit	C305; fill of pit	GrA-35151	475±35	AD 1405–1460	Oak
E3350	Tomboholla	Burnt spread	C2; spread	GrN-30760	3985±55	2831–2299 BC	Alder, ash

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Notes
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OF TROUGHS AND TUYÈRES presents the results of more than forty excavations carried out before construction of the N5 Charlestown Bypass. Pre-development route selection avoided known archaeological sites. Initial small-scale test excavations determined areas where full resolution of all potential archaeological sites was required.

Archaeological work on the road scheme has allowed for an exploration of six millennia of human activity within a relatively ordinary landscape. The results are remarkable and highlight the potential of a landscape where monumental remains do not indicate the full extent of human activity. Work at Sonnagh townland uncovered Early Neolithic roundhouses, pre-dating the well-known site at Ballyglass. A cluster of extremely well-preserved Bronze Age *fulachta fiadh* was also uncovered in Sonnagh, and finds included a tin bead perhaps imported from as far away as Switzerland. A previously unknown archaeological complex site at Lowpark townland included Neolithic pits, a Grooved Ware timber circle and early medieval enclosures. The enclosures are unusual in the Irish archaeological record as they were split-plank timber palisades, constructed sequentially. Evidence for repair of the palisades and contraction of the settlement sites was also recorded. Lowpark has provided a unique record of the technology of ironworking in the early medieval period, with the discovery of three semi-underground iron workshops and artefactual remains including anvils, tuyère fragments and almost one-and-a-half tonnes of iron slag. The excavation at Lowpark has also provided secure dating of souterrains clearly showing their construction period in the sixth and seventh centuries.

The archaeology of the Charlestown Bypass includes many other sites, ranging from the Neolithic to vernacular 19th-century buildings. Specialist reports on the findings have reconstructed past landscapes, indicated contact with the wider world and provided great insights into past technologies and crafts.

This book brings the results of the excavations into the public realm. It provides source material for future archaeological researchers, adds greatly to our knowledge of past activity and the exploitation of the locale in prehistoric and historic times, and records centuries of interaction between people and the landscape.

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