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*Sustainable change:
settlement, environment
and the temporality of
Neolithic western Ireland*

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Submitted in fulfilment of the requirements for the degree of
Doctor of Philosophy at the National University of Ireland, Galway

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Dedicated to the memory of Cora Sheridan

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Abstract

Time is significantly under-theorised in the study of Irish prehistory, and evidence continues to be compartmentalised within the generalising classifications of the Three Age system. The process of Neolithisation is often taken as having been abrupt, characterised by the widespread adoption of settled-mixed-farming: permanent houses and fixed agricultural plots. This interpretation has endured since the establishment of prehistoric archaeology in Ireland, and recent quantitative research has been taken to confirm the traditional view.

It is the contention of the present study that new data are often assimilated uncritically into an anachronistic culture-historical framework. The resulting characterisations of Neolithic life rely on misleading conflation of evidence. By suspending the orthodox view of life in Neolithic Ireland, and revisiting the data critically, the present study argues that many widely-held assumptions are importantly wrong.

In making this case, the concept of time is first problematised, and the treatment of time in archaeology critiqued. The concept of the Neolithic is similarly deconstructed; its place in the archaeological imagination and significance to Irish national identity examined. The analysis focuses on two 'iconic' classes of material remains: field systems and rectangular timber 'houses'. The dating of both is dependent on palaeoenvironmental evidence, and the refinement of radiocarbon-based chronologies using Bayesian statistics. The application of these techniques is critically reviewed.

It is demonstrated that no field system in Ireland is securely dated to the Neolithic, and that the varied function of Neolithic rectangular timber structures has been misleadingly conflated under the typological label 'house'. The study concludes that the development of traditionally-defined Neolithic lifeways in Ireland was an accretive process, varying in tempo according to local conditions. A focus on western Ireland demonstrates the inadequacy of island-wide culture-historical models of change. In order to capture temporality at the scale of the participants, an agent-centred approach is proposed.



Notes for the reader

The approximate date ranges assumed for the archaeological periods referred to in the text are as follows*:

Mesolithic	Early Mesolithic	Late Mesolithic
8000-4000 BC	8000-6500 BC	6500-4000 BC

Neolithic	Early Neolithic	Middle Neolithic	Late Neolithic
4000-2500 BC	4000-3600 BC	3600-3100 BC	3100-2500 BC

Bronze Age	Early Bronze Age	Middle Bronze Age	Late Bronze Age
2500-1600 BC	2500-1600 BC	1600-1000 BC	1000-600 BC

Iron Age
600 BC-AD 400

*after Waddell (2010, vi)

The earliest part of the Bronze Age (*c.* 2500-2000 BC) is also referred to as the Beaker period.

'Earlier prehistory' refers to the period from the first known human settlement in Ireland through to the end of the Beaker period.



Chapter 1

Time and the Neolithic in Ireland

1.1. Purpose, themes, aims and objectives

People did not live in Ireland then. They lived in small, intense communities, which varied greatly in spirit and character...

John McGahern, *Whatever you say nothing: Eye on the 20th century* (1999)

The purpose of this thesis is to increase understanding of the lives of people of Neolithic Ireland. Of the three key dimensions in archaeology – material culture, time and space (e.g. Spaulding 1960) – time is selected as the ‘lead’ perspective. Specifically, the research aims to create new knowledge of the Neolithic through source critical analysis of the available temporal data, as well as through the explicit application of time theory. Rather than viewing time as a neutral parameter, the impact of conceptions of time on the characterisation of Neolithic Ireland will be examined.

Time is a nebulous concept, often seen as under-theorised in archaeology (e.g. Ingold 1993; Gosden 1994; Barrett 2004). Yet it is the primary means by which archaeological knowledge and objects are organised. The ‘Neolithic’ can itself be seen as a temporal construct: a period of time equal (in Ireland) to c. 1,500 years. Thus, the *measurement* of time in archaeology, and the situating of past events in chronologies, is a major aspect of the enquiry. This theme incorporates the selection of contexts and materials for the quantification of the Neolithic: what landscapes, structures, artefacts and ecofacts are seen to define the Neolithic cultural environment? By what means are these remains transformed into knowledge about the past? What assumptions underpin archaeological facts?

Time, however, is more than just a quantity. People experience *being* in time, and that experience melds the present with memories (and histories, traditions and myths) of the past, as well as anticipation of the future. We cannot hope to understand the way people lived in the past if we do not engage with the human experience of time—human *temporality*. The current study seeks to elucidate means by which the available (static) material evidence of events in Neolithic Ireland can be augmented to help elucidate the *dynamic* temporality past lives. Human temporality—at the scale experienced by Neolithic communities in the west of Ireland—is thus the second major theme.

The final (related) theme concerns the temporality of archaeological researchers (*sensu* Karlsson 2001, 55-6). Archaeologists do not approach the past divested of all ‘contemporary baggage’. In seeking to understand the past, we inevitably draw upon our own experiences and knowledge from the present. This can act as a distorting lens. The Neolithic has become a shorthand for a great step forward in human development: the ‘dawn of civilisation’, no less. As well as being hugely significant in the archaeological imagination, the emergence of the first farmers has great significance in the cultural identities of many nations. Ireland is no exception to this, and rural traditions continue to play a significant role in defining Irish national identity. The parallel development of the discipline of archaeology and Ireland as a nation state has helped shape the way in which the temporality of Neolithic Ireland is understood and represented. Deconstructing the representation of the Neolithic is the third major theme.

The separation of these three themes is of course artificial: they are inseparably interwoven in archaeological practice. However, the

identification of these themes informs the specific objectives of the project, which can be grouped around three principal aims:

Aim 1: Increase understanding of the impact of contemporary research practice and social conditions on the characterisation of Neolithic life in Ireland.

Objectives

- ◆ Review the historiography of interpretation of the Neolithic in archaeology.
- ◆ Identify the significance of the Neolithic in the development of Irish national identity.
- ◆ Examine the impact of archaeological and national traditions on the interpretation of archaeological evidence of the Neolithic in Ireland.
- ◆ Demonstrate how those interpretations might differ were it not for those traditions.

Aim 2: Increase the contribution of time measurements to knowledge of Neolithic Ireland.

Objectives

- ◆ Establish a working definition of time, and relate 'archaeological time' to that definition.
- ◆ Trace the development of time measurement in prehistoric archaeology, and its impact on the characterisation of change in prehistory.
- ◆ Define the concept of human temporality and its relationship with measured time.

- ◆ Identify the methods and techniques which underpin current archaeological chronologies.
- ◆ Critically examine the application of these methods and techniques, the temporal data they have contributed, and how these data have been transformed into archaeological knowledge.
- ◆ Test the assumptions that underpin the resulting models of the unfolding of the Neolithic in Ireland, identifying equiprobable alternatives where possible.

Aim 3: To sketch, in a preliminary way, how the development of the Neolithic in Ireland could be re-cast in future research.

Objectives

- ◆ Situate the findings of the present study within an outline chronological framework for the development of the Neolithic in western Ireland.
- ◆ Demonstrate how critical engagement with the established chronological framework has advanced understanding of lifeways in Neolithic Ireland.
- ◆ Demonstrate the contribution greater consideration of multiple temporalities can make to understanding Neolithic life in Ireland.
- ◆ Identify directions for future research which interrogate and build upon the outcomes of this thesis.

◇ ◇ ◇

1.1.1 In what remains of Chapter 1...

The remainder of the current chapter provides additional context for the study. The major parameters are set out, as well as the approach and methodology. These are followed by an introduction to temporality: the structuring concept of the thesis. Finally, an outline of the remaining chapters is provided.



1.2. Scope and constraints

This research draws specifically on the published record. It is outside the scope of the enquiry to generate new data from fieldwork.

The topic of the thesis is the Neolithic. While both the temporal and cultural definitions of the Neolithic will be challenged, it is beyond the scope of this enquiry to examine in detail evidence which has been attributed to other periods.

In material terms, the research focuses on evidence for settlement and subsistence in Neolithic Ireland. Two specific categories of structural evidence—together with associated artefacts and ecofacts—have been selected for close analysis: field systems and rectangular timber structures (typically referred to as houses). Megalithic monuments are seen to represent an outstanding opportunity for complimentary future research focused on broadening understanding of the temporality of life in Neolithic Ireland.

The spatial focus of the study is the west of Ireland, defined broadly as west of the river Shannon. The boundary is however extended south to incorporate the Dingle peninsula, Co. Kerry, and north to incorporate the Slieve League peninsula, Co. Donegal (see Figure 1.1, below). This stretch of Atlantic coastline and its hinterland provided an environmental and social (as well as logistical) counterpart to the Neolithic of the Irish Sea zone in particular. Detailed consideration is however given to the island-wide evidence, and the study is placed in its European context.



Figure 1.1: Outline map of Ireland showing the course of the River Shannon. The project study area is west (left) of the red curve.

1.3. Approach and methodology

Theory precedes knowledge in as much as it tells us how to observe the contexts of the past, but knowledge has to be built out of a practical engagement with the details of our evidence.

John C. Barrett and Ian Kinnes (1988, 1)

This is a critical study that responds to calls to challenge the assumptions that underlie the interpretation of Irish prehistory (e.g. see papers in Desmond *et al.* 2000, and Milner and Woodman 2005a). It is argued that rather than uncritically assimilating new temporal evidence into existing interpretive frameworks, considerable new knowledge can be generated from alternative (internationally tested) approaches, which can better accommodate more refined data.

From a quantitative perspective, the particular focus is on the related issues of context as opposed to circumstance, and target event as opposed to dateable proxy. These are deceptively simple concerns, but, as will be demonstrated, can lead to the large-scale misinterpretation if not properly understood and controlled. It goes without saying that the routine failure to publish proper accounts of the acquisition of quantitative data in the field is a pervasive problem (e.g. Murphy and Whitehouse 2007, xx-xi).

Methodological concerns have, however, generally received greater consideration than theoretical perspectives on time in the context of Neolithic studies in Ireland. Yet the meaning ascribed to dated events is contingent on theoretical perspective. It will be demonstrated that considerable support remains for the notion that the meanings of dated events are self-evident—arrived at through ‘common sense’ (rather than

unexamined theory); or, alternatively, that the meaning will become self-evident once sufficient events have been dated. The position taken here is that data are never gathered, analysed or interpreted atheoretically, and that assumptions should be made explicit and subject to critique.

The conceptual gap between abstract measurements taken in the present and human experience in the past constitutes one of archaeology's greatest challenges. In seeking to bridge the gap between (static, closed) time measurements and the (dynamic, open) human experience of time, much can be learnt from approaches developed in other social science disciplines, as well as international prehistoric studies. In Irish Neolithic studies, considerable recent attention has been applied to the human experience of space (e.g. Bergh 1995; Cooney 2000a), as well as increasingly sophisticated treatments of material culture (e.g. papers in B. O'Connor *et al.* 2009). These broader perspectives seek to situate evidence in its dynamic social context (past and present), forming part of a theoretical framework in which the three key dimensions of space, time and material culture are extended to become spatiality, temporality and materiality (e.g. see Meskell and Preucel 2004). The current enquiry is positioned alongside this work.

The research examines original sources (including excavation and specialist reports, summaries and monographs) with particular regard to the methods by which original data were obtained, and the theoretical frameworks that informed those methods. This investigative approach is extended to the interpretation and synthesis of archaeological evidence, as well as analyses such as palaeoenvironmental studies and programmes of radiocarbon dating. An outline of the methodology is set out below.



1.3.1 Literature review

The concept of time

The analysis begins with a review of literature on the physics and philosophy of time. The outcome is a working definition of the concept of time that can be applied to archaeology.

The concept of time in archaeology

The history of the concept of time in prehistoric archaeology is traced, and situated in the context of time theory.

The concept of Neolithic in Ireland

The history of concept of the Neolithic is traced, and considered in the context of contemporary national identity in Ireland.

Measuring time

Radiocarbon dating—the principal method by which time is now measured in prehistoric archaeology—is introduced, along with Bayesian statistics (the means by which the latest high precision dating sequences have been achieved).



1.3.2 Critical analysis

Structural remains and associated artefacts

The physical evidence for what are presumed to be Neolithic field walls and rectangular timber ‘houses’, together with associated artefacts, has

been established through source-critical analysis of excavation reports and summaries, specialist reports, monographs, quantitative analyses, and syntheses. The following details are of particular concern:

- ◆ the precise nature of evidence, description and classification;
- ◆ the precise spatial context, the security of that context, stratigraphy and topography;
- ◆ preservation and taphonomy;
- ◆ the relationship with other evidence, and the means by which this has been established;
- ◆ the estimated age of the feature or artefact;
- ◆ assumptions made;
- ◆ alternative explanations considered.

A Geographical Information System (GIS) has been used to collate and present certain spatial data. A limited number of site visits have been undertaken to examine and photograph extant remains in context, as well as the representation of material in interpretive centres and museums.



Environment and associated ecofacts

The application of methods of palaeoenvironmental reconstruction and palaeobotanical analysis are the subject of detailed critical analysis. Studies which have been carried out in the context of the identified structural evidence are examined to identify, among other things:

- ◆ the precise nature of evidence and the means of identification;
- ◆ the precise spatial context, the security of that context, stratigraphy and topography;
- ◆ preservation and taphonomy;

- ◆ the relationship with other evidence and the means by which this has been established;
- ◆ the estimated age of the sample(s);
- ◆ assumptions made;
- ◆ alternative explanations considered.

◇ ◇ ◇

1.3.3 Synthesis and discussion

The analysis in context

The prevailing orthodoxy is examined in the context of the received wisdoms and disciplinary traditions identified in the literature review.

- ◆ How were temporal relationships identified?
- ◆ Are there systematic (methodological) issues that may affect these relationships?
- ◆ What outcomes did practitioners expect?
- ◆ Were these expectations confirmed?
- ◆ Does the evidence support alternative interpretations? If so, were these alternatives considered?
- ◆ To what extent do outcomes rely upon analogy with previous research?
- ◆ How do syntheses interpret the evidence?
- ◆ How are time measurements incorporated into archaeological narratives?
- ◆ Is there comparable evidence elsewhere in Atlantic Europe? If so, how has that evidence interpreted? What lessons can be learnt from this?

◇ ◇ ◇

Towards temporality

Setting aside, so far as it is possible, disciplinary tradition and contemporary expectations, what insights have been gained into the process of change that began in the later Neolithic?

- ◆ What evidence is there for the role of indigenous communities in the Neolithisation of Ireland?
- ◆ To what degree was the transition to farming uniform in time and space?
- ◆ Was the 'Neolithic package' introduced simultaneously?
- ◆ By what mechanism were these 'novelties' introduced?
- ◆ When did settled-mixed-farming landscapes emerge?
- ◆ What level of temporal analysis can the evidence support (day/year/decade/generation/century)? For individuals or for groups? How can the constraints be best addressed?
- ◆ What are the theoretical and methodological lessons for future research?



1.4 Temporality and the Neolithic in Ireland: key concepts

Ranke's celebrated phrase, 'Every generation is equidistant from eternity', was doubtless meant as a corrective to the Whig interpretation of history, that which follows the furrow of progress to the present and praises the dead ploughman who deviated least from the appointed line.

Oliver MacDonagh, *States of Mind* (1983, 6)

Such is the significance of the Neolithic in the archaeological imagination, it is easily forgotten that the term is a modern temporal construct (e.g. Zvelebil 1998, 24). Neolithic people are *our* ancestors—like *us*, they were farmers: they tilled the land, herded cattle, and relaxed around the firesides of their homesteads (Pluciennik 2008, 20). The Neolithic way of life—and its archaeological vestiges—is familiar, and can be understood on our terms (Downes and C. Richards 2005). Rural traditions can be traced back to the first farmers, but no further (Zvelebil 1996). Mesolithic people represent the uncivilised *Other*: 'their distance from us economically, practically, conceptually and socially' leaves them outside of tradition (Pluciennik 1998, 64).

The perceived opposition between the Neolithic and what went before is reinforced by highlighting cultural differences (and downplaying similarities) (e.g. Finlayson and Warren 2010, 79). *All* of the innovation seen to have taken place during the (1,500-year-long) Neolithic is often garnered in defence of this temporal border. Thus, a 'relatively uniform culture package' is seen to define the Neolithic from the outset (Cooney 2007a, 549; cf. Whittle 2007a, 379). The social conditions in which changes emerged, the continuities that endured, the development and accretion of new social trajectories, and variations across time and space, are

downplayed or dissolved (cf. e.g. Mead 1929, 236; Baert 1992, 6). It is with the resulting 'compression' of time—the 'loss of *temporality*'¹—that the present study engages.

Following Gosden (1994, 196) the position taken here is that it is *not* the purpose of archaeology to 'dissolve difference, to make it go away'. In part, this avoidance of being 'imprisoned by generalization' demands the precise chronologies (Whittle *et al.* 2008, 66). Undoubtedly, the 'very crude' chronologies with which archaeologists have traditionally been forced to content themselves have contributed to the creation of the opposing essentialised models of Mesolithic and Neolithic (Whittle 2007a, 390). Margins of error that may extend to half a millennium or more leave much to the archaeological imagination. Traditionally preferred models of change are difficult to challenge with such vague data.

There has, however, been considerable recent progress in refining Neolithic chronologies. Stratified series of high precision radiocarbon dates in combination with Bayesian statistics now provide the potential for windows on the tempo of change at the scale of human generations (Whittle 2011; e.g. see Whittle *et al.* 2011a). Here, then, is the opportunity 'to think in terms of more complicated processes, possibly over extended timescales, and in so doing it is time to challenge the essentialist vocabulary which has dominated debate for too long' (*ibid.* 2007a, 391). High-precision chronologies provide a route towards *temporalised*² prehistory. There are, however, considerable methodological and conceptual issues to be overcome in the context of Neolithic Ireland.

Chapters 3 and 4 of the present study examine some of the methodological constraints in detail. But what of the conceptual issues? What does the concept of temporality add to the measured time of chronologies? While

the metaphysics of time is examined in more detail in Chapter 2, in summary, the position adopted here is that measured time is an aspect of human temporality. The measurement of time provides a temporal framework—an essential means of ordering past actions in time (e.g. Gosden 2004, 29). However this framework is closed and static: actions are isolated from each other, and therefore decontextualised—divorced from their social circumstances (e.g. Adam 1990, 3; 2006, 123). Also, due to the nature of the survival of the evidence, and the constraints on its collection, chronologies of prehistory will always remain largely incomplete.

Given the fundamental disciplinary concern for understanding the *people* of the past, archaeologists are faced with the problem of interpreting these incomplete static chronologies in human terms. People do not experience time as disjointed moments: human time flows. Human actions take place in the context of what has happened before, what is happening *now*, and in anticipation of what will happen in the future. The social trajectories of individuals and groups are not fixed: humans are active in developing their social circumstances. Dated actions provide snapshots in time, but temporal context is required in order to render these meaningful. The timing of actions is an aspect of temporal context—an aspect of *temporality*—but cannot alone confer meaning.

The futility of treating time purely as a quantity, and seeking to ‘crack’ prehistory by gathering ever more numbers has long been understood. There is no point at which the substance of past lives will emerge from a spreadsheet. But nor is it sufficient to *imagine* prehistory without recourse to structured evidence. As always in social science, a balance between qualitative and quantitative approaches is required. Whittle (2007a, 378) observes that in some studies, the construction of chronologies has been

consigned to 'a second and rather mundane class of activity'. This is not, however, an accusation that could be levelled at the corpus of research into the Neolithic in Ireland. Here, as will be demonstrated, the treatment of time in prehistory remains overwhelmingly quantitative, with qualitative aspects at best secondary, often being seen as self-evident.

Viewed in terms of Wylie's (1989; 2002, part 3; 2007) 'interpretive dilemma', time in Irish prehistory is typically treated from a 'narrow empiricist' (2007, 519) perspective. Only observational data—in this case dated events—are seen to have the necessary 'stability and authority' to provide genuine knowledge of the past (Wylie 1989, 20; 2002, 33-4). Theory is a matter for the future: to be considered once sufficient data have been accumulated (Woodman 1992, 38; Cooney 1995, 265).

A great irony with this approach is that so disproportionate is the effort expended on gathering data, that only a tiny proportion ever reaches publication, thus 'much of the data is rendered inaccessible to current, and more especially, future archaeologists' (Cooney *et al.* 2006, 11). Moreover, whether acknowledged or not, theoretical assumptions pervade archaeological practice and related scientific analyses: unacknowledged assumptions are by their very nature uncritical and go unchallenged. As Wylie (1996, 438) observed, judgements concerning the significance of archaeological data 'are radically open': contingent upon the social and disciplinary context in which they are interpreted (Mead 1929, 240; Said 2003 [1978], 10; Potter and López 2001, 9).

Where time is understood in purely quantitative terms, evidence for the variety and complexity of social practice can become inconvenient 'noise' in the dataset, seen as detracting from the clarity of chronological models (e.g. Shanks and Tilley 1992, 8; see Barber 2003, 232). However, the most

precise time measurements do not necessarily come from the most archaeologically relevant contexts. There are research priorities and biases that distort the record. Subjective judgements are required where, for instance, there is a single example of a particular dated phenomenon: should this be seen as a recording error, a one-off, or part of an as yet unrecorded pattern? What *is* certain is that the data will always be incomplete, and cannot be expected to manifest themselves in a predictable sequentially-ordered record of human 'progress'; human nature does not conform to this ideal.

Empirical practice, then, does not shelter archaeologists from the need to make theory-laden *qualitative* assumptions – the need to exceed what can securely be established through measured observation. Typically, as Kuhn (1970) famously established regarding empirical research in general, these assumptions conform to the received wisdoms of disciplinary paradigms (cf. e.g. Baert 1998, 187; Trigger 1989, 5-8). In the study of European prehistory, the coming of 'immigrant shepherds and cultivators' – Childe's (1925; 1957) 'Neolithic Revolution' – is arguably the most pervasive paradigm (e.g. Gamble *et al.* 2005, 210; Gamble 2007a, 25): this is the 'familiar version of the past' for which archaeologists have been 'trained to listen' (Gamble 2007b, 91).

In the context of the study of prehistory in Ireland, which 'has been and remains empiricist to a great degree' (Waddell 2005, 2), opinion has held with the Childean view that colonising agriculturalists initiated the rapid and widespread adoption of settled-mixed-farming at the start of the temporally defined Neolithic (Whittle 2011b, 849 with references; Waddell 1978, 121-2). The archaeological tendency to presuppose rapid widespread change at the start of the Neolithic is clear. Where major dislocation is assumed, the agency of external forces is typically invoked.

Certainly a clean break with the past is scientifically expedient, providing clearly binary classifications. However, Childe developed his hypothesis prior to the invention of radiocarbon dating, when the duration of the Neolithic was thought to be just half a millennium (Thomas 2008, 62). As Clarke (1973, 11) put it:

Under the ultra-short chronologies, archaeological time was confused with historical time and seemed packed with data and events; large-scale phenomena appeared to take place in swift interludes-hence the prevalence of 'invasion' explanations. This situation is precisely equivalent to that underlying the 'catastrophe' theories of 18th-century geology and we should note the connexion between time scale, explanation and theory, since it is now exceedingly doubtful that the archaeologist can continue to use the old stock of political, historical and ethnic explanatory models in this direct way.

Following Clarke, it should be expected that explanation and theory would respond to the changing time-scales of the Neolithic, now *circa* three times longer, with chronological resolution substantially improved. In this sense, time theory in archaeology has not kept pace with methodological advances (cf. e.g. Paynter 2002, S97; Whittle *et al.* 2011c, 909; Robb and Miracle 2007, 114). Of course, it may be the adoption of the material culture of the 'Neolithic package', together with settled-mixed-farming, was 'rapid and abrupt' in Ireland: certainly, one would be hard-pressed to find a dissenting voice at present (e.g. see Thomas 2008, 69; Bayliss *et al.* 2011b, 808; Whitehouse *et al.* in press). However, the spectre of reification cannot be dismissed without challenging the assumptions which underlie traditional interpretations.

The issue of whether the 'prime agents'³ in the Neolithisation of Ireland were the indigenous population or migrant farmers will be returned to in Chapter 5. The preceding analysis focuses on the adoption of settled-mixed-farming in the west of Ireland, focusing on whether this was rapid and widespread, or accretive across time and space. Of course, within

these extremes there are endless permutations. However, as a starting point, it should be possible to validate the evidence for an early Childean step-change, identifying any evidence of variation across time and space.

The *evidence* is key, for this constrains ‘the range of plausible interpretive options’, acting as a check on theoretical speculation (Wylie 1989, 26). Besides being grounded in the evidence, the present study is guided by the principal that, given the passage of time, and the fragmentary nature of the archaeological record, it should be expected that there will be more than one plausible interpretation of the evidence in most circumstances. Interpretations which claim ‘unequivocal’⁴, ‘categorically’⁵ demonstrated, ‘emphatically confirmed’⁶ knowledge of the events of four-to-six thousand years ago are treated with scepticism. (This is not to say that some explanations are far better supported – far more plausible – than others.)

Furthermore, the position is taken that, even in circumstances where rapid widespread cultural change is in evidence, there is a need to guard against the ‘block thinking’⁷ that envisages the clean replacement of discrete cultural groups. Dividing human prehistory into largely undifferentiated cultural blocks risks determinism: cultural change devoid of human agency (at least on the part of the recipients) (e.g. Gosden 1994, 3; S. Jones and C. Richards 2000, 103-5). Whittle *et al.* (2011b, 910) quote Paul Ricoeur (1984, 224) in this regard:

A long time can be a time without any present and, so, without past or future as well. But then it is no longer a historical time, and the long time-span only leads back from human time to the time of nature.

If human agency ‘makes time for itself...at the intersection between memory and anticipation’ (Barrett and Fewster 2000, 30; Whittle 2005, 69), human time cannot be properly understood at the scale of the cultural periods of the Three Age System (or large subdivisions thereof).

This raises the issue of the different scales of analysis required to engage with the distant past. At the grand scale of centuries and millennia, environmental change and cultural transformations are visible, but the social circumstances that acted upon and were affected by these processes as they occurred are not. The *Annales* school, established in 1929 by French historians Lucien Febvre and Marc Bloch—particularly as developed by Fernand Braudel (1972 [1966])—has been influential in European archaeology’s endeavour to grapple with this issue (e.g. Knapp 1992, 9; J. Harding 2005, 88).

Braudel’s approach distinguishes between the three temporal scales of short-term events, medium-term (socio-economic, socio-political) cycles, and long-term (environmental) trajectories (Baert 1992, 42; Preucel and Meskell 2004a, 9). Of particular influence among prehistorians has been the latter long-term, large scale structure: the *longue durée* (Bintliff 1991, 17; Whittle *et al.* 2008, 65). The attraction of a long term perspective when dealing with the immense timescales and traditionally fuzzy chronologies of prehistory is clear (Lucas 2005, 14-16). As Hodder (1987, 6) points out, Braudel’s (1972, 1244) observation that ‘the long run always wins in the end’ has an ‘internal logic, a tautologous character from which it is difficult to escape’. However, perhaps unsurprisingly, there has been criticism that the concept *longue durée* is under-theorised (e.g. Gosden 1994, 135).

The problem with the *longue durée*, at least in its application to prehistory, has been that in foregrounding long term geohistory, the spectre of environmental determinism again emerges (Hodder 1987, 6): events risk becoming the inevitable outcome of underlying environmental structures/processes (Baert 1992, 42-3); humans the passive ‘prisoners’ of their environment, rather than active agents in shaping it (*ibid.*; Whittle *et*

al. 2011c, 910). In the context of the study of Irish prehistory there has been little explicit application of the *Annales* approach other than in the work of E. Estyn Evans (see Chapter 2, Section 2.4). The potential of the approach as a theoretical framework for exploring ‘different wavelengths of time’ has, however, been acknowledged (Cooney 2000c, 4; Aidan O’Sullivan 1998, 190-1). The strength of the *Annales* approach as conceived by Braudel is in providing a framework for understanding how phenomena acting at varying but interacting timescales provide historical context for events (Dobres and Robb 2000, 7; Whittle *et al.* 2011b, 3).

Among other social theories engaging with different levels of temporal analysis, *agency* theory has been especially influential in archaeology. In particular, many researchers seeking to accentuate the role of people, individually or collectively, in the ‘social construction of reality’ have been attracted to Anthony Giddens’ (1984; 1979) *structuration* theory (e.g. Moreland 1992; Barrett and Fewster 2000; papers in Meskell and Preucel 2004; Gardner 2008). Structuration theory aims to bind differing temporal scales (Baert 1998, 100-101): for Giddens (1984, 36), ‘the temporality of human practice [is] expressed in the mutual interpolation’ of differing temporal scales.

According to structuration theory, society is continuously created over time through the actions of human agents, *never* fixed or static. Human agents (whether acting individually or as a group) are capable of conceiving and pursuing their own goals. Agents act (or decide not to act) within the context of longer-term structures, however these structures have no independent existence: structures are both the medium and the outcome of human actions (Baert 1998, 100-101; Bhaskar 1998, xvi; Dobres and Robb 2000, 7-8; Danermark *et al.* 2002, 179; M. Johnson 2006, 122). Material culture – materiality – is a mechanism through which people both

maintain and transform social structures (Dobres and Robb 2000, 14; Hodder and Hutson 2003, 94). All material culture reflects the choices, whether conscious or not, of human agents (Joyce and Lopiparo 2005, 368). The archaeological record thus provides (albeit fragmented) insights into the ‘continuous flow’⁸ of agency – the temporality of life – in prehistory.

Structuration as conceived by Giddens does not provide a panacea for archaeological interpretation. The ‘vast temporal and geographic scales of structuration’ embodied in archaeological landscapes present both opportunities and challenges which are disciplinarily specific (e.g. Joyce and Lopiparo 2005, 367-8; Dobres and Robb 2000, 14). Whittle (2003, 11) raises the concern that structuration ‘presents rather disembodied agents’, and that the relationships between individuals and social structures is often oversimplified (see also Whittle *et al.* 2008, 65). Nevertheless, as a framework for re-orientating archaeological thought ‘to view long-term change as a human product, rather than...a result of natural forces operating in abstract time’⁹, structuration has made, and continues to make, a hugely significant contribution to archaeology.

The very limited engagement with time theory and human agency in the study of the Neolithic in Ireland provides an opportunity to rethink long traditions of archaeological thought, re-orientating certain ideas and concerns¹⁰: the purpose of this project is to contribute to that process. In combination, critical engagement with methodological improvements in time measurement, together with the interpretive advancements provided by time theory, open ‘opportunities for writing much more varied and particularising histories of change’ in Neolithic Ireland (Whittle 2007b, 626).



1.5 What follows

Culture is inescapably tied to the human relationship to time: to death and the boundedness of human existence, to change, transience, ephemerality and contingency, and to the rhythmicity of the physical and living environment.

Barbara Adam, *Time* (2006, 120)

In pursuit of the aim of contributing to temporalised prehistory in Ireland, Chapter 2 provides a background to time theory and its manifestation in the development of the discipline of archaeology, as practised in Ireland. Chapters 3 and 4 engage critically with newly available chronological data, examining the ways in which evidence from excavations and palaeoenvironmental studies informs the characterisation of the Neolithic in Ireland. The analysis focuses on presumed-Neolithic field systems (Chapter 3) and rectangular timber structures (Chapter 4) in the west of Ireland. The interpretation of these two classes of evidence are significant in informing the *settled-mixed-farming* interpretation of the Neolithic in Ireland.

Based on the findings from Chapters 3 and 4, and in the light of the theoretical insights from Chapter 2, the *settled-mixed-farming* hypothesis is critically reappraised in Chapter 5. Evidence of multiple temporalities¹¹—multiple Neolithics—is found to be in evidence concurrently across the space of the study area. It is within these varying social trajectories that the agency of Neolithic people and the temporality of Neolithic life becomes more apparent. Chapter 6 summarises the contribution to temporalised prehistory, and recommends future directions for research into the temporality of life in Neolithic Ireland.

Notes

¹ This idea is explored by Harvey (1990) in his study of postmodernity. The quotation comes from page 58 (my emphasis).

² See Baert's (1992) explication of 'temporalised' sociology: 'a research programme featuring diachronic analysis and process (in the sense of both novelty and continuity) as its methodological rules as opposed to structural synchronous research' (p. 4); cf. Bourdieu (1977, 8-9).

³ See Sheridan (2010, 89).

⁴ See Caulfield *et al.* (1998, 639).

⁵ See Finlayson and Warren (2010, 76).

⁶ See Whitehouse *et al.* (in press, 1, 6).

⁷ See Sherratt (1995, 6).

⁸ See Giddens (1984, 3).

⁹ See Gosden (1994, 9).

¹⁰ See Gosden (1994, 9).

¹¹ cf. e.g. Massey (1999, 274); Olivier (2001, 69-70).



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Chapter 2

Time in theory, temporality in practice

2.1 Time and archaeology

*Time present and time past
Are both perhaps present in time future,
And time future contained in time past.
If all time is eternally present
All time is unredeemable.*

T. S. Elliot, *Burnt Norton* (1963 [1935])

The purpose of this chapter is to establish the present study in its theoretical and disciplinary contexts. Fundamentally, the aim of the study is to demonstrate how conceptions of time inform the understanding of prehistory. The starting point (Section 2.2) is a brief examination of the concept of time and its relation to ‘archaeological time’. Two essential perspectives of time emerge: time as a measurable quantity and time as a mutable aspect of human experience. Though not, it is argued, inherently irreconcilable, the relative importance attached to these conceptions is a determining factor in the characterisation of the past.

In Sections 2.3 and 2.4 of this chapter, the representation of time is traced through a brief history of the discipline of archaeology from its foundations in European antiquarianism to its establishment in Irish academe. The Three Age System is synonymous with the establishment of academic archaeology. Albeit that these large ‘blocks’ of time have been much refined, the disciplinary legacy of the notion of a succession of long, largely undifferentiated cultural phases in prehistory remains forceful.

The Neolithic is the period of archaeological time that is the principal concern of the present study. In archaeological tradition, the advent of the Neolithic—the coming of agriculture—is synonymous with the ‘dawn of civilisation’. ‘Stock-breeding and the cultivation of cereals were

revolutionary steps in man's emancipation from dependence on the external environment' (Childe 1925, 50). Farming is similarly construed in the national imaginations of most European nation states, Ireland being no exception. Few nations trace their ancestry to hunter-gatherers (e.g. Pluciennik 1998, 64; Thomas 1999, 11). History begins with the Neolithic (Gamble 2007, 32).

The characterisation of the Neolithic cannot be divorced from the contemporary concerns of researchers. The way it is determined a prehistoric farming community *should* look strongly influences its portrayal. The function and significance of archaeological evidence will be judged through this distorting lens. The presence of seemingly familiar objects and features in Neolithic contexts serves to 'compress' the time between the past and the present.

New technologies and techniques have transformed the measurement of time in Irish archaeology, but the theoretical framework within which the data are understood has received limited attention. The theoretical implications of this interpretive lag are set out in Section 2.5, before being analysed in practice in Chapters 3 and 4. Section 2.6 concludes the review, returning to the concept of temporality which informs the discussion in Chapter 5.



2.2 What *is* time?

What, then, is time? If no one asks me, I know what it is. If I wish to explain it to him who asks me, I do not know.

St. Augustine, *Confessions*, XI, 14 (1965 [397-8])

Though we may have an intuitive understanding of time, it remains a difficult concept to define. St. Augustine was by no means the first thinker in recorded history to grapple with this problem. Among the paradoxes devised by the Greek philosopher Zeno of Elea and Parmenides in the fifth century BC was the flight of an arrow. At the smallest indivisible moment in an arrow's flight, the arrow occupies a space equal to itself (it cannot be at one place in one part of the moment and at another place at another part, as the moment is indivisible). Thus, at every point in its trajectory the arrow is stationary. Movement, and therefore the flow of time—according to Zeno—are an illusion (e.g. Salmon 2002, 41; Jaszczolt 2009, 33).

Zeno's view was contrary to that of Aristotle (384-322 BC), who instead saw the moment as a porous boundary between past and future. The moment—the 'now'—'links together past and future, since it is a beginning of one and an end of another' (*Physics*, Book IV, 222a10 cited in Le Poidevin 2007, 129). Aristotle, then, saw time as dynamic—flowing—'Time is not composed of indivisible nows' (*Physics*, Book VI, 239b9 cited in Le Poidevin 2007, 129). The debate regarding conceptions of the continuity of passing time, and the stasis of the moment, continues.

In the more recent history of post-Enlightenment Europe, the natural sciences—in particular physics—have sought to provide *the* definition of

time. Isaac Newton's *Philosophiae Naturalis Principia Mathematica*, published in 1687, set out a solution which seems to accord with 'common sense' (Hawking 1988, 15-21). According to Newtonian physics, with suitable instrumentation, the interval between two events can be measured absolutely and unambiguously (Disalle 2006, 20). Time could thus be seen as a straight line extending indefinitely in both directions. As such, time could be seen as a fixed background against which events take place (Jaszczolt 2009, 5).

This definition provides a neutrality and detachment which is complementary to the theoretical perspectives that came to dominate social science disciplines such as archaeology, anthropology and geography. Archaeological chronologies were developed in the context of the Newtonian conception of absolute time (G. Lucas 2005, 19). But does Newton's understanding of time constitute *real* time?



2.2.1 Real time

Theoretical physics abandoned the notion of absolute time early in the 20th century. Einstein's theory of relativity, first published in 1905, illustrates that because space is not absolute (as had been predicted by Newton, and Galileo before him), neither is time (Hawking 1988, 21). According to the theory of relativity, physical time is constrained by the speed of light in a vacuum. This cannot be exceeded by any physical object, and is absolute—a fixed physical constant, the value of which is independent of the observer (*ibid.*, ch. 2). *Speed*, and thus the *speed* of light, is calculated by dividing the distance (space) covered by the time taken. Since the speed of light is absolute, but space is not, it follows that time cannot be absolute,

else the equation will not balance (*ibid.*, 21). Considerable experimental evidence supports the theory of relative time: clocks tick slower (time is slower) the faster they are travelling (e.g. Penrose 1999, 257; Jaszczolt 2009, 6).

Physical time, then, is dependent upon the observer's individual frame of reference—her position and movement in space (Hawking 1988, 35). No particular frame of reference is *the* correct frame. However, within a particular frame of reference, all events have discrete locations in space-time which are fixed in relation to each other (Mellor 1998, 13).



2.2.2 Conceptions of time

McTaggart (1908) envisaged two opposing metaphysical conceptions of time which remain central to philosophical definitions (e.g. Gale 2002; Jaszczolt 2009): *A*-series time is characterised by *tensed* distinctions between past, present and future (e.g. Gale 2002, 68). According to *A*-theory, these distinctions are not merely a matter of the observer's perspective, but a fundamental feature of time (Le Poidevin 2007, 8). *A*-series time is dynamic—time flows as future events (which may have been anticipated) become experiences in the present, and may then be retained as memories of the past (e.g. Jaszczolt 2009, 2). By contrast, *B*-series time is permanent. Where *A*-series events continually change with respect to their being past, present or future (because the present shifts) (Gale 2002, 68), *B*-series time does not rely on a privileged *present* in order to locate events. According to *B*-theory, the structure of time is more akin to that of space. Time does not pass *per se* in reality: tensed beliefs are mind-dependent (Le Poidevin 2007, 8).

Rather than being defined by how much earlier or later they are than the present, then, *B*-series events are defined by how much earlier or later they are than each other (Mellor 1998, 10). By removing the subjective observer, and therefore the point of observation, the 'central instant' is removed (McLure 2005, 78). *Now* is privileged only according to our perspective: no future event can change tense if there is no privileged *now* (Sattig 2006, 19). Mellor (1998, 10-11) gives the following example:

...[I]n the Christian calendar 1800 is meant to be the year which contains the events that are between 1800 and 1801 years later than Christ's birth. And the key point about this definition is this: these temporal relations between events never change, unlike their temporal relations to the present moment. For whereas the temporal distance between any event and the present moment is always changing—growing for past events, shrinking for future ones—that between events is always the same: any events that are ever *n* years apart are always *n* years apart. This is why the *B*-times of events, unlike their *A*-times, never change.

Chronologies, then, conform to McTaggart's *B*-series (cf. e.g. Ingold 1993, 157; G. Lucas 2005, 24). The events in a chronology are fixed in their temporal relationship with each other: 'strung together, like the beads on a necklace' (Gell 1992, 151). The situated observer is superfluous to the sequence, which is fixed. Similarly, in the real time of the component of physicists' space-time, if the observer is removed, what remains are events positioned in space-time (Jaszczolt 2009, 19). Real time¹ does not flow. As per the *B*-series, the temporal relationship between events is fixed if there is no privileged *now*.

This is fundamentally at odds with the 'irreducibly tensed' human experience of time (Gale 2002, 84). Past, present and future are irrefutable components of everyday life (Jaszczolt 2009, 5). Time passes—it *flows*—as future becomes present, then past. As Schlesinger (1991, 427) put it: 'there is hardly any experience that seems more persistently, or immediately given to us than the relentless flow of time'. Recollections of the past, and

anticipation of the future, impact on life in the present (Ingold 1993, 378). The privileged present—*now*—defines human time. There is little disagreement between *A*-theorists and *B*-theorists, that as humans, we look forward to surgery with trepidation, and ‘thank goodness’ when it is over (Prior 1959).

A.N. Prior (1968, 133) points out that Einstein himself was vexed by the centrality of the present moment to the human condition:

...the problem of the Now worried him seriously. He explained that the experience of the Now means something special for men, something different from the past and the future, but that this important difference does not and cannot occur within physics. That this experience cannot be grasped by science seemed to him a matter of painful but inevitable resignation. [...] Einstein thought that these scientific descriptions cannot possibly satisfy our human needs; that there is something essential about the Now which is just outside of the realm of science.²

Physics may not be the intellectual space within which the *A*- and *B*-series can be satisfactorily reconciled, but the flow of the *A*-series is not entirely at odds with the independent, isolated, events of the *B*-series (Jaszczolt 2009, 19). Hawking (1988, ch. 9) identifies three ‘arrows of time’, the direction of which must accord in order for intelligent life to exist. The ‘psychological arrow’—the arrow of human experience—is determined by the fact that we remember the past, and not the future (p. 145). The ‘thermodynamic arrow’, is determined by the second law of thermodynamics, which states that disorder (entropy) in the universe increases over time: the scrambling of an egg cannot occur in reverse (p. 144-5). The ‘cosmological arrow’ is determined by the expansion (rather than contraction) of the universe (p. 145).

Our everyday experience of time passing (the psychological arrow) might thus be seen as contingent on the direction of the thermodynamic and cosmological arrows. Neither the present nor the future can change the

past: the linear order of events in space-time corresponds with the way humans experience time (Mellor 1998, 6). In this view, the *A*- and *B*-series are not incompatible theoretical positions, but instead operate at different metaphysical levels: the real time of the physical universe conforms to the *B*-series, while the human experience of time conforms to the *A*-series (Jaszczolt 2009, 21-3).



2.2.3 Archaeological time

Archaeological time exhibits seriation but not duration.

V. Gordon Childe (1956, 58)

While *A*-theory and *B*-theory time may not be irreconcilable concepts, within archaeology an opposition is often maintained between ‘social time’ and ‘science time’ (Gilchrist 2004, 150; cf. e.g. Bayliss *et al.* 2007, 2). The discipline of archaeology emerged from the ‘scientific antiquarianism’ of the eighteenth century, which in turn developed in the context of the ascendancy of natural science (see Section 2.3.2, below). The affinity with natural science provided the foundations for the New (or processual) Archaeology of the 1960s and 1970s, which espoused positivism, functionalism and systems theory as means of explicating past human behaviour (Hodder and Hutson 2003, xi; Bintliff 2008, 148)

Cultural change, according to New Archaeology, occurred in steps determined principally by adaptations to the natural environment (e.g. Hodder and Hutson 2003, 31). Temporal phases and their environmental

imperatives could be measured and charted in chronologies and models. Ironically, then, as Hodder (1987, 2) has observed, ‘the term “processual” has come to be associated with an approach which is, in fact, fundamentally non-processual’.

The challenge to this quintessentially *B-series* view of time came as part of a wider critique of New Archaeology, which was increasingly seen as both narrow in perspective and unreflective (see Clarke 1973). Chronological time was criticised as a simplistic abstraction (e.g. Shanks and Tilley 1987a; 1987b, ch. 5). In particular, rather than seeing change as determined by natural forces and occurring as steps in abstract time, there was a call for consideration of the agency of people in the [social] *process* of change (e.g. Gosden 1994, ch. 1). The ‘disconnected moment[s]’ that comprised chronometric time (Shanks and Tilley 1992, 79) were seen to obscure the *A-series* flow of human *temporality* (e.g. Ingold 1993, 157-9; Karlsson 2001).

The need to invoke human perspectives in the study of the human past is not inherently controversial, however the inevitable criticism of attempts to do so concern the absence of empirical method (Bayliss *et al.* 2007, 2). However to some extent not being constrained by the assumption that *the science way is the only way* is the point (cf. Barrett 1988, 9). The research goals in archaeology are not the same as those in the natural sciences (Ramenofsky 1998, 75). The adoption of a range of approaches – including some which may be seen as ‘unscientific’ – is not in itself a failing (cf. M. Johnson 1999, 34). Just as measurements and models cannot alone evoke places, chronologies – no matter how precise and complete – cannot alone evoke times (cf. Massey 1999).

Chronologies do not divide the past into its natural temporal structure – chronological units were invented, not discovered (Ramenofsky 1998, 75). Nevertheless, once the classified periods within a chronology have been

established and ascribed a particular narrative, they frequently become *naturalised*, assuming an inertia which can stifle new ways of understanding (Wishart 2004, 211; Jordanova 2000, 115). Chronologies in archaeology are unavoidable: they provide a necessary (albeit fragmentary) framework, within which knowledge can be ordered (e.g. Barrett 1994, 35; Gosden 1994, 2; Whittle 1988, 12; Bayliss *et al.* 2007, 2). However, as Clarke (1973) argued, the meaning of archaeological evidence is never self-explanatory. The significance of dated events, the nature of the intervals between them, and the representativeness of the available temporal data within (and beyond) its social context, requires interpretation. This interpretation of time as it was experienced by people – of human *temporality* – is a fundamental aspect of archaeology.

Throughout the history of archaeology, ‘two contrasting attitudes have presented themselves, largely as alternatives’, which can ‘be summarized respectively as “Enlightenment” and “Romantic” attitudes to the past (Sherratt 1996, 140-1). The former is ‘comparative and scientific, privileging rational thought and offering deterministic models’, the latter ‘contextual and relativist, emphasising feeling and experience and offering not abstract structures but sensitive interpretations of perceptible phenomena’ (*ibid.*, 141). The following traces the impact of these perspectives on the development of archaeological time.



2.3 From Renaissance to Romanticism: a brief history of time in archaeology

The development of the discipline of archaeology in Europe provides the context for the development of the discipline in Ireland. The following brief review traces the emergence of archaeological chronologies in the work of ‘scientific antiquarians’ of the late seventeenth- and early eighteenth centuries (Section 2.3.1). In the wake of the Enlightenment, the nineteenth century saw the establishment of Lyell’s uniformitarian geology, Thomsen’s Three Age system, and Darwin’s evolutionary biology. These developments in the understanding of time and change were the foundations of the discipline of archaeology (as distinct from object-oriented antiquarianism) (Section 2.3.2).

The response to the Enlightenment in the later nineteenth century came from the Romantic movement, the rise of which coincided with the ascendancy of nation states and cultural nationalism across Europe. Archaeology played an important role in determining the historical depth of particular traditions and cultures. Cultural-historical archaeology developed in the early twentieth century, describing, as we have seen, the spread of ‘civilisation’ (farming): the most important step in a nation’s progress. The precise measurement of archaeological time began with the introduction of radiocarbon dating, which coincided with the broader application of scientific method under the auspices of New (processual) Archaeology.



2.3.1 The beginnings of prehistoric chronologies

In medieval Europe, megalithic monuments and ancient earthworks were mainly of local interest. They were subjects of folklore and traditions; sometimes a convenient source of building materials; often a target for looters. Christian doctrine restricted interest in archaeological material largely to the collection and preservation of holy relics. Short biblical chronologies held sway, and prehistory was not thought to have extended beyond a few thousand years (e.g. Trigger 1989, 31-5).

The Renaissance was the catalyst for elevating the study of past *human* endeavour within the European academe, countering the dominance of theology. Renaissance humanists drew inspiration from the achievements of classical Rome and Greece (e.g. Burke 1969; Schnapp 1996, 108; Gardner 2008, 97). The development and spread of this intellectual movement across Europe helped antiquaries studying the cultural past in their own countries to receive wealthy, sometimes royal, patronage (Trigger 1989, 49; Thomas 2004, 107). Olaus Worm (1588-1654), a medical doctor who became antiquarian to King Christian IV of Denmark, was a polymath whose background in the natural sciences led him to classify Danish antiquities in accordance with their form and function (Schnapp 1996, 162). The six volumes of his *Danicorum Monumentorum Libri Sex*, published in 1643, demonstrated that ancient Danish material could be systematically studied in a way that previously been restricted to Greco-Roman remains (*ibid.*).

Later in the seventeenth century, British antiquarian John Aubrey (1626-97) developed Worm's ideas, creating the first typo-chronological system for the classification of archaeological remains (Schnapp and Kristiansen 1999, 13). Like Worm, Aubrey was a physician and a keen natural

scientist. He was also a prominent member of the Royal Society of London, with friends and associates including Isaac Newton (1642-1727) and other leading contemporary thinkers such as John Locke (1632-1704) and Thomas Hobbes (1588-1679) (*ibid.*).

Aubrey was an admirer of René Descartes (1596-1650) and Francis Bacon (1561-1626), whose empirical philosophy can be seen to have influenced his method of 'comparative antiquity' (Schnapp 1996, 190; Trigger 1989, 61; Thomas 2004, 20). Aubrey's major work, *Monumenta Britannica*, incorporated techniques of classification and field observation developed in philology and the natural sciences. His method hailed a new way of thinking about antiquities: not only did he classify remains according to typology, he also recognised that their character *changed through time* (Schnapp 1996, 190; Thomas 2004, 20; Fowles 1980; 1982).

Aubrey's chronology was however arbitrary and extremely limited: what would now be recognised as prehistoric material was generally ascribed to either Britons (who according to written records predated the Romans in Britain), or Saxons or Danes (recorded as having invaded Britain following the fall of the Roman Empire) (Trigger 1989, 48; Schnapp 1996, 194).

William Stukeley (1687-1765)—another medical doctor, member of the Royal Society of London, and friend (and biographer) of Newton—engaged more fully with the complexity and longevity of pre-Roman remains. Stukeley, who re-transcribed much of Aubrey's still unpublished *Monumenta Britannica* into a folio in 1718, became the first secretary of the Royal Society of Antiquaries in 1717 (Piggott 1985, 42-5). The members of the Royal Society of London that formed the new society remained true to the ethos of the new science. The consequent emphasis on experiment and observation pervade the meticulous field practices which Stukeley and his colleagues pioneered, including techniques for establishing relative

chronologies (Trigger 1989, 61-4; Schnapp 1993, 213-8). Stukeley noted the sequence of construction layers in barrows, for example, and that Silbury Hill in Wiltshire must predate the Roman road that swerved to avoid it. He discredited the idea that megalithic monuments were of Roman or Saxon origin, instead attributing them to (prehistoric) 'Celts' and their Druidic priesthood (Piggott 1985, 67, 79; Schnapp and Kristiansen 1999, 14).

The 'scientific antiquarianism' (Trigger 1989, 61) of Aubrey and Stukeley was very much a product of the intellectual climate of the late-seventeenth and early-eighteenth centuries. Many of the leading European thinkers shared a background in medicine and an interest in the works of Galileo, Descartes and Hobbes, fostering correspondence and debate not extending beyond medicine and natural history to matters of history and antiquarianism (Emerson 2009, 8). London's learned societies and their European counterparts were at the heart of the 'scientific revolution' that would provide the methodological inspiration for the Enlightenment (Wood 2003, 95; Daniel 1975, 23-4). Newton's accomplishments in physics set the agenda in both science *and* philosophy (Adam 2004, 30; Sklar 2002, 1).

Following Descartes, Newton's *Principia* portrayed the natural world as governed by laws which could be expressed mathematically (Thomas 2004, 21; Cohen and G.E. Smith 2002, 3-4). Nevertheless, Newton himself, like Descartes and Bacon before him, had ascribed the laws of nature to God (e.g. Christianson 1996, 75; Thomas 2004, 30; Schneewind 2006, 335). It followed that the antiquaries of the seventeenth century continued to be constrained by the short biblical prehistory (Schnapp and Kristiansen 1999, 15).

According to the prevailing Christian doctrine, the creation of the earth was not thought to have preceded the birth of Christ by more than a few thousand years. Early in the seventeenth century, James Ussher, Archbishop of Armagh, had made calculations based on the Old Testament which dated the Creation to precisely 4004 BC (e.g. Daniel 1963, 24). Ussher's calculations gained wide acceptance throughout Europe, and antiquaries had no reason to challenge them. Written records continued to be seen as the only reliable means of establishing the chronological context of ancient remains, and it was believed that these extended back to the time of the Creation in the Near East (Trigger 1989, 70-1).

However, by the middle of the eighteenth century, leading Enlightenment figures such as David Hume (1711-1776) had begun to invoke Newton's laws to challenge the 'sophistry and illusion'⁴ of medieval superstitions and religious dogma (e.g. Wylie 2002, 33; Schneewind 2006, 335). The secularisation of science that ensued encompassed the secularisation of time. The Judeo-Christian vision of the human path from fall to salvation was replaced by a (similarly linear) narrative which saw progressive stages of cultural development (Fabian 1993, 26-7; Thomas 2004, 31-2). For Hume, the human past conformed to general laws: 'The chief use of history is [only] to discover the constant and universal principles of human nature...' (Hume⁵ quoted in Burke 1969, 143).



2.3.2 The development of archaeological time

[E]verything which has come down to us from heathendom is wrapped in a thick fog; it belongs to a space of time we cannot measure. We know that it is older than Christendom but whether by a couple of years or a couple of centuries, or even by more than a millennium, we can do no more than guess.

Rasmus Nyerup (1806: as quoted in Daniel 1963, 36)

At the beginning of the nineteenth century, the Danish antiquarian – also librarian at the University of Copenhagen – Rasmus Nyerup (1759-1829) summed up (above) the frustrations of scholars faced with the ‘apparent contemporaneity’³ of prehistoric remains. In 1807, Nyerup was appointed secretary of the new Danish Royal Commission for the Preservation and Collection of Antiquities (Trigger 1989, 75). The Commission amassed a collection of antiquities, and in 1816 Christian Jürgensen Thomsen (1788–1865) was invited to catalogue the collection and prepare it for exhibition (*ibid.*). Faced with the problem of how the collection could be exhibited most efficiently, Thomsen chose a chronological succession which had been mooted since classical times: the ages: stone, bronze, iron (*ibid.*; see also e.g. J. Jensen 1982, 1-2; Gräslund 1987, 18-19; Schnapp and Kristiansen 1999, 32).

The practical difficulty with the system that Thomsen addressed was the classification of prehistoric objects that were not made of stone, bronze or iron; or, for example, stone artefacts made during the Bronze Age (Trigger 1989, 76). The Commission’s collection contained artefacts that had been retrieved from the same context (e.g. grave or hoard): these ‘closed finds’ enabled Thomsen to ascribe characteristic artefacts to particular periods (*ibid.*, Schnapp and Kristiansen 1999, 32). It was ten years after Thomsen conceived his Three Age System that it was published in the *Guide to*

Northern Archaeology (Ledetraad til nordisk Oldkyndighed) 1836 (Gräslund 1987, 18-19). Thomsen framed cultural similarity in law-like terms: 'experience shows that similar conditions and in particular an equivalent cultural level lead to equivalent tools' (Thomsen 1836 quoted in Schnapp and Kristiansen 1999, 32).

Parallel developments in the study of geology and palaeontology had paved the way for establishing the relative date of archaeological contexts. In the process of collecting and describing animal fossils, the French zoologist Georges Cuvier (1787-1832) observed that the lower the geological strata in which fossils were discovered, the more dissimilar the remains were to modern animal species (Trigger 1989, 89; Schnapp and Kristiansen 1999, 28). Cuvier, however, subscribed to the short Biblical chronology, and therefore assumed that a series of great catastrophes had befallen now extinct species, Noah's flood in Genesis among them (Daniel 1963, 41). Cuvier's influence was widespread in Europe, however the 'catastrophism' necessitated by the short biblical chronology came under increasing scrutiny (*ibid.* 43).

Uniformitarianism held that the geological processes represented in geological strata operated over huge timespans, thus negating the need to invoke catastrophes to explain them (Rowley-Conwy 2007, 57). Between 1830 and 1833, the English geologist Charles Lyell (1797-1875) published the three volumes of his *Principles of Geology, Being an Attempt to Explain the Former Changes of the Earth's Surface by Reference to Causes Now in Action*. Lyell's presentation of his observations, largely around Mount Etna in Sicily, demonstrated the continuation of the geological processes that could be observed in ancient rock strata, and so 'weighed the scales' in favour of uniformitarianism (Daniel 1963, 41-4; Trigger 1989, 82).

J.J.A. Worsaae (1821-85), Thomsen's successor, who was appointed Denmark's Inspector for the Conservation of Antiquarian Monuments in 1847, then the first Professor of Archaeology at the University of Copenhagen in 1855, advanced his mentor's work. Worsaae demonstrated the chronological succession of Thomsen's Three Ages through excavations which observed the geological principle of stratigraphy (Schnapp and Kristiansen 1999, 33; Trigger 1989, 82). Interestingly, Worsaae did not see the Three Ages as an evolutionary succession. The English translation of his *Primeval Antiquities of Denmark* (1849) attributed the transition from Stone Age to Bronze Age in Denmark to the arrival of 'a new race of people, possessing a higher degree of cultivation than the earlier inhabitants' (Worsaae 1849 quoted in Daniel 1963, 75).

Meanwhile, Charles Darwin (1809-82) was conducting research in evolutionary biology that would lead to the (1859) publication of his *Origin of Species* (e.g. Trigger 1989, 94). Darwin considered himself a 'philosophical naturalist', engaged in the scientific study of natural history encompassing geology, botany and zoology (Hodge and Radick 2003, 10). As such, he had been inspired by the achievements of Lyell regarding uniformitarian geology (Trigger 1989, 94). For Darwin, scientific enquiry extended beyond collection, description and classification, to a concern with 'general causal and explanatory theories' (Hodge and Radick 2003, 11). The process of evolution set out by Darwin explained the changes observed in palaeontological stratigraphies (Trigger 1989, 94).

The Swedish prehistorian Sven Nilsson (1787-1883), who had studied under Cuvier prior to becoming Professor of Zoology at the University of Lund, shared Thomsen and Worsaae's regard for chronological succession, but focussed on the development of subsistence economies rather than technology (Trigger 1989, 80). Nilsson proposed a model of stages of subsistence (from savage and herdsman to agriculture and

civilisation) which was more in keeping with Darwin's biological evolution (Thomas 2004, 33; see also e.g. Trigger 1998, 61). Rather than seeing population movement (diffusion) as the catalyst for change, Nilsson felt that increasing population levels had compelled hunter-gatherers to become pastoralists, then agriculturalists (Trigger 1989, 80). Nilsson saw cultural evolution as unilinear, and this led him to compare artefacts from prehistoric Scandinavia with ethnographic specimens from living cultures in North America, the Arctic and the Pacific Islands (*ibid.*).

The methodological and theoretical developments in Scandinavia during the early- and middle-nineteenth century enabled the emergence of the discipline of prehistoric archaeology in the later nineteenth century (e.g. Burke 1969, 145; Schnapp and Kristiansen 1999, 33; Trigger 1989, 73; 1995, 267). The discipline developed in the 'scientific spirit of the times', inspired by the positivism manifest in the work of Lyell and Darwin (Maisels 1993, 6). Auguste Comte (1798-1857) had defined positivism as the pinnacle of human understanding, determining that all genuine (positive) knowledge must be scientific (Wylie 2002, 34). Unity of method between social and natural science was fundamental to later nineteenth century positivists such as Herbert Spencer (1820-1903) and Émile Durkheim (1858-1917) (Baert 1998, 178), and fundamental to the developing techniques of archaeological excavation and analysis (e.g. Daniel 1963, 67; Schnapp and Kristiansen 1999, 34).

The temporal legacy of the Enlightenment tradition for archaeology was the development of chronological systems based on typological succession. The Swedish archaeologist that pioneered this approach was Gustav Oscar Montelius (1843- 1921), who had trained in natural sciences before his appointment at the State Historical Museum in Stockholm in 1863 (Trigger 1989, 156). Montelius developed Thomsen's seriation by classifying artefacts according to changes in form and decoration (*ibid.*,

157). By incorporating closed finds and stratigraphy, he was able to demonstrate the chronological succession of his typological classifications (Schnapp and Kristiansen 1999, 36).



2.3.3 Cultural succession

Philosophical reaction against the Enlightenment tradition came to prominence in later nineteenth- and early-twentieth century Europe with the rise of the Romantic movement (e.g. Burke 1969, 143). This coincided with an intense period of nation-building (e.g. Hobsbawm 1983). Though nation-states were recent—historical—cultural zones, national identities were constructed out of a sense of immemorial tradition (e.g. B. Anderson 2006, 11).

Through its concern with the accomplishments of the past, Romanticism fostered patriotic interest in the ‘home’ landscapes and antiquities of countries in northern central European countries (Sklenář 1983, 91; Thomas 2004, 43; M. Johnson 2007). This created an important role for archaeology in the presentation of material evidence of past national achievements. Thus, while archaeological field methods continued to develop in the spirit of positivism, Romanticism played an important role in interpretation and setting the research agenda (Bintliff 2008, 148; Trigger 1995, 268-9).

In place of the rationalism that saw ‘constant and universal principles of human nature’, Romanticism idealised ethnic and national differences (Burke 1969, 143; Trigger 1989, 111). A manifestation of this was renewed

interest in subsistence-based stages of cultural development (S. Jones 1997, 41-2; Pluciennik 2001, 744-5). Universal stages of socio-cultural evolution were presented as a measure of how advanced (or 'backward') a nation or ethnic group should be judged (e.g. S. Jones 1997, 42; Redman 1999, 50). An early exponent of such ideas was Britain's first Professor of Anthropology, Edward Burnett Tylor (1832-1917), who, though conversant with the technologically-defined Three Age System, distinguished three different stages of socio-cultural development: savagery, barbarism, and civilisation (e.g. Daniel 1963, 79; Pluciennik 2001, 745).

Tylor's three evolutionary stages of were adopted by the American anthropologist Lewis Henry Morgan (1818-81). In his (1877) *Ancient society, or, researches in the lines of human progress from savagery through barbarism to civilization*, Morgan identified these stages (which he further divided into progressive sub-phases) with specific technological innovations (Trigger 1998, 75; Pluciennik 2005, 70). Morgan's work was to have an enduring impact on the development of the discipline of archaeology.

The three progressive stages of Morgan's model, with its incorporation of material culture, were complementary to the Three Age System. V. Gordon Childe (1892-1957) was greatly influenced by Morgan's work, which he sought to map on to the Three Age System (Gamble and Gittins 2004, 98; A. Jones 2008, 9). Childe equated savagery with a 'gathering economy', barbarism with food production, and civilisation with the development of cities (Pluciennik 2005, 70). He thus envisaged two comparable 'revolutions': the transitions from hunting to farming (separating savagery from barbarism); and from farming to urban life (separating barbarism from civilisation) (Sherratt 1989, 179). The former –

the 'Neolithic Revolution'—was, for Childe, the dawn of civilisation (1925), and was on a par with the 'mastery of fire'⁶.

Childe went on to define prehistoric cultural groups in terms of traits in material culture:

We find certain types of remains—pots, implements, ornaments, burial rites, house forms—constantly recurring together. Such a complex of regularly associated traits we shall term a 'cultural grouping' or just a 'culture'. We would assume that such a complex is the material expression of what today we would call a 'people' (1929, v-vi).

Though Childe was not the first to link innovation (or its absence) to ethnicity, his approach to *culture-history* dominated European archaeology until the 1960s (S. Jones 1997, 16-18; Shennan 1996, 282). Childe saw cultures as essentially conservative, reproducing themselves generation after generation through socialisation (S. Jones 1997, 24; see Childe 1956, 8). Being the manifestation of enduring tradition, material culture was thought to remain largely unchanged within the discrete spatial and temporal boundaries (S. Jones and C. Richards 2000). He thus highlighted homogeneity within cultures, and heterogeneity between cultures.

Given the perceived tendency towards stasis within defined cultures, significant change required the impetus of 'displacements of population, the expansions, migrations, colonizations or conquests with which literary history is familiar' (Childe 1956, 135). Major change took place at boundaries in time and space, and thus maps could be used to plot the spatial extent of the 'mosaic' of discrete contemporary cultures (Childe 1957, 341). Alternatively, the succession of cultures in particular regions through time and across space could be tabulated:

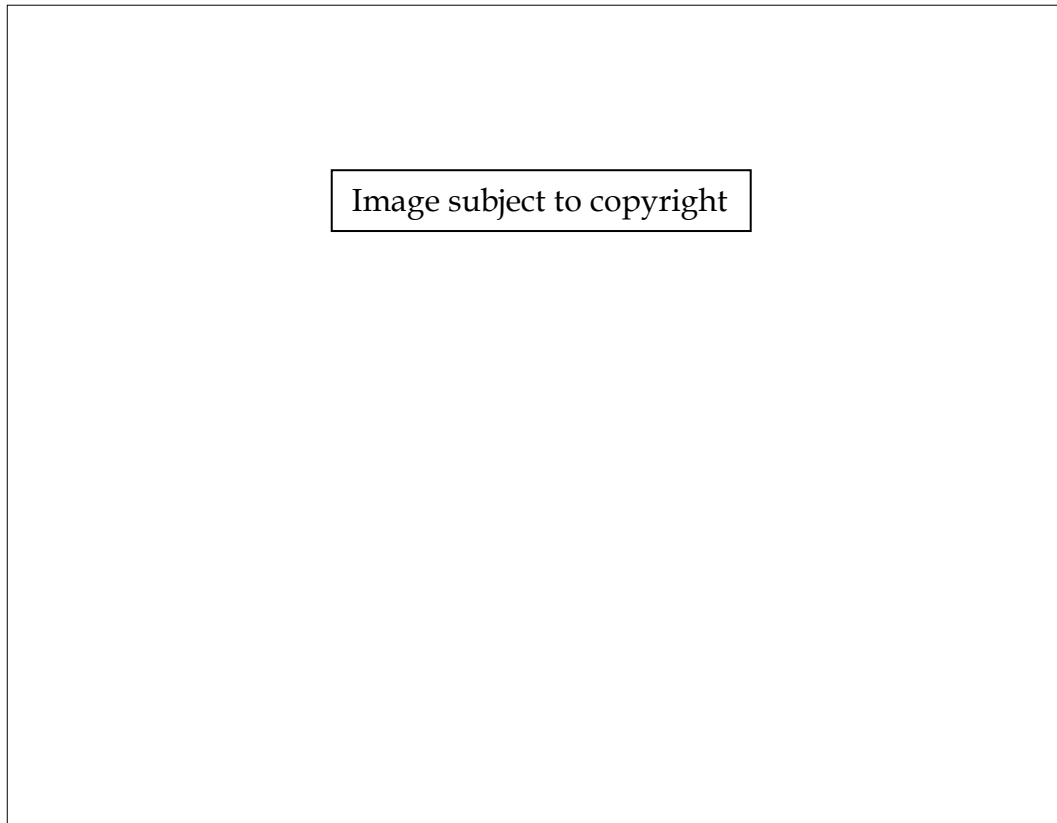


Figure 2.1: Cultural chronology as depicted by Childe (1929); reproduced by Trigger (1989, 171).

Childe was clear that the duration and geographical extent of each culture should be established empirically on the basis of stratigraphy and artefact typologies (Trigger 1989, 170). Culturally defining events—the migrations, colonisations and conquests that changes in material culture were seen to represent—were ‘crystallised’ as points in chronologies; the intervals between these points represented the tenure of particular cultures (S. Jones 1997, 25-6). Grand narratives *described* the stepwise spread of cultures from centres of innovation, with little emphasis on *explanation* (e.g. see Childe 1957, Chapter XIX; cf. S. Jones 1997, 24-5; Gamble 2007, 16; Borić 2007, 98).

The processual archaeology of the 1960s and 1970s developed out of concern for *why?* Rather than accepting the culture-historical perspective of a succession of normative (static) cultures/periods displaced by colonisation, processual archaeology sought to identify underlying causal

processes that explained cultural dynamics. In this view, cultures were 'functioning ecosystems' (Clark 1961, 26), whose adaptive responses to underlying environmental and social circumstances could be scientifically detected, measured and modelled (e.g. S. Jones 1997, 26; Rudebeck 2000, Chapter 6; Hodder and Hutson 2003). Precise quantification of archaeological evidence and its environmental context was seen to provide objective 'facts' about the past. *Middle-range theory* provided the inductive framework by which these 'static' facts could be 'translated' into knowledge of the 'dynamic' underlying historical processes (e.g. Binford 1983, 52).

The measurement and modelling of time in archaeology are discussed further in Section 2.5.



2.4 Time and archaeology in Ireland

In many respects, the basic style of life in prehistoric Ireland was not too far different from the folklife we know to have survived down to the last century and even into this. For Ireland, on the geographic periphery of the Eurasian landmass, is a country which moves at a slightly slower pace than others and thereby preserves some old and neglected traditions which have sadly died out elsewhere.

Peter Harbison (1988, 195)

The development of the discipline of archaeology in Ireland melds the development of the discipline in Continental Europe and Britain with the 'contemporary social and political milieu'⁷ of Ireland. The antiquarian tradition was adopted in Ireland at the beginning of the seventeenth century. Several institutions concerned with the collection and understanding of Irish antiquities were established during the second half

of the eighteenth century, and corresponded with increasing interest in Ireland's Gaelic past.

The late nineteenth and early twentieth centuries saw a revival of this interest in the context of a period of intense nation-building in Ireland and across Europe. Antiquarianism developed into the discipline of archaeology, and the distant past became an essential ingredient of National identity. Disciplinary developments had emphasised cultural succession, with the adoption of farming – the transition to the Neolithic – as the defining point in the establishment of a 'civilised' country. In the period leading to the establishment of the Irish Free State, an idealised conception of the traditional small farming communities in the west of Ireland was fundamental to the framing of 'de-Anglicised' national identity.

Continental scholars joined Ireland's intellectual élite in romanticising a landscape where remnants of ancient Indo-European culture survived into the present (N. Johnson 2001, 98; Harvey *et al.* 2001, 5). The vision of the 'timeless continuity' (e.g. Cooney 1999, 47) of the landscapes of the west of Ireland enabled prehistoric culture to be understood by studying its apparent survival into the present. As Kneafsey (2002, 125) observes, the 'strong formative influences' of romanticism and nationalism informed interpretations of the archaeological record which have come to stand as 'facts'.

This section traces the development of the archaeology in Ireland in its disciplinary and socio-political contexts. Underlying assumptions about the establishment and development of Neolithic lifeways in Ireland are identified, the implications of which are analysed in Chapters 3 and 4.



2.4.1 The establishment of archaeology in Ireland

The founding of the Royal Dublin Society's Committee of Antiquities in 1772, and the inclusion of antiquities within the scope of the Royal Irish Academy at the time of its establishment in 1785, reflected growing interest in the history and culture of Gaelic Ireland (e.g. Herity and Eogan 1977, 6-7; Kidd 2004, 175). Shortly after its foundation, the Royal Irish Academy began a collection of archaeological objects, which developed through the fieldwork of antiquaries, the discovery of artefacts during land clearances and agricultural improvements, and through the acquisition of private collections (Herity and Eogan 1977, 10; Waddell 2005).

During the early nineteenth century, the sense of a national identity rooted in Gaelic antiquity gained momentum (e.g. Sheehy 1980, 7). The 'Romantic ideal of a lost Irish nationhood' captured the public imagination, eclipsing the propaganda that had for so long denigrated Gaelic tradition (Leerssen 2006, 161). George Petrie (1790-1866) was among the most influential figures of the period (e.g. Sheehy 1980, 17). A polymath, whose talents extended from antiquarianism to art and music, Petrie brought knowledge of Gaelic history and culture to a wide audience through his journalism (e.g. Waddell 2005, 103-7).

Petrie was elected to the Royal Irish Academy in 1828, where his organisation and expansion of the museum collection made it a leading visitor attraction (Sheehy 1980, 17). Superintendent of the Topographical Section of the Ordnance Survey of Ireland from 1835 to 1842, and founder member of the Archaeological Society in 1840, Petrie expressed his 'ardent desire to rescue the antiquities of my native country from unmerited

oblivion, and give them their just place among those of the old Christian nations of Europe' (1845, v).

Petrie has been described as the 'father of Irish Archaeology' (see Cooney 1996, 151; Waddell 2005, 105):

His clear-minded approach and his respect for Baconian logic helped to bring Irish antiquarianism from the extremes of the romantic phase into harmony with the more logical and scientific spirit of nineteenth-century science (Herity and Eogan 1977, 8).

Along with his two principal assistants at the Ordnance Survey of Ireland, John O'Donovan (1806-1861) and Eugene O'Curry (1794-1862), Petrie set about the project of producing 'memoirs': written commentaries supplementing each county map with information incorporating (among other things) local history and antiquities (Sheehy 1980, 20; Waddell 2005, 99-100). Petrie (e.g. 1845, 102) did not hold with the received wisdom which, since Stukeley, had led many antiquarians in Ireland (as in Britain) to link megalithic monuments with an ancient Druid priesthood.

While O'Donovan was engaged by Petrie to carry out fieldwork, O'Curry studied early ancient manuscripts (Waddell 2005, 99). Medieval texts such as the *Lebor Gabála Éirenn* (Book of Invasions)—a pseudo-history which sought to accommodate Gaelic Irish origin myths within Biblical accounts—and the *Dindshenchas* (lore of places), provided an alternative narrative for certain archaeological sites (*ibid.*, 15-23). In common with Petrie and O'Donovan, O'Curry was convinced many of the medieval texts had merit as historical sources, and he sought to correlate artefacts and monuments with the ancient peoples the manuscripts described (*ibid.*, 113-6).

O'Curry's research eventually led to his precise dating of the successive colonisations described in the *Lebor Gabála* in a series of lectures delivered

between 1858 and 1860, and published after his death (O'Curry 1873; 1878[1861]). It was O'Curry's 'mythical chronology' – which saw stone, bronze and iron weaponry in contemporaneous use – that informed Petrie's accounts (Herity and Eogan 1977, 9-11; Waddell 2005, 113-16). Thus, Petrie describes the Boyne Valley megalithic complex, Co. Meath, as 'examples of the sepulchral monuments of [the] Tuatha De Danann race'⁸, and continues:

As an example of the monuments of a different race, and of later date, I may refer to the cemetery called Relec na Riogh, at Rathcroghan, the place of interment of many of the kings of the Scotie or Milesian race, and at which was interred the last pagan monarch of this race, the celebrated Dathi, who was killed by lightning, according to our annalists, in the year 406 (1845, 103).

Just as Petrie, O'Curry and O'Donovan were 'illuminating' Irish prehistory with mythical pseudo-history (Waddell 2005, 107), Worsaae and many of his Scandinavian contemporaries were drawing upon myth and folklore to develop nationalistic interpretations of the distant past (Trigger 1984, 358). Worsaae was openly committed to rebuilding the Danish national consciousness through the evocation of a Romantic rural idyll, in which archaeological objects and field monuments traced ethnic continuity back through the Viking period into prehistory (S. Jones 1997, 6). Worsaae's Romantic interpretations, however, were of course grounded in the chronological framework of the Three Age System.

During a tour of Britain and Ireland, Worsaae addressed the Royal Irish Academy twice in 1846 (Worsaae 1847a and 1847b). In his first lecture, he spoke of how knowledge of the ancient past could help engender national pride:

It was immediately after great national calamities, that the attention of the Danish people was turned to that early [Viking] period of their history, as a time from the contemplation of which their spirit of nationality might gain support, and in whose memories they found the hope of a new and equally glorious era again (Worsaae 1847a, 312).

In his second lecture, he summarised the Three Age System, and proposed classifications for certain Irish antiquities, including those ‘stone structures called Cromlechs, Druid’s Altars, etc.’, which he assigned to the Stone Period (Worsaae 1847b, 329 quoted in Waddell 2005, 137).

Nevertheless ‘an insular climate of opinion in which it was easy silently to reject Thomsen’s Three Age system’ remained (Herity and Eogan 1977, 11). Ten years after Worsaae’s visit, William Wilde (1815-1876)—a distinguished surgeon (and father of Oscar)—was commissioned to edit the catalogue of the Academy’s collections. In common with Petrie and O’Curry, Wilde accepted the essential historic truth of the Gaelic Irish origin myths (Waddell 2005, 134). Drawing on his medical background, he attributed perceived differences in skulls from ancient burial monuments as defining characteristics of either the Fir Bolg or the Tuatha de Dannan:

From the foregoing observations it is manifest not only that two separate races, the earliest characterized by very longheads, and who were probably the Firbolgs, or first colonizers, and the other by more globular and capacious skulls, and who, it would appear, were the Tuatha de Danaan [*sic.*], the conquerors of the former, existed in this country prior to the Christian era; but that both races subsequently existed together, and probably amalgamated. Skulls exhibiting both characters may be observed among the present truly Irish inhabitants, but that the more we approach the south and west the more do the former predominate, both in the existing inhabitants, and in the crania found in ancient burial-places (Wilde 1850, 239).

Wilde therefore doubted applicability of the Three Age System to Ireland, and chose instead to organise the first comprehensive catalogue of the Academy’s museum collection under simple descriptive categories: stone; earthen, vegetable and animal materials; copper, bronze, silver and gold (Wilde 1857; 1861; 1862; Herity and Eogan 1977, 10-11; Waddell 2005, 135-6).

It was not until the early twentieth century that the Three Age System gained widespread acceptance in Irish scholarly circles (Waddell 2005, 137). George Coffey (1857-1916), appointed Curator of the Royal Irish Academy's collections in 1897, devoted himself to continuing the cataloguing begun by Wilde (Herity and Eogan 1977, 12). Coffey was an active nationalist, and a significant figure in the *Celtic Revival* of the late nineteenth and early twentieth centuries (e.g. Crooke 2000, 62; Herity and Eogan 1977, 12; Sheehy 1980, 104; see further discussion in Section 2.4.2, below).

Unlike Wilde, Coffey was convinced of the merits of the Three Age System, and chose to apply Montelius's subdivisions of the Bronze Age to the Irish material (Herity and Eogan 1977, 12-13; Waddell 2005, 184). E.C.R. Armstrong (1879-1923) assisted Coffey with the publication of *The Bronze Age in Ireland* (Coffey 1913), which set out the new chronology. Armstrong went on to succeed Coffey in 1914, continuing the work of placing Irish artefacts in European chronological context (Waddell 2005, 184).

The appointment of R.A.S. Macalister (1870-1950) to the newly created chair of Celtic Archaeology at University College Dublin in 1909 led to the publication of the first survey of Irish archaeology from the Neolithic to the arrival of the Anglo-Normans in chronological sequence (Waddell 2005, 191-3). A series of public lectures given by Macalister at UCD in the 1915-16 academic year were published successively as papers in *The Irish Monthly* between 1917 and 1920. In the first of those papers, Macalister began by emphasising the importance of comparing Irish antiquities with contemporaneous material from other countries, and differentiating his work from earlier syntheses of Irish antiquities on the basis of their 'neglect for the important issue of chronology' (Macalister 1917, 346-7). These were themes Macalister developed in his subsequent research,

though the challenges of applying the Three Age System to Irish prehistoric material continued to vex him (e.g. 1928, 28-9; Waddell 2005, 193-4).

Though Macalister did much to embed the Three Age System in Irish Archaeology, he was not immune to the romantic charm of the *Lebor Gabála Éirenn*:

Even in their confused and artificial form, the Book of Conquest and similar works preserved far more early *historical* (as distinguished from legendary) material, and more information on the society and religion of pre-Christian Ireland, than many scholars concede (1908, 16: emphasis original).

His extensive engagement with medieval texts (he produced a five volume translation of the *Lebor Gabála Éirenn*), inevitably influenced his interpretation of prehistory. Waddell (2005, 29, 193) notes that Macalister's (1919) reconstruction of the 200 metre-long 'Banqueting Hall' on the Hill of Tara, Co. Meath, (now interpreted as a processional path⁹) owed much to medieval pseudo-history (see Figure 2.2, below).

Nevertheless, it is perhaps more accurate to describe Coffey, Armstrong and Macalister, rather than Petrie, O'Curry, and O'Donovan, as 'the men who set the investigation of Gaelic antiquity on a new, scientific and critical footing' (*contra* Leerssen 1996, 102); certainly if chronology is the yardstick. The next section examines how the Celtic Revival and the founding of the Free State influenced of the interpretation of prehistory within the framework of the Three Age System.

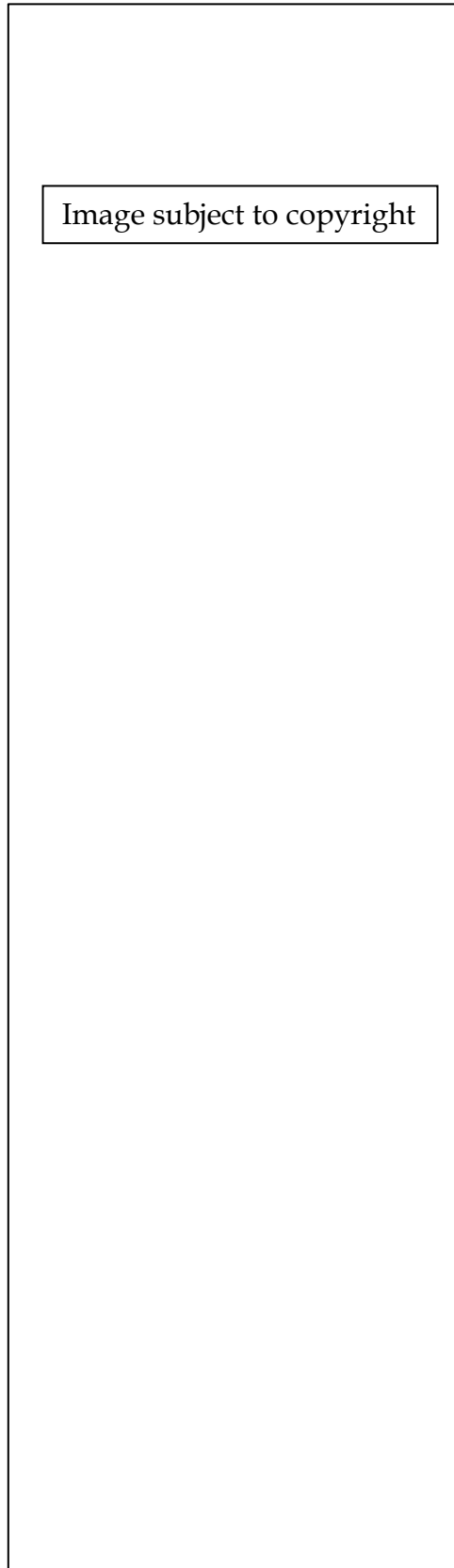


Figure 2.2: Macalister's (1919, Plate IX) 'Restoration of Tech Midchúarta' (the 'Banqueting Hall' on the Hill of Tara) combines the dimensions of the visible earthworks with the descriptions of medieval scribes.

2.4.2 Understanding the Neolithic in twentieth-century Ireland

The image we have created of the Irish (and British) Neolithic may say more about the ideology of the nation state, the legacy of empire, the European project and current theoretical approaches in archaeology than about the realities of life as lived in prehistory.

Gabriel Cooney (2000b, 51)

The Ireland that we dreamed of would be...a land whose countryside would be bright with cosy homesteads, whose fields and villages would be joyous with the sounds of industry...whose firesides would be forums for the wisdom of serene old age. The home, in short, of a people living the life that God desires that men should live.

Éamon de Valera (1943)¹⁰

Macalister held the Chair of archaeology at UCD from 1909 to 1943, and he dominated Irish archaeology between the two World Wars (Waddell 2005, 192). His tenure coincided with the founding of the Free State in 1922, which itself can be seen in the context of the destabilisation of Europe during the First World War (e.g. Garvin and Hess 2009, 21), and the shaping of national identities across Europe in the decades that preceded the War (e.g. Hobsbawm 1983).

Macalister, observed that ‘in Ancient Europe there were no “nations”’ (1949, xii), and was vexed by the appropriation of the past in political interests, using the first post-independence Presidential Address to the Royal Society of Antiquaries of Ireland to decry the extremes of Anglophobia and Anglophilia (Crooke 2000, 58; Waddell 2005, 205-6):

The Anglophile looks back into the dim ages or the past of his native land, and he can descry nothing but hordes of naked savages, living mere animal lives, and expending their whole time and energies in devastating tribal wars: a savagery from which England has raised us.

The Anglophobe scans the same horizon, and sees the cloud-capped towers, the gorgeous palaces, the solemn temples, of a vast and imposing civilisation, devoted to letters and to learning: a civilisation which England has destroyed (Macalister 1925, 11-12)

Inevitably, in Ireland and across Europe, archaeology was drawn upon in the causes of political and cultural nationalism. The potential for archaeology to help foster a shared sense of national identity made protecting Ireland's rich archaeological legacy an early priority for the Irish Free State (e.g. Cooney 1996, 157). Material culture that demonstrated a way of life which extended into deep antiquity (before the degeneration caused the 'malign agency' of the British) would clearly strengthen the national narrative (e.g. Hutchinson 1987, 114-9; Crooke 2000, 32). Reflecting in his post-World War II survey of prehistoric archaeology in Ireland, Joseph Raftery (1913-1992) of the Nation Museum of Ireland recalled that '[t]he Irish Government, striving to re-establish the Gaelic culture of the country, did not neglect its antiquities' (1951, 22).

Woodman (1995, 277) argues that the archaeological and antiquarianism establishment had few formal links with the Celtic Revival¹¹ – a movement at its height in the three decades prior to the establishment of the Free State. An obvious exception was George Coffey, who held the title of Professor of Archaeology at the Royal Hibernian Society, and served as a Member of the Council of the Royal Society of Antiquaries of Ireland in 1897, 1899-1900 and 1903-4¹². He was curator (from 1897), then the first Keeper of Antiquities (until 1914) at the Museum of Science and Art (later the National Museum of Ireland): in effect, Ireland's first professional archaeologist (Cooney 1996, 154; Waddell 2005, 180-2). Coffey also addressed public meetings in favour of Home Rule, and was 'a member of the circle of literary men and artists who fostered the Celtic revival in Dublin' (Herity and Eogan 1977, 12).

The profound influence of Childean culture-history on European archaeology from the 1920s made the study of the origins of agriculture—the *dawn of civilisation*—a priority for nation states across Europe. The process of Neolithisation became an issue that divided Anglophiles and Anglophobes across the new political border in Ireland. Before examining the impact of this on the interpretation of the archaeology in the study area, the perception of rural life in the west of Ireland that developed during the Celtic Revival is briefly considered.



2.4.2.a The Celtic Revival and Ireland's 'timeless' west

[The reader] is about to read an account of neolithic civilization from the inside. Synge and others have described it from the outside, and very sympathetically, but I know of no other instance where it has itself become vocal, and addressed modernity.

E. M. Forster (1953 [1933], v)¹⁴

At the time of the formation of the Irish Free State, small-scale mixed farmers embodied the values of the nation (e.g. Brown 1981, 19; Duffy 1997, 70), and represented the 'critical nation-forming class' (Larkin 1975, 1245; cf. Garvin and Hess 2009, 21). The vision of an idealised rural society with 'simple and anti-materialistic values' was seen to be rooted in the 'character-forming and civilizing qualities' of traditional farming life (Lane 2003, 167; cf. e.g. Whelan 1993, 42).

The farming communities of Ireland's western seaboard lived among some of the best-preserved ancient monuments in Europe. This was a region fêted by writers and artists during the Celtic Revival: its distance

from the anglicised east having ‘preserved Irish authenticity’ (e.g. S. Richards 2009, 28). Writers such as William Butler Yeats (1865-1939) and John Millington Synge (1871-1909) constructed a literary narrative that eulogised the west as a ‘cultural reservoir’ of Gaelic language and tradition (Duffy 1997, 67; N. Johnson 1993, 157-60; 1997, 180; Nash 1993, 94). Both perceived a utopian lifestyle under threat (e.g. Castle 2001, 52; S. Richards 2009), which Synge depicts in his most famous play *The Playboy of the Western World*, set on the ‘wild coast of Mayo’ (Synge 1911 [1907], viii).

In 1905 Synge, along with Jack B. Yeats (1871-1957; brother of W.B. Yeats) as illustrator, were commissioned by the *Manchester Guardian* newspaper to record the prevailing social and economic conditions in the Congested Districts¹³ of Connemara and north Mayo in a series of articles (e.g. Sisson 2009, 54). The experience was a great source of inspiration for Yeats, whose continuing interest in the Ballycastle area of north Mayo is demonstrated by a number of later works (e.g. see J.B. Yeats 1912; cf. Pyle 1970, 98), including this (Figure 2.3, below) painting of Downpatrick Head (which separates the bays of Ballycastle – also known as Bunatrahair – and Killala).

Killala Bay had been the landing place of a French military force in support of Irish forces during the 1798 rising against British rule (e.g. see Jackson 2000, 20). This, and the subsequent Battle of Killala gave the area additional historic resonance. Unbeknown to the visiting writers and artists, turf-cutters gathering fuel in the peat bogs that formed the hinterland of this rugged section of Atlantic coast had been uncovering preserved field boundaries, which would shortly come to define a distinctive Irish Neolithic.

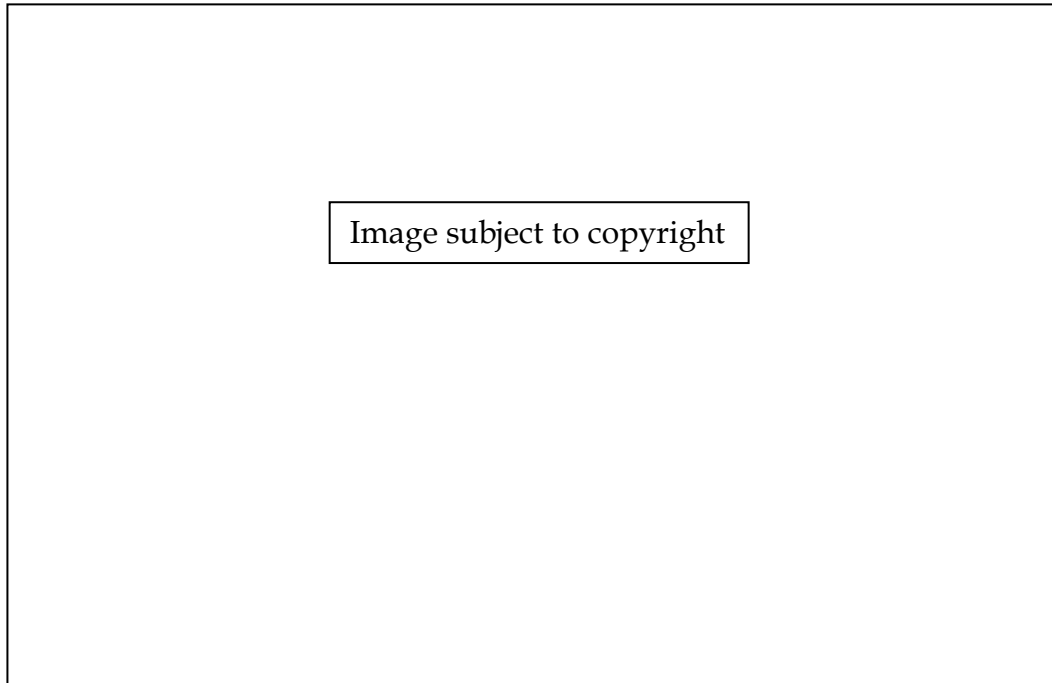


Figure 2.3: *Downpatrick Head* (1909) by Jack B. Yeats. Image available at <http://www.adams.ie/BidCat/detail.asp?SaleRef=3103&LotRef=68>

Another artist whose work complemented the prevailing literary narrative of the west was Paul Henry, who, along with Jack Yeats founded the Society of Dublin painters in 1920 (Duffy 1997, 67; Cusack 2010, 226). Henry's simplified, stylised west of Ireland landscapes became symbolic of the *real* Ireland (e.g. Sheehy 1980, 180). His paintings of traditional cottages in desolate landscapes 'became part of the nationalist iconography of the Free State' (Duffy 1997, 67; see also e.g. Cosgrove 1995, 93). One of Henry's paintings of cottages on Mount Errigal, Co. Donegal (another landscape which would come to prominence in archaeological interpretations of the Neolithic), was chosen to illustrate Irish rural life in the front of the 1932 guide to the Irish Free State: *Saorstát Eireann Official Handbook* (Hobson 1932). This and other paintings by Henry used in the book are included as factual illustrations (none feature in the section on contemporary Irish art) (see Reid 2007, 937).

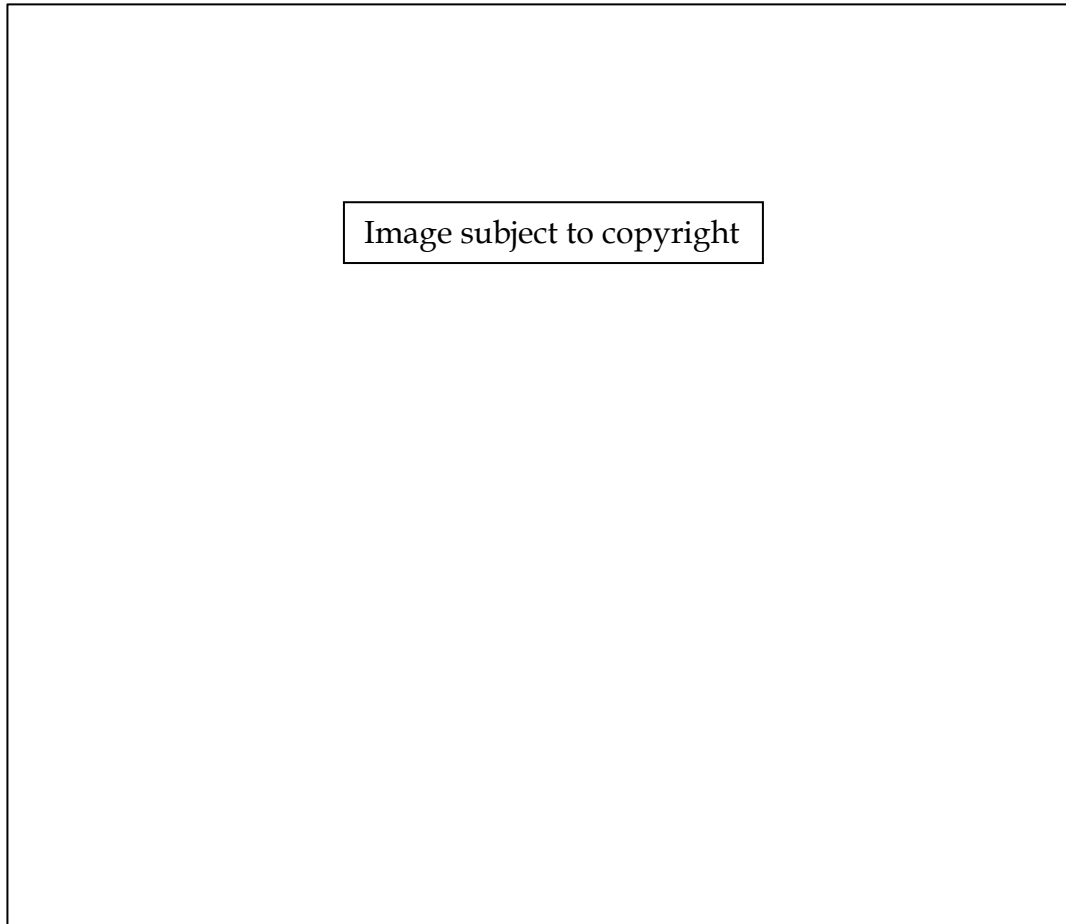


Figure 2.4: Errigal, Co. Donegal (c. 1930) by Paul Henry, frontispiece in Hobson (1932).

Traditional cottages featured strongly in the Celtic Revival's romanticised image of the west, becoming emblematic of a 'valued mythic traditional rural culture' (Cusack 2010, 227). However, in the spirit of romantic primitivism, landscapes were 'emptied' of any indications of hardship. The insides of cottages – 'frequently cramped and insanitary' – were rarely depicted (*ibid.*; Reid 2007, 937).

The domestic lives of 'the disappearing type of "pure" Irish peasant memorialized by the plays of Synge'¹⁵ were the priority of George Russell (1867-1935), a prominent and influential figure in the Celtic Revival who wrote under the pseudonym *Æ* (e.g. Lane 2003; MacPherson 2001; N. Allen 2003). Russell edited the weekly journal of the Irish Agricultural Organisation Society¹⁴, the *Irish Homestead*, from 1905 to 1923 – 'a paper

deeply embedded in the ethos of the cultural revival movement' (e.g. Lane 2003, 165). Through its columns and editorials, Russell evoked an image of glorious and harmonious rural tradition (*ibid.*). For Russell the values nurtured around the firesides in the idealised homesteads of small farming communities were a cultural template for the nation; the homestead the 'cornerstone of Irish identity' (MacPherson 2001, 132):

It is in the cottages and farmers' houses that the nation is born. Here is engendered the fiery seed of nationality, the love for hearth and home, and kin and race, in which is the strength and endurance of peoples...If you aim at a civilisation of a high and noble character, you must begin at the hearth. If the hearth is not clean, the high places of state will be of like character (Russell 1906, 283).

The 'imagined communities' of the west of Ireland were also extolled by organisations such as the Gaelic League, founded by Douglas Hyde in 1893 with a mission of de-Anglicising Irish culture through the restoration of Irish Language (e.g. N. Johnson 1997, 180; Watson 2009, 163).

Archaeology was not immune to the 'contemporary social and political milieu' (Cooney 1996, 158). For Anglophobes, the west of Ireland existed outside of time: past and present were elided in a vision of cultural continuity that decoupled the Irish past from British influences (cf. e.g. Graham 1997, 5). For Anglophiles, the west was similarly timeless and un-British, but rather than being a link with a proud cultural heritage, represented an area beyond the civilising influence of Britain (e.g. E. E. Evans 1968, 7).



2.4.2.b Neolithic Ireland and the ‘timeless’ west

Conventional history is at a loss where, as in the west of Ireland, history and prehistory seem to co-exist and all time is foreshortened into a living present.

E. Estyn Evans (1981, 87)

Historic landings from France and Iberia in [the west of Ireland] are well known. While political conditions may have influenced these approaches, they demonstrate the fact that expeditions from France and Iberia to Ireland tend to arrive via the west coast, in distinction to incursions from Britain which naturally strike on the east.

Ruaidhrí de Valera (1951, 180)

Research in the west of Ireland was an early priority in the new era of archaeological investigation that began in the 1930s. In 1932, E. Estyn Evans (1905-1989)¹⁶, a geographer at Queen’s University, Belfast, began an extensive programme of archaeological fieldwork incorporating the survey and excavation of megalithic tombs (Herity and Eogan 1977, 13; Waddell 2005, 201). Evans subscribed to Childe’s thesis that the technological and economic sophistication of material culture was indicative of the degree of civilisation a society had achieved (e.g. E. E. Evans 1981, 6). He was also strongly influenced by the *Annales* school (*ibid.* 1981, viii; ch. 1; ch. 4; see discussion in Chapter 1), assuming social continuity where external influences were seen to have been minimal (cf. e.g. Graham 1994, 187; Whelan 1997; 2000).

For Evans the west of Ireland was an ‘open air laboratory’; a ‘*tabula rasa*’ (E. E. Evans 1981, 70), untouched by the modern world:

The regions of Ireland which have retained the Gaelic tongue—the remote western peninsulas—have naturally kept many other ancient culture elements, and it is to the Gaeltacht that the student first turns his attention. In the north of Ireland the culture-lag, already apparent in the northeast, increases towards the west: the centuries fall away as one

approaches the Atlantic, and to journey from east to west is to travel into the past (1939b, 207).

Here he believed 'the evolution of society in Britain and western Europe generally' could be observed in the field (1957, 3). Contemporary small scale farming communities represented 'survivals' of the most rudimentary and ancient level of Indo-European civilisation (*ibid.* 1939a). This position was summarised by Desmond McCourt, contributor and joint editor of the 1971 *festschrift* in Evans' honour:

...the continuity that runs through Irish history and prehistory: that the servile cultivators...living in their clustered kingroups, have remained a constant element through centuries of change and conquest, irrespective of changing overlordships. Descendants mostly of Neolithic farmers who were absorbed into the hierarchical social order introduced by later Indo-European conquerors, they continued under the Norman yoke as the serf-like betaghs^[16]...located on their traditional lands in clustered settlements which...came through the vicissitudes of the sixteenth and seventeenth centuries to be mapped by the Ordnance Surveyors in the middle of the nineteenth century (McCourt 1971, 127).

Evans was untrusting of historical documentary sources (e.g. 1957, ix), particularly Gaelic sources (1981, 76). In any case, he saw these as unnecessary when the 'whole sweep of Irish settlement from its genetic origins in prehistory' could be observed in the field (Whelan 1997, 6). Eschewing historical texts, Evans pursued a methodology in which the contemporary and historic material culture of the west of Ireland was examined alongside that of prehistoric, particularly Neolithic, evidence. His interpretation of Neolithic material was explicitly based on the 'study of both the material and spiritual folk-life' of contemporary western Ireland (e.g. 1957, 3; 1981, 75).

Evans was drawn to Mount Errigal in north-west Co. Donegal, and the small clusters of houses—which he called clachans—such as those depicted by Paul Henry (see Figure 2.4, above). Despite acknowledging

that the settlements in question dated back just 200 years (E. E. Evans 1939a, 24), Evans was confident that he had found evidence for 'pre-Celtic' lifeways (1939b, 208). However, rather than the idealised cultural landscape depicted by Henry, Evans' interpretation has been described as a patronising portrayal of a culture suspended in 'an unflattering stasis' (Whelan 1992, 411; see discussion in Graham 1994, 187).

For Evans and like-minded scholars in Northern Ireland, Neolithic culture had been introduced to Ireland by 'megalith-folk' arriving at Carlingford Lough, Counties Down and Louth, from where it diffused, 'degenerating' on its passage westward (Davies and Evans 1943). The manifestation of this regional 'evolution of settlement and civilization' were the 'horned cairns' clustered around Carlingford Lough (*ibid.*, 23). Evans (1938a, 11) observed that similar monuments 'are found elsewhere in western Britain [*sic.*], especially in south-west Scotland', arguing that in Ireland 'it is a striking fact that these monuments are virtually confined to Ulster, which in some aspects of its life showed closer allegiance to south-west Scotland than to southern Ireland in these earliest days of civilization' (see also e.g. Davies 1948, 14).

As Waddell (2005, 205) observes, while the linking of the origin of 'civilization' in Ireland with Scotland 'may have produced a positive resonance in Ulster hearts', alternative narratives were favoured elsewhere on the island. A 'remarkable controversy' ensued (*ibid.*, 206). Ruaidhrí de Valera (1916-1978; son of Éamon), Professor of Celtic archaeology at UCD from (1957-1978), accepted that the distribution of 'horned cairns' ('court cairns' to de Valera; now usually *court tombs*) was a reliable proxy for the spread of colonising 'farming folk' (1960, 40). However, de Valera's fieldwork demonstrated that the greatest concentration of such

monuments was in the north-west counties of Mayo and Sligo, *not* the north-east.

For de Valera, the distribution pattern was indicative 'of a primary western entry and focus and an eastward diffusion' (1960, 40). He linked the morphology of the certain monuments in the Mayo area to monuments in north-west France, suggesting this as the settlers' origin (*ibid.*, 83). According to de Valera, '[i]t would be by no means surprising...that voyagers from the south touching our western coast, could fail at first to find suitable settlement areas and might well be forced to proceed northwards to Killala before achieving any notable success' (*ibid.*, 45). Thus, he proposed the bays Bunatrahir and Killala as the likely scene of the initial landings (*ibid.*; 1951, 190; see Figure 2.5, below).

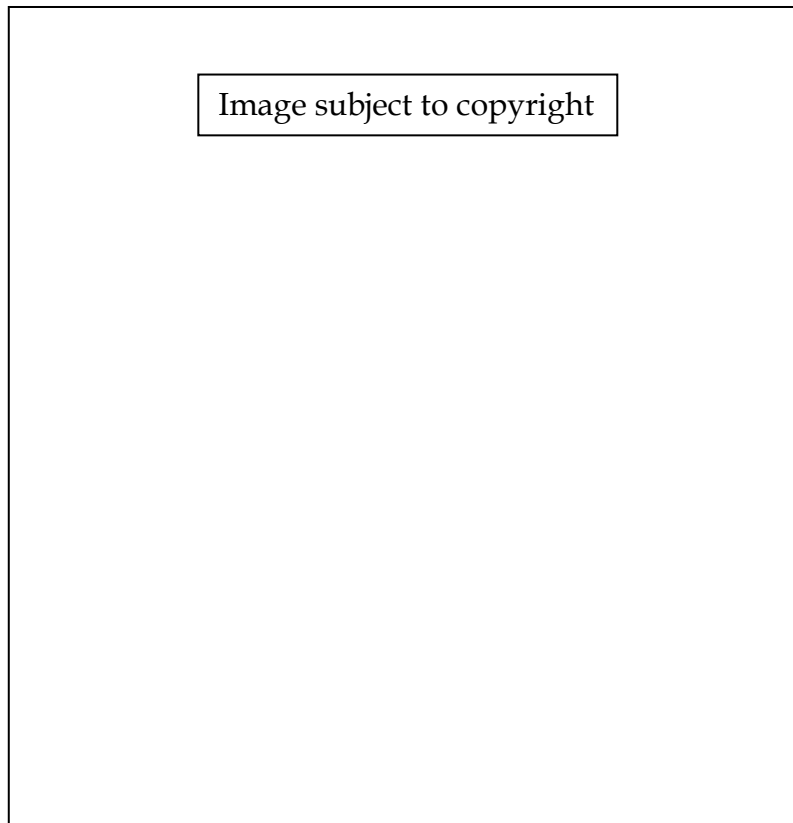


Figure 2.5: 'Map showing megalithic sites near Ballycastle.' After de Valera 1951, Figure 1.

Evans was quick to question the plausibility of voyagers from the south making first landfall so far north (1961, 230-1): in making his case for the

north-east, he suggested that similar monuments in Wales and the Isle of Man may indicate the route of diffusion. He later seized on the historic significance of Killala:

Some critics have suggested that hypothetical but highly successful far-off invasion from France somehow compensates for the disastrous failure of that other French landing on the shores of Killala Bay in 1798 (1981, 112).

While de Valera's arguments cannot be reduced entirely to Anglophobia, clearly, like Evans, political concerns influenced his work (Ronayne 1994, 19; Stout 1996).



2.4.2.b.i Fields of the first farmers

...we have in [the distribution of court cairns] a reliable guide to the lands occupied by the builders. The general picture shows...settlement of great continuity. It seems fair to visualise the spread of a farming folk and to speak of them as colonisers.

Ruaidhrí de Valera (1960, 40).

Significant among the monuments that underpinned de Valera's theory was a court tomb in the townland of Behy, west of Bunatrahir Bay in north Mayo. Previously classified as a passage tomb due to its cruciform chamber, de Valera considered the monument's morphology 'eloquent' testimony 'in favour of an ultimate origin of the court cairns from west European passage graves' (1960, 138-9). Covered by peat, the monument's 'court' feature was uncovered in excavations carried out by de Valera in association with Seán Ó Nualláin (archaeologist at the Ordnance Survey of Ireland) and Michael Herity (UCD) in the 1960s (de Valera and Ó Nualláin 1964, 4-6; Herity 1971, 262; see Figure 2.6, below).

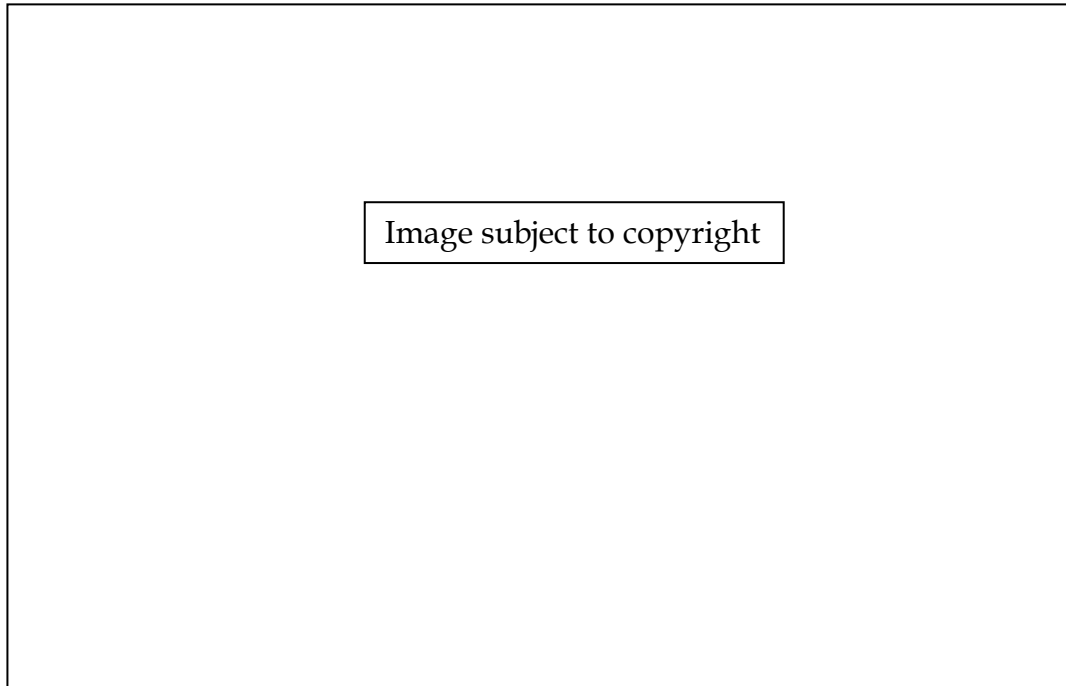


Figure 2.6: *Behy court tomb during excavation. After Warren et al. (2009, Figure 4).*

The Behy monument was among the concentration of court tombs near the village of Ballycastle that represented the ‘outstanding’ prospect for the location of the ‘initial focus of the court cairn builders’, being ‘closely referable to ideal landing points at Bunatrahir, Rathlackan and Rathfran’ (1960, 45). The excavations at the Behy monument revealed field walls beneath the blanket bog which ‘had been built right up to the edge of the cairn’ (Herity 1971, 262). The walls were traced through turf cuttings, to where they joined the larger field system now known as Céide Fields.

Herity determined that ‘a systematic search for and an investigation of pre-bog fences and enclosures in Ireland was capable of extending considerably our knowledge of farming life in the later Stone Age and the earlier Bronze Age’ (1971, 264). He decided to canvass turf-cutters for local knowledge of walls uncovered beneath peat, noting that:

...where modern turf-cutting has removed significant amounts of covering peat, the fields they enclose can be readily enough recognized. It was realized that an unusual new kind of prehistoric evidence in the shape of fields could thus be made available in Ireland to augment the

kinds of habitational evidence already being investigated. This line of research also offered a new means of finding prehistoric homesteads.

It was at this point that Herity engaged Seamas Caulfield to assist with the research (*ibid.*). During the 1930s, Caulfield's father Patrick, the local National School teacher, had notified the National Museum of Ireland of other nearby sections of stone wall discovered beneath the bog by turf cutters (Kneafsey 1995, 143; Conroy 1993, S11). Herity shared de Valera's conviction that the Behy monument was 'of early typological date' and that it lay within the 'primary area' for court tombs, from where 'two clear lines of diffusion eastwards' could be determined (Herity and Eogan 1977, 31). Likewise, Caulfield continued to link the Neolithic in the Ballycastle area to de Valera's hypothesis (e.g. 1983, 195; 1992, 13-14), basing his interpretation of ancient field systems on a suggested absence of 'monuments from later periods', and the 'general agreement in distribution between the Neolithic Court Cairns (de Valera and Ó Nualláin 1964 Map 1) and the occurrence of the field systems' (Caulfield 1978a, 142).

Caulfield's claim to have 'established that the typical rural settlement pattern in Mayo extends back over fifty centuries' (1993, 14) resonated beyond academic archaeology. The story of 'the fields where the first farmers lived and worked and worshipped'¹⁸ was a parable for the ancient values that could reinvigorate Ireland's rural communities (e.g. Caulfield 1993; Conroy 1993; Finlan 1993; MacConnell 1993; Kneafsey 1995; see Figure 2.7 below). Through his promotion of Céide Fields, Caulfield became something of a local celebrity, such that in 1991 he was honoured as 'Mayo Person of the Year' (Conroy 1993; Kneafsey 1995, 148). His efforts persuaded a previous incumbent of that award, former Taoiseach Charles Haughey, to help secure funding of £2.5 million for the construction of the interpretive centre at Céide Fields (MacConnell 1993,

40; Kneafsey 1995, 144). Haughey echoed Caulfield's conviction that Céide Fields provided evidence of a way of life with its roots in deep antiquity, enthusing that '[w]hile the rest of the world was scrambling around in search of its roots, we could prove our 5,000-year pedigree. We are the children of the first Europeans' (Siggins 1990; Kneafsey 1995, 148).

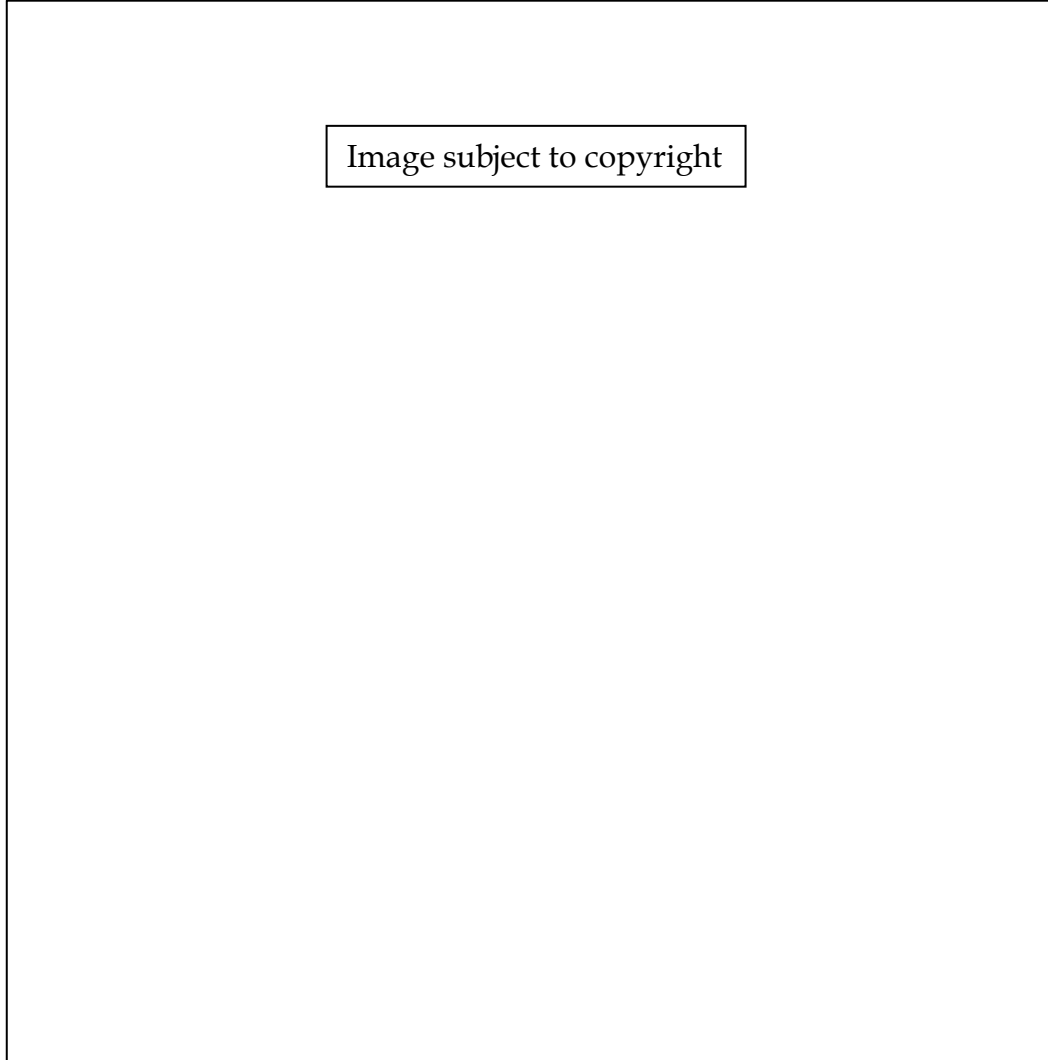


Figure 2.7 'Life 5,000 years ago – insights for today': part of an exhibit at the Céide Fields visitor centre. Many of these themes are expanded in Caulfield 1992.

The continuing 'iconic' archaeological and cultural status of Céide Fields is evidenced by the Irish government's recent recommendation of the site for World Heritage status (B. Lucas 2010). More than forty years after the first archaeological investigations at Céide Fields, the evidence remains unique: 'Not only are they "an outstanding example" but they are *the*

outstanding example of human settlement, land-use and interaction with environment in Neolithic times (*ibid.*, 2: emphasis original).

It has frequently been suggested that the significance of Céide Fields has been underplayed, particularly by English archaeologists (e.g. Cooney 1997; Barclay 2000, 281; Caulfield *et al.* 2009c, 50; Byrne *et al.* 2009b, 41). Legitimate concerns about a 'normalised' Neolithic have, however, served to obfuscate the need for critical evaluation of this 'exceptional' evidence. A further barrier to debate has been the limited publication record (cf. e.g. Caulfield *et al.* 2009a, 4; 2009b, 2; 2009c, 50; 2010, 2; Waddell 2010, 45). Despite the archaeological projects associated with Céide Fields having been described as 'providing a history of Irish archaeology and the availability of funding' (Caulfield *et al.* 2011a, iv), inadequate provision was made for post-excavation analysis (e.g. Caulfield *et al.* 2009a, 3; Warren *et al.* 2009, 2).

Though Cooney has distanced himself from perspectives that see 'long strands of continuities between prehistory and the imagined traditional rural landscape of the national imagination' (2001, 169), the role played by such perspectives in shaping conceptions of Neolithic farmscapes cannot be ignored (cf. *ibid.*). Talk of 'agricultural potential', 'stocking rate per hectare', 'herd composition' and 'beef production' at Céide Fields (Caulfield 1983) bridges the 5,000 year gap to render the Neolithic landscape familiar. The 'emotional appeal' of familiarising language can lead archaeologists to 'slip rapidly into highly dubious concepts' of a 'timeless' countryside (M. Johnson 2007, 129; Finlayson and Warren 2010, 82; cf. e.g. Downes and C. Richards 2005; Brück 2000, 273), where peasant 'folklife' is unchanging (e.g. see Harbison 1988, 195; Mallory and McNeill 1991, 32). Caulfield (1983, 213) has characterised the 'persistent fisher/farmer communities which one finds along the Connaught coast today' as a potential model for prehistoric life at Céide Fields. His evocation of the Neolithic landscape might equally describe the west of

Ireland in the early twentieth century, as portrayed in a Paul Henry painting:

Céide Fields was a farming countryside of typical stone-walled fields where herds of cattle once grazed, a countryside of homes scattered through the landscape surrounded by their garden walls. In many ways it was little different to much of the Irish countryside today (Caulfield 1992, 1; see Figure 2.8, below).

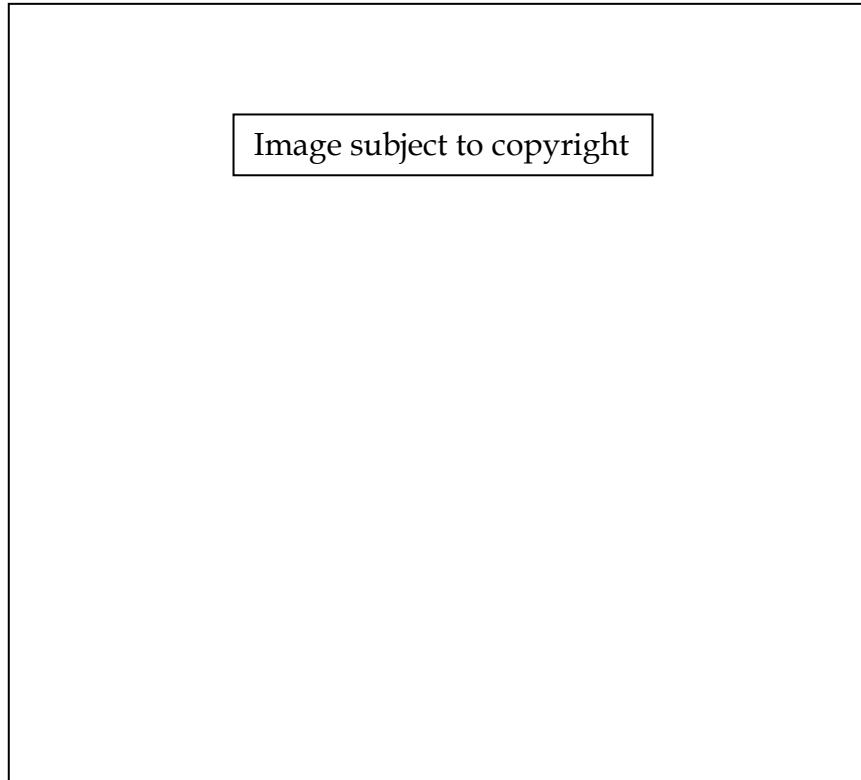


Figure 2.8 'In the Kingdom of Kerry' (1935-7) by Paul Henry, as reproduced in Kennedy (2007, 282).

The key question for Chapter 3 of the current study is whether, when the 'contemporary baggage' (in Cooney's 2001 description) is removed, the archaeological *evidence* from Céide Fields support the narrative?

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2.4.2.b.ii First farmers' houses

Seán P. Ó Ríordáin (1903-1957) preceded de Valera as Professor of Celtic Archaeology at UCD, having succeeded Macalister in 1943. In 1936, while at University College Cork, Ó Ríordáin began a campaign of excavations on the Knockadoon peninsula at Lough Gur, Co. Limerick, which continued until 1954. Significantly, the excavations revealed evidence of prehistoric settlement structures, some of which Ó Ríordáin (1954) assigned to the Neolithic. These were the first apparently domestic structures in Ireland to be attributed to 'Neolithic farmers'. Among the structures, which Ó Ríordáin considered constituted a Neolithic 'village', were the first presumed-Neolithic rectangular 'houses' in Ireland.

In his interpretation of the rectangular structures at Lough Gur, Ó Ríordáin (1954, 302-3) drew on Estyn Evans' plans of the 'clachan' cottages at Mount Errigal (see Figure 2.9 below).

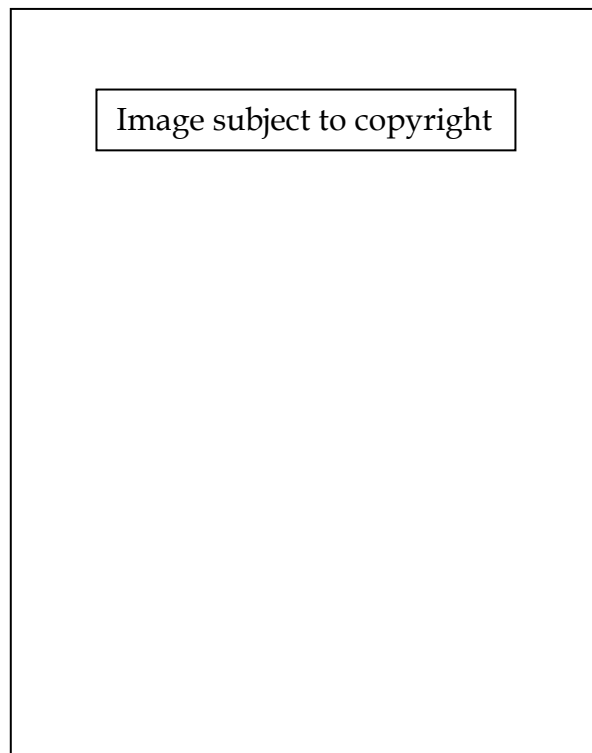


Figure 2.9: 'Suggested cross-section Site A, Knockadoon and cross-section of Donegal cottage (after Evans, Antiquity) for comparison.' After Ó Ríordáin 1954, Figure 2.

In the absence of radiocarbon dating, Ó Ríordáin's dating of the structures at this multi-period site relied upon the stratigraphic association of pottery types. Though significant problems with Ó Ríordáin's assumptions have since become apparent (see Chapter 4), his interpretation of the structures—which quickly became established as 'the type sites for Neolithic settlement in Ireland'¹⁹—has been remarkably enduring.

Since the discovery of the rectangular structures at Lough Gur, considerable new evidence for non-megalithic prehistoric rectangular buildings has come to light through excavation. In keeping with the initial interpretation of the Lough Gur structures, these are generally assumed to represent Early Neolithic farmhouses. Among the first post-Lough Gur discoveries was the footprint of a rectangular timber building beneath an excavated court tomb at Ballyglass, Co. Mayo (Ó Nualláin 1972). Though Ballyglass structure is not located in the vicinity of any known ancient field systems, in the absence of convincing evidence for Neolithic houses at Céide Fields (see Chapters 3 and 5), the two sites are frequently conflated (e.g. Cooney 2000a, 67-8; B. Lucas 2010, 2; Smyth 2013a, 308).

Rectangular timber structures have become the 'vernacular architecture' (e.g. Cooney 2007b, 221) of Irish Neolithic farmers, completing the characterisation of a landscape which is at once 'very different' to Neolithic southern Britain (e.g. Scarre 2007, 125), yet comfortingly similar to contemporary rural western Ireland (see Section 2.4.b.ii, above). As Smyth (2006, 240) observes, it is because of the 'very visible evidence for permanent and organized settlement from an early stage in the Neolithic, as seen at the Céide Fields, Co. Mayo, and, slightly later, in the clusters of buildings on the Knockadoon peninsula, Lough Gur' that 'Irish archaeologists have, for a long time, been more comfortable with the idea of a sedentary Neolithic and more willing to assign a domestic role to Neolithic buildings'.

The risk with having such a clear set of expectations regarding Neolithic houses is that interpretation becomes a self-fulfilling prophecy. Undated prehistoric rectangular timber structures are assumed date to the Early Neolithic, and this may be extended to artefacts, ecofacts and features in the vicinity. Clearly spatial coincidence does not automatically represent contemporaneity. In no case does the occupation floor of a Neolithic rectangular timber structure survive, and the stratigraphy at most sites is almost invariably poorly understood. Significantly, given the poor survival of animal bones (which are presumed to have been present) due to prevailing soil conditions, grass seeds—interpreted as cereal grains – associated with some of the buildings have assumed great evidential importance.

Continuing with the approach adopted in Chapter 3, Chapter 4 critically reviews the evidence from excavations and palaeobotanic studies. The aim is to establish how removing the lens of contemporary expectations might impact on the interpretation of the character of the Neolithic in western Ireland through time.



2.5 Measuring Irish prehistory

2.5.1 Early use of radiocarbon dating

Radiocarbon dating came as a godsend to archaeology. For the first time, the prehistorian could hope to date his finds, both accurately and reliably, by a method that made no archaeological assumptions whatever...all that was needed was a couple of ounces of charcoal or some other organic material buried at the time in question, and science would do the rest.

Colin Renfrew (1976, 249)

With so many sources of possible error impinging upon radiocarbon measurements of elapsed time, it is strongly recommended that multiple interpretive hypotheses be entertained in efforts to understand any anomalies that are recognized. If the anomalies cannot be evaluated so that their sources can be identified, the responsible investigator will publish the results with a discussion of a range of possible explanations, to provide future investigators with clues for solving the problems.

Dena Dincauze (2000, 117)

The introduction of radiocarbon dating in the mid-twentieth century came among a raft of post-War technological developments that underpinned the establishment of processual archaeology (e.g. Clarke 1973, 8-9). As mentioned in Section 2.3.3, processual archaeology aimed to provide a theoretical bridge from events in the archaeological record to an understanding of the long-term processes that were seen to have caused those events. In Ireland, however, engagement with processual archaeology was largely restricted to the adoption of new techniques of measurement and analysis (Woodman 1992, 35; Cooney 1995, 270; 2000c, 3). Cultural change continued to be understood as a series of one-off events (usually colonisations or invasions), rather than the outcome of dynamic processes (e.g. Cooney 1995, 270-1; 2000c, 2-3; but see Waddell 1978).

The first radiocarbon dates in Irish archaeology were obtained in 1953 from samples taken from two burnt mounds at Killeens, Co. Cork, dated by Willard Libby²⁰ at the University of Chicago (Waddell 2005, 227). The first radiocarbon dating facility in Ireland was established in 1959 at Trinity College, Dublin (*ibid.*). Much early use of the technique was directed towards research into settlement evidence, with the aim of correcting the ‘imbalance between habitational and burial evidence’ (Herity and Eogan 1977, 24). Of particular interest, then as now, was the ‘delineation of the earliest farming culture in Ireland’, in pursuit of which radiocarbon dating in combination with palynology was seen to provide great promise (*ibid.*).

Early use of radiocarbon dating, however, had a limited impact on traditional or received understandings of culture change in Ireland²¹. The origin myths of the *Lebor Gabála Éirenn* retained overt influence on some archaeological interpretations (cf. Waddell 2005, 1). Caulfield (1981, 213-4), for example, found ‘close agreement’ between his interpretation of the origin and development of Iron Age society in Ireland and a version of the Milesian legend that saw two sons of Míl arriving separately in Ireland, their divergent paths ultimately leading to early historical political divisions between rival groups.

A number of radiocarbon dates from the relatively early use of the technique (the 1970s, 1980s, and early 1990s) did, however, enter the archaeological literature, providing ‘factual’ support for particular interpretations. The presentation of many of these dates often does not make clear the constraints on their reliability (e.g. Baillie 1990). Many authors have suggested dates obtained prior to the general use of Accelerator Mass Spectrometry (AMS) in the 1990s are of uncertain value (e.g. Woodman 2009, 201; Ashmore 2004, 125).

Pre-AMS ‘bulk’ samples necessarily make for imprecise determinations. Significantly, much of the dated material came from the ‘circumstances’ of archaeological material, but not a well understood *context* (Kinnes 1985, 16). As it will be seen in Chapter 3, this is especially problematic when trying to infer the date of inorganic material – such as a stone wall – from an organic proxy. Understanding the relationship between the target event and proxy evidence is rarely straightforward, particularly where the proxy evidence is poorly understood (Dean 1978, 228; Ramenofsky 1998, 77). Without an informative stratigraphy, the presence of a Neolithic organic material in the vicinity of an archaeological feature clearly does not confer Neolithic Age on that feature.

It remains the case that the number of (relatively costly) radiocarbon dates from any individual site is usually low – in some cases a single date. In addition to the obvious risks, this requires that the objectives for understanding the use of the site through time are limited, often to seeking a date from a construction or early use context, such as basal deposits from foundations or postholes (cf. e.g. Bergh and Hensey 2013, 359). This introduces inevitable bias, militating against understanding of the development of the site. Moreover, any feature in an area where soil was forming in the Neolithic may have surviving organic material from that period in its vicinity. Early cut features are also the most likely places to contain earlier-still intrusive material.



2.5.2 New dates and Bayesian statistics

It is quite possible for statistical averages and human experiences to run in opposite directions.

E.P. Thompson, *The Making of the English Working Class*
(1966, 211)

At the height of the recent economic boom in Ireland, over 2,000 archaeological excavations were being undertaken each year (Cooney *et al.* 2006, 11). This has added significantly to the record of Neolithic sites, in particular non-megalithic sites. Although few of the excavations are comprehensively published, the number of Neolithic high-precision radiocarbon dates available to researchers has substantially increased. In addition to the results from new excavations, there has been targeted radiocarbon-dating of selected archive material.

The temporal data gathered since the late 1990s are seen to corroborate the view that colonisation during the Early Neolithic brought about the rapid transition to agriculture in Ireland (cf. Woodman 2000b, 223; e.g. Cooney 2000a, 13; Cooney *et al.* 2011, 599; Whitehouse *et al.* in press). The dominant narrative envisages ‘bounded, physically structured landscapes’ throughout the Neolithic (Cooney 1997, 23, with references), characterised by enclosed fields and permanent settlement (cf. Smyth 2006, 240). As Cooney (2007a, 547) observed:

The notion of a short, sharp transition around 4000 cal BC, which is currently widely favoured [references omitted], has in effect been mooted in the literature since at least the early 1970s.

Cooney had previously noted that ‘the well-established paradigm within Irish archaeology’ in place in the 1990s had ‘its roots back in the 1930s’ (1995, 269). Not surprisingly, he cautions that ‘the research framework

that we use to interpret these changes has a historical trajectory, which influences the way we think about issues' (2007a, 547).

Of course, it may be argued that contemporary archaeologists are reproducing *the* correct interpretation of the Neolithic in Ireland. But even if this is true, surely there is more that can be said. Relatively little new knowledge has been generated about how the Neolithic developed during the thousand years after the middle of the fourth millennium BC. The chronology suggests a short, event-packed, period in the Early Neolithic followed by relative cultural stasis, even environmentally-determined regression (e.g. Whitehouse *et al.* in press, 19-21; see also Cooney *et al.* 2011, 599). The lack of a sense of how the Neolithic unfolded remains.

It is against this background of a strongly paradigmatic model of Neolithic settlement in Ireland that the use of Bayesian statistics is seen in the present study to warrant critical evaluation. The attraction of Bayesian statistics in applied sciences (social or natural) is clear: unlike classical (frequentist) statistics, Bayesian analyses enable the prior knowledge/beliefs of expert practitioners to be incorporated into probability models (e.g. Buck *et al.* 1996, 171-4; Efron 2013a; 2013b). In archaeology, Bayesian statistics have become an important means of refining series of radiocarbon dates from particular contexts. Prior archaeological knowledge/beliefs about sequences of events have been combined with radiocarbon dates with the aim of producing probability distributions that are both more accurate and more precise²² (e.g. Steier and Rom 2000, 183; Bayliss *et al.* 2007, 5).

At the level of the individual site, informative prior chronological information may come from an ordered stratigraphic series: assuming the samples are coherent and the context has not been disturbed, the stratigraphic order can be used to constrain samples relative to one

another in sequence (e.g. Steier and Rom 2000, 183; Bronk Ramsey 2008, 265; Bayliss *et al.* 2007, 22; Schulting 2011, 145; Scott 2000, 181; Vander Linden 2011, 29). However, radiocarbon-dated sequences such as this are practically non-existent in Irish Neolithic contexts.

A second class of study in which Bayesian statistics can be used is where 'radiocarbon dates from archaeological phases are analysed together in order to better understand the chronology of regions or cultures' (Bronk Ramsey 2008, 265). Rather than being based on stratigraphic information from a single site, these studies are based on 'an interpretation, or a range of possible interpretations, of the regional chronology, and frequently make assumptions about synchronous changes that take place across a region' (*ibid.*). A systematic preference for dates from a particular kind of associated context – such as the first use of sites – will artificially constrain results. It is a feature of Bayesian statistics that start and end boundaries are inferred to bracket the dates under consideration (e.g. *ibid.* 2000, 199). How both are to be inferred where the majority of sites contribute a single date to a model is not clear (see Chapter 4, Section 4.4).

An important aspect of the current thesis concerns assumptions about the coherence of evidential types. Which examples of a defined class of evidence are determined the most representative, and how particular phenomena should be understood, are never neutral considerations. However, such inferences can result in Bayesian *posterior* probabilities (the outcome of combining prior knowledge with measured dates) being 'importantly wrong' (Bayliss *et al.* 2007, 22; cf. e.g. Steier and Rom 2000, 197). As Bronk Ramsey (2000, 201) counsels:

There is no one correct prior for a given situation. A prior is merely a model that can be applied to the data to help in its interpretation. Ideally, several different models with different priors should be tried. If the results from these are all similar, it demonstrates that the conclusions are insensitive to the prior. This approach may not appeal

to some people who wish to take their results, process them statistically and come out with the 'right' answer. However, it is not really so very different from the hypothesis testing method of classical statistics. Here, instead of testing several hypotheses, we apply several prior models based on different possible interpretations of the data.

Where prior knowledge is genuine, the use of Bayesian statistics is uncontroversial. The problem arises in separating genuine prior knowledge from (perhaps deeply held) assumptions. Testing alternative hypotheses – alternative *priors* – is, as Bronk Ramsey suggests, a rational means of controlling this risk. However, the effectiveness of such a strategy is contingent on critical debate among archaeologists. The paradigmatic nature of the study of Neolithic settlement in Ireland inevitably constrains critical debate. Furthermore, it remains the case 'that the number of archaeologists who are synthesising settlement data in Irish prehistory is still quite small' (Cooney 2000c, 3); smaller still when limited to the Neolithic. The inevitable corollary is a lack of alternative perspectives informing Bayesian priors.

In Chapters 3 and 4, a number of systematic constraints on the accuracy and precision of Bayesian chronologies pertaining to settlement in Neolithic Ireland are identified. Critical evaluation of the archaeological evidence provides new knowledge which challenges fundamental assumptions about the nature of Neolithic settlement in Ireland through time and across space.

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2.6. Towards temporality

The belief in migration as a major agent of culture change, allied to an empirical perspective which does not readily admit to the possibility of there being equally valid but contrasting interpretations of alterations in the material culture record, has lasted down to the present.

Gabriel Cooney (1995, 271)

In discussing social landscapes in Irish prehistory, a broad chronological sweep has been used – an experience-distant view. For people on the ground, however, the experience-near reality of time was probably different; as Ingold (1993: 157) has put it, events encompassed both past experience and portents for the future, time and looking back were intimately bound up in carrying forward the process of life.

Gabriel Cooney (1999, 60)

As discussed in Chapter 1, the concept of temporality can be seen to constitute the post-processual critique of processual archaeology's over-reliance on measured time. At the heart of the critique is a challenge to the reductive tendency of chronologies. It has been argued above that the legacy of firmly held traditions concerning culture change impose their own temporality, further serving to constrain the interpretation of life in prehistoric Ireland. For example, the putative rapid and simultaneous adoption of the traditionally defined settled-mixed-farming Neolithic is set against the preceding 'insular' Mesolithic, characterised by foragers trapped in cultural stasis (e.g. see Sheridan 2004a, with references). But is it the evidence that dictates this narrow characterisation of an essentialised Mesolithic culture being abruptly displaced by an essentialised Neolithic, or is a more nuanced picture disguised by archaeological method and tradition?

Whether or not a theoretical perspective is acknowledged, where this presupposes culture change as an event or tightly bounded process, the tendency will either be to discount outlying measurements as anomalous (a problem with the data, *not* the underlying assumption), or else somehow 'shoehorn' inconvenient values into the preferred model. It is not that rapid change is not a valid hypothesis worthy of investigation, but that there are other, equiprobable, hypotheses that likewise warrant thorough consideration. An outlying event may equally be seen as a strong candidate for the early manifestation of a practice yet to be fully established.

While two fundamental conceptions of time—McTaggart's *A*-series versus *B*-series; Enlightenment versus Romanticism; processual versus post-processual; measured time versus human temporality—have been contrasted throughout this chapter, the position taken by the writer is that these approaches can, and should, be complementary, and that the deployment of both in combination offers the greatest prospect of a fuller understanding of life in prehistory.

Measured time provides a necessary framework within which events manifested in the archaeological record can be understood. Without chronologies, events lack temporal context, leading to interpretations that are not reliably grounded (cf. e.g. Gosden 2004, 30; Whittle 2008, 55-6). Where the available data support it, high precision radiocarbon dating in combination with Bayesian modelling can provide a sense of the tempo of unfolding events at the human scale of generations, even decades (e.g. Whittle *et al.* 2010, 71). However, as yet, there is no published account of a Neolithic site in Ireland with a stratified sequence of dates approaching this resolution. There is a pressing need for the alignment of archaeological practice with analytical advances.

Whatever the level of temporal precision achieved, the truism *the numbers cannot speak for themselves* remains. As Robb and Miracle (2007, 114) put it: ‘cutting-edge scientific methods are only as reliable as the interpretive concepts they are used with’. The cultural context in which individuals and social groups lived in prehistory – the ‘narrative and plot’²³ – is no less worthy of archaeologists’ attention. Simply ‘connecting the dots of time 1, time 2, etc.’ (Abbot 2001, 143) provides only staccato glimpses of social history unfolding. The elision of events through time and across space is the inevitable consequence. Also, people can be excluded from chronologies: discounted as ‘dupes’ to underlying processes (cf. Latour 1993, 70; Preucel and Meskell 2004b, 215). Alternatively, ‘pre-packed’ narratives, in keeping with researchers’ personal expectations and beliefs, may be engaged.

The temporal conflation that created an image of Neolithic farming life which lingered in the ‘Celtic mist’ of the twentieth-century west of Ireland sought to create a familiar past: bringing ‘them’ closer to ‘us’. From the perspective thus created, the purpose of prehistoric objects and features then was self-evident: Neolithic farmers lived in recognisable farmhouses, tended their ‘fixed plots’ of land, and worshipped at megaliths. This describes the dominant interpretive paradigm up until the final decade of the last century in Irish Neolithic research, and can be seen to resonate strongly with the way the Neolithic in Ireland is characterised today (e.g. see Smyth 2011, 28; Whitehouse *et al.* in press).

Post-mythological concern with time in the context of the Irish Neolithic has been largely methodological. Presented with an ‘unequivocal’ narrative that begins with the arrival of a new people with a defined ‘package’ of material culture, the often explicit (as Chapters 3 and 4 will demonstrate) objective guiding the selection and analysis of dating evidence has been to confirm what is already perceived to be known. This is a consequence of

the variously described, long-recognised ‘archaeological baggage’²³; ‘contemporary baggage’²⁴; ‘underlying assumptions’²⁵; ‘sacred canon of Irish Archaeology’²⁶ that underpin the characterisation of Neolithic Ireland demands critical scrutiny.

The broader perspective of temporality incorporates the active role of people in shaping prehistory, and is not limited to a single (unquestioned) essentialised perspective. It allows for the possibility, for example, that the Neolithic inhabitants of Ireland did not conform to an (imported) island-wide template lifestyle. That rather than simply being displaced by colonists, indigenous communities—through their own agency, and in contact with overseas groups—were active in shaping a range of Irish Neolithics. It will be shown that the available evidence supports such alternative interpretations of the development of the Neolithic in Ireland at least as strongly as the ‘orthodox’ paradigm.



2.7. Theory in practice

The concern of this chapter has largely been to set out, *in theory*, the archaeological implications of a narrow perspective of time. The task that remains is to demonstrate those implications in practice, and the contribution of an alternative approach.

Taking (*the?*) two key manifestations of the *settled* Early Neolithic in Ireland: field systems and rectangular Neolithic ‘houses’, Chapters 3 and 4 test the settled-mixed-farming narrative against the archaeological and palaeoenvironmental evidence. The findings inform the discussion in Chapter 5, which identifies new insights into the temporality of the unfolding Neolithic supported by the evidence concerning field walls and rectangular ‘houses’. Chapter 6 suggests how the study can contribute to future research into the temporality of Neolithic Ireland.



Notes

¹ Equating *real* time to the *space-time* of theoretical physics accords with broader literature on the subject of time (e.g. Jaszczolt 2009, ch.1). It is not intended to infer the priority of the current physical definition of time.

² Conversation between Einstein and the philosopher Rudolf Carnap as recorded in Schilpp (1963, 36-7).

³ See Daniel (1975, 31).

⁴ See Hume (2007 [1748], 120).

⁵ Though not referenced in Burke, this quotation is from Hume's *An enquiry concerning human understanding* (2007 [1748], 60).

⁶ Childe (1952, 23) quoted in Rudebeck (2000, 150).

⁷ See Cooney (1996, 158).

⁸ According to the *Lebor Gabála Éirenn*, the Tuatha de Dannan (people of the goddess Danu) defeated the incumbent Fir Bolg at the Battle of Moytirra (located in Co. Sligo). For Petrie (1838, 140) the monuments of the Carrowmore megalithic complex, Co. Sligo, were the graves of the slain Fir Bolg. The Milesians – sons of Míl (a Spanish warrior) – were next in the succession of mythical invaders. Most Gaelic families traced their origins to the arrival of Milesians (see Waddell 2005, 20-1, 27).

⁹ See Newman (2007).

¹⁰ From (then Taoiseach) Éamon de Valera's St Patrick's Day address to the nation (1943).

¹¹ Also referred to as the Irish Renaissance, Gaelic Revival, Irish Cultural Revival, Irish Literary Revival, among others.

¹² From Coffey's obituary in the Proceedings of the Royal Society of Antiquaries of Ireland (January 1917), recorded in the *Journal of the Royal Society of Antiquaries of Ireland*, 7 (1), 96-97.

¹³ Congested Districts were areas of acute poverty receiving relief from the Congested Districts Board (established in 1891). Initially focused on the western seaboard, one third of the country came to be so designated.

¹⁴ From the Introductory Note in *Twenty Years A-Growing* by Maurice O'Sullivan's (Muiris Ó Súilleabháin), an 'autobiography teetering towards [a] novel' (Titley 2006, 178), which describes O'Sullivan's youth on Great Blasket Island (off the Dingle peninsula) in the early twentieth century.

¹⁵ Lane (2003, 16) quoting Foster (1993, 228-9).

¹⁶ Evans was appointed to a lectureship in geography at Queen's University, Belfast, in 1928, where he went on to become professor of geography, then first director of its Institute of Irish Studies; he was appointed President of the Institute of British Geographers in 1969 (Graham 1994, 185).

¹⁷ Term used to describe the Gaelic peasant farmers of the medieval period (O'Connor 1998, 73).

¹⁸ Quoted in MacConnell (1990).

¹⁹ See Smyth (2013, 301).

²⁰ Willard Libby led the team at the University of Chicago that developed radiocarbon dating in the late 1940s.

²¹ Kinnes (1985, 16) made similar observations about the early impact of radiocarbon dating in Scotland.

²² Accuracy refers to closeness to the true value (in this case the actual calendar year in which an event occurred); precision to the resolution of the measurement or its replicability (the narrowness of quoted date range or the reproducibility of the result in repeated analyses) (e.g. Dincauze 2000, 87).

²³ Shee Twohig and Ronayne (1993, 1).

²⁴ Cooney (2001).

²⁵ Ó Donnabháin (2000, 194).

²⁶ Woodman (2000a, 7; 2005).



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Chapter 3

Dividing Neolithic landscapes

3.1 Field systems and the characterisation of Neolithic Ireland

The occurrence of field systems has major implications for the way we view the human impact on the environment and use of the land during the Neolithic period in Ireland (4,000-2,500 BC).

Gabriel Cooney (1991, 123)

Apart from the fact that [Neolithic farmer's] tools were of stone, their way of life differed little from that of many small farmers in Ireland up to the beginning of this century.

Michael Herity and George Eogan (1977, 15)

Relict field systems have long provided a tangible link between modern and historic farming practice in Ireland. In the west of Ireland in particular, these survive in remarkable numbers. Depopulation and the unsuitability of the land for intensive mechanised farming have aided the preservation of the walls. Peat bogs have further protected some of the oldest examples. But just how old are Ireland's oldest field walls? For how long have large tracts of the Irish landscape been systematically enclosed?

By far the greatest archaeological research effort into prehistoric field systems in Ireland has been at Céide Fields on the north coast of County Mayo (see Figure 3.1, below). Dated to the earlier Neolithic, Céide Fields is 'iconic for Irish archaeology' (Caulfield *et al.* 2009b, 2; 2010, 2). The complex is widely seen as definitive evidence of a 'short-sharp' transition to settled-mixed-farming in Ireland—a model of change often contrasted with contemporary southern England. No characterisation of the Neolithic in Atlantic Europe can ignore the implications of Céide Fields

(cf. Warren 2009c, 636, 638), and the complex inevitably dominates the present review.



Figure 3.1: Location of field walls discussed in this chapter. Base relief map after Aalen et al. (2011, Fig.5).

Determining the age of the field walls is problematic. The construction material cannot provide direct evidence, so a datable proxy that can be securely linked to the construction or use of the structure is required.

Datable artefactual evidence in secure association with field walls has proved extremely scarce. The spatial proximity of walls to dateable archaeological features has instead often been seen as indicative. In a small number of cases, excavation has provided stratigraphic evidence. However, it is palaeoenvironmental studies that have generally been seen to have resolved the dating conundrum in most recent research.

Céide Fields was originally attributed to the Neolithic on the basis of the field walls being 'sealed' beneath blanket bog, and the spatial coincidence of the field walls with a significant grouping of court tombs. Latterly, the stratigraphic relationship between the field walls and tree stumps preserved in the bog (some of which were radiocarbon dated) was seen as 'unequivocal' proof that the walls were 'older than was anticipated', dating to the Early Neolithic (Caulfield *et al.* 1998, 639). Palaeoenvironmental analyses (Molloy and O'Connell 1995; O'Connell and Molloy, 2001) provided further corroborative evidence. 'Pre-bog' field walls elsewhere in the west of Ireland have been dated to the Neolithic on the basis of the precedent set by Céide Fields. However, the underlying methodological assumptions have received limited critical attention.

Independent engagement with the primary archaeological research at Céide Fields has been hampered by the limitations of the published record. Much of the archaeological fieldwork at Céide Fields and associated sites was poorly recorded and remained unpublished for up to 40 years (e.g. Caulfield *et al.* 2009a, 4; Waddell 2010, 45). However, following a Heritage Council funded pilot in 2008, the Irish National Strategic Archaeological Research Fund awarded significant new funding to remedy the dearth of publication (e.g. Caulfield *et al.* 2009b; 2010). As a result, considerable new information has been made available under the auspices of University College Dublin's *Neolithic and Bronze Age landscapes*

of north Mayo programme. This material has been complemented by the recalibration of the available radiocarbon dates by Whittle *et al.*'s (2011a) *Gathering Time* programme of Bayesian chronological modelling for Britain and Ireland.

The following critical review of the evidence for Neolithic field systems in Ireland incorporates the new material. Beginning with a brief history of research at Céide Fields, I examine the background to its initial characterisation as an integrated Neolithic farming landscape. A detailed review of the research methods subsequently employed at Céide Fields follows. The findings of the various research programmes are re-examined, with particular focus on their independence/interdependence. The same approach is then applied to all other proposed Neolithic field systems in Ireland¹.

The aim of this chapter is to distinguish evidence from assumption. As discussed in Chapter 2, a romanticised characterisation of rural life in the west of Ireland at the beginning of the twentieth century was adopted as a cornerstone of Irish national identity. This image of traditional rural life remains a powerful symbol of patriotic sentiment. However, even if this vision is accepted, it must be seen as historically specific: a manifestation of the social, economic and political conditions *at a particular time*. There are alternative ways in which societies organise themselves, and these cannot be discounted simply on the basis that they are less familiar to modern Western observers. Critical analysis of evidence from medieval Ireland, for example, has demonstrated a dissonance between contemporary Anglo-Norman and Gaelic-Irish economy and settlement patterns, with the latter less constrained by permanent ordered agricultural landscapes (e.g. O'Conor 2002; see Chapter 2).

Cooney's observation concerning 'the major implications' Neolithic field systems have on understanding of the Neolithic in Ireland is apposite (quoted above). The presumption that the field walls at Céide Fields were coeval with the [Neolithic] court tombs preceded reliable evidence. However, having become integral characterisations of Neolithic Ireland, the *hypothesis* that the field walls were Neolithic assumed the status of an archaeological truth. Elsewhere in Atlantic Europe, Bronze Age and Iron Age field systems are well represented in the archaeological record. There are, however, no known Neolithic field systems comparable to Céide Fields.

The present study finds that the attribution of Céide Fields to the Neolithic is path-dependent. It will be argued that disinterested analysis of the available evidence strongly indicates that the field systems were in fact constructed in later prehistory. The implications for the understanding of the temporality of Neolithic life in Ireland are significant.



3.2 Interpreting Céide Fields

Though it is difficult to assign the building and use of these fields specifically to the earliest farmers, it is hoped that further investigations will lead to the finding of farmhouses, the technology of whose builders can be linked with the earliest Neolithic.

Michael Herity and George Eogan 1977, 50

The excavations at the Behy court tomb, situated at the heart of the landscape now known as Céide Fields, revealed field walls beneath the blanket bog which ‘had been built right up to the edge of the cairn’ (Herity 1971, 262). As well as providing a ready-made section of wall, ‘the builders had actually robbed the cairn for walling material (*ibid.*). The walls were traced through turf cuttings, to where they joined the field system (*ibid.*, 262-4; Warren *et al.* 2009, 5). Although the field walls clearly *post-dated* the Behy court cairn (see also Caulfield 1978a, 141; Warren *et al.* 2009, 5; 12; Cooney *et al.* 2011, 615), Herity considered that they could nevertheless ‘immediately be assigned to the early prehistoric period’ on the basis that they rested ‘on the old surface underneath the peat’ (Herity 1971, 264).

Like Ruaidhrí de Valera, Herity linked the Behy field walls to Ireland’s ‘earliest farmers’, and expected further archaeological investigations in the area to reveal ‘farmhouses, the technology of whose builders can be linked with the earliest Neolithic’ (Herity and Eogan 1977, 50; Herity 1971, 264). Herity’s colleague, Seamas Caulfield, went on to pursue this line of enquiry through a prodigious programme tracing the sub-surface field walls using metal probes—a traditional method of locating timbers in the bog (Conroy 1993, S11). Field systems across an area of 12 km² have been recorded using this technique (Caulfield *et al.* 1998, 629; see Figure 3.2 below).

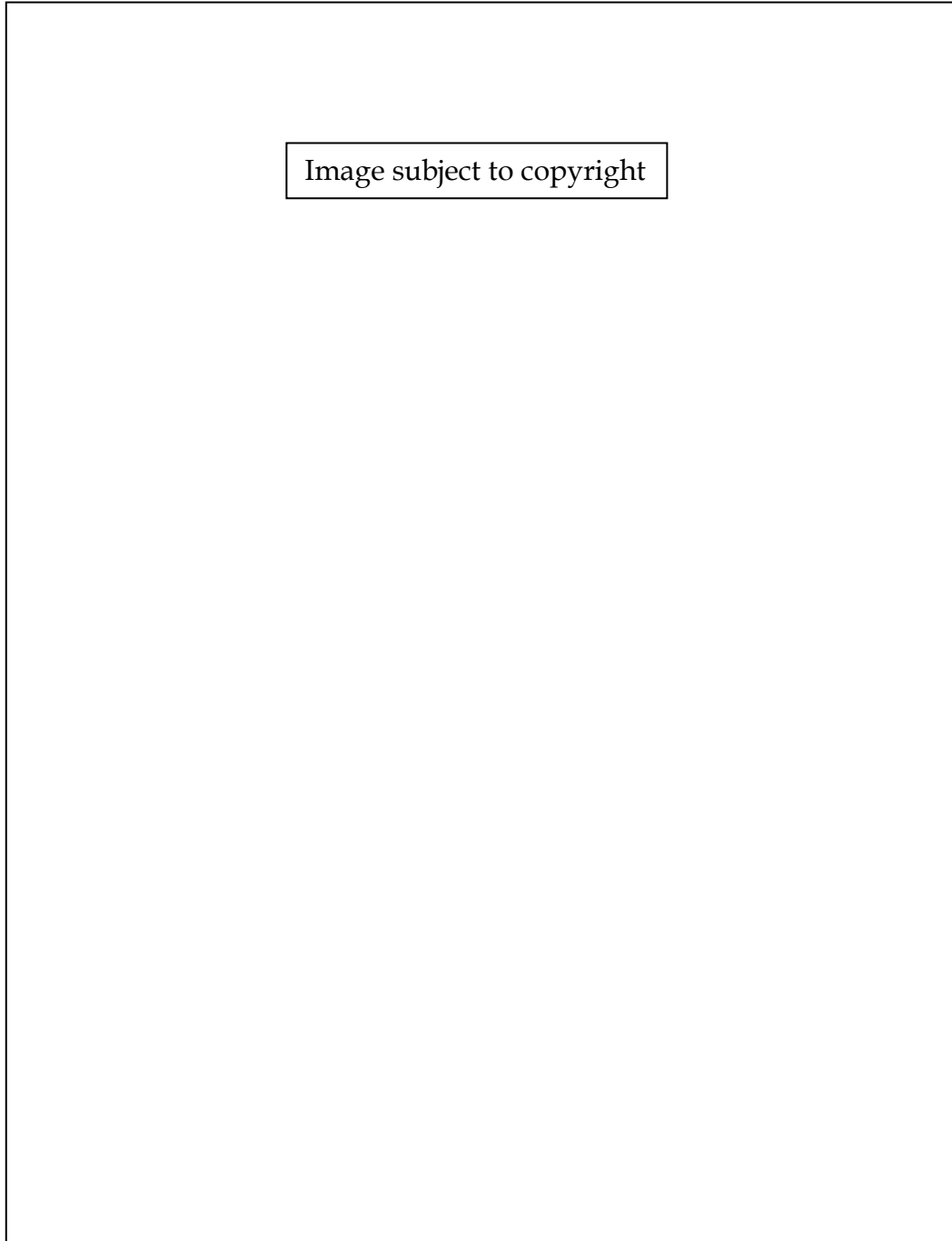


Figure 3.2: The field walls of Céide Fields remains for the most part buried beneath peat. Volunteers mapped the field system by pushing metal probes into the bog to identify patterns among the sub-surface rocks. After Caulfield (2008).

The significance of Céide Fields does not lie in its form: regular systems of rectangular fields (often referred to as 'Celtic fields') are a recognised phenomenon of the Middle to Late Bronze Age and Iron Age in Europe (e.g. Bradley 1978, 268; 2005, 169; 2007, 187-8; Brück 2000). Having 'one

prevailing axis of orientation', Céide Fields also conforms to Fleming's (e.g. 1987; 1989) narrower definition for 'coaxial' field systems. Aside from exceptional preservation, what distinguishes Céide Fields is the proposed antiquity of the field walls. It has been consistently claimed that Céide Fields dates from the earlier Neolithic. Indeed, Céide Fields forms an essential plank of the argument for a rapid transition from the traditionally defined Mesolithic to Neolithic in Ireland and Britain (e.g. Thomas 1999, 10; Scarre 2001, 285; see Cooney 1997, 28-9; 2000a, 44-5; 2003, 50; 2007a, 546; Rowley-Conwy 2004, S92; 2011, S443).

A candidate for World Heritage status, Céide Fields is described as the world's most 'extensive physical remains of a Neolithic farmed landscape' (Caulfield *et al.* 2010, 2; B. Lucas 2010, 2). From a more critical perspective, however, Céide Fields is a temporal anomaly, and this must raise the question of authenticity (Whitefield 2009, 68-72). Certainly, the claim of exceptional antiquity demands an especially high burden of proof.



3.2.1 The nature of the evidence

The Céide Fields are totally authentic in that the stone field walls have quite simply not been disturbed in over 5,000 years. The vast majority are still completely hidden untouched beneath up to 4 metres of blanket peat.

Brian Lucas (2010, 3)

The spatial extent of Céide Fields is identified by Caulfield *et al.* 1998 in the maps reproduced as Figures 3.3 and 3.4, below. Some earlier publications refer to Céide Fields as the 'Behy/Glenulra' system (e.g. Caulfield 1978a), as the coaxial fields which have been identified are centred on these townlands (shaded in Figures 3.3 and 3.4). Caulfield has described Céide Fields thus:

The system is laid out as a series of parallel walls 150 m to 200 m apart running from the edge of sheer cliffs inland for a distance of at least 800 m and almost certainly up to 1 km. The long strips formed by these walls are divided by offset cross walls into rectangular fields of up to 7 ha in area (*ibid.*, 138).

It is common for archaeological literature to include field boundaries in adjacent areas of north Mayo, such as the townlands of Belderg More and Belderg Beg (both in the area marked Belderrig in Figure 3.3), and Annagh More and Annagh Beg (marked in Figure 3.3), as constituent areas of Céide Fields (e.g. Cooney *et al.* 2011, Table 12.6), though the boundaries recorded in these areas do not exhibit the regularity of the main coaxial system. Indeed, 'Céide Fields' is frequently adopted as a shorthand for presumed prehistoric field boundaries across a wide area of north Mayo (cf. Warren 2009c, 639). It is the identified coaxial field systems that are the focus of the following section (3.3), though where evidence from the adjacent areas has been invoked by others this is discussed. Section 3.4 engages with all presumed Neolithic field systems in Ireland beyond Céide Fields in greater detail.

Image subject to copyright

Figure 3.3: The spatial extent of Céide Fields, as defined by Caulfield et al. 1998, Figure 1. For illustrative purposes, Caulfield et al. 1998 Figure 2 (detailing the recorded field walls of Céide Fields) has been inserted to scale (see Figure 3.4, below). The townland of Behy is shaded green; Glenulra yellow. The locations of the dated samples from Caulfield et al. 1998 have been annotated (see Table 3.3).

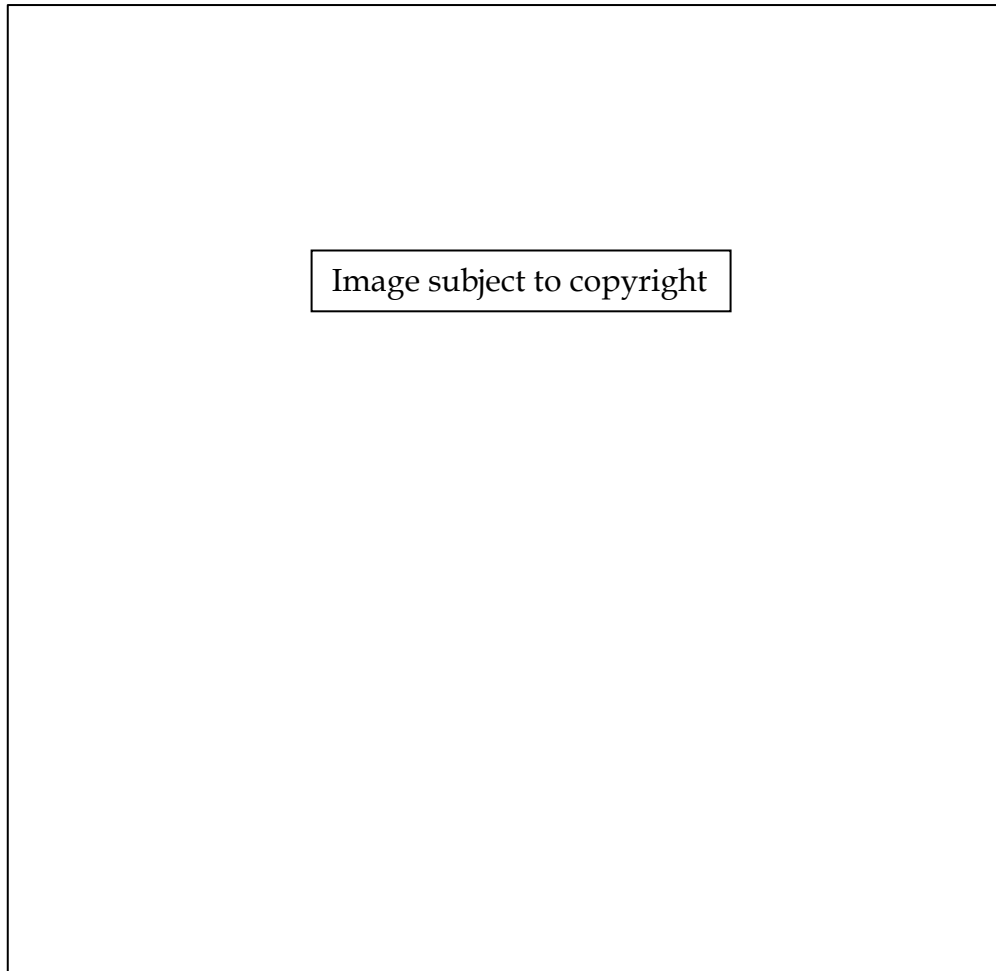


Figure 3.4: Detailed plan of Céide Fields, as per Caulfield *et al.* 1998, Figure 2 (see Figure 3.3 above; Figure 3.2 is comparable in scale and coverage). The townlands of Behy and Glenultra are shaded as per my Figure 3.3.

The field systems were mapped without the aid of modern surveying instruments, relying on 'tape measures and reference points obtained from maps' (Caulfield *et al.* 2010, 5). It is instructive that the locations of the samples for the most recent programme of radiocarbon dating are precise only to within 100 m (assuming no surveying errors) (Caulfield *et al.* 1998, Table 2). While the original drawings have recently been 'georectified', this process cannot militate against the (in some cases significant) spatial errors known to exist in the primary sources (E. O'Keeffe and Ciuchini 2010).

Little of what remains of the field systems of north Mayo is visible to modern eyes, having famously 'been preserved intact by a cover of

blanket bog' (Caulfield *et al.* 1998, 629). For the most part, the walls have been traced beneath the bog with 'steel and bamboo probes' (e.g. Caulfield 1983, 196). It is a rarely acknowledged fact that the observations of researchers 'may not be applicable to the system as a whole since only a very small proportion of the total system is exposed and accessible to examination' (Molloy and O'Connell 1995, 222).

Sections of the preserved field walls have been exposed by turf cutting, and there has been limited archaeological excavation (e.g. Caulfield 1983, 196; see Figure 3.5, below). Molloy and O'Connell (1995, 222) observe that '[i]n a typical cross-sectional view, the walls seldom exceed 80 cm in height, are typically 50-70 cm tall, and, furthermore, slope gently to either side to give a lateral spread of stones of *c.* 2.5 m'. The fabric and form of the field walls do, however, vary across the landscape, with less substantial walls enclosing smaller fields predominating in some areas.



Figure 3.5: Section of exposed field wall close to the Céide Fields visitor centre. Photo: author.

The dating of field systems is problematic (e.g. Fleming 1987, 192; Barrett *et al.* 1991, 143; Thomas 1996, 4; Cooney 1991, 123; 2003, 50). As with megalithic tombs, the age of the construction material (stone) is of course of no relevance. Dateable material must be linked to the use of the structure and a temporal relationship inferred. This is further complicated by the spatial extent of the systems, which, as at Céide Fields, may remain largely beneath the modern ground surface. Furthermore, the fields have the potential to have been utilised over extended periods, though not necessarily continuously.

Often, the target event for dating purposes is simplified to the construction date. However, the relationship between target event and proxy (dateable) evidence remains an intractable problem (e.g. Caulfield *et al.* 2009c, 37; cf. e.g. Dean 1978, 228; Ramenofsky 1998, 77; Tolan-Smith 2008, 133). Multiple plausible possibilities should be expected and considered. Archaeology is not practised in a cultural vacuum, and the interpretation of the proxy evidence will invariably be influenced by the contemporary concerns of the researchers. A rigorous programme of testing and publication is an essential control.

Publication of the archaeological work at Céide Fields and the adjacent field systems has been selective and inconsistent. Academic discourse relies significantly on short preliminary reports (cf. Waddell 2010, 45), unpublished student theses (e.g. Byrne 1986; N. Dunne 1985), and even tourist literature (e.g. Caulfield 1988; 1992. See, for example, Cooney 2000a, 26; 28; 2000b, 57; 2000c, 11; Armit *et al.* 2003, 148; Cooney *et al.* 2011, 616; Verrill and Tipping 2010a, 1215). It has taken more than forty years for the available archive to be brought to publication (e.g. Caulfield *et al.* 2009a, 3; Caulfield *et al.* 2010, 2). Though 'a good photographic and drawn record' is said to have been assembled, 'the written archive is poor',

with consequent reliance on the ‘recollections of the excavator’ (e.g. Caulfield *et al.* 2009b, 4; Warren *et al.* 2009, 3).

This presents a number of concerns. Without access to a comprehensive record of the archaeological work, the lead researcher’s interpretation of the evidence could neither be effectively challenged or verified. A single perspective has become pervasive in the literature (not just the archaeological literature). Repeated largely unchallenged (*pace* Thomas 1996) so many times, over such a long period, this single perspective has, to use Ashmore’s (2004, 125) phrase, become ‘embedded in the literature’. But without peer access to *all* the data, and knowledge of the assumptions made in its interpretation, how can the veracity of the preferred interpretation (to the exclusion of all others) be assured?

In coming to ‘write up’ the excavation after such a long intervening period has elapsed, recollection will inevitably be mediated through subsequent experiences (e.g. Adam 1990, 143). Remembering is an active process (e.g. Wertsch 2002, 11). The creation of a consistent and coherent narrative is a significant factor in determining what we recollect (e.g. Conway 2005, 595-6; see also Neisser 1998, 557). This compounds (albeit perhaps unconsciously) the difficulty of impartial presentation of contradictory or negative evidence (evidence that does not support the preferred interpretation) in the record (cf. e.g. A. Jones 2002; Fanelli 2012, 892).

Contemporary characterisations of Céide Fields defer almost invariably to lead researcher Seamas Caulfield. New evidence is considered (accepted, rejected or modified) within the paradigm of the established narrative. In the light of abundant new research into prehistoric land division, and newly available information, it would be remiss not to revisit that paradigm.



3.3 Dating Céide Fields

...any structure or artifact found on the old surface underneath the peat can immediately be assigned to the early prehistoric period. The blanket bogs of Mayo had therefore provided a ready-made envelope to preserve the walls of these systems and to indicate clearly the latest date at which they could have been built...

Michael Herity (1971, 264)

Herity thus sets out the basis on which it was determined that Céide Fields predates all other field systems in Ireland or Britain. It has been assumed that the modern-day stratigraphic relationship between the relict field walls and other materials in the surrounding bog can be used to establish the relative date of the field walls. This assumption underpins the methodology adopted in research led by Caulfield (e.g. Caulfield 1978a, 142; Caulfield *et al.* 1998, 629; Caulfield *et al.* 2009c, 37; cf. Cooney *et al.* 2011, 616-22). The relationship between the target event and the proxy evidence is uncritically seen as self-evident. The age of the oldest material suspended in the bog 'must' provide a *terminus ante quem* for the date of the field system (e.g. Caulfield *et al.* 1998, 629).

A second strand of chronological evidence, seen as corroborating the dating programmes overseen by Caulfield, comes from palaeobotanic studies designed to identify changes in the natural environment that could be attributed to early farming. Soil cores were extracted with the aim of identifying datable strata from which ancient pollen spores could be extracted and identified, and their relative abundance modelled through time. A core extracted from a deep peat basin in the townland of Glenulra provided the principal evidence for this analysis.

The combined results of three dating programmes have led to the widespread academic acceptance (not limited to the discipline of archaeology) that Céide Fields dates to the earlier Neolithic. These studies are published as Caulfield 1978a; Caulfield *et al.* 1998; and Molloy and O'Connell 1995 (the results of which are also incorporated into O'Connell and Molloy, 2001). Each are critically evaluated below, and discussed in the light of new evidence.



3.3.1 Dating evidence from Caulfield 1978a

3.3.1.a Behy/Glenulra

From the original radiocarbon dating programme (published in Caulfield 1978a), six measurements were seen to determine that ‘many of the field systems [in north Mayo] are Neolithic in date’ (p. 138). These findings underpin the narrative that has been developed in subsequent research. Four of these dates were obtained from samples within the ‘main Céide Fields complex’ on the slopes of Céide hill (see Figure 3.6, below): three from peat samples cored in the vicinity of the Behy tomb; one from charcoal recovered within a stone enclosure in the townland of Glenulra (see Table 3.1, below).

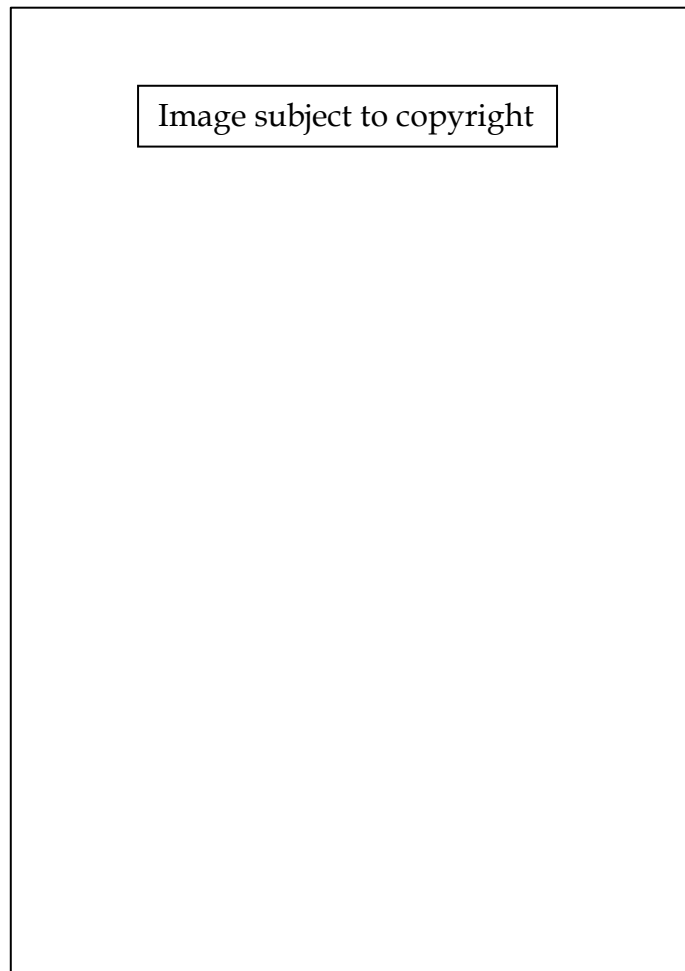


Figure 3.6: ‘Location of Behy Court Tomb within the main Céide Fields complex’; the location of the Glenulra enclosure is also shown. After Caulfield et al. (2011a, Figure 6). Location of Céide Fields visitor centre added by the present author.

Table 3.1: Radiocarbon dates from Behy/Glenulra. After Caulfield (1978a, 141) with additional details from Smith et al. 1973, 222-23; cal BC dates after Cooney et al. (2011, Table 12.6).

Lab code	Sample	Sample material	Relative height (cm)	¹⁴ C years BP	¹⁴ C years cal BC
UB - 153F	Behy monolith	Peat – humic acid	24 to 28 cm	3890 ± 110	2840-2030
UB - 155	Behy monolith	Peat – combined fine particulate and humic acid fractions	30 to 34 cm	3630 ± 70	2130-1770
UB - 158F	Behy monolith	Peat – fine particulate fraction	36 to 38 cm	3930 ± 105	2860-2130
SI - 1464	Glenulra	Bulk charcoal	Not recorded	4460 ± 115	3510-2880

The first three dates (references UB-153F; UB-155 and UB-158F) were obtained from samples of ‘basal peat *close to the Behy tomb*’ [my emphasis] (p.141). The ‘Behy tomb’ is not the evidence in question: it is the field systems for which dating evidence was sought. The relationship between the tomb and the field systems has not been established (though, as discussed above (Section 3.2), the abutting wall post-dates the monument).

The Behy court tomb and the coaxial field system centred on the townlands of Behy and Glenulra are situated on the lower slopes of a northern spur of Maumakeogh mountain – Céide hill (e.g. Caulfield 2011a, 109; see Figure 3.7, below). The accumulation (and erosion) of blanket peat over such terrain is not a uniform process, instead being dependent on factors including topography, hydrology, wind, precipitation, temperature, exposure, aspect, vegetation, the underlying mineral soil, and the actions of people and animals (e.g. Edwards and Hirons 1982; P. Moore *et al.* 1984; M. Evans and Warburton 2007).

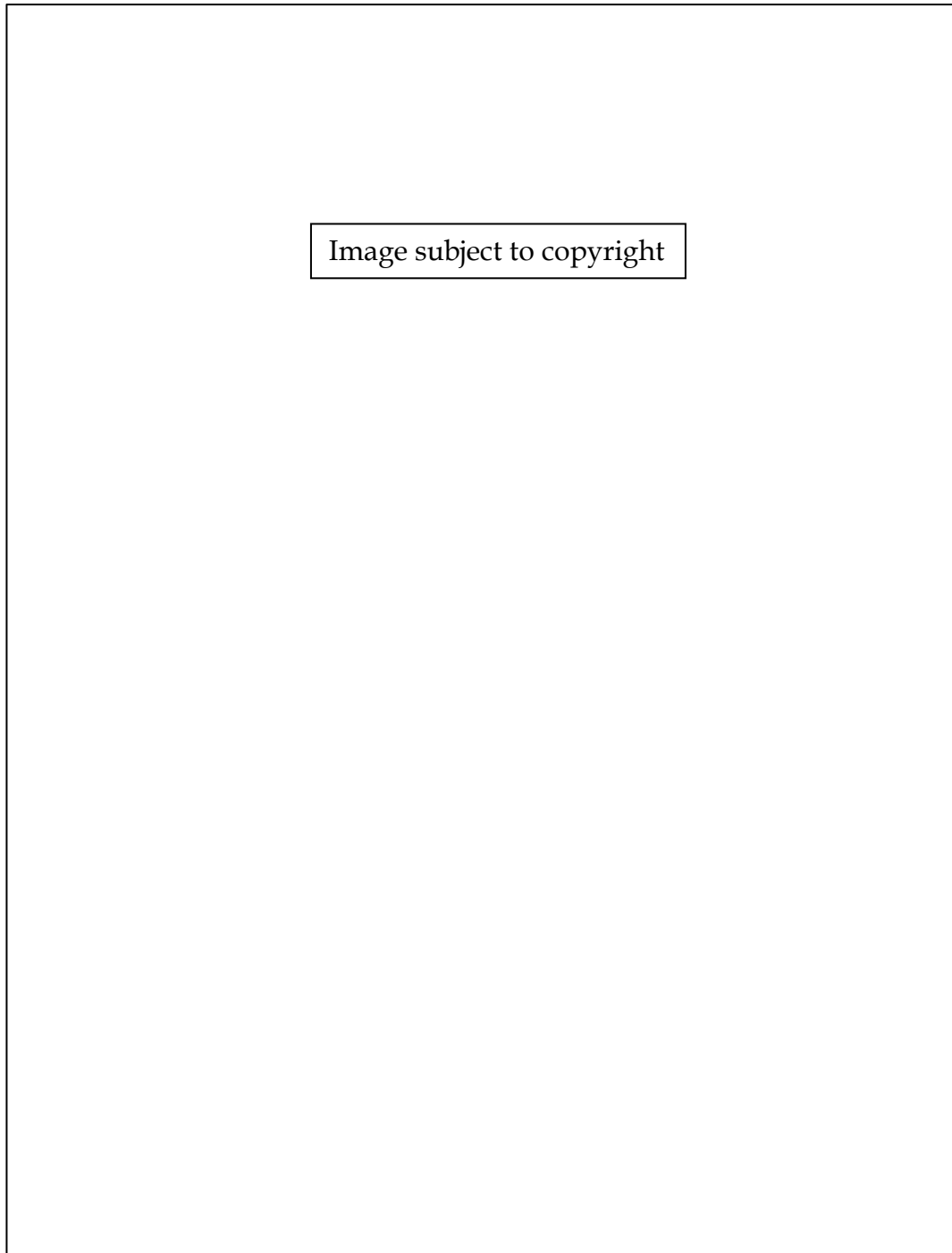


Figure 3.7: The 'main Céide Fields complex' on the lower slopes of Céide hill – as defined in Caulfield et al. (2011a, Figure 6) (see Figure 3.6, above) – superimposed on to an extract of the Ordnance Survey Ireland 1:50,000 map incorporating the summit plateau of Maumakeogh mountain.

Caulfield (2011a, 107) described the Behy tomb as 'encased in two metres of bog'. In contrast, the depth at the location of the dated soil core ('Behy monolith' in Table 3.1, above) was less than half a metre. Oceanic blanket peat accumulating on hillslopes, such as the 'windswept bleak' (e.g.

Caulfield 2011a, 110; A. Smith *et al.* 1973, 222) slopes of Céide hill, is inherently inconsistent, being especially vulnerable to erosion by redeposition (e.g. Edwards and Hirons 1982; Faegri and Iversen 1989, 138-9; M. Evans and Warburton 2007, 49-53). The precise nature of the sub-peat topography is unknown, however the relatively flat area on the hillslope suited to the construction of the monument also provides a relatively stable location for peat accumulation, and may have acted as a focal point for later peat initiation on the hillside (see Figure 3.8, below). Also, the monument itself will have helped prevent accumulating peat from being washed downslope or otherwise eroded. Ó Nualláin *et al.* (2011, 48) observe:

The sense is that peat formation near Behy took place towards the end of the fourth millenium [sic.] and into the third millennium, but may have varied locally. Certainly any accumulations of peat were limited into the Late Neolithic and Early Bronze Age, and the tomb must have remained a visible feature of the landscape to later occupation.

While, at two metres, the peat at the site of the Behy tomb is unusually deep for the slopes of Céide hill, it is far shallower than the deposits on the flat hilltops above (e.g. Caulfield 2011b, 117), and approximately a third of the depth recorded in the Glenulra basin at the foot of the slopes (Molloy and O'Connell 1995; see further in Section 3.3.3.d, below).

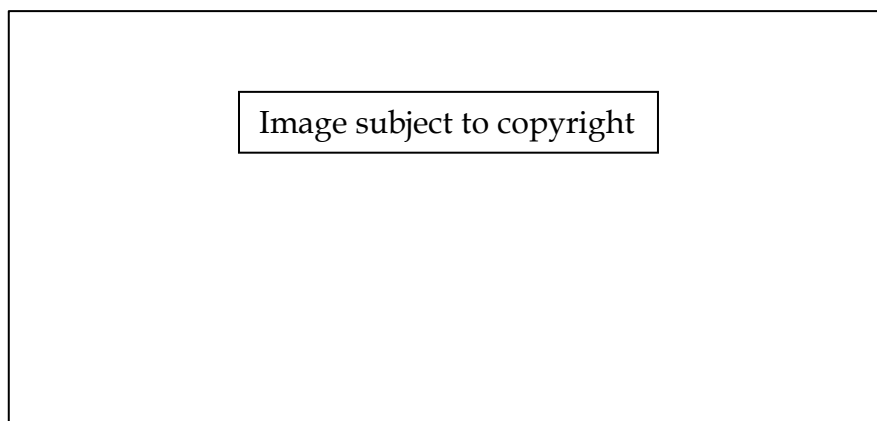


Figure 3.8: 'Hypothetical hill-side showing variations in topography and peat foci' after Edwards and Hirons 1982, Figure 2. Blanket peat spreads outward from relatively level plateaux and basin deposits, as well as 'initiation foci' such as hillslope depressions. Steeper ground may be too well-drained and exposed to erosion to develop more than a thin covering of peat (cf. Caulfield 2011b, 117).

The peat samples in Table 3.1 are recorded as having been extracted from basal peat (Caulfield 1978a). The interface between the peat and the underlying mineral soil—particularly on sloping ground—is a zone of intense hydrological activity (e.g. Holden and Burt 2002; Dykes and Warburton 2007; see Section 3.3.2.b, below). The recently-published report on the 1960s excavations at the Behy tomb notes a ‘peaty wash’ over a ‘cobble layer...comprised of water-rolled stones’ sealed beneath the southern edge of the cairn (Ó Nualláin *et al.* 2011a, 10)—‘presumably downwash from peat further upslope’ (Warren *et al.* 2009, 12). Cuttings which removed sections of the cairn also revealed a thin layer of black peat beneath, which the excavators described as ‘modern’; the excavation report proposes that this ‘may be some kind of wash’ (Ó Nualláin *et al.* 2011a, 13). Brown clays (colluvium) ‘which were often found immediately beneath the peat’ during the excavations were ‘most extensive to the south (upslope), and are found washed against the kerb and “ran over the top of the lowest kerbstone”’ (*ibid.*, 25). The movement of fine sands at the base of the peat above the brown clays were also recorded (*ibid.*, 26)

Remobilisation and redeposition on Céide hill is also in evidence at the micro scale. Commenting on the reversal in the stratigraphy represented by UB-155, the radiocarbon laboratory also warned of ‘considerable movement of humic substances’ within the core profile (A. Smith *et al.* 1973, 223). Humic substances—humic acids, fulvic acids, and humin [acid- and alkali-insoluble organic detritus]—are significant in the determination of peat characteristics, contributing to its hydrologic properties and to the carbon balance of peatlands (Rydin and Jeglum 2006, 95; Shore *et al.* 1995, 375). Humic substances are derived from the decay of organic matter, and are not present in the living plants which formed the peat. The precise mechanisms by which these substances—which account the bulk of highly decomposed peat—are formed are not well understood (*ibid.*; R. Taylor 1987, 42). Humic substances are distributed

through the peat profile by the movement of water, and can therefore constitute a significant source of 'contamination' in samples selected for radiocarbon dating (Baillie 1990, 365; Shore 1995, 375)

Humic acid—the fraction extracted from UB-153F—typically contains most carbon, and so may also have the greatest influence on combined samples such as UB-155 (see Shore *et al.* 1995, 375). Several studies have shown that humic acid typically produces dates which are considerably older than particularly the humin fraction, but also other materials in secure association (e.g. Shore *et al.* 1995; Swindles *et al.* 2013, 1496; Blaauw *et al.* 2004, 1541), though the reverse effect has also been shown (Shore 1995, 373). While the 'fine fraction' of particulate matter (dated material for UB-158F)—which will include material such as pollen—might be expected to provide the 'true age', such material is 'most likely to contain wind borne particles from elsewhere, and these particles may well contain older reworked erosional sediments, the possibility of obtaining an erroneous age is high' (Shore *et al.* 1995, 382). 'The salient fact' as Shore *et al.* (*ibid.*), put it 'remains that different fractions of the same bulk sample can contain significantly different levels of ^{14}C and not that the same level of ^{14}C occurred in the atmosphere over different periods of time'.

As is typical of oceanic blanket peat accumulating on sloping ground, the development (and erosion) of peat on Céide hill was highly variable, thus 'extrapolation over even small distances is unreliable' (McNally and Doyle 1984, 63; Birks and Birks 1980, 10; cf. e.g. Edwards and Hiron 1982, 36; Shore *et al.* 1995). None of the (large) error margins in the calibrated age ranges for the peat samples in Table 3.1 fall exclusively prior to 2500 cal BC: the beginning of the Irish Bronze Age. The applicability of the dated samples—which were not recovered from an archaeological context—to the construction and use of the field walls has not been demonstrated.

The final date (SI-1464) is ‘a single date from charcoal in the Glenulra enclosure’ (p.141). According to Caulfield *et al.* (1998, 630), this represented ‘...the earliest recorded [radiocarbon date] for any archaeological specimen from the Céide Fields system’. The original excavations at the Glenulra enclosure (carried out between 1970 and 1972) remained undocumented until the 2009 publication of the stratigraphic report (Caulfield *et al.* 2009a). That report calibrates the date for sample SI-1464 to 3550-2850 cal BC (*ibid.*, 12-13). This date is published with the following caveat:

There is a single date taken from the enclosure at Glenulra. It is probably from the charcoal spread c127, although it is possible that it came from one of the other charcoal spreads in that area. Additionally there is no information presently to hand regarding the material that was sampled and as such, this bulk date should be treated with considerable caution. At best, the radiocarbon date suggests some activity in the mid-late Neolithic. Please note that this date was cited incorrectly in Caulfield *et al.* 1998 p630 and correctly on p638; the date given here is the correct estimate and error (see Caulfield 1978a).

The uncertainty that surrounds the material which has been dated should alone be sufficient for this date to be disregarded. The fact that the dated material is charcoal further raises the possibility that the dated event was a natural fire (unrelated to any human activity). It is not clear whether the dated material came from *in situ* burning, or was a charcoal-rich redeposition (Caulfield and Warren 2011, 59; see Chapter 5).

On the basis of the evidence presented in Caulfield 1978a, the Behy/Glenulra field system—Céide Fields—was *not* ‘shown to be of Neolithic date’ (*contra* Caulfield 1978a, 142).



3.3.1.b Belderg Beg

Two out of seven radiocarbon dates from field walls at Belderg Beg in the Belderrig/Belderg river valley (west of Céide Fields) are also invoked to claim Neolithic land division (see Table 3.2, below). The first date (SI-1469: 3835±85 BP, recalibrated by Cooney *et al.* 2011 as 2570-2030 cal BC) ‘is from an oak stump growing in peat to the east of the site’ (p. 142). No further information on the spatial relationship between the oak stump and the field walls is provided. It is not clear whether the tree was growing before the bog began to form. Given that the sample material is oak, the radiocarbon date may reflect ‘old wood’, the tree having lived for many centuries before inundation by peat and eventual death (cf. e.g. Higham and Petchey 2000, 265; Bayliss *et al.* 2011a, 38). Moreover, the re-calibrated radiocarbon date confirms that the sample is likely to post-date the Neolithic by several centuries. Even if it is accepted that the stump is *in situ* – that its present stratigraphic location reflects its precise position at death – the age of this stump has no demonstrable bearing on the age of field walls located elsewhere in the blanket bog (see further discussion in Section 3.4.3). Neither the formation of the bog, nor the construction of the field walls, can be assigned to the Neolithic on this evidence.

Table 3.2: Radiocarbon dates from Belderg Beg. After Caulfield (1978a, 141); cal BC dates after Cooney *et al.* (2011, Table 12.6).

Lab code	Sample	Sample material	¹⁴ C years BP	¹⁴ C years cal BC
SI - 1469	Belderg Beg 1	Oak stump	3835±85	2570-2030
SI - 1470	Belderg Beg 2	Pine stump	4220±95	3080-2490
SI - 1471	Belderg Beg 3	‘Block of wood’	3220±85	1690-1310
SI - 1472	Belderg Beg 4	‘Pointed stake’	3210±85	1690-1300
SI - 1473	Belderg Beg 5	‘Pointed stake’	3170±85	1630-1260
SI - 1474	Belderg Beg 6	Charcoal	2295±75	540-180
SI - 1475	Belderg Beg 7	Charcoal	2905±75	1380-900

Sample SI-1470 (4220±95 BP, recalibrated by Cooney *et al.* 2011 as 3080-2490 cal BC) 'is from the outer five rings of a large pine stump which is within 15 m of a pre-bog wall at the south side of the site' (p. 142). Again, the physical distance between the stump and the field wall (in this case quantified) is a significant source of potential error: no temporal relationship can be assumed between objects 15 metres apart in an oceanic blanket bog. Further to this, the properties of the stone in a field wall are very different to the properties of the pine stump. As discussed in detail in below (Section 3.3.2.a), the relative stratigraphic positions of materials whose physical properties are at such variance cannot be assumed to provide a reliable indication of relative age in a peat bog. It must be expected that, prior to modern drainage, peat bogs will have gone through periods of great instability due to waterlogging, particularly on sloping ground.

Of the remaining dates from Belderg Beg, SI-1471, SI-1472 and SI-1473 (all broadly consistent with the wider phenomenon of Bronze Age 'Celtic fields') are attributed to a 'second occupation' (p. 142). A roundhouse was discovered 'in the north-east corner of the site' (p. 141), and date SI-1473 (3170±85 BP, recalibrated by Cooney *et al.* 2011 as 1630-1260 cal BC) 'was from a block of wood within the round house' (p. 142). SI-1471 (3220±85 BP, recalibrated by Cooney *et al.* 2011 as 1690-1310 cal BC) and SI-1472 (3210±85 BP, recalibrated by Cooney *et al.* 2011 as 1690-1300 cal BC) are 'from pointed stakes which were driven into the peat along the line of [a] wall built on the peat'.

This wall is important evidence of the imperative to divide the land in the Bronze Age, despite the encroachment of peat. The wall, which 'survives to a maximum height of 60 cm', is described as 'surprisingly slender' (Caulfield *et al.* 2009c, 26). Its recorded length is 180 m, and it overlies peat towards its southern extent, before apparently being continued for *c.* 50 m

as a line of wooden stakes, from which the two radiocarbon dating samples were taken. Where the wall overlies peat, it is no more than 50 cm wide.

The evidence for Bronze Age activity in the area seems clear, however in his summing-up of the case for the field systems being of Neolithic date (on the same page the Bronze Age evidence is discussed), Caulfield (1978a, 142) asserts that '[t]here was an intensive Neolithic settlement of the region while, on the negative side, there are few Bronze Age tumuli or Iron Age forts through much of the area' (see also p. 141).

Sample date SI-1475 (2905±75 BP, recalibrated by Cooney *et al.* 2011 as 1380-900 cal BC) 'was from charcoal associated with a scatter of flint scrapers at the centre of the site' (p. 142); SI-1474 (2295±75 BP, recalibrated by Cooney *et al.* 2011 as 540-180 cal BC) 'was from charcoal within the round house'. Both are dismissed by Caulfield as 'impossible to reconcile with either the archaeological material or the radiocarbon dates from the site' (p. 142). Cooney *et al.* (2011, 622) suggest laboratory errors may be to blame. Impurities in the dated samples may equally have been a source of error, particularly in this relatively early dating exercise. Besides the risk of contamination from intrusive material in the ground, the risk of cross-contamination from introduced carbon during excavation and retrieval may not have been well understood.



3.3.1.c Critique summary

Neither the field systems at Behy/Glenulra (Céide Fields) or Belderg Beg are ‘shown to be of Neolithic date’ by the evidence presented in Caulfield 1978a. Unsustainable assumptions underpin the dating of both field systems. Caulfield (1978a, 141) proposes that ‘basal peat suggest that the walls of the entire Behy/Glenulra settlement are pre-2000 bc and the single date from the oval enclosure is consistent with this’. No such inference can be made from a single arbitrarily-located peat core on exposed sloping ground where the complexities of the underlying microtopography are unknown. The single charcoal date from Glenulra comes from an unknown context and may not pertain to human activity – certainly, it cannot be reliably associated with the construction or use of the field walls.

At Belderg Beg pine which provides sample SI-1470 was deemed to be growing on a thin layer of peat by the beginning of the Bronze Age. On this basis, it was determined that a field wall built on mineral soil 15 metres away – and by inference a wider field system – were constructed at some time before this (Caulfield 1978a, 141). The more extensive evidence of Middle Bronze Age settlement and enclosure was attributed to a ‘second occupation’.

Although peat had begun to form on the summit plateaux above the Belderg Valley and Céide hill, and in ‘initiation foci’ such as poorly drained hollows, both landscapes were sufficiently peat-free to enable substantial settlement during the Bronze Age. As will be further demonstrated in the remainder of this chapter, the equation of sub-peat with the Neolithic in north Mayo is apt to mislead.



3.3.2 Dating evidence from Caulfield *et al.* 1998

A second programme of dating was initiated in the 1990s in conjunction with the newly established radiocarbon laboratory at University College, Dublin. Caulfield *et al.* 1998 published the results from forty-four pine samples and two peat samples. The specimens, which were gathered from across north Mayo, were dated in order to provide proxy dates for the formation of peat bog. The recorded details of the samples are reproduced in Table 3.3, below². The pertinent samples form the basis of the discussion that follows.

Table 3.3: Radiocarbon dates for subfossil pine stumps. After Caulfield et al. (1998, 633): BP dates are $\pm 1\sigma$; cal BC dates after Cooney et al. (2011, Table 12.6). Additional dates from O'Donnell (1997, Table 5.6) calibrated in OxCal 4.2 (IntCal 13) (<https://c14.arch.ox.ac.uk/oxcal>). (Continues overleaf.) The sample locations are plotted in Figure 3.9, below.

Lab code	Location	Height above mineral soil (cm)	¹⁴ C years BP	¹⁴ C years cal BC
<i>Céide Fields</i>				
UCD-C45	Behy, 1m from wall	0	4450±60	3360-2910
UCD-C51	Behy, near tomb	5	4500±60	3370-2930
UCD-C57	Behy, 65m west of tomb	0	4420±50	3340-2900
UCD-C42	Glenulra	90	4530±60	3500-3020
UCD-C44	Glenulra	0	5370±70	4350-3990
UCD-C21	Ballyknock	10	4490±60	3370-2920
UCD-C23	Ballyknock	75	4540±60	3500-3029
UCD-C28	Ballyknock	20	4230±60	2930-2630
UCD-C29	Ballyknock	30	4510±50	3370-3020
UCD-C34	Ballyknock	35	3950±60	2620-2280
UCD-C37	Ballyknock	30	4500±50	3370-3020
UCD-C40*	Sralagagh (peat [§])	0	2910±40	1220-980
UCD-C22	Aghoo	25	4210±60	2920-2615
UCD-C27	Aghoo	25	4170±50	2900-2570
UCD-C30	Aghoo	20	4190±50	2910-2600
UCD-C33	Aghoo	30	4100±60	2880-2470
<i>Conaghrea (3 km west of Céide Fields visitor centre)</i>				
UCD-C03*	Conaghrea (peat [§])	5	2400±40	750-400

Lab code	Location	Height above mineral soil (cm)	¹⁴ C years BP	¹⁴ C years cal BC
<i>Belderrig 7 (7 km west of Céide Fields)</i>				
UCD-C04	Belderg More	30	4480±60	3370-2920
UCD-C11	Belderg More	50	4010±60	2840-2340
UCD-C14	Belderg More	25	4310±70	3100-2710
UCD-C18	Belderg More	0	4150±60	2900-2490
UCD-C49	Belderg More	On a wall	4580±60	3520-3090
UCD-C07	Belderg Beg	70	3330±50	1750-1490
UCD-C31	Belderg Beg	0	4510±50	3370-3020
UCD-C58	Belderg Beg	75	3960±60	2620-2280
UCD-C60	Belderg Beg	Unknown	3930±50	2570-2240
UCD-C47	Geevraun	45	4210±60	2920-2610
UCD-C46	Geevraun (peat [§])	5 (beneath C47)	5710±90	3270-2880
<i>Annagh More/Annagh Beg (3 km east of Aghoo)</i>				
UCD-C26	Annagh More	On a wall	4350±60	3270-2880
UCD-C50	Annagh More	0	4440±60	3360-2900
UCD-C24	Annagh Beg	180	4440±60	3360-2900
UCD-C38	Annagh Beg	140	3280±60	2470-2040
<i>Erris Region (to the west of Belderrig)</i>				
UCD-C01	Inver	75	4240±60	2930-2630
UCD-C02	Aghoos	65	4340±60	3270-2870
UCD-C12	Aghoos	75	3950±60	2620-2280
UCD-C05	Carnhill	135	4250±60	3010-2670
UCD-C13	Muings	200	3990±60	2840-2300
UCD-C16	Bunalty	65	4490±60	3370-2970
UCD-C19	Gortmelia	10	4530±60	3500-3020
UCD-C20	Carrowmore	65	4230±60	2930-2630
UCD-C25	Glencullin	15	4460±60	3370-2910
UCD-C35	Graghill	40	4440±50	3350-2910
UCD-C36	Gortbrack North	125	3090±50	1460-1210
UCD-C43	Muingerroon South	30	4080±60	2880-2470
UCD-C41	Muingerroon South	0	6720±90	5760-5480
UCD-C52	Tullaghanbaun	Not recorded	4070±60	2880-2460
UCD-C48	Tullaghanbaun	80	7530±100	6600-6210
UCD-C54	Tullaghanbaun (peat [§])	Beneath C48	8660±130	8210-7490

*Additional dates after O'Donnell (1997)

[§]The 'humine' [humins] fraction of the peat samples appears to have been extracted for radiocarbon dating (see O'Donnell 1997, 45).

3.3.2.a Analysis of the dating evidence

At many locations within this blanket bog the stumps of ancient pines (Pinus sylvestris) are found in situ. The pine roots in most cases are either on the surface of the mineral soil under the peat or at an indeterminate level in the peat itself. The age of the trees in the bog overlying Céide Fields is therefore of great significance for the dating of the fields, as the trees must be younger than the bog in which they are growing, which in turn must be younger than the field system beneath it.

Séamas Caulfield *et al.* (1998, 629)

Caulfield *et al.* dated three pine samples in the townland of Behy, ‘close to the Behy megalithic tomb’ (see Table 3.3, above). Sample UCD-C51, described as ‘near tomb’, ‘was found lying horizontally in the bog’; sample UCD-C57, ‘65m west of tomb’, was recorded as ‘an outer remnant of a very large trunk of a fallen pine and is not part of the root system’ (p. 632). Sample UCD-C45 ‘lay on the mineral soil 1 m from a pre-bog wall’ (p. 632). While it is not clear whether this last sample was horizontal, at least two of the three sampled pines from Behy had fallen, and so clearly were not ‘*in situ*’. Details of whether other samples were standing or had fallen are not systematically recorded, however the authors state that ‘[t]he majority of the 44 subfossil pine samples dated in this study were taken from stumps found preserved and standing upright in the peat’ (p. 636).

Applying the logic that ‘[b]ecause these pines grew on peat and were preserved by it, the ¹⁴C dates of the pines are central to the determination of a *terminus ante quem* for the initiation of blanket bog in the North Mayo region’ (p.629), it is relevant to compare the dates for Behy pine stumps with the available dates for the peat in the immediate vicinity. The youngest of the Behy pine stumps is UCD-C57 which was radiocarbon dated as 4420±50 BP (recalibrated by Cooney *et al.* 2011 as 3340-2900 cal

BC). Also ‘near’ to the megalithic tomb at Behy were the radiocarbon dates for basal peat recorded in Caulfield 1978a (UB-158F, UB-155 and UB 153F). As Caulfield *et al.* (1998, 638) note, the oldest of these dates UB-158F is 3930 ± 105 BP (recalibrated by Cooney *et al.* 2011 as 2860-2130). On this evidence, the peat is *younger* than the pine stumps within it.

Though not specifically referred to by Caulfield *et al.* 1998, Molloy and O’Connell (1995, Table 2, Fig. 11, Fig. 13) also obtained radiocarbon dates from peat cores in the vicinity of the Behy monument (see Table 3.4 below). Similarly, the oldest date for the peat at Behy is significantly younger than the pine stumps from the townland dated by Caulfield *et al.* (cf. Cooney *et al.* 2011, 622).

Table 3.4: Radiocarbon dates from pollen cores BHY IV (25m north of Behy tomb) and BHY V (35m east of Behy tomb). After Molloy and O’Connell (1995, Table 2); cal BC dates after Cooney *et al.* (2011, Table 12.6).

Lab. Code	Sample	Height above mineral soil (cm)	¹⁴ C years BP	¹⁴ C years cal BC
GrN-2029	BHY IV (3)	1-4	3630 ± 40	2140-1880
GrN-2030	BHY IV (4)	7-10	2940 ± 40	1300-1010
Gd-6694	BHY V-1	0-1.5 <u>below</u> surface of mineral soil	3990 ± 80	2860-2280
Gd-6696	BHY V-2	7-8.5	3450 ± 80	1960-1530

Further radiocarbon dates were recorded from a core (BHY III) 60m to the west of the Behy monument (see Table 3.5, below). The initial dates from this core were considered ‘too young’ (Molloy and O’Connell 1995, 210). A single new date (GrN-23497) published in O’Connell and Molloy 2001 (p. 101) is taken to suggest a *terminus post quem* for peat accumulation in this sample area *c.* 4100 ± 40 BP (recalibrated by Cooney *et al.* 2011 as 2870-2490 cal. BC). Again, this is later than Caulfield *et al.*’s pine samples.

Table 3.5: Radiocarbon dates from pollen cores BHY III (60m west of Behy tomb). After Molloy and O'Connell (1995, Table 2) [first four], and O'Connell and Molloy (2001, 101) [remaining three]; cal BC dates after Cooney et al. (2011, Table 12.6).

Lab. Code	Sample	Height above mineral soil (cm)	¹⁴ C years BP	¹⁴ C years cal BC
Gd-6693	BHY III-1	0-1	4030±80	Given as for GrN-23497
Gd-7147	BHY III-2	6-7	3360±50	1730-1510
Gd-7148	(Replicates BHY III-2)	6-7	3290±60	1730-1510
GrN-20031	BHY III (5)	14.5-16.5	3290±30	1640-1490
GrN-23497	(Replicates BHY III-1)	0-1	4110±40	2870-2490
GrN-23498		5-6	3870±25	2470-2210
GrN-23499		16.5-17.5	3090±30	1430-1270

While Cooney *et al.* (2011, 622) note that '[w]here it is possible to compare dates for stumps growing on or just above the mineral soil and dates for the base of the peat in a single area, that of the Behy court tomb, the stumps [...] are earlier than the base of the peat', again, the implications for Caulfield *et al.*'s methodology are not discussed.

Peat sample UCD-C03, not published in Caulfield *et al.* 1998, from the townland of Conaghrea, west of Céide Fields (see Figure 3.9) returned the Late Bronze Age/Iron Age date of 750-400 cal BC. A second dated peat sample included in O'Donnell 1997, but not Caulfield *et al.* 1998, was Middle Bronze Age sample UCD-C40 (1220-980 cal BC). This sample was recovered from the townland of Sralagagh on Ballyknock hill, which opposes Céide hill to form the eastern side of Glenultra valley (see Figure 3.10, below). O'Donnell (1997, Table 5.6) records UCD-C40 as having been recovered at the interface between the peat and the mineral soil ('0' cm above the mineral soil). Confusingly, O'Donnell (*ibid.*, 135) later describes the sample as having been 'taken from on top of a wall'. As O'Donnell (1997, 135) observes, these dates serve to 'highlight the variability in the

dates of initiation of blanket bog over a relatively small area such as Céide Fields', with apparently peat-free land throughout the Bronze Age.

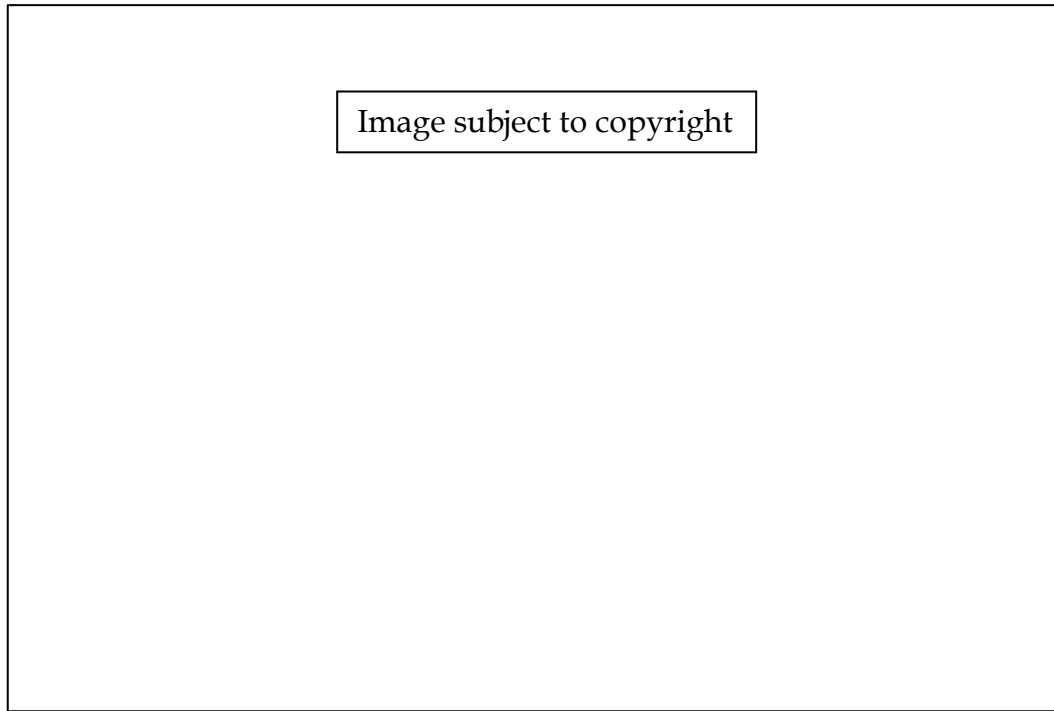


Figure 3.9: *Map of north Mayo after Caulfield et al. 1998, Figure 1, with the approximate locations of the dated samples annotated (see Table 3.3). Peat samples UCD-C03 and UCD-C40 (not in Caulfield et al. 1998) are highlighted in green.*

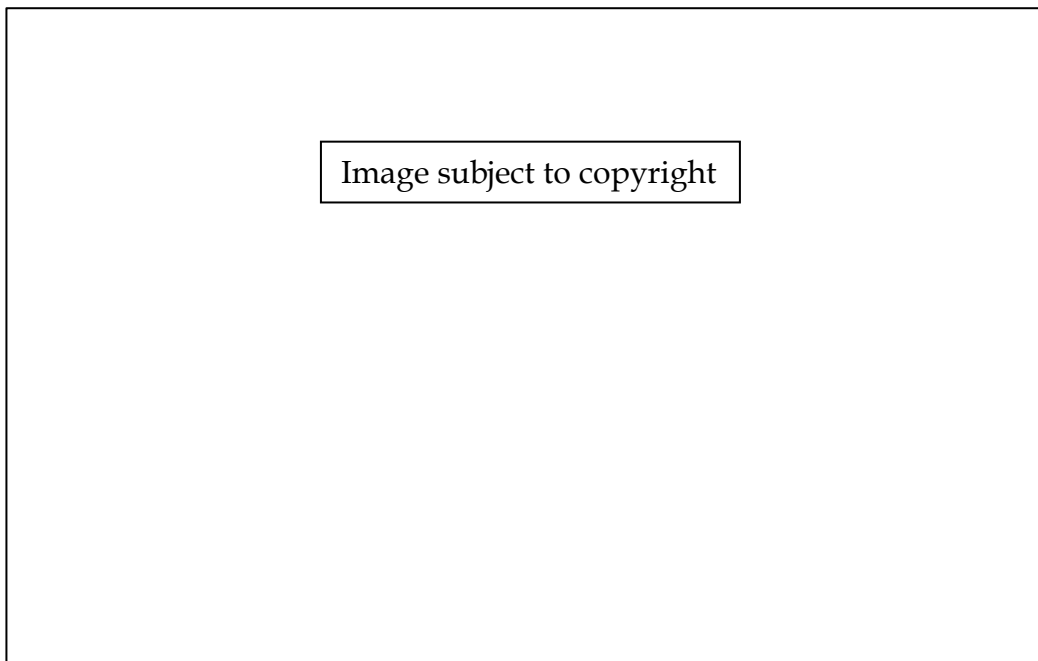


Figure 3.10: *'3D model, with 2x vertical exaggeration, showing Ballyknock (left) and Céide Hill (right)'. After Warren (2011, Figure 3). The approximate location of the Céide Fields visitor centre, as well as the location of sample UCD-C40, have been added by the present author.*

None of the dated pine samples from Ballyknock hill (UCD-C21, UCD-C23, UCD-C28, UCD-C29, UCD-C34, UCD-C37) – all of which are to the east of UCD-C40 – are recorded as having been discovered in association with field walls. Accordingly, the dates for these samples do not determine that ‘pine forest was well established on blanket bog formed over abandoned Neolithic fields’ (*contra* Caulfield *et al.* 1988, 632). The available evidence indicates that the field walls lay elsewhere on the hillside – the bog is not a homogeneous entity.

Near the mouth of the Belderrig/Belderg valley, ‘7km west of Céide Fields’, sample UCD-C49 (4580±60 BP; recalibrated by Cooney *et al.* 2011 as 3520-3090 cal BC), from ‘Belderg More townland, 2 km to the northeast of the Belderg Beg excavation’, is described in the original account as ‘on top of’ a field wall (p. 639). Though the error margin is typically large, UCD-C49 is seen to have returned ‘the earliest of the pine dates from the dominant pine expansion’ (p. 634). From this, Caulfield *et al.* deduce that ‘not only is it clear that the wall predates the pine date, but that the walls were constructed some considerable time before 4580 BP, given the depth of peat from the top of the pine stump to the mineral soil’ (see also Cooney *et al.* 2011, 622).

That ‘depth of peat’ is not recorded, but, of the remaining nine ostensibly *younger* pine samples from the Belderg valley, some were clearly lower in the stratigraphy. A short distance from UCD-C49, sample, UCD-C18 is described as ‘rooted in the mineral soil’. Accordingly, the sampled pine ‘must have died after or only shortly before [peat began to form] locally’ in order to have been preserved (Cooney *et al.* 2011, 622; see also Caulfield *et al.* 1998, 634). The radiocarbon date recorded for UCD-C18 (at the base of the stratigraphy) is 4150±60 BP (recalibrated by Cooney *et al.* 2011 as 2900-2490 cal BC). Caulfield *et al.* (p. 634) concede that ‘an earlier date would have been expected, considering its proximity to a wall and to the other

older samples', but caution that they 'cannot exclude the possibility that the uncertainty in the calibration curve may also be a factor here'. They conclude that a 'similar observation can be made about sample C11' (4010±60 BP; recalibrated by Cooney *et al.* 2011 as 2840-2340 cal BC), also in the townland of Belderg More.

Sample UCD-C31 (4510±50 BP, recalibrated by Cooney *et al.* 2011 as 3370-3020 cal BC), from the townland of Belderg Beg, is the second of the three samples described as having 'its roots in the mineral soil' (p.639). Like UCD-C18, UCD-C31 should therefore have an especially high potential to provide a reliable *terminus post quem* for the initiation of the bog at its particular location, '5m from a wall at the Belderg site'. However, given the large error margins, the precise temporal relationship between UCD-C31 (at the base of the stratigraphy) and UCD-C49 (on top of a field wall) cannot be known (Caulfield *et al.* describe their dates as 'indistinguishable'). Such imprecision compromises the ability to test the temporal coherence of the peat stratigraphy. However, the indications are that height above mineral soil is a poor guide to relative age.

Sample UCD-C26 (4350±60 BP; recalibrated by Cooney *et al.* 2011 as 3270-2880 cal BC) from the townland of Annagh More '8 km to the east of Céide Fields', is the second of the two samples described as 'lying on top of a wall'. As with UCD-C49, this description is suggestive of the sample being *ex situ*, but further contextual details are not recorded. Sample UCD-C50 (4440±60 BP recalibrated to 3360-2900 cal BC in Cooney *et al.* 2011), came from the townland of Annagh More, '3 m away' from sample UCD-C26. UCD-C50 is the final of the three samples recorded as 'rooted in the mineral soil' (p. 635). To an even greater extent than UCD-C49 and UCD-C18, the date ranges for UCD-C26 and UCD-C50 cannot be meaningfully separated, yet UCD-C50 was at the base of the stratigraphy, whereas UCD-C26 was at an intermediate height on top of a wall.

At 'Annagh Beg, on a flat intermediate plateau to the south of Annagh More', sample UCD-C24 returned an *identical* radiocarbon determination as UCD-C50. UCD-C24 was 1.8 metres higher in the peat stratigraphy than sample UCD-C50 (p.634).



3.3.2.b Discussion

It is obvious from these dates that the early date of Céide Fields is not unique in North Mayo. On the contrary, there are many locations in this region where the dates of the pine trees in the bogs provide unequivocal evidence that the field boundaries beneath the bog must predate 4500 BP, at the latest.

Caulfield *et al.* (1998, 629)

Caulfield *et al.*'s conclusion that the field systems at Céide Fields must be Neolithic relies upon the methodological premise that 'the trees must be younger than the bog...which in turn must be younger than the field systems' (p. 629). The above analysis illustrates that the relative stratigraphy of pine stumps in the peat fail to correlate with their radiocarbon ages, with some stumps apparently pre-dating the formation of the mire in which they are lying.

Similar problems were encountered in trying to reconcile the radiocarbon and dendrochronological dates for the timbers of the Early Neolithic *Sweet Track* in Somerset, south-west England, with radiocarbon dates from the surrounding peat (Baillie 1990, 362; Table 1). The dendrochronological dates determine that the track was constructed in 3807/6 BC (*ibid.*, 366; Hillman *et al.*, 1990). The estimated age determined by analysis of the radiocarbon dates from timbers was in reasonable agreement. This was

not the case for the radiocarbon dates from peat samples. According to the radiocarbon dates from peat beneath the track, the timbers of the track were laid before the peat grew (Baillie 1990, 362; Table 1).

As at the Sweet Track, the timber samples from Céide Fields (the pine stumps) provide far greater potential to return accurate radiocarbon dates than the peat samples. The timber provides for more stable and coherent samples (Molloy and O'Connell 2001, 101), that are less susceptible to the 'sampling vagaries' of a bulk sample/shovel-load of soil (Baillie 1990, 360). That said, the (already large) error margins for almost all of the pine samples are underestimated, as the parts of the trees that were dated are not recorded (cf. Cooney *et al.* 2011, 622)³. Further potential sources of error were inherent in the use of UCD's radiocarbon laboratory: a newly established conventional liquid scintillation spectrometry facility (see Caulfield *et al.* 1998, 629-30). A more established laboratory with AMS facilities could have provided enhanced capabilities, including assistance with the selection of the more precisely defined (smaller) samples that this method allows (cf. Dincauze 2000, 107-117; Bayliss *et al.* 2011, 43).

The major constraints of Caulfield *et al.*'s approach, however, derive from the inherent unsuitability of the blanket peat on the hillsides of north Mayo as a medium for stratigraphic inferences. As discussed in Section 3.3.1, the accumulation (and erosion) of blanket peat varies in accordance with factors including topography, hydrology, wind, precipitation, temperature, exposure, aspect, vegetation, the underlying mineral soil, and the actions of humans and people. Particularly in the absence of 'exhaustive sub-peat topographic surveys', generalising assumptions concerning the nature of blanket peat deposits are apt to mislead (e.g. Edwards and Hirons 1982, 36).

The principle which informs the dating methodology in Caulfield *et al.* 1998 is demonstrated in an exhibit at the Céide Fields interpretive centre (see Figure 3.11, below). The assumption being that the partial remains of pine trees are ‘*in situ*’, having remained fixed in stratigraphic stasis in peat for millennia.

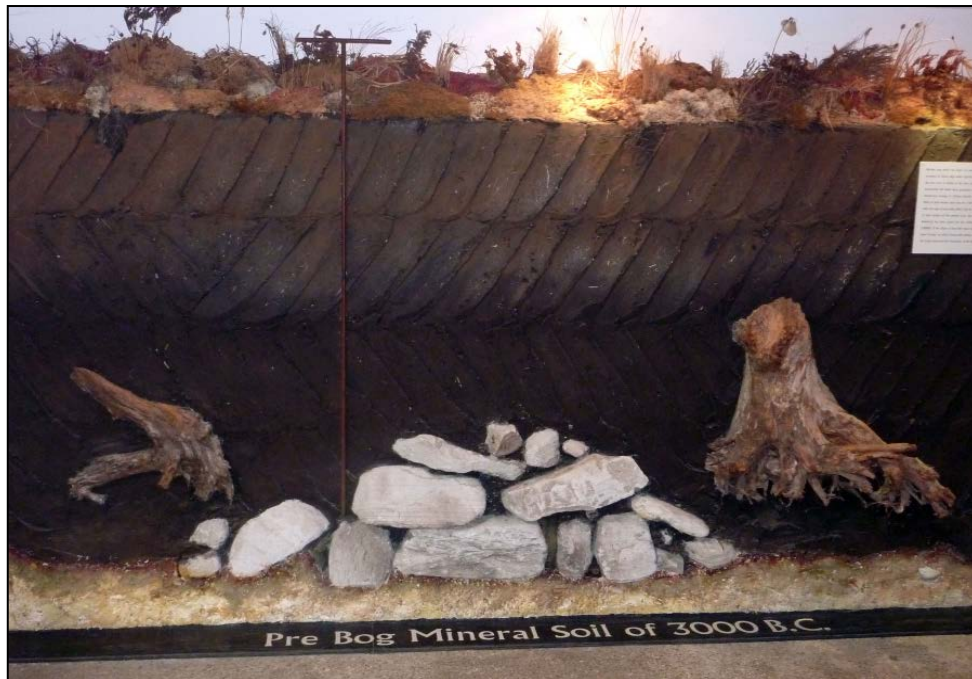


Figure 3.11: Exhibit at Céide Fields visitor centre illustrating probing method for locating sub-peat field walls. Relative dating is based upon the relative location of materials in the peat matrix. Photo: author.

Wooden macrofossils in peat

Pinus sylvestris can tolerate the peatland-edge habitat, and will readily repopulate bogs when drier surface conditions allow (Bradshaw and Browne 1987, 239). It was *Pinus sylvestris* that colonised the ‘shallow peats’ at Céide Fields (O’Connell and Molloy 2001, 101). However, pines growing in peat develop shallow root systems, rendering them unstable, particularly where the water-table is high (e.g. Birks 1975, 185; McNally and Doyle 1984, 59; Eckstein *et al.* 2009, 13; 2011, 789).

The trees will die if their roots are permanently submerged below the water-table, but their stumps may remain upright and be preserved in the anaerobic conditions (that stifle the growth of bacteria, and thus the process of decay) in the bog (Birks 1975, 185-6; McNally and Doyle 1984, 59). While the specific climatic conditions that prevailed during the widespread decline of the pines cannot be known, '[i]n general, it can be assumed that the preservation of a pine stump indicates somewhat wetter conditions than those prevailing during its life' (Birks 1975, 186; see also Bradshaw and Browne 1987, 246).

Unless firmly rooted in the mineral soil (and thus *older* than the peat), macrofossils are unlikely to remain precisely '*in situ*' over millennia in oceanic blanket peat, particularly on sloping ground. Undrained bogs typically have high water-tables with open pools forming on the surface (e.g. Warburton *et al.* 2004, 139; Holden *et al.* 2006, 1764). As Pilcher and Hall put it:

The large undrained bogs with their patchwork of pools and hummocks which covered much of Ireland even in the early years of the last century have almost vanished [...] The open-water pools may be more than 2m deep with nothing solid enough below the water to bear weight [...] There is more water in peat than in milk as peat is at least 95% water; full cream milk is only 85% water (2001, 51-2).

Being less dense than stone, wooden macrofossils have a greater propensity to be suspended in the peat matrix. As such, the 'gravitationally induced downslope transport of [*Pinus sylvestris*] subfossils', and consequent mixing of subfossils within redeposited sediments, can leave older specimens higher in the stratigraphy (Kullman 1994, 251). Such remobilisation and redeposition may occur through soil creep, or localised failures, particularly where there is hydrologically induced shearing at the discontinuity between the peat and the mineral substrate beneath (e.g. M. Evans and Warburton 2007, chapter 5; see further discussion below). The structural integrity of peat deposits – and

their consequent propensity to such mechanical damage – is increased by deforestation (e.g. Reitz and Shackley 2012, 136, 56).

During dryer phases, or in areas (such as those in question) which have been drained for turf cutting, bogs shrink. In some cases, the contraction of the peat causes tree stumps and other timbers to be exposed on the surface (e.g. Pilcher and Hall 2001, 59-60). It should be expected that the movement of wooden macrofossils over millennia will be significant and unpredictable.



Stone structures in peat

According to Caulfield *et al.* (1998, 638), ‘it now seems certain that peat was starting to grow long before the arrival of farming communities’. Caulfield (1983, 200) proposed that the fields enclosed pasture for cattle:

The height of the walls indicates that they are functional barriers capable of retaining cattle [...] The size of the fields indicates that they were primarily organised for a grass crop. Animal husbandry is therefore likely to have been the inspiration for the Behy/Glenulra field system.

The palaeoenvironmental record indicates prolonged periods during which peatland surfaces were sufficiently dry to support pasture for grazing animals (e.g. O’Connell and Molloy 2001, 108, 120; cf. Pilcher and Hall 2001, 36-38). While it is not possible to determine to what extent the stone walls were constructed *on* the peat (cf. O’Connell 1990a, 51), there is evidence of this at Belderg Beg (see Section 3.3.1.b, above). Nowhere is evidence recorded of the underlying mineral soil being disturbed by the builders of the walls (cf. A.E.P. Collins and Waterman 1955, 8; Whitefield 2009, 69).

During the prolonged wetter periods (necessary for the bog's expansion), the peat would have constituted a poor foundation for piled stone and rock. The 'surprisingly slender' nature of the Bronze Age wall resting on peat at Belderg Beg is instructive in this respect. Hanrahan (1954) tested some of the physical properties of peat, including its compressive strength under static loads. He found that due to 'the enormous water-content and low volume of solids in peat', '[i]n an undrained bog, the unconfined compressive strength is negligible' (1954, 113-4).

The compressive properties of soils with a high organic and moisture content are well understood in modern construction. The settling (sinking) of structures built on peat can be substantial, even where loads are small (e.g. Maclean 1952, Chapters 23 and 25; J. Mitchell and Jardine 2002, Chapter 7; McCabe *et al.* 2007, 4). Construction on peat is generally avoided, else substantial ground works are required in advance. Archaeological excavations in Cork city centre revealed that 'floating foundations' were in use on peat in medieval Ireland. In 1445, Skiddy's Castle – an urban tower house – was constructed on a timber raft:

The raft had been assembled on a layer of transported river gravel which measured about 1 m in thickness. The gravel had been laid directly onto the underlying peat into which had been driven a large number of pointed stakes which measured about 1 m in length. The lines of force set up by the stakes were sufficient to 'squeeze out' some of the water in the upper layers of peat thereby making the surface sufficiently dry and compacted so as to prevent the overlying gravel sinking into the peat (Twohig 1978, 20-1).

This is not to suggest that soil compression would have been a concern in the construction of field walls. It should, however, be expected that piled stone will have sunk through the peat as the moisture content increased towards the point of liquid phase (cf. Warburton *et al.* 2004, 143; see Figure 3.12, below).

Thus, that the walls are reported to ‘generally stand on mineral soil’ (e.g. Cooney *et al.* 2011, 615) does not determine that they were ‘built on the mineral soil’ (*contra* Caulfield 1978a, 139). The relatively stable matrix of a bog which has been drained in modern times cannot be assumed to be representative of the entire course of the bog’s development. The displacement of peat under a load is a process which can extend ‘for many hundreds of years’ (Maclean 1952, 466). In the case of substantial field walls constructed in prehistory, the modern stratigraphic location of the (dense, heavy) stone at the bottom of the mire can be attributed to the displacement of the (possibly very thin layer of) underlying peat.



Figure 3.12: Excavated section of field wall at Céide Fields. The mineral soil underlying the peat acts as a barrier to drainage. Photo: Author.

Excavation of the field walls has been minimal, accounting for a fraction of one per cent of the recorded field systems, and has been concentrated in the immediate vicinity of the visitor centre. What lies beneath the field walls is for the most part unknown. Where small sections of wall have been excavated, the aim was often to expose the remains, 'but not examine them in detail':

In many instances, 'excavation' of the walls was only partial: it being the policy not to move or disturb the stones, but to leave them intact as found. It was not therefore possible to see details of construction (Byrne *et al.* 2009a, 22).

Moreover, hydrological activity in blanket bogs is especially intense at the interface with the underlying mineral soil. Water flowing through the networks of pores and larger 'peat pipes' at this level, particularly after heavy or prolonged rainfall, would militate against the preservation of a layer of peat beneath low lying stone (see further discussion in next section). Just as most of the excavated field walls now rest on the mineral soil, from the available evidence, so does the tumble. Either no further degradation of the walls took place after the peat began to form, or the picture is far from complete. Potentially, large sections of the field walls were constructed *on* peat.



Further implications of peat hydrology

Peat pipes (typically ranging in diameter from a few centimetres to over half-a-metre) are a 'ubiquitous' feature of blanket peatlands in Ireland and Britain (e.g. Holden *et al.* 2002; Holden 2005, 9, 10; M. Evans and Warburton 2007, 45). Holden and Burt (2002, 174) found that in the concentration of pipes at the peat-substrate interface, the water flow was 'perennial': material at this level is subject to continual disturbance due to the intrinsic peatland hydrology. Pipe flow can increase where (as in

many parts of Céide Fields) bogs have been drained for peat cutting (Holden *et al.* 2006, 1776; see Figure 3.13, below).



Figure 3.13: Desiccation caused by peat cutting. Note the slope of the ground running down toward the Céide Fields visitor centre (top left of the picture) and the sea. Photo: author.

Warren identified peat pipes during excavations at Belderrig in the townland of Belderg More (see Figure 3.14, below), noting the implications of the movement of water and sediments for the integrity of apparently ‘sealed’ archaeological contexts (2008, 18). Interestingly, Warren (*ibid.*) also observed that field walls themselves are likely to act as ‘channels for sub-bog movement of water and associated sediments’ (see also Warren and Rice 2008, 3).

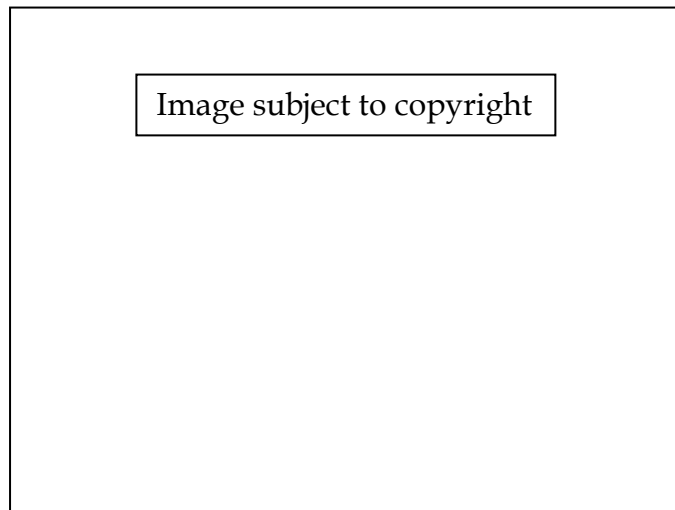


Figure 3.14: Peat pipes discovered during archaeological excavations at Belderrig. After Warren (2008, Figure 24).

The rapid transmission of water via vertical soil pipes from near the peat surface to the interface with the mineral substrate contributes to instability at the interface zone (Warburton *et al.* 2004, 152; M. Evans and Warburton 2007, 51). Many of the failure mechanisms that lead to the mass movement of peat (well recorded in Ireland) involve hydrological activity at the peat-mineral soil interface (e.g. Dykes and Kirk 2001, 395, with references; Warburton *et al.* 2004, Table 1, with references; M. Evans and Warburton 2007, 112, 123).

Prolonged heavy rainfall is typically a precursor to peat slides, bog flows and bog bursts. Natural drainage channels such as gullies and pipe systems become overwhelmed, in some cases leading to the liquefaction of the basal peat (e.g. Warburton *et al.* 2004, 140-3; Dykes and Kirk 2001; 396; 2006, 383-4; M. Evans and Warburton 2007, 26). The water pressure at the peat-mineral substrate interface can increase to the point where it supports some of the weight of the material above, reducing the frictional resistance to shearing (e.g. Dykes and Kirk 2006, 386).

Local topography is a significant compounding factor, with valleys and sloping ground (including 'low gradient slopes') increasing vulnerability (Dykes and Warburton 2007, 1842; see also e.g. Alexander *et al.* 1986; Boylan *et al.* 2008; Dykes *et al.* 2008). This typifies the landscape occupied by the north Mayo field systems (e.g. see Guttman 2005, 30; B. Lucas 2010). From interviews with the local community, Kneafsey (1995, 138) describes people's recollections of peat movements near Céide Fields:

The older people near Céide Fields can tell of how a family were once swamped by a bog burst in the locality, and in recent years the bog began to move once again, sliding down the hillside carrying with it trees and saplings, blocking the road between Ballycastle and Belderrig and creeping down the gully just beyond Céide to fall over the cliffs to the sea (*ibid.*, 138-9).

Another part of Co. Mayo fêted for its ancient field systems is the Pollatomish peninsula (e.g. Caulfield *et al.* 2009b; 2010). In September 2003, a major peat slide at Pollatomish was triggered by heavy rainfall (Long and Jennings 2006, 51; see Figure 3.15, below). Water rapidly transported to the base of the peat was prevented from percolating through the mineral substrate by 'hard pan' and impermeable bedrock. Soil pipes in the basal peat (ranging in diameter from 0.1 to 1 m) were overwhelmed, reducing the stability of the overlying peat (*ibid.*, 53-6).

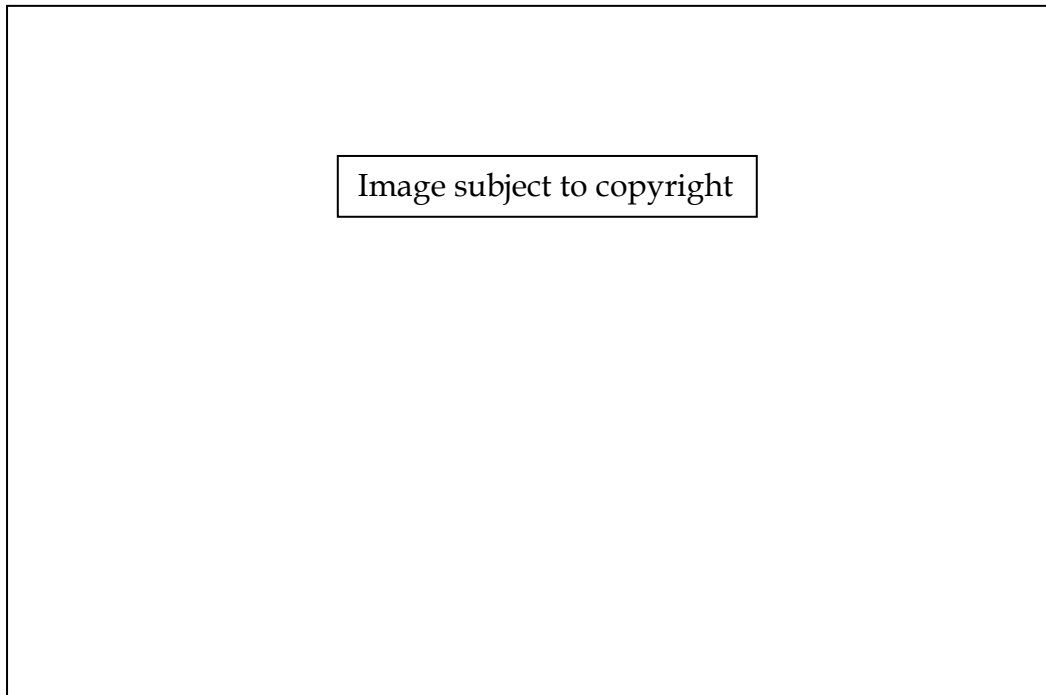


Figure 3.15: Peat slide at Pollatomish, Co. Mayo, in September 2003. After Long and Jennings (2006, Figure 4).

Archaeological evidence for the mass movement of peat in Ireland has been dated to the Early Bronze Age (Murray 1997). In his study of the prehistoric landscapes of Glencloy, Co. Antrim, Woodman (1983, 27) noted that 'many sites have disappeared in the Antrim Glens because of mud flows sweeping down into the valley bottoms.' During excavations near the mouth of the Belderrig/Belderg valley, to the east of Belderg harbour, Warren (2005) found considerable evidence for the downslope movement of peat. Soil analyses indicated that layers of peat may have

been introduced into the local soil structure by an upslope bog burst (Guttman 2005, 30; see Figure 3.16, below).

In Caulfield *et al.*'s analysis, samples UCD-C49 at Belderg More and UCD-C26 at Annagh More are both described as 'on top of' field walls. Sample UCD-C49 came from sloping ground near the mouth of the Belderrig/Belderg valley, see Figure 3.16, below). UCD-C26 was located on steeply sloping ground in the Ballinglen river valley (see Figure 3.17, below). Both these samples were therefore in areas particularly vulnerable to the kind of intense hydrological activity that destabilises peat (and material suspended within it).

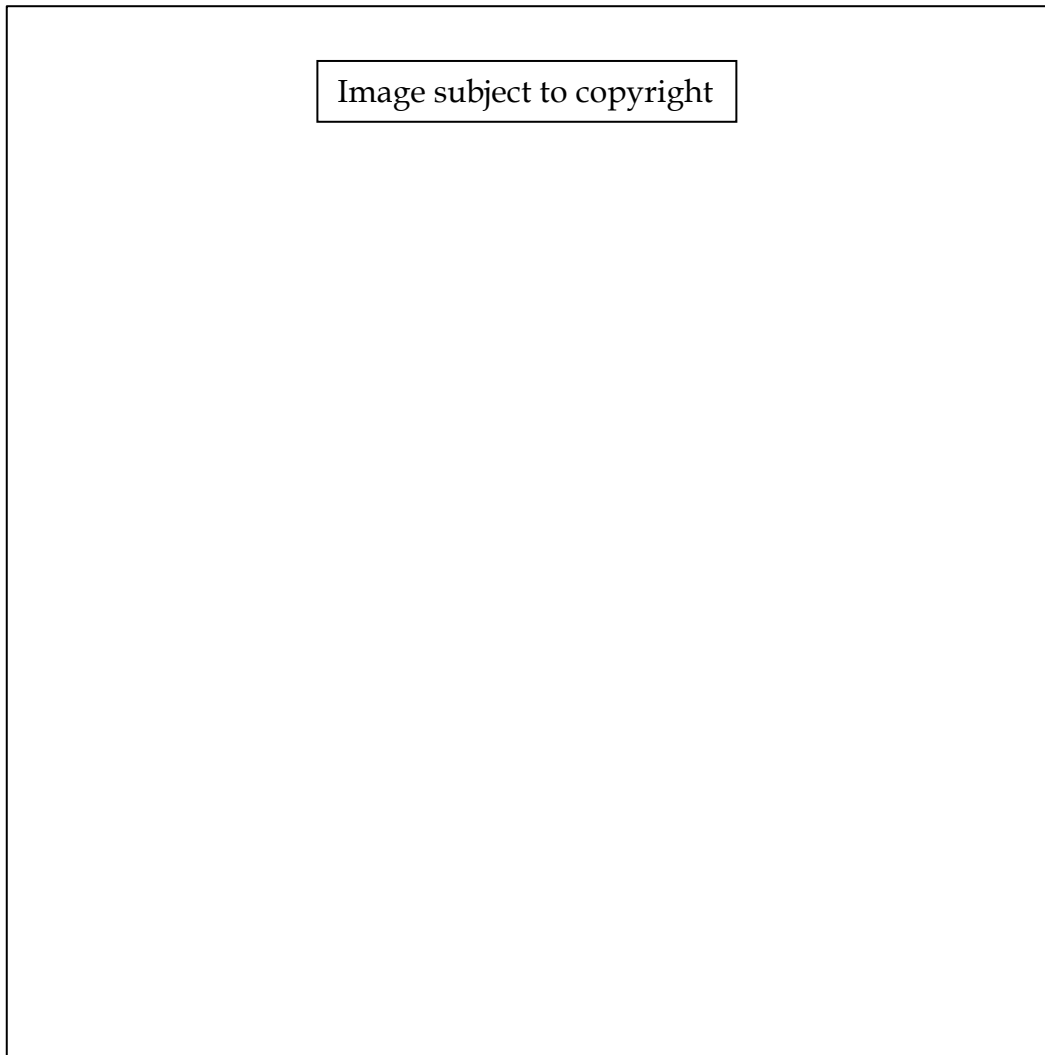


Figure 3.16: The location of the radiocarbon sample was on sloping ground near the mouth of the Belderrig/Belderg valley. Guttman's 2005 soil analyses were carried out nearby (marked by the dark blue square).

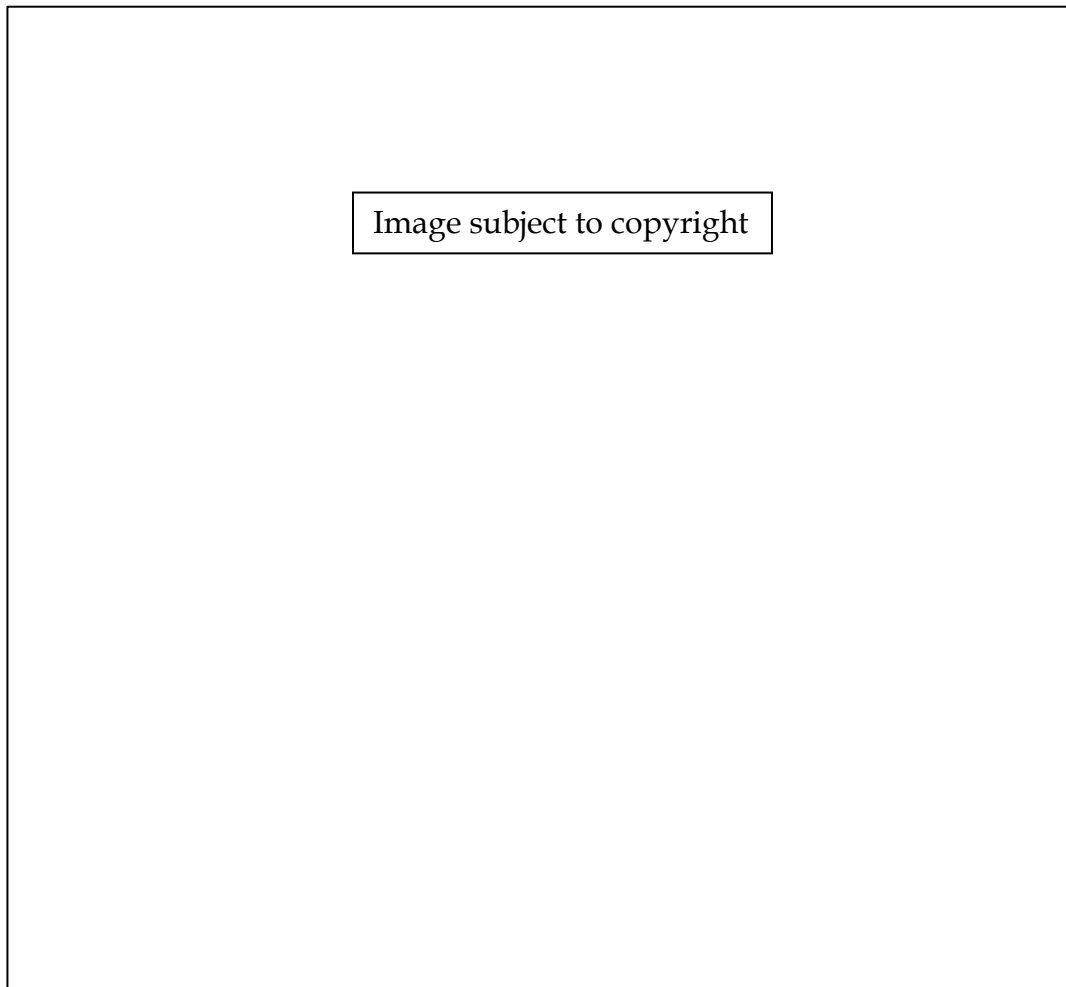


Figure 3.17: Sample UCD-C26 was recovered from steeply sloping ground in the Ballinglen river valley.



3.3.2.c Critique summary

The Céide Fields show a countryside that was systematically divided into regular coaxial field systems bounded by dry stone walls. On the Céide hill a series of parallel walls over 1.5km long divide the land into long strips, varying from 90m to 150m wide. To the west of the Céide Fields Visitor Centre these walls seem initially to follow the contour of the Behy valley and then continue over the spur of the hill onto the eastern Glenultra side merging with a second similar parallel system following the alignment of the Glenultra valley. This continues further eastwards onto the next hillside. The width of each strip remains remarkably consistent, despite 'meanders' in the walls.

B. Lucas (2010, 1)

Neither of the dated samples that are in contact with field walls were recovered from the Behy/Glenultra field system on Céide hill – ‘the regular ladder patterns of Céide that dominate the imagination’⁴. Sample UCD-C49 came from Belderrig: ‘7 km west of Céide Fields’; sample UCD-C26 came from Annagh More: ‘8 km to the east of Céide Fields’. These are not areas where the coaxial field have been recorded. The conflation of Céide Fields with these separate areas is apt to confuse (see Figure 3.18, below).

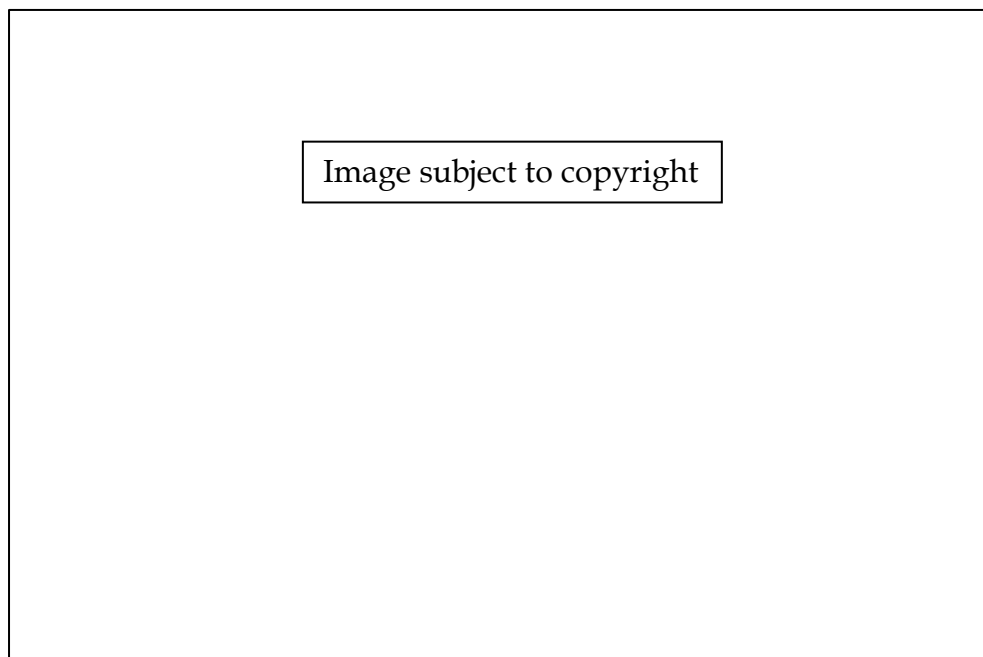


Figure 3.18: Samples UCD-C49 and UCD-C26 are c. 14 km apart. Both are several kilometres from the recorded coaxial field system of Céide Fields. (Caulfield et al. 1998, Figure 2, is inserted to scale – the recorded coaxial field system is top left; see also Figure 3.4 above.)

Overlying peat does not automatically confer ‘pre-bog’ status on an object or feature. *All* deposits of oceanic blanket peat on sloping ground should be assumed to include redeposited material. For this reason such deposits are poorly suited for pollen analysis (see next Section). The coastal hills and valley-side locations of many of the dated samples are prone to soil-creep and the large-scale movement of peat. Hydrological activity—particularly at the interface with the mineral soil, and along conduits (be they natural drainage channels or ancient walls)—prevents ‘sealed’ contexts within the bog remaining undisturbed. Saturated peat has negligible compressive strength. During wetter periods, an undrained bog will provide poor support for stone piled upon it.

The assumption that genuinely pre-bog walls *must* be Neolithic is a logical error. Much of the blanket peat within the core area of Céide Fields did not form in the Neolithic: ‘in the area of the [Céide Fields] Visitor Centre, peat growth did not begin until the turn of the second and first millennia’ (Cooney *et al.* 2011, 616). Peat growth can be strongly asynchronous over very short distances (see Sections 3.3.3.b, c and d, below). The age of material in peat ‘near’ a field wall is of little value in assessing the age of the field wall (conceivably a structure which served to cordon-off areas of deep and unstable peat).

The stratigraphy of peatlands across north Mayo has proven an unreliable guide to relative date. In part, this is due to the inherent instability of blanket peat on exposed coastal slopes (particularly during wetter, accumulative phases). Careful and complete excavation and recording of proxies to be dated as well as the archaeological feature or object with which the proxy is associated is essential in seeking to understand the relationship between the two. Even in these circumstances, the suitability of oceanic blanket peat as a context for secure relative dating would remain in question. The potential sources of error increase with the

distance between the proxy and the archaeological feature or object to be dated.



3.3.3 Dating evidence from Molloy and O'Connell 1995/ O'Connell and Molloy 2001

It is noteworthy that there is considerable evidence not only from GLU IV and the BHY series of profiles, but also from other sources, for mid/late Bronze Age settlement in the N. Mayo region.

Karen Molloy and Michael O'Connell (1995, 221)

In tacit recognition of the inconsistencies within the 1998 study, Cooney *et al.* (2011, 622) conclude that '[t]he establishment of the Céide Fields is best dated by the start of the major clearance episode visible in the Glenulra pollen record'. This refers to the palynological investigations first published in Molloy and O'Connell 1995, and supplemented by O'Connell and Molloy 2001.

Importantly for the present study, Molloy and O'Connell's objective was *not* the dating of the field systems. Rather, their efforts were directed at establishing the 'effects on the natural environment of Neolithic and later farming activity' (1995, 189; 2001, 99). The majority of their fieldwork did not take place in direct association with archaeological remains. In the one instance where dated samples were extracted from the context of a field wall (see discussion concerning profile CF 1b, below), the evidence suggests a construction date in the later Bronze Age.

That there were 'Neolithic fields in Glenulra townland' [the focal area of their study] is accepted as a predetermined fact, based upon the *archaeological record* (e.g. 1995, 189). In what follows, it will be argued that in the absence of the firm archaeological position, the palaeoenvironmental record might be interpreted very differently (cf. Cooney 1999, 48).

Pollen cores

In seeking the palaeoenvironmental signatures of the *established* phenomenon of Neolithic farming at Céide Fields, Molloy and O'Connell extracted soil cores from the townlands of Behy and Glenulra (see Figure 3.19, below). Within the cores, stratigraphical horizons representing discrete palaeoenvironmental phases ('pollen zones') were determined. Samples from selected horizons were dated using conventional radiocarbon dating. The available dates for each core were then fitted to a curve in a 'time/depth' graph. 'The mid-point of the calibrated age range at 1 σ [68%] confidence limit [was] used to construct age/depth relationships...' (2001, 100).

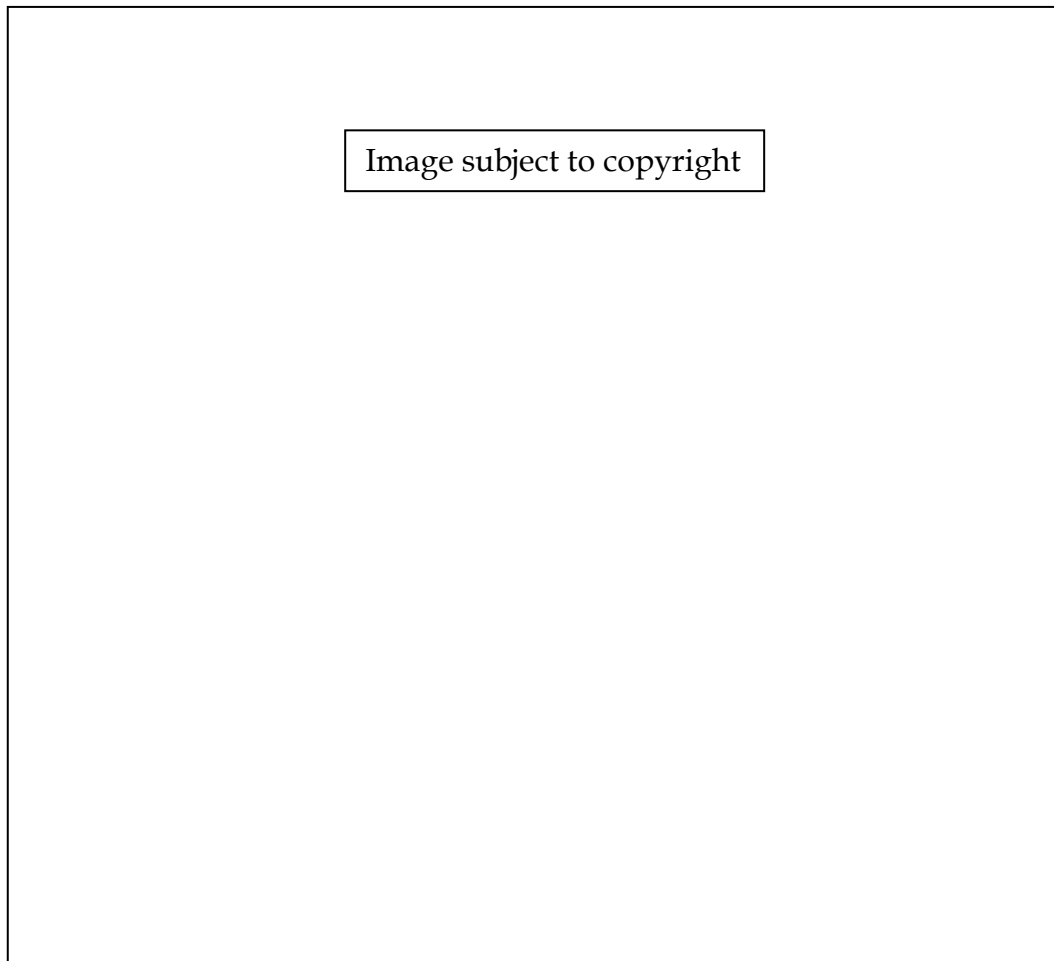


Figure 3.19: Location of pollen cores. 1=Behy megalithic court tomb; 2=Glenulra enclosure; 3=BHY III; 4=BHY IV; 5=BHY V; 6=BHY VI; 7=CF Ib and CF III. GLU IV identified on map. After O'Connell and Molloy (2001, Figure 2).

The taxonomy and abundance of pollen grains within identified pollen zones were plotted in pollen diagrams to provide an indication of the relative proportion of species in the landscape at different points in time.

Six 'short cores' were analysed using this method (cores CF 1b, CF III, BHY III, BHY IV, BHY V and BHY VI). A single 'long core' (GLU IV) was extracted from the deep peat of the Glenultra basin.

Some of the constraints on this method are discussed in the critique which follows. Importantly, the temporal resolution of the pollen zones assigned to the Neolithic is especially poor. The production and dispersal of different pollen types vary depending upon myriad species-dependent characteristics and the prevailing environmental conditions (such as the size of different habitats, and the length of time those habitats existed). The proximity of different habitats at different times will generally be unknown. Topography will influence results, particularly where (as at Glenultra) a drainage feature is the site of the analysis, as water flowing into that feature will have carried pollen (e.g. Edwards 1979, 257-8).



3.3.3.a. Short pollen cores CF 1b and CF III

Short cores CF Ib and CF III were extracted from site of field wall excavation 30 m south-west of the visitor centre (see Figure 3.20, below):

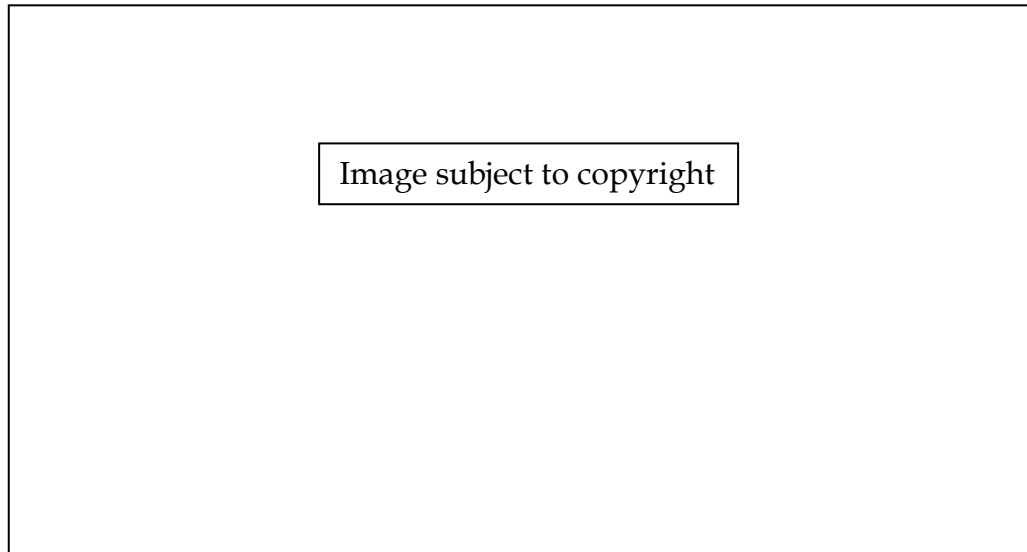


Figure 3.20: Positioning of cores CF Ib and CF III in relation to field wall. After Molloy and O'Connell (1995, Figure 17).

No radiocarbon dates were obtained for CF III due to the dearth of organic material in the cored soil. The three radiocarbon dates recorded from peat samples in profile CF 1b were as follows:

Table 3.6: Radiocarbon dates from pollen core CF 1b. After Molloy and O'Connell (1995, Table 2); cal BC dates after Cooney et al. (2011, Table 12.6).

Lab code	Sample	Height above mineral soil (cm)	¹⁴ C years BP	¹⁴ C years cal BC
GrN-20631	CF I-1	0-1	2760±40	1010-810
GrN-21116	CF I-3	1-2	2870±40	1200-910
GrN-20632	CF I-2	7-8	2250±50	410-190

Clearly there is no evidence for Neolithic activity here. It follows that the site of the Céide Fields visitor centre, and other areas with similarly thin coverings of peat, 'probably remained free of bog until at least the late Bronze Age' (O'Connell and Molloy 2001, 101; Molloy and O'Connell 1995, 213).

3.3.3.b Archaeological soil sample

Molloy and O'Connell were provided with a soil sample of infill material from (presumed Neolithic) plough marks, revealed during excavations in the vicinity of the site of the Céide Fields visitor centre (1995, 195, 214-15). The sample came from north of the visitor centre, c. 55 m from the site of pollen profile CF 1b. A single radiocarbon date (GrN-20032) from this material dated the plough marks to 2390±40 BP, recalibrated as 750-380 cal BC (1995, 215; Byrne *et al.* 2009a, 25). Hence, 'surprisingly' (Byrne *et al.* 2011, 83), the plough marks were deemed 'Iron Age rather than Neolithic' (Molloy and O'Connell 1995, 215).

This Late Bronze Age/Iron Age date is supported by Molloy and O'Connell's analysis of six pollen spectra from the soil sample (1995, 214-15; Byrne *et al.* 2011, 83), as well as the evidence from core CF1b (the only dated peat samples in direct association with a field wall). The archaeologist that supplied the sample, however, has since commented that 'there is a high possibility of contamination from this soil sample' (Byrne *et al.* 2009a, 25). There was no suggestion of contamination at the time (Karen Molloy, personal communication).

Molloy and O'Connell's finding that 'the initiation of peat growth over the Céide Fields was diachronous' (2001, 101) is of great significance to the dating of the archaeological remains. The assumption that peat inundated the field system during the Neolithic (e.g. Caulfield 1978a, 142-3; 1983, 195-6; Caulfield *et al.* 1998, 639)—that 'pre-bog' (more correctly, *beneath* bog) translates to Neolithic—is unsound. Leaving aside arguments about the cogency of the stratigraphy, large parts of Céide Fields and environs saw no peat growth during the Neolithic.

Excavations at the visitor centre – ‘centrally located in what appears to be one of the most complete parts of the system’ (Byrne *et al.* 2009a, 5) – indicate that this area remained peat-free into the Bronze Age. Table 3.7, below, details the radiocarbon dates obtained from samples extracted from beneath the peat during the excavations. Six bulk charcoal samples pertaining to three separate features were dated by the UCD radiocarbon laboratory during 1990s. Eight new dates from short life samples recovered from these same three features, this time obtained from short life samples confirm the ‘striking’ (Byrne *et al.* 2011, 129) extent of Early Bronze Age evidence in sub-peat contexts at the heart of the presumed Neolithic field system.

Table 3.7: Radiocarbon dates from the Céide visitor centre excavations. After Byrne *et al.* (2011, Table 41).

Lab code	Cutting	Context	Specimen	¹⁴ C years cal BC
UB-18598	25	Charcoal layer	<i>Betula</i> sp.	2139-1957
UCD-0268	25	Charcoal layer	Bulk charcoal	2200-1890
UCD-0271	25	Charcoal layer	Bulk charcoal	2460-2040
UCD-0272	10B	Charcoal spread	Bulk charcoal	2470-2140
UCD-0267	10B	Charcoal spread	Bulk charcoal	2470-2140
UB-18597	10B	Charcoal spread	<i>Corylus avellana</i>	2434-2131
UBA-16460	C	Charcoal spread	<i>Betula</i> (charcoal)	2296-2126
UB-18596	H	Burnt organic layer	<i>Betula</i> sp.	2203-2030
UCD-0269	H	Charcoal spread	Bulk charcoal	2140-1770
UCD-0270	H	Charcoal spread	Bulk charcoal	2200-1890
UBA-16675	H	Charcoal spread	<i>Betula</i> (charcoal)	2459-2207
UB-18595	H	Fill of shallow trench	<i>Ilex aquifolium</i>	2332-2137
UBA-16461	H	Fill of ash pit	<i>Maloideae</i> (charcoal)	2873-2501

It follows that ‘the extensive and remarkably regular system of stonewall-bounded fields centred on the townlands of Behy and Glenulra’⁵ were at least in part constructed on ground that remained peat-free into the Bronze Age.



3.3.3.c Short cores BHY III, BHY IV, BHY V and BHY VI

The evidence from short cores BHY III, BHY IV, BHY V and BHY VI further demonstrate the variability in peat growth. Neither BHY IV or BHY V contained peat dated to the Neolithic. As discussed above (Section 3.3.2.a), the re-dating of a sample of basal peat from the BHY-III core did return a date which falls with the final centuries of the Neolithic (BHY III-1: 4110±40 BP, recalibrated as 2879-2490 cal BC by Cooney *et al.* 2011). This is almost identical to the date returned for peat at 5-8 cm in profile BHY VI (400m north-west of Behy court tomb) (see Table 3.8, below). However at a comparable height of 5-6 cm, the new BHY-III sample date is clearly Bronze Age (3870±25 BP, recalibrated as 2470-2210 cal BC by Cooney *et al.* 2011).

The remaining sample from BHY VI—10-13 cm above the mineral substrate—returned a date range beginning *circa* five centuries after the end of the Neolithic (3540±50 BP, recalibrated as 2030-1740 cal BC by Cooney *et al.* 2011). While these dates were not recorded in the context of field walls, they demonstrate the imprecision of the dates derived from peat and the variability in the stratigraphy over relatively short distances.

Table 3.8: Radiocarbon dates from pollen core BHY VI. After Molloy and O'Connell (1995, Table 2); cal BC dates after Cooney et al. (2011, Table 12.6).

Lab code	Sample	Height above mineral soil (cm)	¹⁴ C years BP	¹⁴ C years cal BC
GrN-20027	BHY VI (1)	5-8	4080±50	2880-2470
GrN-20028	BHY VI (2)	10-13	3540±50	2030-1740



3.3.3.d The Glenulra long core

The interpretation of the course of environmental change during the Neolithic at Céide Fields is largely based on the evidence from the Glenulra long core (GLU IV), which was sited in the Glenulra valley approximately one kilometre south-east of the visitor centre. Although at a remove from the established field systems (see Figure 3.21, below), the unusually deep basin peat ‘offered the opportunity of obtaining a core, the base of which might predate the laying out of the field system’ (Molloy and O’Connell 1995, 194).

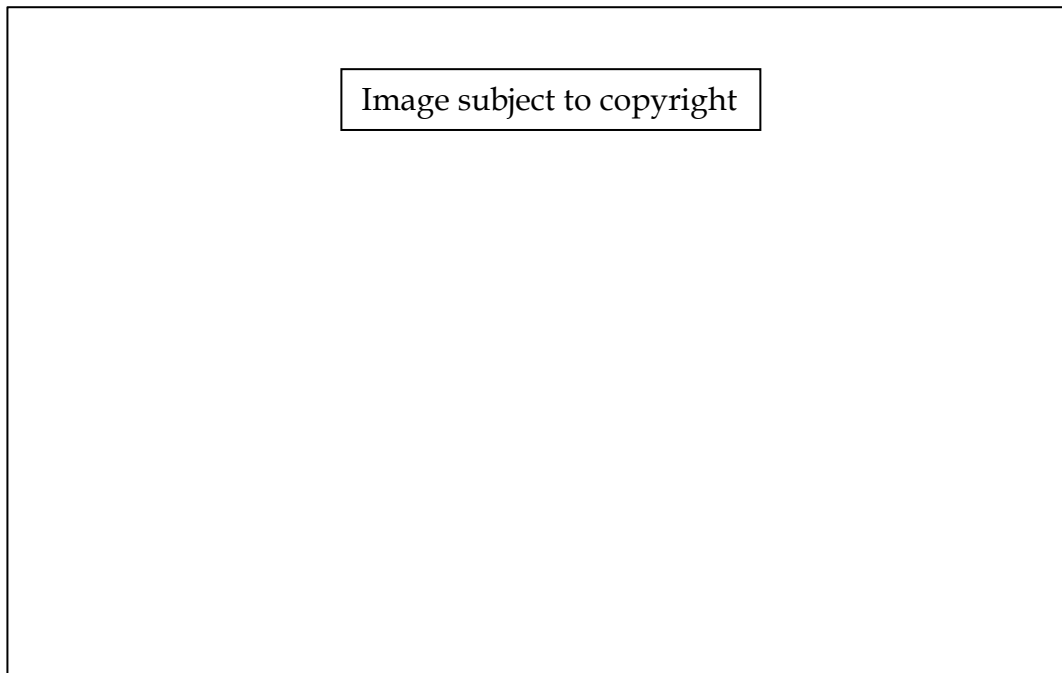


Figure 3.21: ‘3D model, with 2x vertical exaggeration, showing Ballyknock (left) and Céide Hill (right)’. After Warren (2011, Figure 3). The approximate location of the Céide Fields visitor centre, as well as the location of sample UCD-C40, have been added by the present author.

The Glenulra basin was found to be ‘hummocky’, the floor being ‘locally very uneven...exemplified by the varying depths of peat recorded’ (*ibid.*, 197). ‘Stratigraphical investigations in the basin suggest that in the Neolithic the peat body was less than 100 m wide (O’Connell and Molloy

2001, 103).’ While confines of the basin were relatively well suited to the techniques of pollen analysis, conditions within are not representative of those prevailing across the field systems on the slopes of Céide hill. Extrapolation from an inevitably atypical microcosm across the wider heterogeneous environment must invoke significant risks (cf. e.g. Edwards and Hirons 1982, 33; Kuder and Kruge 1998, 1366).

Because the accumulation of peat is not uniform, the time/depth relationship is inevitably complex. Local conditions may also result in peat growth being retarded or eroded at particular times, while the adjacent areas of mire expand (e.g. Blackford 1993, 50). However, a simplified model is adopted for the purposes of the pollen profile (Molloy and O’Connell 1995, 197-201). Molloy and O’Connell estimate that their results ‘can be expected to accurately reflect local vegetation and land-use dynamics within a *c.* 500 m radius’ (O’Connell and Molloy 2001, 103). The edge of the main concentration of field walls peters out *c.* 500m to the west (see Figure 3.14).

Radiocarbon dates were obtained from bulk samples of peat at various depths in the core (see Table 3.9, below). Precise details as to whether chemical, physical or combined fractions were dated are not available (Karen Molloy pers. comm., 12 March 2015). Molloy and O’Connell were satisfied that based on the ‘the mid-point of the calibrated age range at 1 σ [...] apart from the lowermost date, i.e. 5100 \pm 80 BP, there is good internal consistency in the ¹⁴C dates’ (Molloy and O’Connell 1995, 198). However, the extent to which this has been established is a debateable point. The very large error margins do provide scope for interpolation, but below 450 cm (the depths attributed to the earlier Neolithic) two of the five date ranges indicate reversals in the stratigraphy.

The use of conventional radiocarbon dating necessitated the use of bulk samples. Blackford (2000, 194) cautions that the level of precision attainable, with error margins typically in the region 'of between 200 and 500 years...is inadequate for accurate correlation of cores, estimation of rates of change, linkage with other proxy climatic records or the analysis of causal mechanisms'. The chances of the mid-points of even the calibrated age ranges at 1σ representing true calendar ages are practically zero (Taylor 1987, 123). The large error margins quoted are in addition to the one-in-three chance of the dates falling outside the stated range altogether at 1σ . And this assumes there has been no contamination of the samples, and that all other potential sources of error have been avoided. The uncertainty concerning precisely which constituents of the peat samples were dated renders such assumptions optimistic.

Table 3.9: Radiocarbon dates from pollen core GLU IV. After Molloy and O'Connell (1995, Table 2); cal BC dates after Cooney et al. (2011, Table 12.6).

Lab code	Sample	Depth (cm)	^{14}C years BP	^{14}C years cal BP	^{14}C years cal BC
GrN-21636	GLU IV-12	255 to 258	2890±50	2998±106	1260-970
GrN-21121	GLU IV-5	289 to 293	3310±60	3545±77	1750-1440
GrN-21635	GLU IV-11	319 to 322	3510±50	3767±65	1960-1690
GrN-21120	GLU IV-4	351 to 355	3890±60	4324±84	2570-2150
GrN-21634	GLU IV-10	387 to 390	4070±60	4624±184	2880-2460
GrN-21119	GLU IV-3	402 to 406	4110±60	4670±147	2890-2480
GrN-21633	GLU IV-9	440 to 444	4470±60	5133±149	3370-2910
GrN-21118	GLU IV-2	448 to 452	4550±60	5183±127	3500-3020
GrN-21632	GLU IV-8	459 to 462	4500±60	5166±120	3370-2930
GrN-21117	GLU IV-1	486 to 490	4840±60	5565±83	3710-3510
GrN-21631	GLU IV-7	494 to 497	5170±60	5878±112	4230-3800
GrN-21630	GLU IV-6	515 to 518	5100±80	5835±87	4050-3700

The stratigraphic record for core GLU IV is reproduced below (Table 3.10). The lowermost strata of core GLU IV are not used in the subsequent analysis. The strata from ‘an overlapping part’ (520 cm+) of a separate core—GLU Ila (analysed during preliminary investigations)—were deemed representative, and are presented in Molloy and O’Connell’s findings as part of GLU IV (p.218). The precise proximity of GLU Ila to GLU IV is not recorded. The stratigraphic record for core GLU Ila is also included in Table 3.10.

Table 3.10: Stratigraphic record of core GLU IV and basal strata of core GLU Ila. After Molloy and O’Connell (1995, Table 3).

Depth (cm)	Stratigraphy
<i>Profile GLU IV</i>	
81 - 160	Highly fibrous <i>E. vaginatum</i> peat with a loose consistency
160 - 190	Darker peat; mat of fibres at 165-166cm
190 - 205	Fine brown peat with few fibres
205 - 241.5	Red-brown peat with fine woody roots
241.5 - 243	Fine black peat
243 - 300	Fine brown peat; woody roots present at 243-252cm; darker between 280-285cm
300 - 377	Rich chocolate brown, uniform, somewhat fibrous peat; more fibres in bottom 20cm
377 - 474	Peat of looser consistency; tufts of <i>E. vaginatum</i> fibres between 398-406 and 465-471cm; <i>E. vaginatum</i> present in smaller quantities between 455-465cm; small twigs and roots at 410 and 437cm; peat somewhat darker below 406 cm and finer in interval 430-443cm
474 - 500	Compact, red-brown, fibrous peat
500 - 511	Brown wood-rich peat; <i>Betula</i> twigs at 502-503cm; <i>Betula</i> wood (large) at 507-508cm
511 - 530	Dark charcoal-rich peat ; charred wood fragment at 520 cm
530 - 558	Fine, dark brown peat; few fibres; small fragments of <i>Betula</i> wood between 545-546cm
558 - 583	Fine, dark peat; more compact below 570cm
<i>Profile GLU Ila</i>	
457 - 485	Fibrous brown peat, poorly compacted
485 - 486	Compact, red-brown, fibrous peat
486 - 498	Not recovered because of fibrous nature of peat
498 - 512	Brown, fibrous peat; 498-509cm very fibrous and of looser consistency with small fragments of <i>Betula</i> frequent (<i>Betula</i> twig at 502cm); 510-512cm darker in colour
512 - 526	Dark, charcoal-rich peat; particularly dark between 519-526cm
526 - 557	Dark brown, fine peat with few fibres
557 - 575	Dark, fine, peat and particularly compact between 566-575cm

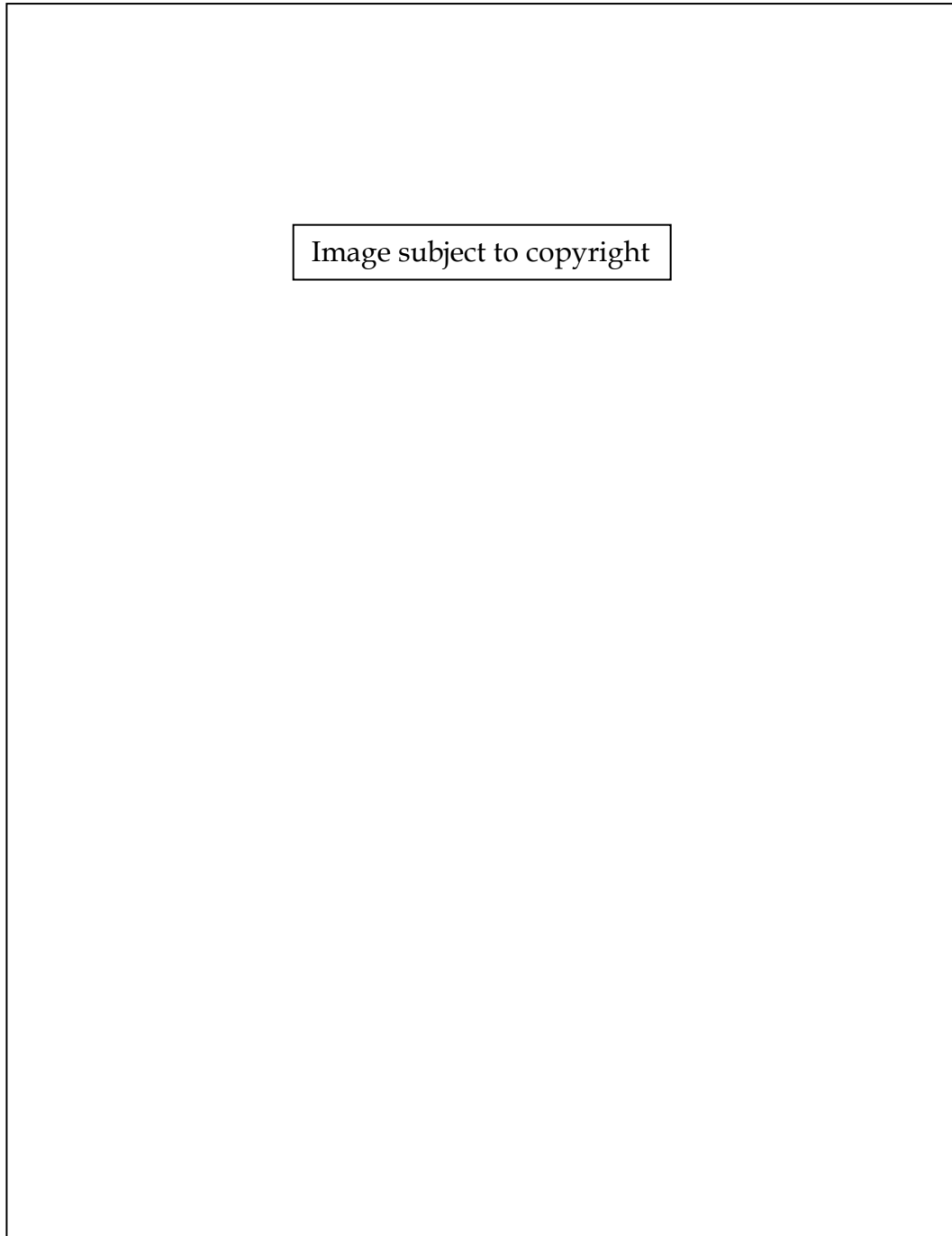


Figure 3.22: Schematic representation of stratigraphic model incorporated into a time/depth relationship graph (A) with local pollen assemblage zones (B). '[T]he ^{14}C dates are calibrated, the mid-point and one standard deviation at either side of the mid-point is indicated by a vertical line and a horizontal bar, respectively. Filled-in bars and circles (mid-point between two ^{14}C dated sample) are used to denote that the points in question are end points of the straight line segments employed in construction of the chronology.' After Molloy and O'Connell (1995, Figure 5).

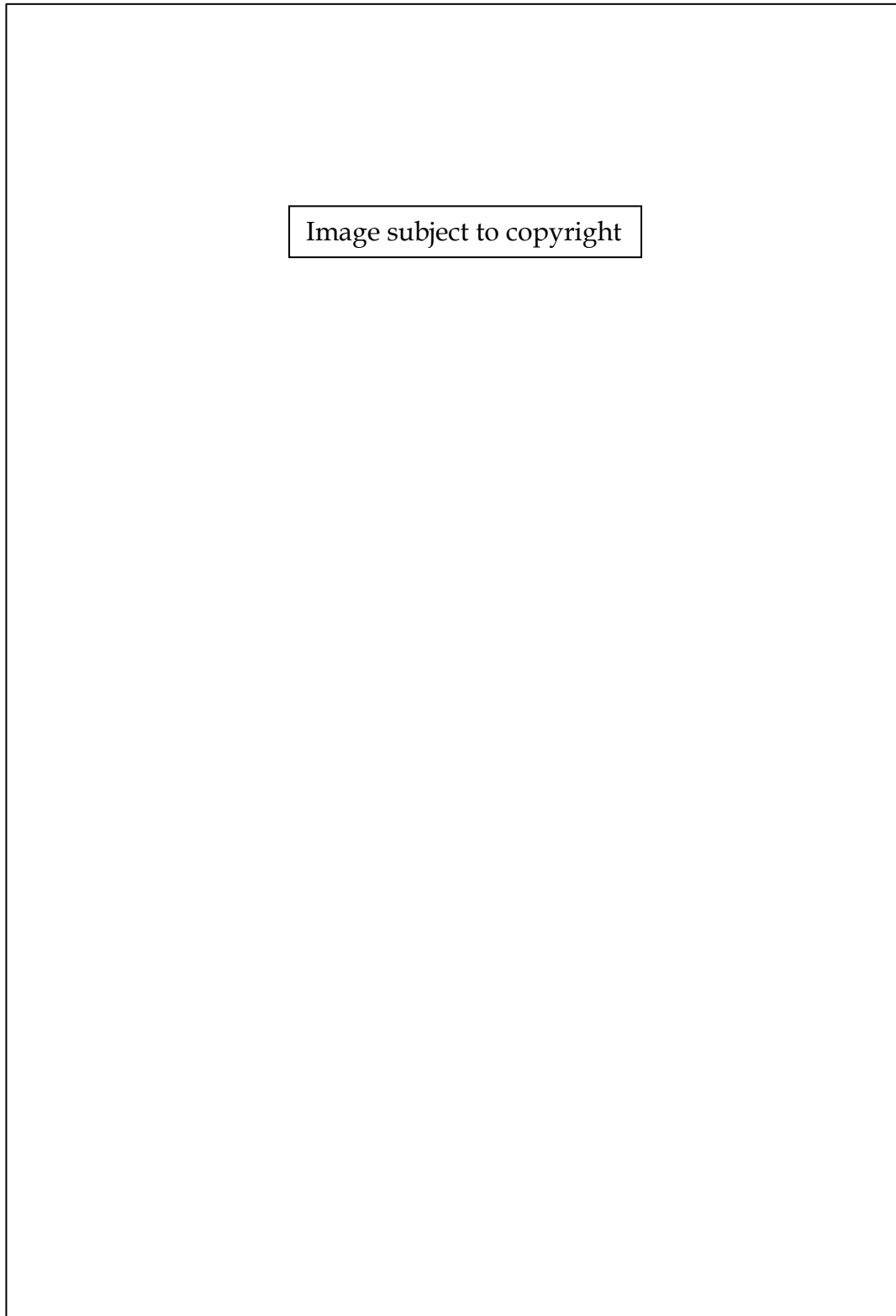


Figure 3.23: Percentage pollen diagram for core GLU IV. After O'Connell and Molloy (2001, Figure 5).

The stratigraphic record is of course a subjective assessment, unlikely to accord precisely with the views of other researchers, and difficult to replicate. The layers/horizons are represented visually in the left-hand column of Figure 3.22, above, where they are mapped onto the time/depth model. The local pollen assemblage zones (LPAZ) are shown in the right-hand column. These form the basis for the Percentage Pollen Diagram (Figure 3.23).

The pollen zones detailed in the Percentage Pollen Diagram represent the key stages of environmental change, *as determined by the researchers*. The necessarily subjective definition of pollen zones is an intractable problem. Questionable assumptions can become entrenched:

In regions where many pollen studies have been carried out, zonation schemes tend to be self-perpetuating, gradually taking on auras of accuracy and generality that they have not earned on their merits (Dincauze 2000, 356).

In some studies, computerised algorithms have been employed to try to overcome the inevitable 'sub-conscious bias' (Birks and Birks 1980, 169) in the drawing of zonal boundaries (e.g. see C. Jensen *et al.* 2002). However, pollen deposition and survival is subject to many variables across even short intervals in time and space. These include:

local factors [such] as topography (relief and elevation), catchment size, depositional environments, soils maturity, disturbance and successions within plant associations, competition, pathogens, consumer effects (herbivory), and human interference with the physical and biological environments (Dincauze 2000, 359).

Just how far it is possible to make inferences about the past environment from pollen data is 'a vexed question' (Lowe and Walker 1997, 172). Edwards (1979, 259) cautioned that pollen zones cannot 'be imbued with anything other than the most general ability to predict chronological relationships'. The earlier Neolithic, as represented in Molloy and

O’Connell’s time/depth model, corresponds with ‘the weakest part of the chronology’ (2001, 116). Defining pollen zones based on the observed stratigraphic units from this time is demonstrably problematic.

However, at Céide Fields, the expectation was that earlier Neolithic farming activity *should* be recognisable in the pollen record. The archaeological evidence for Neolithic farming was deemed ‘unequivocal’ (e.g. Caulfield *et al.* 1998, 630, 639). This introduces the risk of a naturally occurring environmental change (such as a reduction in tree cover) being attributed to human intervention due to its loose temporal correspondence with the archaeological findings. As Dincauze observed:

For pollen diagrams representing NAP [non-arboreal pollen] influx as well as tree pollen, zones may be defined in such a way as to reflect human interference with natural systems—a desirable product for archaeology (2000, 357).



3.3.3.d.i Pollen zone 4 (depth 526-502 cm)

In the ‘pre-Neolithic environment’ of zone 4 (see left-hand column of Figure 3.23, above), Molloy and O’Connell presume a ‘fully wooded landscape with pine playing a dominant role’ (2001, 103-4). A single radiocarbon date—GLU IV-6 falls within this zone (5835±87 cal BP at 515-518cm; recalibrated by Cooney *et al.* 2011 to 4050-3700 cal BC). The median value within the large error margin (rounded to 5840 cal BP) is used to define the end point of zone 4 at *c.* 502 cm (1995, 198).

It is at *c.* 5m that Molloy and O’Connell encountered a layer of timber while coring, presumed to be pine stumps (1995, 202). They align their dating of the pre-Neolithic woodland with Caulfield *et al.*’s 1998 findings on the basis of an outlying (early) date attributed to a pine sample: UCD-C44 (5370±70 BP, recalibrated by Cooney *et al.* 2011 to 4350–3990 cal BC).

3.3.3.d.ii Pollen zone 5 (depth 498-450cm)

Within this zone Molloy and O’Connell describe ‘a major expansion of NAP and especially *Poaceae* and *P. lanceolata*, and a decline in AP’. This is the zone in which Molloy and O’Connell’s evidence for Neolithic farming begins and ends. Three subzones are identified.

Subzone 5a (498-494 cm)

This section of the biostratigraphy is seen to represent ‘the beginning of the main landnam event—woodland clearance in the context of early farming’ (2001, 104). Again, just one radiocarbon date falls within this subzone. GLU IV-7 (494-497cm) was dated to 5878±112 cal BP (recalibrated by Cooney *et al.* 2011 to 4230-3800 cal BC). The large error margin enables the date of this sample to be placed in position above GLU IV-6, and in the range 5840–5660 cal BP (2001, 104). Molloy and O’Connell concede that ‘this part of the profile has rather low temporal resolution’ (2001, 104).

Subzone 5a sees a return to ‘more typical wet bog conditions and relatively fast and steady peat accumulation’ within the Glenulra basin (1995, 203). The ‘substantial rise’ in *Cyperaceae* [sedges] is indicative of an ‘increasingly wet bog surface’ (*ibid.*, 202). ‘*Sphagnum* began to play an important role, pine was no longer growing in the basin... (2001, 104). The increase in *Poaceae* (grasses) is ‘relatively modest’ as ‘would be an expected consequence of increased bog surface wetness and the local establishment of *Sphagnum*’ (1995, 203). Nevertheless, Molloy and O’Connell conclude that the decline in AP and the increase in NAP are ‘best ascribable to Neolithic [human] clearance’ (*ibid.*, 203). They do, however, caution that:

Precise reconstruction of the vegetation developments recorded in subzone 5a is difficult because several interacting changes are occurring in the pollen record at the same time. The decline in *Ulmus*

[Elm] accompanied by a continuous curve for *P. lanceolata* [plantain] [...] suggests that the classical Elm Decline, datable to *c.* 5100 B.P., is represented here. The large decline in percentage representation of *Pinus* pollen will, of itself, result in increased percentage representation of the remaining taxa including NAP. This will be especially so if, as presumed here, a considerable proportion of the pine pollen in the previous zone has arisen from pine growing on the mire surface (*ibid.*, 203).

There are two clear *natural* reasons for the reduction in the proportion of arboreal pollen recorded in subzone 5a: first, the decline in the number of Elm trees (due to disease); second, the decline in the number of pine trees (due to peat accumulation and the increased wetness of the bog within the Glenultra basin). The increase in the proportion of non-arboreal pollen was the inevitable corollary. Recourse to human intervention is not necessary to explain these changes.



Subzones 5b (490-474 cm) and 5c (470-450 cm)

One radiocarbon date was recorded within subzone 5b: GLU IV-1 (486-490 cm) dated to 5565±83 cal BP (recalibrated by Cooney *et al.* 2011 to 3710-3510 cal BC). Subzone 5c incorporates two radiocarbon dates: GLU IV-8 (459 to 462cm) dated to 5166±120 (recalibrated by Cooney *et al.* 2011 to 3370-2930 cal BC); GLU IV-2 (448 to 452cm) dated to 5183±127 (recalibrated by Cooney *et al.* 2011 to 3500-3020 cal BC). Temporal resolution clearly remains a significant problem. While (arguably) the Elm Decline provides a fixed temporal point at the beginning of subzone 5a (O'Connell and Molloy 2001, 104), there are no reliable temporal markers in subzones 5b and 5c. As such, the observed biostratigraphy is floating within the chronology.

Sphagnum remains at elevated levels for much of subzone 5b, declining towards the beginning of 5c. This indicates that the wet conditions that led to the accumulation of the bog—and the corresponding decline in pine pollen—in subzone 5a remain. Nevertheless, for O’Connell and Molloy, the lower proportion of arboreal pollen during subzone 5b is attributable to the ‘most intensive farming phase’:

The exceptionally low AP and high NAP representation (average values 29% and 57% respectively) in subzone 5b suggests widespread deforestation near the basin and also in the wider landscape (most likely $\geq 1\text{km}$ radius) as a result of intensive farming and presumably a relatively dense settlement pattern. Because the regular layout of the extensive field walls required an open landscape, it is likely that the main field system was laid out during this time (2001, 104).

This is quite an interpretive leap, and reflects the extent to which the interpretation of the palaeoenvironmental data is premised on the interpretation of the archaeological data: assuming that the field systems *must* have been laid out during the Neolithic, this is when the environmental conditions best correspond. (The accumulating bog was apparently of no consequence to the pioneering wall-builders.) It also highlights the spatial limitations on the applicability of the proxy data (here doubled from the ‘c. 500 m radius’ estimated on their previous page). The relative contributions through time of the immediate (atypical) microhabitat, versus wind-blown pollen, versus inwash from the surrounding higher ground cannot be known.

The ‘high Cyperaceae values’, ‘abundant *Sphagnum*’, ‘high Cyperaceae’ and ‘*Hydrocotyle* [pennywort] pollen’ recorded in the earlier part of subzone 5b decline towards the midpoint, which ‘suggests some drying out of the bog surface which had been quite wet’ (1995, 2003). This corresponds with an increase in NAP species indicative of grassland, which ‘might reflect heath developing on the surrounding mineral soil’

(*ibid.*): a natural response to the drier conditions. Molloy and O’Connell’s preferred explanation is, however, ‘deforestation’ by farmers.

‘The major phase of Neolithic farming activity is recorded in subzones 5b and 5c’ is characterised by increases in the proportion of pollen from particularly Poaceae (grasses; a.k.a. Gramineae) and *Plantago lanceolata* (ribwort plantain), as well as other grassland species such as *Ranunculus* (buttercup) and ‘*Rumex*-type’ (dock) (2001, 104). However, the open spaces on and around the drying bog will inevitably have been populated by native grasses. By the same token, ‘weed’ species indigenous to Irish grassland such as plantain, buttercup and dock cannot be assumed to indicate farming (cf. e.g. Behre 2007, 206). As Molloy and O’Connell (1995, 216) note, all of these species were present in the Céide Fields landscape before the formation of the bog.

In predictable succession, the recovering landscape sees an increase in arboreal pollen in subzone 5c. *Corylus* (hazel) ‘which can regenerate rapidly’ shows an especially strong recovery (2001, 104). Rather than indicating ‘a reduced, though still substantial, level of farming’ (*ibid.*), this can be seen as the natural response to the continuing drier conditions.



Cereal-type pollen in zone 5

O’Connell and Molloy see the predominance of pollen indicative of grasslands during the ‘Neolithic farming’ phase as confirmation of Caulfield’s hypothesis that the Céide Fields economy was ‘strongly pastoral’ (2001, 104). As has been discussed, pasture is generally indistinguishable from natural open landscapes in the pollen record.

Cereal pollen, on the other hand, where present, has the potential to provide a clearer palaeobotanical signature.

The virtual absence of samples resembling cereal pollen from the lower strata of the pollen cores lead Molloy and O'Connell to the conclusion that 'cereal cultivation had, at best, a very minor role in the Neolithic farming economy' (Molloy and O'Connell 1995, 218). Within the basal stratum of (undated) core GLU II, two large grass pollen were noted in this respect (pollen size being a potential indicator of cultivated species), but were discounted as most likely arising from non-cultivated grass (*ibid.*). At 484 cm in GLU II, four samples 'which are clearly outside the size range of non-cultivated grass pollen', are recorded, these being identified as 'Triticum-type' [wheat-type] (*ibid.*).

Molloy and O'Connell do caution that 'exact correlation' of GLU II with GLU IV 'is not possible because of difficulties in sampling the fibrous layer in GLU II'. However, they consider that '[o]n palynological grounds, it is likely that spectra 484 to 470 cm correlate with spectra from the corresponding depth interval in GLU IV, i.e. spectra about the subzones 5b/5c boundary (*ibid.*). As has been discussed, subzones 5b and 5c are themselves especially vaguely dated. Also, there is 'strong' evidence for 'sustained cereal cultivation' in the Bronze Age and Iron Age at Céide Fields (Molloy and O'Connell 1995, 201, 213), so the washing of individual pollen grains down through the stratigraphy should be expected. The process of coring can itself displace pollen grains (Behre 2007, 206).

Moreover, 'whether palynological techniques can satisfactorily distinguish between cereal-type pollen grains associated with the agricultural impacts of the first Neolithic communities and pollen of wild grasses' remains a vexed question (Macklin *et al.* 2000, 113). According to Behre, 'absolute distinction of pollen from wild grasses and cereals is impossible' (2007,

203). O'Connell himself came to a similar conclusion in his (1987) study of prehistoric cereal-type pollen in Connemara:

...it is recommended that single or occasional cereal-type pollen, recorded in contexts where corroborative evidence of human activity is lacking, or weak, be not regarded as signifying arable farming. [...] It is concluded that the more likely source of these pollen lies in the native herbaceous flora at or in the vicinity of the sampling sites (1987, 220).

With reference to O'Connell's findings, Plunkett concurs:

Certain wild species, such as flote and marram grass, produce large pollen grains that morphologically overlap with cultivated varieties and 'cereal-type' pollen (i.e. grains that satisfy all the physical criteria for cereal pollen) have been reported from early Holocene contexts in Ireland and Britain, long before cultivated grasses could have reached these islands (2007, 231; see also e.g. Hall *et al.* 1993; Plunkett *et al.* 2004, 5; Tweddle *et al.* 2005).

Molloy and O'Connell do acknowledge that 'complication arises from the overlap in morphological characteristics of the pollen of cereals and non-cultivated grasses so that a clear separation is not always possible' (1995, 216).

Along with the four grains from core GLU II, core GLU IV produced 'a single cereal pollen, recorded at 478 cm, and probably referable to *Triticum*-type (Molloy and O'Connell 1995, 218). Molloy and O'Connell conclude that the total assemblage of five cereal-type pollen grains constitutes 'firm evidence for [Neolithic] cereal cultivation' (1995, 218). However, such a tiny sample size compounds the risks of contamination and misidentification.

In support their interpretation of the pollen evidence, O'Connell and Molloy (2001, 104) draw upon archaeological record:

...a stone that may be an ard tip was recovered during excavation of the Glenulra enclosure in the main field system (Caulfield, unpublished).

An ard share, probably of Neolithic age, was also recorded in the context of excavation of plough marks where the visitor centre now stands (Byrne 1992) and a lynchet, which has been interpreted as evidence of tillage, has been recorded in that part of the field system that lies within the area open to visitors (Byrne 1991).

The stone Caulfield suggested ‘may be an ard tip’ may *not* have been: referred to as a ‘possible mudstone adze’ in the now-published stratigraphic report for the Glenultra enclosure (Caulfield *et al.* 2009a, 12, 55), its purpose and date are entirely speculative. The ‘ard share, probably of Neolithic age’ is referred to in the stratigraphic report for the visitor centre excavation (Byrne *et al.* 2009a, 20) as a ‘mudstone polished stone axe/adze butt [...] Initially identified by Byrne as a possible ard share this artefact has been broken and subsequently flaked’. The artefact was discovered in the vicinity of plough marks which Molloy and O’Connell themselves date to the Iron Age (GrN-20032: 2390±40 BP or 750-380 cal BC (Molloy and O’Connell 1995, 215; Byrne *et al.* 2009a, 25; see above). The ‘possible lynchets [interpreted as possible evidence of ploughing] accumulating against some of the cross walls’ in this area are undated (Byrne 1991a, 45; Byrne *et al.* 2009a, 25).



3.3.3.d.iii Pollen zone 6 (446-402 cm)

Temporal resolution remains poor in zone 6, and the observed biostratigraphic markers must continue to be seen as floating within the chronology. Two radiocarbon dates with very high error margins fall within this zone: GLU IV-9 (440 to 444cm) dated to 5133±149 (recalibrated by Cooney *et al.* 2011 to 3370-2910 cal BC); GLU IV-3 (402 to 406) dated to 4670±147 (recalibrated by Cooney *et al.* 2011 to 2890-2480 cal BC).

For O'Connell and Molloy, '[l]ow NAP representation and, in particular, low values for *P. lanceolata*, which grows only on mineral soils devoid of woodland/shrub cover, indicate that farming had more or less ceased (2001, 106). The unfolding environmental changes might, however, be seen as the continuation of the natural regeneration of the woodland which began in zone 5c. The proportion of hazel pollen continues to increase in the earlier part of the zone, and there is a notable increase in birch (*Betula*)—another 'pioneer species'. O'Connell and Molloy determine that 'the basin bog was quite dry during zone 6' (*ibid.*).

Elm pollen increases as zone 6 develops, as does oak (*Quercus*). A 'pine flush' is observed in the latter part of the zone (defining the start of zone 6b in the pollen diagram). O'Connell and Molloy see the ratio of arboreal to non-arboreal pollen in zone 6 as indicative 'of a return to full woodland cover', though it should be noted that 'bog pollen taxa are excluded from the pollen sum on the assumption that most of this pollen comes from the peat basin rather than the surrounding fields...' (*ibid.*, 104). Climate change is invoked to explain these developments:

Further evidence for dry bog surfaces in general is provided by the successful and widespread pine colonisation of peat surfaces in the period corresponding to zone 6 [...] This points to a decrease in the precipitation/evapotranspiration ratio that is probably best attributed to a climatic shift towards increased dryness rather than a localised effect caused by higher evapotranspiration in the catchment as a result of increase in woody vegetation (2001, 108).

Thus, O'Connell and Molloy do not consider that expansion of the bog to be the *cause* of the 'abandonment of the field system' (*ibid.*), though environmental change remains the explanation favoured by many archaeologists (e.g. Cooney *et al.* 2011, 616). Regardless, a significant anomaly remains: 'It is unclear how [the drier conditions and somewhat elevated temperatures] can be reconciled with the idea of widespread initiation of blanket bog at about this time' (2001, 120).

In order to accommodate the theory that Céide Fields was inundated by bog in the later Neolithic, which (having dried) was colonised by pine, the bog required a substantial interval of wetter conditions during which to expand *before* the pine flush in zone 6 (no further expansion of pine is recorded in later prehistoric or historic times (1995, 204-5)). Hence, Molloy and O’Connell report that the ‘increased representation in *Pinus* is, undoubtedly, reflecting the regional colonization by pine of peat surfaces which now, at least partly, cover the stone-wall field system’ (1995, 203-4; see also 2001, 106).

The difficulty is that in the preceding period (zone 5c), which O’Connell and Molloy associate with the decline and eventual cessation of farming, they find no evidence to support the widespread expansion of the bog—on the contrary. The curve for *Calluna* (ling—a heathland plant that favours drier conditions) increases ‘sharply’ and is maintained, ‘while the opposite trend is shown by the Cyperaceae and *Sphagnum* curves (2001, 108). They conclude that the ‘expansion of peat in the region was strongly diachronous’ (*ibid.*). Thus, at the heart of the coaxial field system of Céide Fields—at the site of the visitor centre—Molloy and O’Connell found that the bog did not form until at least the Late Bronze Age.



3.3.3.e Critique summary

It is noteworthy that there is considerable evidence not only from GLU IV and the BHY series of profiles, but also from other sources, for mid/late Bronze Age settlement in the N. Mayo region.

Karen Molloy and Michael O'Connell (1995, 221)

Arguably the key finding of Molloy and O'Connell's work was the 'strongly diachronous' nature of the formation of the bog across Céide Fields and north Mayo. This was not unexpected. The complexity of the coastal topography is immediately clear to the visitor (see Figure 3.21, above). However, the intricacies of the micro-topography underlying the peat remain unknown. Peat has been shown to have formed in depressions and drainage features *millennia* earlier than in adjacent areas. It cannot be assumed that peat overlying the field walls on the exposed slopes of Céide hill formed during the Neolithic—this remains to be demonstrated.

Molloy and O'Connell dated peat in direct association with a field wall during excavations at the site of the Céide Fields visitor centre (core CF 1b). No evidence was found of peat accumulation prior to the late Bronze Age. This finding is supported by the dating of a nearby soil sample of infill material from (presumed Neolithic) plough marks, extracted during archaeological excavations. A single radiocarbon date found that sample to be Late Bronze Age/early Iron Age.

The fourteen dated samples from excavations at the site of the visitor centre—at the heart of the coaxial field system—are overwhelmingly indicative of a peat-free ground surface in the earlier Bronze Age. This accords with the Bronze Age radiocarbon dates the short cores BHY IV and BHY V in the vicinity of the Behy tomb.

While all these dates are imprecise due to the nature of the sampled materials, there are clear implications for the archaeological assumption that 'pre-bog' *must* be Neolithic. At the heart of the coaxial field system on Céide hill, it has been demonstrated that 'pre-bog' cannot be assumed to infer a date earlier than the Late Bronze Age. Evidence of such a 'late' date has been found in direct association with a field wall. Based on their presumed homogeneity, it is frequently that 'the walls were laid out over only one or two human generations' (e.g. Cooney 2000a, 27; see also e.g. Caulfield 1978a, 138; 1983, 197).

Caulfield *et al.* (1998, 638) determine that '[t]here is now evidence to suggest that peat was already accumulating not just in the west of North Mayo but also in close proximity to the human settlements throughout the entire region'. They go on to propose that 'early farming communities entering North Mayo would have found a patchwork of forest and areas already going over to blanket bog' (*ibid.*). The suitability of bogland for grazing animals (the presumed purpose of Céide Fields) is uncontroversial. There is therefore no *prima facie* reason why the field system should not have enclosed pockets of (already) ancient bogland, and that in places field walls should not have been constructed on peat.

The Glenultra long core was extracted from a basin of peat which formed especially early – a suitable location for extracting a core with maximum temporal coverage. However, the relationship between the ecology of this distinct feature and the surrounding landscape through time will have been complex. The site of the core lies approximately half-a-kilometre from the edge of the recorded coaxial field system on Céide hill. As a drainage feature, hydrological reworking and redeposition will have impacted on the composition of the basin fill, with remobilised material (including carbon residues) washed-in from higher ground (Walker 2005, 25, 29). Swindles *et al.* (2013, 1494) recently found 'unambiguous

evidence' of redeposited Bronze Age and Iron Age tephra layers in a topographic hollow in lowland blanket peat on the Shetland Islands. Because of their susceptibility to reworking and redeposition, oceanic blanket peats are 'poorly suited for pollen analysis' (Faegri and Iversen 1975, 169; 1989, 138).

The temporal resolution of dated biostratigraphic samples is poor, particularly among the strata associated with the Neolithic. Pre-Neolithic samples were taken from a nearby undated core. The Elm decline – which is treated as a regionally sequential event 'datable to c. 5100 B.P.' [3960-3810 cal BC⁶] (Molloy and O'Connell 1995; O'Connell and Molloy; but see Whitehouse *et al.*, in press) – is identified as a fixed chronological marker in the stratigraphic sequence. Other environmental developments during the Neolithic must be seen as floating within the chronology.

Significantly, the sequence of environmental change identified is characteristic of a natural ecological cycle and requires no human intervention. Climatic changes are proposed by Molloy and O'Connell which account for the 'woodland dynamics'. No human clearance of the forest is in evidence. The accumulation of peatland is not attributed to human activity.

Molloy and O'Connell's research was predicated on the prior archaeological interpretation of Céide Fields:

The object of the present study, namely Céide Fields, north Co. Mayo, offers an exceptional opportunity for the reconstruction of past environments and, in particular, that relating to the Neolithic. Here, the archaeological evidence for Neolithic settlement is particularly strong and includes entire Neolithic landscapes preserved by widespread growth of blanket bog which had commenced by 4000 B.P., i.e. the end of the Neolithic period [...] The presence of a [Glenultra] basin of deposition, which is suitable in size and optimally located with respect to the fields, offers an exceptional opportunity of seeing how Neolithic activity expressed itself in the pollen record. The palaeoecological data from such a

site can also be expected to provide much new information on duration, intensity and effects on the natural environment of Neolithic and later farming activity, and the relative importance of pastoral versus arable farming economies with the passage of time (1995, 189).

In other words, Molloy and O'Connell were seeking to find the palaeoenvironmental signature of a phenomenon (Neolithic farming), which they already accepted as having taken place. Their research identifies a period during the Neolithic when natural environmental changes resulted in the depletion of the woodland. This provides the only 'window' in the Neolithic environment when the landscape could have been sufficiently clear for fields to be laid out. Molloy and O'Connell's research does not provide evidence that the field systems were laid out at this time.

Rather, Molloy and O'Connell provide a later Bronze Age *terminus ante quem* for a (presumed Neolithic) sub-peat field wall on Céide with the directly associated peat samples in core CF 1b. While these dates must be treated with caution, they are in keeping with the Late Bronze Age date for (presumed Neolithic) plough marks revealed during excavations at the visitor centre.



3.3.4 Summary of the Céide Fields dating evidence

The establishment of the Céide Fields is best dated by the start of the major clearance episode visible in the Glenulra pollen record, which suggests that they were laid out in 3960-3540 cal BC (95% probability [...]), probably in 3845- 3635 cal BC (68% probability). The fields seem to have gone out of use in the second half of the fourth millennium cal BC [...], since pine woodland appears to have become established over the fields. We have two independent estimates for the date when this woodland became established.

Cooney *et al.* (2011, 622)

Cooney *et al.*'s recent review of the evidence (see above quotation) demonstrates the circular nature of many arguments regarding the dating of Céide Fields (cf. Cooney 1999, 48). The 'woodland dynamics' identified by Molloy and O'Connell during the Neolithic are entirely consistent with the natural environmental cycle they identify. Acceptance of the coincidence of this (imprecisely dated) environmental cycle and the rise and fall of a farming community relies upon acceptance of the archaeological chronology. Molloy and O'Connell's research discredits the central assumption of that chronology: that the coaxial field system is beneath peat which formed during the Neolithic.

That peat began to form at localities within the area identified as Céide Fields during the earlier Neolithic, and 'long before the arrival of farming communities' (Caulfield *et al.* 1998, 638), is not in dispute. A period of drier conditions followed, during which a succession of ecological phases culminated in the re-establishment of forest cover across peat-covered areas. This succession incorporated a 'pine flush' (Molloy and O'Connell's zone 6b. Of the pine stumps dated by Caulfield *et al.* (1998) in the townlands of Behy and Glenulra, one – UCD-C44 (5370±70 BP, recalibrated by Cooney *et al.* 2011 to 4350–3990 cal BC) – 'clearly an outlier' (2001, 102; cf. Caulfield *et al.* 1998, 632; Cooney *et al.* 2011, 622) – predates the Elm decline. The

remaining four samples date to the final centuries of the fourth millennium cal BC, and presumably grew during the zone 6b pine flush.

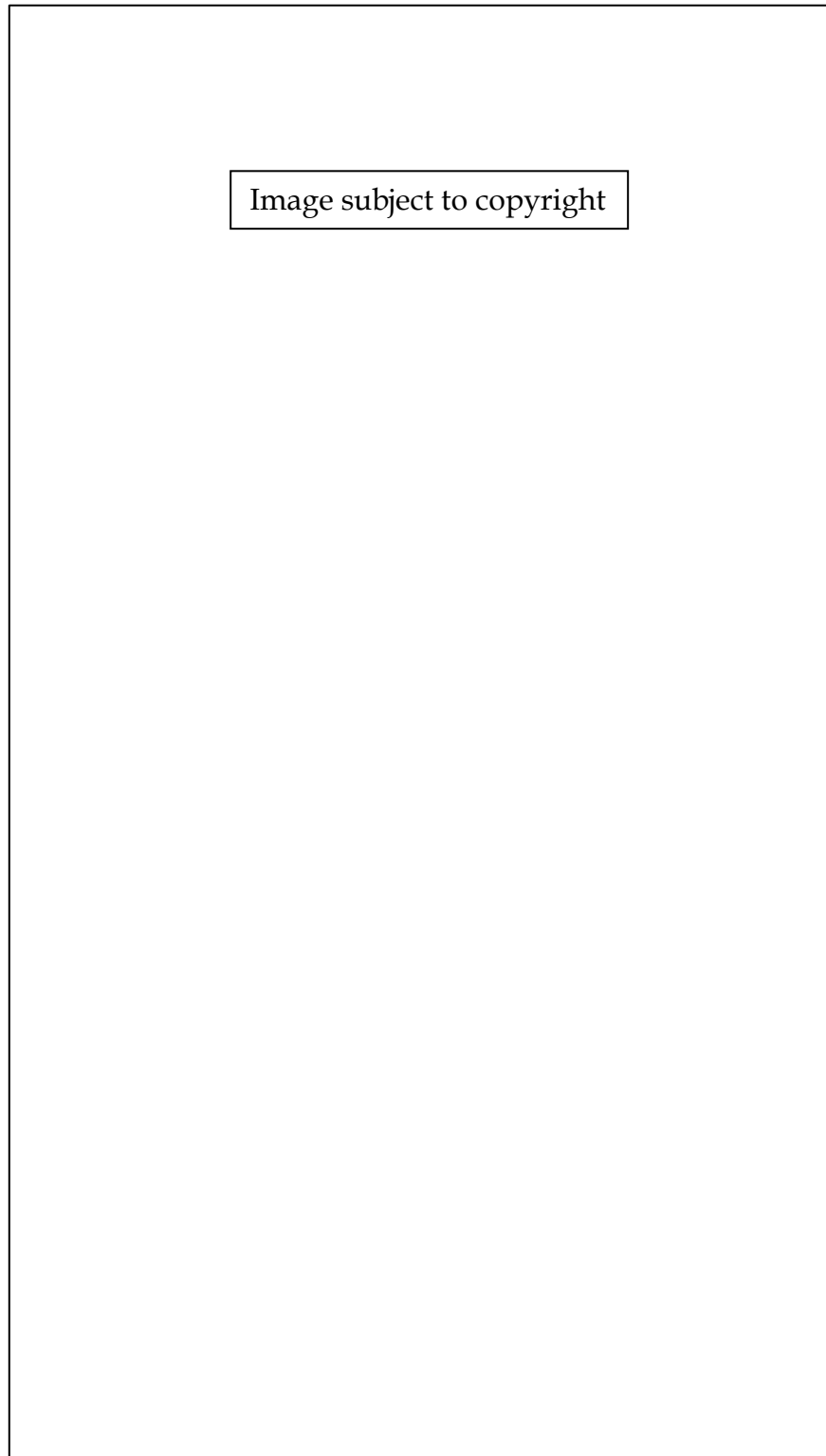


Figure 3.24: Approximate locations from which pine and peat samples were recovered for radiocarbon dating. The spatial extent of Céide Fields (defined by the red box) is as per Caulfield et al. 1998, Figure 2 (see Figure 3.4, above). Samples UCD-C26 and UCD-C49 (highlighted) were in contact with field walls.

The dated pine stumps, generally exposed by turf cutters, are spread randomly across the extensive undulating landscapes of north Mayo, and their direct coincidence with field walls is rare: no such correspondence has been recorded among the coaxial field systems of Céide hill (Figure 3.24, above).

Sample UCD-C26 was found in conjunction with an isolated section of field wall 8 km to the east of Céide Fields, not shown to be part of any field system. It was located on a steep valley side where it can be expected that hydrological activity would render the peat especially unstable. Likewise, sample UCD-C49, which was discovered 7 km to the west of Céide Fields, was close to mouth of a river valley where the sloping ground would be subject to intense hydrological activity. This sample was recovered near the north-west extent of an irregular grouping of field walls.

Archaeological excavation accounts for a very limited proportion of the research into the field walls of north Mayo. In no case has the precise context of a pine stump used for dating (or its detailed attributes) been recorded. The relative 'height above mineral soil' (Caulfield *et al.* 1998, Table 2) depends not only on when peat began to form at the location of the stump, but also erosion and deposition at the site, and the extent to which the stump itself has been mobile. Where tested, the age of the stumps has proved not to be a reliable guide to the age of the peat in which they lie.

As O'Connell and Molloy (2001, 101) observed of the pine samples: 'Wood is an excellent material for ¹⁴C dating because its ¹⁴C content is not subject to alteration by factors that may influence peat samples...'. However, the level of precision achieved by the UCD radiocarbon laboratory is insufficient to relate the age of the pine stumps to their stratigraphic level.

In any case (leaving aside post-deposition mobility which will vary according to the size, shape and location of the sample), it would be the depth of peat that accumulated post-deposition that would be of greater significance in determining relative age.

The depth of peat above the pine samples, having been removed by turf cutters, cannot be known. Even if this could be estimated, it would be subject to myriad localised variations. In particular, the local topography will determine exposure to the prevailing winds; sunlight; susceptibility to accretion/erosion by hydrological transportation (including mass movement). In addition, factors such as drainage of the bog prior to turf cutting (causing shrinkage), and compression (caused by grazing animals) will be of varying significance. For all these reasons, the relative stratigraphic locations of the pine stumps (unless firmly rooted in the mineral soil) cannot be assumed to have remained fixed.

Caulfield *et al.* (1998, 638) identify 'the need for a further series of dates of the basal peat beneath the pine stumps', however it is at the interface with the mineral soil that hydrological activity is typically most pronounced. The dating of the pine stumps was useful in combination with Molloy and O'Connell's work in helping to date the pine flush in zone 6b, but has little bearing on the date of the archaeology at separate locations.

There is no direct evidence that peat (whether or not redeposited) overlying a field wall anywhere within the area Caulfield *et al.* 1998 identify as Céide Fields dates to the Neolithic. The available evidence provides a *terminus ante quem* for the coaxial field system on Céide hill in the later Bronze Age—the earliest period from peat in direct association with a field wall has been recorded.

There is longstanding evidence for a Bronze Age round house at Belderg Beg, to which can be added ‘unequivocal’ evidence for a Bronze Age field wall (*ibid.*, 38), and palaeoenvironmental evidence that plough marks (assumed to have been Neolithic) are later Bronze Age (Verrill and Tipping 2010a; see section 3.4, below).

Across the Belderrig/Belderg valley in the townland of Belderg More, the source pine for Neolithic radiocarbon sample UCD-C49 was found ‘on top of’ a field wall. Approximately fourteen kilometres to the east, the source pine for Neolithic radiocarbon sample UCD-C26 was similarly described ‘as on top of a wall’. These two samples constitute the direct evidence for Neolithic field walls in north Mayo. It is here argued that neither context can be shown to be secure. The weight of evidence suggests that precursors to the coaxial field system on Céide hill were laid out in the Early-to-Middle Bronze Age.



3.4 Beyond Céide Fields

The Céide research, in particular, had a considerable influence of the study of early fields and farming in Ireland. An unintended consequence was to promote the idea of these pre-bog field wall locations as relict landscapes, where prehistoric farms survive in what could almost be described as Pompeii-style preservation. As a consequence, there is a tendency in Ireland to characterise these early farmscapes as 'Neolithic' or 'Bronze Age'...

William O'Brien (2009, 6)

Cooney talks of 'an array of evidence from different parts of the country' for Neolithic field systems (2003, 50), suggesting that 'we need to think of the organisation of landscapes into fields as not exceptional, but rather a recurring aspect of Neolithic life' (2000a, 47). However, as Molloy and O'Connell (2001, 122) observe, of the "'numerous pre-bog field systems'" Cooney (2000a, 46) cites in this context 'he concedes that most...are Bronze Age or later in date'. In fact, as will be discussed, the evidence he cites for Céide being part of a wider phenomenon in the Neolithic invariably (and for the most part explicitly) rely upon analogy with Céide Fields.

The county archaeological surveys of Co. Donegal (Lacy 1983, 50-4), west Galway (including Connemara) (Gosling 1993, 21-5), the Dingle peninsula, Co. Kerry (Cuppage 1986, 17-29) and the Iveragh peninsula, Co. Kerry (Ann O'Sullivan and John Sheehan 1996, 20-33) all do mention 'pre-bog' field walls, as indeed, for example, do the surveys of Co. Leitrim and south Sligo (M. Moore 2003, 39; Egan *et al.* 2005, 75-9). However, it is generally recognised that much of Ireland's peat bogs date from the Bronze Age or later. As Cuppage (1986, 17) put it:

The pre-bog nature of the walls described below does not necessarily imply a prehistoric origin, however, as the onset of peat growth can occur as late as the 12th century a.d. [A. Lynch 1981, 63]. The occurrence of wedge-tombs, standing stones and rock art within some of the systems may indicate an Early Bronze Age date, but the relationships

between these monuments and the settlements and field boundaries can only be determined by excavation.

Supposed parallels with 'field wall arrangements seen in definite Neolithic field systems' (Cooney 2003, 50) do not in themselves constitute credible dating evidence. The specific claims regarding the Neolithic fields systems beyond Céide Fields are discussed below.



3.4.1 Rathlackan, Co. Mayo

Rathlackan, c. 10 km to the east of Céide Fields, is the remaining routinely cited 'definite Neolithic' field system (e.g. Cooney 2003, 50; 2000a, 46; 2007a, 555). Here too, it has been suggested that an excavated court tomb and adjacent enclosure are temporally linked to an extensive field system (Byrne 1991b; 1993; 1994). For Cooney, the Rathlackan field walls date to the 'Middle Neolithic' (2003, 50), however, the recently published stratigraphic report for excavations at the complex confirms that the field walls are 'unfortunately undated' (Byrne 2009b, 37).

Excavations at Rathlackan centred on the 'large and well preserved Court Cairn, with a subtriangular enclosure attached to the northern side...', as well as a 'small square building foundation is located towards the northern apex of the enclosure' (Byrne 2009b, 5). The date of the enclosure could not be established, but it appears that the 'small square building', frequently referred to as a house, 'was occupied at the end of the Neolithic period or at the very beginnings of the Bronze Age' (*ibid.*, 37). Presumably, then, as the house was '*under* a very shallow cover of peat' (*ibid.*, 20 [my emphasis]) this area was peat-free at the beginning of the Bronze Age.

The field walls at Rathlackan are independent of the excavated structures (Cooney *et al.* 2011, 615), and have not been shown to be contemporary with the court tomb. Although the field walls are presumed to be ‘pre-bog’, this does not securely date them to the Neolithic (*contra* Cooney 1997, 28; Byrne *et al.* 2009b, 41). The thin layer overlying peat is not shown to have formed prior to the Bronze Age. Earlier Bronze Age activity is in evidence within Rathlackan court tomb. In its chambers ‘a series of deposits of charcoal rich material were made some time between 2300 BC and 1750 BC. These deposits included sherds of Bronze Age Bipartite Vase...’ (Byrne 2009b, 30). There is no reason to assume that this activity is less likely to be associated with the builders of the field walls than earlier use of the court tomb.



3.4.2 Belderrig, Co. Mayo

At Belderrig in the townland Belderg More (7 km west of Céide Fields), recent archaeological fieldwork led by Warren (e.g. 2008; 2009c) was initially focused on a surface collection of Late Mesolithic lithics. Excavations revealed a large sub-bog field wall, abutted by two small cairns, and in close proximity to fire spreads, a probable horse-shoe shaped structure, and lithics characteristic of the Neolithic. The section of field wall was initially attributed to the earlier Neolithic on the basis of radiocarbon dates from short-lived sample charcoal samples which were thought to be sealed by tumble from the wall (Cooney *et al.* 2011, 624-5; Table 12.6; see Table 3.11, below).

The relationship between the field wall and the dated samples was, however, reassessed during the 2007 excavation season. Warren and Rice (2007, 3) report that:

...in 2005, the fire-setting C115 was interpreted as sealed by 'tumble' of the field wall C112. Given the complexity of this area, and the failure to identify detail in 2005, and reappraisal of the plans this relationship between the fire setting and tumble is no longer upheld.

Instead, the context is sealed by colluvial deposits (*ibid.*; Warren 2009c, 646): an indication of the intense hydrological activity evident at this exposed sloping site (see Figure 3.25, below). The temporal relationship between the field wall and the dated charcoal is unknown.

Table 3.11: Radiocarbon dates from 'informal fire setting' at Belderrig. After Warren (2009c, Table 32-1).

Lab code	Context	Sample	¹⁴ C years BP	¹⁴ C years cal BC
UB-7590	115	<i>Corylus</i> twig charcoal	4780±36	3650-3380
UB-7591	115	<i>Betula</i> twig charcoal	4717±37	3633-3374
UBA-7591	115	Repeats above	4732±30	3634-3377

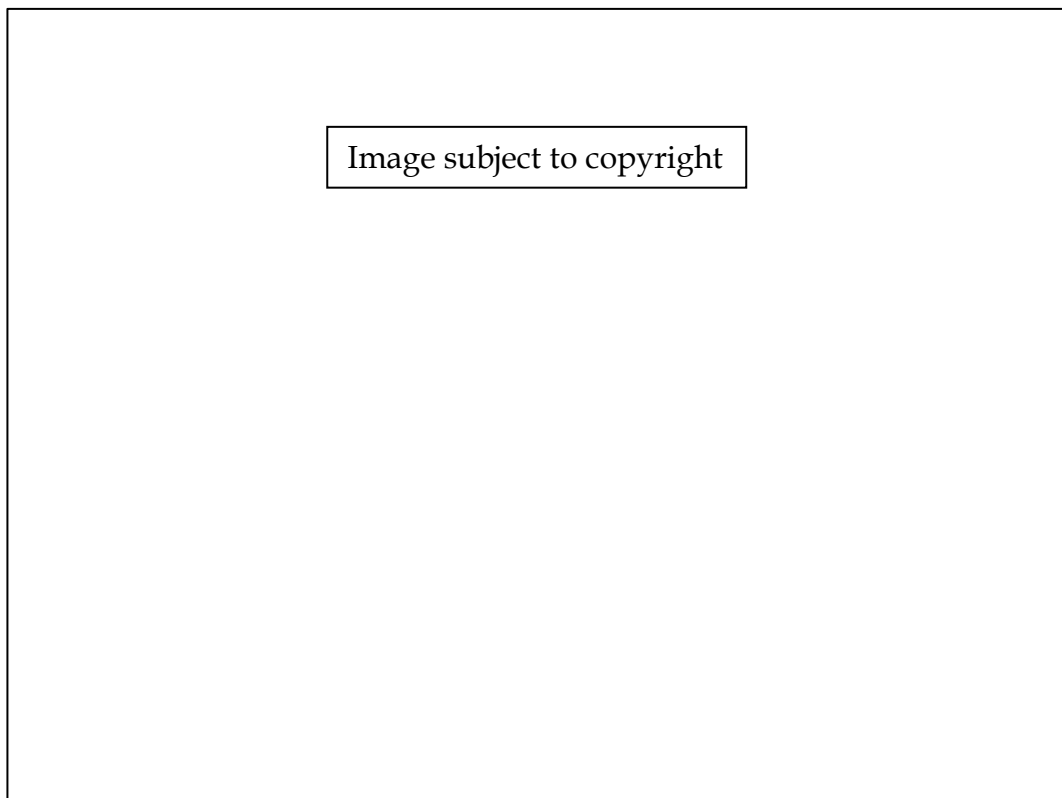


Figure 3.25: Site of the excavations at Belderrig. After Warren (2005a, Figure 3).

The field wall nevertheless continues to be seen as the ‘focal point’ for Neolithic activity at the site (Warren 2009c, 644). The horseshoe/c-shaped ‘probable structure’ is interpreted as post-dating the field wall (*ibid.*, 647; Warren 2008, 15-16; Warren and Rice 2008, 6; see Figure 3.26, below). The interpretation of that structure as Middle Neolithic is by dint of its spatial association with ‘stony layers’ beneath it which contained diagnostic Neolithic lithics, and from which organic remains radiocarbon-dated to the Neolithic were recovered (Warren 2009c, 644). However, all that can confidently be said about the horseshoe pattern in the stones is that it post-dates the stony layer. An interpretation equally well supported by the evidence would be that, in common with the horseshoe-shaped arrangement, the field wall considerably post-dates the stony layers beneath, but that the hydrological activity known to have disturbed the deposits on this exposed hillslope (e.g. Warren 2008, 18; Warren and Rice 2008, 3) – possibly in combination with wind erosion – has prevented the significant accumulation of intervening material. There is no evidence of a foundation trench for the wall (Warren and Rice 2008, 5).

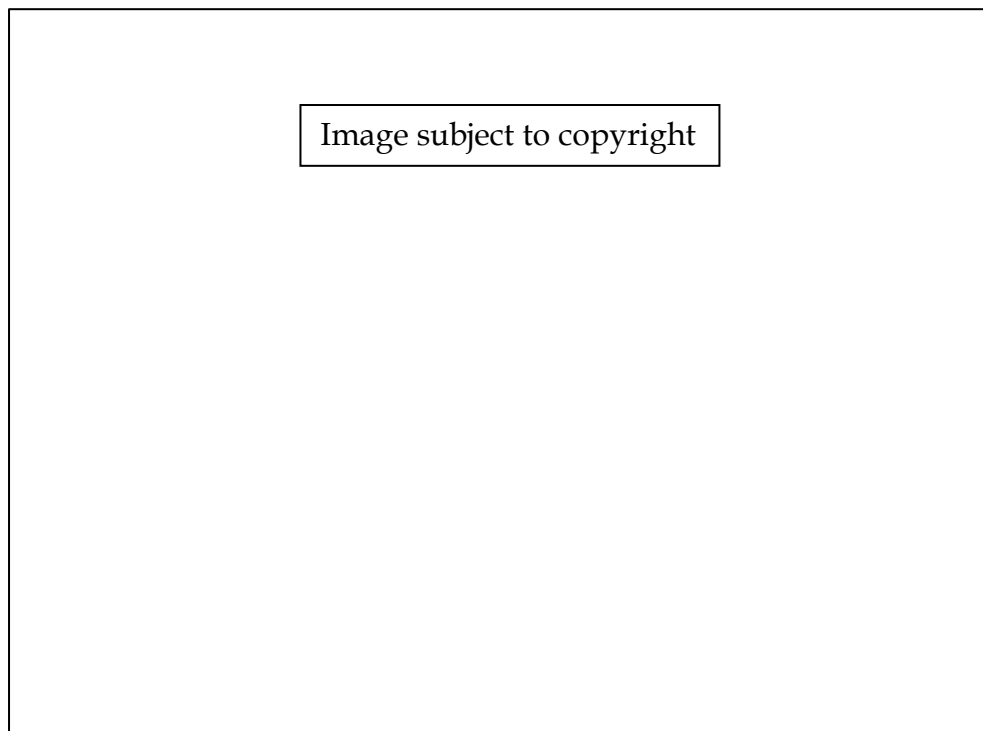


Figure 3.26: Photograph of excavated segment of field wall with ‘c-shaped structure’ highlighted. After Warren and Rice (2008, Figure 9).

3.4.3 Belderg Beg, Co. Mayo

Across the Belderrig/Belderg river on the east-facing valley slopes at Belderg Beg (See Figure 3.27, below), evidence for sub-peat cultivation close to the Bronze Age roundhouse (see Section 3.3.1, above) was the subject of a recent palaeoenvironmental study. Verrill and Tipping (2010a) carried out multi-proxy analyses of evidence for ard cultivation on what Caulfield had interpreted as the Neolithic ground surface (2010a, 1215; see Caulfield 1972, 22-3; 1974; Caulfield *et al.* 2009c, 23). They determined that the peat overlying the ard-marked layer dated to the Late Bronze Age (770-400 cal. BC: GU-11628; SUERC-2046) (*ibid.*, 1216). Verrill and Tipping's study indicated that the interval between cultivation and the onset of peat accumulation was relatively short, and that cultivation could be dated to the 'Mid-or-Late Bronze' Age (*ibid.*, 1222-3). Although Caulfield *et al.* (2009c, 29-40) accept that the identified tillage plots (see Figure 3.27, below) do not predate the Middle Bronze Age, they nevertheless continue to refer to '[p]lough marks representing Neolithic cross-ploughing' in their site description (*ibid.*, 5).

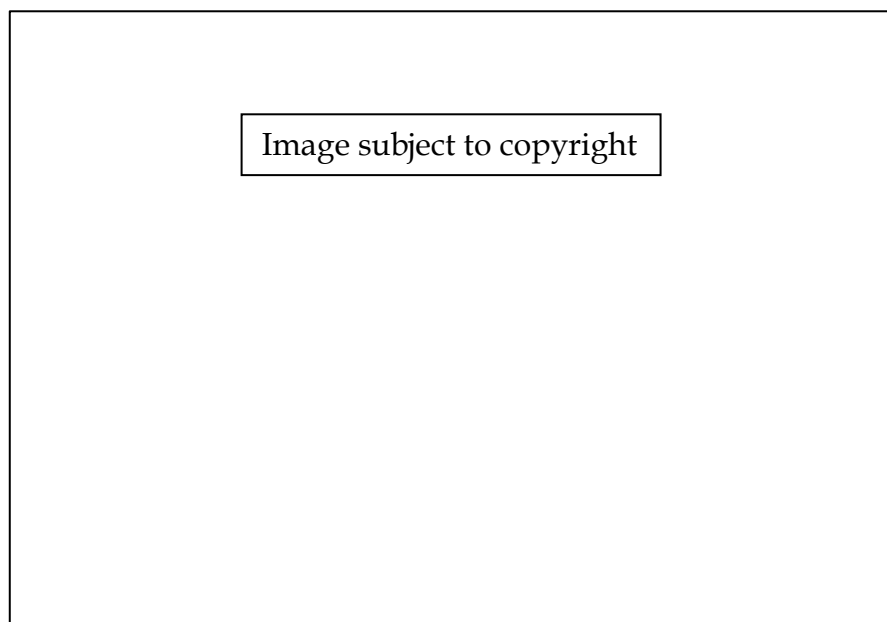


Figure 3.27: Location of palaeoenvironmental studies at Belderg Beg conducted by Verrill and Tipping (2010a and 2010b). The top-centre inset indicates the location of the furrow fill sampling (BB1) deemed to indicate Bronze Age cultivation. After Verrill and Tipping (2010a, Figure 1; 2010b, Figure 2).

Verrill and Tipping (2010b) accept Caulfield's argument that the Bronze Age roundhouse, Bronze Age field wall (Wall 3 in Figure 3.27, above; see also Section 3.3.1.b) – and the plough-marks now established to be Bronze Age – were in fact 'superimposed' onto a Neolithic field system, of which Walls 1 and 2 (Figure 3.27) were deemed to be constituent parts. Pine sample UCD-C31 – 'rooted in the [mineral] soil 5 m from Wall 1' – is taken to provide a *terminus ante quem* for Wall 1 based on 'relative stratigraphy' (*ibid.*, 1013).

The acceptance of UCD-C31 (3370-3020 cal BC) – incorrectly stated as 6300-5590 cal BP in Verrill and Tipping (2010b) – as a (albeit imprecise) proxy for the initiation of peat growth at its particular location should not be assumed to have relevance across arbitrary distances tracts of the hillslope peat (see Section 3.3). Within 200m of Wall 1 (and at the same elevation), and within 100m of Wall 2 (also presumed to be Neolithic), are the plough-marked palaeosols identified by Verrill and Tipping as having been free from peat cover until at least the Middle Bronze Age. The cultivated area is thought to cover at least 1,600m² (Caulfield *et al.* 2009c, 39). This surely invites the question: could the Bronze Age ploughing in fact be the activity for which Wall 2 was constructed (clearing the land) to enclose? Furthermore, might Wall 1 be of similar date and function (as is taken to be the case for Wall 3)?

Verrill and Tipping assume that Wall 1 represents the 'downslope terminal wall of the field system, i.e. no sub-peat wall was identified downslope of this point' (2010b, 1014). This assumption should be treated with caution, given the location of the previously unidentified sub-peat field by Warren (above) extending as far as the coast (see Figure 3.28, below). Boreholes were sited immediately upslope (W8) and downslope (W7) of the field wall. A single sample of basal peat from each borehole was dated (see Table 3.12, below).

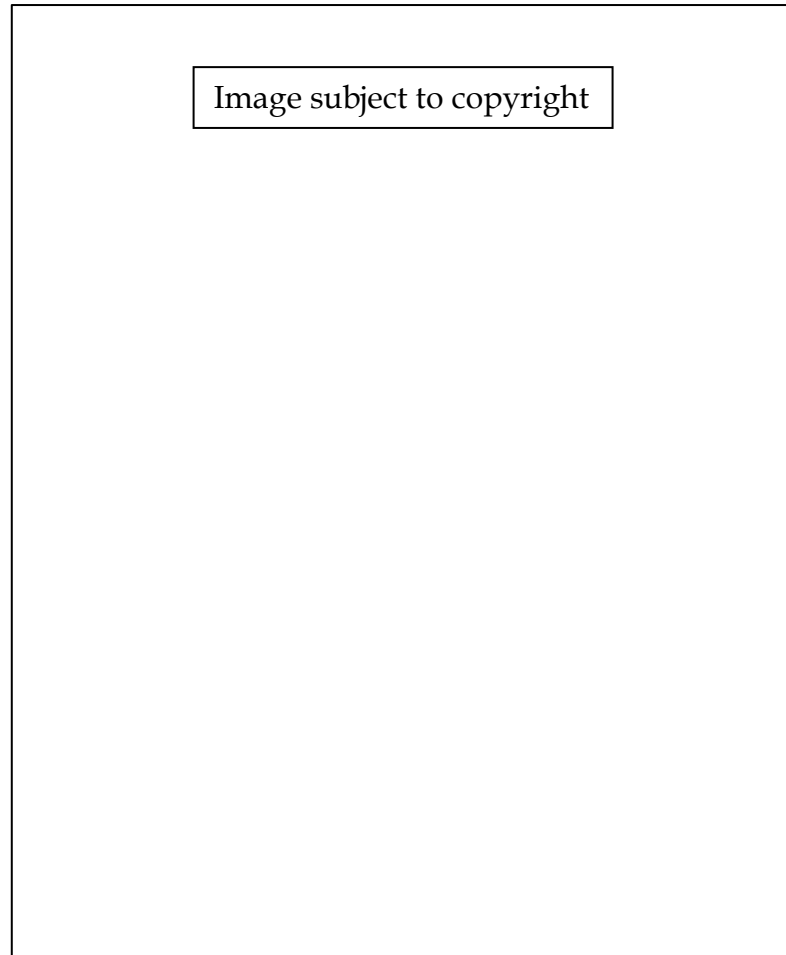


Figure 3.28: Location of excavated section of field wall (after Warren 2005, Figure 2), with map showing location of palaeoenvironmental studies (as per Figure 3.27) inserted to scale.

Table 3.12: AMS radiocarbon assay details for core samples W7 and W8. After Verrill (2006, Table 5.1)/Verrill and Tipping (2101b, Table 1). Cal BC radiocarbon dates calibrated in OxCal 4.2 (IntCal 13) (<https://c14.arch.ox.ac.uk/oxcal>).

Core ref. & Lab code	Sample depth & thickness	Description of material sampled	Fraction assayed	¹⁴ C years cal BP	¹⁴ C years cal BC
W7: GU-12725 SUERC-5757	90-92cm	<i>Dark grey brown organic rich mud with common highly decomposed plant remains and abundant silt particles.</i>	Humic acid (fine fraction)	5030-4840	3080-2900
W8: GU-12726 SUERC-5758	66-68cm	<i>Brown amorphous structureless peat.</i>	Humic acid (fine fraction)	5030-4840	3080-2890

The radiocarbon dates from the two core samples are ‘indistinguishable’ (Verrill and Tipping 2010b, 1014), yet despite their proximity they are derived from dissimilar deposits within sediment stratigraphies that were ‘rather different’ (*ibid.*; see Figure 3.29, below), reflecting their contrasting contexts. Wall 1 appears to have acted as a barrier, both to the downslope transport of soils from higher ground, as well as to the spread of peat from the downslope initiation focus represented by the *c.* 3m deep, *c.* 30m-diameter, basin from which the main BEL core was extracted (*ibid.*, 1014-15; see Figure 3.29).

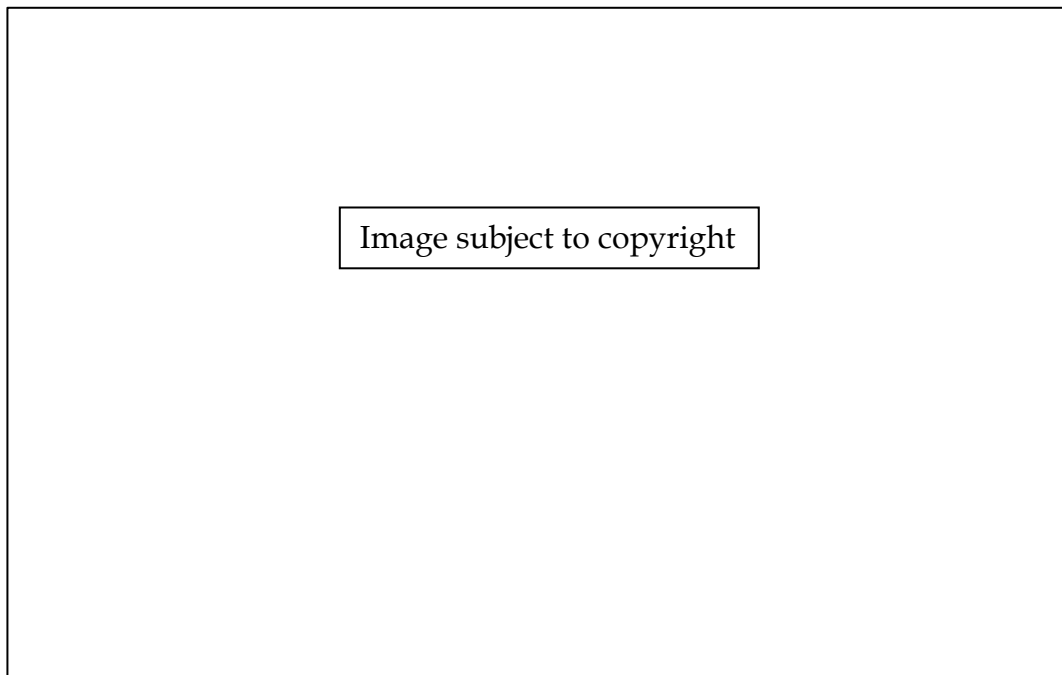


Figure 3.29: ‘Sediment stratigraphy of coring transect.’ Scale denotes vertical exaggeration. After Verrill and Tipping (2010b, Figure 3).

Upslope of the field wall, silty, sandy mineral soil thickened in a downslope direction, indicating ‘that the initial in situ soil was washed downslope as colluvium, banking up against the terminal wall and forming a lynchet. This soil was then buried by herbaceous peat’ (Verrill and Tipping 2010b, 1014-15). Peat sample W8 was recovered ‘brown amorphous structureless peat’ immediately above the mineral soil (Verrill 2006, Table 5.1; Appendix D, Table 1). Immediately downslope of the field wall, the mineral soil was absent, with ‘dark grey brown organic rich

mud with common highly decomposed plant remains and abundant silt particles' gradually giving way to the thin layer of 'grey structure less silty sand' which overlays the bedrock (*ibid.*).

'Brown silty sand' overlies the bedrock upslope of the wall (Appendix D, Table 1), and it may be that there is leaching of fine silts through and beneath the wall. The wall has not been excavated, so its structure and the material upon which it rests are unknown (Verrill and Tipping 2010b, 1015). The humic acid fractions from which radiocarbon dates W7 and W8 were obtained can be expected to have been mobile within the sediments (e.g. Baillie 1990, 365; Swindles *et al.* 2013, 1496). As discussed in Section 3.3.1.a, many studies have found that the humic acid fraction produces dates that are older than other materials in direct association.

Taking the dates for W7 and W8 at face value, Verrill (2006, 109) identifies 'two possible hypotheses':

Firstly, that the walls were indeed constructed in the Neolithic period. If they were constructed on mineral soil for their entire lengths, they would have had to have been built before *c.* 4900 cal. BP, because that was the approximate date at which peat inception occurred at the W7 and W8 borehole locations. At *c.* 4900 cal. BP peat formed on either side of the wall unimpeded. Alternatively, the walls could have been constructed later, extending downslope on to peat, and the terminal section of Wall 1 (running across the slope) was constructed on peat of the same age either side of it.

As noted in Section 3.3.1.b, part of Wall 3 was constructed on peat. Verrill, however, proposes that the palynological record from the BEL core supports the case for earlier land division, and that the putative Neolithic farmers made no effort to 'retard peat spread inside the field' (2006, 109).

Many of the concerns raised in connection with the Glenultra long core (GLU-IV; Section 3.3.3.d, above) apply equally to the BEL core, not least the 'poor' stratigraphic security that can be expected to result from post-depositional processes within the basin and its catchment area, such as

‘bioturbation and mechanical mixing by ploughing and downwashing’ (Verrill and Tipping 2010a, 1222). ‘Despite the lynchet formation against the terminal field wall, some colluvium from eroded soils was redeposited further downslope in the basin peat’ (*ibid.*, 2010b, 1016-17). As with the Glenultra study, the starting point for palynological investigations at Belderg Beg was that the presence of Neolithic field systems was a given – what was sought was the environmental signature of an established phenomenon:

A field system at Belderg Beg, North Mayo, was selected because it was known to have been occupied in the Neolithic and the Bronze Age and was at some time buried by blanket peat (Verrill 2006, 18).

Table 3.13: AMS radiocarbon assay details for BEL core samples. After Verrill (2006, Table 5.4)/Verrill and Tipping 2010b (Table 1). Cal BC radiocarbon dates calibrated in OxCal 4.2 (IntCal 13) (<https://c14.arch.ox.ac.uk/oxcal>).

Lab code	Sample depth & thickness	Description of material sampled	Fraction assayed	¹⁴ C years cal BP	¹⁴ C years cal AD*/BC
GU-11630 SUERC-2048	39-40cm	<i>Moderately humified silty pseudo-fibrous peat.</i>	Humic acid	1530-1350	410-570*
GU-11631 SUERC-2049	130-131cm	<i>Dark brown pseudo-fibrous moderately humified peat.</i>	Humic acid	3080-2840	1110-900
GU-11632 SUERC-2053	199-200cm	<i>Well-humified brown pseudo-fibrous peat.</i>	Humic acid	4240-3990	2290-2040
GU-11633 SUERC-2054	259-260cm	<i>Pseudo-fibrous woody peat, moderately-well humified with numerous ligneous fragments.</i>	Humic acid	5040-4850	3090-2900
GU-11634 SUERC-2055	277-278cm	<i>Very well humified dark brown/black amorphous silty peat.</i>	Humic acid	5590-5330	3640-3380

Humic acid fractions from five stratified samples within the BEL core were radiocarbon dated (see Table 3.13, above). The mid-points of the cal BP ranges were assumed to reflect the true age of the dated strata, and used to estimate the accumulation rate of peat in the basin. A model was constructed which assumed a straight-line relationship between the dated strata: linear interpolation (Verrill 2006, 92-3; Figure 5.8). By assuming that the rate of peat accumulation between the dated strata was uniform, the age of peat at undated depths could be inferred, informing the chronology for the Percentage Pollen Diagram (Figure 3.30, below). The problems with such assumptions are manifest, and have been discussed in Section 3.3.3.d, above. Just two of the five radiocarbon dates pertain to the 'Neolithic section' of the BEL core: 'no [age-depth] model performs reliably well when there are only a few dates' (Telford *et al.* 2004, 5; cf. Verrill 2006, 92).

At *circa* 3m, the BEL core is shallower than the Glenulra long core, and so does not capture the Elm decline, which Verrill and Tipping (2010b, 1011), like Molloy and O'Connell, take to be a regionally synchronous event *circa* 5800 cal BP (see Section 3.3.3.e, above). The BEL sequence begins with GU-11634 SUERC-2055–5590-5330 cal BP (3640-3380 cal BC)—with a 'complex vegetation mosaic' surrounding the basin, with 'grassland, woodland and heath taxa all represented' (*ibid.*, 1017). The high *Poaceae* (grass) pollen percentages recorded in the Percentage Pollen Diagram might be seen as an inevitable consequence of the decline in tree cover. A recent study has shown that the Elm decline in western Ireland was unlikely to have been synchronous, instead extending over the period 3950-3620 cal BC (Whitehouse *et al.* in press, 16).

Verrill and Tipping (2010b, 1017) prefer to interpret the grassland components of the 'vegetation mosaic' as representative of 'pastoral agriculture in the field enclosed by Wall 1 and 2'. Perhaps unsurprisingly,

given the apparently Mid-to-Late Bronze Age date for the nearby presumed-Neolithic plough-marks (*ibid.* 2010a), 'no cereal-type pollen grains were identified in Neolithic levels of the BEL core' (*ibid.* 2010b, 1017). Hence, contrary to the suggestion that 'much of the site was given over to arable crops' during the Neolithic (Caulfield *et al.* (2009c, 5), Verrill and Tipping (2010b, 1017) conclude that 'the field system was constructed as part of a pastoral system'.

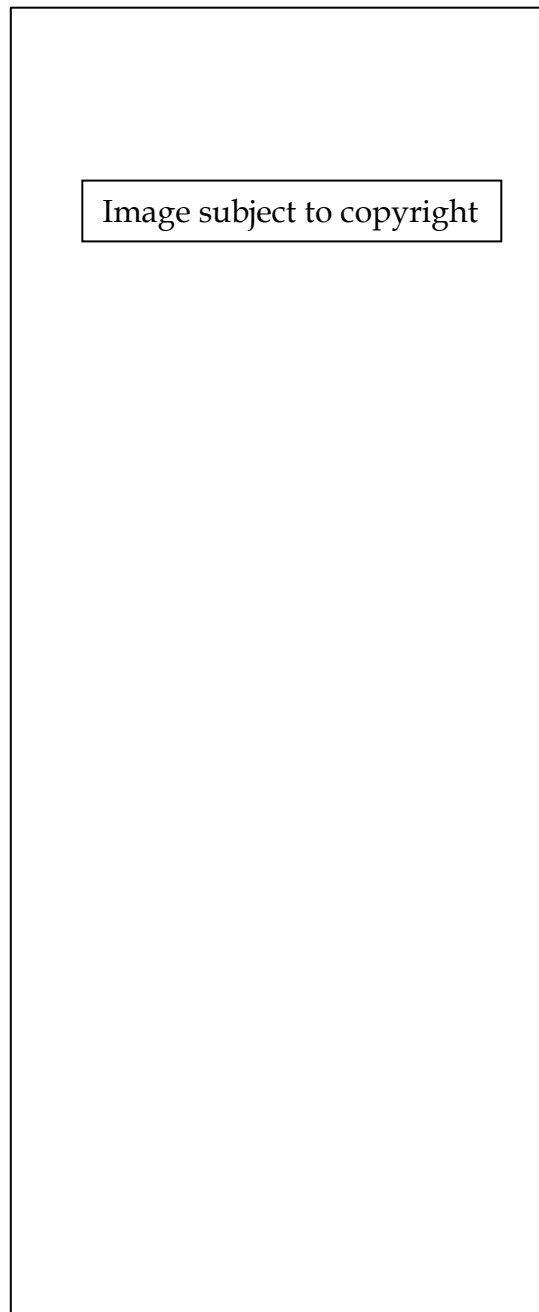


Figure 3.30 'Pollen percentage diagram (selected taxa) for Neolithic section of BEL core. A cross denotes a single pollen grain or spore.' After Verrill and Tipping 2010b, Figure 4.

Verrill and Tipping (2010b, 1019) propose that in pre-Neolithic Belderg Beg, '[t]he lower valley slopes were covered by thin detrital organic muds, with shallow islands of peat in topographic depressions'. Based on the single radiocarbon date GU-11634 SUERC-2055, they propose that 'the mid-altitude slopes were cleared of woodland in the early Neolithic, and small fields delimited with cleared stones' (*ibid.*). A substantial reduction in the proportion of grassland taxa, which Verrill and Tipping date to *circa* 5375 cal BP [5435 cal BC], is presumed to represent abandonment of the field systems. This is equivalent to the start of Molloy and O'Connell's pollen zone 5c (Section 3.3.3.ii, above). Like Verrill and Tipping, Molloy and O'Connell record an increase in arboreal pollen at this time, with alder (*Alnus*) and hazel (*Corylus*) well represented, however the continuing presence of grasses (*Poaceae*) in the Glenulra core was seen to be indicative of 'a reduced, though still substantial, level of farming'.

Although Verrill and Tipping's model sees farming abandoned during relatively dry conditions—as the subsequent increase in dryland taxon oak (*Quercus*) indicates—'deteriorating soil quality and erosion' are postulated as causal factors (2010b, 1019). Poor maintenance of the enclosed land is seen to have been a factor (*ibid.*). Molloy and O'Connell also saw oak values increase as grass pollen fell away at Glenulra at the end of their zone 5c. They proposed a 'climatic shift towards increased dryness' during their zone 6, beginning *circa* 5100 cal BP (O'Connell and Molloy 2001, 108). Cooney *et al.* 2011 (616, 623) model the end of zone 5c/start of zone 6 as 3300-2960 cal BC (95% probability); probably in 3210-3040 cal BC (68% probability), which—citing research by Caseldine *et al.* (2005) on Achill Island, Co. Mayo—they argue may have coincided with a period of increased storminess in the region.

Verrill and Tipping (2010b, 1019) similarly note this proposed 'regional shift to increased wetness' at the end of the fourth millennium cal BC,

although it does not register in their palynological data, and is 'slightly later than the evidence for abandonment at Belderg Beg'. Wetter conditions and the expansion of the bog would seem to rule out agriculture of any kind agriculture closer to the turn of the third millennium BC, and the basal peat dates W7 and W8 at Wall 1 (as well as pine sample UCD-C31). The very low incidence of grass pollen other than at the base of the BEL core also appears to rule out an environmental 'window' for Neolithic agriculture after *circa* 5400 cal BC.

The evidence for Bronze Age 'reoccupation' at the Belderg Beg site is taken to be 'unequivocal' (Caulfield *et al.* 2009c, 38), supported by Verrill and Tipping's (2010a) analysis of the plough-marks. The clearance of stone from the landscape in the context of this arable agriculture can be expected, and is supported by the dates for Wall 3. Reconciling the available evidence with the 'broader narrative' that sees Walls 1 and 2 constructed in the Early Neolithic is, however, 'challenging' (Caulfield *et al.* 2009c, 23).

Given that '[t]he development of bog in the area is complicated' (Caulfield *et al.* 2009c, 31), the stratigraphic sequences which underpin the case for Neolithic field systems are problematic. Setting aside the assumption that Walls 1 and 2 must be Neolithic, the increase in the proportion of 'pioneer genera such as *Betula*, *Corylus*, *Fraxinus*, and *Alnus*' (Verrill 2006, 126), above the base of the BEL core might be seen as the regeneration of woodland following a natural decline in tree cover: the Elm decline (which predates the core) being the obvious candidate. The available evidence linking Walls 1 and 2 to the pockets of open grassland that this environmental window afforded, as opposed to the established Middle Bronze Age farming activity, is insufficient.



3.4.5 The Garron Plateau, Co. Antrim

The Garron Plateau has likewise been associated with Neolithic land division (Cooney 2000c, 11; 2003, 50). However, while Woodman *et al.* (1991/2, 34) do speculate that there may have been seasonal grazing of sheep and cattle in these uplands during the Neolithic, they conclude '[i]t is presumed that the systematic clearance of this upland did not begin until after 4,000 BP, and that the numerous field boundaries found along the edge of the Garron Plateau belong to the Bronze Age.'



3.4.6 Roughan Hill, Co. Clare

For Cooney, Roughan Hill in the Burren is the site of a 'definite Neolithic' field system (2003, 50; 2000a, 46). However, the earliest dated field walls at Roughan Hill fall outside Cooney's own definition of Neolithic (i.e. pre-2500 cal BC; e.g. 2000a, 17; 2000c, 9). 'Mound walls' at Roughan Hill have been dated by association to settlement sites, which in turn have yielded Beaker pottery, (radiocarbon dated) animal bone refuse, and diagnostic Bronze Age artefacts (C. Jones *et al.* 2010, 37-8). These are the remains of Beaker/Early Bronze Age occupation, dating to c. 2500–2000 cal BC (*ibid.*; C. Jones 1998, 28; 41; 2004, 60).

Carleton Jones has conducted an extensive programme of relative dating of the mound walls at Roughan Hill. He has examined the relative erosion of the underlying limestone bedrock which has been protected from erosion by the walls. Jones has speculated, based on erosion rates, that some sections of wall may predate, and others may postdate, the core grouping (2004, 63; 2010, 39), but concluded that 'the majority of the

archaeology on Roughan Hill appears to date to the Beaker and Early Bronze Age periods' (*ibid.*, 38). Recent statistical analysis has confirmed that the outliers fit within a normal distribution, and suggest that 'all the mound walls and their associated habitation sites are Chalcolithic/Early Bronze Age' (C. Jones pers. comm., 29 January 2013).

Beaker pottery links the habitation sites on Roughan Hill to the fourteen wedge tombs in the surrounding landscape (the densest concentration of these monuments in Ireland) (C. Jones 1998; 2004, 60; C. Jones *et al.* 2010, 35-6). While Parknabinnia court tomb attests to a Neolithic presence on Roughan Hill, recent excavation failed to establish a temporal link between this monument and the mound walls. Interestingly, Neolithic activity at Parknabinnia court tomb extends unusually late into the Neolithic, through to the first half of the third millennium cal BC (Schulting *et al.* 2011, 32). Nevertheless, there is no evidence for the re-use of the monument during the Chalcolithic/Early Bronze Age (*ibid.*, 35).



3.4.7 Dartry Mountains, Co. Sligo

In a forceful critique of Burenhult's interpretation of the Carrowmore complex in Co. Sligo, Caulfield counters the view that permanent settlement post-dates the Neolithic by stating that 'one can find within 15 miles of Carrowmore, megalithic tombs with traces of field walls in association with them underneath peat' (1984, 388). This is perhaps a reference to the then recently discovered archaeological complex centred on the townland of Aghamore in the Dartry Mountains, Co. Leitrim. Once again, these are boundaries inundated by bog but *undated*, and spatially related to Bronze Age and later archaeology, as well as Neolithic remains (Whitefield 2009).

3.4.8 Achill Island, Co. Mayo

Excavations at Achill Island have recently uncovered ‘pre-bog’ field walls which are dated by association with roundhouses to the Middle Bronze Age (Rathbone 2011, 34). On Clare Island, a sample of ‘unidentified vegetal material from the base of the wall’ dates a ‘pre-bog’ field wall to the Late Bronze Age/Early Iron Age (UB 6289: c. 700-400 cal BC) (King 2007, 293). Caulfield *et al.* (2009c, 42) speculate that the origin of this wall ‘may have derived from the Neolithic’, but the excavator found no evidence of this.



3.4.9 Beara Peninsula, Co. Cork

A recent extensive programme of archaeological research in the uplands of the Beara Peninsula identified substantial evidence for ‘pre-bog’ field walls, though none were found to pre-date the Bronze Age (O’Brien 2009). The lead researcher observed that the ‘reliance on survey data, much of it highly problematic, has led to many assumptions regarding the relative contemporaneity and ‘association’ of landscape features’ (*ibid.*, 7). Excavations led by O’Brien at field walls in close proximity to a wedge tomb, and thus presumed to be of Early Bronze Age date, were in fact shown to date from the final Bronze Age/early Iron Age (*ibid.*, 9).



3.4.10 Caltragh, Co. Sligo

At Caltragh, a 'Neolithic' enclosure comprises three sections of undated bog-covered field wall (Danaher 2007, 65). The wall sealed a pit and linear cut which were associated with stone tools, but was itself overlain by three *fulachtai fiadh* (burnt mounds). Radiocarbon dates were obtained from samples at each of the burnt mound sites, dating them to 1650-1520 cal BC, 2194-1834 cal BC and 2195-1861 cal BC, so it appears that the wall was no longer performing its original purpose by the Middle Bronze Age (*ibid.*, 69). A nearby *fulachta fiadh* sealed two Bronze Age cremations (*ibid.*, 71).

Three stone axes were incorporated into the fabric of the walls (Danaher 2007, 66, 69) demonstrating that the wall post-dated the manufacture of the axes. Two deposits of burnt animal bones retrieved from the excavation of the wall were seen to be 'have been purposefully inserted at a later date', and considered 'possible closing deposits marking the end of use of the structure' (*ibid.*, 66). While 'no definitive date' is established for the enclosure wall, it is deemed 'probably Neolithic' (*ibid.*, 69; see Cooney *et al.* 2011, 574). This interpretive leap having been made, the inevitable links with Neolithic activity at Céide Fields follow (Danaher 2007, 69-70; Cooney *et al.* 2011, 625).



3.4.11 Millin Bay, Co. Down

At Millin Bay, a 'pre-cairn' wall associated with a multi-phase prehistoric monument has sometimes been linked with Neolithic agricultural field systems (e.g. Piggott 1958, 151; Cooney and Grogan 1994, 39), though not

by the excavators, who saw this unlikely given that the wall was constructed on sandy subsoil among accumulating dunes (A.E.P. Collins and Waterman 1955, 49). The wall runs alongside a long cist containing human remains dated to the Early/Middle Neolithic (see Schulting *et al.* 2011, Table 2), although this early determination may be the result of contamination of the dated samples (*ibid.*, 13-14, 32).

The wall was deemed to predate the central cist on the basis that it was constructed on the original ground surface (into which the cist was cut), and beneath shingle that accumulated into a low mound over much of the site (see Figures 3.31 and 3.32, below). An incomplete oval setting of stone slabs (some decorated), which surrounds the long cist, is also set into the original ground surface (A.E.P. Collins and Waterman 1955, 13). Within the oval stone setting is a 'raised stone-paved area' which constitutes the cairn (*ibid.*, 26; see Figure 3.32).

One of three 'axial' stones, a slab known as 'stone 49' is offset from the both the oval stone setting and an outer semi-circular setting of stone slabs (see Figure 3.31). According to the excavators, the 'pre-cairn' wall 'at this point had been removed to permit the erection of the orthostat' (*ibid.*, 18).

Nine smaller cists were identified, one of which is within the oval stone setting; the remainder are within a megalithic stone circle which surrounds the setting. The excavators did not consider these smaller cists to be primary features of the monument (A.E.P. Collins and Waterman 1955, 25).

The disarticulated partial assemblage of human bone recovered from the central cist is interpreted as re-interred material from secondary burials. This interpretation is supported by the absence of many bones and the incorrect replacement of loose teeth in jaw sockets (suggestive of prior defleshing) (A.E.P. Collins and Waterman 1955, 54, 19, 59). Sherds of

Carrowkeel ware (diagnostic Neolithic pottery) also recovered from the site (e.g. Case 1961, 185, Figure 12; Sheridan 1995, 7), may likewise originate from an earlier burial rite.

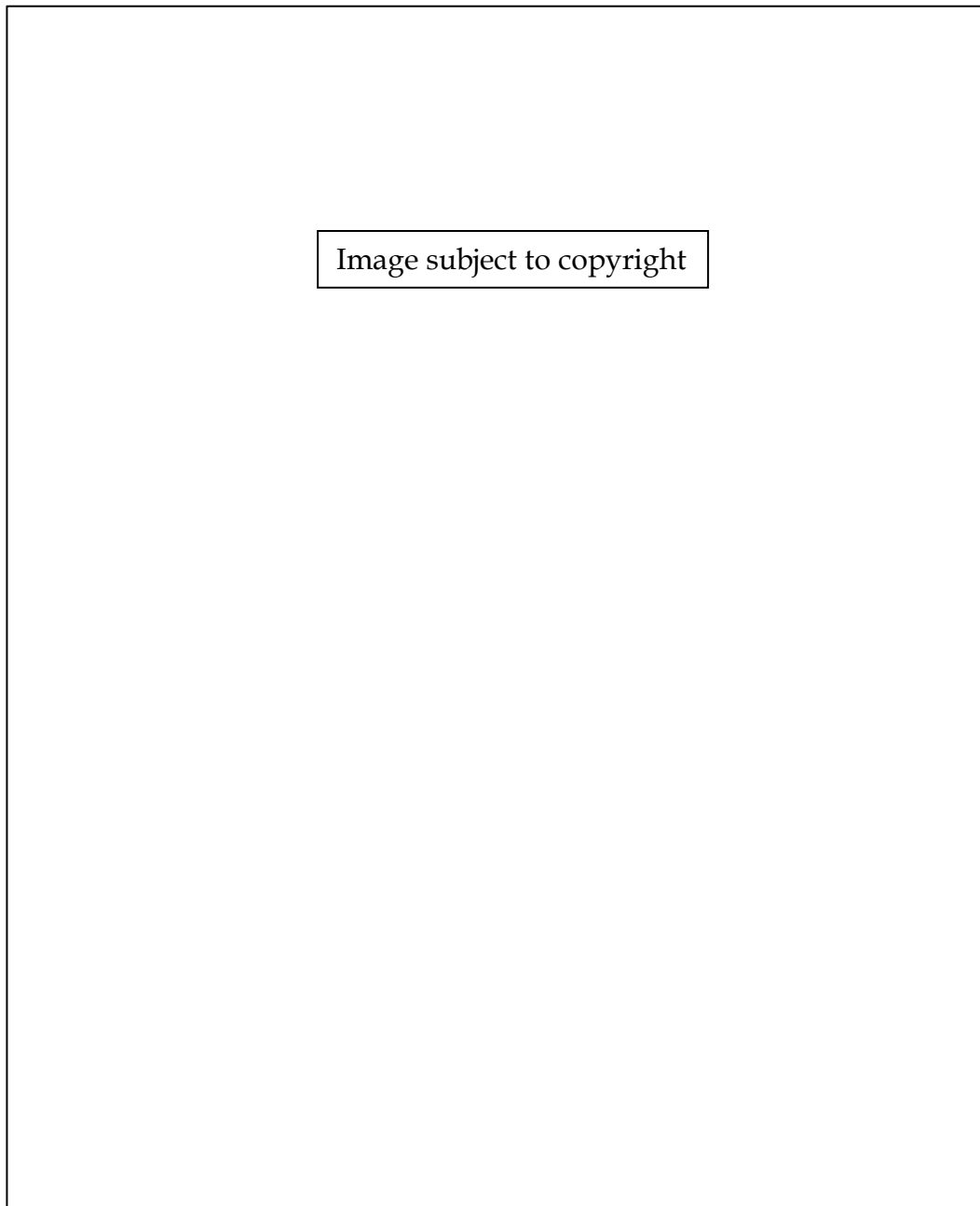


Figure 3.31: Plan of excavation at Millin Bay. The dry stone wall passes through gaps in the inner oval stone setting. According to the excavation report, a section of the wall was removed to enable the erection of stone 49. After A.E.P. Collins and Waterman (1955, Figure I).

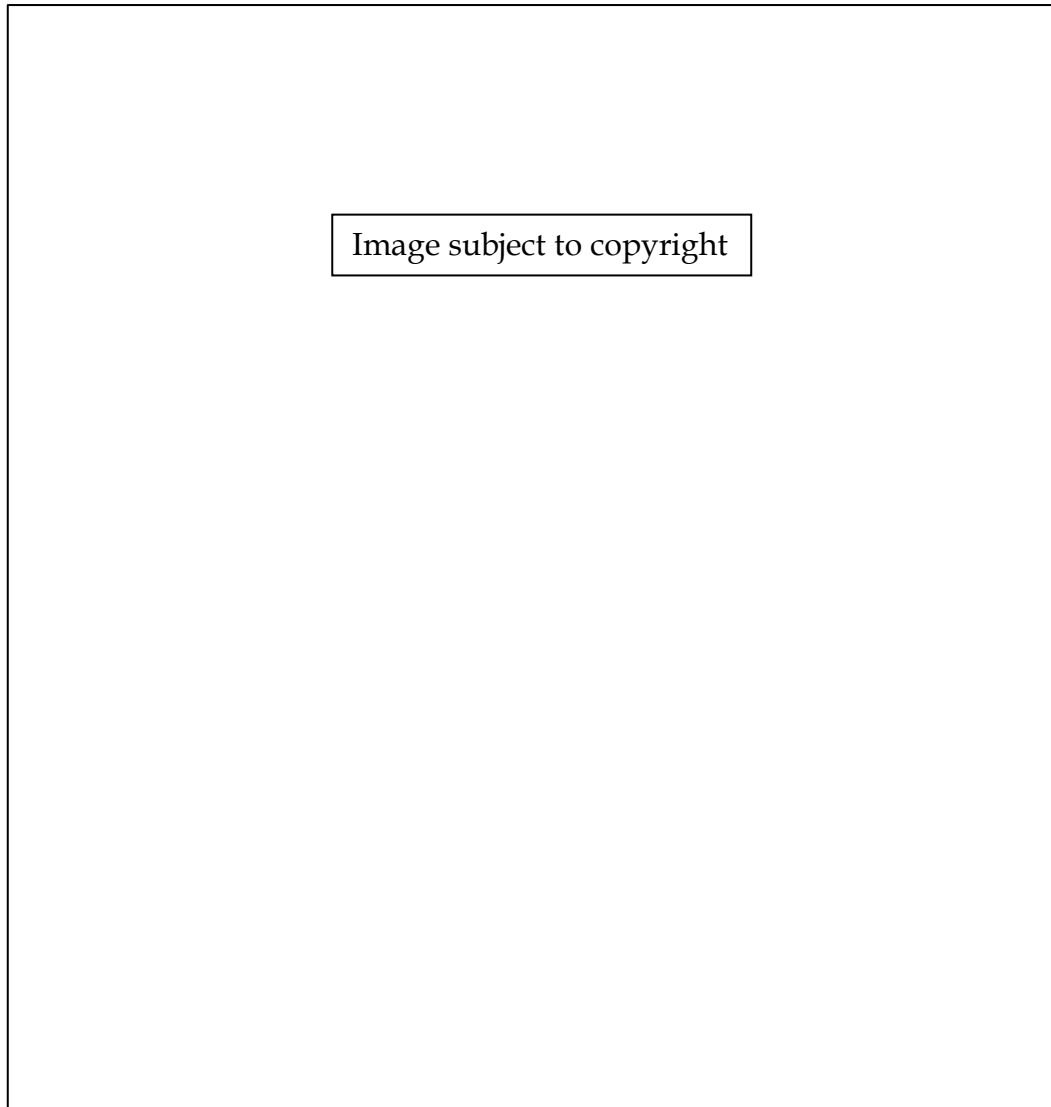


Figure 3.32: 'General view of cairn from north at intermediate stage of excavation.' The wall runs between the two men (top left), joining and exiting the low cairn through gaps in the oval stone setting of the curb. After A.E.P Collins and Waterman (1955, Plate II).

The relationship between the wall and dated bone (which itself appears not to be in its original setting) is unclear. The excavation report stresses that 'evidence of wall collapse was virtually absent and the structure appears to have remained in a recognisable condition until it was finally enveloped beneath the material of the cairn' (A.E.P. Collins and Waterman 1955, 8). The fabric of the wall comprises many flat stones similar to those incorporated in the monument (which *is* much disturbed). The wall does not appear to influence the architecture of the presumed-later monument, but passes through two distinct breaks in the oval stone setting, which, as

the excavators concede, 'suggests the wall is later than the setting (*ibid.*, 14).

Collins and Waterman (1955, 16) nevertheless conclude that the wall in fact pre-dates central cist. This is on the basis that an accumulation comprising mostly 'dirty shingle', which encloses the oval stone setting, is seen to be a continuation of the cairn (*ibid.*, 26), and thus contemporary with the setting (and by extension the central cist). The wall is subsumed beneath this material.

It is, however, unclear why the shingle of this 'retaining bank' should not be seen as a natural (later) accumulation in the 'dune-like conditions' known to have prevailed at the site. The 'mixed deposit of dirty shingle and stone' that formed the 'upper mound' of the cairn (see Figure 3.32, above) *was* deemed likely to have been 'an entirely natural phenomenon resulting from the continuing accumulation (and dispersal) of drift sand over the original monument' (A.E.P. Collins and Waterman 1955, 27).



3.4.12 Valencia Island, Co. Kerry

Of all the proposed examples of 'Neolithic' field systems in Ireland, just one is seen by Cooney *et al.* (2011, 623) as sufficiently robustly dated to support the establishment of Céide Fields in the earlier Neolithic: 'The single date for Valencia Island could be compatible with the use of that system in the mid-fourth millennium cal BC'.

G.F. Mitchell (1989, Table 2) recorded that radiocarbon date (I-14206) as 4760±100 BP), which is recalibrated by Cooney *et al.* (2011, Table 12.6) as 3710-3350 cal BC. The date came from a 2 m section of field wall exposed

by turf cutting at the Emlagh Bog Embayment in the townland of Cool West (G.F. Mitchell 1989, 75; see Figure 3.33, below). Though Ann O'Sullivan and John Sheehan (1996, 21) recorded the length of exposed wall as 6 m, it is not apparent that the wall is part of a field system. The proxy date for the wall came from 'willow twigs collected at the *level* of the base of the wall' (G.F. Mitchell 1989, 75 [my emphasis]).

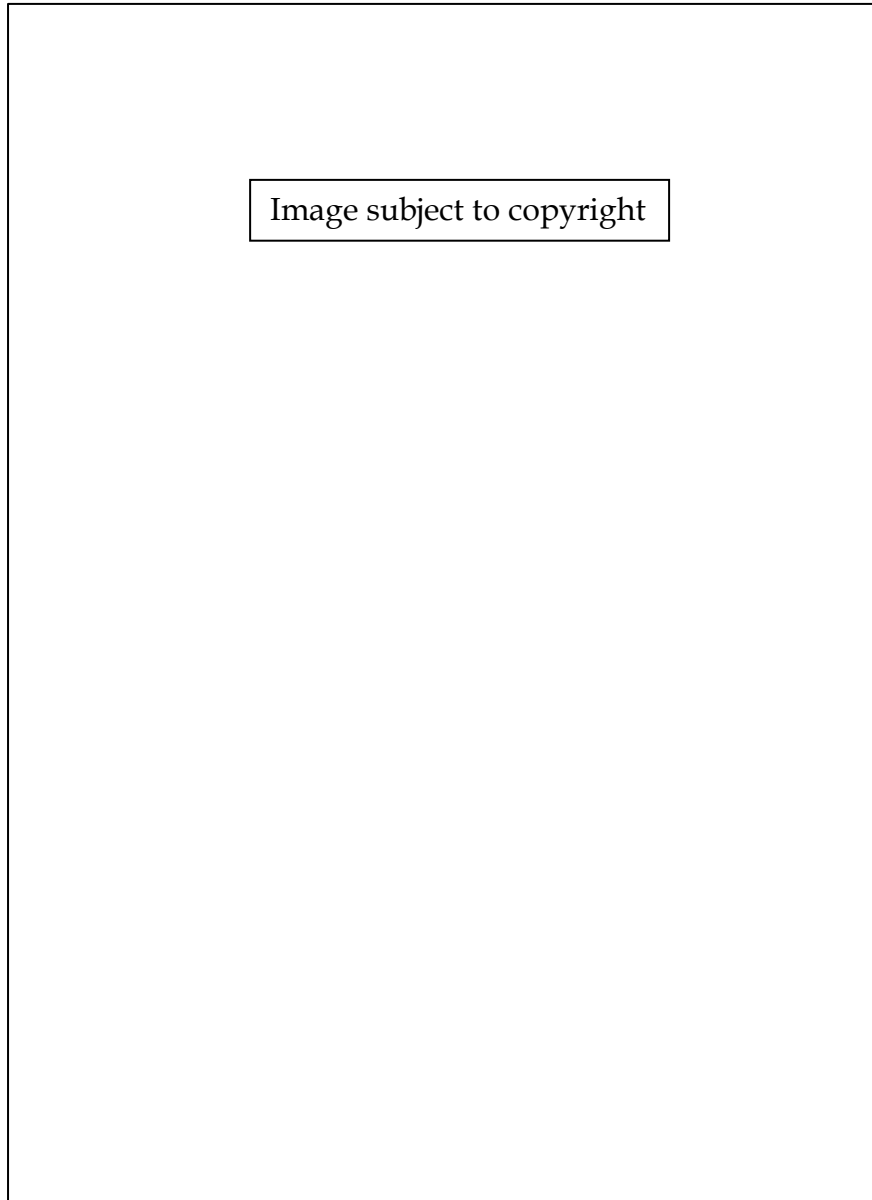


Figure 3.33: Section of exposed field wall at the Emlagh Bog Embayment, Valencia Island. The lighter material within the red oval is identified as exposed mineral soil. Some of the earth between the slabs was resting on peat, at what was presumed to be the surface level when the wall was constructed. After G.F. Mitchell (1989, 89).

Given that the ‘wall was erected by pushing a double line of stones down into the already-formed peat’ (1989, 89), the stratigraphy is clearly compromised. The single proxy date from twigs cannot be seen to pinpoint the date of activities within the disturbed stratigraphy. There are no corroborating Neolithic finds in the area. Bronze Age activity is, however, in evidence close by (*ibid.*, 16, 77), and extensive remains of later prehistoric field walls are recorded across the Island (*ibid.*, 98-9).



3.4.13 Critique summary

Cooney’s (2000a, 46) assertion that there are ‘numerous pre-bog field systems’ in Ireland is correct, however *none* are securely dated to the Neolithic. ‘Pre-bog’ does not automatically confer Neolithic status on an object or feature. ‘[P]eat is a notoriously difficult medium for dating’ (Baillie 1990, 362). It does not accumulate uniformly, and did not begin to develop until the Bronze Age or later across much of the Irish landscape (e.g. O’Connell 1990a, 68). Arguably, it is the coincidence of Bronze Age, rather than Neolithic, archaeology with field walls in Ireland that is more ‘noteworthy’ (cf. Molloy and O’Connell 1995, 221): particularly given that elsewhere in Europe, it is during the Bronze Age that such field systems enter the archaeological record.



3.5 Conclusion: a romantic vision?

The likely date of the pre-bog fields in North Mayo

The two field systems [Céide Fields and Belderg Beg] along the North Mayo coast which have been excavated have been shown to be of Neolithic date. The majority of the other pre-bog field systems in this region are also likely to date to this period for the following reasons:

- (1) There was an intensive Neolithic settlement of the region while, on the negative side, there are few monuments of later periods such as Bronze Age tumuli or Iron Age forts throughout much of the area.*
- (2) There is a general agreement in distribution between the Neolithic Court Cairns...and the occurrence of the field systems [...].*

Seamus Caulfield (1978a, 142).

Both of the field systems referred to in the above quotation are now dated primarily on the basis of interpolated age–depth models from pollen cores in peat basins. The establishment of the coaxial field systems on Céide hill ‘is best dated by the start of the major clearance episode visible in the Glenultra pollen record’ (Cooney *et al.* 2011, 622; see also Cooney 2007, 554–5). The relatively high proportion of grass pollen at the base of the BEL pollen core ‘is interpreted to represent pastoral agriculture in the fields enclosed by Walls 1 and 2’ at Belderg Beg (Verrill and Tipping 2010b, 1017). Each model identifies a single environmental window during the Neolithic when there appears to have been sufficient breaks in the tree cover for agriculture to have taken place at scale. However, ‘[a]ll age–depth models are wrong’: the question is ‘how badly?’ (Telford *et al.* 2004). A key constraint is the (incorrect) assumption of a constant rate of sedimentation between the (few) dated strata. As the deviation from this assumed linearity increases, interpolated dates become increasingly inaccurate, with precision spuriously high’ (*ibid.*, 5).

Both analyses were initiated on the basis that the Neolithic provenance of nearby field walls was an (archaeologically) established fact. However, direct evidence in support of the Neolithic interpretation of the north Mayo field systems remains elusive. The broad spatial coincidence between the field systems and a dispersed grouping of court tombs identified by Caulfield (above) does not demonstrate temporal equivalence. Archaeological interpretations rely upon the presumed integrity of stratigraphic relationships environmental proxies in the blanket peat.

The argument that 'pre-bog' (beneath bog) walls *must* be Neolithic because peat in the region has been dated to the Neolithic is predicated on a fundamental misunderstanding of the formation, development (and erosion) of oceanic blanket peat on undulating ground. Rather than carpeting the landscape in a single 'Pompeii-style' event, the peat formed first in the foci of drainage waters – such as the peat basins in the Glenulra and Belderg valleys from which the GLU-IV and BEL pollen cores were extracted – and on the summit plateaux and valley floors. Gravity determines that hillslope peat accumulates later, in thinner deposits, and is especially prone to erosion, remobilisation and redeposition. In particular, the intense hydrological activity that is characteristic of undrained blanket peats, particularly during wetter periods, and especially along basal drainage channels and into drainage features, destabilises materials suspended in the bog.

Microscopic fractions (including humic substances and pollen) are especially mobile, however larger macrofossils such as the remains of tree stumps are also susceptible to the inherent instability of the peat matrix, with soil creep and more dramatic mass movements such as bog bursts and peat slides leading to redeposition. Inevitably, there are implications for the integrity of stratigraphic relationships: 'if inferences are drawn

from data based on only one or two sites per hillslope (particularly in the absence of exhaustive sub-peat topographic surveys), then the possibility of spurious inferences are highly likely' (Edwards and Hirons 1982, 36).

In the absence of evidence for Neolithic cereal cultivation, it is assumed that the landscape was (albeit unnecessarily) cleared of stone for pastoral farming. There is, however, 'no primary evidence regarding the livestock species kept at Belderg Beg or indeed Céide Fields' (Verrill and Tipping 2010b, 118). The assumption that the Neolithic environmental windows identified by Molloy and O'Connell (1995) and Verrill and Tipping (2010b) must be when the respective field system at Céide Fields and Belderg Beg were laid out are path-dependent, relying on the prior assumption that both field systems *must* be Neolithic.

Broader palaeoenvironmental research by both Molloy and O'Connell and Verrill and Tipping demonstrated the Bronze Age provenance of associated presumed-Neolithic evidence. Though less celebrated, Bronze Age archaeology has long been very much in evidence among the field systems. On the same page as the quotation at the head of this Section, Caulfield (1978a, 142) identifies significant evidence for Bronze Age activity in association with the field walls at Belderg Beg is discussed (see also Caulfield 1978a, 141). Four years earlier, the case for Bronze Age settlement in Belderrig (Belderg) valley was stated as follows:

...if this second occupation was by Bronze Age people, their presence here is readily understandable. A rich vein of copper in the cliff-face a mile to the north-west would be reason enough for a settlement by a metal-using community. Early Bronze Age settlement in Belderrig valley is already indicated by the wedge-tomb on the opposite side of the valley half-a-mile to the east (Caulfield 1974).

In recognition of the significant Bronze Age presence in the region, the project to bring the archaeological research to publication is entitled *Neolithic and Bronze Age Landscapes of North Mayo*. At Belderg More, a

‘suspected’ Bronze Age stone circle, not recorded in the Record of Monuments and Places, is noted (though its relationship with the field system is not described) (Caulfield *et al.* 2009c, 50). The shallow peat deposits on Céide hill have been accepted as evidence that at least *some* of the enclosed land at the heart of Céide Fields ‘probably remained free of bog until at least the late Bronze Age’ (O’Connell and Molloy 2001, 101; Molloy and O’Connell 1995, 213; Cooney *et al.* 2011, 616). Here, ‘sporadic farming activity’ is thought to have taken place within the boundaries ‘in the millennia after’ the hypothesised ‘main occupation’ of the fields’ (Caulfield 2011a, 112). The ‘second occupation’ at Belderg Beg is dated by the roundhouse and associated wooden stakes following the line of a field wall.

Although none of the radiocarbon dates associated with Céide Fields or Belderg Beg are free from potential sources of error, it is contextually secure radiocarbon dates pertaining to the hypothesised ‘primary’ Neolithic field systems that are conspicuously absent. Presumed evidence for Neolithic ploughing at both Céide Fields and Belderg Beg has been shown to be Late Bronze Age. Peat formation in direct association with an excavated section of field wall at the heart of Céide Fields was dated to the Late Bronze Age. Hearths and associated charcoal, also in the vicinity of the Céide Fields visitor centre, have been comprehensively dated to the Bronze Age.

Elsewhere in Ireland, where ancient field systems have been linked to the Neolithic, this has generally been on the basis of the precedent set by the north Mayo field systems, in particular Céide Fields. In the broader European context, Céide Fields stands alone as the only coaxial field system dated to the Neolithic (e.g. Fleming 1987; 1989; A. Harding 2000, 155; Turner 2012, 31; R. Johnston 2013, 316-8). Indeed, given the absence of such fields in contemporary Neolithic Brittany (Scarre 2011, 38), Galicia

(Bradley 1997, 52), and Britain (Fleming 1987; 1989; R. Johnston, 2013; Turner 2012, 31) it is difficult to imagine where the 'immigrant farmers with an already established neolithic economy' (Caulfield 1983, 205) arriving in Ireland drew inspiration.

The presumption that Céide Fields is Neolithic has significant implications for the way the Neolithic in Ireland (and Britain) is characterised. Rowley-Conwy (2004, S92), for example, maintained that '[t]here has never been any good reason to suggest' that Céide Fields was poorly dated, observing that 'if such a huge system was Neolithic, it would demonstrate the importance of agriculture [...]'. Thus, Céide Fields is central to arguments for the rapid introduction of mixed agriculture centred on fixed settlement in Early Neolithic Ireland and Britain (e.g. see Cooney 1997, 28; 1999, 50; 2000a, 45; 2003, 50; 2007a, 555; Rowley-Conwy 2004, S92; 2011, S443; Sheridan 2003, 3; 2007b, 442, 465).

Claims of any form of Neolithic field systems in Europe are rare, and with the exception of Céide Fields, pertain to the Late Neolithic/Early Bronze Age, and to smaller, more irregular arrangements (e.g. R. Johnston 2013, 316-8; Turner 2012; see Chapter 5). An obvious parallel in Ireland is Roughan Hill. It is feasible that among the sub-peat land divisions of north Mayo there are individual plots or small groups of fields that were laid-out during the Late Neolithic/Early Bronze Age. It is among such 'smaller, more "organic"'⁷ arrangements, possibly dating from the later third millennium BC, that research into the origins of stone-walled land divisions in Ireland should focus. There is insufficient evidence to contend that the coaxial field system on Céide hill predates the established later Bronze Age/Iron Age north European phenomenon of 'Celtic' fields, nor that Céide Fields is early within this sequence in a European context.

Chapter 5 examines the enduring appeal of the Neolithic interpretation of Céide Fields in Irish archaeology. It is argued that the characterisation of proto-modern farming communities in Neolithic Ireland creates a deceptively familiar image. This serves to compress time, stifling the advancement of knowledge and understanding of Neolithic life. Chapter 4 examines the parallel characterisation of Neolithic rectangular timber structures in Ireland as the forerunner of the vernacular farmstead.



Notes

¹ The field walls/field systems under analysis are defined by their proposed agricultural purpose. Kerbs surrounding megalithic tombs, for example, are excluded.

² In addition to the information in the first four columns of the Table 3.3, Caulfield *et al.* supply an Irish National Grid reference for each sample (see Figure 3.3).

³ It is recommended that the outer rings of trees are used for radiocarbon dating samples in order to militate against the risk of dating 'old wood' (e.g. Bayliss *et al.* 2011, 38). O'Connell and Molloy (2001, 101-2) calculate that the failure to record which parts of most of the stumps were sampled introduces a further potential error up to *c.* 100 years.

⁴ Description of Céide Fields from Byrne *et al.* (2009a, 5).

⁵ Description of Céide Fields from O'Connell and Molloy (2001, 100).

⁶ Date calibrated in OxCal 4.2 (IntCal 13) (<https://c14.arch.ox.ac.uk/oxcal>).

⁷ See R. Johnston (2013, 318).



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Chapter 4

Finding home in Neolithic Ireland

4.1 Speculating on Neolithic houses

The dwelling-house, a potent symbol...stands as testimony to an ancient system of values, a world-view which has filtered through the millennia from the Neolithic Age to the twenty-first century, retaining many of the same essential characteristics of height, shape and width for thousands of years.

Fidelma Mullane, *Vernacular architecture* (2000, 71)

Given that the people of Neolithic Ireland are seen to have practised mixed farming, archaeological convention dictates that recognisable farmhouses should be a feature of the archaeological record (e.g. Thomas 1999, 10). Indeed, '[t]he apparent paucity of house structures over much of Britain is held up as evidence for a non-sedentary way of life' (Sheridan 2010, 89). Southern Britain in particular is often contrasted with Ireland: the latter seen as 'not quite so bereft of evidence for a sedentary(ish) lifestyle' (*ibid.* 2003, 3).

The first such discovery in Ireland was at Lough Gur, Co. Limerick, where excavated structural remains were interpreted as the dwellings of a Neolithic 'village community' (Ó Ríordáin 1954). Significantly, rectangular buildings were among those excavated, enabling comparisons with the vernacular rural architecture of twentieth-century western Ireland (*ibid.* 1979, 4). Since the Lough Gur excavations, around eighty rectangular wooden structures deemed to be Neolithic have been identified across Ireland, although the west of Ireland is poorly represented (Smyth 2011; 2013a; 2014; see Figure 4.1, below). Smyth's (2006; 2011; 2013a; 2014) important recent syntheses of the island-wide evidence build on earlier works by Grogan (1996; 2002; 2004).

BC (and before the start of the Neolithic in Ireland or Britain), longhouse construction in continental Europe had lapsed (e.g. Whittle 1996, Chapter 6; 2003, 272). Furthermore, the Irish buildings are substantially smaller than the earlier European longhouses, and there is little material evidence beyond their (generally) straight walls to suggest that the Irish structures fulfilled a similar purpose, or reflect a cultural affiliation (Bradley 2007, 40).

The interpretation of the Irish rectangular timber structures as the domestic counterparts of Neolithic monuments – the family dwellings of Ireland’s first farmers – came prior to many advancements in techniques of excavation and analysis (e.g. Cross 2003, 198). Significantly, it has since been demonstrated that the rectangular structures at Lough Gur almost certainly date to the later Bronze Age (e.g. Cleary *et al.* 2003). Nevertheless, the image of an Early Neolithic landscape dotted with farmsteads that would be familiar to modern eyes endures (see Figure 4.2, below).

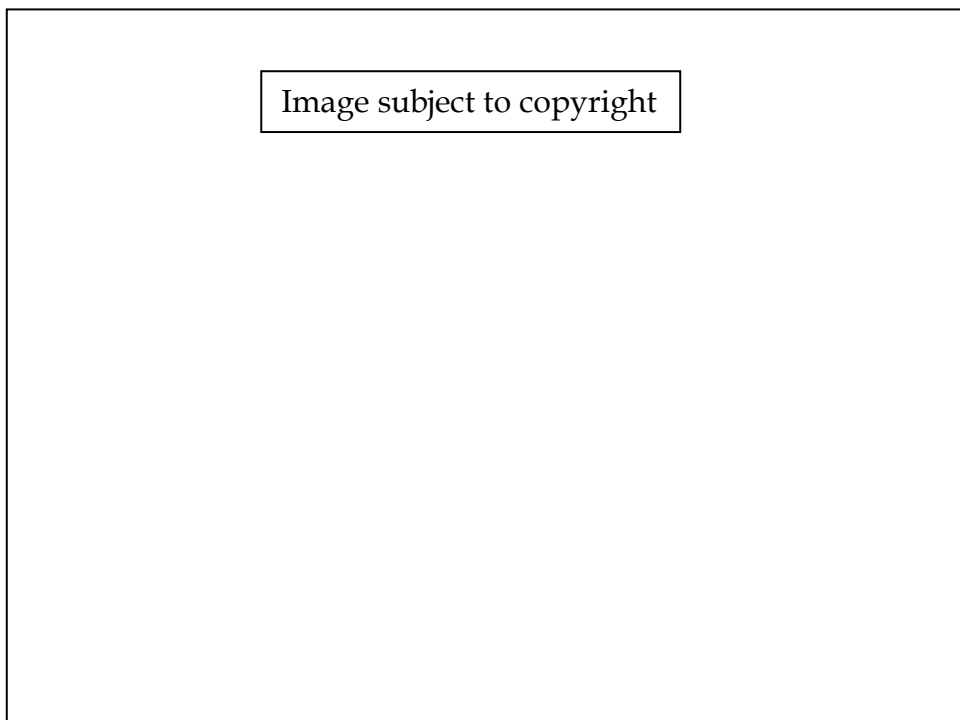


Figure 4.2: '3D digital of visualisation an early Neolithic house at Gortore townland [Co. Cork] by Julianna O'Donoghue (Eachtra Archaeological Projects)', reproduced by McSparron 2008, Plate 1.

In common with stone-walled field systems, rectangular timber ‘houses’ are seen as part of the ‘settlement signature’ of Neolithic Ireland (e.g. Smyth 2011, 28). Excavations at the sites of several of the timber structures have yielded precise Neolithic radiocarbon dates; many of these dates are clustered in the earlier Neolithic. Thus, cast as the farmsteads of the first ‘colonising’ farmers (e.g. McSparron 2008, 19), the buildings form part of a compressed model of the Neolithic akin to the short chronologies of (pre-radiocarbon dating) cultural-historical archaeology. Change occurs with the arrival of the new cultural group (cf. Warren 2013, 528-9), following which social change is limited until the arrival of the next colonists, or the occurrence of an environmental calamity.

Whether or not there was a step-change to a proto-modern farming lifestyle at the very start of the Neolithic in Ireland is at the heart of the present study. The assumption that rectangular timber structures were (almost without exception) the accommodation element of a simultaneously-introduced ‘uniform culture package’ (Cooney 2007a) is cognate with the idea of a clean break with the pre-farming past. However, the direct evidence for the function of the buildings (which are by no means homogeneous in character) is limited (e.g. Cross 2003, 198). In what follows, it will be argued that ambiguous evidence has routinely been interpreted as self-evidently domestic. In combination with the frequent assumption that spatially related artefacts and ecofacts are temporally related, this has led to the widespread acceptance of a conflated narrative.

The excavated structures have typically been heavily truncated by later activities, and in no case does the floor survive. Most of the material culture (and most of the radiocarbon dates) come from construction contexts, and may therefore bear little relation to the way in which the structures were used day to day. Direct evidence linking the buildings to

farming is poor. Animal bone is almost totally absent, and as will be demonstrated, evidence linking the buildings to arable farming is less reliable than is generally acknowledged. Field systems cannot be reliably linked either spatially or temporally with the Neolithic structures. Pottery sherds are the most consistently recovered artefacts, but these are not of course diagnostic of domestic activity.

I argue that the routine characterisation of these structures as familiarly domestic is path-dependent, relying heavily on preconceptions. This is not to create a dichotomy between 'ritual' and domestic, or claim that no Neolithic family ever spent the night in a rectangular timber structure. However, to suggest that the larger, plank-built examples are representative of Neolithic farmers' 'homesteads' will be shown to be at best speculative. Acknowledging the variability of the structures, and seeing them in the context of developing architectural traditions (not limited to dwellings), opens out the temporality of Neolithic life, rather than closing it down.

The review of the evidence begins with a summary of current knowledge of settlement practice prior to the appearance of the rectangular structures. A brief history of research into Neolithic houses across Ireland follows. Next, the current evidence and interpretations are critiqued. Particular attention is paid to cereal remains, as (in the absence of faunal remains) these are fundamental to the linking of the buildings directly with agricultural activity. Radiocarbon dates associated with the structures are then reviewed. Finally, the evidence from the small subset of buildings in the west of Ireland is reviewed in the context of the national picture. The social and theoretical backdrop to interpretation of the evidence is examined more fully in Chapter 5.



4.1.1 Before the 'boom': settlement structures in Mesolithic Ireland

Mount Sandel, Co. Derry, currently provides the earliest reliable evidence of a human presence in Ireland, marks the beginning of the Irish Mesolithic, and incorporates the first settlement structures (e.g. Woodman 2009). Here, roughly circular arrangements of postholes arranged around central hearths provide the main evidence for the dwellings (*ibid.* 1985, 129-36). The structures were preserved in a slight hollow, each measuring *c.* 6m in diameter. At least seven structures were identified from among the mass of postholes, stakeholes and hearths, with the maximum number of possible structures not thought to exceed 10 (*ibid.*, 172-6). Based on the size and angle of some of the postholes, the structures were constructed of flexed saplings (see Figure 4.3, below). No evidence survives of the materials used to cover the timber frames.

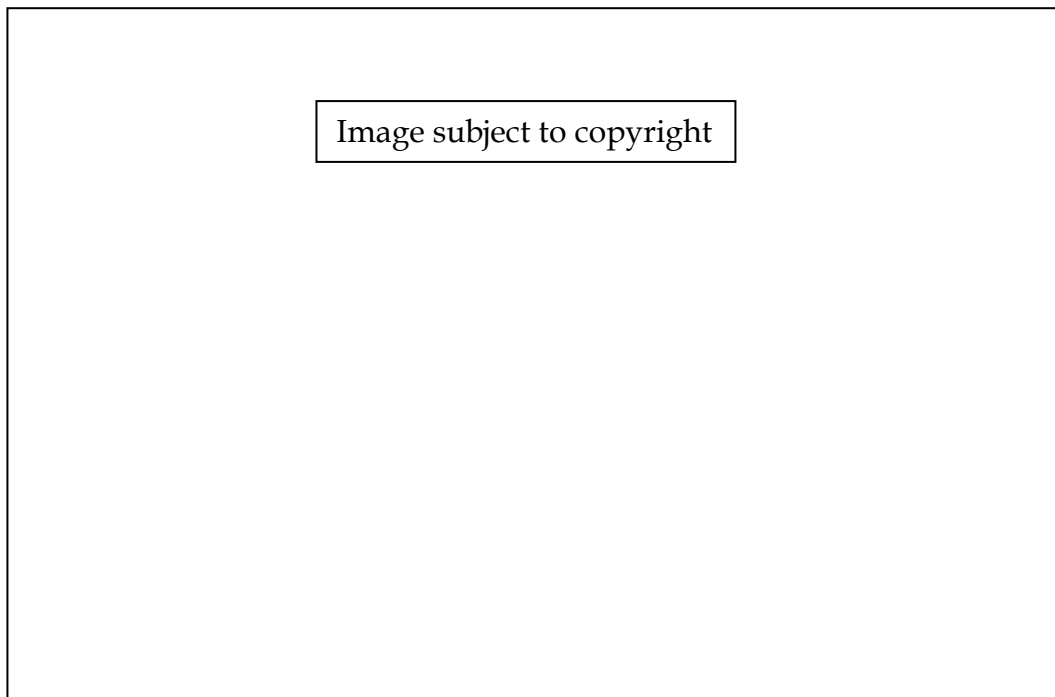


Figure 4.3: Hypothetical reconstruction of hut framework at Mount Sandel. After Woodman (1985, Figure 66).

The dating evidence from the Mount Sandel excavations (carried out in the late 1970s) has recently been augmented by the AMS radiocarbon dating of additional samples, and Bayesian modelling (Bayliss and Woodman 2009). Occupation at Mount Sandel is now thought to have commenced *c.* 7700 cal BC, and possibly lasted for less than 100 years (*ibid.*, 116-21). Beyond Mount Sandel, no settlement structure in Ireland predates rectangular Neolithic buildings on present evidence.

While Mount Sandel is unique in Ireland, there are comparable sites in Britain. At Howick, Northumbria, a substantial sub-circular hut *c.* 6m in diameter was twice rebuilt, and occupation at this coastal site appears to span at least three generations in the early centuries of the eighth millennium cal BC (Waddington 2007, 196-7, 203). At Broom Hill, Hampshire, a series of hollows—one with hearth, and inclined stakeholes defining an area of *c.* 5m x 4.5m—may mark the position of shelters similar to those at Mount Sandel (C. Smith 1992, 131-3; Tolan-Smith 2008, 148). Though less reliably dated, the site appears to have been occupied in the mid-eighth millennium cal BC (Waddington 2007, 212; Tolan-Smith 2008, 148). At East Barns, East Lothian, angled postholes define a structure *c.* 5m by 6m, incorporating a possible hearth, dated to *c.* 8000 cal BC (Gooder 2007, 51-3)

Like Mount Sandel, the British sites are characterised by assemblages of narrow-blade microliths (e.g. Waddington 2007, 223), though Bayliss and Woodman (2009, 118) suggest that insular aspects of the Mount Sandel assemblage may indicate that earlier sites remain to be discovered in Ireland. Nevertheless, there are clearly sufficient similarities to indicate some level of seaborne contact between Britain and Ireland during the earlier Irish Mesolithic (e.g. Woodman 2009, 202-3; Tolan-Smith 2008, 152).

Understanding of Irish Mesolithic settlement, and indeed the Early Mesolithic in Ireland generally, is based primarily on the 'type site' of Mount Sandel (Finlay 2003, 92; Woodman 2009, 202). A semi-sedentary existence, centred on presumed 'base camps' is sometimes hypothesised, in contrast to a more mobile later Mesolithic (e.g. Woodman 1985, Chapter 12; Woodman *et al.* 1999, 137-9). Nevertheless, in Ireland Mount Sandel remains the Early Mesolithic 'base camp bench mark that all other sites fail to meet' (Finlay 2003, 84). In the absence of Mount Sandel, the Mesolithic in Ireland would present quite differently; likewise, a single new site could 'radically change our knowledge' of the Mesolithic in Ireland (Woodman 2003, 7; Finlay 2003; 91; Cooney and Grogan 1994, 10).

So scarce are Mesolithic find spots in Ireland that as of 2003, their number was comparable to the Isle of Man, an island with a land mass less than 1% that of Ireland (Woodman 2003, 13; McCartan 2003). The period attracts limited specialist interest in Ireland, and it is considerably more difficult for non-specialists to identify Mesolithic sites (e.g. Warren 2013, 538; Wickham-Jones 2005, 34; Fredengren 2002, 112). Diagnostic durable materials such as pottery and metals do not feature in assemblages, and besides middens there is also an absence of defined structures. For the non-specialist excavating a site where Mesolithic and later archaeology occur in close proximity, a modest assemblage of surviving Mesolithic material may lack the cachet of excavating, say, a rectangular prehistoric building or precious metals (cf. Warren 2013, 534). Time pressures and other priorities may result in the Mesolithic evidence not receiving suitable treatment and recording (Woodman 2003, 15).

The 'classic' locations for Mesolithic sites, particularly in Ireland, are at the water's-edge (i.e. rivers, lakes and the sea shore). These are often in poor coincidence with excavations in advance of commercial developments such as the recent road schemes in Ireland (Woodman 2003, 15). In the

south and west of Ireland, marine transgressions may have resulted in many Mesolithic sites being inundated by the sea (e.g. Woodman *et al.* 1999, 133; Milner and Woodman 2007, 10). Continuing coastal erosion was the impetus for the excavations at the important Late Mesolithic site of Ferriter's Cove, Co. Kerry (*ibid.*). Burenhult (1984, 41) obtained a fourth millennium BC radiocarbon date for peat growth at the shoreline at Strandhill, Co. Sligo (close to the Carrowmore megalithic cemetery), suggesting that the sea level here had risen by at least a metre since the Neolithic, possibly eroding earlier parts of prehistoric shell middens. Clearly, regardless of archaeological practice, in Ireland, as in parts of Britain and Scandinavia, the discovery of a representative sample of Mesolithic sites cannot be expected (Woodman 2004, 293; 2009, 208).

In Ireland, as in Britain, the dearth of evidence from the later Mesolithic constitutes a significant weakness in models of the Mesolithic-Neolithic transition (e.g. Whittle 2007a, 379). The density of lithics at find spots is often low, and microliths by their nature are elusive, particularly at disturbed sites. Later Mesolithic tools can be hard to differentiate from Neolithic assemblages (e.g. Woodman and E. Anderson 1990, 377; Woodman *et al.* 1999, 139; see Woodman 2005). This absence of *evidence* from the Mesolithic period, often results in 'recourse to gross generalisations' (Finlay 2003b, 92; e.g. see Cooney 2007a, 545). Mesolithic evidence is certainly less accessible than that of later periods, and must be approached differently, yet it cannot be taken as read that because largely organic material culture has decayed, Mesolithic material culture lacked sophistication (see further discussion below).

Taphonomic factors, then, are not the only obstacle to meaningful comparisons between the Mesolithic and Neolithic. The transition between these two archaeological constructs also 'marks the meeting point between different traditions of enquiry' (Edmonds 1999, 5; c.f. e.g. Milner

and Woodman 2005b, 5; Warren 2009b, 617). The same evidence is likely to be interpreted very differently if deemed to have come from a Mesolithic context rather than a Neolithic context (e.g. Zvelebil 1996, 149; Bailey and Whittle 2005, 4-5), even though chronological overlaps and misinterpretation may render this distinction entirely artificial (e.g. Woodman 1994, 216-7; Woodman 2005, 140-1). As Woodman and Anderson (1990, 377) put it:

As much of the later Mesolithic material came from a very late context there was a need to define the Mesolithic as something typologically distinct from the Neolithic, but which might overlap chronologically. The result is a relatively tight set of definitions, that may have excluded aspects of later Mesolithic assemblages in order to maintain the difference between Neolithic and Mesolithic assemblages.

The spatial proximity of known later Mesolithic and Neolithic material may be indicative of cultural continuity (*pace* Thomas 2008, 67). Examples include Newferry, Co. Antrim (Woodman 1977); Ballydown, Islandmagee, Co. Antrim (Crothers 1996; D. Moore 2003, 156, 174); Bally Lough, Co. Waterford (Green and Zvelebil 1993, 22); Baylet, Co. Donegal (Woodman and Milner 2003; Woodman 2009, 197-8); Dalkey Island and Sutton, Co. Dublin (Woodman *et al.* 1997, 137-138, 143); Killuragh Cave, Co. Limerick (Woodman and O'Shaughnessey 2003); Hermitage, Co. Limerick (T. Collins and Coyne 2006); Belderrig, Co. Mayo (Warren 2006; 2009a); and Clowanstown, Co. Meath (Mossop 2009, 899) (see also Chapter 5, Section 5.3).

Nevertheless, evidential biases in combination with particular archaeological approaches 'inevitably produce a Neolithic that is sharply differentiated from [Mesolithic] societies, and consequently one in which the gulf between pre-farming and farming societies is hugely exaggerated' (Finlayson and Warren 2010, 79). Pluciennik (2008, 19) argues that in many ways the Mesolithic continues to be 'defined by default *against* the Neolithic' (my emphasis), sedentism being traditionally seen as a social-

evolutionary jump achieved at the start of the Neolithic (e.g. Milner 2005b, 32; Thomas 1999, 10). However, the presumed step-change in settlement practice at the start of the Neolithic in Ireland may be illusory. The four millennia-long absence of post-Mount Sandel evidence for settlement structures continues beyond the Early Neolithic, *unless* the Early Neolithic rectangular buildings are dwellings. No other potential dwellings have been dated to the Early Neolithic, but circular dwellings of similar dimensions to the Mount Sandel structures have been identified in the middle and later Neolithic (e.g. Smyth 2011, 18; see below).

In the absence of further evidence, the Mount Sandel structures are often seen to define the Mesolithic house building 'tradition' in Ireland (e.g. Cross 2003, 195-6). The rectangular buildings are thus seen to represent a break with tradition, and signify a new way of life (e.g. Cooney 2007a, 556). However, among the corpus of Irish Neolithic rectangular buildings are insubstantial post-framed structures where no great leap forward in construction techniques utilised at Mount Sandel is in evidence. Similarly, in Britain, at Bolam Lake in Northumberland, an insubstantial earlier Neolithic post-built straight-sided ('tent-like') structure, *c.* 10 m by 3.5 m, was interpreted as a temporary dwelling, albeit in the context of transhumance (Waddington and Davies 2002; Sheridan 2007a, 446-7; see Chapter 5). It would seem unlikely that the construction of a shelter with a straight edge was beyond the gift of the Mesolithic inhabitants of Ireland and Britain.

At the other end of the spectrum of wooden rectangular structures in Neolithic Ireland are the larger buildings constructed of split-oak planks. Some are 'monumental in terms of scale as well as in terms of having historical or enduring significance' (Smyth 2011, 28). Are these unequivocal evidence of a farming society that defines itself through extravagant domestic architecture?

4.1.2 Living in the past: the settled Neolithic

The plans of houses at Ballyglass, Co. Mayo, and Ballynagilly, Co. Tyrone, show comfortable dwellings comparable in size to Irish rural cottages. The stout timber constructions would not merely be adequate but even quite comfortable quarters. These long-barrow people were no mere primitive peasants let alone semi-nomadic pastoralists as has sometimes been suggested. Their farms and houses show them to have been well-organized stock raisers and agriculturalists.

S. P. Ó Ríordáin (1979, 4)

As mentioned in Chapter 2, the first presumed-Neolithic rectangular Neolithic ‘houses’ to be identified in Ireland were recorded in the context of the prehistoric ‘village’ on the Knockadoon Peninsula at Lough Gur (Ó Ríordáin 1954). It was Ó Ríordáin’s wish that his characterisation of Neolithic farming life at Lough Gur should act as a template for the interpretation of future discoveries of Neolithic buildings (*ibid.*, 456), and so it has proven.

Ó Ríordáin’s excavations at Lough Gur were pioneering in scope, investigating an archaeological landscape rather focusing at site level (Woodman 1983, 26; 1993, 7). His work has understandably been influential in shaping archaeological expectations of Neolithic settlement in Ireland (e.g. Cooney *et al.* 2011, 597; Smyth 2013a, 301). However, Ó Ríordáin’s characterisation of Neolithic Lough Gur was developed at a time when a ‘short rich Neolithic’ was seen to mark the transition between Mesolithic and Bronze Age (Woodman 1993, 7). Though notions of a ‘short-sharp’ Neolithic have since given way to a radiocarbon-based chronology extending to c. 1500 years, and considerable new research has been carried out at Lough Gur, the chronology proposed by Ó Ríordáin for Lough Gur has proved remarkably enduring (*ibid.*, Cleary *et al.* 2003, 100; Roche 2004, 115; see e.g. Cooney 2007b, 221-2).

The chronology Ó Ríordáin developed, which placed (presumed) houses at the start of the Neolithic, relied upon a pottery sequence that saw flat-bottomed 'Class II' pottery as contemporary with (earlier Neolithic) Carinated Bowl pottery (e.g. Cleary 1993, 114). Ó Ríordáin reported 'Class II' pottery at the 'lowest levels' of his excavations, and thus 'belonging to the earliest occupation of the site' the Early Neolithic (1954, 333-43). However, based on excavations of a prehistoric enclosure at Lyle's Hill, Co. Down, Estyn Evans (1953, 45) was sceptical of Ó Ríordáin's attribution of 'Class II' pottery to the Early Neolithic.

Ó Ríordáin's stratigraphic recording and the resultant pottery sequence has since been subject to further critique (e.g. Kelly 1978; Cleary 1993). Among those that have studied the evidence, there is now widespread acceptance that the 'Class II' pottery from Lough Gur which Ó Ríordáin took to be earlier Neolithic is in fact diagnostic of the later Bronze Age (e.g. Cleary 1993; 1995; Cleary *et al.* 2003; Sheridan 1995, 17; Roche 2004, 114). Radiocarbon dating of structural remains accords with this determination (Cleary 1995, 7-9; Cleary *et al.* 2003, 138-9).

Neolithic material, including Carinated Bowl pottery diagnostic of the earlier Neolithic, has been recovered from Lough Gur. The earliest radiocarbon date comes from charcoal associated with a burial – the flexed inhumation of a child accompanied by a stone axe chip and sherds of Carinated Bowl pottery: 3640-3370 cal BC (4740±60 BP, GrN-16825: Cleary 1995, 40; Cooney 2007b, 221; Smyth 2013a, 313). However, as Smyth (2011, 14) has pointed out, 'the stratigraphic relationship between structural features and diagnostic middle Neolithic material cannot be properly ascertained'. The broad spatial association of the burial and settlement structures cannot be assumed to indicate temporal parity. Stone footings (see Figure 4.4 below) set the rectangular structures at Lough Gur apart from all other Neolithic rectangular structures in Ireland (see discussion

below). As Cooney (2007b, 221) observes, contrary to Ó Ríordáin's wishes, 'the *Neolithic* structures at Lough Gur are again being perceived as an isolated phenomenon' [my emphasis].

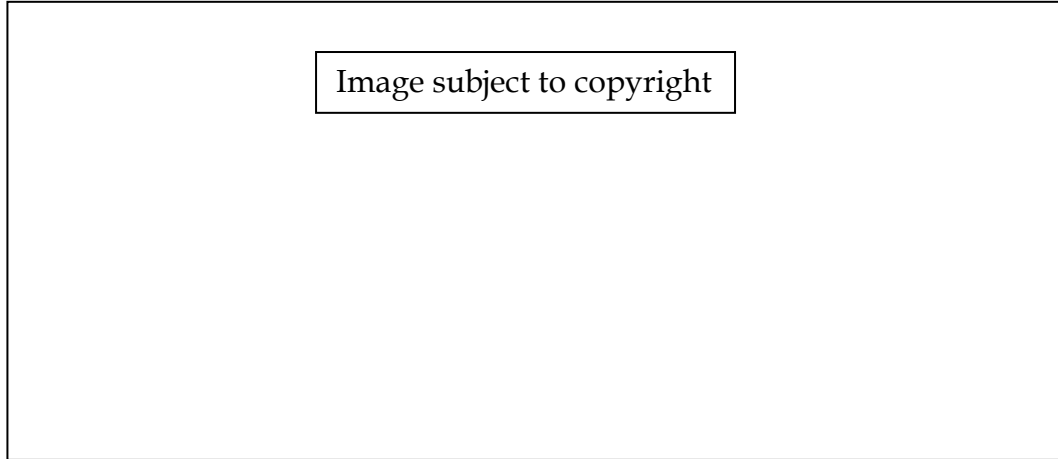


Figure 4.4: Site A at Lough Gur – the stone footings set it apart from other Neolithic rectangular structures in Ireland. After Ó Ríordáin (1954, Plate XV).

Speculation continues that 'a number of [Lough Gur 'house' structures] may well belong to a late 37th/36th century BC': i.e. the Early Neolithic (Smyth 2013a, 313), having 'survived the revisionism' (*ibid.* 2014, 74). Smyth (2014, 75) argues that '[o]n first inspection the Site A house at Lough Gur seems to fall neatly into the category of Neolithic house', but goes on to acknowledge 'several crucial differences between the Site A house and Irish Early Neolithic houses'. Based on 'little more than educated guesswork' (*ibid.*, 79), Smyth concludes that Sites A and B are likely to date the Middle Neolithic. This is a view shared by Cooney, who has spoken of the 'contemporaneity of rectangular and circular houses' at Lough Gur in the Middle Neolithic, and 'the growing social differentiation within the settlement over time and a gradual trend towards the dominance of circular houses' (2000a, 80). He also suggests that at Lough Gur 'it is the family and local context that seems to dominate. There is a strong sense of continuity and flexibility as houses are rebuilt and adapted to current conditions and surroundings' (2007b, 222).

In fact, as Cleary has consistently argued, many of the structures presumed to be Neolithic must be reassigned to the later Bronze Age (Cooney *et al.* 2011, 598). The 'shallowness of the deposits and the shortcomings of the excavator's recording system' (Sheridan 1995, 15, with references) require that new evidence be submitted before any 'house' structure at Lough Gur can be considered Neolithic. In the absence of reliable evidence for Neolithic buildings at Lough Gur, 'the site cannot add much' to discussions about Neolithic houses (Cooney *et al.* 2011, 598). Nevertheless, in accordance with Ó Ríordáin's wishes, his imagined Neolithic 'village community' continues to provide 'a background and a framework against which sites with comparable equipment may be considered' (1954, 456; e.g. see Smyth 2013a, 301).

In 1959, evidence of a Neolithic 'shelter', or possibly a succession of light structures, was discovered at Townleyhall in Co. Louth (Liversage 1960). This was followed by the excavation of an 'almost exact parallel' structure, sealed beneath a passage tomb less than 2 km away in the same townland (Eogan 1963). In the 1960s a rectangular structure at Ballynagilly in Co. Tyrone was initially thought to have represented fifth millennium BC Neolithic settlement in Ireland (ApSimon 1969; 1976; see Whittle 1990). Some early radiocarbon dates at the site (all from charcoal) were from uncertain contexts, but sample UB-197 (from pine charcoal and associated with Neolithic pottery) is dated with 95% confidence to 4550-4350 cal BC (Cooney *et al.* 2011, Table 12.4). It is, however, now generally accepted that the dated material is older than the Neolithic context, perhaps having been redeposited, or derived from bog pine (*ibid.*, 601; Whittle 2007a, 378).

In 1970, Ó Nualláin uncovered the foundations of a rectangular structure beneath a court tomb at Ballyglass, Co. Mayo (Ó Nualláin 1972). Again, the radiocarbon dates for the structure were problematic (though in this case anomalously recent) (Cooney *et al.* 2011, 598). Smyth (2011, 14),

however, reports that new dates for the court tomb overlying the house are Early Neolithic. As discussed in Chapter 2 (and see below), being the nearest prehistoric rectangular ‘house’ to Céide Fields, it is frequently linked to that site.

Since these early discoveries, the number of structures recorded as Neolithic dwellings has increased considerably. By 1996, Grogan identified 50 houses, of which 14 were rectangular in plan (Grogan 1996, 41). The ‘boom in Neolithic houses’ continued (Cooney *et al.* 1999). By 2002, 90 houses were recorded, over 40 of which were rectangular (Grogan 2002, 517). Since then, evidence largely derived from commercially-led excavations, has increased the number of rectangular structures identified almost twofold to *c.* 80 buildings over *c.* 50 sites (Smyth 2011, 4; 2013a, 303; Cooney *et al.* 2011, 564), with the numbers continuing to rise (Smyth 2014, 1). But what identifies these buildings as houses?



4.2. Rectangular timber structures as houses

This 'boom in Neolithic houses' (Cooney 1999, 73) is now an intrinsic aspect of settlement in the Irish early Neolithic.

Rose M. Cleary (2011, 417)

The recent expansion in the number of known sites, in combination with the 'hectic' nature of pre-development archaeology, has resulted in a variable publication record. From the available evidence, the archetypal Irish Early Neolithic 'house' is seen to be a rectangular building constructed of split oak planks which were inserted into slot-trenches (e.g. Grogan 2002, 518; see Figure 4.5 and 4.6 below). Of the 46 'definite houses' identified by Grogan (2004, 106), 29 are confidently interpreted as having been constructed using this method, with a further nine 'probably' conforming. In some cases, the remains of oak planks have been identified. In many others, the principal source of evidence is either oak charcoal or the presence of a slot trench, neither of which automatically implies oak planking. Smyth (2006, 237) points out that more recent data reveal considerable variation in construction methods, with post and wattle walling evident at many sites, either alone, or in combination with planking (see also Smyth 2011, 5).

Direct evidence of roofing materials of course does not survive. In some cases, however, it appears that additional support for the weight of the roof was provided by substantial posts (e.g. Smyth 2006, 238; 2011, 56; Grogan 1996, 249). At other sites, it is unlikely the structures were ever roofed (Smyth 2006, 243; Danaher 2007, 105-6).

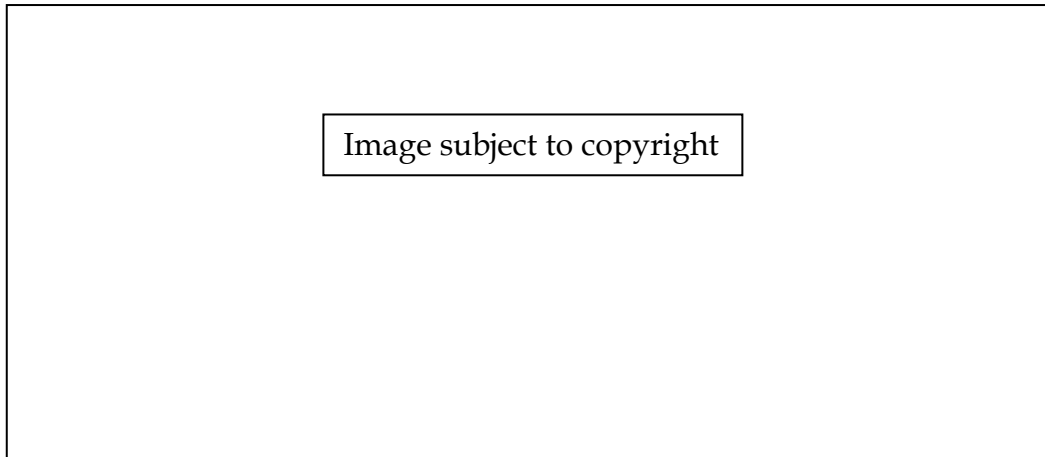


Figure 4.5: Section through foundation trench of 'House 1', Corbally, Co. Kildare. After Purcell (2002, Plate 5).

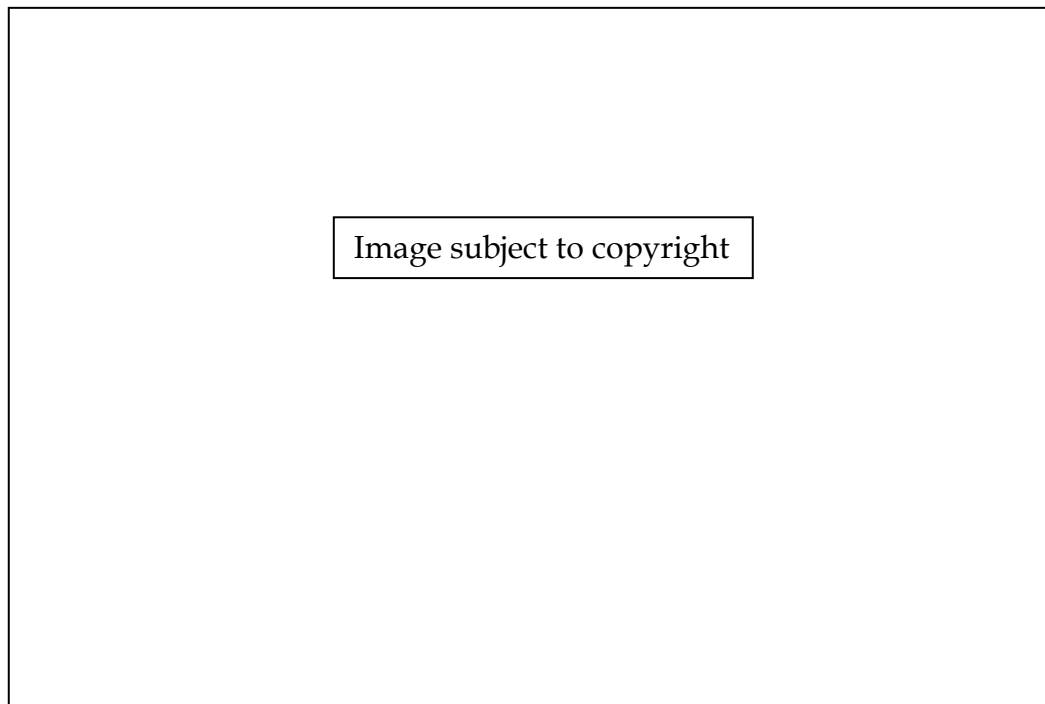


Figure 4.6: Excavated slot-trenches at 'House 2', Corbally. After Purcell (2002, Plate 4).

The shape of the buildings also varies considerably (e.g. compare Figures 4.6, above, and 4.7 and 4.8, below). Within the typical description of 'rectangular', the structures range from being almost square, to a length to width ratio of more than 2:1 (Grogan 2002, 518; Smyth 2006, 234). A few examples, such as Ballygalley (Site 1), Co. Antrim, have curving end walls (Simpson 2002; Smyth 2011, 14; see Figure 4.8 below). Smyth summarises that 'most houses are 6–12m long and 4–8m wide' (2011, 5), with 'quite a

tight cluster of buildings measuring 6–8m long by 4–7m wide, and perhaps a second, looser, cluster of buildings measuring 9–11m by 6–8m' (2006, 234). By comparison, the Mount Sandel 'huts' were c. 6 m in diameter.

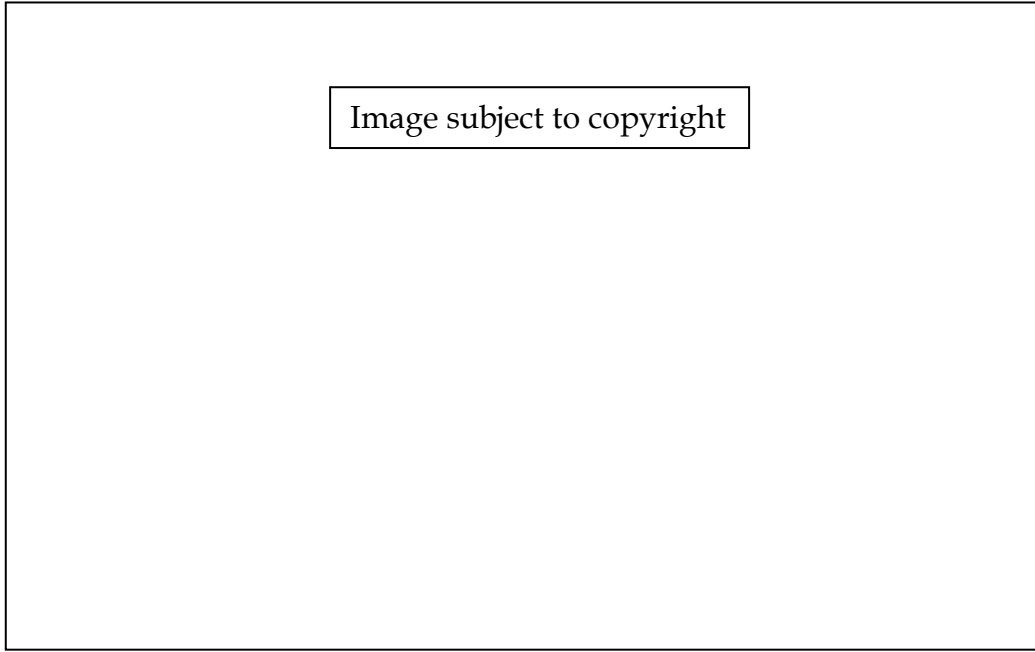


Figure 4.7: 'House 2' at Coolfore, Co. Louth, measured 6m by 5.1m. After Ó Drisceoil (2007, Plate 5).

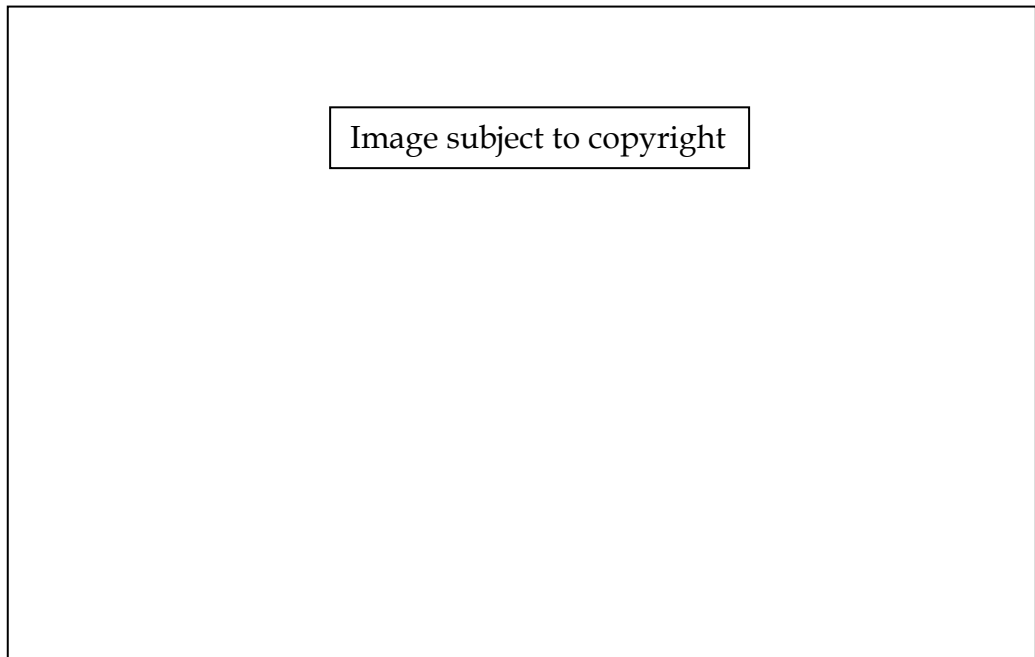


Figure 4.8: Excavations at Ballygalley (Site 1) revealed a structure with a curving 'annexe'; conjectural reconstruction inset. After Simpson (2002, Figures 8.2 and 8.4).

Grogan (1996, 57) observed ‘a marked preference in the location of house sites on sheltered south to west facing slopes’ (see also Cooney 2000a, 74; Cross 2013, 305). The majority of the recorded examples are located close to a substantial water source (Grogan 1996, 57), with some near the coast (see McSparron 2008, 19). There is a wide geographical spread, though few have been recorded in the ‘under-researched midlands’ (Cooney *et al.* 2011, 564). Likewise, as will be discussed, the west is significantly under-represented. The orientation of the structures appears to be determined by local conditions, with no discernible pattern even where there are multiple structures at a single site (Smyth 2006, 237).

In the absence of parallels to Ó Ríordáin’s discoveries at Lough Gur, expectations of Neolithic villages akin to Evans’s clachans faded. This settlement model was replaced by one of ‘dispersed settlement’ where ‘families live in their own small farms which are scattered across the countryside’ (Mallory and McNeill 1991, 32). Simpson (1996, 132) characterised a pattern of ‘dispersed rather than isolated settlement similar to that which prevails in the west of Ireland today and is preserved in the Scottish system of crofts.’ This model of ‘homes scattered across the landscape’ was also evoked by Caulfield (e.g. 1992, 1) for Céide Fields, who has argued that the ‘persistent fisher/farmer communities which one finds along the Connaught coast today’ may be an ‘appropriate model’ for Neolithic settlement patterns (1983, 213).

Cooney, however, has roundly criticised the ‘classic model’ of dispersed settlement for its elision of Neolithic and modern settlement patterns (2000, 68). He contended that such characterisations ‘grossly oversimplify the complexity and dynamism of settlement patterns and ignore the need to set them in particular social and historical contexts’, concluding that ‘at both times one might expect a diversity of pattern, depending on local conditions and social dynamics’ (*ibid.*, 68-9). According to Smyth, as the

corpus of evidence for Neolithic rectangular structures has increased, neither the 'village' nor 'dispersed settlement' model can be seen to provide a suitable template (e.g. 2006, 235).

Multiple rectangular structures have been recorded at *c.* 20% of sites (depending on the evidential threshold), but it has proved difficult to determine whether these represent groups of structures in contemporaneous use, or successive re-building at the same site (e.g. Grogan 2002, 522; 2004, 109; Smyth 2006, 236; 2011, 7; 2014, 49). As Smyth observes the scale of excavations may be the determining factor in the number of structures discovered at some sites (2006, 235). The footprints of three earlier Neolithic structures were initially discovered at Corbally, where a wide area was surveyed ahead of gravel extraction (Purcell 2002); subsequent excavations revealed the remains of up to four structures *c.* 60-100m to the south-west (*ibid.*; Tobin 2003a). At Tullahedy, Co. Tipperary, a research excavation (which extended a commercial excavation) exposed an extensive area of prehistoric activity, including the remains of three Neolithic rectangular structures (Cleary and Kelleher 2011).

The two settlement clusters/sequences at Corbally are the largest close grouping of Neolithic rectangular buildings in Ireland. At Thornhill, Co. Derry, there are up to four 'possible' rectangular structures, but no evidence from this site has been radiocarbon dated (Logue 2003). At Knowth, Eogan (1984, 211-44) interpreted a sub-rectangular structure at the western edge of the main passage tomb, though possibly not roofed, as a 'single homestead'. Further investigations revealed a second, possibly earlier phase of Neolithic occupation encroaching beneath the northern and eastern edges of the main passage tomb (Eogan and Roche 1997). Partial foundations in this area are thought to represent at least two earlier Neolithic rectangular structures (*ibid.*, xiii, 7-21; Cooney *et al.* 2011, 594).

Three structures are interpreted as rectangular houses at Ballygalley, Co. Antrim; likewise Monanny, Co. Monaghan, and Ballintaggart, Co. Down. Groups of two rectangular structures are recorded at Tankardstown South, Co. Limerick, Ballyharry, Co. Antrim, and Coolfore. Finally, at Granny, Co. Kilkenny, a second insubstantial sub-rectangular structure interpreted as possibly having been open-ended (Hughes 2005, 33). In many of the cases where the remains of two or three structures have been discovered in close proximity, a pattern of one of the footprints being markedly smaller has been observed, these often being interpreted as ancillary structures (Cooney 2000a, 64; Smyth 2011, 7). ‘Villages’ comprising rectangular buildings are not a feature of Early Neolithic Ireland on present evidence.

Straight walls do not determine that the buildings should be dwellings, so what of the associated evidence?



4.2.1 ‘Definite houses’

Few of the houses had surviving floors...and we can only speculate as to the precise activities that took place within them. It is probable that they acted primarily as sleeping quarters, but were also used for the storage of tools, grain, fodder and personal belongings...they may have been used on occasion to shelter animals. We might expect that social gatherings took place in the evenings, probably involving occasional guests or visitors as well as the constant inhabitants. Cooking may also have occurred within the structures.

Eoin Grogan (2002, 521)

Grogan’s description (above) of the ‘function’ of Irish Neolithic rectangular buildings clearly draws upon descriptions of Irish vernacular

houses. As he acknowledges, this characterisation is not based upon the archaeological evidence of what took place at these sites, but is instead an opinion of what 'We' might expect. Nevertheless, he concludes that 'Irish archaeologists, at least' have accepted that the 'evidence of the houses' represents 'an important focus of permanent settlement patterns' (2002, 521; see also Smyth 2006, 240).

Bradley (2007, 41) has observed that contents of Irish Neolithic rectangular structures 'can be distinctly unusual, for they include significant quantities of fine pottery, but few other artefacts. However, for Smyth, the material assemblages 'found in and around the Irish Neolithic buildings' are 'decidedly "domestic"' (2006, 240). While she does caution that evidence for long-term occupation is not ubiquitous (*ibid.*, 243-4), Smyth is satisfied that 'the structures represent 'the "invisible" archaeology of domestic life' (2011, 1), having generally functioned as dwellings or ancillary 'work-buildings' (2006, 240-4; 2011; 2013).

The immediate problem with Smyth's assumption is that the floors of the structures 'almost never survive, truncated by agricultural practices and topsoil stripping ahead of excavation' (Smyth 2013a, 303). As a result, 'the deposits that are recovered tend not to be tied in stratigraphically to structural features' (*ibid.*). In other words, the spatial relationship between excavated material is assumed to imply a temporal relationship, even though the stratigraphy is not intact. Inevitably, this leads to the risk of later (or earlier) activities carried out in the same locality being conflated with the structural evidence.

Specifically, the signs of domestic activity Smyth (e.g. 2006, 240-3) identifies are pottery, cooking and storage pits, hearths, lithics and stone axes, animal bones, associated fence lines, associated ard marks and ard fragments, querns/rubbing stones, and cereals remains. Smyth (following

Grogan 2004, 105) also considers that the size of the buildings is indicative of domestic use: ‘most of these buildings could certainly accommodate the members of a family or kin group, perhaps over a dozen people in some cases’ (2006, 241; 2011, 5). However, the size of the larger buildings might equally be seen as indicative of a role as a community asset—a place for gathering—rather than a family home (cf. Cross 2003). Each of the remaining indicators is discussed below.



4.2.1.a Pottery

Smyth (2006, 240) observes that ‘[s]herds of early Neolithic carinated pottery, some fire-blackened and bearing burnt residues, are found in the cut features of nearly all of these buildings’. Destruction by fire, however, is a relatively common fate for the structures, so this need not imply cooking. Also, it has been argued that Carinated Bowls do not make effective cooking pots, and are instead better suited to serving food (Cross 2003, 200; Starnini 2008, 105-6). Food is a cultural artefact which may be consumed for social, ritual or ideological reasons outside of a domestic setting (e.g. Cross, 2003, 200; Milner 2005a, 59).

It may be the case that pottery is an object ‘we would normally associate with the provision and consumption of food’ (Smyth 2006, 240 [my emphasis]), but for the people of early prehistoric Ireland, its significance may have run deeper. Sheridan argues that the ‘special-purpose’ status of Carinated Bowl pottery may have been over-played (2007a, 458-60), but its presence at funerary monuments, and gathering places such as enclosures, renders it a poor proxy indicator of a domestic site. However, as Whittle *et al.* (2011b, 876) observe ‘[t]he frequently high quality, in fabric, form and

finish, of Carinated Bowls—at their best thin-walled, hard, and burnished—points to symbolic value’.

Whether one sees the introduction of pottery as driven by the migration of people or the migration of ideas (or both), its ubiquity at significant Early Neolithic sites, fine form, and the apparent adherence to a design template, are indicative of a technology and form that became bound up with people’s identities (cf. Jordan and Zvelebil 2009, 62). At some Neolithic rectangular buildings, Carinated Bowl pottery appears to have been deliberately placed as a foundation deposit (e.g. Smyth 2006, 242, with references)—a further indication of the pottery’s symbolic significance.

A further important point regarding the pottery recovered from the rectangular timber structures is that by no means all the assemblages have been identified as Carinated Bowl pottery (and therefore Neolithic). In the majority of cases, the assemblages are either insufficient for reliable identification, or (all or in part) too badly weathered, or otherwise undiagnostic. The single sherd of Middle Bronze Age pottery identified at Kishoge, Co. Dublin (O’Donovan *et al.* 2004, 1), cautions against assuming that all pottery spatially associated with the structures is linked to primary use. While in some cases pottery in post-holes or foundation trenches may be votive deposits, in other cases it may simply represent construction debris (the remains from builders’ meal breaks).



4.2.1.b Lithics

Evidence for the manufacturing or maintenance of stone tools (recorded at less than 20% of sites) is the other principal artefactual evidence seen to be

indicative of the domestic function of the structures (Smyth 2006, 240; 2011, 5; 2013a, 307). The apparent absence of such (durable) evidence at the majority of sites might be seen as surprising, given that stone tools were presumably used in the construction of buildings. The presence of worked stone and debitage in foundation trenches and postholes should be expected, but may not be indicative of the primary use of the buildings.

The (sharp) waste material from lithic production is something logically to be kept at a safe distance from one's living space. The maintenance and manufacture of stone tools will almost certainly have been carried out in the vicinity of dwellings, but using a house as a 'shelter...for tool production' as Smyth (2006, 243) suggests seems counterintuitive. Such activities, of course, do not imply permanent settlement. At Ballygalley, the estimated number of lithic pieces discovered ran to 'several hundred thousand' (Simpson 1993, 61), with sources including Scotland and the Lake District. The excavator concluded that the 'quantities of lithic material seem too great for it to be a straight forward dwelling house' (*ibid.* 62).

Worked lithic material found in construction contexts might in some cases have been votive foundation deposits (see Smyth 2006, 240-2; 2011, 8-10, 13). Clearly this does not determine that the future use of the buildings must be domestic. Bergh and Hensey (2013, 348), for example, argue that foundation deposits may have constituted an important precursor to the construction of megalithic monuments. The association of quartz with ritual practice during the Irish Neolithic is attested to at Newgrange (e.g. Cooney 2000a 136-7, 177; Scarre 2002, 11-12) and elsewhere (e.g. Bergh 1995, 161; 2003, 60; Cooney 2000a, 162).

In terms of the symbolism of Neolithic stone tools, stone axes provide the most compelling and widely discussed evidence. Their presence at a

number of Neolithic rectangular buildings may be indicative of the special role of these structures. Smyth (2011, 13) notes that '[m]ost of the axes placed in deliberate deposits are in basal layers of features, i.e., likely foundation deposits' (see also e.g. Smyth 2013a, 308-9, with references). At Corbally, Co. Kildare, a polished stone axe was discovered blade up in the foundation trench of a rectangular structure ('house 4') (Tobin 2003a, 185-6; see Figure 4.9, below), 'partially surrounded by a ring of pottery sherds' (Smyth 2006, 242; 2011, 10; 2013, 308).

Scarre (2011, 82-3) considers the vertically set axes in the chamber of the Tumulus de Saint-Michel at Carnac in Brittany, along with two opposing pairs of upright axes in the intertidal zone of the nearby Quiberon peninsula, as 'striking' exemplars of the symbolism of stone axes. If the axe at Corbally was a deliberate deposition, it *could* be indicative of the significance of the structure as a dwelling, but might equally signify an entirely different, perhaps more profound, role.

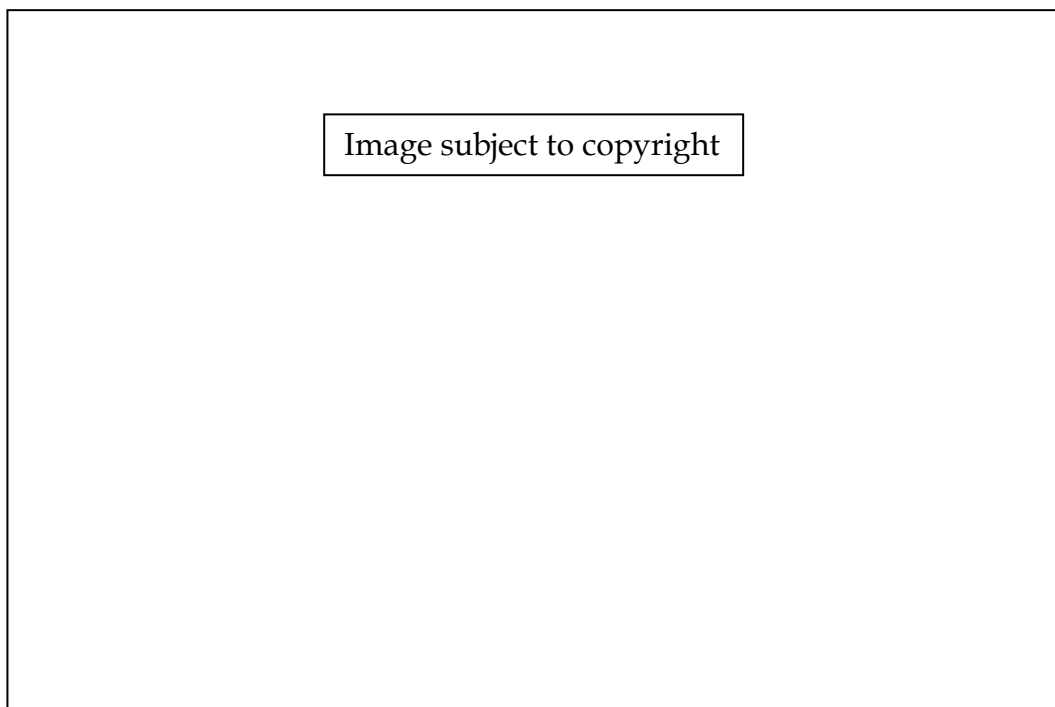


Figure 4.9: Polished stone axe in situ in foundation trench of 'house 4' at Corbally. After Tobin (2003a, 186).



4.2.1.c Hearths and pits

Not unreasonably, hearths and pits have been associated with the cooking and storage of food (e.g. Smyth 2006). Neither, of course, need imply permanent occupation or the domestic use of the structures. Rebuilding a fire in a previously used well-sited fire pit is logical, and pits may have housed cached resources. As will be discussed in more detail regarding specific sites, pits are often difficult to link temporally with the structural remains.

Smyth (2006, 241) reports that '[h]earths, or the remains of hearths, have been recovered from approximately 19 buildings'. However many of the buildings have been truncated, and associated hearths need not have been inside the structures (*ibid.*). Certainly, the absence of a hearth would have made for uncomfortable living conditions. Cross (2003, 199) has contended that the surviving hearths are not sufficiently substantial to have constituted habitually used domestic sources of heat and light. She also points out the importance of fires in community and ceremonial contexts. In the absence of radiocarbon dates, hearths too are difficult to link temporally with the surviving structural evidence.



4.2.1.d Animal bone

Animal bone is very poorly represented at these sites, however as Smyth (2006, 241) observes the acidity of Irish soils militates against the survival of (particularly unburnt) bone. While the absence of such evidence must be seen as problematic for Cross's (2003) interpretation of the structures as

feasting halls, animal bone should equally be expected among the remnants of the domestic life of farmers. Animal bone is generally absent from earlier Neolithic contexts in Ireland (e.g. Woodman and McCarthy 2003, 31-2). Undated samples that have been attributed to earlier Neolithic contexts should be treated with particular caution (Schulting *et al.* 2011, 39; see Chapter 5).



4.2.1.e Fences

The idea that ‘fence lines’ should be associated with Neolithic rectangular structures is perhaps a hangover from the image of Neolithic farming communities portrayed at Céide Fields (see previous chapter). There is no reliable evidence of associated fences at any Neolithic ‘house’ site. Their presence has, however, been speculated in a small number of instances. At Russellstown, Co. Carlow, ‘tantalising’, though ‘slight evidence’ is noted (Logan 2007, 68). However, this is a multi-period site, and ‘the possible remains of a field system and/or further settlement enclosures, represented by several linear trends (low-level magnetic responses)’ from geophysical survey (*ibid.*). There is no evidence that these features are in any way related to human activity presumed Neolithic ‘farmstead’. A section of ditch was excavated, which it is suggested may have extended to enclose the ‘house’ (*ibid.*). There is not, however, any evidence to support a temporal link, and other nearby ‘ditches that appeared to act as field boundaries are likely to be post-medieval in date’ (Hegarty 2006).

A fence line recorded in the vicinity of a Neolithic rectangular building at Cloghers, Co. Kerry, has not been dated. Such is the disturbance caused by deep-ploughing at the site that the relationship between the feature and other presumed evidence of the ‘house’ is unclear (Kiely 2003; see section

4.5.2, below). A 'possible fence line' near the rectangular structure at Kilgobbin, Co. Dublin, is likewise undated (see Smyth 2006). The 'palisades' identified by Logue (2003) in the vicinity of 'Neolithic houses' at Thornhill, Co. Derry, are undated (as are the 'houses' themselves). Palisades feature in Irish later medieval rural settlement (e.g. O'Connor 2002, 84), so assuming their date is problematic. Besides, it is not clear how, if a temporal link were proven in any of the cases, these remains would demonstrate that any of the buildings had a domestic function.



4.2.1.f Ards and ard marks

'Ard-marks' recorded at a single site – Ballygalley – 'appear to post-date' a rectangular structure referred to as 'House 2' (Simpson *et al.* 1995, 4; see also Smyth 2006, 241). However, the marks are cut by (and therefore seen to predate) a post-hole associated with a further presumed Neolithic structure—'House 3' (Cooney *et al.* 2011, 587). The problem with the implication that these marks can be associated with arable farming is the improbability of their survival. As Reynolds (1981, 101) points out 'repeated ploughing would ultimately be self cancelling, the end product being a totally and consistently disturbed soil horizon created by the same implement within its particular depth capacity'.

It might be argued that the ground was therefore ploughed only once, not as a precursor to planting crops, but as a ritualistic preparation of the ground (Rowley-Conwy 1987). 'Rip-ards' (also known as 'sod-busters'), used in the preparation of ground prior to initial cultivation, might leave striations so deep as to remain discernible to excavators. However, experimentation has shown that a metal sheath is likely to have been

required to protect such an implement from excessive wear (Reynolds 1981, 102-4).

Similarly, a single site – Ballyharry (‘House 1’) – produced ‘a portion of an ard point’ (D. Moore 2003, 159; Smyth 2006, 241). This must be seen as a tentative identification, and the stratigraphy at the site was unclear: ‘Although many features are assigned to specific stratigraphic phases, however, there are a number that may belong to any of the phases of activity since there were few direct stratigraphic relationships’ (D. Moore 2003, 156). At nearby Ballyharry Farm, the remains of a Neolithic structure were substantially disturbed by later agricultural activity and other earthworks (Ó Néill *et al.* 2004, 8-12, 22). Whether or not the ‘quernstones and rubbers’ recovered from the Ballyharry (Crothers 1996, 13; 1997; D. Moore 2003) relate to the primary context is likewise open to interpretation.



4.2.1.g Querns and rubbers

In addition to Ballyharry, querns/rubbing stones are recorded in association with a small number of Neolithic rectangular timber structures. Two quern fragments were recorded at Corbally: one from a pit disturbed in antiquity; the other from a foundation trench (Purcell 2002, 135, 140). Various quern stones/ fragments of quern stones are recorded at Tullahedy, Co. Tipperary (Cleary 2011, 421). Saddle querns are recorded at the undated site of Thornhill, though no contextual information has been published (Logue 2002, 2003, 154). ‘[P]ossible quern fragments’ were recovered at the undated site of Cruicerath, Co. Meath (Smyth 2006, 241).

At Ballygalley, a 'double-sided saddle quern was found beside the south wall of House 2', however full details of the context are not published, and substantial Bronze Age activity was recorded in the immediate vicinity (Simpson *et al.* 1994). A further saddle quern was recorded in the area of a pit and gulley which post-date 'House 1' (Simpson 1991; 1996, 123-4). As many as nine quern stones have been associated with Ballygalley, however not all of these are associated with Neolithic contexts (A. Connolly 1994, 30).

In all cases, dating the use of quern stones is problematic. Their identification - particularly when fragmentary - is often conjectural (cf. A. Connolly 1994, 31). Though often associated with cereal processing and therefore agriculture, quern stones can equally be indicative of the processing of wild foods, and indeed non-food stuffs (e.g. Kinnes 1985, 31). The presence of quern stones is not automatically indicative of a 'domestic' setting (e.g. Bradley 2005, 107; see Cooney 1981). Saddle querns were most prevalent during the Bronze Age in Ireland, but remain an ambiguous source of evidence (e.g. A. Connolly 1994, 31-3).



4.2.1.g Definite houses?

Thus far, the evidence from Neolithic rectangular timber structures is not indicative of a universal function, domestic or otherwise. The inference that all the structures were domestic dwellings (e.g. Cooney 2007a, 557; Sheridan 2010, 90; Smyth 2011; 2013a; Rowley-Conwy 2004, S93) is not supported by the evidence. The variability in the structures is not simply a result of taphonomy: there are fundamental differences in form, fabric and associated remains. In some cases, this may link the structures to mobile settlement patterns (e.g. Smyth 2013a, 308). In others, the level of

investment in construction, and/or the richness of the associated remains, might be seen as suggestive of a primary function which is communal or ceremonial, rather than being an ostentatious home.

‘Terminology’, as Kinnes (1985, 26) pointed out, is often ‘formative to both perception and expectation’. In the book that arguably did more than any other publication to secure the place of rectangular ‘houses’ in Ireland’s Neolithic package, Armit *et al.* (2003, 146) caution that:

In the view of the obvious differences in both scale and layout of these buildings, it would clearly be simplistic to assume a single or uniform function for Neolithic rectilinear structures. [...] It should probably be expected...that such large and complex buildings will have served a range of functions, and this range of possibilities is beginning to be explored.

This message is however obscured in an article entitled ‘Irish Neolithic houses’, in a section dedicated to ‘The Irish “house boom”’, in a book entitled ‘Neolithic Settlement in Ireland and Western Britain’. The shorthand ‘house’ alone serves to suppress debate.

In the general absence of animal bone and identifiable farming plots, the class of evidence that has come to the fore in representations of the buildings as farmhouses is cereal remains. This is the focus of the following section.



4.3 Cereal remains and rectangular ‘houses’

There has long been a feeling amongst some archaeologists that if only they managed to excavate in the right places, they would find Neolithic settlements with substantial timber buildings similar to those known from continental Europe. Associated with them would be plant and animal remains that would enable the elucidation of the mixed agricultural economy.

Mark Robinson (2000, 88)

Increasingly, the importance accorded to cereal cultivation has come to define perspectives on how the Neolithic ‘should be approached and interpreted’ (G. Jones and Rowley-Conwy 2007, 391). This is exemplified by conceptualisations of life in Irish Neolithic rectangular ‘houses’. While mixed farming remains very much at the heart of the dominant narrative (e.g. Smyth 2011, 5), in the absence of evidence for animal husbandry, it falls to evidence for arable farming—in particular grass seeds – to pick up much of the evidential slack.

Smyth (2006, 240) noted that ‘[c]harred cereal grain and/or cereal-processing waste have been found on at least 12 [rectangular ‘house’] sites. Since then, considerable research effort has been expended on the identification and analysis of potential evidence for Neolithic cereal processing in Ireland, with ‘house’ sites a particular focus (*ibid.* 2013, 310). The indications are that the sites of many additional rectangular ‘houses’ have yielded cereal-type evidence (e.g. see McClatchie 2009; McClatchie *et al.* in press; Whitehouse *et al.* 2010; in press).

Cross (2003, 199) has linked cereal remains to her ‘feasting hall’ hypothesis, but typically the presence of such remains is seen to imply that the rectangular structures principally represent the houses of settled

farmers (e.g. Sheridan 2010, 90, with references). Indeed, Finlayson and Warren (2010, 76) take the view that '[a]ssociated palaeo-environmental and archaeobotanical evidence demonstrates categorically that farming was a central feature of the subsistence of the communities that inhabited these buildings'. Excavators have come to expect that cereal remains *should* be present (e.g. see McSparron 2003, 174; McSparron and Weir 2003, 11; Danaher 2009, 11). In an atmosphere of such high expectations, the danger must be that evidence will be accepted uncritically. After all, how could science be wrong?



4.3.1 Understanding the palaeobotanical evidence

The evidence ranges from a few partial grains to more substantial assemblages.

Jessica Smyth (2006, 240, 1)

Cultivated wheats are classified according to their response to threshing, there being two distinct forms: hulled and naked. Hulled wheats such as emmer (sometimes referred to as glume wheats) are the more primitive form. The hulled wheats emmer (*Triticum dicoccum*) and einkorn (*T. monococcum*) are both thought to have been present in Neolithic Ireland, with emmer being more prevalent (Monk 2000, 79; M. McClatchie *et al.* in press, 4). There is some evidence for free-threshing (naked) wheats (*T. aestivum/durum/turgidum* L.), but recorded assemblages comprise only grain in all cases, and therefore constitute tentative identifications (McClatchie *et al.* in press, 4). Both naked barley (*Hordeum vulgare* L. *var. nudum*) and hulled barley (*Hordeum vulgare* L.) are also thought to have

been present. Emmer wheat, however, dominates Early Neolithic assemblages (*ibid.*).

The grains of hulled wheats are protected within a tough spikelet, comprising glume bases, lemma (which has extensions known as awns) and palea (e.g. Jacomet 2006; see Figure 4.10, below). Threshing breaks the spikelets free from the wheat ear, but does not release the grain. Further processing may involve parching to make the hulls more brittle (Hillman 1981, 153-4). Finally, pounding is required to dehusk the seed (e.g. Bogaard 2004, 68; Zohary and Hopf 2000, 29). Hulled wheats may be stored as spikelets, with the grain being removed at a later stage (e.g. Bogaard and G. Jones 2007, 363). Wheat grain stored as spikelets is less likely to spoil than naked grain (Hillman 1981, 138), and this improves the chances of chaff reaching a 'domestic' setting, where late stage processing may take place (*ibid.* 1984, 13).

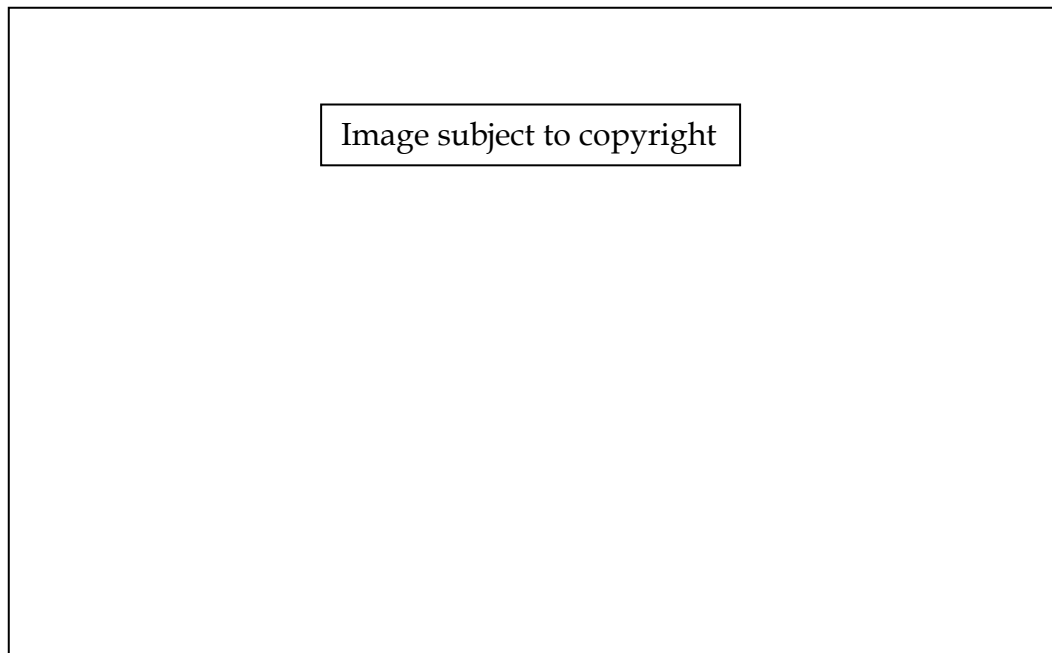


Figure 4.10: The major components of glume/hulled wheat ear, in the intact state, after threshing and after pounding. After Hillman et al. (1996, Figure 54).

Charring is the principal means by which grain is preserved (e.g. Hillman 2001, 28; Zohary and Hopf 2000, 4). In normal circumstances, this would

introduce a 'very tight taphonomic filter' (G. Jones and Rowley-Conwy 2007, 400). However, Smyth (2006, 245) identifies the deliberate burning as a 'practice bound up with houses in early Neolithic Ireland': the frequency with which the structures were 'substantially or completely destroyed by fire' being a defining characteristic (*ibid.*, 229).

Much of the evidence for cereal remains at Irish Neolithic 'houses' is based on the morphology of small assemblages of grain which are charred and otherwise degraded. This introduces a significant (but often unacknowledged) risk of misidentification. Grain morphology varies significantly between different regions and through time. Seed keys and modern reference specimens from the limited number of taxa surviving today cannot be fully representative of ancient grass taxa (Hillman *et al.* 1996; Hillman 2001, 28-9; Willcox 2004, 145). Within a species, the appearance of grains can vary greatly, depending upon their position on the ear (Jacomet 2006, 18; Hillman, 2001, 31). Local growing conditions will likewise affect plant development (Jacomet 2006, 18).

While the morphological identification of well-preserved specimens is challenging, the effects of charring presents further significant obstacles. Carbonisation deforms the grains, variously causing shrinkage and puffing (*ibid.*, 4). The level of distortion varies according to conditions of charring (so is unpredictable) (Boardman and G. Jones 1990, 8; Jacomet 2006, 18; Braadbaart 2008). The reliable identification of ancient wheat is enhanced where both grains *and* spikelet forks/glume bases are present (e.g. Hillman *et al.* 1996; Miller 1992; Hillman 2001, 31; Zohary and Hopf 2000, 33; see Figure 4.11, below). Spikelet forks and glume bases are the predominant form of chaff on Neolithic sites throughout Ireland, Britain and central Europe (McClatchie *et al.* in press, 4). Both are resilient, like cereal grains and weed seeds, and may be preserved by charring (at temperatures of 2-400°C, or where a covering of ash deprives the sample

of oxygen during heating) or waterlogging (e.g. Hillman 1981, 139-40; 2001, 31; Hillman *et al.* 1996, 200; Bogaard and G. Jones 2007, 363). Charring affects the morphology of grains more than that of chaff (Hillman *et al.* 1996, 205).

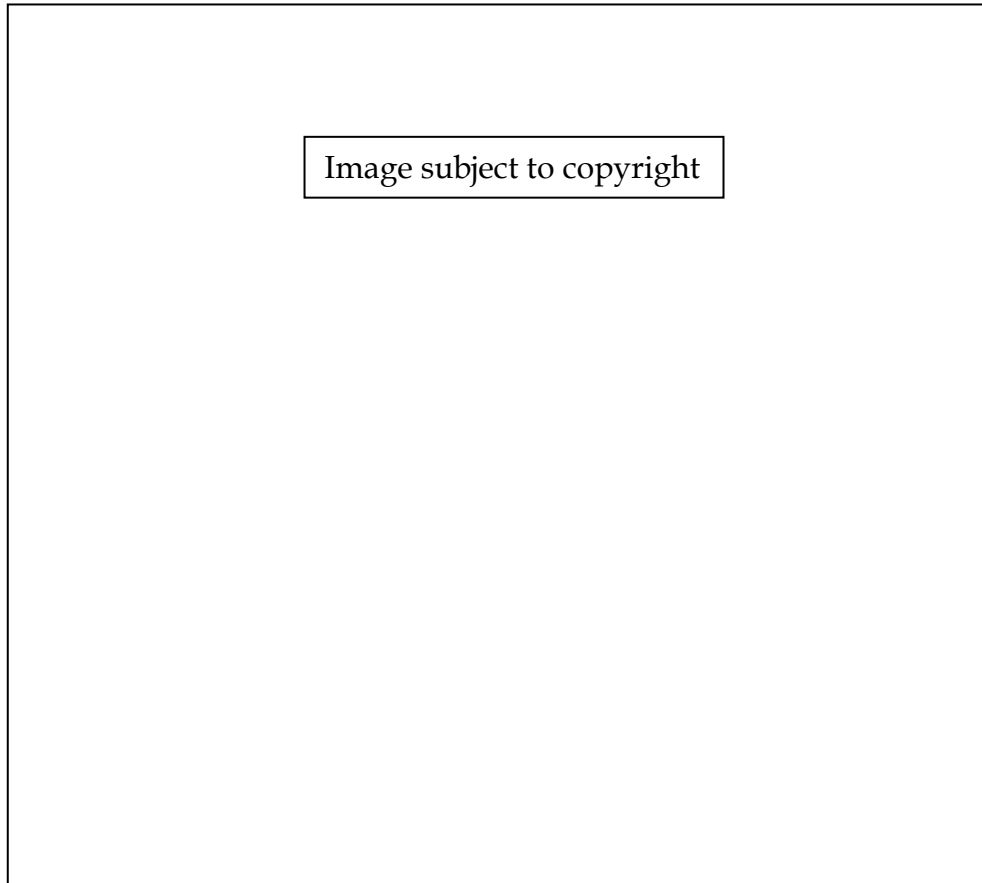


Figure 4.11: Charred partial spikelet fork (top left) and glume bases from *Triticum aestivum ssp. spelta* (spelt wheat) recovered from the multi-period archaeological site at Baysrath, Co. Kilkenny. After McClatchie (2011b, 9).

Some native grasses were almost certainly food sources for people during the Neolithic. 'Grass seeds are essentially all edible, and are highly nutritious' (Mears and Hillman 2007, 328). Tall Fescue (*Festuca arundinacea*), for example, produces very large seeds which are nutritionally rich (*ibid.*, 329). It grows in dense stands which are easy to harvest, and is a native of Ireland well suited to damp and otherwise rough and marginal ground (Gibson and G. Newman 2004, 304-5; Stace 2010, 996). Couch grasses (*Elymus*)—native examples of which include

bearded couch (*E. caninus*) (e.g. Stace 2010, 1048; Rose 1989, 131-4) – have been exploited as food sources in other parts of the world, including North America (Doebley 1984, 61). Tall fescue and bearded couch are examples of widespread wild grasses whose seeds are sufficiently comparable to those of species of wheat and barley that misidentification could occur in small degraded samples (see Figures 4.12 and 4.13, below).

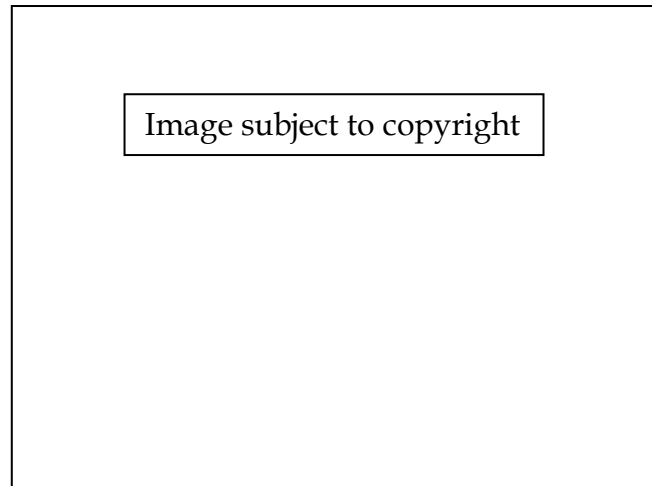


Figure 4.12: Modern samples of grains from Festuca arundinacea and the closely related Festuca pratensis (also a widespread native of Ireland). The size and basic morphology of these grains are sufficiently similar to species of wheat and barley that small degraded samples may be indistinguishable. See Figure 4.13, below. After Cappers et al. (2006, photos 296-D and 297-C).

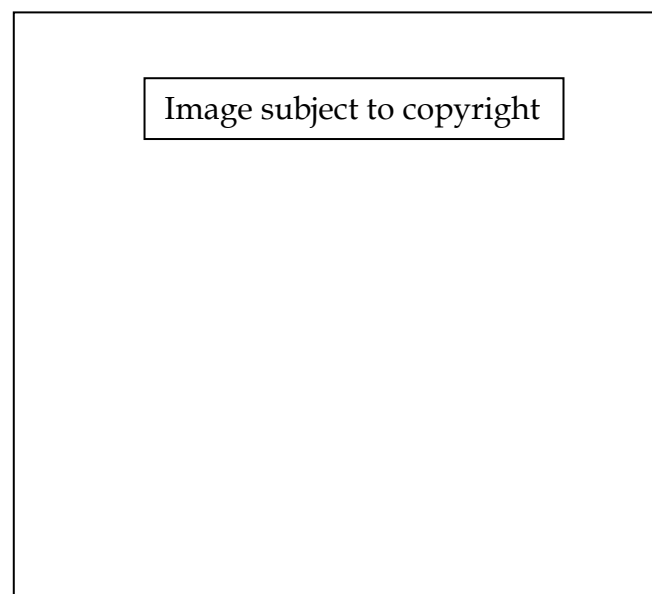


Figure 4.13: Charred grains of spelt wheat recovered from the multi-period archaeological site at Baysrath, Co. Kilkenny. Spelt is an ancient species of wheat with grains often indistinguishable from emmer (Jacomet 2006, 18). Image after McClatchie (2011b, 9).

Hillman (2001, 28) has cautioned that, '[t]he uncomfortable reality is that...archaeobotanical evidence is often paltry'. Identifications made on the strength of individual (often significantly degraded) grains, or samples sizes in single figures, must be seen as speculative (*ibid.*). Security of context is also a particular problem with such small samples. Bioturbation – the activity of burrowing mammal, worms, insects; root penetration; downwash – and human activity, will result in the movement of small plant macrofossils through soil strata (e.g. Retallack 2001, 50). It is against the background of all these constraints that the following evidence for cereal grains from individual Irish Neolithic rectangular structures must be evaluated.



4.3.2 Cereal remains associated with Irish Neolithic rectangular timber structures

4.3.2.a Tankardstown South, Co. Limerick

'House 1' at Tankardstown South provides the largest body of cereal-type remains among Earlier Neolithic rectangular structures in Ireland (Monk 1988; 2000; see Figure 4.14, below). Though 'often interpreted as representing a typical assemblage from Neolithic Ireland' (McClatchie *et al.* 2009, 4), the assemblage—which constitutes several hundred carbonised cereal-type, principally *Triticum*-type, grains and grain fragments—remains 'without parallel'².

The cereal-type remains were charred, and for the most part fragmentary due to apparent grinding and/or trampling (Monk 1988, 185-6). 'Occasional' *Triticum*-type glume bases and spikelets, however, confirmed

their identification (*ibid.* 2000, 79). The low incidence of chaff and weed seed was taken to indicate that the grain was a 'cleaned product' (*ibid.*).

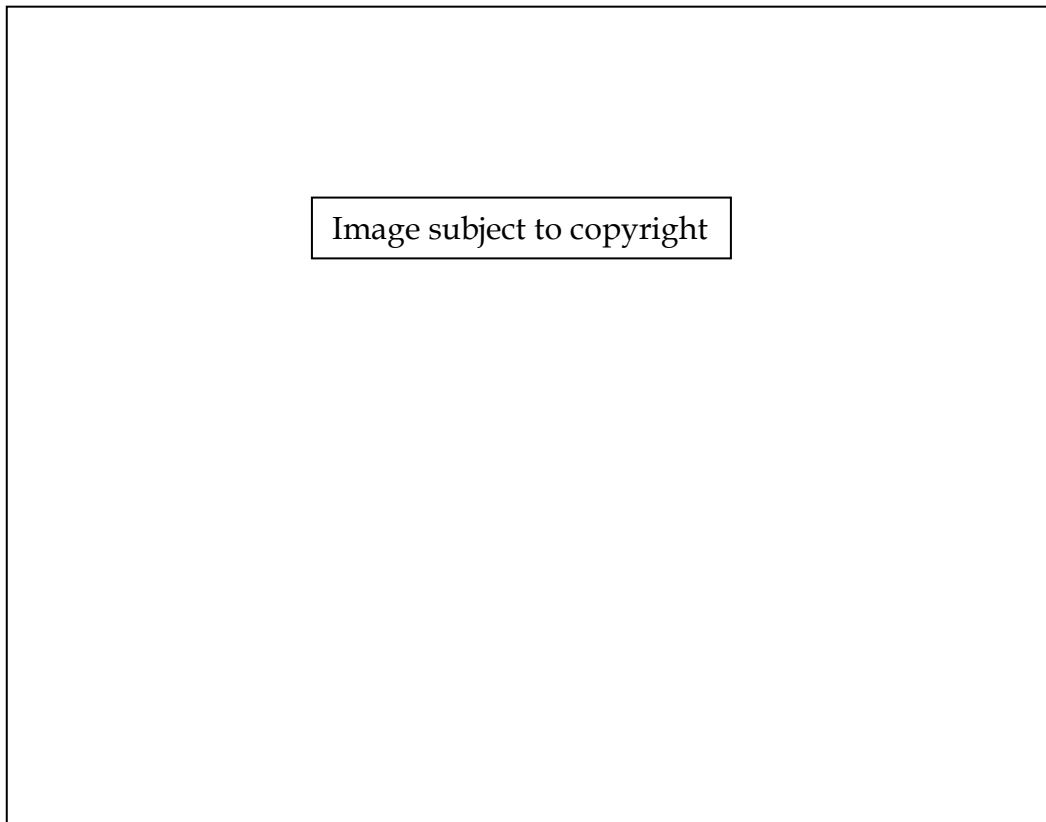


Figure 4.14: Plan of Neolithic rectangular structures at Tankardstown South, Co. Limerick. 'House 1' encroached on the path of a new gas pipeline (represented by broken line). Subsequent excavations (marked by rectangles) revealed other features, including 'House 2'. After Gowen and Tarbett (1998, Figure 1).

The contexts of the finds – in the fill of structural features – was taken to suggest that they may have been incorporated after the buildings had fallen out of use, or else during the process of repair (*ibid.* 1988, 186). No occupation layers survived at Tankardstown, these having been ploughed out; all the surviving evidence came from cut features (Gowan 1988, 27; Gowen and Tarbett 1988, 156). Posthole 'F23' in 'House 1' – taken to be one of two main roof supports (highlighted in Figure 4.15, below) provided 'by far the highest incidence of [cereal-type] remains', largely within its fill (context 'F35') (Monk 1988, 185).

The plough-soil above 'House 1' was shallow, with a maximum depth of just 23 cm, (Gowen 1988, 27; see Figure 4.15, below), and this may account for the contamination from modern species identified in samples from F35 and other contexts. *Polygonum* sp. (Knotgrass), *Atiplex* sp. (Orache) and the penetration of modern *Gramineae* (grass) species were recorded (Monk 1988, 186-7). Ancient and historic cut features were recorded during the excavations. A large pit (c. 1.2m x 1.7m) immediately to the south-west of 'House 1' contained animal bone, post medieval pottery, a hone, iron artefacts and a lump of lead (Gowen 1988, 37; Figure 2). A pit c. 2m to the west of 'House 1' contained charred oat grains 'considered to be of early historic date' (Gowen and Tarbett n.d.). The interior of 'House 2' (c. 20m north-west of 'House 1') was substantially disturbed by two concentric Bronze Age ring ditches (*ibid.*, 1990). A pit which contained two broken upright undecorated Bronze Age pots, each with a cremation, was also found in the interior of 'House 2' (*ibid.* 1988; 1990; n.d.; Tarbett and Gowen 1988).

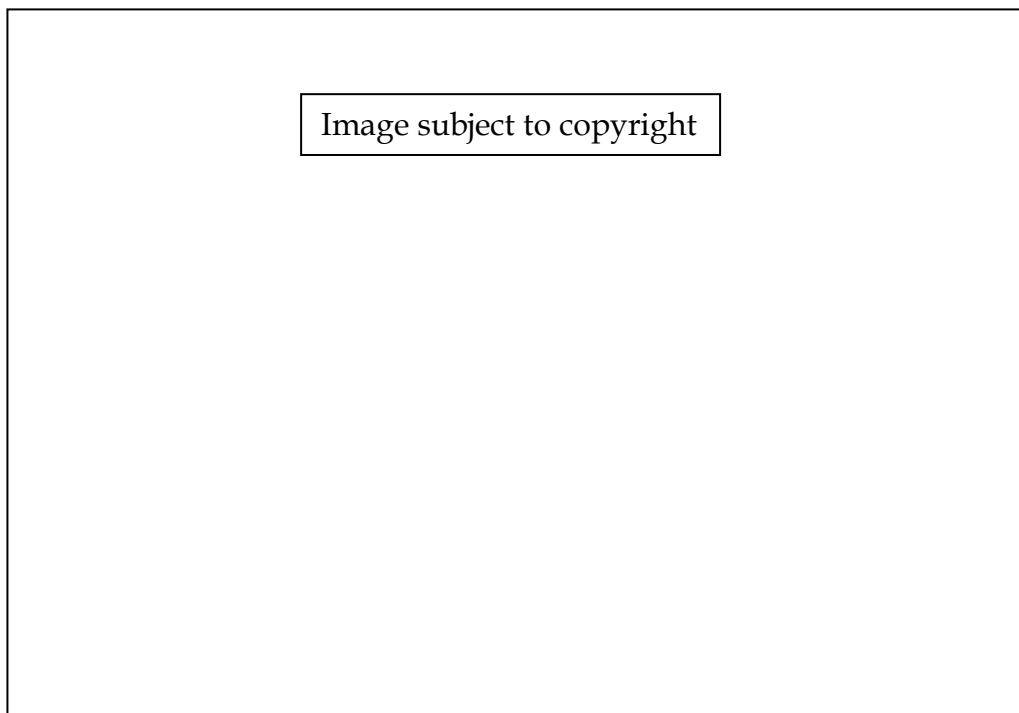


Figure 4.15: Tankardstown 'House 1' photographed from the south-west during excavation. Posthole F23 is circled in red. After Gowen and Tarbett (n.d., Plate 4.2.1). Detailed image of posthole F23 (top-left). After Gowen (1988, Plate 14).

Two (charred) *Triticum*-type grains from posthole 'F23' in 'House 1' (fill context 'F35') were radiocarbon-dated (Monk 2000, Table 3; see Table 4.1, below).

Table 4.1: Radiocarbon dates for *Triticum*-type grains at Tankardstown, 'House 1'. After Monk 2000, Table 3; cal BC dates after Cooney et al. (2011, Table 12.3).

Lab code	Sample reference	Material	¹⁴ C years BP	¹⁴ C years cal BC
OxA-1476	F23 fill 35 1/2	Charred grain	4890±80	3930-3520
OxA-1477	F23 fill 35 2/2	Charred grain	4840±80	3790-3310

The date ranges for these samples overlap with similarly imprecise results for three charred oak timbers: GrN-14713: 3985-3785 cal BC; GrN-15836: 3940-3700 cal BC; and GrN-15387: 3960-3370 cal BC (Cooney et al. 2011, Table 12.3). The oak timbers came from foundation trenches, and are therefore linked to construction. Cooney et al. determined that the grains were 'significantly later', and therefore 'may date the use of the structure' (2011, 597).



4.3.2.b Corbally, Co. Kildare

Up to seven Neolithic rectangular structures have been identified in an area earmarked for gravel extraction at Corbally (Tobin 2003b, 33). Two groups of up to three structures are separated by what may have been a palaeochannel (Smyth 2006, 235; see Figure 4.16 below). The seventh possible Neolithic structure is isolated from the two groups (Tobin 2003b, 33). There is insufficient evidence to determine the sequence in which the buildings were constructed, and whether any were contemporary (see Smyth 2006, 243).

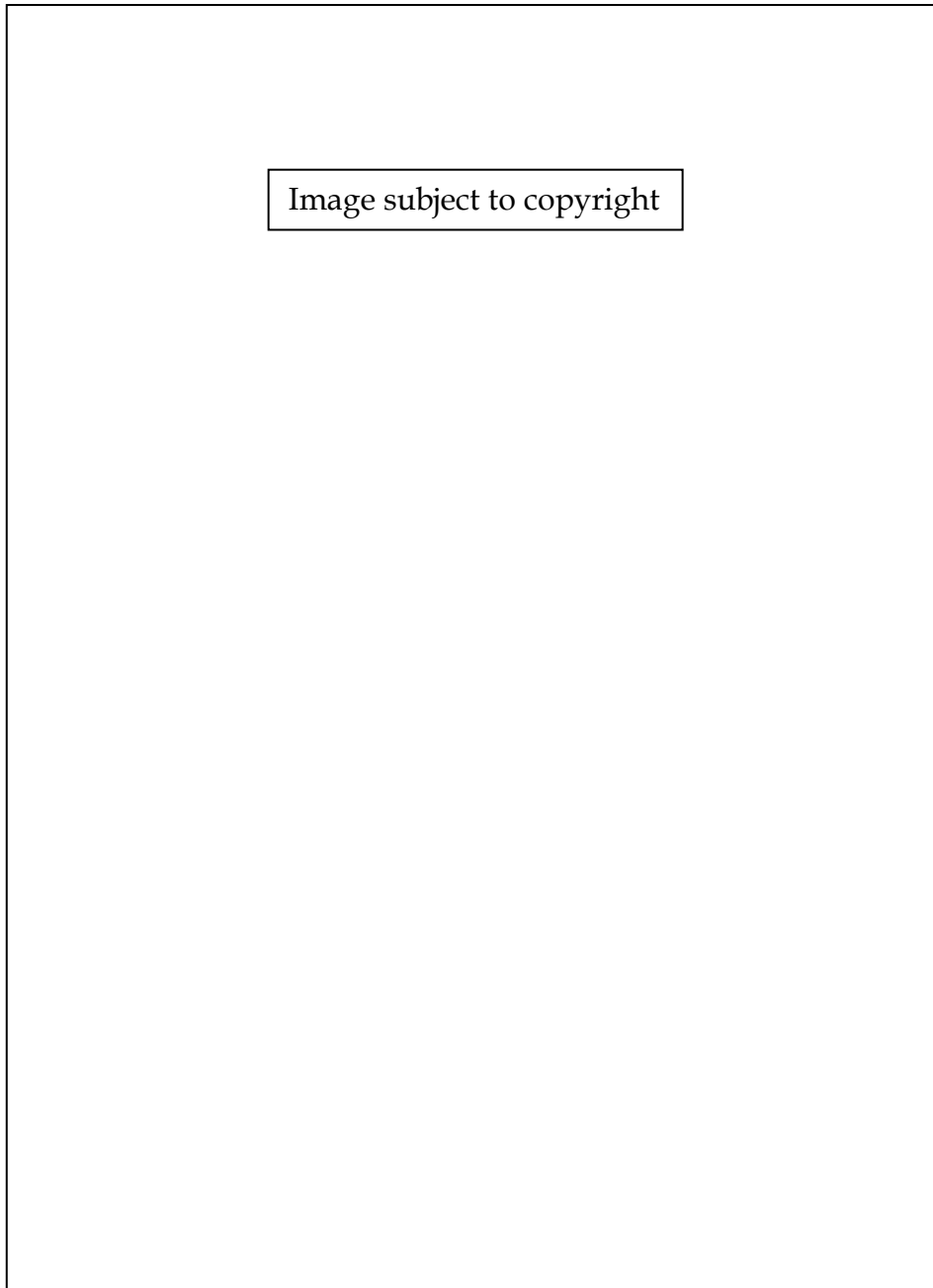


Figure 4.16: Two groups of Neolithic structural remains at Corbally (top-left and centre); a further possible structure ('House 7') lies between the two groups. Significant later archaeological activity is recorded in the vicinity. After Tobin (2003b, 36).

The cereal-type remains recovered from the initial excavations at Corbally (structures 1-3) were archaeologically 'significant' (Smyth 2006, 41-2), though '[t]he overall quantity of seeds recovered from the Neolithic samples from Corbally was low, restricting the potential for interpretation' (Purcell 2002, 71). What is remarkable is that wheat-type chaff was

recovered in greater quantities than the charred cereal-type grains, particularly at the site of 'House 3'. The most prolific context—the fill of internal posthole 'F187'—contained '31 wheat glumes' and '27 fragments of stalk material', 'while only nine cereal grains were recovered' (*ibid.*, 67). The ratio of chaff to grains seemed counterintuitive, leading the excavators to make the 'extremely tentative' suggestion that crop-processing was carried out in 'House 3' (*ibid.*, 71).

It is unusual for fragments of straw to be preserved as charred remains at prehistoric sites, though dense 'straw nodes' sometimes survive (Hillman 1981, 140). Should the 'fragments' in question from 'House 3' represent straw nodes, the proportion relative to seeds is nevertheless remarkably high (e.g. compare with assemblages in Monk 1988). The apparent fracturing of *all* spikelet forks into glume bases (see Figure 4.10 above) could be the result of (meticulous) pounding (cf. Hillman 1981, 154), but no grain fragments are recorded. The surviving wheat-type grains – identified 'based upon morphological criteria' which 'may not be exact' – were, however, 'badly preserved, *in contrast* to the well-preserved chaff' (Purcell 2002, 71 [my emphasis]).

Ultimately, the excavator and archaeobotanical specialist conclude that '[t]he quantities of material recovered from Corbally fall below the minimum numbers required to conduct comparative statistical analysis and it is not certain that the house 3 samples listed above contain crop-processing waste' (Purcell 2002, 71). The evidence 'suggests that the grains and the chaff are present in the samples as the result of *different* processes or events' (*ibid.* [my emphasis]). They may not be temporally linked. Though 'all are from internal features in house 3', '[t]hese samples come from a variety of context types' (*ibid.*). It must be seen as plausible the better-preserved (undated) chaff represents later activity than the

poorly-preserved grain. Later crop processing activity is known to have taken place nearby (see below).

Between 'Houses' 1-3, four samples, each containing just one (full or partial) presumed *Hordeum* grain were recovered, and '[s]ome of these grains were badly preserved and could only be tentatively identified' (Purcell 2002, 71). Evidence for barley cultivation is thus insubstantial.

Cereal-type remains were included in radiocarbon dated samples from 'Houses' 1, 2, 3, 5 and 6:

Table 4.2: Radiocarbon dates for cereal-type grains at Corbally. After Cooney et al. (2011, Table 12.3).

Lab code	Structure	Material and context	¹⁴ C years BP	¹⁴ C years cal BC
GrA-13702	1	Charred grain. External trench F3.	4880±50	3770-3530
GrA-13700	2	Charred grain. Internal posthole F53.	4900±50	3790-3540
GrA-13697	3	Charred grain. Internal posthole F208.	4910±50	3800-3630
GrA-24212	5	Cereal remains. Foundation trench.	4885±45	3770-3540
GrA-28255	5	'Hazelnut and cereal remains.' Roof support posthole.	4770±60	3660-3370
GrA-24213	6	'Hazelnut and cereal remains.' Foundation trench.	4840±45	3710-3520

'Houses' 4-7 lie between 60 and 100m to the south-west of the initial group and were excavated separately (Purcell 2002, 33-4). The published record of these excavations is more limited. 'House 4' may have been damaged by fire, and subsequently repaired (Tobin 2003a, 185). The western foundation trench is truncated by a lazy bed (discussed below). In the area of the eastern trench, 'seeds, chaff and some hazelnut shells' were identified, however neither the circumstances of their preservation nor

their precise contexts are published (see Tobin 2003a, 185-6). There are no published radiocarbon dates for 'House 4'. 'House 5' – also apparently destroyed by fire – was likewise cut by a lazy bed/drain (*ibid.*, 186). No details of plant remains are published for 'House 5', however two radiocarbon dates – one from 'cereal remains' in a foundation trench, the other from 'hazelnut and cereal remains' provide an earlier Neolithic estimate (see Table 4.2, above).

'The evidence for House 6 is not conclusive' (Tobin 2003a, 186). What initially appeared to be a rectangular plan 'became less defined during excavation', and the 'features may not have been part of a single structure as in a house' (Tobin 2003a, 186). The remains were again truncated by a lazy bed/drain. Environmental sampling identified 'a high density of seeds and chaff, with the predominant species being wheat' (*ibid.*, 187), though, as with 'House 4', neither the circumstances of preservation nor precise context are published. As with one of the samples from 'House 5', the dated sample is a mixture of indeterminate 'cereal remains' and 'hazelnut' (presumably hazelnut shell) (see Table 4.2, above).

'The seventh house...was identified as a series of pits/postholes and the partial remnants of a foundation trench. An assemblage of pottery from one of the postholes dated these features to the Neolithic' (Tobin 2003b, 33). As with 'House 6', the features that constitute 'House 7' must be seen as indeterminate (see ground plan in Figure 4.16, above). No plant remains are recorded at 'House 7', and no radiocarbon dates are published.

Security of context is especially important in assessing the evidence for cereal remains at 'Houses' 4-6. Each of these sites is apparently cut by lazy beds. This form of spade-dug ridge and furrow cultivation has its origins in later prehistoric Ireland (e.g. G.F. Mitchell 1979, Fowler 1981, 20;

see Verrill and Tipping 2010a, 1223). At Carrownaglogh, Co. Mayo, for example, wheat and barley were grown in spade-dug cultivation ridges during the Late Bronze Age (O'Connell 1986). Lazy beds proved effective in providing well-drained and aerated growing conditions in Ireland's damp climate (e.g. G.F. Mitchell 1979, 29; Bell 1984). Cereals were the principal crop grown in lazy beds prior to the arrival of the potato in the seventeenth century AD (e.g. Whelan 1997, 68; 2011, 91; Caulfield 1988).

Considerable later prehistoric and early historic evidence has been identified in the immediate vicinity of 'Houses' 4-6 (Purcell 2002, 33; Tobin 2003a, 187; 2003b; 2004; see Figure 4.17, below). The lazy beds that truncate 'Houses' 4-6 are adjacent to evidence of intense historic cereal production (Tobin 2003a, 187; 2003b; 2004). Sixteen corn drying kilns have been identified (*ibid.*, 2004; Monk and Kelleher 2005; 2009, Table 16.1, Table 16.3, 144). Prehistoric pottery and lithics have been recovered from the fill of these kilns (Tobin 2003a, 187), demonstrating their encroachment on the prehistoric sites. The kilns have not been dated, though the excavator suggests they are of early medieval origin (*ibid.*). Many of the dated examples elsewhere in Ireland have proven to be later medieval (Monk and Kelleher 2009, 149).

In line with other excavated examples, the Corbally kilns produced a range of grains from cereal species cultivated in Ireland in historic times: wheat, barley (including germinated hulled barley) and oats (Monk and Kelleher 2009, 144; 2005, 85). Charred plant remains are produced by both material used for fuel, and grain being dried (*ibid.* 2009, 144). Some of the excavated kilns at Corbally 'showed evidence of a high proportion of failures where the grains ignited' (Tobin 2003b, 36; 2004). Associated features included 'rake-out' area, drainage channels, and pits - including 'an elongated pit that contained vast amounts of carbonised environmental materials that had clearly been dumped', possibly

associated with malting barley (*ibid.* 2003b, 34). 'Large amounts of charred seed were recovered from the fills' of constituent features of the kilns (*ibid.* 2003a, 187).

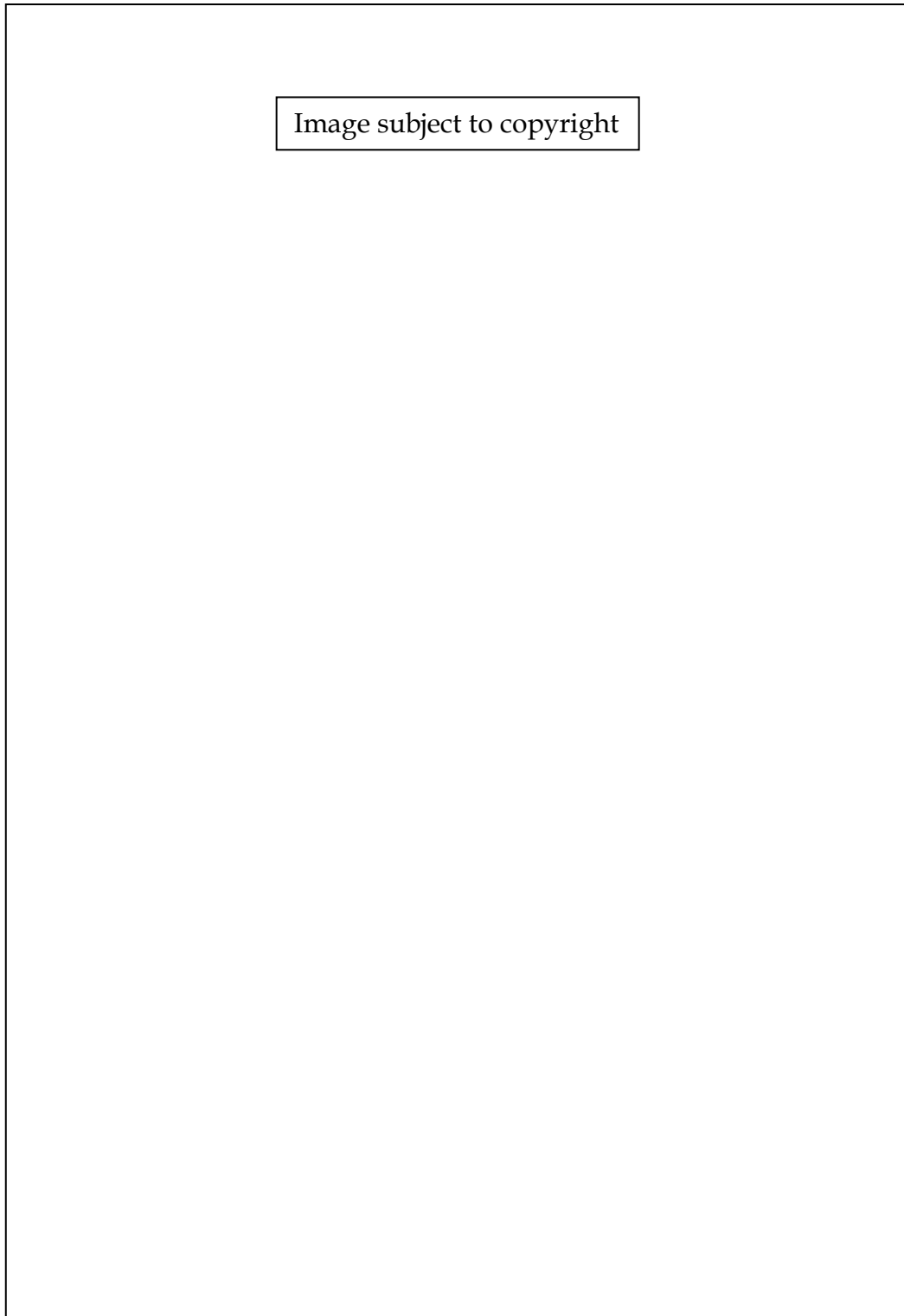


Figure 4.17: The two groups of Neolithic structural remains at Corbally (top-left and centre) lie among a significant concentration of later archaeological remains. After Tobin (2003b, 36).

In short, there is significant potential for intrusive cereal remains at the Corbally Neolithic structures, particularly in the area of 'Houses' 4-6. No radiocarbon dates are recorded from the apparently abundant assemblage at 'House 4'. No cereal assemblage is mentioned in reports of 'House 5', however a single indeterminate 'hazelnut and cereal remains' sample is dated. At 'House 6', though the cereal assemblage was apparently abundant, only a mixed 'hazelnut and cereal remains' sample was dated. The small quantity of (full or partial) degraded grass grains that constitutes the assemblage of cereal-type grains from 'houses' 1-3 falls below the level of evidence necessary to make a positive identification. At 'House 3', intrusive material provides a plausible alternative to the 'tentative' suggestion of Neolithic cereal processing. As noted, the excavator observed that the relatively large samples of chaff were much better preserved than small assemblage of grass grains.



4.3.2.c Ballygalley, Co. Antrim

At Ballygalley, Neolithic structural remains were excavated across two sites either side of a culvert (e.g. Simpson 1995; 1996; Simpson *et al.* 1990; 1994; 1995; see Figure 4.18, below). 'House 2' (6.6 m by 5.2 m) and 'House 3' (5 m by 3 m) were located to the south of the culvert, along with 'Structure 4' (2.7 m by 2.2 m) (Simpson 1996; Cooney *et al.* 2011, 587). Initial excavations at 'House 1', to the north of the culvert, recovered nine grains identified as barley (*Hordeum* spp.) from a pit which also contained hazelnut fragments, flint artefacts and pottery (Simpson *et al.* 1990, 44). During a second season of excavations, sieving revealed charred barley grains in unspecified numbers from other features at 'House 1' (Simpson 1991). Earlier Neolithic radiocarbon dates were obtained from various

bulk charcoal samples and unidentified charcoal samples (Cooney *et al.* 2011, Table 12.3).

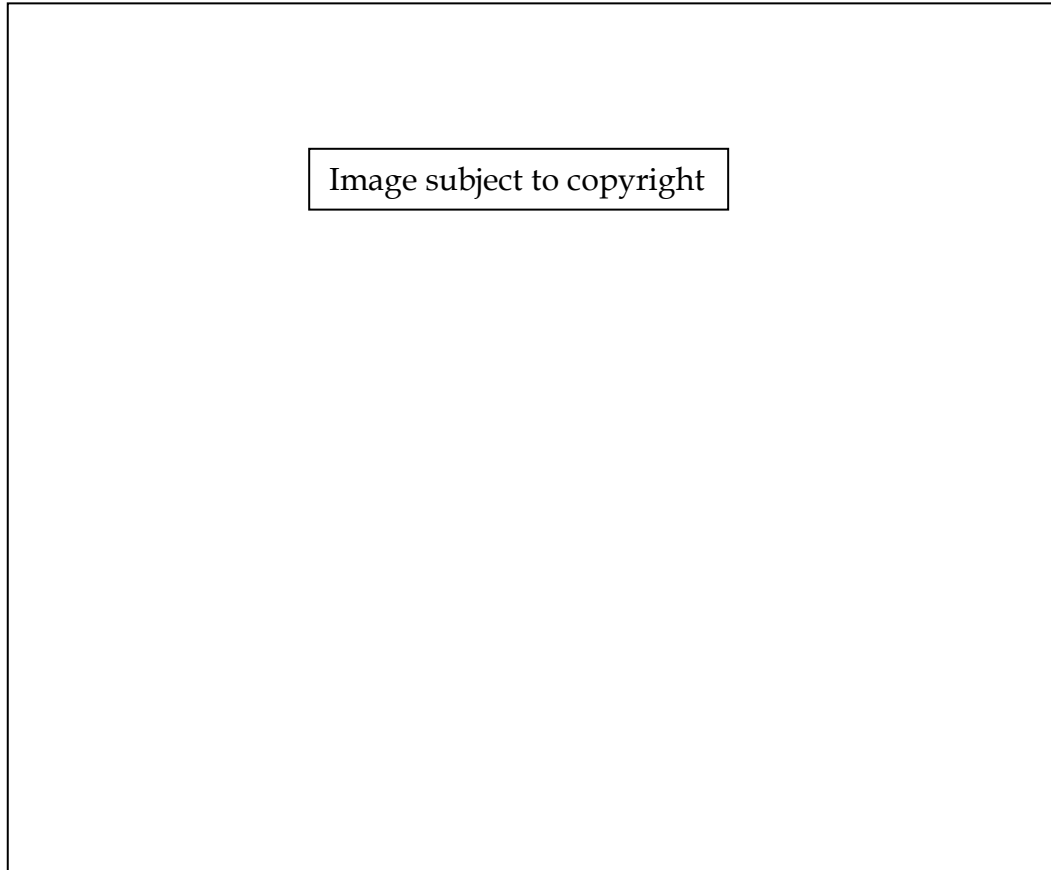


Figure 4.18: Plan of excavations at Ballygalley, with 'House 1' top right. After Simpson (1996, Figure 8.1).

Flotation of samples from 'House 1' produced a further unquantified grain assemblage described as 'relatively large for an Irish Neolithic site (Simpson 1995, 38). This was 'dominated by wheat (*Triticum* spp.) with an unusually high proportion of what appears to be einkorn (*Triticum monococcum*)' (*ibid.*; see also Simpson 1996, 127-8). This identification must, however, be treated with caution. The evidence for einkorn in Neolithic Ireland is poor: grains have tentatively been identified at just one other site: Tankardstown South (McClatchie *et al.* in press, 5), the (presumed) impression of an einkorn spikelet in pottery from Dooley's Cairn—a court tomb at Ballymacaldrack, Co. Antrim (*ibid.*, 5, Figure 8; Jessen and Helbaek 1944, 18; Monk 1986, 31).

It may also be instructive that the 'condition of the grain in the house' is at variance with material from other locations at the site (Simpson 1995, 38; 1996, 129). That only 'clean' grain was found within the 'house' has been taken as evidence that only cereals that had been processed elsewhere were introduced into the structure itself (*ibid.*, 1995, 39; G. Jones and Rowley-Conwy 2007, 45). It might equally be the case that the grain was incorrectly identified as cereals, or was intrusive material. Chaff found in other contexts is undated.

Diagnostic Bronze Age pottery was recovered from both Sites 1 and 2, and '[s]even un-urned human cremations were found in shallow pits concentrated to the south-west of House 2, associated with a barbed and tanged arrowhead and some undecorated Early Bronze Age pottery sherds' (Simpson *et al.* 1995). Full analysis and publication of the excavations at Ballygalley is awaited in order to clarify the interpretation of the 'various strands of evidence' from the site (Bayliss *et al.* 2011b, 843).



4.3.2.d Knowth, Co. Meath

At Knowth, a small assemblage of charred cereal grains is associated with the earlier Neolithic foundation trenches identified by Eogan and Roche (1997) beneath and adjacent to the main passage tomb (B. Collins 1997; see Figure 4.19, below). Many of the grains were 'corroded', and no chaff or 'cereal weeds' were recovered. From the northern area, ten wheat grains were identified from three samples, nine of which were recorded as emmer. From a further three samples in the eastern area, two wheat grains, two 'degraded and unidentifiable charred cereal' grains, one barley grain and one possible oat grain were identified (*ibid.* 1997, 296). These

identifications must be seen as tentative given the small quantity and poor preservation of the grains. Security of context is also problematic due to the complex phasing of the prehistoric evidence at the site: the earlier Neolithic zones are overlain by Bronze Age evidence which includes sparse cereal remains (*ibid.*). The plant remains specialist concluded:

Although cereals were present in Earlier 'Western' Neolithic, Decorated Pottery, Grooved Ware and Beaker contexts, the nature of the remains give us little detail in terms of prehistoric crop husbandry at this time, or the extent to which cereals were significant in the economy (B. Collins 1997, 299).

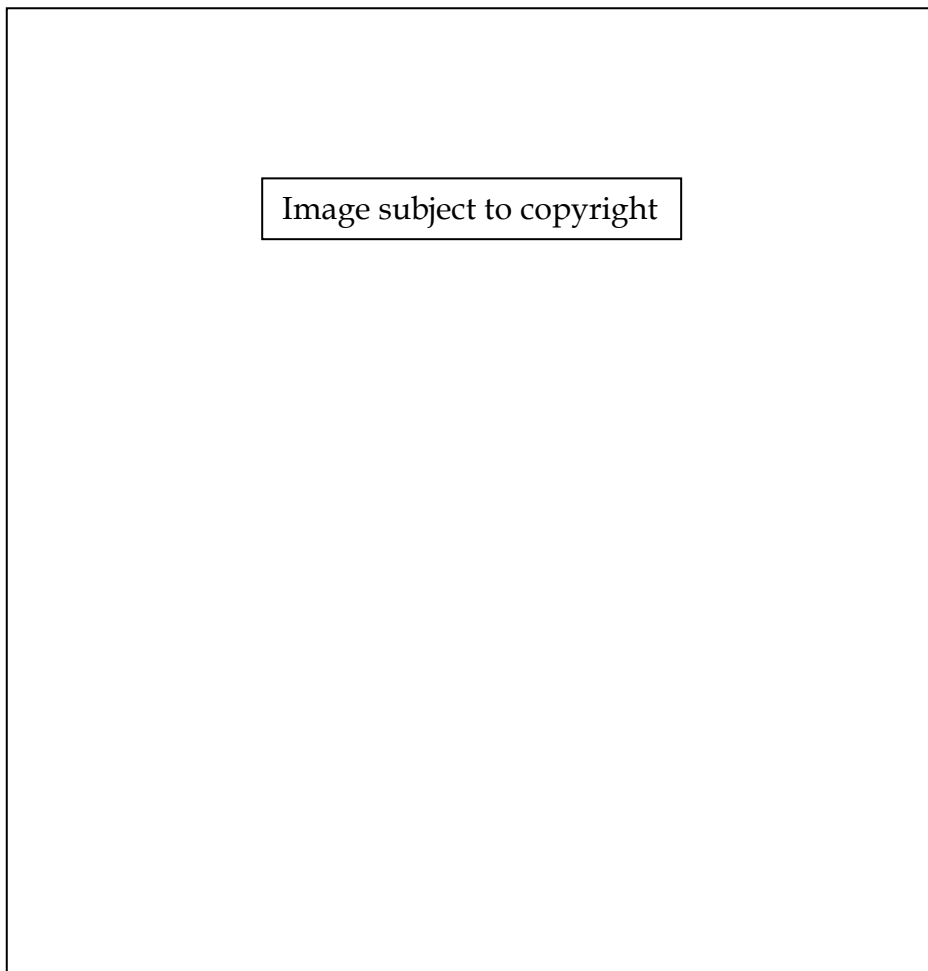


Figure 4.19: Foundation trenches (presumed to represent Early Neolithic rectangular timber structures) in zones B and C at Knowth. After Eogan and Roche (1997, Figure 1).

4.3.2.e Ballintaggart, Co. Down

Three 'Neolithic house structures' were identified along with significant Bronze Age activity during excavations ahead of road construction (Chapple *et al.* 2009; see Figure 4.20, below). All the archaeobotanical material was preserved as a result of charring. The plant macrofossil remains 'survived in a fragmented state of preservation'. They were identified by comparison with modern reference material and published seed keys (C. Dunne 2009a, 245).

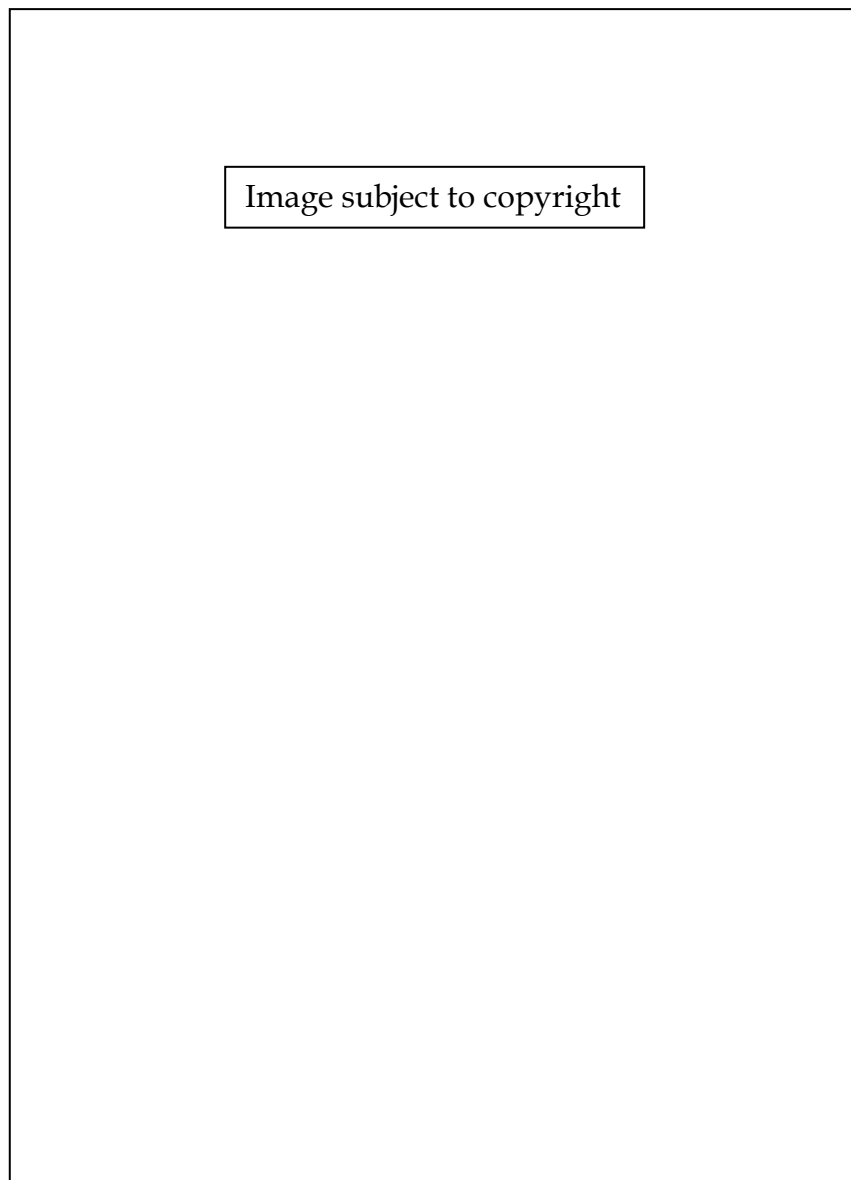


Figure 4.20: Plan of excavated Neolithic and Bronze Age features in the townland of Ballintaggart. Neolithic features are marked in blue, Bronze Age in yellow. After Chapple *et al.* (2009, Figure 6).

Structure 1 produced a single grain identified as *Triticum aestivum* (bread wheat) from the fill of a slot trench. Another single grain was recovered from an associated ditch. Structure 2 produced four grains identified as *Triticum aestivum*, and two unidentified cereal fragments. No chaff was recovered from either site (C. Dunne 2009a, 245-6). A larger, more varied cereal assemblage was recovered from the adjacent Bronze Age funerary contexts (*ibid.*, 247).

Seed impressions were identified on seven sherds of pottery: all were deemed to date to the Neolithic (C. Dunne 2009b). Three of the impressions were apple pips; one the fruit stone of a blackthorn or sloe. The three remains impressions 'were not as well preserved as the apple pips hence identifications are far more tentative', but they are recorded as representing cereal caryopses (grains), specifically *Triticum* sp. (*ibid.*). One of the impressions is thought to have been from a charred wheat grain; the principal identifying feature on the other two seems to have been a ventral groove (*ibid.*, Table 1), but this does not distinguish cereal species from native wild grasses (e.g. see Figure 4.12, above; Figure 4.21, below).

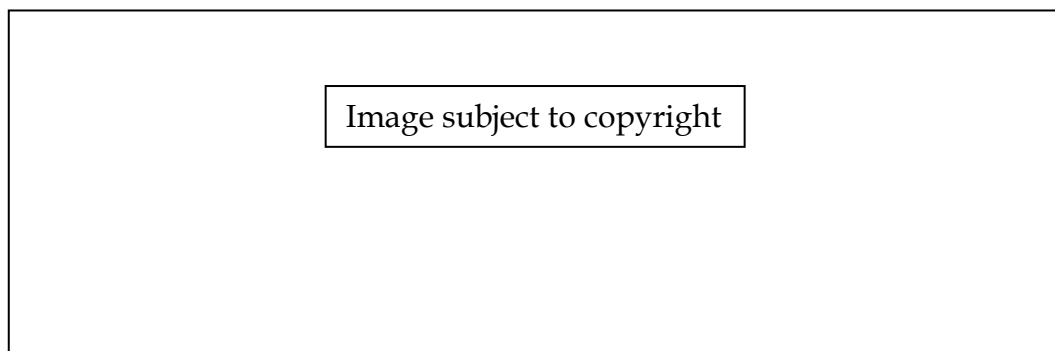


Figure 4.21: Modern sample of the seed of the widespread Irish native wild grass *Elymus caninus* (bearded couch). Note the clear groove on this, the ventral surface. After Cappers et al. (2006, photo 416-D).



4.3.2.f Tullahedy, North Tipperary

Recent excavations of Neolithic rectangular structures at Tullahedy have been comprehensively published (see Cleary and Kelleher 2011). The principal settlement evidence comprised 'two adjacent Neolithic rectangular structures (interpreted as houses) and a third structure (possible house)' on the lower slopes of a glacial mound (McClatchie 2011a, 162; see Figure 4.22, below). Associated features include pits and hearths, and it is thought the site may have been enclosed by a palisade during the Neolithic. Early medieval, medieval and modern evidence was also recorded (Kelleher 2011, 19).

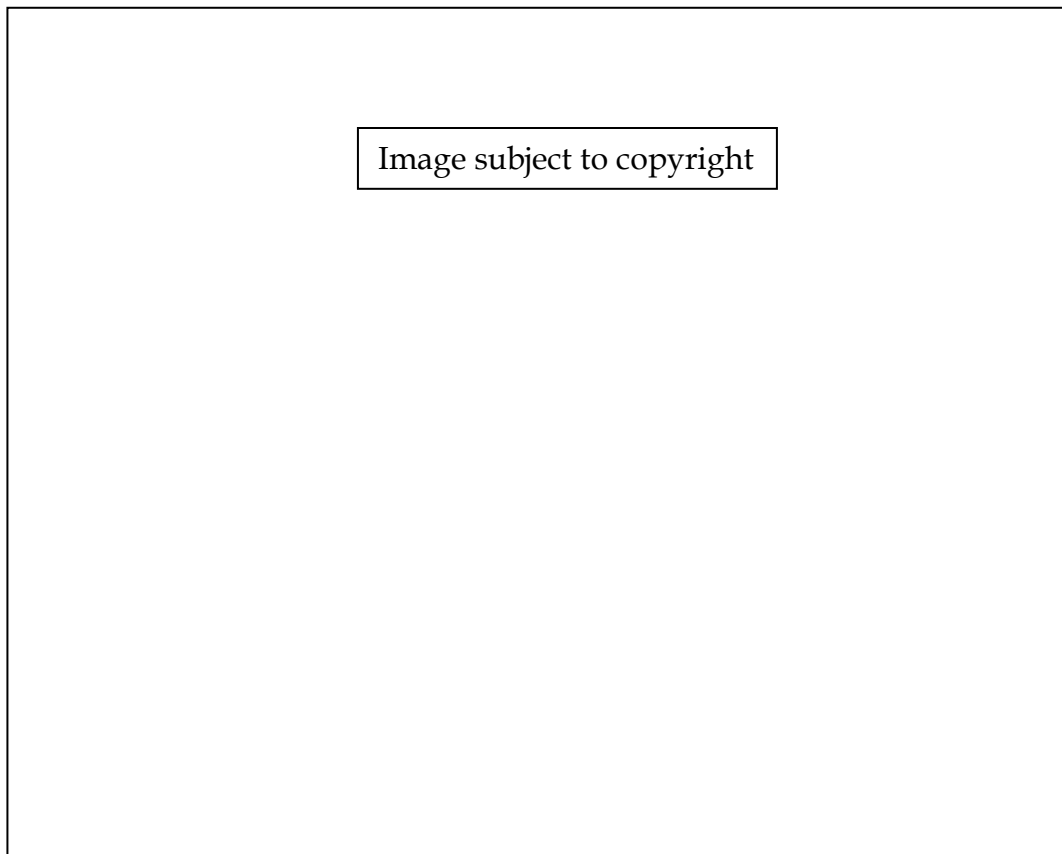


Figure 4.22: Plan of Tullahedy site showing the locations of the known Neolithic structures. After Cleary and Kelleher (2001, Figure 2.21).

Small numbers of possible cereal grains/ fragments of cereal grains were identified within the structural remains. Outside the structures, larger samples were recorded, some of which are associated with the Neolithic phases at the site. For the most part, the cereal remains could not be identified to species level. Emmer wheat is proposed as the predominant prehistoric species present, but identification was largely based upon grain morphology alone (the unreliability of which is acknowledged by the plant remains specialist) (McClatchie 2011a, 163). Associated with the earliest phase at Structure 1, a single hulled-wheat glume base was identified in a stakehole (C1533) (where 'a single possible cereal grain fragment' was also identified). This is taken as confirmation that 'at least some of the grains are likely to be of hulled wheat, supporting the tentative identification as emmer wheat' (*ibid.*).

Beyond this, occasional indeterminate cereal grains, 'including possible emmer wheat' were recovered from a small number of slot trenches and internal pits at Structures 1 and 2. A posthole within Structure 3 'contained more than 50 cereal grains, most of which appear to have been emmer wheat', where two further postholes also 'contained cereal grains (including possible emmer wheat)' (McClatchie 2011a, 166).

Hazelnut shell was, however, 'the predominant plant type recorded in most samples dating to the Neolithic at Tullahedy' (*ibid.*, 173, Appendix 6.1). Forty five of the Neolithic radiocarbon dates come from samples of hazelnut shell. In total, 82 radiocarbon dates were obtained for samples at the site, four of which came from possible cereal remains associated with the Neolithic phases within Structure 1; two from cereal remains from Structure 2; and two from Structure 3 (see Table 4.3, below).

Table 4.3: Radiocarbon dates for cereal-type grains within Structures 1, 2 and 3 at Tullahedy. After Schulting 2011, 146-50 with additional information from McClatchie 2011a, Appendix 6.1 and Kelleher (2011, 22-43).

Lab code	Feature	Context	Material	¹⁴ C years BP	¹⁴ C years cal BC
<i>Structure 1</i>					
UBA-11178	Slot trench C1336	Fill C1421	Possible wheat grain	4756±34	3638-3380
UBA-11179	Slot trench C1554	Fill C1586	Possible wheat or barley grain	4826±24	3654-3530
UBA-15313	Internal pit C1278	Upper fill C1308	Possible wheat grain	4784±30	3642-3520
UBA-15311	Internal pit C1279	Fill C1279	Possible wheat grain	4750±33	3636-3380
<i>Structure 2</i>					
UBA-11173	Slot trench C1190	Fill C1190	Possible wheat grain	4738±24	3633-3379
UBA-15305	Internal pit C1155	Fill C1162	Possible wheat grain	4707±31	3630-3371
<i>Structure 3</i>					
UBA-15278	Posthole C731	Fill C730	Possible wheat grain	4788±37	3651-3384
UBA-15278	Posthole C687	Fill C688	Possible wheat grain	4791±29	3644-3522

Structures 1 and 2 are overlain by a post-occupation spread of material, and therefore provide evidence of the sequence of activities during the Neolithic (Schulting 2011, 146). The large number of (mainly cut) features outside these structures cannot, however, generally be related stratigraphically, and therefore offer little indication of sequence (*ibid.*, 146).

Cereal-type grains were recovered from pits in the vicinity of Structures 1 and 2. Generally, the quantities are small and spread through multiple fill contexts. So, for example, two grains recovered from the basal fill (C1077) of a stone-lined hearth pit (C1075), measuring 1.3m x 0.8m x 0.36m, together formed a single radiocarbon-dated sample dated to the Neolithic: Lab code UBA-11169 was dated to 4770±25 BP, calibrated as 3638-3518 cal BC (Schulting 2011, Table 5.1). 'A layer of heat shattered angular sandstones (C1157), ranging in size from 0.1-0.3m, measured 1.2m x 0.4m x 0.2m thick and was laid directly on top of the basal fill (C1077)' (Kelleher 2011, 33). This could indicate that the dated grains were residual material, and that the majority of the small but varied cereal-type specimens dispersed among four different contexts above the stone lining were later (*pace* McClatchie 2011a, 163). Stratified dated samples could of course have ruled this out.

Pit C1090, however, yielded a remarkable quantity of cereal remains, estimated at 3,500 grains (McClatchie 2011a, 166; Kelleher 2011, 32). This estimation is based on the examination of approximately one-fifth of the flots from samples taken from two fill contexts: middle fill (C1123) and lower fill (C1124) (See Figure 4.23, below). Wild grasses were present in the samples, but the presence of emmer wheat was determined on the basis of glume bases and spikelet forks.

A sample comprising two possible wheat grains from the basal fill was radiocarbon dated: Lab code UBA-15301 was dated to 4757±31 BP, calibrated as 3637-3381 cal BC (Schulting 2011, Table 5.1). This is the only radiocarbon date from the three fills (C1124, C1123 and upper fill C1122) that comprise pit C1090. The feature has been interpreted as 'a receptacle, perhaps for fire waste deriving from food preparation activities at the nearby hearth [C1075]' (McClatchie 2011a, 175).

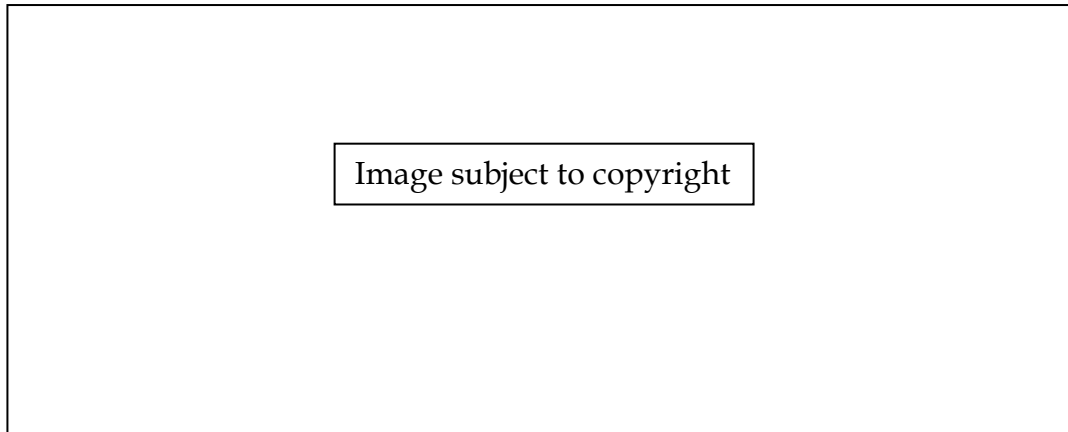


Figure 4.23: Section drawing of pit C1090. After Cleary and Kelleher (2001, Figure 2.21).

While the lower part of pit C1090 has steep sides which may imply rapid infill, and there are no signs of the pit being recut, the selection of only basal samples for dating is unfortunate. Only with stratified samples can the coherence of the deposit be demonstrated (cf. Dincauze 2000, 107, 116; Ashmore 2004, 126). The selection of basal material from the lower fill suggests that earliest possible date was sought. The risk that this material was residual cannot be ignored, particularly in the presence of many Medieval cut features containing assemblages of hundreds of cereal grains (McClatchie 2011a, 171-3).



4.3.2.g Other sites with recorded cereal-type remains

At Pepperhill, Co. Cork, on the route of the pipeline on which the structures at Tankardstown South were discovered, the truncated remains of a possible Neolithic structure which 'may be of relatively unsophisticated construction' was identified (Gowen 1988, 44-51; see also Gowen 1987, 10; Tarbett and Crone 1987). A small, 'badly preserved', assemblage of possible cereal grains was identified among the seeds of modern weeds and grasses, hazelnut fragments and charcoal from oak

and hazel (Gowen 1987, 10; Monk 1988). '[O]ne poorly preserved *Triticum*-type grain' was identified being 'longish, almost parallel-sided grain with shallow ventral groove' (Monk 1988, 188). These features are not unique to cereal grains (see above). Seven further unidentified cereal grain fragments are recorded (*ibid.*).

At Ballyharry, Co. Antrim, a sequence of rebuilding may have spanned many centuries (D. Moore 2003, 163). A series of dates from unidentified charcoal are clustered in the early centuries of the fourth millennium cal BC (see Cooney *et al.* 2011, 593; Table 12.3). 'Charred wheat (*Triticum* sp.) and barley (*Hordeum* sp.) grains and charred hazelnut fragments were recovered from within the bedding trenches and exterior features' (*ibid.*, 161). No details of the composition of the assemblage or the quantity of material are reported. However, given that '[p]reliminary analysis of the remains would tend to suggest that only processed cereals were associated with the structure' (*ibid.*, 161-2), and that chaff is not mentioned, it is assumed that grains were identified morphologically. Seven hundred metres to the east, at Ballyharry Farm, a further presumed-Early Neolithic rectangular structure was substantially disturbed by later agricultural and horticultural activity (Ó Néill *et al.* 2004; Ó Néill 2007).

While none of the evidence from Thornhill has been radiocarbon dated, the excavator at this site also envisaged 'a lengthy period of activity' (Logue 2003, 154). Unidentified (and unquantified) 'cereal' grains are recorded as having been recovered from linear features (interpreted as palisades) in the proximity of the structural remains (Logue 2003, 154). The relationship between this undated material and the presumed-Neolithic rectangular structures has not been established.

First identified as a series of burnt and cut features, prehistoric remains have been found at Richardstown, Co. Louth, included a curving foundation trench thought to be Neolithic (see Figure 4.24, below). No

material was radiocarbon dated, but, flint blades and a sandstone axehead presumed to be Neolithic were recovered from the site (Byrnes 1999, 33; 2000, 221-2). The structural remains are truncated large Bronze Age pits, 19th century ploughing and drainage, and modern quarrying. Bronze Age remains include two furnaces, two large 'roasting' pits, three pits filled with ash and charcoal-rich soil, bronze slag, a number of large sherds of coarseware pottery, flint blades and two large 'pit' burials (*ibid.*). Smyth (2006, 240) reports a 'significant' cereal assemblage, but details of this have not been published by the excavator. Security of presumed Neolithic contexts may be problematic with so many later cut features, no surviving occupation layer, and in the absence of radiocarbon dates.

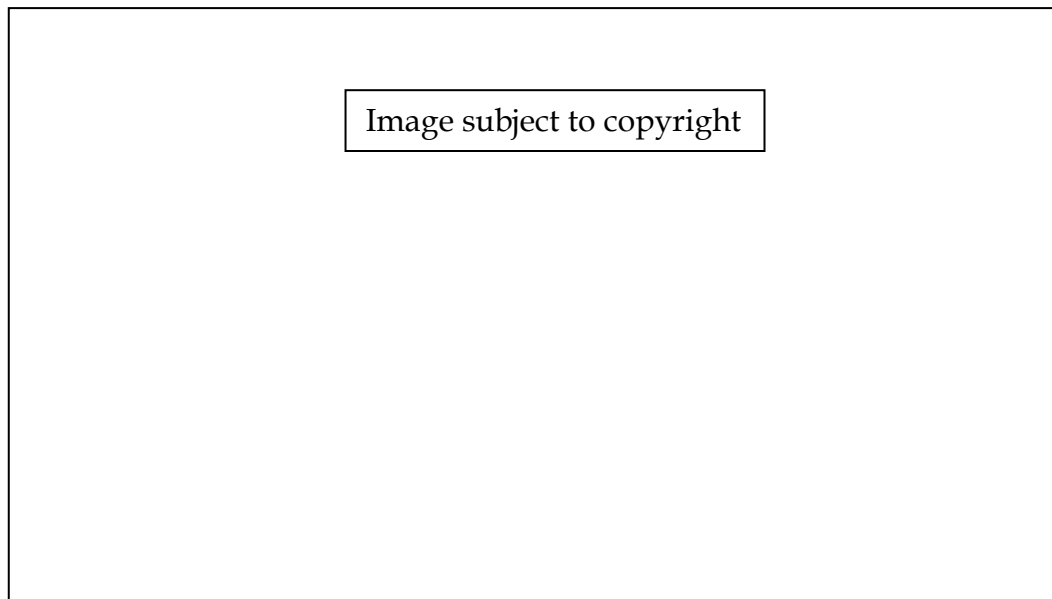


Figure 4.24: Presumed Early Neolithic foundation trench at Richardstown. After Byrnes (1999, 33).

'A number of distinct phases of activity were identified at Monanny' (F. Walsh 2006, 7). Three rectangular structures interpreted as Neolithic houses (together with associated pits and hearths) were found in conjunction with 'Bronze Age activity in the form of a burnt mound and pits; an early medieval cereal-drying kiln; a medieval burial; and post-medieval agricultural features' (*ibid.*; see Figure 4.25, below).

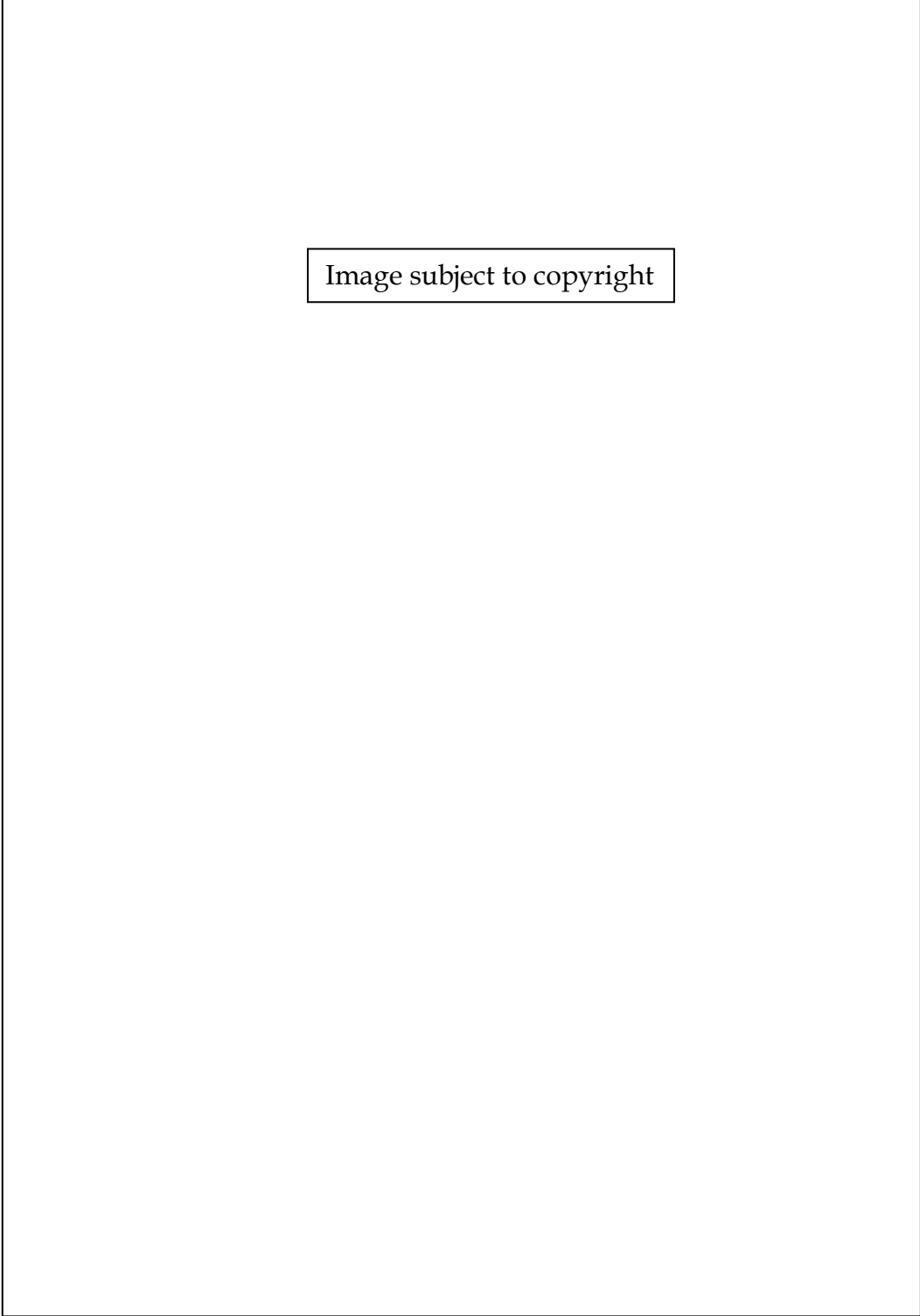


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Figure 4.25: Plan of excavated features at Monanny. After Walsh (2006, Illustration 2).

Among the 'small quantity of plant remains' recovered from soil samples, hazelnut shells featured, along with 'emmer wheat' from 'Houses' A and 'Naked barley' from 'House C' (F. Walsh 2006, 17). Details of the number

of grains, their level of preservation, or the means of identification are not published, nor are their precise contexts. Given the adjacent cereal drying kiln, and the significant disturbance of the site by later prehistoric and historic cut features and ploughing, the temporal association of the grains and the structures must be seen as tentative. Nevertheless, the excavator infers that the Early Neolithic population 'farmed the land along the river's edge, growing wheat and barley...' (*ibid.*, 9).



4.3.3 Reasons to be cautious: problems with the identification of cereal remains at Irish Neolithic rectangular timber structures

Presumed evidence for cereal farming from the small cohort of Neolithic rectangular timber structures in the west of Ireland (discussed in section 4.5 below), provides further evidence of the problems with the identification and interpretation of grass seeds associated with Irish Neolithic rectangular timber structures that has been established above. Sample size is the overriding concern, with the vast majority of assemblages (typically less than 10 grains) being too small to be reliably identified (e.g. see McClatchie *et al.* in press, 4). Further constraints can be summarised as follows:

- ◆ The consistent and repeatable identification of samples requires the preservation of combinations of grain characteristics that are rarely present in charred Neolithic specimens (Hillman *et al.* 1996, 206).
- ◆ Ancient strains of grasses will have no precise modern counterparts. The applicability of seed keys and modern reference

samples with idealised specimens can be limited (e.g. Hillman 2001, 28-9; Wilcox 2004, 145).

- ◆ In addition to charring, taphonomic processes may significantly alter the morphology of samples. Individual grains may vary in accordance growing conditions and their position on the plant. The morphology of grains from wild species overlap. Few Irish Neolithic sites have yielded evidence for chaff.
- ◆ Security of context is difficult to ensure. Many of the sites are cut by, or adjacent to, later features which are potential sources of intrusive materials.
- ◆ Stratigraphic relationships are poorly understood at most (all?) sites. A 'flush' of (wild) grass seeds and associated weed species will be present in Early Neolithic levels at all sites where preservation conditions permit relating to the Elm Decline. Temporal association between grass seeds and adjacent archaeological features must be proven, not assumed (likewise cultivation).
- ◆ Bioturbation is further a potential source of intrusive material.
- ◆ The dating of unrepresentative samples, leading to the temporal conflation of material in spatial proximity: individual seeds (particularly from basal deposits) cannot be assumed to be representative of material throughout a context (such as a pit or trench).

Neolithic grain samples are typically badly degraded. Their identification relies upon considerable subjectivity. The degree of confidence accorded to such interpretations may rest significantly on the 'self-certainty' of the

analyst (Hillman *et al.* 1996, 206; Hillman 2001, 28). Uncritical acceptance of the assumption that cereal remains *should* be present at Neolithic 'houses' can only serve to compound this problem.

Clearly it is necessary for plant-specialists to control for wild grasses, the presence of which should be expected. Possible construction contexts such as wall slots are the principal source of grain reliably associated with rectangular 'houses'. However, (wild) grasses may have been incorporated into daub for sections of walling, or lighter screen walls. It is also likely that the structures were thatched (cf. e.g. Grogan 1988, 149; Simpson 1996, 127; Cooney 2000a, 59; Smyth 2006, 246). The floors of the may have been strewn with reeds or straw (cf. Hamlin and Hughes 1997, 58). Everyday portable items such as basketry and cordage will likewise have incorporated grasses. It makes practical sense that the immediate vicinity of structures, if not already a forest clearing or area of open ground, be cleared of trees and shrubs, thus creating a habitat for grasses.

In all these cases, hearths and fires would introduce charred Neolithic wild grass seeds. Among the native wild grasses of Ireland, there are species with edible seeds that share many of the morphological characteristics of cereals. Where features such as a ventral ridge, parallel sides, or grain size accord with cereals, they also accord with non-cultivated grasses. Evidence for processing of these wild species (such as quern stones and rubbers) might be misinterpreted in the archaeological record where cereal processing is expected. It might be argued that the assumption of cereal processing represents an ethnocentric interpretation of the evidence: fields of wheat and barley are not the only source of useful grass products.

Grass seeds are generally discovered in much lower numbers than hazelnut shells at Irish Neolithic rectangular timber structure. Hazelnut

shells are, however, a by-product which may be cast into the fire (thus charred) (e.g. G. Jones and Rowley-Conwy 2007; Thomas 2008, 71). In contrast, grass seeds may be the desired end-product, and thus less easily detected by archaeologists (particularly prior to the widespread involvement of archaeobotanists at excavations). Nevertheless, wild grasses were almost certainly present at all these sites. If the site conditions were such that hazelnut shell was preserved, some grass seed might be expected. Moreover, as has been discussed, chaff can be expected to accompany preserved cereal grain. This has been demonstrated by many post-Neolithic charred assemblages (e.g. M. Robinson 2000, 87-8; Thomas 2008, 71).

Wild grasses *were* present throughout Ireland in the Early Neolithic: it is the presence of introduced cereals that is to be proven. The default position where tiny assemblages of grass seed cannot be positively identified should not be that they are most likely cereals. Tankardstown South is unique among the structures in that cereal remains from the confined context (albeit the basal fill) of a posthole have been dated. Leaving aside Tullahedy, that single deposit is larger than the sum of all the recorded assemblages associated with Neolithic rectangular timber structures in Ireland. Basing the interpretation of all (presumed) Neolithic rectangular timber structures on the evidence from a single site is clearly fraught (cf. McClatchie *et al.* 2009, 4).



4.4 Dating the ‘boom’

This does place a burden of rigour, however, on the archaeologist. Not only must the stratigraphic sequence included in a model be accurate, but this relative chronological sequence must also apply to the dated samples. None of them can be reworked, curated, residual, or intrusive, or the inputs to the model will not be correct. As these inputs are informative, if they are wrong, then the chronology suggested by the model will also be wrong!

Bayliss *et al.* (2007, 14)

In the absence of unifying form, features, artefacts or ecofacts, the evidence for Neolithic rectangular timber buildings being the signature homesteads of Ireland’s first farmers relies increasingly on dating evidence. Having for a long time been interpreted as ‘iconic’ manifestations of settlement practice *throughout* the Neolithic, Bayesian analysis of the available radiocarbon dates has introduced a new perspective (Cooney *et al.* 2011, 599). In common with other archaeological features whose dating evidence has been refined using this method, the date range has been dramatically curtailed. It has become widely accepted that Irish Neolithic rectangular structures belong to a tightly defined ‘horizon’ of perhaps less than a century (e.g. *ibid.*). For many, this is indicative of a colonisation event (e.g. McSparron 2008, 19).

The first to apply Bayesian statistics to Irish rectangular ‘house’ data was McSparron (McSparron and Weir 2003), who analysed 15 short-life samples from five sites, finding that 95% fell within a range of approximately 300 years (3800–3520 cal BC), and c. 60% within a range of 100 years (3730–3630 cal BC) (*ibid.*, 11). McSparron extended this analysis in 2008 to include 18 samples from seven sites, and reported that ‘...analysis using OxCal 3.10 suggests that we can have a 95.4% confidence

in the suggestion that the use/construction of these dated structures commenced between 3715 and 3650 cal. BC and ended between 3690 and 3625 cal. BC' (2008, 19; see Figure 4.26 and Table 4.4, below). McSparron's findings are regularly cited and widely accepted (e.g. Whitehouse *et al.* 2010, 18; Cleary 2011, 417; Schulting *et al.* 2011, 30; Sheridan 2013, 283; McClatchie *et al.* in press, 8). There are, however, considerable problems with the analysis.

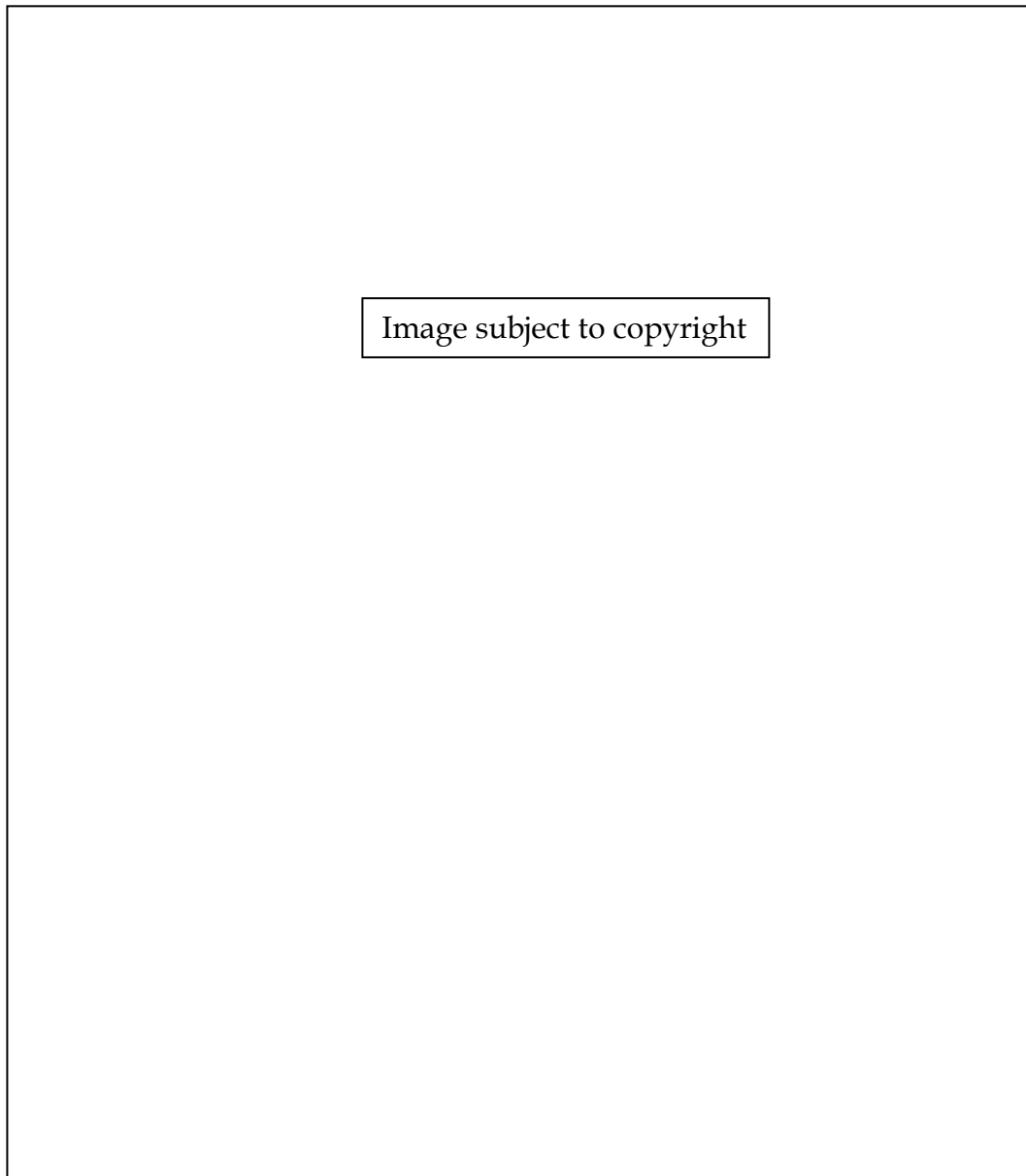


Figure 4.26: Radiocarbon dates from Irish Neolithic structures included in McSparron's 2008 model. After McSparron 2008, Figure 3.

Table 4.4: 'Gold standard' radiocarbon dates selected by McSparron 2008. Details as published in Cooney et al. (2011, Table 12.3).

Lab code	Structure	Material and context	¹⁴ C years BP	¹⁴ C years cal BC
Beta-171411	Barnagore	Oak charcoal.	4880±70	3950-3630
Beta-134226	Cloghers	Hazelnut shell(s). Fill of posthole.	4850±40	3710-3530
Beta-134227	Cloghers	Hazelnut shell(s). Fill of wall.	4900±40	3770-3630
GrA-13701	Corbally 1	Hazel (unclear if nut or wood). Internal posthole F13.	4930±50	3900-3630
GrA-13702	Corbally 1	Charred grain. External trench F3.	4880±50	3770-3530
GrA-13698	Corbally 2	Hazel (unclear if nut or wood). Internal posthole F148.	4900±50	3790-3540
GrA-13700	Corbally 2	Charred grain. Internal posthole F53.	4900±50	3790-3540
GrA-13695	Corbally 3	Hazel (unclear if nut or wood). Internal posthole F249.	4920±50	3800-3630
GrA-13697	Corbally 3	Charred grain. Internal posthole F208.	4910±50	3800-3630
GrA-24212	Corbally 5	'Cereal remains'. Foundation trench.	4885±45	3770-3540
GrA-24213	Corbally 6	'Hazelnut and cereal remains.' Foundation trench.	4840±45	3710-3520
Beta-188378	Enagh	Hazelnut shell frags. Posthole F207.	4880±40	3720-3540
UB-6200	Kilgobbin	Hazelnut shells. Posthole F985	4914±37	3970-3630
UB-7595	Monanny A	Hazelnut shell from floatation. Foundation trench 110.	4897±37	3770-3630
UB-7594	Monanny B	Hazelnut shell from floatation. 'Occupation deposit' 592.	4836±37	3700-3530
UB-7596	Monanny C	Hazelnut shell from floatation. Foundation trench 948.	4970±37	3910-3650
OxA-1476	Tankardstown	Grain. Foundation Trench F35.	4890±80	3930-3520
OxA-1476	Tankardstown	Grain. Foundation Trench F35.	4840±80	3790-3370

Bayesian statistics provide the means of improving the precision of radiocarbon dates by incorporating *prior* knowledge or beliefs about the archaeological context to constrain the calculated date range (see Chapter 2 for further discussion, with references). Specifically, archaeological information about temporal relationships within a series of date distributions is incorporated into Bayesian models. ‘Priors’ may be known stratigraphic relationships between a series of dated objects, or, potentially, come from an accepted typological sequence.

Where prior knowledge/beliefs are genuine, the use of Bayesian statistics is uncontroversial (Efron 2013b, 133). The controversy with the method – which, in terms of scientific credibility, has itself undergone several ‘booms’ and ‘busts’³ – is the often inherently subjective nature of priors. The risk is that incorrect priors may result in an increase in precision (i.e. a more tightly defined date range), at the expense of accuracy: the true sample age is not represented. As Bayliss *et al.* (2007, 22) cautions:

It is essential that the informative prior beliefs – the archaeological information and particularly the stratigraphic sequence of samples included in a model – are accurate or the resulting date estimates will be importantly wrong.

An additional problem with McSparron’s model is that no stratified series of radiocarbon-dated samples is utilised. Instead, presumed-Neolithic rectangular timber structures are classified as a cohesive evidential type (‘houses’), with individual dates from selected sites *assumed* to represent the span of activity for the classification as a whole. Where there are multiple dates from a site, these come from contexts which cannot be reconciled stratigraphically. Whether the ‘gold standard’ dates included in the model come from ‘well understood’ site matrices is therefore a debateable point (see McSparron 2008, 18). Also, while all but one of the dated samples come from short-life ecofacts, many are not single entities – the other main criterion for the ‘gold-standard’ dates (see Table 4.4,

above). This raises the question of how many of the rejected dates that do not confirm McSparron's conclusion were also *nearly* 'gold-standard'.

No site demonstrates a credible 'lifecycle' for the use of these structures. Eight of the 18 contribute only one date to the model—the three individually dated structures at Monanny, and two of the structures at Corbally, as well as Barnagore (Co. Cork), Enagh (Co. Derry) and Kilgobbin. The 10 remaining dates come from five structures, each contributing two dates. This scarcely lessens the improbability of the evidence of the first and last usage of a structure being preserved, recovered, and selected by the excavators for dating. In the absence of a stratified sequence of dates (which either confirms or disproves the temporal coherence of a deposit), relating individual (usually small and potentially mobile) ecofacts to a fixed point in the use of the rectangular structures is fraught for reasons which have been discussed.

Corbally provides almost half of the selected dates—eight of 18; Monanny provides three. With 61% of the data coming from just two sites, it is presumptuous to assume that this is a 'typical' or 'representative' sample (see McSparron 2008, 18-19). Arguably, the very presence of so many structures at these two sites differentiates them from a 'typical' known site. Certainly the model cannot be 'representative of Irish Neolithic rectangular houses as a whole', given that 83% of the data comes from just four sites (including two each from Cloghers and Tankardstown).

The model is clearly over-reliant on Corbally, where the excavator was at pains to point out that stratigraphic relationships were poorly defined, both 'within' structures 1 to 3, and between the different structures (Purcell 2002, 35, 43, 53, 70). No details of stratigraphy are published regarding structures 4-7, however later groundworks have disturbed much of the evidence (Tobin 2003b; see above).

Similar problems to those encountered by McSparron are acknowledged by Cooney *et al.* in their Bayesian chronological models for rectangular Neolithic buildings (2011, 586-601). While they were able to identify 20 short-life samples from 14 structures, six of these structures are from Corbally, as were 10 of the samples (*ibid.*, 598). Based on their preferred model, Cooney *et al.* find that 'the activity represented by the use of these rectangular structures lasted for a relatively restricted period of time: 30-115 years (95% probability [...]), probably for 55-95 years (68% probability)' (*ibid.*, 598). However, they note that the Corbally dates might unduly influence the model, and that additional less ambiguous samples would be beneficial. They conclude that a 'very slightly longer chronology, however, cannot be ruled out at this stage' (*ibid.*, 598-9).

Given that the charred remains of structural timbers remain at a number of sites, the goal of a refined date range for the introduction of Neolithic rectangular house using Bayesian statistics might have been seen as a reasonable aim. However, the structural evidence has the disadvantage of being susceptible to the 'old wood' effect (particularly given the widespread use of oak), which will compromise precision (see Cooney *et al.* 2011, 598). Nevertheless, reasonable account of this phenomenon can be taken in at least some cases, such as at Barnagore, where date Beta-171411 (3950-3630 cal BC—see Table 4.4, above) derives from a 'slight' oak stake (Danaher 2009, 9; Cooney *et al.* 2011, 598).

The approach to Bayesian modelling adopted by Cooney *et al.* necessarily imposes a statistical distribution to counteract the probabilistic scatter inherent in radiocarbon dating and the calibration process (2011, 662; Bayliss *et al.* 2011a). This is because radiocarbon measurements are probability distributions which, as estimates of the true radiocarbon content of a sample, scatter around the true value within the (normally distributed) quoted error margin (Bayliss *et al.* 2011a, 18). Scatter will

increase with the number of available dates attributed to a phenomenon. Calibration can serve to exacerbate the effect of scatter, as date ranges may spread onto plateaux in the calibration curve (*ibid.*). Thus,

within any group of dates relating to an archaeological phase, a proportion of the probability distributions of the calibrated radiocarbon dates will lie outside—earlier or later than—the actual calendar span of that phase. If this scatter is not taken into account, then it will appear that the archaeological activity started earlier, finished later, and continued for longer than was actually the case (Bayliss *et al.* 2007, 5).

It is not unreasonable that those few date ranges attributed to rectangular timber structures extending to the pre-fourth millennium BC, and not compromised by the potential of ‘old wood’, are nevertheless treated as statistical outliers. At the other end of the date range, however, estimates of the end of the phenomenon may be more difficult to defend. Recent attempts to define a ‘post-house horizon’ (Schulting 2011, 155; Smyth 2013a; 2014, Chapter 5), with typologically distinct rectangular buildings, suggest that the end-points defined by Cooney *et al.* (2011) and McSparron (2008) (both prior to 3600 cal BC) may be an artefact of their analytical approaches, rather than a social phenomenon in Neolithic Ireland. The fact that the relatively well-dated Tullahedy structures overlap the ‘house horizon’ and ‘post-house horizon’ supports this suggestion.

The limitations of the dating evidence from Irish Neolithic rectangular structures, in particular the lack of a stratified series from any site, compromises the sophistication (and the reliability) of published Bayesian chronological models (cf. Bayliss *et al.* 2011b, 831). The analyses have low statistical power due to the lack of suitable data (cf. Button *et al.* 2013, 365). The stratigraphies of the chosen sites are poorly understood, and of course cannot be reproduced. The presence of short-life ecofacts in spatial proximity to these structures provides circumstantial, *not* contextual evidence (cf. Kinnes 1985).

Assumptions about the temporal relationship between ecofacts and the date range for activities associated with the structures must be treated with caution. The samples were not collected with a view for dating the span of activities at the sites, and are unsuited to high precision modelling. This is a particular cause for concern in the case of the new study by Whitehouse *et al.* (in press; see further discussion in Chapter 5 of the present study), where radiocarbon determinations on charred grass grains and hazelnut shells from 30 individual rectangular structures at 20 sites are seen to provide confirmation of the findings in Cooney *et al.* (see also Smyth 2014, 41-50). The assumptions regarding the identification of these samples as cereals are problematic, as is uncertainty surrounding the contexts from which many of the samples were recovered.



4.5 Neolithic rectangular timber structures in the west of Ireland



Figure 4.27: Distribution of known Neolithic rectangular timber structures in Ireland, after Smyth (2006, Figure 1; 2013, Figure 13.3) and Cooney et al. (2011, Figure 12.1). The red curve represents the limit of the (west of Ireland) study area. Replicates Figure 4.1, above.

The west of Ireland is poorly represented in the distribution of known Neolithic rectangular timber structures (see Figure 4.27, above). This absence of archaeological evidence does not of course alone provide evidence of absence. Much of the construction work that has led to the discovery of so many of these structures during ‘rescue’ excavations in recent years has taken place in the east of the country. The five structures so far identified are an insufficient basis upon which to define a reliable regional characterisation. Nevertheless, observations regarding their form, fabric, setting, dating and associated artefacts and ecofacts are instructive when considering the island-wide evidence. Of particular importance to the current study is evidence that may indicate the structures functioned as farmers’ dwellings.



4.5.1 Ballyglass, Co. Mayo

The rectangular house [...] discovered in Ó Nualláin's excavations under Ballyglass Court Cairn in Mayo, in 1970 [...] yielded Primary Neolithic pottery with pointed rims, and a flint assemblage similar to that in the centre Court Cairn above. Though a relatively long span of habitation, say even a century, is implied in the permanence of such a well built house, there is no need to regard it as other than the house of a family of Neolithic A [Early Neolithic] farmers, the most extensive evidence for which so far is the thirty Court Cairns in the area.

Michael Herity and George Eogan (1977, 47)

The rectangular wooden structure discovered beneath a court tomb in the townland of Ballyglass has played an important role in framing understandings of Neolithic settlement in Ireland. In line with expectations that Neolithic ‘farmhouses’ should be present among the relict field systems of north Mayo (Herity 1971, 264; Herity and Eogan

1977, 50), the Ballyglass structure was not interpreted dispassionately. Discovered beneath court tomb⁴ Ma. 13, the structure was immediately and unambiguously characterised as a house (Ó Nualláin 1972).

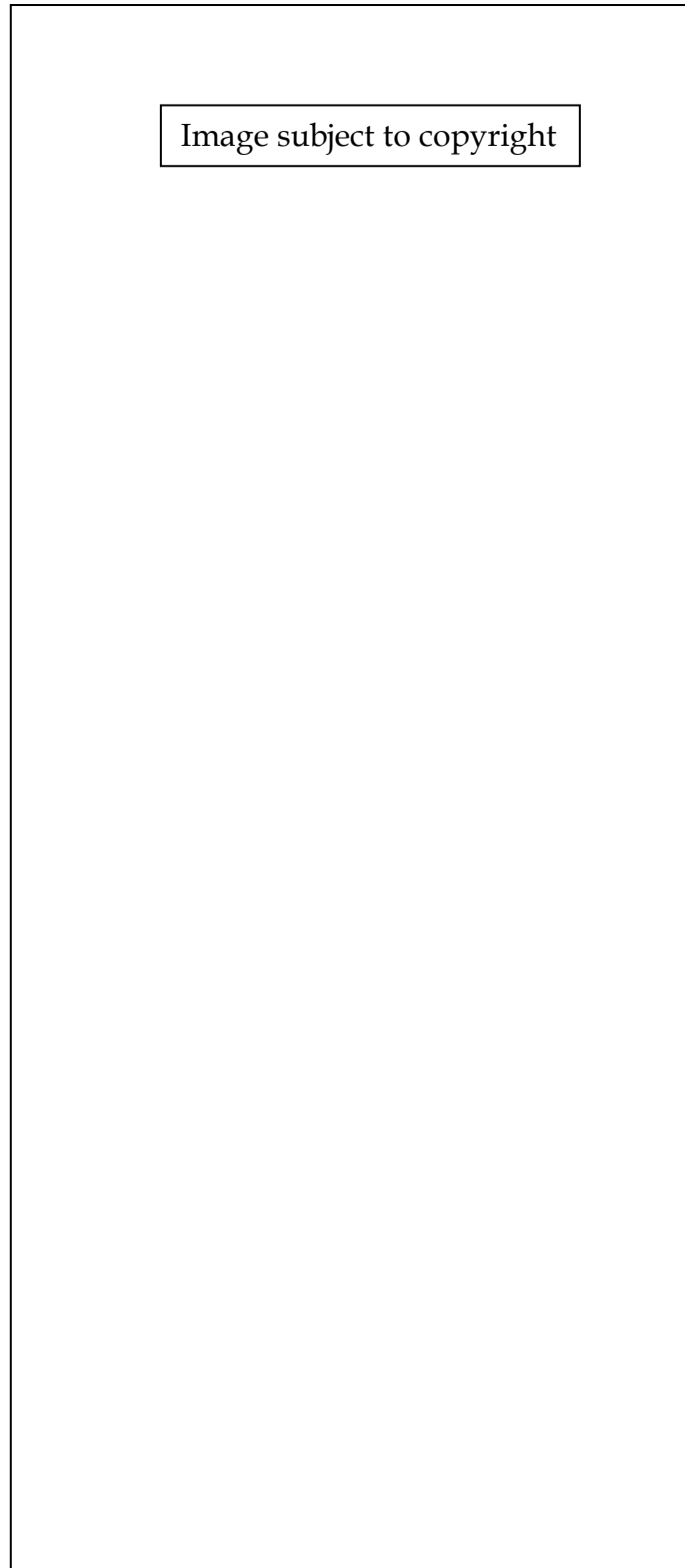


Figure 4.28: Plan of court tomb (Ma. 13) and underlying rectangular wooden structure. After Ó Nualláin (1972, Figure 1).

Situated beneath the western end of the cairn (see Figure 4.28, above), the structure measured 13m by 6m (Ó Nualláin 1972, 54). The foundation trenches which demarcate much of the structure were c. 20 cm deep. These incorporate postholes, 'many up to 70 cm in depth', which constitute the 'principal structural components of the house' (*ibid.*). No foundation trench was evident in the north-west gable of the structure; instead, there were a series of five postholes. The excavator interpreted these as forming a 'porch', there also being the suggestion of an 'entrance passage' within the structure (*ibid.*; see posthole arrangement at bottom of Figure 4.28). Grogan (2002, 519), suggests this may have been an area 'for storing grain or fodder'.

Analysis of charcoal from within the foundation trenches and postholes indicates that a variety of wood types, including oak, were utilised (Cooney *et al.* 2011, 596). A mixture of construction methods appear to have been used at the site (Smyth 2006, 238). The line of the later cairn has regard for the western wall of the timber structure. The excavator speculated that the earlier structure was 'intentionally demolished to make way for the construction of the tomb' (Ó Nualláin 1972, 54).

Few artefacts can be unequivocally associated with the 'house' because of the 'lack of reliable stratification' (Ó Nualláin 1972, 55). Sherds of Carinated Bowl pottery were recovered from wall trenches and postholes. Few lithics were found within the structure, though pits in front of the court area of the tomb yielded 'numerous implements, with concave scrapers predominant'. The excavator proposed that 'it may well be that these pits should be associated with the occupation of the house rather than the period of tomb construction' (*ibid.*).

Analysis of a collection of environmental samples taken from Ballyglass identified 'a low incidence of charred grain, unfortunately indeterminate to species' (Monk 2000, 87). Smyth (2006, 240) describes an assemblage of

‘a few grains’. Clearly the context of these indeterminate grass seeds is problematic, given the issues with the site stratigraphy. Intrusive Beaker and Late Bronze Age pottery was found in the tomb (Ó Nualláin 1972, 55; Carlin and Brück 2012, 196). A possible cereal grain retrieved from underneath the orthostat of the court tomb overlying the house—thus, ostensibly of great relevance to the dating of the ‘house’—was determined by Whitehouse *et al.* (in press, Supplementary Data) to be High medieval AD 1261-1384 (UBA-14398).

The published radiocarbon dates for the structure are set out in Table 4.5, below. These had been counted among the evidence for the continuation of the construction of Neolithic rectangular timber structures into the Middle Neolithic (Cooney 2000a, 15). However these ‘anomalously recent’ dates are now attributed to laboratory errors (Cooney *et al.* 2011, 596). Smyth (2011, 14) reported ‘new dates of 3850–3700 and 3790–3660 cal BC from the house’, the former later revised to 3950-3700 cal BC (Smyth 2014, 44), with details to follow in Ó Nualláin *et al.* (forthcoming).

Table 4.5: Radiocarbon dates from timber structure beneath Ballyglass court tomb (Ma. 13). After Cooney et al. (2011, Table 12.3); UBA-8570 and -8571 after Smyth 2014, Appendix 3.

Lab code	Material	Context	¹⁴ C years BP	¹⁴ C years cal BC
SI-1450	Unidentified charcoal.	North wall trench.	4680±95	3650-3100
SI-1451	Unidentified charcoal.	South wall trench.	4575±90	3630-3010
SI-1452	Unidentified charcoal.	East wall trench.	4480±90	3500-2900
SI-1453	Unidentified charcoal.	Partition wall trench.	4530±95	3620-2910
SI-1454	Oak charcoal.	Posthole 29 (F62)	4575±105	3640-2920
UBA-8570	Hazelnut shell	Posthole (F43)	5005±42	3950-3690
UBA-8571	Charred seed	East end of eastern wall slot.	4948±32	3790-3650

Excavation of a second court tomb (Ma. 14, a.k.a. Ballyglass II) in the townland of Ballyglass revealed the remains of two 'C-shaped' structures interpreted as huts (Ó Nualláin and Ó Donnabháin 1998; Waddell 2010, 43). The structures lie immediately outside the area of the cairn.



4.5.2 Cloghers, Co. Kerry

The rectangular structure at Cloghers, measuring 7.8m north-south by 13m east west, is defined by foundation trenches. The northern wall was constructed from stakes and posts set in a substantial trench. The southern and western walls were defined by narrower slot trenches, which are thought to have supported split planks. Two substantial corner posts marked the line of the east wall (Kiely 2003, 182; Kiely and L. Dunne 2005, 47). This relatively large structure contained two internal divisions, with the western section (thought to have been separated by a plank wall) measuring 3.6m, and the eastern section (thought to have been separated by a stake wall) measuring 4.4m respectively. The remaining central space measured 3.3m. The floor surface was not preserved, and the identifiable features were significantly truncated by later cultivation furrows running north-south (Kiely 2000, 97; see Figure 4.29 below). No evidence of an internal hearth was found, but there was evidence from the southern and northern walls that the house may have been destroyed by burning (*ibid.* 2003, 184; Kiely and Dunne 2005, 47).

A foundation trench runs parallel to the structure 1m to the south, extending 11m east-west. At its western end, the trench cuts the limestone bedrock. Stakeholes were identified in the trench, but no artefacts. The excavator interprets the feature as a fence-line (Kiely and L. Dunne 2005,

47; see Figure 4.30, below). A line of stakeholes and postholes that ran parallel to the western wall were interpreted as supports for the wall or roof. To the east of the structure, a group of 25 stakeholes and three pits were excavated, all of which contained a single fill with no notable inclusions (Kiely 2003, 184). A substantial pit 5m to the east contained a small assemblage of faunal remains, and was interpreted as a possible roasting pit. Bone fragments identified to species were from cattle and sheep.

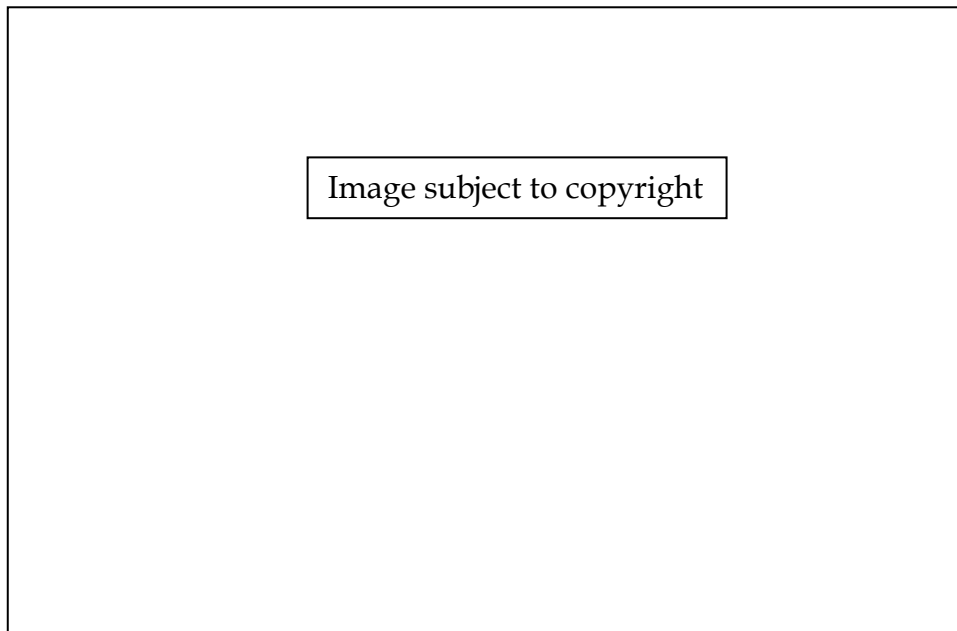


Figure 4.29: View from the north of truncated remains of Neolithic structure at Cloghers. After Kiely (2003, Figure 22.3).

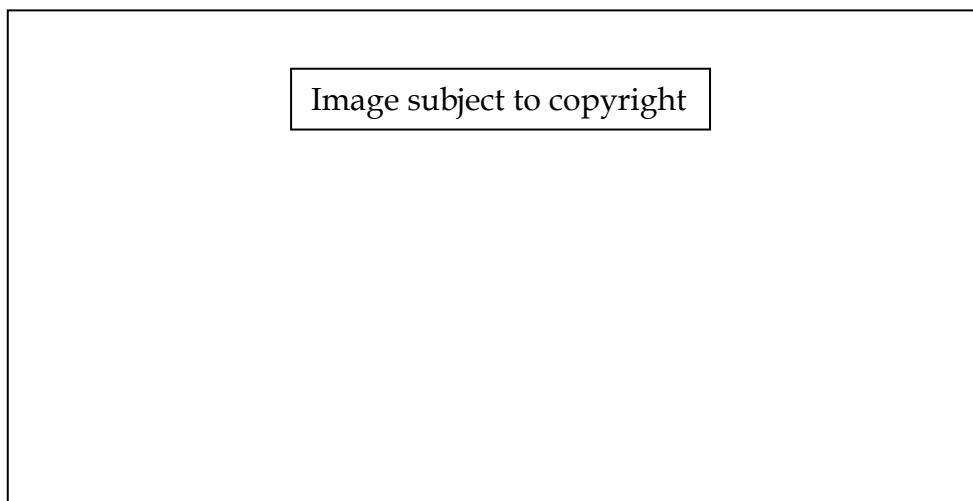


Figure 4.30: Post-excavation plan of Neolithic structural remains at Cloghers. After Kiely and L. Dunne (2005, Figure 7).

A 'homogeneous assemblage' of 125 sherds of Carinated Bowl pottery recovered from the north-east corner of the structure is thought to represent minimum of 10 vessels (Kiely and L. Dunne 2005, 47-8). Approximately 350 struck lithics were recovered in association with the structure, over half of which were manufactured from locally available greenstone (volcanic tuff). Flint, quartz, chert and mudstone were also utilised. A quartz core recovered from the base of a substantial posthole at the northern end of the western wall slot has been interpreted as a deliberate deposition. Five polished stone axe fragments and three limestone beads were also recovered. Tools for the manufacture of polished stone axes was identified in a pit a short distance to the east of the structure, along with sherds of Beaker pottery, flint flakes, and over 500 barley grains (*ibid.* 53). This pit is 20m from a Beaker and Bronze Age complex (see below).

Radiocarbon measurements were returned for two fragments of charred hazelnut shell. The first, recovered from the basal fill of a posthole in the western wall, is calibrated as 3710-3530 cal BC (Beta-134226); the other, from the eastern section of the northern wall foundation, is calibrated as 3770-3630 cal BC (Beta-134227) (Cooney *et al.* 2011, Table 12.3).

An extensive programme of soil sieving demonstrated 'an absence of the typical Neolithic emmer and einkorn' (Kiely and L. Dunne 2005, 48). Oat grains were recovered, but these are interpreted as 'weed seeds as this cereal was not cultivated until later prehistoric or Early Medieval times'. Bread wheat and barley were also identified.

Extensive Beaker and Bronze Age activity was identified between 50m and 200m to the west of the Neolithic structure, comprising four structures, a number of pits, stakehole arrangements and two *fulachtaí fiadh* (burnt mounds). Post-holes defining two of the structures contained barley and

wheat as well as other plant seeds. '[L]arge cereal grain caches, arable weeds and wild fruit seeds' were recovered from associated pits (Kiely 2002; Kiely and L. Dunne 2005, 50-4).

Given the level of disturbance caused by later cultivation at the site, the apparently atypical nature of the presumed-Neolithic grain assemblage, and the extensive evidence for Bronze Age agriculture, the excavator's conclusion that the Neolithic people that constructed the 'house' 'cleared and tilled the land [and] husbanded animals' (Kiely 2003, 187) must be seen as speculative.



4.5.3 Drummenny Lower, Co. Donegal

The 'rectangular structure of possible Neolithic date' in the townland of Drummenny Lower, is defined by a continuous slot trench with maximum dimensions of 9.3m by 6.3m (C. Dunne 2003, 164-5; see Figure 4.31, below). Much of the fill was disturbed, although some sandstone packing stones remained *in situ*. Signs of heat-fracturing among the remaining packing stones and abundant charcoal suggest that the structure may have been destroyed by fire. Three corner posts were evident in the slot trench, and two large postholes and a smaller posthole traversed the short axis of the structure. Oak charcoal recovered from the slot-trenches may indicate that the structure was plank-built (*ibid.*, 165-8).

The floor surface was not preserved, but the topographic location of the structure indicates that it would have declined in slope by a metre across its shorter (east-west) axis (C. Dunne 2003, 165). There was no evidence of an internal hearth, pits or other associated features. Forty-eight sherds of

Carinated Bowl pottery were recovered from the site along with a small lithic assemblage indicative of Neolithic activity. No radiocarbon measurements are published. The structure is in close proximity to an excavated court tomb in the neighbouring townland of Drumrat.

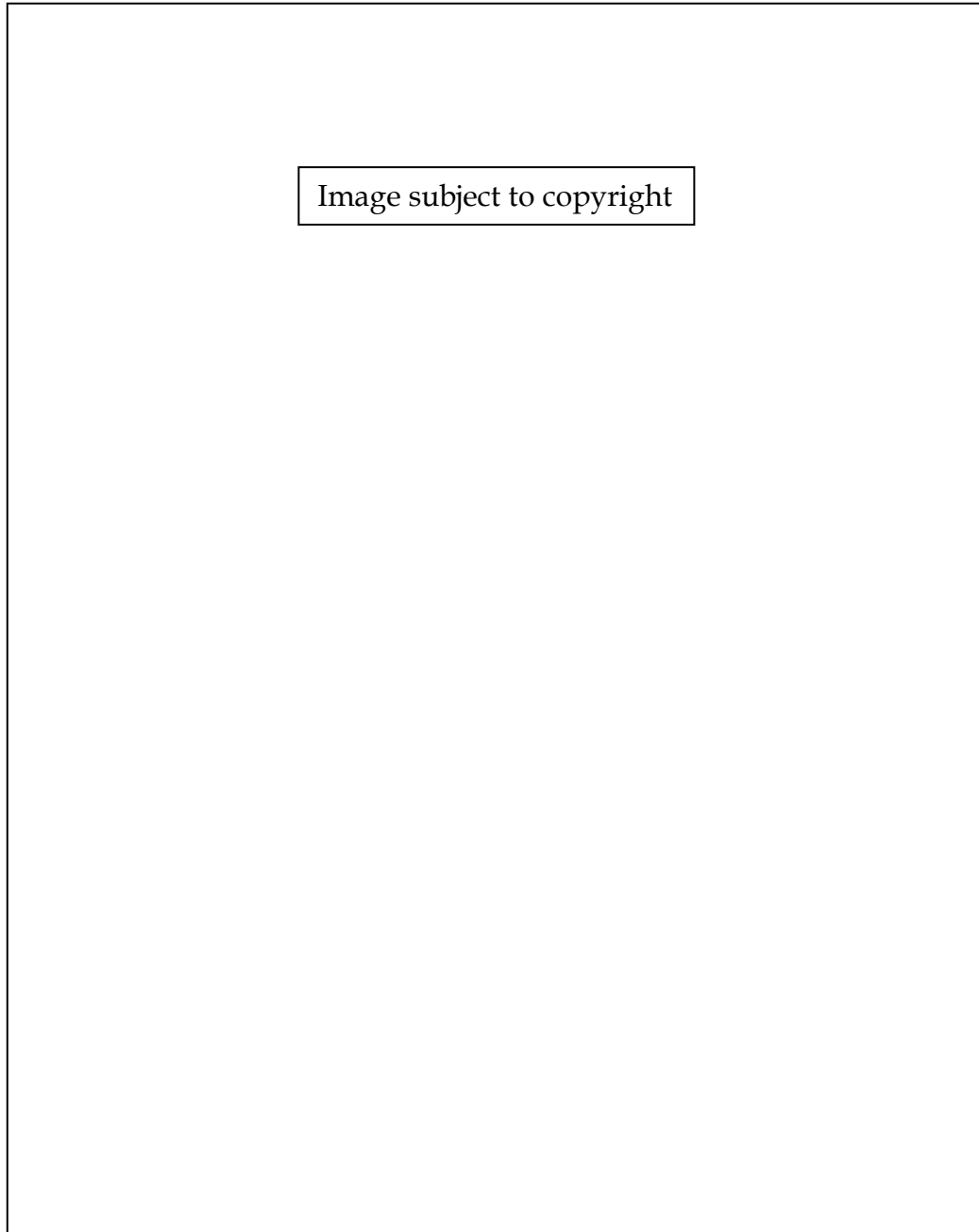


Figure 4.31: Plan of rectangular structure at Drummenny Lower. After C. Dunne (2003, Figure 19.2).

Palaeoenvironmental analyses carried out in the vicinity of the structure recovered 'a high level of grass pollen' (C. Dunne 2003, 168), but the

temporal relationship between this and the (undated) structure has not been established. Some of the grass pollen was described as ‘cereal-sized’ (not a reliable identification). Fragments of hazelnut shell were also recovered from the fill of internal postholes, as were grass seeds interpreted as cereal grains:

A cache of charred grains was identified as poorly preserved naked barley (*Hordeum vulgare*). Charred remains of bread wheat (e: *Triticum aestivum*) were also recovered from post and foundation slots. Significantly, no traces of waste products such as glumes or rachis were found. This finding may imply that cereal processing was not taking place at the site (*ibid.*).

The absence of chaff makes the identification of the seeds more difficult. The temporal relationship between the seeds (the identification of which must be seen as tentative) and the structure has not been established, beyond the fact that the seeds post-date the structure.

The author of the published evidence from Drummenny Lower cautions against labelling the rectangular structure as a house, observing that ‘[t]he site lacks many of the features that are usually associated with domestic activities; no hearth or refuse pits were found. The occurrence of a dramatic incline in the floor surface would have made occupation somewhat uncomfortable’ (C. Dunne 2003, 170).



4.5.4 Gortaroe, Co. Mayo

The rectangular structure at Gortaroe is defined by a foundation trench measuring 9.8m by 6.8m, oriented northwest-southeast (R. Gillespie 2002, 7; 2003a, 279; see Figure 4.32, below). The trench contained tightly packed flat stones, which are thought to have supported a split plank wall. The

corners of the structure are rounded. Excavations revealed that the floor appeared to have been 'stepped' in order to compensate for sloping ground. Neither an occupation layer nor a hearth was identified. Several pits, postholes and stakeholes were identified within the building, some of which may have housed structural supports. A stone-filled linear feature to the south of the structure, which continued beyond the extent of the excavation, was interpreted as a possible drain. This was of indeterminate date.

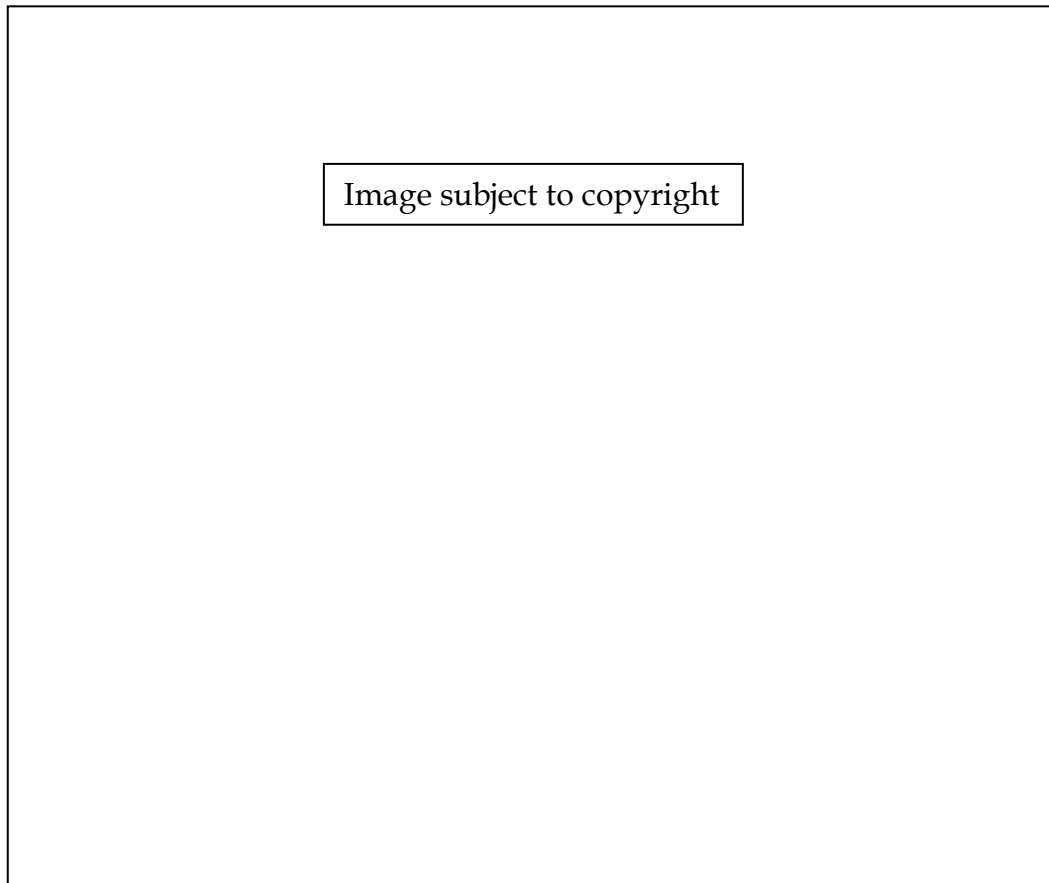


Figure 4.32: Plan of rectangular structure at Gortaroe. After R. Gillespie (2002, 7).

Disturbance of the site may help to account for the overall paucity of the artefactual remains. One sherd of unidentified prehistoric pottery was recovered from a foundation trench, and a perforated glass bead (presumably with no temporal association to the structure) was found in an adjacent area. A small assemblage of lithics was also recovered 'from the general area of the site'. This included one piece of burnt flint, some

quartz crystals and worked quartz. Chert was the predominant lithic material, with an assemblage comprising an unfinished javelin-head, an unfinished planoconvex knife, a hollow scraper, a concave side scraper, some blades, waste flakes and debitage (R. Gillespie 2002, 7; 2003a, 279).

A sample of oak charcoal from an internal posthole, and a sample of alder charcoal from a foundation trench, have been radiocarbon dated. Between them, the two calibrated measurements span much of the fourth millennium BC: 3910-3630 cal BC (GrN-27799) and 3620-3130 cal BC (GrN-27799) respectively (Cooney *et al.* 2011, Table 12.3). The excavator determined that it was unlikely that the structure was razed by fire, and it has instead been suggested that the construction timbers may have been charred to inhibit decay (see Smyth 2006, 249).

Charred hazelnuts were recovered from the site, along with 'one grain of *Hordeum vulgare*' (Cooney *et al.* 2011, 596). Clearly the interpretation of a single seed as barley must be seen as speculative. Security of context is also problematic, not least because of the adjacent medieval corn drying kiln (see R. Gillespie 2003a; Monk and Kelleher 2005, Table 1). Other later prehistoric activity in the immediate area included several well-preserved *fulachtaí fiadh* (R. Gillespie 2003a; 2003b).



4.5.5 Magheraboy, Co. Sligo

Magheraboy is the site of one of only two confirmed causewayed enclosures in Ireland (Cooney *et al.* 2011, 562). The enclosure is located on the Cúil Irra peninsula, along with the Carrowmore megalithic cemetery

and the Neolithic complex on Knocknarea mountain. Though just 50m OD, the site commands a prominent location, being the second highest point on the peninsula (Danaher 2007, 91). The peninsula is the focus of the largest regional grouping of megalithic monuments in Ireland (see Bergh 1995; forthcoming). The rectangular structure is located within what is interpreted as the inner timber palisade of the causewayed enclosure. The palisade trench defines the southern boundary of the structure (Danaher 2007, 104-5; see Figures 4.33, and 4.34, below).

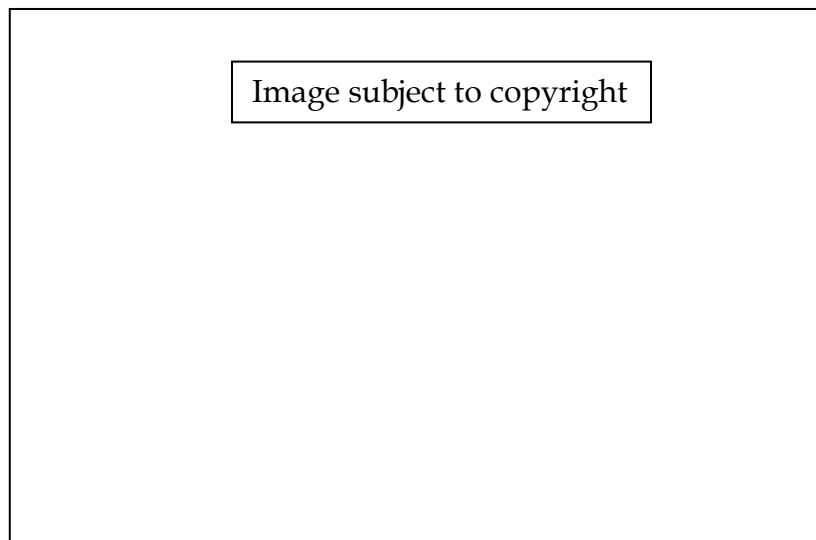


Figure 4.33: Foundation of rectangular structure excavated at Magheraboy (foreground). The large curving trench which abuts the ditch section of the causewayed enclosure is the ditch of a (medieval) ringfort. After Danaher (2007, Plate 6.2).

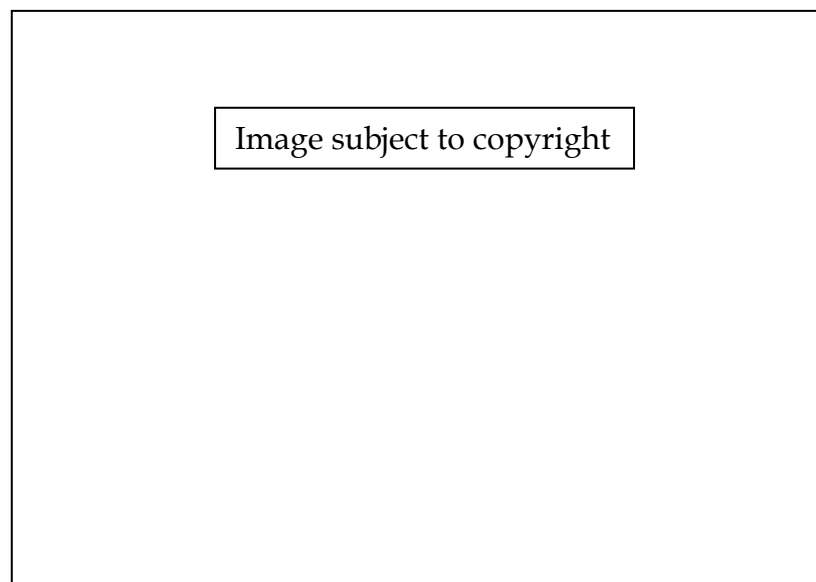


Figure 4.34: Conjectural reconstruction of Magheraboy causewayed enclosure, with rectangular structure top-right. After Danaher 2007, Figure 6.8.

The rectangular structure was defined by the three remaining slot trenches in sandy subsoil. The dimensions of the enclosed area are 14m by 4.5m, but the slot trenches were shallow, and the excavator considers that the structure would have been of light construction. No evidence of additional structural pits or holes were found, and thus it was deemed unlikely that the structure had a roof. Accordingly, while the building shares some similarities with Neolithic rectangular 'houses', it would have made for an impractical dwelling (Danaher 2007, 105-6). There are some parallels between this structure and 'House B' at Knowth (see Section 4.2.1.a, above), which the excavator considered may also have been unroofed (Eogan 1984, 219). Suggested functions for the Magheraboy structure include animal pen, mortuary structure (a possible excarnation platform was located nearby), or focus of unspecified ritual activity. A single artefact - a sherd of Neolithic pottery - was found in association with the structure (Danaher 2007, 106-9).

The first use of the segmented ditch which defines the causewayed enclosure has been dated as 4115-3850 cal BC (Cooney *et al.* 2011, 584). Being the earliest date for a structure of this kind in Ireland or Britain, the measurement is not without controversy (e.g. Bayliss *et al.* 2011b, 852, 864). On present evidence, it is estimated that the causewayed enclosure remained in use until the 35th century cal BC (Cooney *et al.* 2011, 585). The excavator did not consider that the ditch segments were all contemporary with the palisade (Danaher 2007, 93). Both the palisade and the timber structure are undated. In the absence of corroborating evidence, the temporal relationship between the timber features and the segmented ditch remains unresolved (Cooney *et al.* 2011, 584).



4.6 Neolithic rectangular timber structures of the west in context

Being between 4.5 m and 7.8 m along the shorter axis, by between 9.3 m and 14 m long, the dimensions of Neolithic rectangular structures in the west of Ireland are in keeping with larger structures nationally. The internal arrangement of the buildings is difficult to determine given the absence of occupation surfaces, but Ballyglass and Cloghers at least had internal divisions. Physically, the buildings *could* have provided living space for kin groups or other social units; equally, they may have had a different role.

The structures at Ballyglass, Cloghers, Drummenny Lower and Gortaroe are among those Grogan (2004, Table 1) identifies as constructed of vertical split-oak planks. The construction material for the Magheraboy building has not been established. This building is associated with the timber palisade which it abuts, and for which oak was deemed to have been the main construction material (Danaher 2007, 93). However, the excavator considers that the walls of the rectangular structure were 'light and flimsy', and 'not as high as the uprights of the palisade' (*ibid.*, 105). Perhaps, then, oak planks were not used here. It is suggested that Cloghers was partially plank-built. Charcoal recovered from the foundation trenches and postholes at Ballyglass came from a variety of tree species. Clearly oak was readily available to the builders of the rectangular timber structures; as Danaher (2007, 92-3) suggests at Magheraboy, oak may have been among the trees felled to make way for the buildings.

The function of the buildings cannot automatically be inferred by their relatively large ground plans (*contra* Grogan 2002, 521). As Smyth (2006, 243-4) has observed:

The trappings of crop and animal husbandry and long-term occupation are not being found with all of these houses and few archaeologists would argue that the buildings are 'farmhouses' in any modern sense. The role these buildings had in the early Irish Neolithic and their relationship with emerging agricultural practice is far more intricate and complex than we have previously acknowledged.

Deliberate deposition in post-holes or foundations, as is suggested at Cloghers, may be indicative of the cultural capital bound up in these buildings. Charcoal from foundations and postholes (as at Ballyglass, Cloghers, Drummenny Lower and Gortaroe) could indicate that timbers were pre-treated to extend their lives, but in at least some cases appears to be the result of destruction of the buildings by fire. While accidental fires cannot be ruled out, symbolic burning linked to ritual practice is frequently suggested (see Smyth 2006, 245-51).

Given its light construction, and the possibility that it was unroofed, the excavator considers that the Magheraboy structure was unlikely to have functioned as a dwelling. The slope of the ground surface at Drummenny Lower led the excavator at that site to a similar conclusion, though presumably this could have been compensated for with an artificial floor. In the later fourth millennium BC, among the Jura mountains of in eastern France, buildings are thought to have been constructed with planked floors raised above wet surfaces (Whittle 2003, 41). The ground surface at Gortaroe was also sloping.

The link between the buildings and 'emerging agricultural practice' is not demonstrated by the examples in the west of Ireland. No cereal grains are

associated with the structure at Magheraboy. The reported single barley grain at Gortaroe cannot be reliably identified, and its precise context is uncertain. Likewise the assemblage of 'a few grains' at Ballyglass is insufficient for reliable identification, and cannot be attributed to a secure context. The grain assemblage at Cloghers does not come from a secure context, and is characteristic of later assemblages (in keeping with the substantial post-Neolithic disturbance at the site). The poorly preserved grass seeds at Drummenny Lower could not be reliably identified, and their context proves only that they post-date the structure (which itself is undated).

Whether or not imported cereal grass species were available to – and being cultivated by – the cultural groups that used the rectangular structures, it is clear that they gathered native plant species. Hazelnuts – nutritious and relatively easy to store – were recovered from Cloghers and Drummenny Lower. Native grasses would have been suitable for food, thatch, flooring, use in screen walls, cordage, basketry, etc. The expectation that cereal grains *should* be present at Neolithic 'houses' prevents due consideration being given to the likely presence of native grass seeds that are morphologically similar (often indistinguishable due to taphonomic degradation). The link between arable farming and Neolithic rectangular timber structures in the west of Ireland is unproven.

The link between the structures and pastoral farming is similarly problematic. It should be expected that direct evidence for Neolithic pastoral farming would be rare given the acidity of much of Ireland's soil. The mineral component of bone is soluble in acidic soils with a high moisture content (e.g. T. O'Connor 2000, 23-5). Small calcinated fragments of limb bones were discovered in the 'cooking pit' 5 m to the east of the Cloghers structure: of 20 bones identified to species, 18 were cattle and two were sheep (hare is also thought to have been represented). However,

no evidence from the pit has been dated, and considerable post-Neolithic agricultural activity is in evidence in the vicinity.

As with Drummenny Lower, there are no radiocarbon dates from the rectangular structure at Magheraboy. If the Magheraboy structure is linked to the earliest activity at the site, it may be the earliest rectangular timber building in Ireland. However, if the structure was unroofed, it would have made for an unlikely dwelling.

Two charcoal dates from Gortaroe between them span much of the fourth millennium cal BC. The five mid- to late-fourth millennium cal BC radiocarbon dates from charcoal at Ballyglass are seen as anomalously recent, given that the structure predates a court tomb. The two new dates from short life samples may situate construction of the timber structure in the early fourth millennium cal BC, perhaps before the putative 'house horizon'. Two short-life samples from Cloghers date activity at that structure to between *c.* 3800 and 3500 cal BC. The available dating evidence is consistent with the rectangular timber features first appearing in the early centuries of the Neolithic. The Gortaroe dates, at least, open the possibility of rectangular timber structures being present in the late fourth millennium BC.

In terms of artefacts, Carinated Bowl pottery at Ballyglass, Cloghers and Drummenny Lower help date activity at these sites to the earlier Neolithic. A single sherd of Neolithic pottery was recovered at Magheraboy, and a single sherd of unidentified prehistoric pottery came from Gortaroe. The Carinated Bowl pottery is consistent with the earlier Neolithic radiocarbon dates, but is functionally ambiguous. Deemed best suited for serving food, it could be used in a domestic, social or ceremonial context.

Lithics would have been essential to all manner of activities. The buildings could not have been constructed without lithics, and their presence at foci of human activities would have been ubiquitous. Lithics characteristic of the Neolithic were recovered at Cloghers, Drummenny Lower, Gortaroe and Ballyglass. Axe manufacture is suggested to have taken place in the vicinity of the Cloghers structure. Five polished stone axe fragments were found in the northeast corner of the building, and these have been linked to a 'set of stone axe manufacturing tools' (comprising a hammerstone and a grinding stone) found with a completed axe in the upper fills of a nearby pit (Kiely and Dunne 2005, 53).

There is a clear association between the rectangular timber structure at Ballyglass and the court tomb which overlies it. The timber structure at Drummenny Lower is in close proximity to the Drumrat court tomb. Thirty metres to the south-west of the Drummenny Lower structure a rectangular spread of intensely burnt subsoil and carbonised wood measuring 1.65 m by 2.5 m has been *interpreted* as a cremation pyre. No radiocarbon dates are published for this feature, but associated lithics led the excavator to suggest a Neolithic or Early Bronze Age date (Desmond 2000).

The temporal association between Irish Neolithic rectangular structures and court tombs is borne out by the available radiocarbon dates (see Schulting *et al.* 2011). Ó Nualláin (1972, 56) saw the sequence at Ballyglass as representing a change of function from domestic to mortuary, and this interpretation has informed most subsequent discussion (e.g. Cooney 2000a, 63; Grogan 2002, 521). However, as Cross (2003, 200) argues, the relationship between activities associated with rectangular timber structures and monuments or gathering places may have been more direct.

An ongoing excavation in southern Britain may lend some support to Cross's view. Court tombs are often linked to the long mound tradition in Neolithic Britain (e.g. Waddell 2010, 97). At Dorstone Hill in Hertfordshire, the remains of what has been interpreted as two timber halls have recently been discovered, preserved beneath long mounds (Addelman 2013). In common with many of the rectangular timber structures of Ireland, the buildings appear to have been burnt down.

The question of whether monuments such as court tombs and long mounds were burial places or places with burials (Whittle 1988, 144; Bergh 1995, 143) remains unresolved. Either way, the human remains at these sites are often linked to multi-stage funerary activities that might incorporate multiple locations (e.g. Scarre 2011, Chapter 7; Bergh and Hensey 2013, 347). Rectangular Neolithic timber structures could, then, have functioned as precursors to megalithic monuments.

In some cases, stone and timber were contemporary. At Shanballyedmond, Co. Tipperary, the excavation of the court tomb revealed a U-shaped setting of 34 postholes which enclosed the cairn (O'Kelly 1958; 1989, 89-91; see Figure 4.35, below). Wooden adjuncts to megalithic monuments may be far more prevalent than is recorded, given the limited spatial extent of many excavations (cf. e.g. O'Kelly 1989, 89). In the cases of Drummenny Lower and Magheraboy, the excavators suggest the structures may have played a role in extended funerary practices (see C. Dunne 2003, 170-1; Danaher 2007, 106-9).

The stone chambers within megalithic monuments have the potential to provide a dry environment with concentrations of alkaline material that can protect bone from the corrosive effect of Ireland's acidic soils (as well as from disturbance by people or animals). Conversely, the (invariably disturbed) footprints of rectangular timber Neolithic buildings exposed

any bone to leaching by aqueous acidic soils. This may explain the absence of animal bone in Neolithic rectangular timber buildings, but also the absence of human bone. The impermanent presence, particularly of bone that has not been effectively cremated, could not be expected to leave a recognisable archaeological signature. The domestic consumption of meat at the structures is not ruled out by the absence of bone, but neither is ceremonial feasting, or aspects of funerary activity.

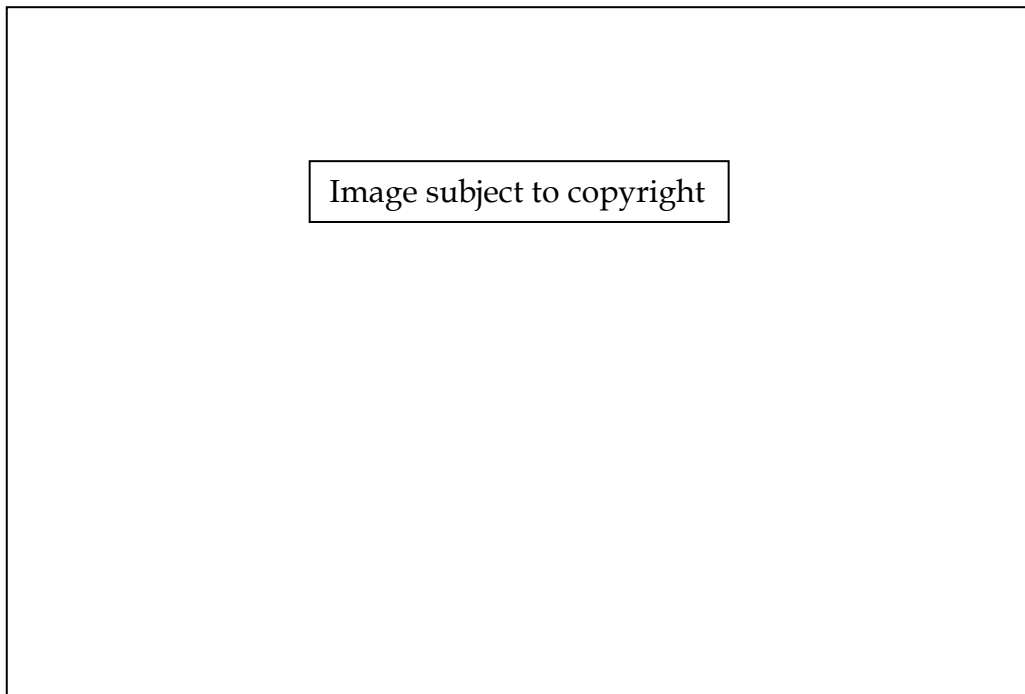


Figure 4.35: Conjectural drawing of Shanballyedmond court tomb, Co. Tipperary. After O'Kelly (1989, Figure 40).

There is broad consensus that causewayed enclosures were places where 'public events' took place, be these social gatherings or ceremonies (Bradley 2007, 74; Whittle *et al.* 2011c, 891, with references). In addition to the physical association of the Magheraboy rectangular timber structure with one of the two known causewayed enclosures in Ireland, Irish rectangular timber structures appear to have been broadly contemporary with the larger corpus of causewayed enclosures in southern England (Whittle *et al.* 2011c, 891). As Whittle *et al.* (2011b, 906) observe 'at least some of the Irish rectangular houses could have been the venue for significant social gatherings, with feasting not excluded...'

In summary, the small corpus of rectangular structures in the study area cautions against the buildings being labelled *en masse* as houses. It is reasonable to assume that all the buildings date to the Neolithic, probably the earlier Neolithic, but considerable new dating evidence would be required for an estimate of the precision claimed by McSparron (2008) and Cooney *et al.* (2011). The form, features, artefacts and ecofacts associated with the structures are ambiguous. In all cases, the available evidence could reasonably be interpreted as relating the buildings to a community-wide role. Perhaps some of the structures were both dwellings *and* places of gathering (cf. e.g. Grogan 2002, 521; Smyth 2011, 30). Finally, the link with agricultural activity is characteristically problematic. Domesticated animals may have been available to the people that used the buildings (witness Cloghers), but there is no evidence that the buildings were in any way linked to the management of herds. Likewise, the evidence for arable farming in connection with the rectangular timber buildings of the west of Ireland is tenuous.



4.7 Conclusion: moving beyond the familiar

The earliest [Neolithic] farmers in Ireland, like farmers elsewhere across NW Europe, were not engaged in shifting cultivation, but practised longer-term fixed-plot agriculture.

Nicki Whitehouse *et al.* (in press, 1)

It can be argued that the available evidence from the west of Ireland is so limited that a single unusual structure (Magheraboy, say) could distort an otherwise harmonious picture. However, it is clear from the island-wide

evidence that the structures do not constitute a coherent evidential type. It is the headline figure—currently c. 80 ‘houses’—that informs the ‘orthodox’ characterisation of an Early Neolithic property ‘boom’ (e.g. Whitehouse *et al.* in press, 3; see also e.g. Cleary 2011, 417).

The ‘boom’ is heavily reliant on there having been a *Childean* revolution⁵ in the means of subsistence: an ‘abrupt’ transition to ‘fixed-plot’ agriculture (e.g. see Whitehouse *et al.* in press). The lack of evidence for animal husbandry must weigh against this somewhat. No rectangular Neolithic rectangular building so far discovered can be linked with a dated Neolithic enclosed field or field system. Nevertheless, the expectation that prehistoric rectangular timber structures represent the ‘iconic’ (Cooney *et al.* 2011, 599) houses of Ireland’s first farmers has led to the uncritical interpretation of other presumed evidence for agriculture. In particular, while the vast majority of grass seed assemblages are insufficient for reliable identification, they have been assumed to represent cereal farming. I have argued that in fact it is wild grasses that were ubiquitous in the context of these buildings.

If not all of these rectangular ‘houses’ were permanent dwellings, groups of structures represent sequences of rebuilding, and the house horizon was followed immediately by a ‘post-house horizon’, the narrow ‘boom’ event starts to look more like an iterative *process* of change. The associated archaeological remains do not determine the function of the buildings. Carinated Bowl pottery is often associated with ‘special’ contexts; lithics have generally been recovered from construction contexts; there are no recurring ‘signature’ assemblages of material remains. Moreover, in no case is there an occupation layer, which would perhaps yield the greatest potential to indicate function.

If, in fact, the larger, more elaborate buildings were not houses at all, but in fact places for communal gathering (see discussion in Chapter 5), and the Lough Gur structures date to the later Bronze Age, the putative short-lived boom in prehistoric rectangular houses might be seen as an artefact of research methodologies.

Stone footings might render the Lough Gur buildings anomalous, but the absence of accurately recorded *stratigraphic sequences* of radiocarbon dates from the known Neolithic sites significantly compromises the reliability of the dates *and* derived dating models (cf. e.g. Kinnes 1985, 16). Bayesian analyses are reliant upon such sequences to inform accurate ‘prior beliefs’, without which the integrity of the models is diminished (e.g. Bayliss *et al.* 2007, 22). The Irish structures have not been excavated in accordance with a considered research methodology (cf. Bergh 2005, 2-3). The sequential dating of samples in order to understand the lifecycle of the buildings has not been a consideration. Often, it is the earliest possible date—the construction event—which has specifically sought by excavators, introducing inevitable bias into radiocarbon measurements.

In Chapter 5, I will argue that the ‘orthodox’ interpretation of Irish Neolithic rectangular timber structures as the signature for settled farmers’ houses, and the association of these ‘houses’ with a step-change in prehistoric lifeways, owe much to prevailing research traditions. It will be argued that the alternative interpretations are at least equally well supported by the available evidence, and that to ignore these inhibits understanding of temporality in Neolithic Ireland.



Notes

¹ See Cooney *et al.* (1999, 13).

² See Monk (1988, 187).

³ See Efron (2013a, 1177).

⁴ From the numbering system in de Valera and Ó Nualláin (1964).

⁵ See Kotsakis (2005).



Chapter 5

Tempus fugit

5.1 Unpacking Neolithic Ireland

That was probably the reason that history was more of an oracle than a science. Perhaps later, much later, it would be taught by means of tables of statistics, supplemented by anatomical sections. The teacher would draw on the blackboard an algebraic formula representing the conditions of life of the masses of a particular nation at a particular period: 'Here, citizens, you see the objective factors which conditioned the historical process.'

Arthur Koestler, *Darkness at noon* (1985 [1940], 20)

The review of the evidence for field systems and rectangular timber buildings attributed to the Early Neolithic in Ireland demonstrates that the dominant interpretation of the rapid and widespread establishment of settled-mixed-farming is paradigmatic. Alternative interpretations are at least equally well supported by the evidence. The temporality—or, more correctly, multiple *temporalities*—of Neolithic Ireland are deserving of greater prominence in research frameworks, archaeological practice, interpretation, and regional, national and international syntheses. In the light of the critical review of the evidence from Neolithic western Ireland in earlier chapters, the following discussion revisits the *settled-mixed-farmers* hypothesis, concluding with a new outline chronology for the Neolithic in western Ireland.

Section 5.2 sets out systematic biases which hinder the interpretation of dating evidence. Section 5.3 examines the evidential basis for claims that life in the final centuries of Late Mesolithic Ireland was *essentially* different from life in the Early Neolithic. Section 5.4 develops this theme, challenging the interpretation a 'short-sharp' transition to settled-mixed-farming, characterised by fixed-plot agriculture and substantial permanent dwellings. Section 5.5 sets out a new draft chronology for discussion, and as a stimulus for future targeted research.

5.2 The evidence in perspective

Confirmation bias operates in at least three ways. First, ambiguous information is readily interpreted to be consistent with one's prior beliefs; second, people tend to search for information that confirms rather than disconfirms their preferred hypothesis; third, people more easily remember information that supports their position. We also know that people fall prey to hindsight bias, the tendency to judge an event as more predictable after it has occurred.

Eric-Jan Wagenmakers *et al.* (2012, 632)

In other words the archaeobotanical evidence has been accommodated to fit current interpretations of the Neolithic rather than providing empirical evidence to support them.

Glynis Jones and Peter Rowley-Conwy (2007, 408)

The dependence on scientific method in the study of prehistoric archaeology in Ireland continues to increase. The latest chronologies for both field systems and rectangular 'houses' in Neolithic Ireland are contingent on the interpretation of palaeoenvironmental and palaeobotanical evidence. That interpretation is not a disinterested clinical process – as Edwards has cautioned:

The palynologist must be aware that his audience consists increasingly of archaeologists who are not aware of the finer details of the palaeoecologist's art. This consciousness would also perhaps remind him that his own discipline is somewhat subjective and that his statements must be fully qualified (1979, 259).

Even where specialists have been at pains to make it clear that their interpretations are speculative, caveats can be 'lost in translation' in archaeological syntheses. Thus, the 'extremely tentative' (Purcell 2002, 71) explanation for the highly anomalous assemblage at Corbally 'House 3' (where *well* preserved fragments of stalk material and wheat glumes both exceed the tiny assemblage of nine *poorly* preserved grass grains by a ratio

of 3:1) has come to define the cottage crop processing industry in Early Neolithic Ireland (e.g. Smyth 2006, 241; 2011, 7; 2013, 308; G. Jones and Rowley-Conwy 2007, 406). Whether or not the identification of the ‘badly preserved’ grains as Neolithic wheat ‘based upon morphological criteria’ which ‘may not be exact’ (Purcell 2002, 71) is considered compelling, a more straight-forward explanation than the suggestion that the stalk material also survived from the Neolithic, would be that the stalk material is later (much later). Any attribution of undated well-preserved grass stalks (that do not come from a well-understood stratigraphic context) to the Neolithic *must* be ‘extremely tentative’. Activity associated with nearby medieval crop-processing facility appears worthy of at least equal consideration (Monk and Kelleher 2005; 2009).

Where the archaeological narrative is strong (regardless of its grounding), but the available data weak or inconclusive, the narrative will be reified. Large-scale cattle ranching and ‘beef production’ (Caulfield 1983) such as that suggested at Céide Fields, commencing ‘probably in 3845- 3635 cal BC (68% probability)’ (Cooney *et al.* 2011, 622), has no precedent anywhere in Neolithic Europe. ‘Coaxial’ field systems seemingly remained limited to north Co. Mayo until the well into the Bronze Age, when similar ‘Celtic Fields’ feature throughout Atlantic Europe. While the archaeological evidence from north Mayo demonstrates a Neolithic presence in the vicinity of the (future) field systems, it also demonstrates a strong presence in every succeeding period (*contra* Caulfield 1978a, 142).

The argument that Céide Fields dates to the Early Neolithic – which relies on a palynological study that explicitly sought to identify Neolithic ‘farming activity’ – is classically circular, of the type identified by Cooney (1999, 47-8):

The reliance on pollen analysis to suggest the character and effect of prehistoric farming and vegetational history has led to a perception and

presentation of the evidence of the settlement landscape as representing phases of farming expansion alternating with regeneration of the forest cover. The prominence of this view in the literature has led to simplistic formulations of the character of the prehistoric landscape when interpreted by, for example, historical geographers. However, the difficulties of interpretation of the pollen record in landscape terms should make us very wary of accepting a reconstruction of the course of human impact on the environment that, by definition, is based on derived rather than direct landscape evidence. It is clear that palynological interpretation is also influenced by views put forward in the archaeological literature, leading to the danger of a circular argument.

What Molloy and O'Connell (1995) identified is an environmental window during the earlier Neolithic when wetter conditions led to the expansion of blanket bog in parts of the north Mayo landscape, with a consequent decrease in woodland. This is the 'clearance episode' by which (Cooney *et al.* 2011, 622) determine that the 'establishment of the Céide Fields is best dated'. Human intervention in this process has not been demonstrated. Whether or not the conditions were apt for the development of intensive farming is moot. The temporal link between the construction (and demise) of the field systems and this environmental downturn has not been shown, yet is taken as read. In the absence of the seemingly unshakeable archaeological conviction that the field systems *should* be Neolithic, the later prehistoric arable farming shown to have taken place in the vicinity would surely provide an alternative hypothesis worthy of testing (see Section 5.4.2, below).

Why should the Early Neolithic interpretation of Céide Fields be favoured to the practical exclusion of all other explanations? The notion that north Mayo was the home of Ireland's 'first farmers' clearly has an impeccable pedigree in Irish archaeological tradition dating back to Ruaidhrí de Valera. An indication of its wider appeal is provided by Rowley-Conwy:

If such a huge system was Neolithic, it would demonstrate the importance of agriculture and threaten the current consensus [among

‘post-processual’ archaeologists in Britain concerning settlement mobility]. There has therefore been a tendency to suggest that the Céide fields are poorly dated, belonging to the end of the Neolithic. There has never been any good reason to suggest this (2004, S92, references omitted).

Thus, an Early Neolithic date for Céide Fields provides some of the *missing* evidence for a particular characterisation of the Neolithic in Britain and Ireland.

A related consideration concerns disciplinary priorities. The dominant empiricist perspective in Irish archaeology is predisposed to prioritise knowledge derived from natural sciences. Social ‘facts’ are expected to emerge once sufficient data has been gathered and processed (see Chapter 1, Section 1.4; cf. Wylie 2007, 520). In this sense, the methods of obtaining and processing data are seen to provide the necessary theoretical framework for its interpretation (cf. Yoffee and Sherratt 1993, 3).

The practical gathering of data is of course fundamental to archaeology, and much of the excavation that has taken place in Ireland in recent years has been forced by the pace of development. However, it has long been recognised that in the absence of explicit concern for the socio-cultural context in which the archaeological record was created—the absence of a theoretically-informed research framework—unexamined received wisdoms will fill the vacuum (Clarke 1973, 18). ‘Archaeological truths’ are thus created and reified.

Andrew Jones (2002, 56) has observed that the presentation of results from (presumed) objective excavations and data analyses tend not to feature ‘analysis of contradictions or problems; instead, peripheral contradictory conclusions are jettisoned, while a single unified conclusion or explanation is retained’. Thus, for example, in McSparron’s (2008) influential analysis of Neolithic rectangular timber structures, 83% of the data in his

‘representative sample’ are drawn from just four sites; 61% from just two sites. However, just as analysts tend to overestimate the reliability and completeness of archaeological data, archaeologists tend to underestimate the fallibility of modelled results: if the science says so, who are we to argue (cf. Massey 1999, 264)?

Whether or not the assumptions about the reliability of the sample contexts are accepted, the interpretation of the model goes *beyond* what can be objectively determined (*sensu* Wylie 2007, 519; Hodder 1992, 73). The data cannot be seen to prove the interpretation:

The sudden appearance of rectangular houses in so many diverse locations across Ireland suggests the activity of a colonising group possibly making landfall a number of times in different locations around the coast (McSparron 2008, 19).

Other than this (speculative) reference to the distribution of the sites in the model, the only Irish rectangular structures explicitly drawn upon in the interpretation of the results are the (excluded) structures at Lough Gur and (undated) structures at Thornhill (*ibid.*, 19-21): feasibly not Neolithic evidence at all. Alternative interpretations are surely equally worthy of consideration. However, this short magazine article leaves critics poorly equipped to counter the views put forward.

Caulfield (1978b, 15, quoting Shawcross 1972, 591) congratulated Grahame Clark on the (1954) publication of his excavations at Star Carr: ‘the report has a lasting scientific worth because it is open to re-examination and re-organisation in the light of new evidence and ideas’. The clarity of the available record enabled Caulfield to contribute his ‘alternative view’ of the evidence. Several years on from the economic boom that led to the discovery of so many prehistoric sites in Ireland, detailed publication of the evidence in the majority of cases seems an unlikely prospect. Looking back at the pre-boom sites that shaped understanding of the Neolithic in

Ireland, the comprehensiveness of the evidence available for scrutiny is decidedly mixed. Even the ‘iconic’ prehistoric complexes associated with Céide Fields—pivotal in defining the way the Neolithic in Ireland is understood—were for so long largely unpublished. In the intervening decades, through selective publication, a particular interpretation became ‘embedded in the literature’. Thus, as Caulfield (1984, 388-9) warned ‘has happened so often in the past’, ‘speculation’ became ‘the data on which others [built]’.

McSparron’s study was superseded by Cooney *et al.* (2011), but a demonstrably representative dataset of contextually secure, high precision dates remained problematic: 43% of (14) structures contributing dates, and 40% of the (20) samples came from Corbally. The new study by Whitehouse *et al.* (in press), supplemented the published and unpublished material used by McSparron and Cooney *et al.* with new high precision dates on new short-life samples (curated charred ‘cereal’ grains and hazelnut shells from excavations). While the new dates are of high precision, they come only from indirect evidence (Whitehouse *et al.* in press, 5) and imprecisely defined contexts. As such, the dates are of uncertain relevance to the use of the structures.

There is an overwhelming systematic bias towards the (disturbed) contexts of post holes and slot trenches, but further details, such as the nature of the context fill (homogeneous? Truncated?), and the precise location of the sample within the context (basal? Unknown?), cannot be understood without publication of the original excavations. No site contributes a stratified sample. Almost 30% of the new dates again come from Corbally (though no ‘crop processing’ evidence from ‘House 3’ was dated).

Anywhere where grass was growing (or brought by people, even deposited in animal droppings) during the Neolithic, and there was a fire (whether deliberate or natural), has the potential to produce Neolithic grass seeds preserved by charring. The Elm Decline in Ireland immediately precedes the putative “boom” in the archaeological record’ at many sites (Whitehouse *et al.* in press, 16). While it seems clear that there was some regional variation in the timing of the Elm Decline, there remains ‘strong coincidence with early agriculture’, according to the pollen diagrams for many sites (*ibid.*, 1). An argument that has been advanced here is that the sequences in those pollen diagrams must be taken as floating chronologies in the absence of comprehensive, stratigraphically secure, series of precise and accurate radiocarbon dates. The Elm Decline itself is taken as a fixed ‘pollen-stratigraphic marker’ (Whitehouse *et al.* in press, 16) in many pollen sequences, and assigned a notional date (e.g. O’Connell and Molloy 2001), thus the argument becomes circular. What is clear is that Elm Decline itself resulted in a ‘boom’ in non-arboreal pollen and seeds—including grasses—which will be manifest in pollen diagrams and the lower strata of excavations at Neolithic sites.

The clustering of dates from ‘cereal-type’ seeds (taken as a proxy date for the ‘house boom’) is almost invariably based on unreliable identifications (tiny, degraded samples identified morphologically). The association of these seeds with the archaeological evidence is overwhelmingly circumstantial (i.e. spatial but *not* demonstrably temporal). Furthermore, later activity at sites will in most cases have generated further (probably larger) deposits of grass seeds. These must be distinguished from any Neolithic seeds. Taking a seed from the deepest part of a context, and presuming every other seed in that context is of the same date is poor practice, and risks conflating unrelated evidence.

Though archive material from Céide Fields and associated sites has now come to publication, it is acknowledged that the intervening 40 years compromise the record. Here, as in the majority of rectangular ‘house’ sites, the data available for public scrutiny are incomplete, thus assumptions in the collection, analysis and interpretation of the underlying data are unclear. Among the withheld information are negative data—data that does not confirm expectations. This, as Fanelli (2012, 892) demonstrates, distorts scientific knowledge. The absence of negative data exaggerates the significance of phenomena, and prevents the disciplinary ‘self-correction’ necessary for ‘scientific progress’ (*ibid.*; cf. e.g. A. Jones 2002, 56-7; Button *et al.* 2013, 368).

Having examined the available data behind the archaeological syntheses that characterise Neolithic western Ireland, what follows are some ‘alternative views’ on the unfolding developments in Neolithic communities that critical engagement with the evidence supports.



5.3. Agency in Mesolithic Ireland

Great Britain and Ireland were relatively well populated with mesolithic hunters and fishers. But a neolithic culture of distinctive Western type was first introduced by peasants who crossed to Southern England from North France or Belgium and did not mingle with the pre-existing food-gatherers. The neolithic farmers owed hardly an item in their equipment to their mesolithic forerunners and competitors.

V. Gordon Childe (1957, 322-3)

...one cannot but argue that it was the passage tomb builders who, to use the words of the famous prehistorian Gordon Childe who for so long worked in Scotland, ushered in the 'dawn of civilization'.

George Eogan (1992, 127)

It is not new to suggest that the role of Mesolithic communities in shaping the Early Neolithic is frequently underplayed. However, as has been shown, what Gamble *et al.* (2005) termed 'agricultural thinking' – the legacy of Childe's conviction that history started with farming – remains strong. No study that considers the nature of the Early Neolithic in Ireland should ignore, or pay only lip-service to, life before the putative Neolithic 'revolution'.

The temporality of life in Early Neolithic Ireland (and Britain) is frequently conflated due to the assumption that a template for the Neolithic way of life *arrived* as a contemporaneous 'package' (Whittle 2007a, 379; e.g. see Cooney 2007a, 549). In a recent study of archaeological perspectives on the adoption of agriculture in Ireland, Warren (2013, 528-9) found that:

Irish researchers are more likely to stress colonisation as the dominant cause than researchers in Britain or Europe. This distinction is not related to certainty – as high a proportion of Irish researchers as British were 'unsure' about the cause.

As discussed in Chapter 2, there are modern socio-cultural reasons for this: farming tradition feeds strongly into Irish national identity. In archaeological tradition, the significance of the Childean *dawn of European civilisation* is undeniable. The maintenance of a clear distinction between Mesolithic and Neolithic people has served to harden the familiar narrative (cf. e.g. Kotsakis 2005, 9; Borić 2005, 16), such that, as Robb and Miracle (2007, 104) observe:

...it is extremely difficult to avoid slipping, unconsciously, from classifying a society archaeologically as 'Mesolithic' to assuming that it was in fact ethnographically made up of 'Mesolithic people' who must have been socially distinct from 'Neolithic people'.

This might, for example, explain why the Mesolithic presence which had long been recognised in the immediate vicinity of the field systems at Belderg More (e.g. Woodman *et al.* 1999, 139; Cooney 2000a, 27), received as Warren (2006 1; 2009a) observes, 'little critical attention'. Seemingly a potential role for these people in the establishment of agriculture in the region did not warrant investigation.

Sheridan (2004, 12), reports a 'striking contrast in the distribution of late Mesolithic and Carinated Bowl findspots'. However, Mesolithic evidence at sites which have yielded Carinated Bowl pottery has long been in the archaeological record. These include sites in the Boyne Valley and at Loughcrew, Co. Meath (e.g. Cooney 2000a; Waddell 2000). Kilgreany Cave, Co. Waterford (Woodman *et al.* 1997, 141), and Newferry, in the Bann Valley, Co. Antrim (Woodman 1977) both produced Late Mesolithic evidence and Neolithic pottery. The landscapes of the Bann Valley and its estuaries feature numerous Mesolithic and Neolithic sites in close proximity (e.g. Cooney *et al.* 2011, 573). Other landscape studies have produced similar results (e.g. Green and Zvelebil 1990; Aidan O'Sullivan 1997; 1998). More recent excavations such as at Clowanstown 1, County

Meath (Mossop 2009, 899) and Gortore 1b, Co. Cork (O'Donoghue 2011) have produced both Late Mesolithic evidence and Carinated Bowl pottery.

It should also be borne in mind that the discovery of pottery during excavation will immediately result in that site being attributed to the Neolithic or later. Moreover, as discussed in Chapter 4 (Section 4.1.1), there are many aspects of archaeological research practice that militate against the discovery of Mesolithic sites across large parts of Ireland. These include the lack of specialist expertise (particularly outside of the north-east); the lack of distinction between particularly Late Mesolithic and Early Neolithic assemblages; locational biases in research activity; poor preservation of the largely organic Mesolithic material culture (which of course by definition older, thus further susceptible to decay, marine transgression and other disturbance).

However, Woodman (2004, 293) identifies researcher expectations as continuing to represent the greatest barrier to the discovery of Mesolithic sites across much of Ireland. This may derive from the lack of 'esteem' in which Mesolithic sites are held outside of the north-east, together with the longstanding belief that the absence of inland flint sources across much of the island meant that only the north-east could sustain Mesolithic settlement. Warren (2013) similarly found grounds for concern regarding researcher expectations regarding the nature of Mesolithic evidence, leading to a 'dangerous potential for such arguments to become self-fulfilling' (p. 538). It is against this background that Woodman (2004, 293) advises that areas without known Mesolithic evidence should be seen as areas where such evidence has not yet been discovered, rather than 'empty landscapes'. Comparisons between the distribution of Mesolithic and Neolithic findspots in Ireland thus amount to a comparison of two contrasting research traditions, rather than (necessarily) two contrasting settlement patterns (cf. e.g. Edmonds 1999, 5).

Sheridan (2004, 12) also finds the consistency of the earliest Carinated Bowl pottery 'very striking'; likewise, the skill of its manufacture. The 'unlikelihood of the indigenous foragers rapidly and simultaneously gaining expertise in pottery manufacture' is thus seen to suggest a colonising 'diaspora' of 'makers and users' as the engine for the widespread distribution of Carinated Bowl pottery. This hypothesis too raises several questions. By 'simultaneously' Sheridan is referring to a period that probably lasted many centuries, and by no reliable measure can be demonstrated to be less than a century. In other words, a period longer than the industrial revolution: surely long enough for skills transfer. Alternatively, unerring consistency might be seen to point to its centralised manufacture by a small number of specialists (either in Ireland or overseas), but distributed widely through trade and exchange. Again, there is no requirement for large-scale population displacement.



5.3.1 Overthrown by strangers?

Though the idea that the Late Mesolithic in Ireland was 'insular' retains support (e.g. Sheridan 2010, 92), there has been growing recognition of the evidence to the contrary. Traditionally, the argument for insularity has hinged upon the 'idiosyncratic' broad blade lithics that characterise Irish Late Mesolithic assemblages (e.g. Green and Zvelebil 1990, 2). The later Mesolithic lithic assemblage does differ from that in much of Britain, but, localised developments occurred within Britain too, and the changes in Ireland may have been overemphasised (Woodman 2009, 202-3).

The restricted range of large mammals in Ireland (Woodman *et al.* 1997; see further discussion below), and the available raw materials (Costa *et. al*

2005, 26-8) would have influenced the nature of the Irish toolkit, but is not incompatible with, for example, 'the transportation of cattle to Ireland as prestige gifts, economic supplements etc. at a date prior to the commencement of a farming economy' (Woodman and McCarthy 2003, 36). The development of distinctive lithics might reflect changes in 'procurement strategies', with a greater emphasis on the manufacture of nets, traps and baskets (E. Anderson 1990, 387; 1993, 24; Costa *et al.* 2005, 29-30) see McQuade and O'Donnell 2007, and FitzGerald 2007, for recent discoveries). Equally, social factors could be at play: perhaps 'a shift in the perception of the importance of lithic tools in the activities of later Mesolithic society (Costa *et al.* 2005, 30).

Just as a distinctive lithic assemblage need not imply social isolation, the evidence for international cultural connections in Late Mesolithic Ireland is increasing. Ireland's Late Mesolithic toolkit is analogous to that of the Isle of Man (Peterson 1990, 369; E. Anderson 1993, 16; McCartan 2003), which though visible from vantage points in Ireland, required a sea crossing of more than 40 km. It seems counterintuitive, given the location of the Isle of Man, that there would have been contact with Ireland, but not south-west Scotland, north-west England or north Wales (Thomas 2008, 64; cf. Woodman 2004, 295). At the nearest point, Scotland is less than half the distance from Ireland as the Isle of Man, and clearly intervisible in good weather (e.g. Woodman and McCarthy 2003; Thomas 2008, 64). Butt-trimmed flakes analogous with Irish Late Mesolithic 'Bann Flakes' have been recovered from a number of sites in south-west Scotland (Thomas 2013, 266). Contemporary maritime exploration off the Scottish coast is evidenced by the colonisation of islands such as the Scottish Hebrides (C. Smith 1992, Chapter 8; Mithen 1997, 106; Tolan-Smith 2008, 152).

While irrefutable evidence for contact between Scotland and Ireland in the Late Mesolithic has not been identified, there are similarities in some aspects of the surviving material culture (Warren 2005b, 138). Among such evidence are shell middens. At Dalkey Island, off the coast of Co. Dublin, middens with evidence ranging from the Mesolithic through to the Bronze Age yielded sheep bone dated to the Late Mesolithic (Woodman *et al.* 1997). Though Milner (2010, 48) has recalibrated the date to 4036-3654 cal BC (OxA-4566), it remains likely that this is a pre-farming context. Kilgreany Cave, another multi-period prehistoric site, also yielded early cattle bone: the date range as calibrated in Milner (*ibid.*) is 4234-3798 cal BC (OxA-4269).

These sites may provide evidence 'that a limited importation of cattle into Ireland, either by sea-faring farmers or hunter-gatherers, took place prior to the development of the Irish Neolithic *per se*' (Woodman and McCarthy 2003, 34). Woodman and McCarthy (*ibid.*) further suggest that early examples of cattle bone in caves may be among other evidence from the Late Mesolithic which has been misinterpreted as it did not accord with preconceptions (cf. e.g. Woodman 2000a; Fredengren 2002, 19). Far too many [Mesolithic] sites are poorly dated (Warren 2013, 535).

It is interesting in the light of past academic tussles concerning the primacy of east versus west (presumed to indicate Britain versus continental Europe) in the conjectural colonisation of Ireland by Neolithic farmers, that the west of Ireland has yielded the strongest available evidence for long-distance contact between Mesolithic Ireland and overseas farming communities. Ferriter's Cove, Co. Dingle, provides uncontested evidence of a cattle tibia in a Late Mesolithic context: 4490-4320 cal BC (OxA-3869) (Schulting 1999, 219; recalibrated in Cooney *et al.* 2011, Table 12.9). Mesolithic hunter-fisher-gatherers in Ireland *did* have contact with farming groups.

Among the many important contributions Ferriter's Cove has made to the understanding of the Late Mesolithic in the west of Ireland is the vulnerability of such sites to coastal erosion. The Ferriter's Cove site was discovered in the course of its destruction by the sea: 'The extent of erosion, and consequent loss of the landscape, prior to the discovery of the settlement in the 1970s can never be ascertained (Woodman *et al.* 1999, 107). Woodman *et al.* (*ibid.*, 137) considered that the dearth of known Late Mesolithic and Early Neolithic sites in the area can in part be attributed to coastal erosion. Further up the west coast, at Fanore More beach, Co. Clare, Late Mesolithic material has recently been recovered from an eroding shell midden, close to where two Late Mesolithic stone axes were subsequently washed-up by storms (M. Lynch 2012; Siggins 2014). The Late Mesolithic activity on the north Mayo coast at Belderrig was discovered in the context of an eroding coastline. Further up the north-west coast at Strandhill, Sligo Bay – where Late Mesolithic and very Early Neolithic dates (e.g. Bergh 2002, 143-144; Danaher 2007; Dowd 2008, 306-308) are recorded among the great concentrations of megalithic monuments of Carrowmore and environs (e.g. Bergh 1995) – Burenhult discovered evidence of an inundated area of earlier Neolithic coastline (see Chapter 4, Section 4.1.1).

Sheridan (2013, 286-7; see also e.g. 2006, 24-5; Sheridan 2010, 91-2) proposes that Ferriter's Cove represents a failed colonisation 'probably due to there having been an insufficient critical mass of immigrants and their domesticates, together with natives who were not interested in becoming acculturated'. However, the evidence from Ferriter's Cove indicates a temporary settlement revisited by hunter-fisher-gather groups over a period of many centuries (Woodman *et al.* 1999, 135-8). There is no evidence for settled farming; no pottery. Tresset (2003, 25-6) proposes that such evidence lies elsewhere, the Ferriter's Cove beasts being escapees from a careless immigrant farmer's landholding. This is apparently 'more

plausible' than the 'far-fetched' suggestion that local Mesolithic people sought-out resources from overseas (*ibid.*).

It is understandable that a group of 'settled' Neolithic farmers (of the kind often characterised as having exorcised seafood from their diet) would have struggled to organise a successful maritime colonisation (cf. Thomas 1988, 60; 2008, 64). The factors (social? environmental?) that might have motivated the Breton farmers to organise as colonisers and abandon their native lands can only be guessed at (cf. Thomas 2007, 427). How did the would-be colonisers know that they needed to bring their own livestock? Surely an awkward prospect on such a voyage (cf. Carden 2012, 82). Perhaps there was only room for prized breeding specimens aboard boats of the putative flotilla, which were then eaten at Ferriter's Cove when no indigenous beasts were to be found.

Such was the calamity of this 'false start' that it is seen to have put paid to the dreams of a better life in Ireland for the inhabitants of north-west France for several centuries. Pioneer groups then set out up the Irish Sea, establishing footholds in Wales, Scotland and the north of Ireland. This paved the way for the 'diaspora' that would cross from north-east France to England, spreading quickly to Ireland and overthrowing the 'natives' in a brief episode (Sheridan e.g. 2004; 2006; 2010; 2013; *pace* Sheridan 2011; cf. e.g. Caulfield 1983, 205; McSparron 2008) c. 3750 cal BC, according to the latest estimates (Whitehouse *et al.* in press).

An alternative 'model' emerges if the starting point is, as Woodman (e.g. 2000b, 255) has consistently found, that the people of Late Mesolithic Ireland 'relied heavily on fishing [and] probably sea-mammal hunting' (my emphasis; cf. Thomas 2007, 430; 2008, 64; 2013, chapter 8). Tolan-Smith (2008, 152) considers that the Late Mesolithic of north-western Britain and adjacent parts of Ireland was a 'mainly maritime venture' (cf.

Wickham-Jones 2014, 701). Skilled mariners from south-west Ireland, experienced in deep-sea fishing (Woodman *et al.* 1999, 89; cf. Kinnes 1984, 367; 1985, 15; Pickard and Bonsall 2004, 284), and presumably used to crossing to crossing open water to reach colonies of birds and marine mammals, would possess the technical expertise to make the crossing to Brittany. The *prima facie* evidence for Late Mesolithic coastal communities having the skills and motivation to make significant sea crossings is surely no less compelling than that for *settled* continental farmers (Thomas 2013, chapter 8).

It has been suggested that the Ferriter's Cove cattle bone could represent the remains of an imported joint of meat, rather than an imported live animal (e.g. Thomas 2008, 64). Whether or not this was the case, a developing network of exchange (or perhaps increasingly audacious raiding) may have led to the slow introduction of beef, mutton and venison into the diets of indigenous Irish communities. The absence of evidence for animal bones from earlier Neolithic assemblages is consistent with this, but a *striking* incongruity if the Early ('Carinated Bowl') Neolithic proposed by Sheridan marked the widespread rapid adoption of settled agriculture in Ireland.

Only a small number of *circumstantial* deposits of animal bone are associated with Neolithic rectangular 'houses' in Ireland. These, according to Sheridan (2010, 97-8), are signature dwellings of the 'Carinated Bowl Neolithic' farming groups in Ireland. Though unburnt bone generally survives poorly in Ireland's predominately acidic soils, given the widespread evidence of burning at these sites (hearths *and* 'house' fires), some evidence of this supposed dietary mainstay should be expected to have survived. The picture at other sites featuring earlier Neolithic pottery is similar. In a recent study, Schulting *et al.* (2011) were unable to date *any* faunal remains associated with court tombs to

prehistory 'let alone' the Neolithic. They include the following note of caution regarding the faunal evidence from Neolithic mortuary monuments in Ireland:

McCormick (1986; 2007) has summarised the limited faunal material known from prehistoric Irish monuments, and drawn attention to the recurrent practice of placing only token deposits of the three main domestic species in Neolithic mortuary monuments. However, the faunal dating results reported here argue for considerable caution in attributing animal remains from these sites to the Neolithic, even in cases where they were thought by the excavator to be in a primary context (*ibid.*, 39).

As Woodman and McCarthy (2003, 32) put it:

It is quite sobering to realise that the first Neolithic assemblage of any substance is that from the Final Neolithic settlement at Newgrange, Co. Meath [references omitted], and after that one must go well into the Bronze Age before there are both substantial and consistent occurrences of faunal remains.

With very limited reliable evidence for cereal cultivation (see Chapter 4 and Section 5.4, below), and in the absence of field system (see Chapter 3 and Section 5.5, below), the theorised rout of the 'natives' by incoming farmers at the start of the Neolithic seems difficult to sustain. The remaining components of the Neolithic 'package' could reasonably have been incorporated into the material culture of Ireland as imported artefacts or ideas.

Sedentary farming is not a pre-requisite for the use of pottery (Jordon and Zvelebil 2009). Though is present at widely dispersed sites in earlier Neolithic Ireland, this is typically in small quantities and at probable gathering places—such as megalithic monuments, the two known causewayed enclosures (at Donegore, Co. Antrim, and Magheraboy), and (some) rectangular timber structures. This is consistent with its introduction as a prestigious item. It is also important to remember that

while pottery that is circumstantially related to Neolithic structures is assumed to be Carinated Bowl pottery, in many cases this has not been reliably demonstrated (cf. Schulting *et al.* 2008, 8; see examples in Chapter 4).

Equally, the potential for Late Mesolithic groups utilising pottery should not be dismissed out of hand. Jordan and Zvelebil (2009, 54-61) describe the potential for pottery use among hunter-fisher-gatherers in 'aquatic environments – along coasts, estuaries and in river valleys' (cf. Rice 1999, 21-3). These were areas where diverse concentrations of resources were predictable (and where the raw materials for pottery manufacture were available). The oft-cited difficulty that transporting pottery may have caused mobile groups diminishes where boats were used for transport. The use of pottery around the water's edge (among mostly organic materials) might explain its absence from dated late Mesolithic assemblages.

The worked antler of red deer were, like pottery, widely circulated in Early Neolithic Ireland (e.g. Ó Floinn 2011, 29-30; Carden *et al.* 2012; Bergh and Hensey 2013). However, it is not until the Late Neolithic that the first substantial assemblage of red deer skeletal remains is in evidence (Carden *et al.* 2012, 82). The implication is that either only a small resident population was introduced in the Early Neolithic (possibly maintained specifically for their antler), or that just antlers (and perhaps some venison joints) were imported at intervals over many centuries (*ibid.*; see Bergh and Hensey 2013, 358). As Woodman and McCarthy (2003, 37) put it: 'a strong case could be made that initially antlers alone were imported to Ireland as a raw material for artefact manufacture'.

Trading relationships, rather than colonisation, can account for the appearance of novel artefacts and ecofacts, for which the earliest evidence

(so far identified) comes from Ferriter's Cove. Such items could have been distributed along inshore and riverine routes widely and efficiently by those who travelled them to maintain the cultural affinities evidenced by the distinctive aspects of Irish Late Mesolithic lithic tradition (in particular butt-trimmed flakes and polished stone axes – see Costa *et al.* 2005, 20). It may, as Sheridan suggests, have been some time before craftspeople in Ireland developed the requisite skills to create fine pottery. Perhaps the cachet of the Breton bowls, together with their availability from traders, delayed the process. Locally manufactured bowls may be among the later derivatives. In general terms, the introduction of aspects of the 'Neolithic package' should perhaps be seen – initially at least – as social rather than economic phenomena (cf. Woodman and McCarthy 2003; Carden *et al.* 2012, 82).

The case against Ferriter's Cove being part of a developing network of contacts between Late Mesolithic Ireland and continental Europe rests heavily on the presumed inertia of Irish Mesolithic 'natives'. In the Childean tradition, Sheridan (2004, 12), for example, doubts 'indigenous Mesolithic agency' in the appearance of aspects of Neolithic material culture. Yet the argument for Ireland's (self-imposed) isolation is in turn contingent on ignoring the impact of taphonomy and (extraordinary) research bias that compromise understating of the Late Mesolithic: as Cooney (2007a, 546) cautions: 'We should of course be careful that [the poor record] is not uncritically seen as a direct reflection of a low level of activity during the Later Mesolithic'.

In the light of the historically poor recognition of Mesolithic sites in Ireland, coupled with the well documented erosion of the west coast, it is premature to 'write-off' Ferriter's Cove as an isolated failed attempt at colonisation by acquisitive farming groups (Sheridan 2010, 91-2; Sheridan 2013, 286-7). As Spikins (2008, 10) put it, the coastal locations submerged

by rising seas are precisely where Late Mesolithic society should be expected to have been most developed. Hypothesised colonisations tend 'not leave to the miserable recipients any active part in the cultural process' (Theocharis 1967, 68-9, translated from the Greek by Kotsakis 2005, 11). Centuries of temporality are thereby compressed into an ahistorical revolutionary event. To paraphrase Wolf (1997, 347), the indigenous population of Ireland were not the passive recipients of an invasive culture, 'but participated in the creation of a new one'.



5.4. Challenging the *settled-mixed-farming* hypothesis

The evidence of the houses has been accepted by Irish archaeologists, at least, as representing an important focus of permanent settlement patterns.

Eoin Grogan (2002, 521)

'House' – as Grogan (1996, 51) reminds us – has 'all the connotations of permanency'. Prior to the traditionally defined Neolithic, people lived in *huts* – 'implying...ephemeral, temporary structure[s]' (*ibid.*). Against this background Grogan's (2002, above) assertion that Neolithic houses have been accepted as a focus of permanent settlement is tautologous. The settled-farming narrative follows from the classification of the structures as houses. The model of a settled-mixed-farming Neolithic *needs* recognisable farmsteads. This may in part explain the 'resistance of some Irish scholars' to non-megalithic funerary practice observed by Kinnes (see Section 5.4.3, below). Potentially Neolithic structures with room to sleep a

family¹ that fall outside the traditional characterisation of monuments are instinctively labelled as houses.

It is not known whether any of the Mesolithic inhabitants of Ireland built houses (*huts*) with straight edges. Only one settlement comprising circular huts is known over a period of almost four millennia. The settlement pattern in Middle and Late Neolithic Ireland (a further millennium) is scarcely better understood. Presumed Early Neolithic rectangular timber structures are the mainstay of the prehistoric 'house' evidence in Britain and Ireland before the Middle Bronze Age. *If* the orthodox interpretation of these structures is wrong, then the settled-mixed-farming interpretation of the Irish Neolithic is compromised.

Rectangular timber buildings constitute the only known structures that *could* be the houses in which the colonising farmers of the 'Carinated Bowl Neolithic' sheltered themselves from the wandering Irish 'natives' (see Sheridan 2010, 97-8; Cooney 2007a, 557; Smyth 2011, 3). However, according to Bayliss *et al.* (2011b, 840), while the other elements of the 'Neolithic "package"' were 'adopted all at once in Ireland', 'rectangular houses' were a 'slightly later' exception (earlier exceptions are also acknowledged; cf. Whittle *et al.* 2011c, 863). Whitehouse *et al.* (in press, 16) similarly date the start of the 'house horizon' to several decades after the initial Neolithic presence in Ireland. By these estimates, the first structures were unlikely to have been constructed before the instigators of the colonisation of Ireland were dead². Perhaps, then, some were monuments to the fallen (see discussion in Section 5.4.3, below).

It is easily forgotten that beneath the headline figure of more than 80 'timber rectangular Early Neolithic houses now known in Ireland, all displaying a striking level of homogeneity', that there is significant variation in form and context. Though for Grogan (2002, 521), the function

of the 'larger buildings' is self-evident: they 'clearly represent the remains of houses', there remains broad acceptance that this is not a homogeneous classification. While ascribing a date-range to the structures based on the examples which have yielded the highest precision (albeit indirect) dating evidence has clear methodological advantages from a purely quantitative perspective, this does not automatically correspond with the most credible archaeological interpretation of the available evidence.

By implication, the fact that the majority of structures (almost two thirds even following Whitehouse *et al.* in press) do not have high precision dates opens the possibility that many fall outside the tightly defined 'house horizon'. I have argued that even where high precision dates exist, their accuracy as proxies for the use of the structures is often open to question. It is telling that though 'the existence of a distinct "house horizon" ...lasting for up to a century' has been 'emphatically confirmed' by Whitehouse *et al.* (in press), Smyth (2013) has already begun the task of identifying those examples that belong to the 'post-"house horizon"'. Conceivably, as is most strikingly demonstrated at Lough Gur, not all the structures are Neolithic. Could non-specialist excavators be expected to assume that a prehistoric timber structure with straight walls, but no other reliable means of assigning date of function, is anything other than an Early Neolithic house? Clearly excavating the remains within this paradigm will impact on the findings.

There are alternative interpretations that present (at least) equally credible sub-groupings. Devising programmes of radiocarbon dating and analysis around considerations other than the (circumstantial) presence of individual datable grass seeds in disturbed basal contexts might shed new light on the temporality of Neolithic Ireland. Some pertinent aspects of the available evidence are discussed below.

5.4.1 'Flimsier' structures

...there are other Early Neolithic structures, smaller and flimsier in their construction, that hint at a different temporality of use and which suggest that transhumance, or other activities requiring fairly basic levels of shelter, was also part of the Early Neolithic lifestyle.

Alison Sheridan (2013, 294)

It is clear from the rectangular timber structure at Magheraboy that neither straight walls nor a relatively large floor area determine that a prehistoric (probably early fourth-millennium BC) building was substantial (i.e. constructed of planks). Nor does the presence of slot trenches (also at Magheraboy). Nor does the presence of oak charcoal (oak provided the main structural timbers of the palisade feature of the causewayed enclosure, with which the rectangular timber structure is seen to be contemporary) (Danaher 2007).

Oak was widely present in the Early Neolithic landscape, and oak stakes would have made sturdy structural timbers (see also Danaher 2009). Slot trenches are a sensible feature, whether or not the walls were *substantial*: they make for sturdier walls—particularly when packed with stone and soil—keeping the wind (and unwanted guests such as bears, wolves, foxes and mice, out). Even (possible) prehistoric fence lines (e.g. at Cloghers, and at Bolam Lake³, north-east England, were constructed in linear slot trenches). Many of the slot trenches at Irish prehistoric rectangular timber structures contain evidence of stake- and post-holes. At Ballyglass, for example, the slot trenches were on average just 20 cm deep (though in the absence of identified occupation layers at *any* site, the depth of features must be somewhat speculative). The local soil conditions may have been a significant factor in determining the depth and breadth of the slot trenches. Some of trenches may have acted as drains.

Were they to have been excavated outside of the paradigm of the plank-built Irish Early Neolithic house, many of the Irish rectangular structures may have been interpreted differently. Again at Bolam Lake, a sub-rectangular structure dated to the Early Neolithic measured *c.* 10m x 3.5m (Sheridan 2007a; 2013). Excavators interpreted the structure as having been ‘a temporary structure with a light frame that could be erected very quickly, in a matter of hours at most, probably supporting a tent-like dwelling’ (Waddington and Davies 2002, 23). The excavators continue:

Indeed the structural remains are more oriented to traditional concepts of Mesolithic settlements—that is transient residences—rather than the idea of permanent dwellings that have usually been associated with concepts of Neolithic farmers (*ibid.*).

Of course, communities for whom farming was not the main source of food need not be constantly on the move. Larger posts may indicate a longer stay, but do not in themselves demonstrate settled-mixed-farming. Were dated evidence of cattle or sheep bone to be present at any of the rectangular structures in Ireland, the case for pastoral farming (even transhumance) would be strengthened. As has been shown in Chapter 4, the *reliable* evidence for the presence of cereals during the Neolithic is very much the exception (see further discussion below). No field or field system is reliably dated to the Neolithic, despite the claimed widespread presence of ‘longer-term, fixed-plot agriculture’ (e.g. Whitehouse *et al.* in press, 18).

Given these circumstances, there is surely a case for testing alternatives to the *settled-mixed-farming* hypothesis, beginning with the Early Neolithic.



5.4.2 No fixed abodes

...*Neolithic societies were not mobile...*

Michael Monk (2000, 82)

It is striking that the conjectural pioneering colonists of earlier Neolithic Ireland, though thought to *define* themselves through their houses (e.g. Smyth 2011, 3), left no apparent trace of substantial dwellings at the known great centres of their activity. Yet the remains of flimsier Neolithic structures are frequently present. Could it be that lighter, impermanent, structures are in fact the signature dwellings of the Irish Neolithic (cf. Waddell 2010, 42-3)?

According to the latest estimates from the Carrowmore megalithic complex, early use of the site is contemporaneous with the rectangular 'house horizon' (Bergh and Hensey 2013, 359). The lightweight Magheraboy rectangular structure is nearby to the east. However, as Smyth (2006, 243) notes, this 14m × 6m—apparently unroofed—rectangular structure 'suggests that this size and shape of timber building could be employed in other contexts'. No evidence of a substantial plank-built rectangular structure has been found in the vicinity, despite the recent routing of a four-lane highway through the landscape.

To the west of Carrowmore, on Knocknarea mountain, a total of 17 (circular/sub-circular) houses/hut sites have been recorded (Bergh, forthcoming). The available radiocarbon dates place these structures in the final quarter of the fourth millennium cal BC, and their exposed location avers against them representing agricultural settlement (*ibid.*; see also Bergh 2002, 146-8).

Although much of the evidence from Carrowmore and environs comes from ritual contexts, it has long been suggested that settled-mixed-farming ‘with emphasis on cattle and wheat’ had been practised in the area during the Neolithic, but that later activity meant that ‘land divisions [and presumably farmers’ houses] were unlikely to have survived’ (e.g. Cooney and Grogan 1998, 466). A recent study claims to have identified palynological evidence of Early Neolithic arable farming in the vicinity, commencing *c.* 3760 cal BC (Ghilardi and O’Connell 2013). The high resolution dating of this conjectural farming episode is defined by two (imprecise) radiocarbon dates from a stratigraphically inconsistent (lake sediment) pollen core⁴.

Farming is identified principally on the basis of a slight increase in the proportion of the weed *Plantago lanceolata* (ribwort plantain) in the pollen profile (3.4%, up from 1.8%) (p. 635), but this coincides with their dating of the Elm decline (and thus a fall in arboreal pollen): no human impact on the landscape is demonstrated (see discussion in Chapter 3). Ghilardi and O’Connell concede that the Early Neolithic activity had ‘a rather modest impact on woodland cover (p. 642), but nevertheless link their findings to the appearance of ‘Neolithic rectangular houses’ (*ibid.*). They reinforce their conclusion that ‘cereal cultivation coincided with the Elm decline’ on the basis of [just] ‘two cereal-type pollen recorded in the basal spectrum’ of the pollen zone they define as earlier Neolithic (p. 633, my emphasis). They later acknowledge that aquatic grasses could account for these (as of course might the mobility of specimens in the stratigraphy) (p. 643).

Despite relatively intensive research, no reliable evidence of early Neolithic arable farming, pastoral farming, substantial farmhouses, fields or field systems has been found in the vicinity of Carrowmore. It is during the Bronze Age that changes in the environment consistent with widespread arable farming are in evidence (see Ghilardi and O’Connell

2013, 643-5). Investigations at the Carrowkeel-Keashcorran megalithic complex and its environs (also in Co. Sligo) have similarly failed to demonstrate fixed-plot arable or pastoral farming during the earlier Neolithic. On the Mullaghfarna plateau at the east of the complex, c. 150 circular stone foundations/enclosures have been identified (Bergh 2003; forthcoming). These range in diameter from 6-20m, and a series of radiocarbon dates span the period 3200-1200 cal BC. Their exposed, difficult-to-access location, and the absence of any artefacts or ecofacts of an agricultural nature, argue against any functional link with settled farming.

A recent palynological study of a core of lake sediment (extracted c. 3km north of the complex) has proposed an (albeit limited) episode of arable farming in the vicinity coinciding with the Elm Decline (Stolze *et al.* 2012). The decline of elm unsurprisingly corresponds with a decline in arboreal pollen (elm 'formed a substantial part of the woodland cover' prior to its decline) (Stolze *et al.* 2012, 399). The (inevitable) corollary is an increase in the percentage of non-arboreal pollen, including wild grasses and *Plantago Lanceolata*. Among the grass seeds – based primarily on morphology – an unspecified 'low' incidence of 'single grains' of *Triticum*-type pollen was identified: so low, that even with the '[t]wenty-fold exaggeration' applied to pollen types with low frequency in the Percentage Pollen Diagram for the core, the *Triticum*-type pollen does not register (*ibid.*, Table 5). Interestingly, *Hordeum*-type grains *do* register – throughout the diagram (including pre-Elm Decline). However, the difficulty of reliably distinguishing *Hordeum* pollen from that of wild grasses is acknowledged:

Comparing the single occurrences of *Triticum* type pollen with the average representation of *Hordeum* type of 0.1-0.2% throughout the pollen record, it is argued that pollen of the *Hordeum* type may have derived from the largely anemophilous *Glyceria* (cf. Moore *et al.*, 1991), a frequent grass of lake fringe communities. As the pollen signal of this grass may mask the occurrence of single grains from cultivated *Hordeum*, an often self-pollinating taxon (Vuorela, 1973), its presence as

a cereal crop around the lake cannot be established with confidence (Stolze *et al.* 2102, 401).

It is surprising that this even smaller working sample of *Triticum*-type pollen—likewise typically morphologically inseparable from several species of native wild grass—is not treated with similar caution. Furthermore, as with Ghilardi and O’Connell’s study, the inevitable imprecision of the dated strata in the core, together with the potential mobility of microscopic grains within it, further compromise the results. The interpretation of Early Neolithic arable farming cannot be reliably inferred from the palynological evidence.

At the great centres of Neolithic activity in the east of the country, the picture is similar. At both Knowth and New Grange there is evidence of settlement pre-dating passage tombs, though only lighter structures are recorded. There is no reliable evidence (either archaeological or palaeoenvironmental) of fixed-plot arable or pastoral farming in the earlier Neolithic. Though the osteoarchaeological report for the Knowth excavations ventures: ‘On the basis of the very tenuous data, it might be suggested that large cattle were already present in the Boyne valley before the Beaker period’ (McCormick 1997, 301), this is not supported by the dating of any of the small number of bone fragments found in the soil at Knowth. Like the rectangular timber structure at Magheraboy, the sub-rectangular ‘House B’, beneath the footprint of the main cairn at Knowth, demonstrates that large (12.3m x 10.1m) earlier Neolithic rectangular timber structures could be insubstantial, and were not necessarily dwellings (again its light construction and lack of internal post-holes was thought by the excavators to indicate that it was unroofed).

Though generally later Neolithic or Bronze Age, lighter prehistoric structures thought to have been dwellings are recorded elsewhere. In the west, at Ballyglass II (see Chapter 4, Section 4.5.1), the two ‘C-shaped’

structures, interpreted as huts, are presumed to pre-date the adjacent court tomb are indicative of short-term occupation. Charcoal from the foundation trench of the northern hut was radiocarbon dated to 3400-2750 cal BC (Ó Nualláin and Ó Donnabháin 1998, 141; Smyth 2013a, 315). However, this is another of the dates from the Smithsonian Institute (see Chapter 3, Section 3.3.1.b and Chapter 4, Section 4.5.1) where laboratory errors may affect the (albeit imprecise) estimate (Cooney *et al.* 2011, 596).

An assemblage of almost 500 stone implements (mostly of chert) was recovered, largely from the topsoil. Among these were almost 200 hollow scrapers (generally seen as diagnostic of the Middle Neolithic). Of these, one was found in the wall (foundation?) of the southern hut, three in the wall (foundation?) of the northern hut, and two within the footprint of the northern hut (Ó Nualláin and Ó Donnabháin 1998, Table 1). Perhaps, as Smyth (2013, 315) suggests, the presence of the scrapers supports a Middle Neolithic date for the huts. Many more are found within the footprint of the adjacent court tomb, but the lack of stratigraphy impairs their usefulness as dating proxies.

Cooney *et al.* (2011), recalibrated a radiocarbon date for unidentified charcoal from *beneath* the court tomb adjacent the Ballyglass II huts to 3100-2620 cal BC (SI-1463), but consider this date 'anomalously recent' for the reasons discussed. Assuming that the huts do predate the court tomb, and thus date to the early centuries of the Middle Neolithic (or earlier), they may provide further evidence for episodic settlement at that time. The excavator interpreted the huts as follows:

The compact design of the southern hut suggests that it may have served as some form of workshop. The more open plan of the second hut may indicate a temporary abode or shelter that could have accommodated a small family or group (Ó Nualláin and Ó Donnabháin 1998, 141).

Until recently, the Ballyglass II 'huts' had been assumed to be broadly contemporaneous with the Ballyglass I 'house' c. 250m to the north. For Grogan (2002, 522), evidence of multiple phases of occupation in the Early Neolithic; for Cooney (2000a, 15), an indication that '[r]ectangular houses were still in use' in the Middle Neolithic'.

In common with the Ballyglass II 'hut' sites, the rectangular 'house' at Ballyglass I (on three sides at least) is defined by foundation trenches, with post-holes and stake-holes in and around them. It is not evident that this structure was plank-built—the charcoal recovered from the trenches and post-holes came from a variety of tree species. At c. 13m x 6m (including porch and 'end compartment'), the footprint of the structure is large: of similar proportions to Knowth 'House B' and Magheraboy. The main compartment—which measured c. 5m by 6m—contained no internal post holes (Ó Nualláin 1972, 54; see Figure 5.1, below), which could be indicative of a light roof structure.

Though, following Herity and Eogan (1977, 47), 'a relatively long span of habitation, say even a century' is often assumed, there is no evidence—no stratified sequence of dates—to support this interpretation. The hut sites at Ballyglass II suggest a different settlement pattern. The resonance of the locality is indicated by the court tombs, but these need not imply that this was a place of permanent settlement. Certainly, the evidence for Early Neolithic agriculture at Ballyglass I is at best meagre, with the 'low incidence of charred grain, unfortunately indeterminate to species' (Monk 2000, 87), as we have seen, laid within an uncertain stratigraphy. No prehistoric animal bone has been recovered from the area (Schulting *et al.* 2011, 36).

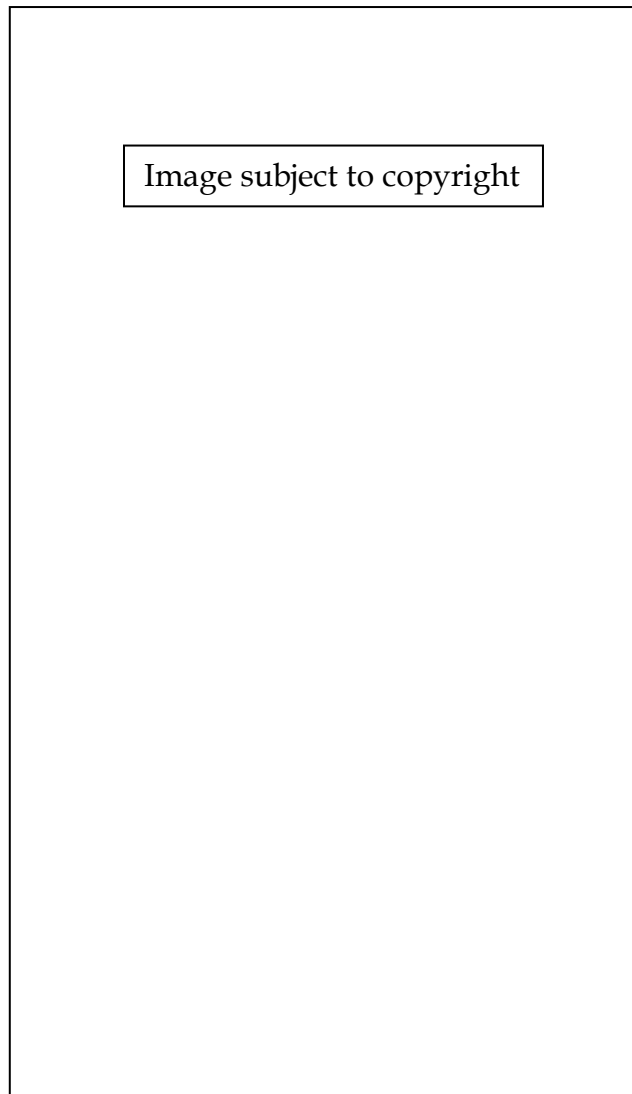


Figure 5.1: Plan of Ballyglass I, with 'porch' to the northwest (bottom), and 'end compartment' to the south-east (top). After Ó Nualláin (1972, Figure 2).

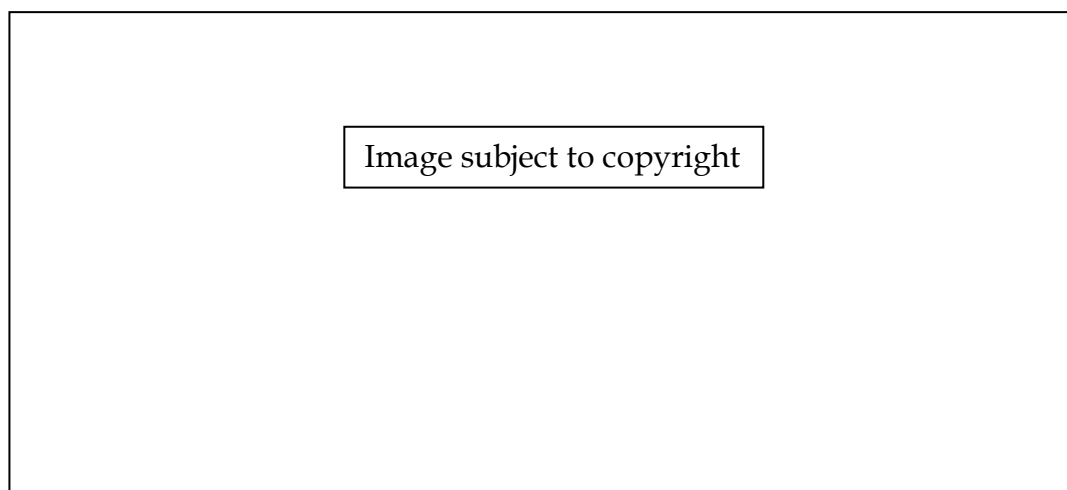


Figure 5.2: Plan of court tomb (Ma. 13) with the footprint of the Ballyglass I 'house' beneath the north-west section of the cairn. After Ó Nualláin (1972, Figure 1).

It may be time to review some of the most basic assumptions about Ballyglass I. As noted in Chapter 4, Smyth (2014, 44) reports new dates of 3950–3700 and 3790–3660 cal BC, which may place the structure ahead of the putative ‘house horizon’. Following Kinnes (1975, 19–21), Powell (2005) suggests that court tombs – particularly the more complex examples such as that in question – were ‘modular’ buildings which may have been modified over many generations. Clearly the full extent of the cairn could not be realised until the end of the construction process. Could the Ballyglass I ‘house’ represent a phase in the development of monument, never having had a domestic function (see plan in Figure 5.2, above)?



5.4.2.a Prehistoric settlement at Céide Fields

There is no inherent reason why even close management of herds should require stone walls. Perhaps, therefore, we can think in wider ways about their significance. Was this a distinctive way of signing the land, an expression of regional identity or identities, a means of aligning people with the substance of the earth and its mythic properties, and a medium through which community could be assembled and tied to place?

Cooney *et al.* (2011, 625)

Despite the dearth of evidence linking Ballyglass I to agriculture, it has long been assumed to represent the idealised ‘stout timber’ Neolithic house of ‘well-organized stock raisers and agriculturalists (Ó Ríordáin 1979, 4; cf. Herity and Eogan 1977, 47): the kind of dwelling that *should* be present among the ‘permanently settled, farmed areas’ of Céide Fields (e.g. see Smyth 2013a, 308; B. Lucas 2010, 2). The presumed-Neolithic field systems of North Mayo are in fact notable for their absence of evidence for Neolithic settlement structures. In keeping with the findings of Chapter 3, the earliest date associated with what could be considered a ‘permanent’

dwelling within the ancient field systems of north Mayo comes from the Middle Bronze Age roundhouse at Belderg Beg: 1690-1210 cal BC (SI-1473) (Caulfield 1978a, 141-2; Cooney *et al.* 2011, Table 12.6; Verrill and Tipping 2010a, 1215).

In the absence of any recognisable prehistoric house-like structure within the core area of Céide Fields, the Glenulra enclosure has been cast as the 'family dwelling' of Neolithic farmers (Caulfield 1992, 11; see also e.g. Cooney 2000a, 68; B. Lucas 2010, 2). '[N]o evidence of a classic "early Neolithic" timber house was recovered on site' (Caulfield and Warren 2011, 72). Within the c. 500 square-metre enclosure (internal dimensions c. 300m²)—assumed, like the field walls, to be Neolithic—a 'horseshoe shaped' stone spread c. 7m across has been identified from aerial photographs (see Figure 5.3, below). 'Although no hearth was associated with this foundation, and no postholes were identified within it, it may represent the foundation of a small structure' (Caulfield *et al.* 2009a, 13). An oval foundation of similar size (also devoid of internal features) was excavated on the site of the Céide Fields visitor centre. It was interpreted as an 'animal pen', and 'such an interpretation could also be ascribed to the horseshoe shaped foundation within the enclosure' (*ibid.*). However, the authors caution that '[i]t is also possible that what appears as a single horseshoe shaped foundation on the aerial photographs is not actually a single cohesive structure' (*ibid.*, 14).

Elsewhere within the main enclosure, a series of postholes were identified with '10 definite examples...found over an area of around 10m by 7m', but 'no conclusive evidence to indicate which, if any, of these postholes were in use at the same time' (Caulfield *et al.* 2009a, 15). The authors observe that '[t]he pattern of postholes do not form a conclusive pattern, and multiple interpretations of their layout are possible' (*ibid.*).

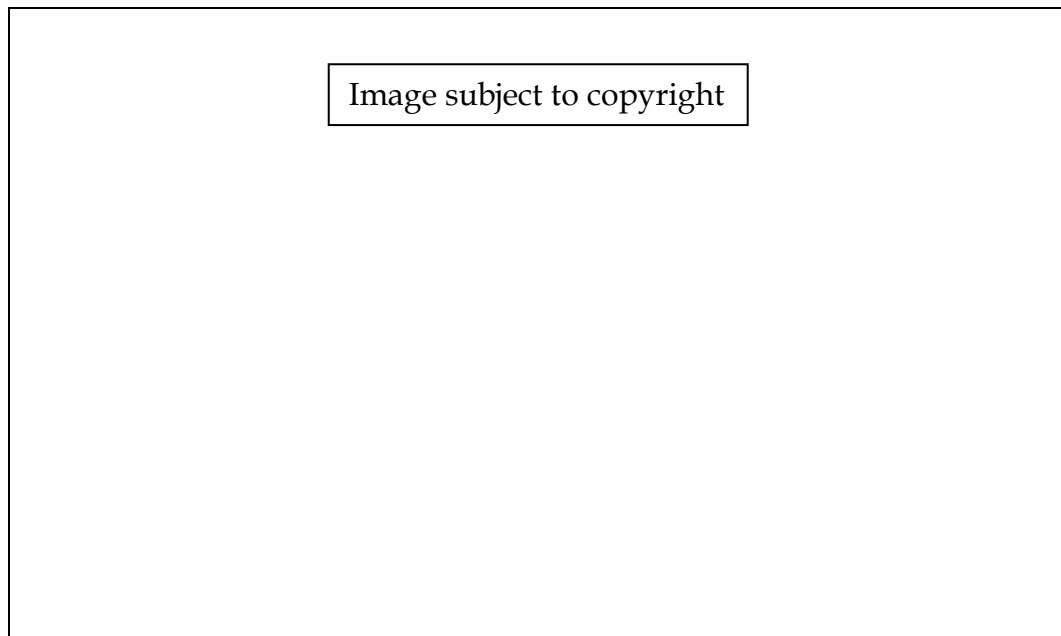


Figure 5.3: Oblique aerial photograph of Glenultra enclosure during excavations. After Caulfield et al. (2009a, cover image).

Of three charcoal-rich spreads which were located towards the west of the enclosure, one—it is not clear which—appears to overlie one of the postholes (Caulfield and Warren 2011, 59). Caulfield and Warren (*ibid.*) caution that it is not clear whether the three charcoal-rich spreads recorded within the enclosure ‘should be considered to be small open hearths or are deposits of burnt material from elsewhere’. As has been noted, natural fires may have been frequent in the vicinity in prehistory (Molloy and O’Connell 1995, 216).

If that spread had not been disturbed—the enclosure is ‘located on reasonably steep ground’ (Caulfield and Warren 2011, 52)—then Caulfield and Warren’s (*ibid.*, 59) assertion that that spread ‘must post date at least this posthole’ holds. Though it is not clear from which of the three charcoal spreads radiocarbon date SI-1464 (3550-2850 cal BC; see Chapter 3) was obtained, Caulfield and Warren assume that the spreads are contemporaneous (*ibid.*). A second radiocarbon date—3498-3352 cal BC (UBA-16676)—has recently been obtained ‘from a charcoal spread/hearth, probably from the same feature’ from which SI-1464 was obtained. While,

having been obtained from birch charcoal—rather than a bulk sample as was the case for SI-1464—this date provides greater precision, the temporal relationship between the various strands of evidence from the excavations remains a mystery.

Most of the finds ‘were alternately from a “debris layer over a large stone spread” or a “debris layer over a small stone spread”’ (Caulfield *et al.* 2009a, 8). It is thought that these descriptions refer to material overlying the horseshoe-shaped feature, though the authors caution ‘[t]his interpretation is however only offered as a very tentative solution to an unresolved issue’ (*ibid.*). The principal finds were seventy-six pieces of poorly fired coarseware (29 sherds of which have since been identified as Carinated Bowl pottery—Roche 2010), and six convex scrapers, ‘the majority’ of which were of chert (Caulfield *et al.* 2009a). Debitage and a small number of flakes of various rock types were also identified, along with a possible chert core, and the ‘possible mudstone adze’ referred to in Chapter 3.

In summary, within the soil overlying part of the Glenultra enclosure there are a small number of lithics and sherds of pottery that are probably Neolithic. At some time there may have been a horseshoe shaped structure with stone footings within the area encircled by the enclosure; at some time there may have been one or more stake-framed structures. Whether or not these were synchronous, or constructed before or after the surrounding stone enclosure, cannot be determined (Caulfield *et al.* 2009a, 17). There is ‘no stratigraphic evidence relating the enclosure and the internal evidence’ (Caulfield and Warren, 70). ‘The overwhelming impression is that the structural and artefactual data relates to more than one phase of activity’ (*ibid.*).

It is not clear whether the scrapers relate to activity associated with any conjectural structure, but if they do, and such structure was roofed, it 'raises the possibility that this is a prehistoric [perhaps Neolithic] house' (Caulfield *et al.* 2009a, 14). Any such house would, however, appear to have been light in structure. There seems to be a striking mismatch between the investment that has gone into constructing the field walls and the apparent (lack of) investment in anything that could be seen as a Neolithic dwelling.

Similarly, though '[n]o definite structure could be deduced from the site remains at the time', irregular 'stone footings and a posthole' defined a 'probable structure' identified during excavations at the nearby Céide Fields visitor centre (Byrne *et al.* 2009a, 23). Interpreted as a lightly built dwelling, two 'surprisingly late' radiocarbon dates suggest Bronze Age activity: UCD-0268 – 2200-1890 cal BC; UCD-0271 – 2460-2040 (*ibid.*, Caulfield *et al.* 2009a, 14). The possible horseshoe-shaped structure above a layer containing Middle Neolithic lithics at Belderrig is also insubstantial (Caulfield and Warren 2011, 70). Elsewhere, the closest parallels are thought to be the 'hut' sites at Ballyglass II, and (Bronze Age) structures at Lough Gur (Caulfield *et al.* 2009a, 14, 18).

On the basis that there *may* be some form of dwelling within the Glenulra enclosure, it is often speculated that other 'small stone foundations associated with the various field systems in North Mayo...may have been the foundations of small houses' (Byrne 2009b, 39; e.g. see Caulfield 1992, 11-12; Cooney 2000a, 28; 2003, 50; Caulfield *et al.* 2009a, 17; B. Lucas 2010, 2; Cooney *et al.* 2011, 615). However, as Byrne (2009b, 39) cautions, such features 'are not particularly well understood at present, nor are they convincingly dated'. In the context of Rathlackan, Byrne concedes that 'some of the buildings labelled as houses may not represent domestic structures' (*ibid.*, 6), nor indeed date from the Neolithic (e.g. *ibid.* 26, 38).

Despite the absence of evidence for permanent Neolithic settlement structures among the field systems of north Mayo, clearly there was a significant Neolithic presence in the area. The court tombs attest to this, as do some of the lithics and pottery sherds that have been turned-up during excavations. However, it may be telling that while human bone ‘in good condition’ was recovered from the Behy court tomb, no animal bone is recorded (Fibiger 2011, 45). Had Neolithic ‘beef production’ been practised on the scale alluded to by Caulfield (1983), the absence of artefacts or preserved fragments of prehistoric bone indicative of such practice from any of the north Mayo field systems seems surprising. While unburnt bone might not survive in the acidic peat, ‘calcined’ bone (bone burnt white) has been found in such conditions (Schulting *et al.* 2011, 36). Among the dated evidence for Bronze Age farming at Belderg Beg is bovid horn (Warren *et al.* 2011a, 139): UBA-16672—bovid horn artefact—1908-1691 cal BC; UBA-16673—bovid horn—804 - 594 cal BC (Caulfield *et al.* 2011b, 18).

The clearing of stone from fields is, however, normally associated with arable farming in preparation for ploughing (Fowler 1981, 18). Why clear the ground for cattle? Caulfield (1983, 200) acknowledges that ‘[t]he height of the walls indicates that they are functional barriers capable of retaining cattle but not of retaining/excluding sheep and deer’. Of course, the low walls could have been augmented by trees and shrubs (cf. Fleming 1987, 110). Equally, cattle could have been controlled with hobbles, as is well attested in the historical record (e.g. E.E. Evans 1942, 50; McCourt 1955, 371; Aidan O’Sullivan and Van de Noort 2007, 74). Perhaps the low walls meant that hobbles were still necessary, though no withies have been recovered from the bog.

Plough marks on what had been interpreted as the Neolithic ground surface at Belderg Beg were dated by Verrill and Tipping to the ‘Mid-or-

Late Bronze' Age (2010a, 1222-3). Similarly, (presumed Neolithic) plough marks, at the site of the Céide Fields visitor centre were dated to the 'Iron Age rather than Neolithic' (Molloy and O'Connell 1995, 215). Molloy and O'Connell (*ibid.*, 221) found this and evidence for later Bronze Age arable farming at Céide Fields 'unexpected', given that it was 'taking place under what, in terms of present day farming, must surely be regarded as marginal conditions'. However, they report that 'substantial Bronze Age arable farming' was indicated in 'comparable' conditions at Belderg and also Carrownaglogh (also in Co. Mayo) (*ibid.*; see also O'Connell 1986; 1990b; Waddell 2000, 268).

Verrill and Tipping (2010a, 1223) consider that the '[f]irm evidence of significant and persistent arable agriculture at Belderg Beg' during the Bronze Age is consistent with a regional context which 'suggests that settled mixed agriculture was characteristic of western Ireland'. The archaeological record is of course far from complete, but for now the Middle Bronze Age roundhouse at Belderg Beg is the earliest substantial structure among the field systems. The roundhouse has been temporally linked to a field wall by an arrangement of wooden stakes that mark out the line of a section of wall. Could it be that the later Bronze Age evidence at Belderg Beg, in keeping with the broader national and European evidence, provides the regional cultural context for the construction of the field systems on Céide Hill? This argument is picked-up in Section 5.5.



5.4.3 Permanent houses for the west of Ireland's first farmers?

In the view of the obvious differences in both scale and layout of these buildings, it would clearly be simplistic to assume a single or uniform function for Neolithic rectilinear in Britain or Ireland.

Ian Armit *et al.* (2003, 146)

Was there a 'boom' in rectangular house construction in the west of Ireland commencing in the 38th century BC? The short answer, on present evidence, is *no*. The extent to which the same can be said for the rest of the country will require further investigation. What is clear, is that in many respects, the west of Ireland appears to have been at the forefront of the changes that began to take place at the end of the fifth millennium BC. Ferriter's Cove, Magheraboy and the wider Carrowmore-Carrowkeel-Keashcorran landscapes eloquently attest to this. However, it was not until the Middle-to-late Bronze Age that the settled-mixed-farming landscapes of the popular imagination began to emerge (though their conflation with the modern rural west of Ireland is no less dubious for that).

In the absence of evidence for 'fixed plots', the dearth of evidence for bones from domesticated animals, and few reliably identified cereal grains, where does this leave the rectangular Neolithic 'farmstead'? The position taken here is that the date range for prehistoric buildings with straight walls cannot be constrained to a century, even a millennium, and each needs to be considered on its individual merits.

As has been discussed, few would argue that the Magheraboy structure is a house (despite having straight walls, a relatively large ground plan, and probably having had oak as a principal construction material). The

structure appears to relate to gatherings – possibly ceremonies or rituals – at the causewayed enclosure. This structure has not been tied to the ‘house horizon’, and may pre-date it.

Similarly, the Ballyglass I ‘house’ cannot be temporally disentangled from the monument (this time a court tomb) within which it is situated. Was it a wooden adjunct, later entombed by the cairn? Certainly there is no evidence to link the structure either to domesticity or to farming. Nearby, wooden ‘huts’ adjacent to another court tomb suggest temporary settlement/craft-working. Was the locality a ‘persistent place’ for communities that were not tied to a particular identity-defining house? Regardless, the structure has not been tied to the ‘house horizon’.

None of the evidence from the Drummenny Lower structure has been dated. Sherds of Carinated Bowl pottery and a small assemblage of lithics were recovered during excavations, however their relationship with the structure is uncertain. As the author of the published account puts it:

The occurrence of the paltry pottery and lithic assemblages at the Drummenny structure would tend to suggest that it had been in use for a short period of time, perhaps a season or longer, until its eventual destruction by fire (C. Dunne 2003, 170).

The presence of the Drumrat court tomb in the immediate vicinity may account for the visits to the area. Palaeoenvironmental research was carried out in the area, but in the absence of any dated samples the nature of the Neolithic environment remains uncertain. No animal bone was recovered from the site, and an undated ‘cache’ of poorly preserved grass seeds does not constitute evidence of Neolithic arable farming. Due to the absence of ‘features associated with domestic activity’ (for example, no hearths or refuse pits), and the incline of a metre across the short (*c.* 6m) axis of the structure, the author of the published account did not interpret the building as a dwelling.

The rectangular structure (with rounded corners) at Gortaroe was similarly built on sloping ground, this time along its long axis. The excavator suggests that the floor may have been 'stepped' to accommodate this, however substantial disturbance at the site meant that this could not be established with certainty. Finds were scarce: a single sherd of undiagnostic pottery and a small lithic assemblage were recovered during excavations, as was a glass bead—nothing in a secure, undisturbed context. A single grass seed recovered from the site was interpreted as barley, though this of course must be seen as (extremely) tentative. That said, there is a medieval corn drying kiln in the immediate vicinity, and the grain is undated. Two imprecise radiocarbon dates—one from alder in a foundation trench, the other from oak in a posthole, span much of the fourth millennium cal BC. The structure cannot therefore be reliably linked either to the 'house horizon', or agriculture. Its function is unknown.

The final structure from the west is at Cloghers in the far south of the study area. This is the structure that perhaps best accords with the idealised 'stout' building that shows signs of having been in place for more than a season. Though heavily truncated by later cultivation, this appears to have been a substantial, partially plank-built, structure with two internal divisions. Approximately 350 struck lithics, 125 sherds of Carinated Bowl pottery, and five polished stone axe fragments were found in association with the building. Two radiocarbon measurements from charred hazelnut shell—one from the basal fill of a posthole in a foundation trench, the other from a foundation trench, provide dates which overlap with the 'house horizon': 3710-3530 cal BC (Beta-134226) and 3770-3630 cal BC (Beta-134227).

Interpreting the function is far from straightforward, not least due to the presence of a substantial Bronze Age settlement in the immediate area,

with the closest Bronze Age house just 50m to the west, and three more within 200m. Post-holes defining two of these structures contained barley and wheat as well as other plant seeds. Large cereal grain caches, arable weeds and wild fruit seeds were recovered from associated pits. So while 500 barley grains were identified in a pit near to the Neolithic structure, the presence of Beaker pottery in the same pit, coupled with the fact that the assemblage comprises species not typically associated with the Neolithic, these (undated) remains cannot be seen evidence of Neolithic cultivation. Likewise, (undated) fragments of burnt animal bone—some from domesticates—recovered from a nearby burnt pit, cannot be seen as evidence of Neolithic pastoral farming.

If not a Neolithic farmhouse, then what? Though temporal resolution remains problematic, the rectangular structures at Magheraboy, Ballyglass and Drummenny Lower indicate that quite large enclosed spaces, though possibly temporary, were utilised during the Neolithic in areas where ceremonies and gatherings took place. There are other examples, such as at Shanballyedmond, where wooden (linear) features formed part of megalithic monuments, or as at Dooley's Cairn, Co. Antrim where a linear mortuary structure (which was burnt down) was incorporated into a later court tomb (A.E.P. Collins 1976). Could—as Cross (2003) and others have suggested—*some* of the rectangular structures currently referred to as houses, have instead fulfilled a primary role as a ceremonial or gathering place?

There are clear parallels with Neolithic studies in Scotland. Here, rectangular timber structures dated to the Early Neolithic were similarly cast as a 'Holy Grail', representing the *missing* evidence for sedentary mixed farming at the very start of the Neolithic (Brophy 2007, 84, with references; Bradley 2007, 42). The Scottish structures are larger than their Irish counterparts, but share some characteristics. Recent critical reviews

of the evidence from the Scottish buildings have brought about a change in the 'orthodox' interpretation (e.g. Barclay *et al.* 2002; Brophy 2007). Rather than being seen as part of a settlement hierarchy, the structures at Claish, Crathes (a.k.a. Warren Field) and Balbridie are now typically associated with social or ceremonial gatherings, and referred to as halls, *not* houses⁵ (e.g. Brophy 2007; Smyth 2006, 241; Thomas 2008; Whittle *et. al* 2011a).

In common with the Scottish 'halls', there is 'nothing inherently "domestic"' about Cloghers (see Brophy 2007, 84). The internal divisions aver against the notion of a feasting hall (certainly there is no reliable evidence for feasting on domesticated plants or animals), however the space would enable for different stages in a ceremony to process to be separated, perhaps privileging access to certain activities. Of course, the divisions in a court tomb may function similarly (e.g. Thomas 1990). Barclay *et al.* 2002, point to architectural similarities between wooden mortuary structures and the Scottish 'halls'. Likewise Smyth (2011, 14) observed:

Neolithic timber houses and court tombs do share certain similarities in terms of shape and the organisation of space, and it is not difficult to see how one may have replaced the other, constructing relationships in stone that had previously been articulated in wood.

A.E.P. Collins (1976, 3) suggested that Dooney's Cairn may have originally had a timber forecourt, similar to the 'crescentic facade of upright timber posts' identified at Lochhill cairn in Kirkcudbrightshire, southwest Scotland (see Masters 1973). It may be no coincidence that the east wall of the Cloghers structure (interpreted as incorporating the entrance) was not plank built, but marked by two substantial corner posts: could this end have been open or openable? Rather like the north wall of Ballyglass I (see Figure 5.1, above).

The timber mortuary structure at Lochhill, like that at Slewcairn (also in southwest Scotland) (Masters 1981), was burnt down (Barclay *et al.* 2002, 120). Both were prolific in pottery and lithics (Kinnes 1985, 36). The ceramic remains at Cloghers are thought to represent a minimum of 10 Carinated Bowls (Kiely 2003, 185), and a substantial lithic assemblage (350 pieces) was also recovered, despite the massive disturbance from deep-ploughing. Other examples of 'linear zone' (Kinnes 1975; 1985; 1992b) mortuary structures in Scotland are found at Dalladies, Aberdeenshire (Piggott 1972), as well as Eweford West and Pencraig Hill, both in East Lothian (MacGregor and McLellan 2008): all are Neolithic rectangular timber structures, and all appear to have been deliberately burnt down (see also e.g. Barclay *et al.* 2002, 120; Sheridan 2006; 2010, 98; A. Jones 2007, 112).

Kinnes (1992, 87) observed 'the resistance of some Irish scholars to acceptance of [non-megalithic] practices'. An example of this can be seen in the case which Ó Nualláin (1972, 56) makes in support of his interpretation of the Ballyglass I 'house':

Habitation refuse has been found under the excavated court-tombs at Ballymarlagh, Co. Antrim (Davies 1949) and Ballybriest ("Carnanbane"), Co. Derry ([E.E.] Evans 1939 [1940]) and in the latter case, pits, fires and post-holes were also present.

The excavators were more circumspect. Much of Davies' assessment of the pre-monument activity at Ballymarlagh focuses on evidence for on-site cremation, and he proposes that the 'scattered sherds and some of the charcoal could be derived from the pyre and the funeral ceremonies' (1949, 34). He does, however, go on to suggest that the activities of the builders or an earlier occupation may provide an alternative explanation (*ibid.*). Estyn Evans similarly concluded that the pre-cairn evidence at Ballybriest was *not* the result of 'normal habitation', again invoking cremation and other '[e]laborate rites' (1940, 12). What for Ó Nualláin

(1972, 56; see also Grogan 2002, 521) is clear evidence of 'domestic activity of some sort or another' need not form part of a settled-mixed-farming narrative.

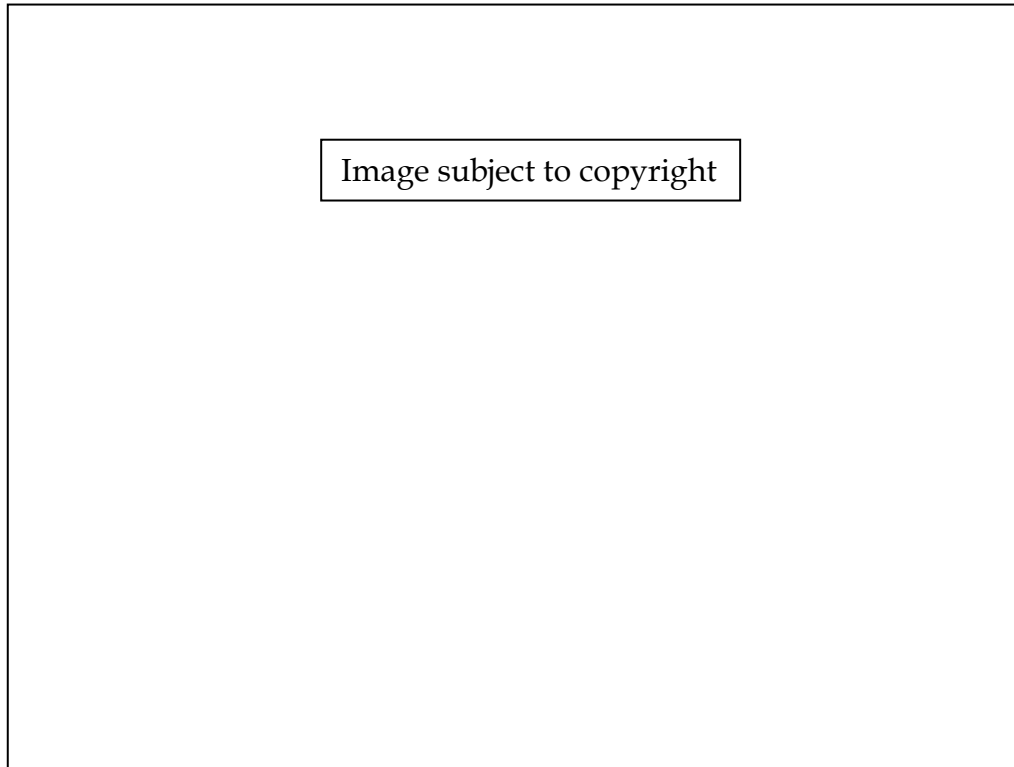


Figure 5.4: 'Reconstruction of the façade and other features at Eweford West.' After MacGregor and McLellan (2008, Figure 2.12).

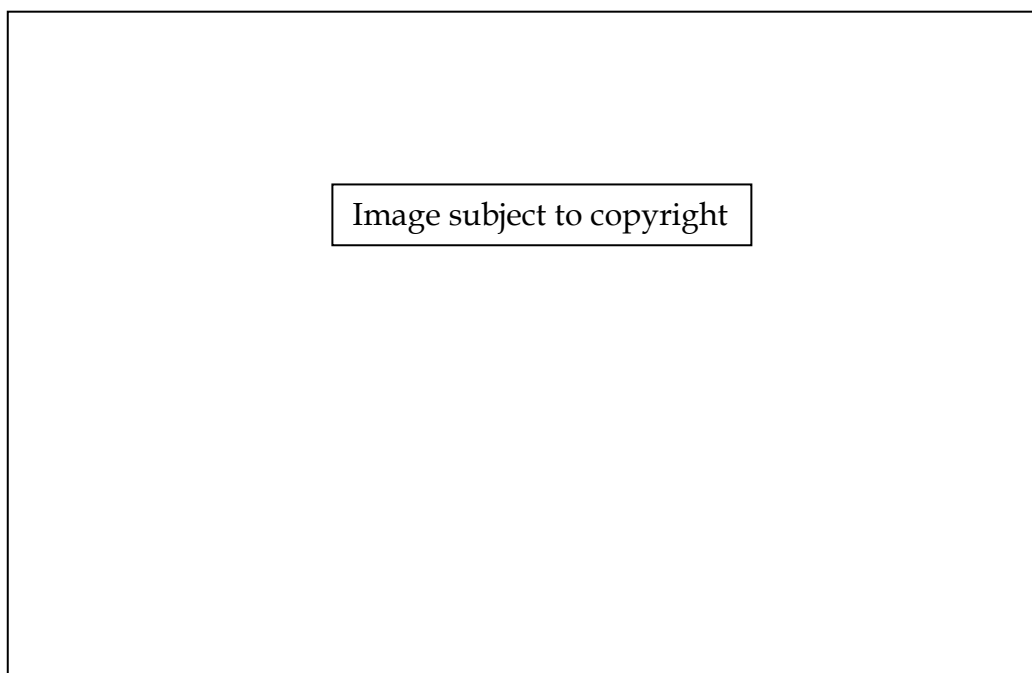


Figure 5.5: 'Reconstruction of Cloghers Neolithic house.' After Cooney et. al (1999, 13).

It nevertheless remains very difficult to imagine that in contemporary research, an arrangement of timber features such as that at Eweford West found in an Irish Neolithic context would be interpreted as anything other than an agricultural settlement. The contrasting interpretations of Cloghers and Eweford are interesting in this respect (see Figures 5.4 and 5.5, above): the 'possible fence line at Cloghers' recorded under 'traces of domestic activity' (Smyth 2006, 241), for example, is comparable to the 'timber screen' adjacent to the mortuary structure at Eweford (MacGregor and McLellan 2008, 25). Both are *c.* 10 m long, constructed of post and stakes in a trench, and appear to have been burnt down (*ibid.*; Kiely 2003, 185).

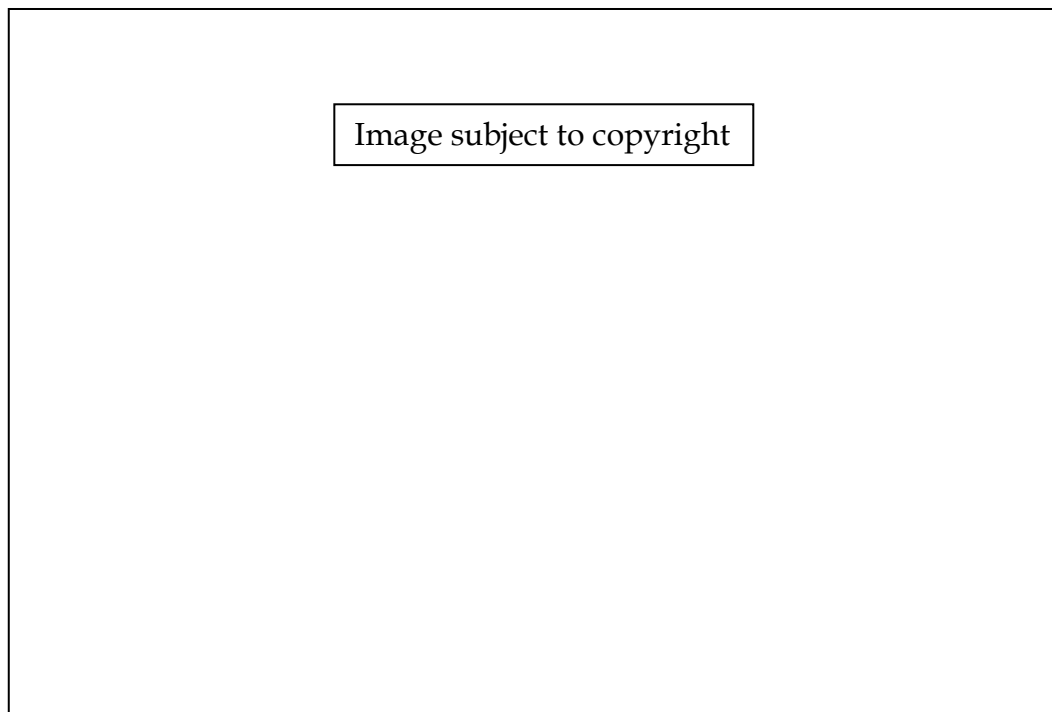


Figure 5.6: 'Groundplan of the long mortuary enclosure at Inchtuthil, Perthshire, Scotland, showing the position of burnt timbers'. After A. Jones (2007, Figure 11; adapted from Barclay and Maxwell (1991, Illustration 2).

Scottish Neolithic 'long mortuary enclosures', described by Barclay *et al.* (2002, 121-2) as 'rectilinear ditched enclosures, on a scale similar to a long barrow but with closed off ends and no trace of a mound' may, like linear zone structures have been 'used for the laying out (and possibly natural

excarnation) of the dead' (Brophy and Sheridan 2012, 47). In keeping with this interpretation, traces of bone, which would have been unburnt at this stage in the funerary process, are rare (Barclay *et al.* 2002, 122). At Inchtuthil, Perth and Kinross, the 'ditched enclosure' (cf. foundation trench) contained a 'timber fence' (cf. timber walls) which was 'burnt down and replaced' (*ibid.*; see Barclay and Maxwell 1991). Again, it is difficult to imagine anything other than a domestic function being assigned to such a structure, had it been excavated in Ireland (see Figure 5.6, above).

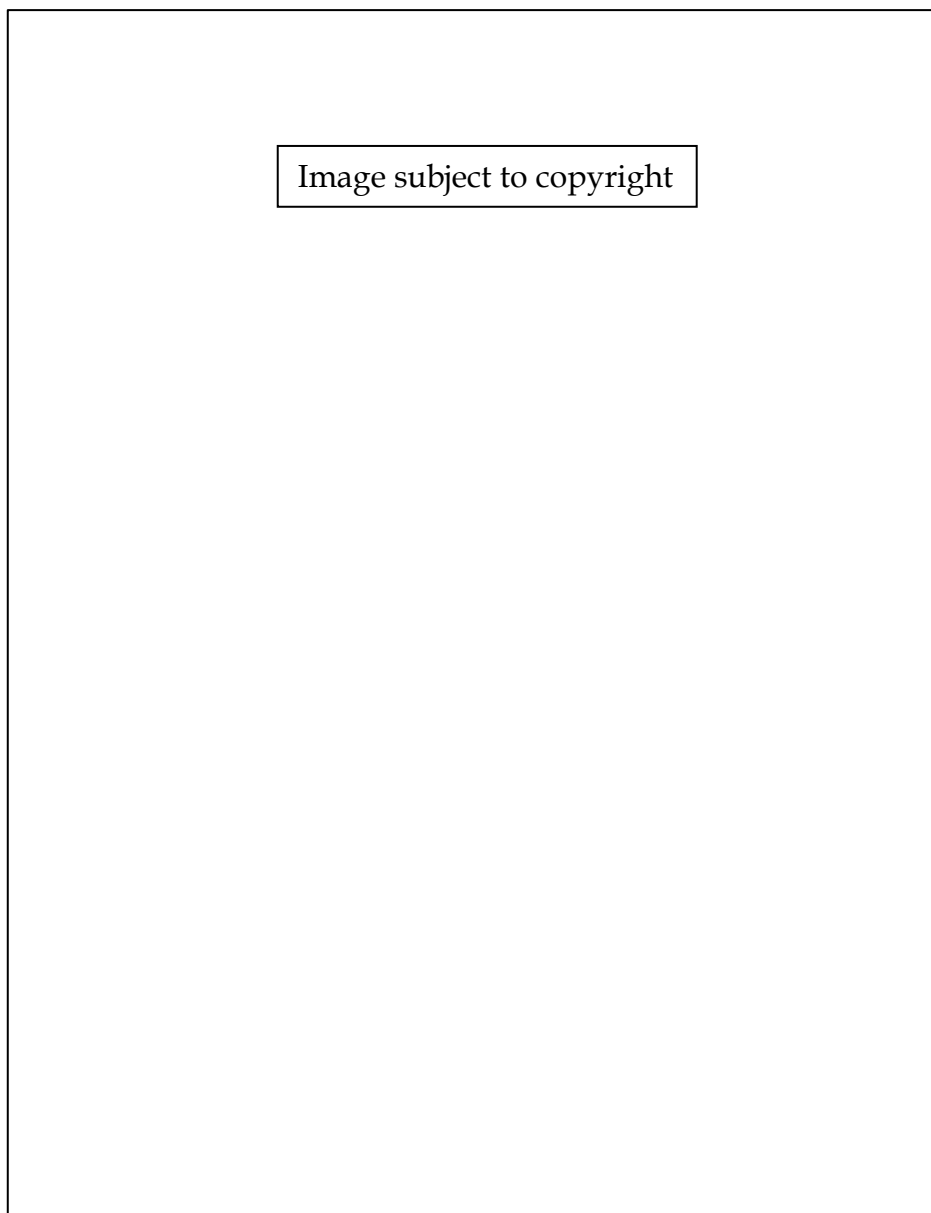


Figure 5.7: Photograph of Cloghers during excavation, showing the extent of truncation caused by ploughing. After Cooney *et. al* (1999, 14).

As Figure 5.7 (above) illustrates, it is not preservation conditions that enable Irish Neolithic rectangular timber structures to be so precisely (narrowly?) defined. The stratigraphy of the sites is invariably poorly understood, which can be contrasted with the very well recorded stratigraphies at some of the Scottish sites. Nevertheless, the interpretive straightjacket that sees all Irish Neolithic rectangular structures classified as houses is sufficiently forgiving that any signs of non-domestic activity can be readily accommodated within the genre. Working from the truism that there can be no clean separation between ritual activities on the one hand, and domestic on the other, any signs that particular structures were the focus of gatherings, ceremonies or otherwise non-domestic activities can be assimilated into the 'rectangular house' architectural family (e.g. Grogan 2002, 521).

The unusually large structure at Cloghers, with its rich material assemblage including apparent evidence for 'deliberate deposition' (e.g. Smyth 2006, 242-4; 2011, 28-30; 2013a, 308; 2014, 57), might be seen as an example of this interpretive shoehorning. This is not to argue that ritual and domestic architecture were invariably separated, however the continuing apparent reluctance to consider that timber structures could have an exclusively non-domestic function, when it is *certain* that some megalithic monuments in Ireland had timber components/precursors, seems dogmatic.



5.4.3.a A 'house horizon' in Neolithic Ireland?

...the arguments that have been advanced to play down the role of cereal cultivation and the domestic nature of [rectangular timber] house structures have already been thoroughly critiqued by others...

Alison Sheridan (2010, 90)

For Whitehouse *et al.* (in press), the evidence for a tightly defined 'house horizon'—beginning *c.* 3720 cal BC, and lasting up to a century—is 'irrefutable' (p. 7). The position taken here is that the measurement of the 'horizon' is overwhelmingly based on the circumstantial association of unreliably identified 'cereal-type' grass seeds.

Rather than being cultivated grasses, the seeds in fact largely represent the increase in wild meadows and clearings that followed the Elm Decline. The presence of these seeds at Neolithic levels in the stratigraphy will be present anywhere that preservation conditions permit (regardless of whether there was human activity at any time during the Neolithic). The linking of these seeds to structural remains has been made possible by the invariably poor stratigraphic discrimination at excavated sites.

As the examples from the west of Ireland demonstrate, among the 'houses' that Whitehouse *et al.* (like McSparron 2008 and Cooney *et al.* 2011 before them) assign to the 'horizon' are many structures that on the balance of probabilities are highly unlikely to have functioned as dwellings. The invariable absence of discernible occupation layers supports this interpretation: in many cases, there was no occupation; in others occupation was temporary. Rather than 'defining themselves' through their 'monumental' houses (Smyth 2011, 3, 28) and 'signing the land' (Cooney *et al.* 2011, 625) with their field boundaries, it was funerary monuments and structures related to ceremonies and gatherings that

‘created a social landscape, and provided links of continuity between past and present generations and their land’ (Thomas 1998, 64). These are the enduring timber structures buildings that, like the megalithic monuments that in some cases succeeded or coexisted with them, ‘can be viewed as expressions of the human endeavour to create stability and permanence’ (Adam 2006, 120), providing ‘reference points in a landscape of movement’ (Bergh 2002, 139). These were the structures that were structures of ‘temporal extension’, transcending the finitude of human life (Adam 1990, 135).

Among the ‘flimsier’ rectangular timber structures in particular, there are buildings that may well have functioned as dwellings. The position taken here is that their straight walls are unremarkable, and cannot be assumed to differentiate Early Neolithic dwellings from either later Mesolithic or later Neolithic settlement structures. Most of the ‘Neolithic’ rectangular buildings in Ireland (particularly the light, badly degraded examples) are unreliably dated, and are conflated with non-domestic rectangular structures. The only confirmed Mesolithic (circular) dwellings in Ireland pre-date the Neolithic by *circa* four millennia. While the form of most Mesolithic dwellings in Ireland is unknown, light rectangular buildings have been recorded in Britain. Similarly, relatively little is known about middle and later Neolithic dwellings in Ireland, hence Smyth reports ‘the waning house’, whence ‘structural evidence appears slight’ (2011, 14). Prehistoric circular structures of house-like proportions do not attract the attention (or funding for radiocarbon dates) that their ‘iconic’ straight-edged counterparts enjoy.

Smyth (2006, 244) has rightly pointed out that ‘it should be clear that the function of these [rectangular] houses is something that needs to be explored on a site-by-site basis’ (cf. Armit *et al.* 2003, 146). The only problem with this is the implicit underlying assumption that the

structures *are* 'houses'. It is through the continuing (invariable) use of this label that expectations and perceptions are formed (cf. Kinnes 1985, 26). This clearly influences excavation practice. Unqualified references to '80 houses in Ireland' now appear in the general literature (see Cummings and Harris 2011, 363). Confirmation practice drawing on circular references between archaeological literature and palaeoenvironmental data has helped place this assumption on a 'scientific' footing.

An evidentially sustainable interpretation of settlement practice during the Neolithic must acknowledge Thomas's (1996, 1) observation that 'farmyards' remain 'entirely absent' from the archaeological record for Neolithic Ireland. In the few instances where animal bones have been found in close association with rectangular structures, none have been dated to the Neolithic. No rectangular timber structure can be temporally linked with a field system (or even a field). The strongest case for a securely identified assemblage of cereal grain that has been dated to the Neolithic comes from 'House 1' at Tankardstown South, but even here the evidence is not conclusive. Several hundred cereal-type grains/grain fragments were recorded, mostly in the fill of a large post-pit. Post-Neolithic cut features are among those spatially associated with the 'house', including a presumed historic pit containing oat grain. The presumed Neolithic cereal deposit was not homogeneous. Only two grains from within it were radiocarbon dated, and their precise location within the deposit was not recorded.

If it is accepted that the Tankardstown 'House 1' structure does contain a large cache of Neolithic cereal grains, this makes it the exception – not the rule. There is an acknowledged overreliance on Tankardstown 'House 1' to provide an interpretive framework for prehistoric rectangular timber structures in Ireland (McClatchie *et al.* 2009, 4; Whitehouse *et al.* in press, 3; e.g. see Cross 2003; Smyth 2006). The structure is among the few in

Ireland (which may also include Cloghers) where the material remains can be meaningfully compared to those of the Scottish ‘halls’ (Brophy 2007, 89). Though physically smaller than the Scottish structures, not all activities associated with the building need have taken place inside. The nature of its construction, and the range of artefacts and ecofacts – which include a suggested votive deposit bone in a trench at the entrance (Smyth 2011, 10; 2006, 242) – are disproportionate to its suggested function as a family dwelling (Brophy 2007, 89; Cross 2003, 200).

Considerably less has been published regarding Tankardstown ‘House 2’, c. 20m to the north-west of ‘House 1’ (Gowen and Tarbett 1988; 1990), but the sites appear to have been broadly contemporary based on radiocarbon dates and the presence of Carinated Bowl pottery (see also Cooney *et al.* 2011, Table 12.3; Whitehouse *et al.* press). At c. 15m x 7.50m, ‘House 2’ is by far the larger structure. Interestingly, its tripartite divisions and one apparently (at least partially) open end defined by ‘two stout corner posts’ bear striking resemblance to the structure at Ballyglass 1 (see Figure 5.8). Likewise, the (albeit heavily truncated) structure at Cloghers. There are other larger rectangular timber structures that may have had open or semi-open ends. The artefact-rich site of Ballygalley 1, Co. Antrim, among them, where the curving end walls may have functioned similarly to the court area of a court tomb, creating an area of restricted access between the outside world and inner chambers.

The Tankardstown ‘houses’ are some distance from the sea, which may call into question their interpretation as among the settlements of farmers of a ‘colonising group possibly making landfall a number of times in different locations around the coast’ (McSparron 2008, 19). In any case, movement around Ireland by water was hardly the prerogative of the putative colonisers. The dates from the sites, however, suggest they are broadly contemporary with the phenomenon of causewayed enclosures in

southern Britain. A corresponding function relating to the gatherings and/or ceremonies of dispersed communities thus fits well with the evidence (e.g. Cross 2003; Cooney *et al.* 2011; Whittle *et al.* 2011b, 906). The presence of the rectangular timber structure within the causewayed enclosure at Magheraboy lends some support to this interpretation.

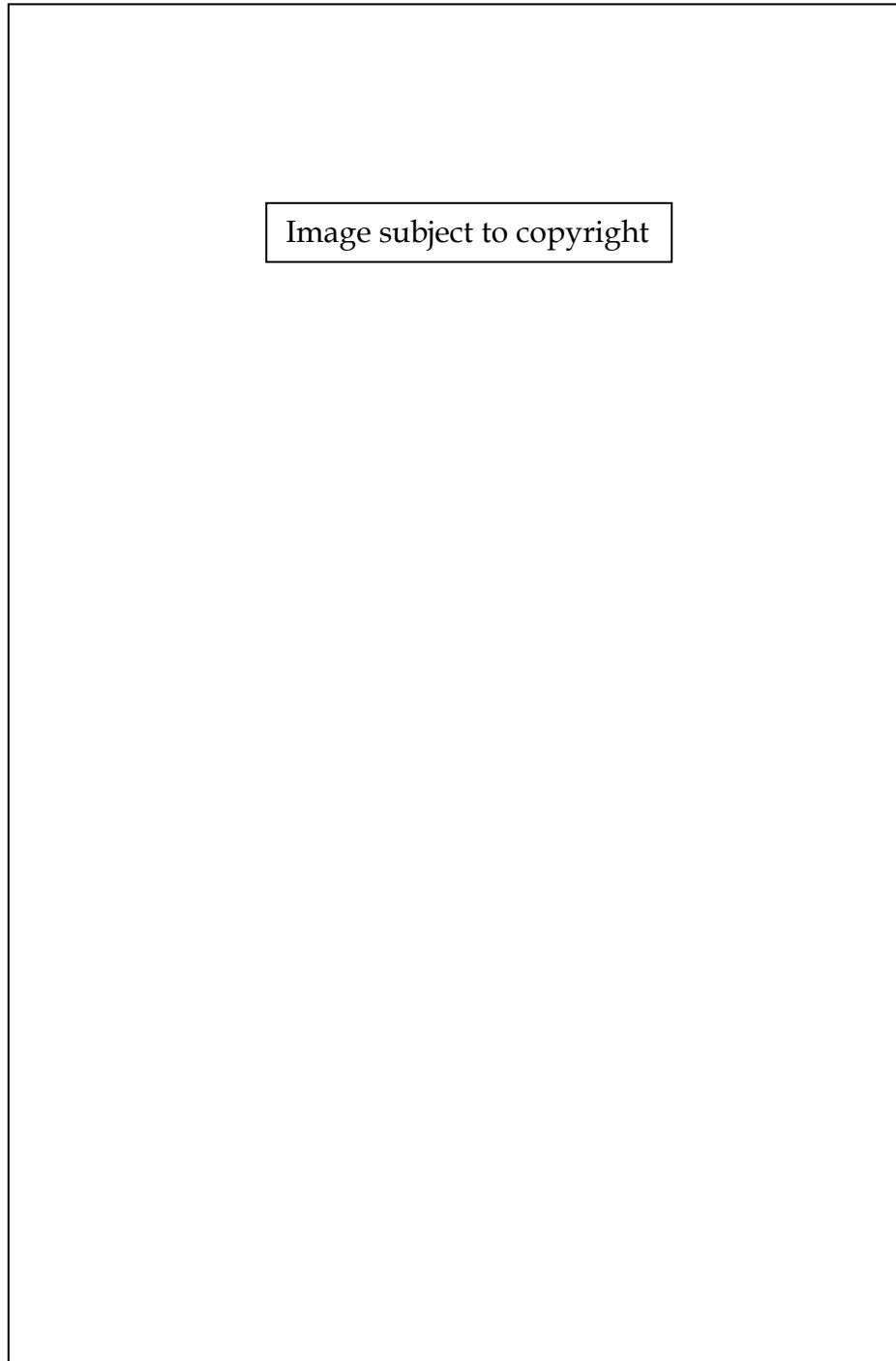


Figure 5.8: Ground plans of Tankardstown 2, Ballyglass 1 and Cloghers. Based on Grogan 1996 (Figure 4.2) and Smyth 2011 (Figure 1). The Tankardstown 2 structure is truncated by Bronze Age earthworks.

Such an interpretation, however, fits less well with the evidence from Lough Gur, 12 km to the north-west of Tankardstown, where evidence of earlier Neolithic activity is not accompanied by substantial contemporaneous structural remains. Other such apparently Early Neolithic sites with little or nothing in the way of structural evidence are known (Cooney *et al.* 2011, 601). Lighter straight-sided rectangular structures in the wider vicinity of Tankardstown, seen as broadly contemporary, are recorded at Pepperhill, Co. Cork (Gowen 1988, 44-51; Grogan 2002, 522), and further south at Barnagore, also in County Cork (Danaher 2009; Smyth 2013a, 308).

Similarly, in Scotland, Bishop *et al.* observe that ephemeral structures and pit sites linked to Neolithic occupation have been found in close proximity to apparently contemporaneous 'halls'. While the 'halls' are notable for their large cereal assemblages, the ephemeral sites 'were dominated by wild species' (2009, 83-4)⁶. The evidence from Tankardstown, in common with the Scottish 'halls', is suggestive of 'a more significant and central role in early Neolithic society' (Brophy 2007, 89), akin to that of a gathering and/or ceremonial site.

The study of rectangular timber structures in Scotland has developed along different lines to that in Ireland. There are some valuable insights, both methodological and theoretical, that could benefit similar research in Ireland tremendously. The key methodological insights pertain to the importance of dating multiple stratified samples from secure contexts (e.g. Ashmore 2004, 126; Bayliss *et al.* 2011b, 831), and the need for caution in the identification of cultivated grass seeds and pollen (Macklin *et al.* 2000). From a theoretical perspective, critical engagement with the *diversity* of the evidence, rather than being constrained by narrow received wisdoms, is seen as the vital step forward (cf. S. Jones and C. Richards 2000). The

following draft chronology sets current understanding of the development of the Neolithic in the west of Ireland within a temporal framework.



5.5 Outline chronological framework for the development of the Neolithic in western Ireland.

The past is a cultural construction, no different from heaven. As an ideal our conception of the past came into being at a certain time and place for certain reasons. This is not to say that the past is a fiction, but it is to say that whenever we look back and describe the view as 'history' or 'prehistory', such a view has to be understood as our creation or, minimally, as our selection and interpretation of the range of all those things that actually happened.

Mark P. Leone (1978, 30)

As discussed in Chapters 1 and 2, chronologies provide a necessary framework within which the events of the past can be given order and meaning. What follows, in accordance with Aim 3 of the present study, is an attempt to situate the findings in the context of the development of the Neolithic in western Ireland.

The chronology draws upon those proposed in a number of other recent studies which are referenced below, with the hope of making a contribution to a vibrant area of contemporary archaeological research. It is beyond the scope (and means) of the present study to conduct an exhaustive source-critical review of all the evidential components of the developing Neolithic in Ireland. Instead, 'consensus' positions from recently published research are sought for classes of evidence not covered by this thesis. Gaps identified in the evidence, as well as any contentious interpretations of the available evidence, will hopefully act as a stimulus for future research.



5.5.1 Final Mesolithic: c. 4300–3800 cal BC

The evidence suggests an intensification of human activity in Ireland in the final centuries of the fifth millennium cal BC. Most excavated Mesolithic sites in Ireland are concentrated in the Final Mesolithic (e.g. Costa *et al.* 2005, 21; Warren 2009a, 146; Fredengren 2010, 241), and much of the Late Mesolithic lithic assemblage comes from Final Mesolithic contexts (e.g. Woodman and Andersen 1990, 377). As has been discussed, taphonomy and research biases may in part account for this temporal clustering, however it is notable that the final centuries of the fifth millennium BC provide the earliest reliably dated evidence (from Ferriter's Cove) for interaction between culturally Mesolithic people in Ireland and culturally Neolithic people from overseas. This period appears to mark the onset of a lengthy 'availability phase' (e.g. Zvelebil and Lille 2000; Zvelebil 2004), during which experimentation with aspects of Neolithic culture begins in Ireland.

In contrast to Sheridan's characterisation of a failed colonisation by migrant Breton farmers, it is here proposed that the evidence from Ferriter's Cove reflects an intensification of maritime contacts between the hunter-*fisher*-gatherers of Final Mesolithic Ireland and neighbouring areas of Atlantic Europe (see Section 5.3). There is no reliable evidence for significant population movement during this period, nor a step-change to a new national or regionally defined way of life. Rather, as Robb (2013, 666) observes in the context of northern Germany and southern Scandinavia, discrete farming-dependent identities on the one hand, and hunter-*fisher*-gatherer identities on the other, remain stable in the long-term, despite increasing contact and the sharing of ideas and material culture.

Within Ireland during this period, different external cultural influences reach different cultural groups at different times, and are received and experimented with varying enthusiasm and success, according to local conditions. It may be many centuries after the first joints of beef are consumed by maritime communities in the west, that cattle meat became available to communities in the east. Kilgreany Cave in the south-east—4240-3790 cal BC, as calibrated in Cooney *et al.* (2011, Table 12.9; OxA4269)—currently provides the next earliest date for cattle bone in Ireland. Further up the east coast, the sheep bone at Dalkey Island—4040-3640 cal BC, as calibrated in Cooney *et al.* (2011, Table 12.9; OxA4566)—may provide further evidence of contact between coastal hunter-fisher-gather communities in Final Mesolithic Ireland, and overseas coastal groups that possess domesticated animals.

At both Dalkey Island and Ferriter's Cove, the bones of domesticates were found in the context of shell middens. It is frequently argued that shell middens are indicative of an increasing attachment to place among later Mesolithic societies, with repeated visits and social gatherings leading to the sedimentation of located memories and traditions spanning generations, sometimes centuries. The presence of small quantities of Final Mesolithic human bone at Ferriter's Cove (Woodman *et al.* 1999, Table 8.1: OxA-4918, 4520-4260 cal BC⁷) and Rockmarshall, Co. Louth (*ibid.*, OxA-4604, 4715-4370 cal BC⁸), may support the hypothesis that in some senses shell middens acted as precursors to megalithic monuments (e.g. Bradley and Chapmen 1984, 350). Though Irish Mesolithic middens lack any obvious architectural intentions (Milner and Woodman 2007, 10), Whittle *et al.* (2007, 140) have argued that mounds of midden material may have influenced the morphology of certain Neolithic monuments. Low, long, cairns of the kind associated with some Irish court tombs and portal tombs may be an example of such a transference. Interestingly, there is a

dual court tomb overlooking the middens at Rockmarshall (Ronayne 1984, 179, 182, Appendix 2).

Recent Bayesian modelling of 47 radiocarbon determinations from twelve Irish court tombs estimates that megalithic construction fell within the range 3700-3570 cal BC (Schulting *et al.* 2011). Of the 15 oldest dates in the sample, all but one came from charcoal. The old wood effect may well be a factor, however residual activity from pre-megalithic timber mortuary structures has long been in evidence at several of the dated sites (*ibid.*, 25-6; see also e.g. *ibid.* 2014, 111; ApSimon 1997; Sheridan 2006; Section 5.4.3, above). Some such activity is likely to date from the Final Mesolithic.

Whittle *et al.* (2011c, e.g. 852) conclude that, on present evidence, the Magheraboy causewayed enclosure was constructed in the 40th or 39th century cal BC. Among the suite of radiocarbon dates which confirm the monument's antiquity is GrA-319161–3965-3810 cal BC (Cooney *et al.* 2011, Table 12.2)–from an oak plank (Danaher 2007, Table 12.1). There is a possibility that the material in the ditch in which the plank was found was residual, and that the plank itself was re-used (Cooney *et al.* 2011), in which case it might provide evidence for construction using oak timbers among culturally Mesolithic people in the area.

Alternatively, as has been taken to be the case, the palisade and rectangular timber structure may be contemporaneous with the plank, though no dates from a suitable context are available to provide confirmation (Cooney *et al.* 2011, 584). It suggests that light straight-sided structures were part of the architectural repertoire of people in this part of the west of Ireland at a time which might elsewhere be taken as Mesolithic. Given its light construction, and the possible absence of a roof, the rectangular timber structure may have served a purpose other than as a dwelling. It remains the case that no example of domestic architecture—

whether with circular *or* straight walls—has been reliably dated to any time during the preceding three millennia in Ireland. Light straight-sided structure may have been in use along with light circular structures during this period.

The hypothesis that construction of simple passage tombs at Carrowmore, a short distance from Magheraboy, began during the fifth millennium BC (e.g. Burenhult 1984) has not withstood sustained critique (e.g. see Bergh and Hensey 2013). Nevertheless, while the most intensive period of use of the monuments is dated to *c.* 3600-3200 cal BC (*ibid.*, 359), a series of charcoal dates from various monuments within the complex in the later fifth and early fourth millennium cal BC (see Cooney *et al.* 2011, Table 12.12) remain to be explained. Allowing for natural fires and the implications of old wood, Bergh and Hensey (*ibid.*, 358) propose that it is ‘highly possible that the elevated ground at the centre of the Cúil Irra peninsula could have been a focus of activity well before the first megalithic monuments were erected’; they also note apparent pre-monument activity at Knowth.

Elsewhere, *Pinus sylvestris* charcoal in the context of cremation deposits in a passage tomb on the summit of Croaghaun in the Ox Mountains, Co. Sligo—intervisible with both the Carrowmore megalithic complex and Magheraboy causewayed enclosure—returned sixth and fifth millennium cal BC radiocarbon dates (Bergh 1995, 105). Ua-713 (5740-5470 cal BC) came from a cremation deposit partly underlying chamber orthostats; St-10453 (4120-4340 cal BC) came from a charcoal spread with cremated bones in the outer part of the chamber (*ibid.*; see Cooney *et al.* 2011, Table 12.12). Cooney *et al.* (2011, 651, 667) speculate that re-used bog pine may explain the early dates; the introduction of earlier cremations into the context of a new auspicious structure is a further possibility. Calcined human bone from the passage tomb at Baltinglass, Co. Wicklow—e.g.

cranial fragment UBA-14759, 3946-3714 (Whitehouse *et al.* in press, Supplementary Data)—suggests either an early date for the megalithic monument or the introduction of curated material (see Schulting 2014, 111).

The Final Mesolithic in Ireland appears to have been pre-pottery, however this does not exclude the possibility of small-scale importation and experimentation. Likewise, there are no reliably dated cereal-type seeds in evidence during this period (see Whitehouse *et al.* in press, 8). Polished shale and mudstone axes were, however, a feature of Final Mesolithic Ireland (e.g. Woodman 1994, 216; 2003, 2; Bradley 1998, 43; Cooney 2000b, 56; Waddell 2010, 11), with mudstone axes at Newferry, and a cache of five shale axes at Ferriter's cove (Woodman *et al.* 1999), among prominent examples. An axehead of Antrim porcellanite was recovered in close association with the dated oak plank (GrA-319161 – 3965-3810 cal BC – see above) at Magheraboy (Cooney *et al.* 2011, 665).

The presence of components of the traditional Neolithic 'package' in parts of the west of Ireland during the Final Mesolithic need not be seen as evidence for 'pioneer' Neolithic communities. Only if there is an expectation that migrants introduced a consolidated Neolithic package 'all at once' are the data concerning the introduction of Neolithic things and practices in Ireland 'contradictory' (see Bayliss *et al.* 2011b, 837-47; cf. e.g. Thomas 2013, 157; Finlay 2003, 93; Robb 2013, 659). As additional sequences of radiocarbon dates are modelled, the indications 'that different elements of what we identify as the "Neolithic" did not necessarily appear simultaneously in Ireland' remain (Schulting 2014, 112).

In the absence of evidence for a 'single transregional mechanism' (Robb 2013, 660) of Neolithisation in Ireland, the caching of axes at Ferriter's Cove, possible investment in boats suitable for deep-sea fishing (see

Section 5.3.1), and repeated visits that led to the accumulation of the midden, may point to developing patterns of delayed-return strategies among Final Mesolithic hunter-fisher-gathers in western Ireland (cf. Thomas 2013, 423). The piecemeal introduction of exotic meats and other novelties acquired from overseas contacts, perhaps first at seasonal gatherings at persistent places such as shell middens, may have taken many centuries to develop into local economies in which the herding of domesticated animals played a major part (*ibid.*, 227, 429; Cross 2001; Robb 2013, 660). Certainly, Final Mesolithic sites on the west coast should remain a priority for research into the Mesolithic-Neolithic transition in Ireland.



5.5.2 The Early Neolithic: c. 3850–3600 cal BC

The evidence suggests that the decades around 3800 cal BC represent the beginnings of a *Zvebilian* substitution phase for some communities in Ireland, though for other groups the availability phase may not yet have begun. The first megalithic monuments appear in the landscape at the beginning of this period, including one of the few dated portal tombs in Ireland. The recently published monograph from the most comprehensively excavated portal tomb—Poul nabrone in the Burren, Co. Clare—models primary use of the monument in the range 3885–3720 cal BC [Model 3] or 3825–3710 cal BC [Model 4], based on 32 AMS ¹⁴C dates (Schulting 2014). Along with the evidence from Magheraboy, this places the west of Ireland in the vanguard of Neolithic monument construction (A. Lynch 2014, 194).

As has been discussed, ‘a contemporary or even earlier non-megalithic burial tradition in Ireland’ (Schulting 2014, 111), possibly incorporating linear timber structures (see Section 5.4.3), may have accompanied Poul nabrone in the ‘funerary landscape’. Some linear timber structures which are included in the count of rectangular Neolithic ‘houses’ may in fact have had funerary or ceremonial purposes, and among these may be early examples. The Magheraboy structure presents a strong case among the Neolithic rectangular timber structures in the west, and the new dates for the timber structure at Ballyglass I may argue likewise. Other examples of court tombs with apparent precursor timber structures have been discussed in Section 5.4.3.

An early date from calcined human bone in a court tomb in the northwest at Tully, Co Fermanagh – UBA-13546, 3961-3718 cal BC – could indicate an example of an early court tomb, contemporary with Poul nabrone (Schulting *et al.* 2011, 26-7). Developed passage tombs have generally been seen as later than portal tombs and court tombs in recent appraisals (e.g. Cooney *et al.* 2011, 657-68), however simple early examples may have been constructed at the beginning of the Early Neolithic (Schulting 2014, 111).

At over 200, there are almost as many unclassified megalithic monuments as passage tombs in Ireland – equivalent to roughly half the number of court tombs, and slightly higher than the number of confirmed portal tombs (Waddell 2010, 63). The date range for these monuments has not been estimated. As observed by Bayliss and M. O’Sullivan (2013, 62), the practical absence of high precision dating sequences makes for a ‘depressing’ constraint on the discussion of the early use of stone monuments.

Nevertheless, there is a marked increase in evidence for Neolithic structures during the 38th century cal BC, with significant regional

grouping established over the following centuries. Megalithic monuments were not, however, ubiquitous throughout the country (e.g. see distribution maps in Waddell 2010, Chapter 3), which may speak of the varied tempo and character of the developing Neolithic. Causewayed enclosures remain a rare feature throughout the Irish Neolithic, with just one other example besides Magheraboy recorded at Donegore Hill, Co. Antrim (Mallory *et al.* 2011). However, the emerging reliance on domesticated foods will have facilitated gatherings of the kind causewayed enclosures are often thought to have accommodated (cf. Robb 2013, 664). Among the plank-built timber structures constructed in Early Neolithic Ireland may have been communal timber structures, designed to be returned to at certain times of the year for gatherings (see Section 5.4.3). Domestic structures during this period, on the other hand, were light in character, in keeping with the continuing preference for seasonal mobility. The relative straightness of the walls was of no great significance.

While the position taken here is that the development of the Neolithic was more extended in time and regionally varied than, for example, Models 2 and 3 in Cooney *et al.* (2011, 657-68) suggest, the adoption of Neolithic practices in Ireland nevertheless has a 'cumulative directionality' (Robb 2013, 660) that sees expansion and consolidation in this period. The availability of herding animals, in particular cattle, is seen to underlie the changes in material expression which began at the start of the Early Neolithic. As Thomas (2013, 429) observes, 'it is quite unlikely that any Mesolithic society could accumulate domesticated resources without having experienced a profound social transformation'. The continuous, dominant relationships humans have with domesticated animals are profoundly different to episodic encounters with wily prey.

Animal bone 'is generally not the material of choice in dating programmes' (Schulting 2014, 112), and the problems of survival in acid

soils have been discussed. However, a further reason for the absence of significant concentrations of animal bones in the Neolithic may be that domesticated animals were not confined to field systems, but instead controlled in herds, with pastures integrated into networks of movement. Hunting remained a source of food, and red deer may have been introduced into the landscape by the end of this period, to which the use of antler pins as grave goods may attest (e.g. see Bergh and Hensey 2103). Permanent field systems—much less formal coaxial systems—did not feature in the landscapes of Early Neolithic Ireland (see Section 5.4.2).

Understanding the role of cereals during this period is compromised by the paucity of securely identified specimens (a consequence of badly degraded assemblages, typically in low single figures), poorly understood provenance, and the total absence of stratified dating sequences. It is, however, reasonable to assume that small stands of domesticated grasses were maintained at certain frequented locations by some groups. These would have complimented the harvesting of wild grasses and reeds. Various forms of Bowl pottery come into widespread use during this period (Bayliss *et al.* 2011b, 808), and Antrim porcellanite is established among materials for polished stone axes which are traded over long distances.

What brought about this increase in the tempo of change in the early centuries of fourth millennium cal BC Ireland? Leaving aside the invasion hypothesis, the dynamics of indigenous Final Mesolithic communities are seen to hold many of the answers, and remain a pressing priority for future research. From the local information that is available for this period, the prevailing environmental conditions cannot be ignored. The Elm Decline continues to be seen to correlate strongly with the earliest Neolithic evidence in Ireland (e.g. Whitehouse *et al.* 2011), and will have increased the tracts of non-forested landscape. This could only have made

movement with herding animals easier, as well as increasing stands of wild grasses and making space for domestic stands. As such, the Elm decline appears to have facilitated the expansion of Neolithic practices, building the momentum for change.

The important differences between the present assessment of the Early Neolithic, and that in Cooney *et al.* (2011, 657-68), are that the 'Neolithic package' is seen here as a menu of components which were adopted at different times (over a period of centuries, not decades) according to local conditions. The present analysis indicates that Early Neolithic Ireland was not an island of settled-mixed farmers. There were no permanent field systems, and communities were seasonally mobile, their dwellings typically light. Not all rectangular timber structures were dwellings—some of the earlier examples may have been linked to funerary practices and gatherings. While there is a definite decrease in radiocarbon-dated material towards the middle of the fourth century BC, this is in part a function of the inherent bias towards construction/early contexts in the dating of many structures, and the absence of stratified sequences of later dates.



5.5.2.a The Middle Neolithic: c. 3600–3100 cal BC?

As Cooney (2000a, 15) observes '[t]he evidence from occupation sites indicates some degree of continuity from the Early Neolithic (cf. Cooney *et al.* 2011, 633), though 'it remains very hard to follow [the] subsequent developments in any detail (Whittle *et al.* 2011c, 905). Clearly ideas spread, along with innovations in material culture. But was there a decisive transition which was sufficiently widespread and meaningful in

people's lived experience to mark the end of the beginning of the Neolithic in Ireland (cf. Cooney *et al.* 2011, 633)?

Cooney (2000a, 11), following the pottery sequence devised by Sheridan (1995), identifies 3600 BC as the start of the Middle Neolithic in Ireland (Sheridan proposed 3650 cal BC). In seeking to define a *terminus ante quem* for the end of the Early Neolithic in Ireland, Cooney *et al.* 2011 (562, 585, 633-57) model dates from Linkardstown-type burials and passage tombs, which they see as representative of a discrete Middle Neolithic architectural tradition.

Linkardstown burials are a minor regional class of megalithic monument, concentrated in the south and east of the country (see Lynch 2014, Figure 9.8), of which there are around a dozen known examples. Cooney *et al.* (2011, 634-7) model the date range for Linkardstown burials as beginning in 3835-3500 cal BC (90% probability), probably 3710-3560 cal BC (68% probability), ending 3425-3015 cal BC (95% probability), probably 3355-3180 cal BC (68% probability). However they caution:

These estimates are relatively imprecise because of the limited number of burials dated. Greater precision would require either site specific dating of series of related samples (if available in archive) or the dating of a substantial number of further primary burials (which are not available in archive) (*ibid.*, 637).

The single Linkardstown-type monument in the present study area—at Poulawack in the Burren, Co. Clare—contributes three dates to the model, from disarticulated bone sealed in the central cist—GRN-12622, 3640-3360 cal BC; OxA-3264, 3370-2920 cal BC; and OxA-3265, 3500-3020 cal BC (Cooney *et al.* 2011, Table 12.11). However, this monument can scarcely be seen as representative of a sea-change in Neolithic life in the west of Ireland.

There also are significant problems with the representativeness of the available dates for passage tombs in Cooney *et al.* (2011, 637-657), which are overwhelmingly biased toward a small number of major complexes – principally, the Boyne Valley, as well as at Tara (the Mound of the Hostages), both in Co. Meath, and Carrowmore in the west. Whether or not these can be taken as expressions of a new and contemporaneous pan-regional way of life, and a decisive break from the Early Neolithic, remains to be demonstrated. In their second model for the currency of passage tombs, Cooney *et al.* (*ibid.*, 657) estimate that the monuments began to be constructed in 3640-3205 cal BC (95% probability), probably 3495-3285 cal BC (68% probability); their first use ending 2870-2735 cal BC (95% probability), probably in 2860-2795 cal BC (68% probability). While their first model (*ibid.*, 656-7) estimates a similar end range, primary use in the range 5275-3160 cal BC (95% probability), probably 4005-3190 cal BC (68% probability). They sound the following note of caution:

This analysis demonstrates the limitations of our current understanding of the chronology of passage tombs in Ireland. Further samples of short-life material unequivocally associated with the primary use of these monuments are urgently required. Our estimates for when passage tombs were first built are extremely tentative at this stage, although a date within the third quarter of the fourth millennium cal BC is most plausible at present (*ibid.*, 657).

Cooney *et al.* did not seek a precise and comprehensive definition of the Middle Neolithic in Ireland, nor do they propose such. Although Bergh and Hensey (2013) estimate that the most intense use of the megalithic monuments at Carrowmore fell between *c.* 3600 and 3200 cal BC, this cannot alone be seen to define a discrete Middle Neolithic period in the west of Ireland.

While other forms of megalithic monuments have not received the research focus afforded to the major passage tombs, excavated examples of court tombs do fall within this period. Of the twelve monuments

modelled in Schulting *et al.* (2011), the majority of which saw activity (albeit in some cases secondary activity) during this period. Notable among these are the examples from the west: Parknabinnia, Ballyglass II, Rathlackan and Behy. In the Burren there is overlapping use of the Poulawack Linkardstown-type burial, Poulnabrone portal tomb and the Parknabinnia court tomb between 3500 and 3100 cal BC (A. Lynch 2014, Figure 9.8).

Post-3600 cal BC is post 'house-horizon' according to the current orthodoxy (e.g. Smyth 2014; Whitehouse *et al.* in press), however the position taken here is that a more nuanced analysis of Neolithic timber structures might identify meaningful groupings within this category with discrete temporal spans. The 'post-house horizon' rectangular timber structures must offer credence to this hypothesis (see Chapter 4).

It has been suggested above that *some* of the structures counted as houses may have had funerary, ceremonial or community roles as their primary function. Among the more substantial structures may have been precursors to stone monuments, which might therefore be expected to be early in date. Timber structures cannot be expected to have endured physically for as long as stone monuments, and so might be expected to have had shorter lifespans. Though visible to curious later visitors, stone monuments are more likely to preserve usage evidence, such as sealed deposits within the chambers and cists, not vulnerable to plough or mechanical digger. This will bias dates from timber structures to earlier contexts. While the only substantial stratified series of dates for a megalithic monument in Ireland so far comes from the Mound of the Hostages, there is no such series for any timber structure.

On present evidence, then, there is a decline in the substantial timber structures after 3600 cal BC, which may in part reflect the increasing

substitution of timber monuments with stone structures in many areas. Lighter structures continue to represent the main form of domestic structure. Among the dated examples of these may be the 'huts' at Ballyglass II, as well as the structures in the Glenultra enclosure, the Céide Fields visitor centre, Belderg and Knocknarea discussed above (cf. Smyth 2014, 81-5). As with the Early Neolithic, the lightness of the structures – reflecting mobility, rather than the permanent accommodation of sedentary farmers – is seen as of greater significance than the straightness of the walls. There were no permanent field systems in the Irish landscape during this period. Herds of domesticated animals were probably, therefore, moved through the landscape, and hunted animals, such as pigs and possibly deer, continued to feature in people's diets. Palynological evidence indicating some areas of open grassland suggests that stands of domesticated grasses, visited and tended seasonally, continued. The decline in cereal-type grains observed by Whitehouse *et al.* (in press) is likely to reflect the relative paucity of identified Middle Neolithic sites, and the problems of misidentification of wild grass seeds in the earlier, more open, post-Elm Decline landscapes.

Pottery styles in use, as might be expected develop, and there is an increasing value placed upon polished stone axes of particular provenance, which are traded widely. Ultimately, as Cooney *et al.* (2011, 633) foresaw might be the case, there is insufficient evidence to define a culturally discrete Middle Neolithic in Ireland. Developments varied in tempo from region to region, community to community. At a national scale, the Early Neolithic in Ireland extends to *c.* 3100 cal BC (cf. Waddell 2010, vi).



5.5.3 The Late Neolithic: c. 3100–2500 cal BC

Bearing in mind the continuity of trends which Cooney (2000a, 15) identifies as obscuring the onset of the putative Middle Neolithic (see above), the Late Neolithic (date range as above) is considered even ‘harder to separate’ from what went before (*ibid.*, 17). There is evidence for the re-use of megalithic monuments during this period (e.g. see Schulting *et al.* 2011), however the main period for the construction of stone monuments in the Neolithic has passed according to the available evidence.

Likewise, there is no evidence for substantial timber structures (Smyth 2014, 85-96). Those probable-domestic structures that have been identified are light in character, sometimes incorporate rectangular stone-edged hearths, and in a few instances are associated with sherds of Grooved Ware pottery (*the* diagnostic early-third millennium dating proxy in Ireland – see below) (*ibid.*; 2014, 149). This apparently modest investment in domestic architecture suggests the continuation of at least seasonally mobile herding, supplemented by wild game and plants, with the probable (seasonal) tending of domesticated grasses. As with the post-3600 Early Neolithic, grass grains – including those identified as cereals or ‘cereal-type’ – are found at a ‘much smaller proportion of sites’ (Whitehouse *et al.* in press, 20) than in the more open landscapes that succeed the Elm Decline.

Many writers have recently connected the later Neolithic with a period of climatic uncertainty (e.g. Whitehouse *et al.* in press, 4; Brophy and Sheridan 2012, 55). Caseldine *et al.* (2005, 172-6) present a case for ‘a severe climatic event, probably one or a series of severe storms’ c. 5200-5100 cal BC, represented by the deposition of a silt layer up to 5cm thick, transported from higher slopes across extensive flat areas of blanket bog

on Achill Island. Whitehouse *et al.* (in press, 4) observe that this coincides with a series of narrow tree rings, suggestive of a severe climate downturn at c. 3190 cal BC identified by Baillie and Munro (1988, 345-6). Similarly timed periods of wetter, stormier, conditions have been observed in studies in southwest Sweden (de Jong *et al.* 2006) and the Aran Islands in Galway Bay, offshore from the Burren (Holmes *et al.* 2007).

Cooney *et al.* (2011, 623) identify this period of climatic uncertainty as a possible explanation for the demise of agriculture at Céide Fields. Their Bayesian modelling of Molloy and O'Connell's data estimates the reclamation of post-agricultural Céide Fields by pine woodland at '3300-2960 cal BC (95% probability...), probably in 3210-3040 cal BC (68% probability)'. At Owenbegacashel on Achill Island, the researchers observed 'an almost continuous layer of [*Pinus*] macrofossil remains overlying the silt' (Caseldine *et al.* 2005, 172). The second study area on Achill, at Caislean, provided similar evidence of 'a very clear discontinuous layer of *Pinus* remains, which always overlies the silt' (*ibid.*).

While these events have been shown here to *precede* the laying-out of Céide Fields, it is in the final centuries of the Neolithic that the origins of stone-walled field systems in Ireland might profitably be sought.

Two field systems on the Scottish island of Arran have been suggested as having Neolithic origins (Barber 1997, 144). The 'Celtic fields' at Kilpatrick were thought possibly of Iron Age date, though perhaps Neolithic:

the banks of the system are constructed on soil with no underlying peat, the system, considered only within the context of Arran Island, probably dates to an earlier period, possibly to the LN/EBA' (Barber 1997, 144).

The problems with making such assumptions regarding blanket peat on hillslopes have been discussed at length above.

Similarly, at Machrie North on Arran, by tenuous association with a pit sealed by hillwash, which contained Grooved Ware and Beaker pottery, and charcoal dated to 2490-2149 cal BC (GU-3527), a Neolithic date was proposed for a system of sub-peat field walls (Barber 1997, 144, 80-83). Although the dating of the Arran field systems is insecure (cf. Brophy and Sheridan 2012, 44), their link with the Neolithic has not been entirely abandoned (e.g. Noble 2006, 33; Bradley 2007, 43). Likewise, a possible later Neolithic irregular field system at Scord of Brouster on Shetland (Whittle *et al.* 1996) is now considered earlier Bronze Age (e.g. Sheridan 2012, 25), although a Late Neolithic origin has again not been completely ruled out (e.g. Brophy and Sheridan 2012, 44). In Ireland, although the evidence from Roughan Hill is now also seen to the earlier Bronze Age (see Section 4.5.3, below), it is not inconceivable that the origin of this and other small irregular field systems in Ireland could date to the final centuries of the Neolithic.

Smyth (2013b, 414) argues that the idea that there *should* be distinct Late Neolithic in Ireland may have been imported from Britain, entering the literature largely unquestioned. It does seem clear that Grooved Ware was 'part of the ceramic repertoire' of the early-third millennium BC (Waddell 2010, 53). Distinct chronological phases in the development of the complexes at Knowth and Newgrange incorporating timber and pit circles have been associated with the presence Grooved Ware (*ibid.*; cf. e.g. Cooney 2000a, 31, 158, 165-7, with references). Nevertheless, it remains to be demonstrated that this there is a distinct 'Grooved Ware "package"', the appearance of which heralds a significant change in lifeways across the country.

Smyth (2013b, Figure 3; 2014, Figure 5.13) identifies half-a-dozen locations besides Knowth and New Grange where circular post-built structures are

associated with Grooved Ware. These are concentrated in Co. Meath and the centre-east of the country, and are often—though not exclusively—ceremonial sites. There are a few examples further north, such as at Ballynahatty, Co. Down—also widely interpreted as a ceremonial centre (e.g. Waddell 2010, 117-8; Smyth 2011, 20; Brophy and Sheridan 2012, 55). Outside of the east and north-east, Grooved Ware sherds have been identified among pottery assemblages at the Lough Gur complex, both at the Grange stone circle, and in an apparently domestic context on Knockadoon (e.g. Clearly *et al.* 2003; Sheridan 2004b). The remains of Grooved Ware vessels were also identified among a pottery assemblage recovered from a cluster of pits at Lowpark, near Charlestown, in the east of Co. Mayo (R. Gillespie 2007, 13).

As with the conjectural Middle Neolithic, while regional innovations and networks of communication are expressed in the material culture of this period, the rapid and widespread adoption of new lifeways (of which Grooved Ware was a key material expression) is not in evidence (cf. Sheridan 2004b, 30-1). It may, however, prove the case that environmental indicators discernible in the stratigraphy at some sites will assist in recognising further evidence from this period in future research, regardless of the presence of Grooved Ware.



5.5.4 Chalcolithic/Early Bronze Age c. 2500–1600 cal BC

Carlin and Brück (2012, 194) argue that ‘there is too great a divide between specialists working on the Neolithic and the Bronze Age, despite the striking evidence of continuity’. There is evidence of continuity in settlement practice: ‘residential sites have a low archaeological visibility, with no distinctive house types or domestic layout, and almost no evidence of enclosure or fortification’ (O’Brien 2012, 214). The similar absence for farmsteads or otherwise substantial settlement sites in Early Bronze Age southern Britain led Brück (1999; 2000) to propose a model of residentially mobile groups, moving between gathering places, pasture, seasonal crops and wild resources, much as has been proposed here for Neolithic Ireland.

Nevertheless, there is broad agreement that there was ‘an important transition period at the end of the Neolithic in Ireland that spanned the second half of the 3rd millennium BC’, marked by the introduction of copper working, the use of Beaker pottery, and developments in funerary practice (O’Brien 2012, 211). Opinion is divided as to whether this transition period, which ended c. 2150–2000 BC with the ‘slow introduction of tin-bronze metallurgy and the declining use of Beaker pottery’ (*ibid.*) represents a distinct Irish Chalcolithic. Carlin and Brück (2012) argue that the pace of social change was not sufficiently ‘rapid and dramatic’, nor nationally homogeneous, to constitute a period distinct from the centuries that preceded and succeeded the introduction of copper. While acknowledging continuities from the Late Neolithic, arguing for ‘considerable variability in social structures across different territorial identities’ O’Brien (2012), sets out a series of structural changes

in society which he argues characterise a meaningfully distinct Chalcolithic.

Beaker pottery appears to have been used exclusively for several centuries during this period, though its use may have initially overlapped with the use of Grooved Ware, and later Bowl and Food Vessels around the turn of the second millennium (O'Brien 2012, 212). Changes in other aspects of material culture associated with the Beaker 'international assemblage', new social practices and craft skills, and the expansion of communities into parts of Ireland without evidence from earlier prehistory are seen by O'Brien (*ibid.*) to represent new systems of 'exchange and mobility' at 'local, regional and supra-regional level'. For others, this may be seen as the extension and development of existing 'inter-regional social networks' (Carlin and Brück 2012, 206), which, for example, had recently seen the introduction of Grooved Ware from Orkney (e.g. Sheridan 2004, 32-3).

In place of the 'classic Beaker single grave found in Britain and the continent', the putative Chalcolithic in Ireland sees the introduction of a new form of megalithic monument, which with c. 550 recorded examples, is the most numerous form in Ireland (e.g. Waddell 2010, 63). Schulting *et al.* 2008 model the 'sudden' introduction of wedge tombs to the period 2540-2300 cal BC, though their sample is restricted to the six excavated monuments for which radiocarbon dates are available. Perhaps because 'western Ireland was more integrated into an Atlantic seaboard web of connections' (C. Jones 2007, 219), as opposed to the closer ties with Britain evident in the east, the distribution of wedge tombs has a distinct western bias (see Figure 5.9, below). The greatest concentration – 80 monuments – is found in the Burren.

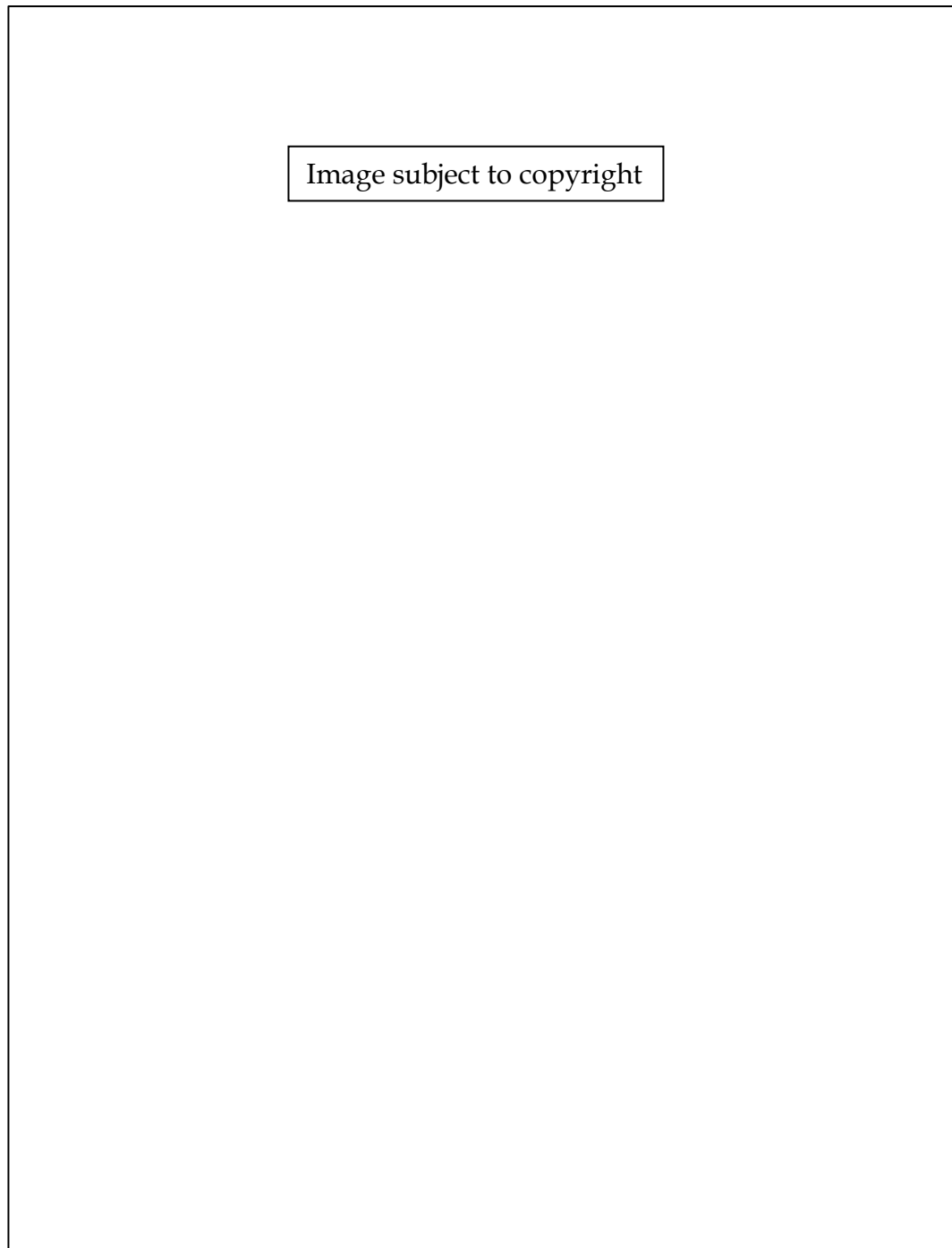


Figure 5.9: Distribution of wedge tombs in Ireland with detail of the Burren grouping. After de Valera and Ó Nualláin (1982, Figure 44).

Within the Burren, the greatest concentration of wedge tombs on Roughan hill (C. Jones 2003, 188). Although no Burren wedge tombs have been excavated, based on the available evidence from elsewhere, the wedge tombs are seen as broadly contemporary with the field systems on Roughan hill (e.g. C. Jones *et al.* 2010, 36, 39). Elsewhere, wedge tombs are

in close proximity to irregular field prehistoric systems at Rathlackan (Byrne *et al.* 2009b, 6; Byrne 2011, 145, 150-2), Belderg More (Caulfield 1974; 2011b, 121; see Chapter 3, Section 3.5) the Dartry mountains (Whitefield 2009, 9, 94); Ballyhoneen/Kilmore on the Dingle Peninsula, Co. Kerry (Cuppige 1986, 20-4) and there are two wedge tombs on Valencia Ireland (G.F. Mitchell 1989, 97). However, as noted in Chapter 3, field walls on the Beara Peninsula, Co. Cork, assumed to be Early Bronze Age due to their proximity to a wedge tomb, were found on excavation and radiocarbon dating to probably be of final Bronze Age/early Iron Age in date (O'Brien 2009, 9).

The earliest substantial assemblage of faunal remains from any prehistoric site in Ireland comes from the Beaker levels at New Grange, where cattle is the dominant species (e.g. McCormick 2007, 84-8). Animal bones have been found in association with burial deposits and Beaker material at a small number of excavated wedge tombs, although the contexts are generally insufficiently well understood to provide accurate dates, as, for example, in the disturbed contexts of the Lough Gur wedge tomb. (*ibid.* 1986, 39, 43). For the most part, it is the later Bronze Age before large assemblages of animal bone have been shown to be present at prehistoric sites in Ireland (e.g. *ibid.*, 2007; Woodman and McCarthy 2003, 32).

There are problems, then, with O'Brien's (2012, 219) assertion that 'general decline in agriculture during the Late Neolithic was reversed after 2500 BC'. Even if it is accepted that agriculture was in decline in the Late Neolithic, it was well into the Bronze Age before the 'recovery' became widespread. Similarly, O'Brien cites various pollen analyses as evidence of the post-2500 farming renaissance. As has been discussed, the resolution of dates from such studies (particularly as early as those he cites) is often problematic. Nevertheless, there is considerable evidence that it is quite some time *post-2500 BC*—during the later Bronze Age—

before evidence of widespread evidence of agriculture registers in pollen studies and cereal assemblages (e.g. Molloy and O'Connell 2001, 122; Plunkett 2007, 232-3; McClatchie *et al.* in press, 6). In her study of production and consumption of crops in Bronze Age Ireland, McClatchie (2009) 'focused upon evidence from the Middle and Late Bronze Age in Ireland, due to a relative dearth of Early Bronze Age material'⁸.

Among the 'rare instances' of field systems dating to the third millennium BC in Europe (R. Johnston 2013, 328), there may be examples in the west of Ireland. More research is needed, however the most comprehensive evidence comes from Roughan Hill around the turn of the second millennium BC. None of the Irish prehistoric field systems identified in Chapter 4 can be reliably shown to predate the Roughan Hill complex.

As has been established elsewhere in Europe, 'Celtic fields' such as the coaxial field system on Céide Hill post-date the Chalcolithic and Early Bronze Age. Molloy and O'Connell (1995, 121) identify considerable evidence for 'pastoral farming with a strong arable component' during the Middle-to-Late Bronze Age, from their pollen studies as well as the dating of a field wall and plough marks (cf. Warren *et al.* 2011a, 139; see above). There is good evidence for farming activity in the Belderg Valley after the middle of the second millennium BC, beginning with the roundhouse and associated features, and extending to the middle of the first millennium BC, at which time the dated on a bovid horn can be added to Verrill and Tipping's evidence for spade agriculture (Warren *et al.* 2011a, 139). Later Bronze Age developments in the Belderg valley provide the regional context for the development of the field systems on Céide hill.



5.6 Chapter summary

The human understanding from its own peculiar nature willingly supposes a greater order and regularity in things than it finds, and though there are many things in nature which are unique and full of disparities, it invents parallels and correspondences and non-existent connections.

Francis Bacon, *The New Organon* (2000 [1620], XLV)

The point of departure from the established narrative concerning the nature of Neolithic life in Ireland is the pervasive assumption that communities in the Final Mesolithic were insular, and as such unlikely agents of cultural change. Traditionally, the Mesolithic in Ireland has received limited attention among archaeological researchers and field workers. As recently as 1970, prominent Irish researchers questioned the very existence of Mesolithic culture in Ireland (Herity 1970, 29-30; cf. Ryan 1980, 46). Engagement with the period remains limited, and often disconnected from research into later prehistory. It has been argued that perceptions of a disconnect in lifeways at the end of this phase of prehistory might be seen as inevitable.

In fact there is increasing evidence that the Final Mesolithic was a period in which ideas and material culture from overseas were available to people in Ireland through maritime contact. The case has been presented that such novelties were not adopted as a uniform Island-wide package. Moreover, indigenous communities cannot be reliably characterised as 'passengers' in a process of change unfolding in accordance with a colonial template. Pronounced regional variations are apparent in the timing, tempo and manifestations of change. The presence of residual/curated material at many Early Neolithic sites suggests that local

cultural traditions may have played a significant role in local developments.

The archaeological record does not lend itself to the identification of a ‘tipping point’ at which the island of Ireland can be said to have become ‘Neolithic’. Many aspects of Neolithic material culture—such as different forms of monuments, stone tools and pottery—appear to have become widespread during the fourth millennium BC, however the extent of reliance on domesticated animals and plants is unclear and must surely remain a research priority.

The key finding of the present research is that the imagined landscape of settled-mixed-farmers, characterised by extensive field systems and substantial farmsteads, is not sustained by the available evidence. Field systems, together with associated dwellings and grain-rich cereal assemblages, become a *relatively* widespread feature in the Irish landscape during the later Bronze Age. However, as Brück (2000, 273) cautions, this much later evidence of an apparently familiar farming landscapes is no less apt to deceive, and should not be treated uncritically.



Notes

¹ See Grogan 1996, 57-9; 2002, 521; 2004, 106.

² See Robb (2007, 40-3) regarding models of Neolithic life expectancy; cf. Whittle *et al.* (2011b, 911).

³ See Waddington and Davies (2002, 15).

⁴ Ghilardi and O'Connell (2013, Table 1) radiocarbon-dated plant materials (*Betula* and *Pinus* bud scales, fruit and other 'fragments') in lake sediments to obtain radiocarbon dates for their earlier Neolithic pollen zones. Two dates for this period came from the lower strata of the core: GrA-45449: 4036-3786 cal BC (depth 578 cm) and GrA-45446: 3658-3091 cal BC (depth 560 cm). The huge error margin associated with particularly the latter date is indicative of the unreliability of these measurements. A further indication comes from dated sample UBA-15777: 3708-3537 cal BC—this sample was recovered from a depth of 250 cm (above the Iron Age samples). See further discussion on pollen zones in Chapter 3.

⁵ The view that the Early Neolithic Scottish timber buildings should be referred to as halls is not universal. Sheridan (2010, 97-8) considers that the buildings functioned as dormitory structures for newly arrived settlers (see also Sheridan 2013). G. Jones and Rowley Conwy (2007) also question the 'special' status of the buildings, which they see as primarily domestic.

⁶ Though Bishop *et al.* do find a low incidence of cereal-type grains at some ephemeral sites, their results are almost certainly exaggerated by their uncritical acceptance of unreliably identified assemblages. For example: 'Plant species classed as 'cf' were added to the definite species identifications' (2009, 62). Also, by implication, the majority of samples were identified morphologically—especially problematic for the smaller assemblages at ephemeral sites (among which were single-figure assemblages) (*ibid.*).

⁷ Date calibrated in OxCal 4.2 (IntCal 13) (<https://c14.arch.ox.ac.uk/oxcal>).

⁸ From the abstract available at <http://ethos.bl.uk>.



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Chapter 6

In our time

6.1 Temporality in practice

*'Tis with our judgments as our watches, none
Go just alike, yet each believes his own.*

Alexander Pope, *An essay on criticism* (2006 [1711], 19)

In Chapter 2, common ground was identified between the measured 'real time' of physics and the flow of human experience using Hawking's (1988) three arrows of time. The arrow of human experience, where future becomes present then past is irreversible, and accords with the physical arrows of entropy (increasing disorder), and cosmology (the expanding universe). The three arrows of time must agree in order for intelligent life to exist.

If the mathematicised representation of time accepted by most physicists is correct, the apparent flow of time is a quirk of human experience¹. Each moment in time occupies a discreet, static, position. The linear order in which each moment is experienced confers the illusion of flow. However, whether one takes the view that this (*B-series*) view of time is itself a human construct, and thus contingent on the (*A-series*) flow of human time, or vice-versa, both fundamental conceptions of time agree that the order in which events in (pre)history took place cannot change.

Archaeologists' attempts to reconstruct the true past are hampered by the incompleteness of the material record, the ambiguity of that record, and the distorting lens of life as it is experienced in the present. There is no recollection of the human experience of time in the distant past on which to draw. How then can the most reliable approximation of the human past be achieved? In theory, the measured time of the chronologies should

provide the true sequence of events, and therefore an authoritative representation. However, the material available for measurement are meagre, and the measurements always approximations. Chronologies are created in particular modern contexts, in which particular contemporary expectations and beliefs prevail. Where these expectations and beliefs go unacknowledged, or are treated as self-evident truths, the apparent objectivity of measured time is illusory.

In order to meaningfully characterise human life in the past, archaeologists invariably make inferences which go beyond observable 'facts' of measured time. In so doing, it is vital that assumptions are acknowledged and challenged, and alternative hypotheses tested. Starting with a predetermined narrative, then uncritically 'joining the dots' of time 1, time 2, etc., across a homogenised space, risks producing self-fulfilling circular arguments, as has been demonstrated in Chapters 3 and 4.

Critical engagement with time is an essential prerequisite to a better understanding of the lives of people in Neolithic Ireland. Taking *time* as the analytical motif, the three interrelated aims of the present thesis identified in Chapter 1 were directed at increasing knowledge of Neolithic life in the west of Ireland. These aims are briefly revisited below in the light of the thesis findings.



6.2 Sustainable change

...it is easy to forget the potency of the conceptual basis of a 'label' which we tend not to think twice about using. However, such basic forms of order actually participate strongly in the construction of archaeological data. Hence, what appears to be primary, and uncontaminated data, are in reality already situated in a particular historical discourse.

Siân Jones and Colin Richards (2000, 101)

Aim 1: Increase understanding of the impact of contemporary research practice and social conditions on the characterisation of Neolithic life in Ireland.

In addressing this aim, the origin of the paradigm of the settled-mixed-farming Neolithic was identified, and traced through the development of the discipline of archaeology in Ireland. The paradigm was born out of the Childean culture-historical framework that dominated archaeology at the time of the establishment of the Irish Free State. The theory that farmers from continental Europe (*not* Britain) brought 'civilisation' to Ireland in deep antiquity was both politically expedient and archaeologically respectable.

The social history of Ireland thus begins with farming: hunter-fisher-gatherers have no place in the national imagination. The modern sense of Irish national identity has been significantly shaped by a romanticised view of the traditional farming communities of the west of Ireland – their houses/homesteads, fields and cattle. Beef farming remains one of Ireland's most important industries², and the desire to own a substantial house hardly needs restating in the wake of the recent property boom³. And so it was for Ireland's first farmers: we are presented with an

apparent ‘boom and bust’ in ostentatious houses at the start of the Neolithic, coupled with ‘beef production’ on an industrial scale at Céide Fields.

The perceived continuities in rural life are such that Séamas Caulfield’s perspective on the organisation of Neolithic settlements is seen as relevant to the planning process for rural housing in the 21st century⁴. The vision of Ireland as a chronotope, ‘a place with an uneven distribution of time-passage, where time is apt to slow down and come to a standstill at the periphery’ (Leerssen 1996, 226), retains explicit support in popular historical and archaeological writing, as well as implicit support in scholarly archaeology. The imagined social landscapes of Neolithic Ireland are ‘[i]n many ways little different to much of the Irish countryside today’ (Caulfield 1992, 1). Rather like a Paul Henry painting, life is depicted as unchanging – *timeless*; and just as Henry’s paintings are bereft of any signs of the challenges experienced by the rural poor, there is little room for complicating evidence in the characterisation of the Neolithic.

The resulting *detemporalised* model of Neolithic life conflates poorly dated evidence in support the dominant paradigm. Treated disinterestedly, the same evidence supports alternative interpretations at least equally well. Progress towards genuine understanding of the nature of Neolithic life in Ireland, through time and across space, requires the suspension of conviction in the settled-mixed-farming hypothesis, and the development and testing of competing theories. It is hoped that the present study contributes to this requirement.



Aim 2: Increase the contribution of time measurements to knowledge of Neolithic Ireland.

Having been accorded the status of historical fact—as opposed to hypothesis to be tested—the romantic image of the abrupt transformation of the presumed cultural blank canvass of pre-Neolithic Ireland provides a narrowly defined outcome which is seemingly well-suited to precise quantitative measurement. Evidence of the putative step-change to a proto-modern agrarian society—characterised by a clearly differentiated material repertoire—is the outcome that techniques of excavation and analysis are expected to deliver: the template against which research findings are judged. The analytical ‘noise’ of data that falls outside the expected parameters can thus be readily discounted.

Accordingly, as has been demonstrated, the starting point for many palaeoenvironmental and palaeobotanical studies is that the archaeological sequence is unequivocal; it is the environmental signature of an already established phenomenon that is sought. This is perhaps most striking at Céide Fields and Belderg Beg (e.g. Molloy and O’Connell 1995, 189; Verrill 2006, 18). At both locations, evidence presumed to be Neolithic—a section of field wall at the heart of the Céide Fields complex; cultivation ridges at both Céide Fields and Belderg Beg—was shown to date to the later Bronze Age. The ‘noteworthy’ evidence of mixed agriculture at Céide Fields during the later Bronze Age (Molloy and O’Connell 1995, 221) corresponds with the only substantial prehistoric dwelling in either landscape: the securely-dated roundhouse—with associated and contemporary section of field wall—at Belderg Beg. Furthermore, such evidence corresponds with similar evidence elsewhere in Ireland, as well as in continental Europe and Britain. The Neolithic dates at Céide Fields and Belderg Beg, on the other hand, are indirect and explicable in terms of natural environmental cycles:

from an archaeological perspective they are anomalous. Nevertheless, the narrative endures.

Similarly, in the case of Neolithic rectangular timber structures, the orthodox narrative goes substantially beyond what can be reasonably inferred from the available evidence. In this case, the deeply held assumption that Neolithic farmers should live in substantial farmsteads was established by the discovery in the late 1930s of the stone footings of an apparent Early Neolithic rectangular timber structure at Lough Gur. Without the benefit of radiocarbon dating, the structure was dated by the presence of a pottery type, since recognised as later Bronze Age, *not* Early Neolithic. The radiocarbon dating of structural remains accords with this determination (e.g. Cleary *et al.* 2003, 138-9; *pace* Smyth 2014; see Chapters 4 and 5). Nevertheless, the phenomenon of the straight-walled Neolithic farmstead, having become embedded in disciplinary tradition, has proven remarkably enduring.

With the arguable exception of the recent discovery of (straight) stake rows – components of Late Mesolithic fish traps (e.g. WK-16559: 5910-5710 cal BC) from the River Liffey, Co. Dublin (McQuade 2005; McQuade and O'Donnell 2007), scant evidence survives from timber architecture dating to the Mesolithic. From the period of *circa* four millennia that succeed the Mount Sandel settlement, no structure that can be reliably characterised as a monument or dwelling has been identified. This appears to have reinforced the view that the straight wall or fence was an Early Neolithic innovation, and that linear prehistoric timber structures invariably represent the dwellings of Neolithic farmers (cf. Kinnes 1992, 87). Despite 'the obvious differences in both scale and layout of these buildings' (Armit *et al.* 2003, 146; cf. Smyth 2006, 244), they are characterised as 'displaying a remarkable level of homogeneity' (Smyth 2014, 75).

The conflated description of the structures has recently been augmented by a conflated timeline. High precision dates from short life samples—mostly grass seeds—often in circumstantial, frequently unrecorded proximity to the dating targets—have been taken to accurately date the *duration* of the structures' functional lives as dwellings (see Whitehouse *et al.* in press). Where contexts in direct association with the structures are recorded, there is a strong bias towards possible construction contexts such as wall slots and post holes (see Chapter 4). Evidence pertaining to the ongoing usage or abandonment of the structures may be significantly underrepresented. *None* of the samples come from a stratified sequence of dates. As with Céide Fields, it has been argued here that natural 'woodland dynamics' might reasonably account for this first widespread 'flush' of grass seeds in Early Neolithic contexts: specifically the (generally imprecisely dated) Elm Decline, which is often seen to correspond with Early Neolithic evidence (see Whitehouse *et al.* in press).

This is not to suggest that no rectangular Neolithic structures were Early Neolithic—some undoubtedly were. However, within this category there are buildings that almost certainly did not function as dwellings. In addition to light, probably unroofed structures in the context of monuments at Knowth and Magheraboy, examples which might best be attributed to a non-megalithic funerary tradition in Ireland have been identified (see Chapter 5). Also, the case had been advanced for a non-residential function linked to ceremonial activity at sites such as Ballyglass I, Tankardstown 2 and Cloghers.

Among the straight-sided Neolithic timber structures recorded in Ireland are light, impermanent buildings analogous to the Early Neolithic structure at Bolam Lake in northeast England. The excavators interpreted the Bolam Lake evidence as 'more oriented to traditional concepts of

Mesolithic settlements – that is transient residences – rather than the idea of permanent dwellings that have usually been associated with concepts of Neolithic farmers’ (Waddington and Davies 2002, 23). The Magheraboy structure demonstrates that lighter Early Neolithic buildings incorporated oak as a building material. The ubiquity of substantial structures constructed of split oak planks may have been overstated (see discussion in Chapter 4). Potential evidence of temporary settlement is underplayed in most syntheses: ‘many Neolithic dwellings may have been relatively flimsy structures, frequently replaced and leaving little archaeological trace’ (cf. Waddell 2010, 41-2), as we must presume was throughout the four millennia of the preceding Mesolithic. Just as insubstantial straight-sided structures were present in Early Neolithic Ireland, they cannot be excluded from the architectural repertoire of the Mesolithic. The presence of straight walls does not constitute evidence of a discontinuity in the concept of domestic space at the start of the traditionally defined Neolithic (cf. Waddell 2010, 42).

The paradigm of ‘ubiquitous domesticity’⁵ is not generally observed in the study of Scottish Neolithic rectangular timber structures. Here, broader, more flexible, research frameworks have long been adopted. Various kinds of non-megalithic funerary structures have been identified, some of which bear remarkable similarities to *certain* Irish rectangular timber structures (see Chapter 5). Variability is also recognised in the function of non-funerary rectangular timber structures, ranging from stout communal ‘halls’ to ‘flimsier’ temporary dwellings. The ‘halls’ at Balbridie, Claish and Crathes contribute stratified series of high precision radiocarbon dates, well suited to temporal modelling using Bayesian statistics. These high precision sequences are not presumed to be representative of the wider corpus of rectilinear timber structures. Also, there has been greater willingness to challenge where necessary the radiocarbon dates and proxy

relationships that helped shape earlier narratives (e.g. Ashmore 2000; 2004; Macklin *et al.* 2000). A similar level of source criticism should be applied to the Irish evidence.



Aim 3: To sketch, in a preliminary way, how the development of the Neolithic in Ireland could be re-cast in future research.

The chronological outline set out in Chapter 5 illustrates the inadequacy of the culture-historical ‘block thinking’⁶ attendant with Three Age-based characterisations of the development of prehistoric lifeways in Ireland. In keeping with culture histories at the grand scale, the current orthodoxy emphasises a sharp divide at the boundary between the Mesolithic and the Neolithic, but general homogeneity within these cultural types. The focus of present study on the west of Ireland brings into sharp relief regional deviation from the homogenised national template. However it is not simply a case of developing a handful of regional models to replace a single generalising account: ‘[t]here were simply too many Mesolithic’s and Neolithics in question’ (Whittle 2007, 623).

Both the temporal and spatial boundaries within the outline chronology presented can be seen to have been porous. Abrupt discontinuities, while conventionally expected, are not in evidence. The adoption of aspects of Neolithic culture appears to have been accretive through time, and varied across space. Undoubtedly, the adoption of the elements of the traditionally-defined Neolithic ‘all at once’ would provide analytical clarity (Bayliss *et al.* 2011b, 840). However, among most comprehensive and technologically advanced excavations in Irish archaeological record—at sites such as Ferriter’s Cove, Magheraboy and Poul nabrone—the evidence does not conform to a simplistic model of cultural succession.

Must the orthodox model be correct, and the data either wrong or ‘the exception(s) that proves the rule’ (*ibid.*)? Or is it time to consider that the testing of alternative rules might be worthy of research effort; that ‘the “Neolithic” did not necessarily appear simultaneously in Ireland’ (Schulting 2014, 212)?

The position taken here is that the adoption and rejection of changes through time and across space were the result of the choices of active human agents. A small proportion of the ‘specific moment[s] of human agency’, which represent ‘the actualisation of...structural pattern[s] situated within [the] diachronic flow of time’⁷, are preserved as events in the archaeological record. Where these can be dated as part of high resolution sequences, a sense of the diachronic flow of human temporality – ‘with agency and structure playing out principally at the scale of generations, lifetimes and active social memory’ (Whittle *et al.* 2011b, 913) – is presented to archaeologists in raw form. The accumulation of multiple sequences from different times and different places can help to place individual actions within developing social structures.

The defence of these anachronistic temporal blocks detracts from the complexity of the evidence on (in) the ground. The Neolithic in Ireland comprised multi-stranded interactive processes of change that defy any atemporal national stereotype. A plurality of competing interpretations is both inevitable and essential to the development of temporalised, agent-centred prehistory. Method and theory must together create the necessary time and space. All can, and did, exist independently of each other at different times and in different places. ‘[L]ong histories of social interactions’ brought about this ‘cultural hybridization’, creating ‘axes of variation which cut across the traditional period boundaries’ (Pluciennik

2008, 28). Future research priorities, such as those recommended below, should seek to understand this cultural diversity, rather than suppress it.



6.3 Recommendations for future research

As discussed in Chapter 2, for the writers and artists of the Celtic Revival, the ‘timeless’ west of Ireland was a ‘cultural reservoir’, preserving the traditions of the ancient past. The Romantic narratives that developed lacked temporal structure and thus elided history (and prehistory). Twenty-first-century archaeology has the means to unpick conflated characterisations of life in the past, and the west of Ireland provides exceptionally preserved evidence of the course of cultural change.

The need to develop an integrated research framework within which contributing field work, analysis and research can be situated and coordinated is uncontroversial. In the case of Neolithic studies, the work of the Neolithic Panel of the Scottish Archaeological Research Forum (e.g. Brophy and Sheridan 2012) provides a useful template.

Gathering Time (Whittle *et al.* 2011a) represents an important milestone in Irish Neolithic studies, setting out much of the source material which underpins understanding of Neolithic Ireland, and providing new analysis and interpretation within a clear structure. Our knowledge of aspects of Neolithic material culture has already been advanced by studies which have framed their chronologies in response to *Gathering Time*. One such study is Lynch’s (2014) Poul nabrone monograph, which critically

engages with the ‘all at once’ model for the Neolithisation of Ireland, seen as most plausible in *Gathering Time* (see Bayliss *et al.* 2011b, 840). Poul nabrone is established as an early example of a megalithic tomb, and therefore an important marker in the process of Neolithisation in the west, with evidence for a long history of human engagement. With the exception of Poul nabrone, portal tombs in Ireland are poorly dated, and Schulting (2014, 114) identifies the Burren, in the vicinity of Poul nabrone, ‘as the obvious place to start’ with a programme of targeted excavations.

A similar case could be made for other classes of evidence extending from the earliest Neolithic through the Bronze Age on the Burren. Evidence from the Fanore More beach midden provides a Late Mesolithic coastal connection with the area (A. Lynch 2014, 4). The centuries-long concurrent use with the Poul nabrone portal tomb of at least two further classes of Neolithic monument – the Poulawack Linkardstown-type burial and the Parknabinnia court tomb – illustrates the vibrancy and complexity of Neolithic life on the Burren (*ibid.*, 184). As mentioned in Chapter 1, research targeting megalithic monuments represents an outstanding opportunity to extend the present study. The long histories of human engagement with monuments, which may have enabled prehistoric peoples to transcend their everyday experience of time (cf. Adam 2006, 120), have huge potential to broaden our understanding of the temporality of Neolithic life. Were excavations to reveal evidence of pre-megalithic timber structures, understanding of the depth of engagement at these places would be further enhanced.

As with portal tombs, the chronology of wedge tombs is especially poorly understood, and the Burren is home to the largest concentration of these monuments. Hut sites, cairns and hill-top enclosures, such as those on Turlough Hill (Bergh 2008), have the potential to extend knowledge of

settlement practice through time. Roughan Hill and the nearby Coolnatullagh valley provide outstanding early examples of integrated agricultural landscapes with multiple phases of occupation (e.g. C. Jones *et al.* 2010).

The Burren is one of many exceptionally preserved prehistoric landscapes in the west of Ireland where the temporalities of prehistoric life can be explored through targeted archaeological fieldwork and complementary scientific studies. The diversity and temporal depth of the evidence on the Dingle peninsula in the southwest, and the Cúil Irra peninsula in the northwest—respectively the locations of the important early evidence from Ferriter’s Cove and Magheraboy—invite additional targeted fieldwork. Further Neolithic settlement evidence contemporary with the Carrowmore monuments, surely awaits discovery on the Cúil Irra peninsular.

Precise, stratified *sequences* of radiocarbon dates from clearly defined contexts among the prehistoric field systems of north Mayo will help clarify their chronological sequence. In addition to stone structures, the preservation of structural timbers in peat—such as those associated with the Bronze Age roundhouse at Belderg Beg—offers great potential as a source of further early settlement evidence. The peatlands of the west of Ireland also clearly have much to contribute to understanding of the palaeoenvironment, with clear priorities including Bayesian analyses of precise stratified sequences of radiocarbon measurements targeted at dating the Elm Decline and later Neolithic period of climatic instability.

Future palaeoenvironmental/palaeobotanical studies should make clear where sample sizes or degradation prevent reliable identifications, setting-out alternative interpretations for consideration (cf. Hillman *et al.* 1996,

206; Hillman 2001, 28). There must also be a greater willingness to challenge received wisdoms about how archaeological and palaeoenvironmental evidence *should* be interpreted, and to test alternative hypotheses. By keeping time and temporality centre-stage, archaeology and related disciplines will increase understanding of the ‘breadth and depth of difference’⁸ of prehistoric communities in Ireland, as well the similarities, affinities and continuities that feature clearly in the archaeological record. The result will be ‘complicated account[s]’ incorporating ‘series of temporalities’ (see Whittle *et al.* 2011b, 913). Such accounts might in time enable the realisation of Waddell’s (2010, vi) desire to finally ‘dispense with the antiquated Three-Age system’.



Notes

¹ See, for example, discussion in Smolin (2013, part I).

² Lawrence (2013, 1).

³ See, for example, McManus (2011).

⁴ McCormack (2003).

⁵ See, for example, Rowley-Conwy (2004, S96).

⁶ See Sherratt (1995).

⁷ See Harding (2005, 89).

⁸ See Gosden (1994, 196); cf. Massey (1999, 274).



Bibliography

Aalen, F.H.A., Whelan, K. and Stout, M. (eds.) 2011. *Atlas of the Irish rural landscape*. Second edition. Cork: Cork University Press.

Abbott, A. 2001. *Time matters: on theory and method*. London: University of Chicago Press.

Adam, B. 1990. *Time and social theory*. Cambridge: Polity Press.

Adam, B. 2004. *Time*. Cambridge: Polity Press.

Adam, B. 2006. Time. *Theory, culture and society* **23** (2-3), 119-126.

Addelman, M. 2013. Two 6000-year-old 'halls of the dead' unearthed, in UK first. Available at: <http://www.manchester.ac.uk/aboutus/news> [last accessed: 30 December, 2013].

Alexander, R., Coxon, P. and Thorn, R. 1986. A bog flow at Straduff townland, County Sligo. *Proceedings of the Royal Irish Academy* **86B**, 57-70.

Allen, N. 2003. *George Russell (Æ) and the New Ireland, 1905-30*. Dublin: Four Courts Press.

Anderberg, A.-L. 1994. *Atlas of seeds and small fruits of Northwest-European plant species (Sweden, Norway, Denmark, East Fennoscandia and Iceland) with morphological descriptions. Part 4: Resedaceae-Umbelliferae*. Stockholm: Swedish Museum of National History.

Anderson, B. 2006. *Imagined communities: reflections on the origin and spread of nationalism*. Revised edition. London: Verso.

Anderson, E. 1993. The Mesolithic: fishing for answers. In E. Shee Twohig and M. Ronayne (eds.), *Past perceptions: the prehistoric archaeology of south west Ireland*, 16-24. Cork: Cork University Press.

ApSimon, A. 1969. An Early Neolithic house in Co. Tyrone. *Journal of the Royal Society of Antiquaries of Ireland* **99** (2), 165-8.

ApSimon, A. 1976. Ballynagilly and the beginning and end of the Irish Neolithic. In S. J. de Laet (ed.), *Acculturation and continuity in Atlantic Europe*, 15-38. Bruges: de Tempel.

ApSimon, A. 1997. Wood into stone: origins for the Irish megalithic tombs. In A. Rodríguez Casal (ed.), *O Neolítico Atlántico e as Orixes Megalitism*, 129-40. Santiago de Compostela: University de Santiago de Compostela.

Armit, I., Murphy, E., Nelis, E. and Simpson, D. 2003. Irish Neolithic houses. In I. Armit, E. Nelis and D. Simpson (eds.), *Neolithic settlement in Ireland and western Britain*, 146-8. Oxford: Oxbow Books.

Ashmore, P. 2000. Dating the Neolithic in Orkney. In A. Ritchie (ed.), *Neolithic Orkney in its European Context*, 299-308. Cambridge: McDonald Institute for Archaeological Research.

Ashmore, P. 2004. Absolute chronology. In I. Shepherd and G. Barclay (eds.), *Scotland in Ancient Europe: the Neolithic and Early Bronze Age of Scotland in their European context*, 125-38. Edinburgh: Society of Antiquaries of Scotland.

Augustine. 397-8 [1955]. Confessions. In A. Outler (ed. and trans.), *Augustine: Confessions and Enchiridion*, 30-333. Louisville, KY: Westminster John Knox Press.

Babić, S. 2005. Status, identity and archaeology. In M. Díaz-Andreu, S. Babić and S. Lucy *The archaeology of identity: approaches to gender, age, status, ethnicity and religion*, 67-85. London: Routledge.

Bacon, F. 2000 [1620]. *The new Organon*. Eds. L. Jardine and M. Silverthorne. Cambridge: Cambridge University Press.

Baert, P. 1992. *Time, self and social being: temporality within a sociological context*. Aldershot: Avebury.

Baert, P. 1998. *Social theory in the twentieth century*. Cambridge: Polity Press.

Baillie, M. 1990. Checking back on an assemblage of published radiocarbon dates. *Radiocarbon* **32** (3), 361-6.

Baillie, M. and Munro, M. 1988. Irish tree rings, Santorini and volcanic dust veils. *Nature* **332** (6162), 344-6.

Bailey, D. and Whittle, A. 2005. Unsettling the Neolithic: breaking down concepts, boundaries and origins. In D. Bailey, A. Whittle and V. Cummings (eds.), *(un)settling the Neolithic*, 1-7. Oxford: Oxbow Books.

Barber, J. 1997. *The archaeological investigation of a prehistoric landscape: excavations on Arran 1978-81*. Edinburgh: Scottish Trust for Archaeology for Research.

Barber, J. (ed.) 2003 *Bronze Age farms and Iron Age farm mounds of the Outer Hebrides*. Edinburgh: The Society of Antiquaries of Scotland with Historic Scotland and the Council for British Archaeology.

Barclay, G. 2000. Between Orkney and Wessex: the search for regional Neolithics in Britain. In A. Richie (ed.), *Neolithic Orkney in its European context*, 275-85. Cambridge: McDonald Institute for Archaeological Research.

Barclay, G. 2004. '...Scotland cannot have been an inviting country for agriculture and settlement': a history of the Neolithic in Scotland. In I. Shepherd and G. Barclay (eds.), *Scotland in Ancient Europe: the Neolithic and Early Bronze Age of Scotland in their European context*, 31-44. Edinburgh: Society of Antiquaries of Scotland.

Barclay, G. and Maxwell, G. 1991. Excavation of a Neolithic long mortuary enclosure within the Roman legionary fortress at Inchtuthil, Perthshire, *Proceedings of the Society of Antiquaries of Scotland* **121**, 27-44.

Barclay, G., Brophy, K. and G. McGregor, 2002. Claish, Stirling: an early Neolithic structure in its context. *Proceedings of the Society of Antiquaries of Scotland* **132**, 65-137.

Barrett, J.C. 1987. The Glastonbury Lake Village: models and source criticism. *Archaeological Journal* **144**, 409-23.

Barrett, J.C. 1988. Fields of discourse: reconstituting a social archaeology. *Critique of Anthropology* **7** (3), 5-16.

Barrett, J.C. 1994. *Fragments of antiquity: an archaeology of social life in Britain, 2900-1200BC*. Oxford: Blackwell.

Barrett, J.C. 2004. Temporality and the study of prehistory. In R. Rosen (ed.), *Time and temporality in the ancient world*, 11-27. Philadelphia: University of Pennsylvania Museum of Archaeology and Anthropology.

Barrett, J.C. and Kinnes, I. 1988. Introduction. In J.C. Barrett and I. Kinnes (eds.), *The archaeology of context in the Neolithic and Bronze Age: recent trends*, 1. Sheffield: University of Sheffield.

Barrett, J.C. and Fewster, K. 2000. Intimacy and structural transformation: Giddens and archaeology. In C. Holtorf and H. Karlsson (eds.), *Philosophy and archaeological practice: perspectives for the 21st century*, 25-33. Göteborg: Bricoleur Press.

Barrett, J.C., Bradley, R. and Green, M. 1991. *Landscape, monuments, and society: the prehistory of Cranborne Chase*. Cambridge: Cambridge University Press.

Bayliss, A. 2009. Rolling out revolution: using radiocarbon dating in archaeology. *Radiocarbon* 51, 123-47.

Bayliss, A., Bronk Ramsey, C., van der Plicht, J. and Whittle, A. 2007. Bradshaw and Bayes: towards a timetable for the Neolithic. *Cambridge Journal of Archaeology* 17 (1): Supplement, 1-28.

Bayliss, A. and Woodman, P. 2009. A new Bayesian chronology for Mesolithic occupation at Mount Sandel, Northern Ireland. *Proceedings of the Prehistoric Society* 75, 101-23.

Bayliss, A., van der Plicht, J., Bronk Ramsey, C., McCormac, G. Healy, F. and Whittle, A. 2011a. Towards generational time-scales: the quantitative interpretation of archaeological chronologies. In A. Whittle, A. Bayliss and F. Healy (eds.), *Gathering time: dating the Early Neolithic enclosures of Southern Britain and Ireland*. Volume 1, 17-59. Oxford: Oxbow Books.

Bayliss, A., Healy, F., Whittle, A. and Cooney, G. 2011b. *Neolithic narratives: British and Irish enclosures in their timescapes*. In A. Whittle, A. Bayliss and F. Healy (eds.), *Gathering time: dating the Early Neolithic enclosures of Southern Britain and Ireland*. Volume 2, 682-847. Oxford: Oxbow Books.

Bayliss, A. and O'Sullivan, M. 2013. Interpreting chronologies for the Mound of the Hostages, Tara, and its contemporary contexts in Neolithic and Bronze Age Ireland. In: M. O'Sullivan, C. Scarre and M. Doyle, M. (eds.), *Tara – from the past to the future: towards a new research agenda*, 26-104. Dublin: Wordwell.

Behre, K. 2007. Evidence for Mesolithic agriculture in and around central Europe? *Vegetation History and Archaeobotany* 16 (2-3), 203-19.

Bell, J. 1984. A contribution to the study of cultivation ridges in Ireland. *Journal of the Royal Society of Antiquaries of Ireland* 114, 80-97.

Bender, B. 2000. Investigating landscape and identity in the Neolithic. In A. Ritchie (ed.), *Neolithic Orkney in its European Context*, 23-30. Cambridge: McDonald Institute for Archaeological Research.

Bergh, S. 1995. *Landscape of the monuments*. Stockholm: Riksantikvarieämbet Arkeologiska Undersökningar.

Bergh, S. 2000. Knocknarea – the archaeology of a mountain. *Archaeology Ireland* **14** (2), 14-18.

Bergh, S. 2002. Knocknarea: the ultimate monument: megaliths and mountains in Neolithic Cúil Irra, North-West Ireland. In C. Scarre (ed.), *Monuments and landscape in Atlantic Europe*, 139-51. London: Routledge.

Bergh, S. 2003. Mullaghfarna prehistoric enclosures. Available at: www.excavations.ie [last accessed: 17 January, 2011].

Bergh, S. 2005. Comments on 'Archaeology 2020: repositioning Irish archaeology in the knowledge society'. Unpublished submission, NUI Galway.

Bergh, S. 2008. Surveying Turlough Hill. In M. Comber and C. Jones (eds.), *Burren landscape and settlement: an INSTAR project*, 22-30. Galway: NUI Galway and The Heritage Council.

Bergh, S. 2010. *Neolithic dates from Carrowmore – a review*. Unpublished report, NUI Galway.

Bergh, S. (forthcoming). *Knocknarea: the archaeology of a mountain*.

Bergh, S. and Hensey, R. 2013. Unpicking the chronology of Carrowmore. *Oxford Journal of Archaeology* **32** (4), 343–66.

Bhaskar, R. 1998. General introduction. In M. Archer, R. Bhaskar, A. Collier, T. Lawson and A. Norrie (eds.), *Critical realism: essential readings*, ix-xxiv. London: Routledge.

Binford, L. 1983. *In pursuit of the past*. London: Thames and Hudson.

Bintliff, J. 1991. The contribution of an *Annaliste*/structural history approach to archaeology. In J. Bintliff (ed.), *The Annales school and archaeology*, 1-33. Leicester: Leicester University Press.

Bintliff, J. 2008. History and Continental approaches. In R. A. Bentley, H. Maschner and C. Chippindale (eds.), *Handbook of archaeological theories*, 147-64. Plymouth: AltaMira Press.

Birks, H. 1975. Studies in the vegetational history of Scotland, IV. Pine stumps in Scottish blanket peats. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences* **270** (905), 181-226.

Birks, H. J. and Birks, H. 1980. *Quaternary palaeoecology*. London: Edward Arnold.

Bishop, R., Church, M. and Rowley-Conwy, P. 2009. Cereals, fruits and nuts in the Scottish Neolithic. *Proceedings of the Society of Antiquaries of Scotland* **139**, 47-103.

Blaauw, M., van der Plicht J. and van Geel, B. 2004a. Radiocarbon dating of bulk peat samples from raised bogs: nonexistence of a previously reported 'reservoir effect'? *Quaternary Science Reviews* **23**, 1537-42.

Blaauw, M., van Geel, B., Mauquoy, D. and van der Plicht, J. 2004b. Carbon-14 wiggle-match dating of peat deposits: advantages and limitations. *Journal of Quaternary Science* **19**, 177-82.

Blackford, J. 1993. Peat bogs as sources of proxy climatic data: past approaches and future research. In F. Chambers (ed.), *Climate change and human impact on the landscape*, 47-56. London. Chapman and Hall.

Blackford, J. 2000. Palaeoclimatic records from peat bogs. *Tree* **15 (5)**, 293-8.

Boardman, S. and Jones, G. 1990. Experiments on the effects of charring on cereal plant components. *Journal of Archaeological Science* **17 (1)**, 1-11.

Bogaard, A. 2004. *Neolithic farming in central Europe*. London: Routledge.

Bogaard, A. and Jones, G. 2007. Neolithic farming in Britain and central Europe: contrast or continuity? In A. Whittle and V. Cummings (eds.), *Going over: the Mesolithic-Neolithic transition in north-west Europe*, 357-75. Oxford: Oxford University Press.

Boivin, N. 2004. Mind over matter? Collapsing the mind-matter dichotomy in material culture studies. In E. DeMarrais, C. Gosden and C. Renfrew (eds.), *Rethinking materiality: the engagement of mind with the material world*, 63-71. Cambridge: McDonald Institute for Archaeological Research.

Borić, D. 2005. Deconstructing essentialisms: unsettling frontiers of the Mesolithic-Neolithic Balkans. In D. Bailey, A. Whittle and V. Cummings (eds.), *(un)settling the Neolithic*, 16-31. Oxford: Oxbow Books.

Borić, D. 2007. The house between grand narratives and microhistories: a house society in the Balkans. In R. Beck Jnr. (ed.), *The durable house: house society models in archaeology*. Occasional papers, volume 35, 97-129. Carbondale, IL: Center for Archaeological Investigations, Southern Illinois University.

Bourdieu, P. 1977. *Outline of a theory of practice*. Trans. R. Nice. Cambridge: Cambridge University Press.

- Boylan, N., Jennings, P. and Long, M. 2008. Peat slope failure in Ireland. *Quarterly Journal of Engineering Geology and Hydrogeology* **41**, 93-108.
- Braadbaart, F. 2008. Carbonisation and morphological changes in modern dehusked and husked *Triticum dicoccum* and *Triticum aestivum* grains. *Vegetational History and Archaeobotany* **17**, 155-66.
- Bradley, R. 1978. Prehistoric field systems in Britain and north-west Europe – a review of some recent work. *World Archaeology* **9 (3)**, 265-80.
- Bradley, R. 1997. *Rock art and the prehistory of Atlantic Europe: signing the land*. London: Routledge.
- Bradley, R. 1998b. *The passage of arms: an archaeological analysis of prehistoric hoards and votive deposits*. Oxford: Oxbow Books.
- Bradley, R. 2005. *Ritual and domestic life in prehistoric Europe*. London: Routledge.
- Bradley, R. 2007. *The prehistory of Britain and Ireland*. Cambridge: Cambridge University Press.
- Bradley, R. and Chapman, R. 1984. Passage graves in the European Neolithic – a theory of converging evolution. In G. Burenhult (ed.), *The archaeology of Carrowmore: environmental archaeology and the megalithic tradition at Carrowmore, Co. Sligo, Ireland*. Theses and papers in Northern European Archaeology, 14, 348-56. Stockholm: Institute of Archaeology, University of Stockholm.
- Bradshaw, R. and Browne, P. 1987. Changing patterns in the post-glacial distribution of *Pinus sylvestris* in Ireland. *Journal of Biogeography* **14 (3)**, 237-48.
- Braudel, F. 1972 [1966]. *The Mediterranean and the Mediterranean world in the age of Phillip II*. Trans. S. Reynolds. London: Fontana/Collins.
- Bronk Ramsey, C. 2000. Comment on 'The use of Bayesian statistics for ¹⁴C dates of chronologically ordered samples: a critical analysis'. *Radiocarbon* **42 (2)**, 199–202.
- Bronk Ramsey, C. 2008. Radiocarbon dating: revolutions in understanding. *Archaeometry* **50 (2)**, 249-75.
- Brophy, K. 2007. From big houses to cult houses: Early Neolithic timber halls in Scotland. *Proceedings of the Prehistoric Society* **73**, 75-96.

Brophy, K. and Sheridan, J.A. 2012. Neolithic Scotland: ScARF panel report. ScARF summary Neolithic panel document, June 2012. Available at: www.scottishheritagehub.com [last accessed: 23 March 2014]

Brown, T. 1981. *Ireland: a social and cultural history*. London: Fontana.

Brück, J. 1999. What's in a settlement? Domestic practice and residential mobility in Early Bronze Age southern England. In J. Brück and M. Goodman (eds.), *Making places in the prehistoric world: themes in settlement archaeology*, 52-75. London: UCL Press.

Brück, J. 2000. The Early-Middle Bronze Age transition in southern England. *Oxford Journal of Archaeology* **19** (3), 273-300.

Buck, C., Cavanagh, W. and Litton, C. 1996. *Bayesian approach to interpreting archaeological data*. Chichester: Wiley.

Burenhult, G. 1984. (ed.), *The archaeology of Carrowmore: environmental archaeology and the megalithic tradition at Carrowmore, Co. Sligo, Ireland*. Theses and papers in Northern European Archaeology, 14. Stockholm: Institute of Archaeology, University of Stockholm.

Burke, P. 1969. *The Renaissance sense of the past*. London: Edward Arnold.

Button, K., Ioannidis, J., Mokrysz, C., Nosek, B., Flint, J., Robinson, E. and Munafò, M. 2013. Power failure: why small sample size undermines the reliability of neuroscience. *Nature Reviews Neuroscience* **14**, 365-76.

Byrne, G. 1986. *The pre-bog archaeology of the Ballycastle-Palmerstown area of north Mayo*. Unpublished M.A. thesis, University College Dublin.

Byrne, G. 1991a. Céide Fields, Glenulra. In I. Bennett (ed.), *Excavations 1990: summary accounts of archaeological excavations in Ireland*, 45-6. Bray: Wordwell.

Byrne, G. 1991b. Rathlackan, Co. Mayo. In I. Bennett (ed.), *Excavations 1990: summary accounts of archaeological excavations in Ireland*, 46. Bray: Wordwell.

Byrne, G. 1992. 'Céide Fields', Glenulra and Behy. In I. Bennett (ed.), *Excavations 1991: summary accounts of archaeological excavations in Ireland*, 34-5. Bray: Wordwell.

Byrne, G. 1993. Rathlackan, Co. Mayo. In I. Bennett (ed.), *Excavations 1992: summary accounts of archaeological excavations in Ireland*, 49. Bray: Wordwell.

- Byrne, G. 1994. Rathlackan, Co. Mayo. In I. Bennett (ed.), *Excavations 1993: summary accounts of archaeological excavations in Ireland*, 61-2. Bray: Wordwell.
- Byrne, G. 2011. Survey from Ballinglen to Rathfran Bay. In S. Caulfield, G. Byrne, N. Dunne and G. Warren (eds.), *Neolithic and Bronze Age landscapes of north Mayo: report 2011*, 143-67. Dublin: UCD School of Archaeology.
- Byrne, G., Dunne, N., Caulfield, S., Warren, G., Walsh, P., McIlreavy, D. and Rathbone, S. 2009a. *Archaeological excavations in association with the construction of the Céide visitor centre (E494): stratigraphic report*. Dublin: UCD School of Archaeology.
- Byrne, G., Warren, G., Rathbone, S. McIlreavy, D. and Walsh, P. 2009b. *Archaeological excavations at Rathlackan (E580): stratigraphic report*. Dublin: UCD School of Archaeology.
- Byrne, G., Dunne, N. and Warren, G. 2011. Excavations at the Céide Fields visitor centre 1989-1994. In S. Caulfield, G. Byrne, N. Dunne and G. Warren (eds.) 2011. *Excavations on Céide hill, Behy and Glenultra, north Co. Mayo, 1963-1994*, 74-131. Dublin: UCD School of Archaeology.
- Byrnes, E. 1999. Recent excavations at Richardstown, Co. Louth. *Archaeology Ireland* **13 (4)**, 33.
- Byrnes, E. 2000. Richardstown, Co. Louth. In I. Bennett (ed.), *Excavations 1999: summary accounts of archaeological excavations in Ireland*, 221-2. Bray: Wordwell.
- Cappers, R. Bekker, R. and Jans J. 2006. *Digitale zadenatlas van Nederland*. Groningen: Barkhuis Publishing and Groningen University Library.
- Carden, R., McDevitt, A., Zachos, F., Woodman, P., O'Toole, P., Rose, H., Monaghan, N., Campana, M., Bradley, D. and Edwards, C. 2012. Phylogeographic, ancient DNA, fossil and morphometric analyses reveal ancient and modern introductions of a large mammal: the complex case of red deer (*Cervus elaphus*) in Ireland. *Quaternary Science Reviews* **42**, 74-84.
- Carey, S. and Woo, M.-K. 2000. The role of soil pipes as a slope runoff mechanism, Subarctic Yukon, Canada. *Journal of Hydrology* **233**, 206-22.
- Carlin, N. and Brück, J. 2012. Searching for the Chalcolithic: continuity and change in the Irish Final Neolithic/Early Bronze Age. In M. Allen, J. Gardiner., J. A. Sheridan (eds.), *Is there a British Chalcolithic? People, place and polity in the late 3rd millennium*. Prehistoric Society Research Paper 4, 193-210. Oxford: Oxbow Books.

Case, H. 1961. Irish Neolithic pottery: distribution and sequence. *Proceedings of the Prehistoric Society* **27**, 174-233.

Caseldine, C., Thompson, G., Langdon, C. and Hendon, D. 2005. Evidence for an extreme climatic event on Achill Island, Co. Mayo, Ireland around 5200-5100 cal. yr BP. *Journal of Quaternary Science* **20** (2), 169-78.

Castle, G. 2001. *Modernism and the Celtic Revival*. Cambridge: Cambridge University Press.

Caulfield, S. 1972. Beldergbeg. In G. Delaney (ed.), *Excavations 1972: summary accounts of archaeological work in Ireland*, 22-23. Belfast: Association of Young Irish Archaeologists.

Caulfield, S. 1974. Agriculture and settlement in ancient Mayo. *The Irish Times*. 23 December: p. A3.

Caulfield, S. 1978a. Neolithic fields: the Irish evidence. In H. Brown and P. Fowler (eds.), *Early land allotment*, 137-144. Oxford: BAR British Series 48.

Caulfield, S. 1978b. Star Carr: an alternative view. *Irish Archaeological Research Forum* **V**, 15-22.

Caulfield, S. 1981. Celtic problems in the Iron Age. In D. Ó Corráin (ed.), *Irish Antiquity: essays and studies presented to M. J. O'Kelly*, 205-15. Cork: Tower Books.

Caulfield, S. 1983. The Neolithic settlement of North Connacht. In T. Reeves-Smith and F. Hamond (eds.), *Landscape archaeology in Ireland*, 195-215. Oxford: BAR British Series 116.

Caulfield, S. 1984. Discussion. In G. Burenhult (ed.), *The archaeology of Carrowmore: environmental archaeology and the megalithic tradition at Carrowmore, Co. Sligo, Ireland*. Theses and papers in Northern European Archaeology, 14, 388-9. Stockholm: Institute of Archaeology, University of Stockholm.

Caulfield, S. 1988. *Céide Fields and Belderrig guide*. Killala: Morrigan Book Company.

Caulfield, S. 1992. *Céide Fields, Ballycastle, Co. Mayo*. [Fieldguide. Publisher and place of publication omitted].

Caulfield, S. 1993. Where there's bog there's brass. *The Irish Times*. 16 February: p. 14.

Caulfield, S. 2008. Plan of Céide Fields. In The Office of Public Works, *The Céide Fields visitors' guide*. Dublin: The Office of Public Works.

Caulfield, S. 2011a. History of archaeological and related research in north Mayo. In S. Caulfield, G. Byrne, N. Dunne and G. Warren (eds.), *Neolithic and Bronze Age landscapes of north Mayo: report 2011*, 106-16. Dublin: UCD School of Archaeology.

Caulfield, S. 2011b. Probed surveys: Erris, Céide Fields and Belderg More. In S. Caulfield, G. Byrne, N. Dunne and G. Warren (eds.), *Neolithic and Bronze Age landscapes of north Mayo: report 2011*, 117-22. Dublin: UCD School of Archaeology.

Caulfield, S., O'Donnell, R. and Mitchell, P. 1998. Dating of a Neolithic field system at Céide Fields, County Mayo, Ireland. *Radiocarbon* **40** (2), 629-640.

Caulfield, S., Warren, G., Rathbone, S., McIlreavy, D. and Walsh, P. 2009a. *Archaeological excavations at the Glenulra enclosure (E24): stratigraphic report*. Dublin: UCD School of Archaeology.

Caulfield, S., Byrne, G., Downes, M., Dunne, N., Warren, G., Rathbone, S. and Walsh, P. 2009b. *Neolithic and Bronze Age landscapes of north Mayo: 2009 summary report*. Dublin: UCD School of Archaeology.

Caulfield, S., Byrne, G., Downes, M., Dunne, N., Warren, G., Rathbone, S., McIlreavy, D. and Walsh, P. 2009c. *Archaeological excavations at Belderg Beg (E109): stratigraphic report*. Dublin: UCD School of Archaeology.

Caulfield, S., Byrne, G., Downes, M., Dunne, N. and Warren, G. 2010. *Neolithic and Bronze Age landscapes of north Mayo: summary report 2010*. Dublin: UCD School of Archaeology.

Caulfield, S., Byrne, G., Dunne, N. and Warren, G. (eds.) 2011a. *Excavations on Céide hill, Behy and Glenulra, north Co. Mayo, 1963-1994*. Dublin: UCD School of Archaeology.

Caulfield, S., Byrne, G., Dunne, N. and Warren, G. (eds.) 2011b. *Neolithic and Bronze Age landscapes of north Mayo: report 2011*. Dublin: UCD School of Archaeology.

Caulfield, S. and Warren, G. 2011. Excavations at the Glenulra enclosure 1970-1972. In S. Caulfield, G. Byrne, N. Dunne and G. Warren (eds.) 2011. *Excavations on Céide hill, Behy and Glenulra, north Co. Mayo, 1963-1994*, 52-74. Dublin: UCD School of Archaeology.

Chapple, R., Dunlop, C., Gilmore, S. and Heaney, L. 2009. *Archaeological investigations along the A1 dualling scheme, Loughbrickland to Beech Hill, Co. Down, N. Ireland (2005)*. Oxford: BAR British Series 479.

Childe, V. G. 1925. *The dawn of European civilization*. London: Cape.

Childe, V. G. 1929. *The Danube in prehistory*. Oxford: Clarendon Press.

Childe, V. G. 1931a. Skara Brae: a 'Stone Age' village in Orkney. *Antiquity* **5 (17)**, 47-59.

Childe, V. G. 1931b. Skara Brae: a Pictish village in Orkney. London: Kegan Paul, Trench, Trubner & Co.

Childe, V. G. 1952. *New light on the most ancient East*. Fourth edition. London: Routledge and Kegan Paul.

Childe, V. G. 1956. *Piecing together the past: the interpretation of archaeological data*. London: Routledge and Kegan Paul.

Childe, V. G. 1957. *The dawn of European civilization*. Sixth edition. London: Routledge and Kegan Paul.

Christianson, G. 1996. *Isaac Newton and the scientific revolution*. New York: Oxford University Press.

Clark, J.G.D. 1954. *Excavations at Star Carr*. Cambridge: Cambridge University Press.

Clark, J.G.D. 1961. *World prehistory: an outline*. Cambridge: Cambridge University Press.

Clarke, D. 1973. Archaeology: the loss of innocence. *Antiquity* **47**, 6-18.

Cleary, R. 1993. The later Bronze Age at Lough Gur: filling in the blanks. In E. Shee Twohig and M. Ronayne (eds.), *Past perceptions: the prehistoric archaeology of south west Ireland*, 114-20. Cork: Cork University Press.

Cleary, R. 1995. Later Bronze Age settlement and prehistoric burials, Lough Gur, Co. Limerick. *Proceedings of the Royal Irish Academy* **95C (1)**, 1-92.

Cleary, R. 2011. Discussion. In R. Cleary and H. Kelleher (eds.), *Archaeological excavations at Tullahedy, Co. Tipperary: Neolithic Settlement in north Munster*, 406-32. Dublin: The Collins Press.

Cleary, R., McKeown, S., Tierney, J., Hannon, M. Anderson, E., Cahill, M. and O'Shaughnessy, J. 2003. Enclosed Late Bronze Age habitation site and boundary wall at Lough Gur, Co. Limerick. *Proceedings of the Royal Irish Academy* **103C (4)**, 97-189. Cooney,

Cleary, R. and Kelleher, H. (eds.) 2011. *Archaeological excavations at Tullahedy, Co. Tipperary: Neolithic Settlement in north Munster*. Dublin: The Collins Press.

Coffey, G. 1913. *The Bronze Age in Ireland*. Dublin: Hodges Figgis.

Cohen, B. and Smith, G. E. 2002. *Introduction*. In B. Cohen, B. and G. E. Smith (eds.), *The Cambridge companion to Newton*, 1-32. Cambridge: Cambridge University Press.

Collins, A.E.P. 1976. Dooley's Cairn, Ballymacaldrack, County Antrim. *Ulster Journal of Archaeology* **39**, 1-10.

Collins, A.E.P. and Waterman, D. 1955. Millin Bay: a Late Neolithic cairn in Co. Down. Belfast: HMSO.

Collins, B. 1997. Plant remains. In G. Eogan and H. Roche, *Excavations at Knowth, 2: settlement and ritual sites of the fourth and third millennia BC*, 295-300. Dublin: Royal Irish Academy.

Collins, T. and Coyne F. 2006. As old as we felt... *Archaeology Ireland* **20 (4)**, 21.

Connolly, A. 1994. Saddle querns in Ireland. *Ulster Journal of Archaeology* **57**, 26-36.

Conroy, G. 1993. Caulfield, Céide and Mayo 5000. *Archaeology Ireland* **7 (2)**, S11-S13.

Conway, M. 2005. Memory and the self. *Journal of Memory and Language*. **53 (4)**, 594-628

Cooney, G. 1981. A saddle quern from Baltinglass Hill, County Wicklow, *Journal of the Royal Society of Antiquaries of Ireland* **111**, 102-106.

Cooney, G. 1991. Irish Neolithic landscapes and land use systems: the implications of field systems. *Rural History* **2 (2)**, 123-39.

Cooney, G. 1995. Theory and practice in Irish archaeology. In P. Ucko (ed.), *Theory in archaeology – a world perspective*, 263-77. London: Routledge.

Cooney, G. 1996. Building the future on the past: archaeology and the construction of national identity in Ireland. In M. Díaz-Andreu and T. Champion (eds.), *Archaeology and nationalism in Europe*, 146-63 London: University College London Press.

Cooney, G. 1997. Images of settlement and the landscape. In P. Topping (ed.), *Neolithic Landscapes*, 23-31. Oxford: Oxbow Books.

Cooney, G. 1999. Social landscapes in Irish prehistory. In P. Ucko and R. Layton (eds.), *The archaeology and anthropology of landscape: shaping your landscape*, 46-65. London: Routledge.

Cooney, G. 2000a. *Landscapes of Neolithic Ireland*. London: Routledge.

Cooney, G. 2000b. Recognising regionality in the Irish Neolithic. In A. Desmond, G. Johnson, M. McCarthy, J. Sheehan and E. Shee Twohig (eds.), *New agendas in Irish prehistory: papers in commemoration of Liz Anderson*, 49-65. Bray: Wordwell.

Cooney, G. 2000c. Reading a landscape manuscript: a review of progress in prehistoric settlement studies in Ireland. In T. Barry (ed.), *A history of settlement in Ireland*, 1-49. London: Routledge.

Cooney, G. 2001. Bringing contemporary baggage to Neolithic landscapes. In B. Bender and M. Winer (eds.), *Contested landscapes: movement, exile and place*, 165-80. Oxford: Berg.

Cooney, G. 2003. Rooted or routed? Landscapes of Neolithic settlement in Ireland. In I. Armit, E. Nelis and D. Simpson (eds.), *Neolithic settlement in Ireland and western Britain*, 47-55. Oxford: Oxbow Books.

Cooney, G. 2007a. Parallel worlds or multi-stranded identities? Considering the process of 'going over' in the Irish Sea zone. In A. Whittle and V. Cummings (eds.), *Going over: the Mesolithic-Neolithic transition in north-west Europe*, 543-66. Oxford: Oxford University Press.

Cooney, G. 2007b. In retrospect: Neolithic activity at Knockadoon, Lough Gur, Co. Limerick, 50 years on. *Proceedings of the Royal Irish Academy* **107C**, 215-25.

Cooney, G. and Grogan, E. 1994. *Irish prehistory: a social perspective*. Bray: Wordwell.

Cooney, G. and Grogan, E. 1998. People and place during the Irish Neolithic: exploring social change in time and space. In M. Edmonds and

C. Richards (eds.), *Understanding the Neolithic of north-western Europe*, 456-80. Glasgow: Cruithne Press.

Cooney, G., Dunne, L., Kiely, J., Purcell, A., McSparron, C. and McManus, C. 1999. A boom in Neolithic houses. *Archaeology Ireland* **13** (1), 13-16.

Cooney, G., O'Sullivan, M. and Downey, L. 2006. *Archaeology 2020: repositioning Irish archaeology in the knowledge society*. Dublin: University College Dublin.

Cooney, G., Bayliss, A., Healy, F., Whittle, A., Danaher, E., Cagney, L., Mallory, J., Smyth, J., Kador, T. and O'Sullivan, M. 2011. Ireland. In A. Whittle, A. Bayliss and F. Healy (eds.), *Gathering time: dating the Early Neolithic enclosures of Southern Britain and Ireland*. Volume 2, 562-669. Oxford: Oxbow Books.

Cosgrove, M. 1995. *Paul Henry and Achill Ireland*. In U. Kockel (ed.), *Landscape, heritage and identity: case studies in Irish ethnography*, 93-116. London: Routledge.

Costa, L., Sternke, F. and Woodman, P. 2005. Microlith to macrolith: the reasons behind the transformation of production in the Irish Mesolithic. *Antiquity* **79**, 19-33.

Cross, S. 2001. Competitive feasting in the Neolithic. *Archaeology Ireland* **15** (1), 11-13.

Cross, S. 2003. Irish Neolithic settlement architecture – a reappraisal. In I. Armit, E. Nelis and D. Simpson (eds.), *Neolithic settlement in Ireland and western Britain*, 195- 202. Oxford: Oxbow Books.

Crooke, E. 2000. *Politics, archaeology and the creation of the National Museum of Ireland*. Dublin: Irish Academic Press.

Crothers, N. 1996. Ballyharry's Game. *Archaeology Ireland* **10** (4), 12-14.

Crothers, N. 1997. Ballyharry: Neolithic house. In I. Bennett (ed.), *Excavations 1996: summary accounts of archaeological excavations in Ireland*, 1-2. Bray: Wordwell.

Cummings, V. and Harris, O. 2011. Animals, people and places: the continuity of hunting and gathering practices across the Mesolithic-Neolithic transition in Britain. *European Journal of Archaeology* **14** (3), 361-82.

Cuppage, J. 1986. *Archaeological survey of the Dingle Peninsula*. Ballyferriter: Oidhreacht Chorca Dhuibhne.

Cusack T. 2010. A 'countryside bright with cosy homesteads': Irish nationalism and the cottage landscape. *National Identities* **3** (3), 221-38.

Danaher, E. 2007. *Monumental beginnings: the archaeology of the N4 Sligo inner relief road*. Dublin: The National Roads Authority.

Danaher, E. 2009. An early Neolithic house at Barnagore, Co. Cork. *Journal of Irish Archaeology* **18**, 1-16.

Danermark, B. Ekström, M. Jakobsen, L and Karlsson J. Ch. 2002. *Explaining society: critical realism in the social sciences*. London: Routledge.

Daniel, G. 1963. *The idea of prehistory*. Cleveland, OH: World Publishing Company.

Daniel, G. 1975. *A hundred and fifty years of archaeology*. London: Duckworth.

Davies, O. 1948. A summary of the archæology of Ulster: part I. *Ulster Journal of Archaeology* **11**, 1-42.

Davies, O. 1949. Excavations at the horned cairn of Ballymarlagh, Co. Antrim. *Ulster Journal of Archaeology* **12**, 26-42.

Davies, O. and Evans, E.E. 1943. The horned cairns of Ulster. *Ulster Journal of Archaeology* **6**, 7-23.

Dean, J. 1978. Independent dating in archaeological analysis. *Advances in Archaeological Method and Theory* **1**, 223-55.

de Jong, R., Björck, S., Björkman, L. and Clemmensen, L. (2006) 2006. Storminess variation during the last 6500 years as reconstructed from an ombrotrophic peat bog in Halland, southwest Sweden. *Journal of Quaternary Science* **21**, 905-919.

Desmond, S. 2000. Site 11, Drumhinny Lower: prehistoric. In I. Bennett (ed.), *Excavations 1998: summary accounts of archaeological excavations in Ireland*, 29-30. Bray: Wordwell.

Desmond, A., Johnson, G., McCarthy, M., Sheehan, J. and Shee Twohig, E. (eds.) 2000. *New agendas in Irish prehistory: papers in commemoration of Liz Anderson*. Bray: Wordwell.

de Valera, E. 1943. *St Patrick's Day 1943 address*. Raidió Teilifís Éireann radio broadcast. 17 March. Available at: http://www.rte.ie/laweb/II/II_t09b.html [last accessed: 21 March 2011].

de Valera, R., 1951. A group of horned cairns near Ballycastle, Co. Mayo. *Journal of the Royal Society Antiquaries of Ireland* **81** (2), 161-97.

de Valera, R. 1960. The court cairns of Ireland. *Proceedings of the Royal Irish Academy* **60C**, 9-140.

de Valera, R. 1961. The 'Carlingford Culture', the long barrow and the Neolithic of Great Britain and Ireland. *Proceedings of the Prehistoric Society* **27**, 234-52.

de Valera, R. 1965. Transeptal court cairns. *Journal of the Royal Society of Antiquaries of Ireland* **95**, 5-37.

de Valera, R. and Ó Nualláin, S. 1964. *Survey of the Megalithic Tombs of Ireland*. Volume II, Co. Mayo. Dublin: Stationery Office.

de Valera, R. 1979. Preface to the fifth edition. In S. Ó Ríordáin *Antiquities of the Irish Countryside*. Fifth edition. Revised by R. de Valera, xiii-xvi. London: Methuen.

Dincauze, D. 2000. *Environmental archaeology: principles and practice*. Cambridge: University of Cambridge.

Disalle, R. 2006. *Understanding space-time: the philosophical development of physics from Newton to Einstein*. Cambridge: Cambridge University Press.

Dobres, M.-A. and Robb, J. 2000. Agency in archaeology: paradigm or platitude? In M.-A. Dobres and J. Robb (eds.), *Agency in Archaeology*, 3-17. London: Routledge.

Doebley, J. 1984. 'Seeds' of wild grasses: a major food of Southwestern Indians. *Economic Botany* **38** (1), 52-64.

Dowd, M. 2008. The use of caves for funerary and ritual practices in Neolithic Ireland. *Antiquity* **82**, 305-317.

Dowling, G. 2006. The liminal boundary: an analysis of the sacral potency of the ditch at Ráth na Ríg, Tara, Co. Meath. *The Journal of Irish Archaeology* **15**, 15-37.

Downes, J. and Richards, C. 2005. The dwellings at Barnhouse. In C. Richards (ed.), *Dwelling among the Monuments: the Neolithic village of*

Barnhouse, Maeshowe passage grave and surrounding monuments at Stenness, Orkney, 57-127. Cambridge: McDonald Institute for Archaeological Research.

Driscoll, K., McClatchie, M., McGowan, A., O'Donnell, L. and Roche, H. (eds.) 2010. *Neolithic and Bronze Age landscapes of north Mayo: report 2010*. Dublin: UCD School of Archaeology.

Duffy, P. 1997. Writing Ireland: literature and art in the representation of Irish place. In B. Graham (ed.), *In search of Ireland: a cultural geography*, 64-83. London: Routledge.

Dunne, C., 2003. Neolithic structure at Drummenny Lower, Co. Donegal: an environmental perspective. In I. Armit, E. Nelis and D. Simpson (eds.), *Neolithic settlement in Ireland and western Britain*, 164-71. Oxford: Oxbow Books.

Dunne, C. 2009a. Appendix 6a: microfossil analysis for archaeological licence AE/04/77. In R. Chapple, C. Dunlop, S. Gilmore and L. Heaney (eds.), *Archaeological investigations along the A1 dualling scheme, Loughbrickland to Beech Hill, Co. Down, N. Ireland (2005)*, 245-9. Oxford: BAR, British Series 479. Oxford.

Dunne, C. 2009b. Appendix 2d: report on the cereal/seed impressions on ceramics. In R. Chapple, C. Dunlop, S. Gilmore and L. Heaney (eds.), *Archaeological investigations along the A1 dualling scheme, Loughbrickland to Beech Hill, Co. Down, N. Ireland (2005)*, 211-2. Oxford: BAR, British Series 479. Oxford.

Dunne, N. 1985. *Pre-bog archaeology: the Glenamoy-Barnatra peninsula Co. Mayo*. Unpublished M.A. thesis, University College Dublin.

Dykes, A. and Kirk, K. 2001. Initiation of a multiple peat slide on Cuilcagh Mountain, Northern Ireland. *Earth Surface Processes and Landforms* **26**, 395-408.

Dykes, A. and Kirk, K. 2006. Slope instability and mass movements in peat deposits. In: I. Martini, A. Martínez Cortizas and W. Chesworth, W. (eds.), *Peatlands: evolution and records of environmental and climate changes*, 377-406. Amsterdam: Elsevier.

Dykes, A. and Warburton, J. 2007. Geomorphological and subsurface drainage controls on failures of peat-covered hillslopes triggered by extreme rainfall. *Earth Surface Processes and Landforms* **32**, 1841-62.

Dykes, A., Gunn, J. and Convery (Née Kirk), K. 2008. Landslides in blanket peat on Cuilcagh Mountain, northwest Ireland. *Geomorphology* **102**, 325–40.

Eckstein, J., Leuschner, H., Bauerochse, A. and Sass-Klaassen, U. 2009. Subfossil bog-pine horizons document climate and ecosystem changes during the Mid-Holocene. *Dendrochronologia* **27**, 129–46.

Eckstein, J., Leuschner, H. and Bauerochse, A. 2011. Mid-Holocene pine woodland phases and mire development—significance of dendroecological data from subfossil trees from northwest Germany. *Journal of Vegetation Science* **22**, 781–94.

Edmonds, M. 1999. *Ancestral Geographies of the Neolithic*. London: Routledge.

Edwards, K. 1979. Palynological and temporal inference in the context of prehistory, with special reference to the evidence from lake and peat deposits. *Journal of Archaeological Science* **6** (3), 255–70.

Edwards, K. and Hiron, K. 1982. Date of blanket peat initiation and rates of spread—a problem in research design. *Quaternary Newsletter* **36**, 32–7.

Efron, B. 2013a. Bayes' theorem in the 21st century. *Science* **340**: 1177–8.

Efron, B. 2013b. A 250-year argument: belief, behavior, and the bootstrap. *Bulletin of the American Mathematical Society* **50** (1): 129–46.

Eliot, T.S. 1963 [1935]. Burnt Norton. In *Collected poems 1909–1962*, pp. 175–81. New York: Harcourt, Brace and World.

Emerson, R. 2009. *Essays on David Hume, medical men and the Scottish Enlightenment: industry, knowledge and humanity*. Farnham: Ashgate.

Eogan, G. 1963. A Neolithic habitation-site and megalithic tomb in Townleyhall townland, Co. Louth. *Journal of the Royal Society of Antiquaries of Ireland* **93** (1), 37–81.

Eogan, G. 1984. *Excavations at Knowth, 1*. Dublin: Royal Irish Academy.

Eogan, G. 1992. Scottish and Irish passage tombs: some comparisons and contrasts. In N. Sharples and J.A. Sheridan (eds.), *Vessels for the ancestors: essays on the Neolithic of Britain and Ireland in honour of Audrey Henshall*, 120–7. Edinburgh: Edinburgh University Press.

Eogan, G. and Roche, H. 1997. *Excavations at Knowth, 2: settlement and ritual sites of the fourth and third millennia BC*. Dublin: Royal Irish Academy.

Evans, E.E. 1939a. Some survivals of the Irish open field system. *Geography* **24 (1)**, 24-8.

Evans, E.E. 1939b. Donegal Survivals. *Antiquity*. **13**, 207-22.

Evans, E.E. 1940. Excavations at Carnanbane, County Londonderry: a double homed cairn. *Proceedings of the Royal Irish Academy* **45C**, 1-12.

Evans, E.E. 1942. *Irish heritage: the landscape, the people and their work*. Dundalk: Dundalgan Press.

Evans, E.E. 1957. *Irish Folkways*. London: Routledge.

Evans, E.E. 1968. Archaeology in Ulster since 1920. *Ulster Journal of Archaeology* **37**, 3-8.

Evans, E.E. 1973. *The personality of Ireland: habitat, heritage and history*. Cambridge: Cambridge University Press.

Evans, E.E. 1981. *The personality of Ireland: habitat, heritage and history*. Revised edition. Belfast: Blackstaff Press.

Evans, M. and Warburton, J. 2007. *Geomorphology of upland peat: erosion, form and landscape change*. Oxford: Blackwell.

Evans, R. 2013. Beware meddling with the history curriculum. *The Times*. 1 March: Letters, p. 21.

Fabian, J. 1983. *Time and the Other: how anthropology makes its object*. New York: Columbia University Press.

Faegri, K. and Iversen, J. 1975. *Textbook of pollen analysis*. Third edition. Oxford: Blackwell Scientific Publishing.

Faegri, K. and Iversen, J. 1989. *Textbook of pollen analysis*. Fourth edition (revised by K. Faegri, P. Kaland and K. Kryzwinski). Chichester: John Wiley and Sons.

Fanelli, D. 2012. Negative results are disappearing from most disciplines and countries. *Scientometrics* **90**, 891-904.

Fibiger, L. 2011. Human bone. In S. Caulfield, G. Byrne, N. Dunne and G. Warren (eds.) 2011. *Excavations on Céide hill, Behy and Glenultra, north Co. Mayo, 1963-1994*, 45. Dublin: UCD School of Archaeology.

Finlan, M. 1993. Having a field day all year long: Mayo is on the tear, celebrating 5,000 years of its existence. *The Irish Times*. 13 July: p. 11.

FitzGerald, M. 2007. Catch of the day at Clowanstown, Co. Meath. *Archaeology Ireland* **27** (4), 12-15.

Finlay, N. 2003. Cache and carry: defining moments in the Irish later Mesolithic. In L. Bevan and J. Moore (eds.), *Peopling the Mesolithic in a northern environment*, 87-94. Oxford: BAR International Series 1157.

Finlayson, B. 2006. Overview—setting up questions. In C. Conneller and G. Warren (eds.), *Mesolithic Britain and Ireland: new approaches*, 165-184. Stroud: Tempus.

Finlayson, B. and Warren, G. 2010. *Changing natures: hunter-gatherers, first farmers and the modern world*. London: Duckworth.

Fleming, A. 1987. Coaxial field systems: some questions of time and space. *Antiquity* **61**, 188-202.

Fleming A. 1989. The genesis of coaxial field systems. In R. Torrence and S. van der Leeuw (eds.), *What's new? A closer look at the process of innovation*, 63-81. London: Unwin Hyman.

Forster, E. M. 1953 [1933]. Introductory note. In M. O'Sullivan, *Twenty years a-growing*. Trans. M. Llewelyn Davies and G. Thomson, v-vi. Oxford: Oxford University Press.

Foster, R.F. 1993. Protestant magic: W.B. Yeats and the spell of Irish history. In *Paddy and Mr Punch: connections in Irish and English history*, 212-32. London: Allen Lane.

Fowler, P. 1981. Wildscape to landscape: 'enclosure' in prehistoric Britain. In R. Mercer (ed.), *Farming practice in British prehistory*, 9-54. Edinburgh: Edinburgh University Press.

Fowles, J. 1980. *John Aubrey's Monumenta Britannica*. Volume 1. Annotations by R. Legg. Sherborne: Dorset Publishing Company.

Fowles, J. 1982. *John Aubrey's Monumenta Britannica*. Volume 1. Annotations by R. Legg. Sherborne: Dorset Publishing Company.

Fredengren, C. 2002. *Crannógs: a study of people's relationship with lakes, with particular reference to Lough Gara in the north-west of Ireland*. Bray: Wordwell.

Fredengren, C. 2010. Interpretation: the significance of lake settlement at Lough Kinale. In C. Fredengren, A. Kilfeather and L. Stuijts, *Lough Kinale; studies of an Irish lake*, 237-66. Bray: Wordwell.

Gale, R. 2002. Time, temporality and paradox. In R. Gale (ed.), *The Blackwell guide to metaphysics*, 66-86. Oxford: Blackwell.

Gale, R. (ed.) 2002b. *The Blackwell guide to metaphysics*. Oxford: Blackwell.

Gamble, C. 2007a *Origins and revolutions: human identity in earliest prehistory*. Cambridge: Cambridge University Press.

Gamble, C. 2007b. No Neolithic Revolution. Review of 'First farmers: the origins of agricultural societies'. *Cambridge Archaeological Journal* **17** (1), 91-3.

Gamble, C. and Gittins, L. 2004. Social archaeology and origins research: a Palaeolithic perspective. In L. Meskell and R. Preucel (eds.), *A companion to social archaeology*, 96-118. Oxford: Blackwell.

Gamble, C., Davies, W., Pettitt, P., Hazelwood, L. and Richards, M. 2005. The archaeological and genetic foundations of the European population during the Late Glacial: implications for 'agricultural thinking'. *Cambridge Archaeological Journal* **15** (2), 193-223.

Gardner, A. 2008. Agency. In R. A. Bentley, H. Maschner and C. Chippindale (eds.), *Handbook of archaeological theories*, 95-108. Plymouth: AltaMira Press.

Garvin, T. and Hess, A. 2009. Gustave de Beaumont: Ireland's Alexis de Tocqueville. In S. Ó Síocháin (ed.), *Social thought on Ireland in the nineteenth century*, 9-26. Dublin: University College Dublin Press.

Gell, A. 1992. *The anthropology of time: cultural constructions of temporal maps and images*. Oxford: Berg.

Ghilardi, B. and O'Connell, M. 2013. Fine-resolution pollen-analytical study of Holocene woodland dynamics and land use in north Sligo, Ireland. *Boreas* **42**, 623-49.

Gibson, D. and Newman, J. 2001. *Festuca arundinacea* Schreber (*F. elatior* L. ssp. *arundinacea* (Schreber) Hackel). *Journal of Ecology* **89**, 304-24.

Giddens, A. 1979. *Central problems in social theory*. London: MacMillan.

Giddens, A. 1984. *The constitution of society: outline of the theory of structuration*. Cambridge: Polity Press.

Gilchrist, R. 2004. Archaeology and the life course: a time and age for gender. In L. Meskell and R. Preucel (eds.), *A companion to social archaeology*, 142-60. Oxford: Blackwell.

Gillespie, R. 2002. Neolithic house at Gortaroe, Westport, Co. Mayo. *Archaeology Ireland* **16 (1)**, 7.

Gillespie, R. 2003a. Gortaroe II: Neolithic house and possible kiln. In I. Bennett (ed.), *Excavations 2001: summary accounts of archaeological excavations in Ireland*, 279. Bray: Wordwell.

Gillespie, R. 2003b. Gortaroe: *fulachta fiadh*. In I. Bennett (ed.), *Excavations 2001: summary accounts of archaeological excavations in Ireland*. Bray: Wordwell.

Gillespie, R. 2007. Prehistory and history on the N5 Charlestown bypass in counties Mayo and Roscommon. In J. O'Sullivan and M. Stanley (eds.), *New routes to the past*, 11-25. Dublin: National Roads Authority.

Gillespie, S. 2000. Lévi-Strauss: maison and société à maisons. In R. Joyce and S. Gillespie (eds.), *Beyond kinship: social and material reproduction in house societies*, 22-52. Philadelphia: University of Pennsylvania Press.

Gooder, J. 2007. Excavation of a Mesolithic house at East Barns, East Lothian, Scotland: an interim report. In C. Waddington and K. Pedersen (eds.) *Mesolithic studies in the North Sea basin and beyond. Proceedings of a conference held at Newcastle in 2003*, 49-59. Oxford: Oxbow Books.

Gosden, C. 1994. *Social being and time*. Oxford: Blackwell.

Gosden, C. 2004. Shaping life in the late prehistoric and Romano-British periods. In R. Rosen (ed.), *Time and temporality in the ancient world*, 29-44. Philadelphia: University of Pennsylvania Museum of Archaeology and Anthropology.

Gosling, P. 1993 *Archaeological inventory of County Galway: volume I – west Galway*. Dublin: Stationary Office.

Gowen, M. 1987. Tankardstown, Co. Limerick: a Neolithic house. *Archaeology Ireland* **1(1)**, 6-10.

Gowen, M. 1988. *Three Irish gas pipelines: new archaeological evidence in Munster*. Bray: Wordwell.

- Gowen, M. and Tarbett, C. (n.d.). Tankardstown, Co Limerick: E372. *Significant unpublished Irish archaeological excavations 1930-1997. Section 4: Neolithic* Available at: www.heritagecouncil.ie [last accessed: 13 May, 2013].
- Gowen, M. and Tarbett, C. 1988. A third season at Tankardstown. *Archaeology Ireland* **2(4)**, 156.
- Gowen, M. and Tarbett, C., 1990. Tankardstown South. In I. Bennett (ed.), *Excavations 1989: summary accounts of archaeological excavations in Ireland*, 38-39. Bray: Wordwell.
- Graham, B. 1994. The search for the common ground: Estyn Evans's Ireland. *Transactions of the Institute of British Geographers* **19 (2)**, 183-201.
- Graham, B. 1997. Ireland and Irishness: place, culture and identity. In B. Graham (ed.), *In search of Ireland: a cultural geography*, 1-16. London: Routledge.
- Gräslund, B. 1987. *The birth of prehistoric chronology: dating methods and dating systems in nineteenth-century Scandinavian archaeology*. Cambridge: Cambridge University Press.
- Grayson, D. 1983. *The establishment of human antiquity*. New York: Academic Press.
- Green, S. and Zvelebil, M. 1990. The Mesolithic colonization and agricultural transition of south-east Ireland. *Proceedings of the Prehistoric Society* **15**, 57-88.
- Green, S. and Zvelebil, M. 1993. Interpreting Ireland's prehistoric landscape: the Bally Lough archaeological project. In P. Bogucki (ed.), *Case studies in European prehistory*, 1-29. Boca Raton, FL: CRC Press.
- Grogan, E. 1988. The pipeline sites and the prehistory of the Limerick area. In M. Gowen (ed.), *Three Irish gas pipelines: new archaeological evidence in Munster*, 148-57. Bray: Wordwell.
- Grogan, E. 1996. Neolithic houses in Ireland. In T. Darvill and J. Thomas (eds.), *Neolithic houses in northwest Europe and beyond*, 41-60. Oxford: Oxbow Books.
- Grogan, E. 2002. Neolithic houses in Ireland: a broader perspective. *Antiquity* **76**, 517-25

Grogan, E. 2004. The implications of Irish Neolithic houses. In I. Shepherd and G. Barclay (eds.), *Scotland in Ancient Europe: the Neolithic and Early Bronze Age of Scotland in their European context*, 103-14. Edinburgh: Society of Antiquaries of Scotland.

Guttman, E. 2005. Appendix 3: micromorphology report. In G. Warren, *Excavations in 2005 at Belderrig, Co. Mayo*, 29-30. Dublin: School of Archaeology, University College Dublin.

Hall, V., Pilcher, J. and Bowler, M. 1993. Pre-elm decline cereal-size pollen: evaluating its recruitment to fossil deposits using modern pollen rain studie. *Proceedings of the Royal Irish Academy* **93B**, 1-4.

Hamlin, A. and Hughes, K. 1997. *The modern traveller to the early Irish church*. Second edition. Dublin: Four Courts Press.

Hanrahan, E. 1954. An investigation of some physical properties of peat. *Géotechnique* **4 (3)**, 108-23.

Harbison, P. 1988. *Pre-Christian Ireland*. London: Thames and Hudson.

Harding, A. 2000. *European societies in the Bronze Age*. Cambridge: Cambridge University Press.

Harding, J. 2005. Rethinking the great divide: long-term structural history and the temporality of the event. *Norwegian Archaeological Review* **38 (2)**, 88-101.

Harvey, D. 1990. *The condition of postmodernity: an enquiry into the origins of social change*. Oxford: Blackwell.

Harvey, D., Jones, R., McInroy, N. and Milligan, C. 2001. Timing and spacing Celtic geographies. In D. Harvey, R. Jones, N. McInroy and C. Milligan (eds.), *Celtic geographies: old culture, new times*, 1-20. London: Routledge.

Hawking, S. 1988. *A brief history of time: from the big bang to black holes*. London: Bantam Press.

Herity, M. 1971. Prehistoric fields in Ireland. *Irish University Review* **1**, 258-65.

Herity, M. and Eogan, G. 1977. *Ireland in prehistory*. London: Routledge.

Hillman, G. 1981. Reconstructing crop husbandry practices from charred remains of crops. In R. Mercer (ed.), *Farming practice in British prehistory*, 123-62. Edinburgh: Edinburgh University Press.

Hillman, G. 2001. Archaeology, Percival, and the problems of identifying wheat remains. In P. Caligari and P. Brandham (eds.), *Wheat taxonomy: the legacy of John Percival*, 27-36. London: Linnean Special Issue 3.

Hillman, G., Mason, S., de Moulins, D. and Nesbitt, M. 1996. Identification of archaeological remains of wheat: the 1992 London workshop. *Circaea* **12** (2), 195-209.

Hobsbawm, E. 1983. Mass-producing traditions: Europe, 1870-1914. In

Hobsbawm, E. and Ranger, T. (eds.), *The invention of tradition*, 263-307. Cambridge: Cambridge University Press.

Hobson, B. (ed.) 1932. *Saorstát Eireann: official handbook*. Dublin: Talbot Press.

Hodder, I. 1987. The contribution of the long term. In I. Hodder (ed.), *Archaeology as long-term history*, 1-8. Cambridge: Cambridge University Press.

Hodder, I. 1992. *Theory and practice in archaeology*. London: Routledge.

Hodder, I. and Hutson, S. 2003. *Reading the past: current approaches to interpretation in archaeology*. Cambridge: Cambridge University Press.

Hodge, J. and Radick, G. 2003. Introduction. In J. Hodge and G. Radick (eds.) *The Cambridge companion to Darwin*, 1-16. Cambridge: Cambridge University Press.

Hofmann, D. 2005. The emotional Mesolithic: past and present ambiguities of Offnet cave. In N. Milner and P. Woodman (eds.), *Mesolithic studies at the beginning of the 21st century*, 194-11. Oxford: Oxbow Books.

Holden, J. 2005. Controls of soil pipe frequency in upland blanket peat. *Journal of Geophysical Research: Earth Surface* **110** (F01002), 1-11.

Holden, J. and Burt, T. 2002. Piping and pipeflow in a deep peat catchment. *Catena* **48**, 163-99.

Holden, J., Burt, P. and Vilas M. 2002. Application of ground-penetrating radar to the identification of subsurface piping in blanket peat. *Earth Surface Processes Landforms* **27**, 235-49.

Holden, J., Evans, M., Burt, T. and Horton, M. 2006. Impact of land drainage on peatland hydrology. *Journal of Environmental Quality* **35** (5), 1764-78.

Holland, C. (ed.) 2001. *The geology of Ireland*. Edinburgh: Dunedin Academic Press.

Holmes, J., Jones, R., Haas, J., McDermott, F., Molloy, K. and O'Connell, M. 2007. Multi-proxy evidence for Holocene lake-level and salinity changes at An Loch Mór, a coastal lake on the Aran Islands, western Ireland. *Quaternary Science Reviews* **26**, 2438-62.

Hughes, J. 2005. Two Neolithic structures in Granny townland, County Kilkenny. In J. O'Sullivan and M. Stanley (eds.), *Recent archaeological discoveries on national road schemes 2004*, 25-35. Dublin: National Roads Authority.

Hume, D. 2007 [1748]. *An enquiry concerning human understanding*. Ed. P. Millican. Oxford: Oxford University Press.

Hutchinson, J. 1987. *The dynamics of cultural nationalism: the Gaelic Revival and the creation of the Irish nation state*. London: Allen and Unwin.

Ingold, T. 1993. The temporality of landscape. *World Archaeology* **25**, 152-174.

Jackson, A. 2010. *Ireland, 1798-1998: war, peace and beyond*. Second edition. Oxford: Wiley-Blackwell.

Jacomet, S. 2006. *Identification of cereal remains from archaeological sites*. Second edition. Trans. (part) J. Greig. Basel: IPAS, Basel University.

Jaszczolt, K. 2009. *Representing time: an essay on temporality as modality*. Oxford: Oxford University Press.

Jensen, C. Kunzendorf, H. and Vorren, K.-D. 2002. Pollen deposition rates in peat and lake sediments from the *Pinus sylvestris* L. forest-line ecotone of northern Norway. *Review of Palaeobotany and Palynology* **121**, 113-32.

Jensen, J. 1982. *The prehistory of Denmark*. London: Methuen & Co. Ltd.

Johnson, M. 1997. Ironies. In A. Gwilt and C. Haselgrove (eds.), *Reconstructing Iron Age societies: new approaches to the British Iron Age*, 308-311. Oxford: Oxbow Books.

Johnson, M. 2006. On the nature of theoretical archaeology and archaeological theory. *Archaeological Dialogues* **13** (2), 117-132.

Johnson, M. 2007. *Ideas of landscape*. Oxford: Blackwell.

Johnson, N. 1993. Building a nation: an examination of the Irish Gaeltacht Commission Report of 1926. *Journal of Historical Geography* **19** (2), 157-68.

Johnson, N. 1997. Making space: Gaeltacht policy and the politics of identity. In B. Graham (ed.), *In search of Ireland: a cultural geography*, 174-91. London: Routledge.

Johnson, N. 2001. From time immemorial: narratives of nationhood and the making of national space. In J. May and N. Thrift (eds.), *Timespace: geographies of Temporality*, 89-105. London: Routledge.

Johnston, R. 2005. Pattern without a plan: rethinking the Bronze Age coaxial field systems on Dartmoor, south-west England. *Oxford Journal of Archaeology* **24** (1), 1-21.

Johnston, R. 2013. Bronze Age fields and land division. In H. Fokkens and A. Harding (eds.), *The Oxford handbook of the European Bronze Age*, 311-27. Oxford: Oxford University Press.

Jones, A. 2002. *Archaeological theory and scientific practice*. Cambridge: Cambridge University Press.

Jones, A. 2007. *Memory and material culture*. Cambridge: Cambridge University Press.

Jones, A. 2008. Introduction. In A. Jones (ed.), *Prehistoric Europe: theory and practice*, 1-13. Oxford: Wiley-Blackwell.

Jones, C. 1998. Interpreting the perceptions of past people. *Archaeological Review from Cambridge* **15** (1), 7-22.

Jones, C. 2003. Neolithic beginnings on Roughan Hill and the Burren. In I. Armit, E. Nelis and D. Simpson (eds.), *Neolithic settlement in Ireland and western Britain*, 189- 94. Oxford: Oxbow Books.

Jones, C. 2004. *The Burren and the Aran Islands: exploring the archaeology*. Cork: Collins Press.

Jones, C. 2007. *Temples of stone: exploring the megalithic tombs of Ireland*. Cork: Collins Press.

Jones, C., Carey, O. and Hennigar, C. 2010. Domestic production and the political economy in prehistory: evidence from the Burren, Co. Clare. *Proceedings of the Royal Irish Academy* **111C**, 33–58.

Jones, G. and Rowley-Conwy, P. 2007. On the importance of cereal cultivation in the British Neolithic. In S. Colledge and J. Conolly (eds.), *The Origins and spread of domestic plants in Southwest Asia and Europe*, 391–419. Walnut Creek, CA: Left Coast Press.

Jones, S. 1997. *The archaeology of ethnicity: constructing identities in the past and present*. London: Routledge.

Jones, S. and Richards, C. 2000. Neolithic cultures in Orkney: classification and interpretation. In A. Richie (ed.), *Neolithic Orkney in its European context*, 101–6. Cambridge: McDonald Institute for Archaeological Research.

Jones, S. and Richards, C. 2005. Artefacts, monuments and cultural identity. In J. Downes, S. Foster, C. Whickham-Jones and J. Callister (eds.), *The heart of Neolithic Orkney world heritage site*, 80–86. Edinburgh: Historic Scotland.

Jordan, P. and Zvelebil, M. 2009. *Ex oriente lux: the prehistory of hunter-gatherer ceramic dispersals*. In P. Jordan and M. Zvelebil (eds.), *Ceramics before farming: the dispersal of pottery among prehistoric Eurasian hunter-gatherers*, 33–89. Walnut Creek, CA: Left Coast Press.

Jordanova, L. 2000. *History in practice*. London: Arnold.

Joyce, R. and Lopiparo, J. 2005. Doing agency in archaeology. *Journal of Archaeological Method and Theory* **12** (4), 365–74.

Karlsson, H. 2001. Time for an archaeological ‘time out’? In H. Karlsson (ed.), *It's about time: the concept of time in archaeology*, 45–59. Göteborg: Bricoleur Press.

Kelleher, H. 2011. The excavation. In R. Cleary and H. Kelleher (eds.), *Archaeological excavations at Tullahedy, Co. Tipperary: Neolithic Settlement in north Munster*, 6–114. Dublin: The Collins Press.

Kelly, E. 1978. A reassessment of the dating evidence for Knockadoon Class II pottery. *Irish Archaeological Research Forum* **V**, 23–7.

Kennedy, S. 2007. *Paul Henry: paintings, drawings, illustrations*. London: Yale University Press.

Kidd, C. 2004. *British identities before nationalism: ethnicity and nationhood in the Atlantic world, 1600–1800*. Cambridge: Cambridge University Press.

Kiely, J. 2000. Cloghers, Tralee: Neolithic house. In I. Bennett (ed.), *Excavations 1998: summary accounts of archaeological excavations in Ireland*, 97. Bray: Wordwell.

Kiely, J. 2002. Cloghers, Tralee: prehistoric. In I. Bennett (ed.), *Excavations 2000: summary accounts of archaeological excavations in Ireland*. Bray: Wordwell.

Kiely, J. 2003. A Neolithic house at Cloghers, Co. Kerry. In I. Armit, E. Nelis and D. Simpson (eds.), *Neolithic settlement in Ireland and western Britain*, 182-7. Oxford: Oxbow Books.

Kiely, J. and Dunne, L. 2005. Recent archaeological excavations in the Tralee area. In M. Connolly (ed.), *Past kingdoms: recent archaeological research, survey and excavation in County Kerry*, 39-64. Tralee: Kerry County Council/The Heritage Council.

Kimball, M. 2000. Variation and context: ecology and social evolution in Ireland's Later Mesolithic. In A. Desmond, G. Johnson, M. McCarthy, J. Sheehan and E. Shee Twohig (eds.), *New agendas in Irish prehistory: papers in commemoration of Liz Anderson*, 31-47. Bray: Wordwell.

King, P. 2007. The archaeological excavation of a pre-bog wall (Cat. No. 183) at Bunnamohaun. In P. Gosling, C. Manning and J. Waddell (eds.), *New Survey of Clare Island*. Volume 5: Archaeology, 291-6. Dublin: Royal Irish Academy.

Kinnes, I. 1975. Monumental function in British Neolithic burial practices. *World Archaeology* 7 (1), 16–29.

Kinnes, I. 1984. Microliths and megaliths: monumental origins on the Atlantic fringe. In G. Burenhult (ed.), *The archaeology of Carrowmore: environmental archaeology and the megalithic tradition at Carrowmore, Co. Sligo, Ireland*. Theses and papers in Northern European Archaeology, 14, 367-70. Stockholm: Institute of Archaeology, University of Stockholm.

Kinnes, I. 1985. Circumstances not context: the Neolithic of Scotland as seen from the outside. *Proceedings of the Society of Antiquaries of Scotland* 115, 15-57.

Kinnes, I. 1992. Balnagowan and after: the context of non-megalithic mortuary sites in Scotland. In N. Sharples and J.A. Sheridan (eds.), *Vessels*

for the ancestors: essays on the Neolithic of Britain and Ireland in honour of Audrey Henshall, 83-103. Edinburgh: Edinburgh University Press.

Knapp, A. B. 1992. Archaeology and *Annales*: time, space and change. In A. Bernard Knapp (ed.), *Archaeology, Annales and ethnohistory*, 1-21. Cambridge: Cambridge University Press.

Kneafsey, M. 2001. Tourism images and the construction of Celticity in Ireland and Brittany. In D. Harvey, R. Jones, N. McInroy and C. Milligan (eds.), *Celtic geographies: old culture, new times*, 123-38. London: Routledge.

Koestler, A. 1985 [1940]. *Darkness at noon*. Trans. D. Hardy. Harmondsworth: Penguin Books.

Kotsakis, K. 2005. Across the border: unstable dwellings and fluid landscapes in the earliest Neolithic of Greece. In D. Bailey, A. Whittle and V. Cummings (eds.), *(un)settling the Neolithic*, 8-15. Oxford: Oxbow Books.

Kuder, T. and Krüge, M. 1998. Preservation of biomolecules in sub-fossil plants from raised peat bogs—a potential paleoenvironmental proxy. *Organ Geochemistry* **29** (5-7), 1355-68.

Kuhn, T. 1970. *The structure of scientific revolutions*. Second edition. Chicago: University of Chicago Press.

Kullman, L. 1994. Palaeoecology of pine (*Pinus sylvestris* L.) in the Swedish Scandes and a review of the analysis of subfossil wood. *Geografiska Annaler* **76A** (4), 247-59.

Lacy, B. 1983. *Archaeological survey of County Donegal*. Lifford: Donegal County Council.

Lane, L. 2003. 'It is in the cottages and farmers' houses that the nation is born': AE's *Irish Homestead* and the Cultural Revival. *Irish University Review* **33** (1), 165-81.

Larkin, E. 1975. Church, state, and nation in modern Ireland. *American Historical Review* **80** (5), 1244-76.

Latour, B. 1993 *We have never been modern*. Trans. C. Porter. Cambridge, MA: Harvard University Press.

Leerssen, J. 1996. *Remembrance and imagination: patterns in the historical and literary representation of Ireland in the nineteenth century*. Cork: Cork University Press.

- Leersen, J. 2006. *National thought in Europe: a cultural history*. Amsterdam: Amsterdam University Press.
- Leone, M.P. 1978. Time in American archaeology. In C. Redman, M. Berman, E. Curtin, W. Langhorne Jr., N. Versaggi, and J. Wanser (eds.), *Social archaeology: beyond subsistence and dating*, 25-36. New York: Academic Press.
- Le Poidevin, R. 2007. *The images of time: an essay on temporal representation*. Oxford: Oxford University Press.
- Liversage, G. 1960. A Neolithic Site at Townleyhall, Co. Louth *Journal of the Royal Society of Antiquaries of Ireland* **90** (1), 49-60.
- Logan, E. 2007. Uncovering Carlow's oldest farmstead. *Seanda* **2**, 67-8.
- Logue, P. 2002. Ballynashallog and Ballynagard: Neolithic settlement. In I. Bennett (ed.), *Excavations 2000: summary accounts of archaeological excavations in Ireland*, 53-4. Bray: Wordwell.
- Logue, P. 2003. Excavations at Thornhill, Co. Londonderry. In I. Armit, E. Nelis and D. Simpson (eds.), *Neolithic settlement in Ireland and western Britain*, 149-55. Oxford: Oxbow Books.
- Long, M. and Jennings, P. 2006. Analysis of the peat slide at Pollatomish, County Mayo, Ireland. *Landslides* **3** (1), 51-61.
- Lowe, J. and Walker, M. 1997. *Reconstructing Quaternary environments*. Harlow: Prentice-Hall.
- Lucas, B. 2010. *Tentative submission to World Heritage Centre: the Céide Fields and north-west Mayo boglands*. Wexford: Department of the Environment, Heritage and Local Government.
- Lucas, G. 2005. *The archaeology of time*. London: Routledge.
- Lynch, A. 1981. *Man and environment in south-west Ireland, 4000 BC – AD 800: a study of man's impact on the development of soil and vegetation*. Oxford: BAR British Series 85.
- Lynch, A. 2014. *Poulnabrone: an Early Neolithic portal tomb in Ireland*. Dublin: The Stationery Office.
- Lynch, M. 2012. Fanore More: shell midden. In I. Bennett (ed.), *Excavations 2009: summary accounts of archaeological excavations in Ireland*. Bray: Wordwell.

Macalister, R.A.S. 1917. Pre-Celtic Ireland. *The Irish Monthly*, **45 (528)**, 346-352.

Macalister, R.A.S. 1919. Temair Breg: a study of the remains and traditions of Tara. *Proceedings of the Royal Irish Academy* **34C**, 231-404.

Macalister, R.A.S. 1925. *The present and future of archaeology in Ireland: an address delivered at a meeting of the Royal Society of Antiquaries of Ireland held on 27 January, 1925*. Dublin: Falconer

Macalister, R.A.S. 1928. *The archaeology of Ireland*. London: Methuen.

Macalister, R.A.S. 1949. *The archaeology of Ireland*. Second revised edition. London: Methuen.

MacConnell, S. 1990. Uncovering the secrets of the Céide Fields. *The Irish Times*. 22 September: p. A3.

MacConnell, S. 1993. Making a Mayo miracle. *The Irish Times*. 29 May: Review, p. 40.

MacDonagh, O. 1983. *States of mind: a study of Anglo-Irish conflict, 1780-1980*. London: George Allen and Unwin.

MacGregor, G. and McLellan, K. 2008. A burning desire to build: excavations at Eweford West and Pencraig Hill (3950-3380 BC). In O. Lelong and G. MacGregor (eds.), *The lands of ancient Lothian: interpreting the archaeology of the A1*. Edinburgh: Society of Antiquaries of Scotland.

Macklin, M., Bonsall, C., Davies, F. and Robinson, M. 2000. Human-environmental interaction during the Holocene: new data and interpretations from the Oban area, Argyll, Scotland. *The Holocene* **10 (1)**, 109-21.

Maclean, D. (ed.) 1952. *Soil mechanics for road engineers*. London: Her Majesty's Stationery Office.

MacPherson, J. 2001. 'Ireland begins in the home': women, Irish national identity and the domestic sphere in the *Irish Homestead*, 1896-1912. *Eire-Ireland* **36 (3/4)**, 131-52.

Maisels, C. 1993. *The Near East: archaeology and the Cradle of Civilization'*. London: Routledge.

Mallory, J. P. and MacNeill, T. E. 1991. *The archaeology of Ulster: from colonization to plantation*. Belfast: The Queen's University of Belfast.

Mallory, J.P., Nelis, E. and Hartwell, B. 2011. *Excavations on Donegore Hill, Co. Antrim*. Dublin: Wordwell.

Massey, D. 1999. Space-time, "science" and the relationship between physical geography and human geography. *Transactions of the Institute of British Geography* **24**, 261-76.

Masters, L. 1973. The Lochhill long cairn. *Antiquity* **47**, 96-100.

Masters, L. 1981. Chambered tombs and non-megalithic barrows in Britain. In C. Renfrew (ed.), *The megalithic monuments of western Europe*, 97-112. London: Thames and Hudson.

McCabe, B., McNeill, J. and Black, J. 2007. *Ground improvement using the vibro-stone column technique. Paper presented to a joint meeting of Engineers Ireland West Region and the Geotechnical Society of Ireland, NUI Galway, 15th March 2007.* Available at: www.nuigalway.ie/civileng/staff/documents_bmc/2007mccabe_mcneill_and_black_iei_west_region_geotech_soc_lecture.pdf [last accessed on 3 June 2013].

McCartan, S. 2003. Mesolithic hunter-gatherers in the Isle of Man: adaptations to an island environment? In L. Larsson, H. Kindgren, K. Knutsson, D. Loeffler, and A. Åkerlund (eds.), *Mesolithic on the move: papers presented at the sixth international conference on the Mesolithic in Europe, Stockholm 2000*, 331-9. Oxford: Oxbow Books.

McClatchie, M. 2009. *Arable agriculture and social organisation: a study of crops and farming systems in Bronze Age Ireland*. Unpublished Ph.D. thesis, Institute of Archaeology, University College London.

McClatchie, M. 2011a. Analysis of non-wood plant macro-remains. In R. Cleary and H. Kelleher (eds.), *Archaeological excavations at Tullahedy, Co. Tipperary: Neolithic Settlement in north Munster*, 161-78. Dublin: The Collins Press.

McClatchie, M. 2011b. A long tradition of cereal production. *Seanda* **6**, 8-11.

McClatchie, M., Whitehouse, N., Schulting, R., Bogaard, A and Barratt, P. 2009. Cultivating societies: new insights into agriculture in Neolithic Ireland. In M. Stanley, E. Danaher and J. Eogan (eds.) *Dining and dwelling: proceedings of a public seminar on archaeological discoveries on national road schemes, August 2008*, 1-8. Dublin: National Roads Authority.

McClatchie, M., *et al.* (in press). Neolithic farming in north-western Europe: archaeobotanical evidence from Ireland. *Journal of Archaeological*

Science (2012), <http://dx.doi.org/10.1016/j.jas.2012.10.022> [Last accessed on 11 March 2013].

McCormack, C. 2003. One-off housing key for rural living, meeting told. *The Irish Times*. 22 February: p. 2.

McCormick, F. 1986. Animal bones from prehistoric Irish burials. *Journal of Irish Archaeology* **3**, 37-48.

McCormick, F. 1997. Animal bone analysis from Neolithic and Beaker complexes. In G. Eogan and H. Roche, *Excavations at Knowth, 2: settlement and ritual sites of the fourth and third millennia BC*, 301-6. Dublin: Royal Irish Academy.

McCormick, F. 2007. Mammal bone studies from prehistoric Irish sites. In E. Murphy and N. Whitehouse (eds.), *Environmental archaeology in Ireland*, 77-101. Oxford: Oxbow.

McCourt, D. 1955. Infield and outfield in Ireland. *The Economic History Review* **7** (3), 369-76.

McCourt, D. 1971. The dynamic quality of Irish rural settlement. In R. Buchanan, E. Jones, and D. McCourt (eds.) *Man and his habitat*, 126-64. London: Routledge.

McGahern, J. 1999. Whatever you say nothing: eye on the 20th century. *The Irish Times*. 26 October: p. 13.

McManus, R. 2011. Celtic Tiger housing. In F.H.A. Aalen, K. Whelan, and M. Stout (eds.), *Atlas of the Irish rural landscape*. Second edition, 156-65. Cork: Cork University Press.

McNally A. and Doyle G. 1984. A study of sub-fossil pine layers in a raised bog complex in the Irish midlands: 1. Palaeowood extent and dynamics. *Proceedings of the Royal Irish Academy* **84B**, 57-70.

McQuade, M. 2005. North Wall Quay Dublin: Late Mesolithic fish-traps. *Archaeology Ireland* **19** (2), 6.

McQuade, M. and O'Donnell, L. 2007. Late Mesolithic fish traps from the Liffey estuary, Dublin, Ireland. *Antiquity* **81**, 569-84.

McSparron, C. 2003. The excavation of a Neolithic house in Enagh townland, Co. Derry. In I. Armit, E. Nelis and D. Simpson (eds.), *Neolithic settlement in Ireland and western Britain*, 172-5. Oxford: Oxbow Books.

McSparron, C. 2008. Have you no homes to go to? *Archaeology Ireland* **22** (3), 18-21.

McSparron, C. and Weir, D. 2003. The excavation of a Neolithic house and other structures at Enagh, County Derry. *Ulster Journal of Archaeology* **62**, 1-15.

McTaggart, J. 1908. The unreality of time. *Mind* **17** (68), 457-74.

Mead, G. 1929. The nature of the past. In J. Cross (ed.), *Essays in honor of John Dewey, on the occasion of his seventieth birthday*, 235-42. New York: Henry Holt.

Mears, R. and Hillman, G. 2007. *Wild food*. London: Hodder and Staunton.

Mellor, D. 1998. *Real time II*. London: Routledge.

Meskell, L. and Preucel, R. (eds.) 2004. *A companion to social archaeology*. Oxford: Blackwell.

Miller, T. 1992. A cautionary note on the use of morphological characters for recognising taxa of wheat (genus *Triticum*). In: P. Anderson (ed.), *Préhistoire de l'agriculture: nouvelles approches expérimentales et ethnographiques*, 249-54. Paris: Centre Nationale de la Recherche Scientifique.

Milner, N. 2005a. Seasonal consumption practices in the Mesolithic: economic, environmental, social or ritual. In N. Milner and P. Woodman (eds.), *Mesolithic studies at the beginning of the 21st century*, 56-68. Oxford: Oxbow Books.

Milner, N. 2005b. Can seasonality studies be used to identify sedentism in the past? In D. Bailey, A. Whittle and V. Cummings (eds.), *(un)settling the Neolithic*, 32-7. Oxford: Oxbow Books.

Milner, N. 2010. Subsistence at 4000-3700 cal BC: landscapes of change or continuity? In: B. Finlayson and G. Warren (eds.), *Landscapes in transition*, 46-54. Oxford: Oxbow Books.

Milner, N. and Woodman, P. (eds.) 2005a. *Mesolithic studies at the beginning of the 21st century*. Oxford: Oxbow Books.

Milner, N. and Woodman, P. 2005b. Looking in to the canon's mouth: Mesolithic studies in the 21st century. In N. Milner and P. Woodman (eds.), *Mesolithic studies at the beginning of the 21st century*, 1-13. Oxford: Oxbow Books.

Milner, N. and Woodman, P. 2007. Deconstructing the myths of Irish Shell Middens. In N. Milner, O. Craig and G. Bailey (eds.), *Shell middens in Atlantic Europe*. Oxford: Oxbow Books.

Mitchell, G. F. 1979. Tillage tools in Ireland during the past 5,000 years. The Boyle Medal discourse, 1978. *Journal of Earth Sciences, Royal Dublin Society* **2**, 27-40

Mitchell, G. F. 1989. *Man and environment in Valencia Island*. Dublin: Royal Irish Academy.

Mitchell, J. and Jardine, F. 2002. *A guide to ground treatment*. London: Construction Industry Research and Information Association Publication C572.

Molloy, K. and O'Connell, M. 1995. Palaeoecological investigations towards the reconstruction of environment and land-use changes during prehistory at Céide Fields, western Ireland. *Probleme der Küstenforschung im südlichen Nordseegebiet* **23**, 187-25.

Monk, M. 1988. Archaeobotanical study of samples from pipeline sites. In M. Gowen (ed.), *Three Irish gas pipelines: new archaeological evidence in Munster*, 185-91. Bray: Wordwell.

Monk, M. 2000. Seeds of Discontent: an environmental archaeological contribution to the nature of the Earlier Neolithic. In A. Desmond, G. Johnson, M. McCarthy, J. Sheehan and E. Shee Twohig (eds.), *New agendas in Irish prehistory: papers in commemoration of Liz Anderson*, 67-87. Bray: Wordwell.

Monk, M. and Kelleher, E. 2005. An assessment of the archaeological evidence for Irish com drying kilns in the light of archaeobotanical and experimental evidence. *Journal of Irish Archaeology* **14**, 77-114.

Monk, M. and Kelleher, E. 2009. Aspects of the archaeology of the Irish keyhole-shaped corn-drying kiln with particular reference to archaeobotanical studies and archaeological experiments. In, A. Fairbairn and E. Weiss (eds.), *From foragers to farmers: papers in honour of Gordon C. Hillman*, 139-52. Oxford: Oxbow Books.

Moore, D. 2003. Neolithic houses in Ballyharry townland, Islandmagee, Co. Antrim. In I. Armit, E. Nelis and D. Simpson (eds.), *Neolithic settlement in Ireland and western Britain*, 156-63. Oxford: Oxbow Books.

Moore, M. 2003. *Archaeological inventory of County Leitrim*. Dublin: The Stationery Office.

- Moore, P. Merryfield, D. and Price, M. 1984. The vegetation and development of blanket mires. In P. Moore (ed.), *European mires*, 203-35. London: Academic Press.
- Morgan, L. H. 1877. *Ancient society, or, researches in the lines of human progress from savagery through barbarism to civilization*. London: MacMillan.
- Mossop, M. 2009. Lakeside developments in County Meath, Ireland: a Late Mesolithic fishing platform and possible mooring at Clowanstown 1. In S.
- McCartan, R. Schulting, G. Warren and P. Woodman (eds.), *Mesolithic horizons: papers presented at the seventh international conference on the Mesolithic in Europe, Belfast 2005*, 895–899. Oxford: Oxbow Books.
- Mullane, F. 2000. Vernacular architecture. In C. Rynne, N. Buttimer and H. Guerin (eds.), *The heritage of Ireland*, 71-7. Cork: Collins Press.
- Murphy, E. and Whitehouse, N. 2007. Introduction. In E. Murphy and N. Whitehouse (eds.), *Environmental archaeology in Ireland*, xi-xxi. Oxford: Oxbow.
- Murray, C. 1997. *Derryfadda, Tipperary: degraded platform*. 1997: 539 DER218. Available at: www.excavations.ie [last accessed on 3 February 2013].
- Nash, C. 1993. Embodying the nation: the west of Ireland landscape and Irish identity. In M. Cronin and B. O'Connor (eds.), *Tourism in Ireland: a critical analysis*, 86-114. Cork: Cork University Press.
- Neisser, U. 1988. Time present and time past. In M. Gruneberg, P. Morris and R. Sykes (eds.), *Practical aspects of memory: current research and issues*. Volume 2, 545-60. Chichester: Wiley.
- Newman, C. 2007. Procession and symbolism at Tara: analysis of Tech Midhchúarta (the 'Banqueting Hall') in the context of the sacral campus. *Oxford Journal of Archaeology* (26) 4, 415-38.
- Noble, G. 2006. *Neolithic Scotland: timber, stone, earth and fire*. Edinburgh: Edinburgh University Press.
- Nyerup, R. 1806. *Oversyn over faedrelandets mindesmaerker fra oldtiden*. Copenhagen.
- O'Brien, W. 2009. *Local worlds: early settlement landscapes and upland farming in south-west Ireland*. Cork: The Collins Press.

O'Brien, W. 2012. The Chalcolithic in Ireland: a chronological and cultural framework. In M. Allen, J. Gardiner., J. A. Sheridan (eds.), *Is there a British Chalcolithic? People, place and polity in the late 3rd millennium*, 211-25. Prehistoric Society Research Paper 4. Oxford: Oxbow Books.

O'Connell, M. 1986. Reconstruction of local landscape development in the post-Atlantic based on palaeoecological investigations at Carrownaglogh prehistoric field system, County Mayo, Ireland. *Review of Palaeobotany and Palynology* **49**, 117-76.

O'Connell, M. 1987. Early cereal-type pollen records from Connemara, western Ireland and their possible significance. *Pollen et Spores* **29**, 207-24.

O'Connell, M. 1990a. Origins of Irish lowland blanket peat. In G. Doyle (ed.), *Ecology and conservation of Irish peatlands*, 49-71. Dublin: Royal Irish Academy.

O'Connell, M. 1990b. Early land use in north-east County Mayo: the palaeoecological evidence. *Proceedings of the Royal Irish Academy* **90C**, 259-79.

O'Connell, M. and Molloy, K. 2001. Farming and woodland dynamics in Ireland during the Neolithic. *Proceedings of the Royal Irish Academy* **101B (1-2)**, 99-128.

O'Connor, B., Cooney, G. and Chapman, J. (eds.) 2009. *Materialitas: working stone, carving identity*. Oxford: Oxbow Books.

O'Connor, T. 2000. *The archaeology of animal bones*. Sutton: Stroud.

O'Connor, K. 1998. *The archaeology of medieval rural settlement in Ireland*. Discovery Programme Monograph 3. Dublin: Royal Irish Academy.

O'Connor, K. 2002. Housing in later medieval Gaelic Ireland. *Ruralia* **4**, 197-206.

O'Curry, E. 1873. *On the manners and customs of the ancient Irish*. Ed. W. K. Sullivan, Dublin: W.B. Kelly.

O'Curry, E. 1878 [1861]. *Lectures on the manuscript materials of ancient Irish history, delivered at the Catholic University of Ireland, during the sessions of 1855 and 1856*. Reissue. Dublin: William A. Hinch; Patrick Traynor.

Ó Donnabháin, B. 2000. An appalling vista? The Celts and the archaeology of later prehistoric Ireland. In A. Desmond, G. Johnson, M. McCarthy, J.

Sheehan and E. Shee Twohig (eds.), *New agendas in Irish prehistory: papers in commemoration of Liz Anderson, 189-196*. Bray: Wordwell.

O'Donnell, R. 1997. *The establishment of a radiocarbon dating facility at University College Dublin and its application to a study of palaeoecological material from Céide Fields and the North Mayo blanket bog*. Unpublished Ph.D. thesis, University College Dublin.

O'Donoghue, J. 2011. Archaeological excavation report: E2410—Gortore 1b, Co. Cork. Mesolithic, Neolithic, and Early Bronze Age activity on the banks of the River Funshion. *Eachtra Journal* **10**.

O'Donovan, E., P. Johnston, I. Stuijts and S. Milliken 2004. A Neolithic house at Kishoge, Co. Dublin. *Journal of Irish Archaeology* **12/13**, 1-27.

Ó Drisceoil, C. 2003. Archaeological excavation of a Neolithic settlement at Coolfore, Co. Louth. In I. Armit, E. Nelis and D. Simpson (eds.), *Neolithic settlement in Ireland and western Britain*, 176-81. Oxford: Oxbow Books.

Ó Drisceoil, C. 2007. A preliminary report concerning the archaeological excavation of Neolithic houses at Coolfore, County Louth. *Journal of the County Louth Archaeological and Historical Society*. **26 (3)**, 360-85.

Ó Floinn, R., 2011. Annagh, Co. Limerick: 1992E047. In: M. Cahill and M. Sikora (eds.), *Breaking ground, finding graves: reports on the excavations of burials by the National Museum of Ireland, 1927-2006*, 17-47. Dublin: Wordwell.

O'Keeffe, E. and Ciuchini, P. 2010. Creating digital archaeological landscapes. In K. Driscoll, M. McClatchie, A. McGowan, L. O'Donnell and H. Roche (eds.), *Neolithic and Bronze Age landscapes of north Mayo: report 2010*, 179-84. Dublin: UCD School of Archaeology.

O'Kelly, M.J. 1958. A horned cairn at Shanballyedmond, Co. Tipperary. *Journal of the Cork Historical and Archaeological Society* **63**, 37-72.

O'Kelly, M.J. 1989. *Early Ireland: an introduction to Irish prehistory*. Cambridge: Cambridge University Press.

Olivier, L. 2001. Duration, memory and the nature of the archaeological record. In H. Karlsson (ed.), *It's about time: the concept of time in archaeology*, 61-70. Göteborg: Bricoleur Press.

Ó Néill, J. 2007. Ballyharry Farm, Ballyharry, Island Magee: Neolithic occupation: Neolithic settlement. In I. Bennett (ed.), *Excavations 2004: summary accounts of archaeological excavations in Ireland*. Bray: Wordwell.

Ó Néill, J., Donaghy, E. and Sloan, B. 2004. *Investigations at Ballyharry Farm, Ballyharry, Co. Antrim AE/04/22*. Unpublished report for the Centre for Archaeological Fieldwork, Queen's University Belfast.

Ó Nualláin, S. 1972. A Neolithic House at Ballyglass near Ballycastle, Co. Mayo. *Journal of the Royal Society of Antiquaries of Ireland* **102** (1), 49-57.

Ó Nualláin, S. and Ó Donnabháin, B. 1998. Excavation of the smaller court-tomb and associated hut sites at Ballyglass, County Mayo. *Proceedings of the Royal Irish Academy* **98C**, 125-75.

Ó Nualláin, S, Murray, M. and Warren, G. 2011. Excavations at Behy court tomb, 1963-64 and 1969. In S. Caulfield, G. Byrne, N. Dunne and G. Warren (eds.) 2011. *Excavations on Céide hill, Behy and Glenultra, north Co. Mayo, 1963-1994*, 5-51. Dublin: UCD School of Archaeology.

Ó Nualláin, S., Greene, S. and Rice, K. (eds.) (forthcoming). *Excavation of the centre-court tomb and underlying house site at Ballyglass, Co. Mayo*. Seandálaíocht Monograph 3. Dublin: UCD School of Archaeology.

Ó Ríordáin, S. 1954. Lough Gur excavations: Neolithic and Bronze Age houses on Knockadoon. *Proceedings of the Royal Irish Academy* **56C**, 297-459.

Ó Ríordáin, S. 1979. *Antiquities of the Irish Countryside*. Fifth edition. Revised by R. de Valera. London: Methuen.

O'Sullivan, Aidan. 1997. Last foragers or first farmers? *Archaeology Ireland* **11** (2), 14-16.

O'Sullivan, Aidan. 1998. *The archaeology of lake settlement in Ireland*. Discovery Programme Monographs 4. Dublin: Royal Irish Academy.

O'Sullivan, Aidan and Van de Noort, R. 2007. Temporality, cultural biography and seasonality: rethinking time in wetland archaeology. In J. Barber, C. Clarke, M. Cressey, A. Crone, A. Hale, J. Henderson, R. Housley, R. Sands and J. A. Sheridan (eds.), *Archaeology from the wetlands: recent perspectives*, 67-78. Edinburgh: Society of Antiquaries of Scotland.

O'Sullivan, Ann and Sheehan, J. 1996. *The Iveragh Peninsula: an archaeological survey of South Kerry*. Cork: Cork University Press.

Overland, A. and O'Connell, M. 2009. Palaeoecological investigations in the Barrees Valley. In B. O'Brien (ed.), *Local worlds: early settlement landscapes and upland farming in south-west Ireland*, 285-322. Cork: The Collins Press.

Paynter, R. 2002. Time in the valley: narratives about rural new England. *Current Anthropology* **43**, Supplement, S85-101.

Penrose, R. 1989. *The emperor's new mind: concerning computers, minds, and the laws of physics*. Oxford: Oxford University Press.

Peterson, J. 1990. Assessing variability in Late Mesolithic assemblages in Ireland. In P. Vermeersch and P. Van Peer (eds.), *Contributions to the Mesolithic in Europe*, 369-376. Leuven: Leuven University Press.

Petrie, G. 1838. An account of a very remarkable collection of stone circles, cairns, &c. situate in the townland of Carrowmore. *Proceedings of the Royal Irish Academy* **1**, 140-2.

Petrie, G. 1845. *The ecclesiastical architecture of Ireland, anterior to the Anglo-Norman invasion*. Dublin: Hodges and Smith.

Pickard, C. and Bonsall, C. 2004. Deep-sea fishing in the European Mesolithic: fact or fantasy? *European Journal of Archaeology* **7** (3), 273-90.

Piggott, S. 1958. Review of 'Millin Bay: a Late Neolithic cairn in Co. Down'. *Ulster Journal of Archaeology* **21**, 141-2.

Piggott, S. 1972. The excavation of the Dalladies long barrow, Fettercairn, Kincardineshire. *Proceedings of the Society of Antiquaries of Scotland* **104**, 23-47.

Piggott, S. 1985. *William Stukeley: an Eighteenth-century antiquary*. London: Thames and Hudson.

Pilcher, J. and Hall, V. 2001. *Flora Hibernica: the wild flowers, plants and trees of Ireland*. Cork: The Collins Press.

Pluciennik, M. 1998. Deconstructing 'the Neolithic' in the Mesolithic-Neolithic transition. In M. Edmonds and C. Richards (eds.), *Understanding the Neolithic of north-western Europe*, 61-83. Glasgow: Cruithne Press.

Pluciennik, M. 2001. Archaeology, anthropology, and subsistence. *Journal of the Royal Anthropological Society* **7** (4), 741-58.

Pluciennik, M. 2005. *Social evolution*. London: Duckworth.

Plunkett, G. 2007. *Pollen analysis and archaeology in Ireland*. In E. Murphy and N. Whitehouse (eds.), *Environmental archaeology in Ireland*, 221-40. Oxford: Oxbow.

- Pluciennik, M. 2008. Hunter-gatherers to farmers? In A. Jones (ed.), *Prehistoric Europe: theory and practice*, 16-34. Oxford: Wiley-Blackwell.
- Plunkett, G., Gormley, S. and Wilson, P. 2004. Society, archaeology and palaeoenvironment at Grangemore Dunes, Co Derry. *Ulster Journal of Archaeology* **63**, 1-13.
- Pope, A. 2006 [1711]. An essay on criticism. In P. Rogers (ed. and trans.), *Alexander Pope: the major works*, 17-39. Oxford: Oxford University Press.
- Powell, A. 2005. The language of lineage: reading Irish court tomb design. *European Journal of Archaeology* **8 (1)**, 9-28.
- Potter, G. and López, J. 2001. After postmodernism: the new millennium. In J. López and G. Potter (eds.), *After postmodernism: an introduction to critical realism*, 1-18. London: The Athlone Press.
- Preucel, R. and Meskell, L. 2004a. Knowledges. In L. Meskell and R. Preucel (eds.), *A companion to social archaeology*, 3-22. Oxford: Blackwell.
- Preucel, R. and Meskell, L. 2004b. Places. In L. Meskell and R. Preucel (eds.), *A companion to social archaeology*, 215-29. Oxford: Blackwell.
- Prior, A.N. 1959. Thank goodness that's over. *Philosophy* **34 (128)**, 12-17.
- Prior, A.N. 1968. *Papers on time and tense*. Oxford: Clarendon Press.
- Purcell, A. 2002. Excavation of three Neolithic houses at Corbally, Kilcullen, Co. Kildare. *Journal of Irish Archaeology* **11**, 31-75.
- Pyle, H. 1970. *Jack B. Yeats: a biography*. London: Routledge and Kegan Paul.
- Raftery, J. 1951. *Prehistoric Ireland*. London: Batsford.
- Ramenofsky, A. 1998. The illusion of time. In A. Ramenofsky and A. Steffen (eds.), *Unit issues in archaeology: measuring time, space and material*, 74-84 Salt Lake City, UT: University of Utah Press.
- Rathbone, S. 2011. The Slievemore roundhouses. *Archaeology Ireland* **25 (1)**, 31-5.
- Redman, C. 1999. The development of archaeological theory: explaining the past. In G. Barker (ed.), *Companion encyclopaedia of archaeology*, 49-80. London: Routledge.

- Reid, B. 2007. Creating counterspaces: identity and the home in Ireland and Northern Ireland. *Environment and Planning D: Society and Space* **25**, 933-50.
- Renfrew, C. 1976. *Before civilization: the radiocarbon revolution and prehistoric Europe*. Harmondsworth: Penguin.
- Retallack, G. 2001. *Soils of the past: an introduction to paleopedology*. Oxford: Blackwell Science.
- Reynolds, P. 1981. Deadstock and livestock. In R. Mercer (ed.), *Farming practice in British prehistory*, 97-122. Edinburgh: Edinburgh University Press.
- Rice, P. 1999. On the origins of pottery. *Journal of Archaeological Method and Theory* **6** (1), 1-54.
- Richards, S. 2009. The playboy of the western world. In P. Mathews (ed.), *The Cambridge companion to J. M. Synge*, 28-40. Cambridge: Cambridge University Press.
- Ricoeur, P. 1984. *Time and narrative*. Volume 1. Trans. K. McLaughlin and D. Pellauer. London: University of Chicago Press.
- Robb, J. 2007. *The early Mediterranean village: agency, material culture, and social change in Neolithic Italy*. Cambridge: Cambridge University Press.
- Robb, J. 2013. Material culture, landscapes of action and emergent causation: a new model for the origins of the European Neolithic. *Current Anthropology* **54** (6), 657-83.
- Robb, J. and Miracle, P. 2007. Beyond 'migration' versus 'acculturation': new models for the spread of agriculture. In A. Whittle and V. Cummings (eds.), *Going over: the Mesolithic-Neolithic transition in north-west Europe*, 99-115. Oxford: Oxford University Press.
- Robinson, M. 2000. Further considerations of Neolithic charred cereals, fruit and nuts. In A. Fairbairn (ed.), *Plants in Neolithic Britain and beyond*, 85-90. Oxford: Oxbow Books.
- Roche, H. 2004. The dating of the embanked stone circle at Grange, Co. Limerick. In H. Roche, E. Grogan, J. Bradley, J. Coles and B. Raftery (eds.), *From megaliths to metals: essays in honour of George Eogan*, 109-16. Oxford: Oxbow Books.

Roche, H. 2010. Ceramics. In K. Driscoll, M. McClatchie, A. McGowan, L. O'Donnell and H. Roche (eds.), *Neolithic and Bronze Age landscapes of north Mayo: report 2010*, 110-42. Dublin: UCD School of Archaeology.

Ronayne, M. 1994. *Located practices: deposition, architecture and landscape in Irish court tombs*. Unpublished M.A. thesis, University College Cork.

Rose, F. 1989. *Colour identification guide to the grasses, sedges, rushes and ferns of the British Isles and north-western Europe*. London: Viking.

Rowlands, M. 1987. Core and periphery: a review of concept. In M. Rowlands, M. Larsen and K. Kristiansen (eds.), *Centre and periphery in the ancient world*, 1-11. Cambridge: Cambridge University Press.

Rowley-Conwy, P. 1987. The interpretation of ard marks. *Antiquity* **61**, 263-66.

Rowley-Conwy, P. 2004. How the west was lost: a reconsideration of agricultural origins in Britain, Ireland, and southern Scandinavia. *Current Anthropology* **45**, Supplement, S83-113.

Rowley-Conwy, P. 2007. *From Genesis to prehistory. The archaeological Three Age System and its contested reception in Denmark, Britain and Ireland*. Oxford: Oxford University Press.

Rowley-Conwy, P. 2011. Westward ho! The spread of agriculture from Central Europe to the Atlantic. *Current Anthropology* **45**, Supplement 4, S431-452.

Rudebeck, E. 2000. *Tilling nature, harvesting culture: exploring images of the human being in the transition to agriculture*. Stockholm: Almqvist and Wiksell International.

Russell, G. (Æ) 1906. At the roots of nationality. *Irish Homestead*, 14 April: p. 282.

Ryan, M. 1980. An Early Mesolithic site in the Irish midlands. *Antiquity* **54**, 46-7.

Rydin, C. and Jeglum, J. 2006. *The biology of peatlands*. Oxford: Oxford University Press.

Said, E. 2003 [1978]. *Orientalism*. London: Penguin.

Salmon, W. 2002. Causation. In R. Gale (ed.), *The Blackwell guide to metaphysics*, 19-42. Oxford: Blackwell.

- Sattig, T. 2006. *The language and reality of time*. Oxford: Clarendon Press.
- Scarre, C. 2001. Modeling prehistoric populations: the case of Neolithic Brittany. *Journal of Anthropological Archaeology* **20**, 285–313
- Scarre, C. (ed.) 2002. *Monuments and landscape in Atlantic Europe*. London: Routledge.
- Scarre, C. 2007. *The megalithic monuments of Britain and Ireland*. London: Thames and Hudson.
- Scarre, C. 2011. *Landscapes of Neolithic Brittany*. Oxford: Oxford University Press.
- Schilpp, P. 1963. *The philosophy of Rudolf Carnap*. La Salle Ill: Open Court.
- Schlesinger, G. 1991 E pur si muove. *Philosophical Quarterly* **41 (165)**, 427–41.
- Schnapp, A. 1996. *The Discovery of the past: the origins of archaeology*. London: British Museum Press.
- Schnapp, A. and Kristiansen, K. 1999. Discovering the past. In G. Barker (ed.), *Companion encyclopaedia of archaeology*, 3–48. London: Routledge.
- Schneewind, J. 2006. Toward enlightenment: Kant and the sources of darkness. In D. Rutherford (ed.), *The Cambridge companion to early modern philosophy*, 328–52. Cambridge: Cambridge University Press.
- Schulting, R. 1999. Radiocarbon dates. In P. Woodman, E., Anderson, and N. Finlay, *Excavations at Ferriter's Cove, 1983–95: last foragers, first farmers in the Dingle Peninsula*, 219. Bray: Wordwell.
- Schulting, R. 2011. The radiocarbon dates. In R. Cleary and H. Kelleher (eds.), *Archaeological excavations at Tullahedy, Co. Tipperary: Neolithic Settlement in north Munster*, 145–61. Dublin: The Collins Press.
- Schulting, R. 2014. The dating of Poul nabrone. In A. Lynch (ed.), *Poul nabrone: an Early Neolithic portal tomb in Ireland*, 93–113. Dublin: The Stationery Office.
- Schulting, R., Sheridan, J. A., Clarke, S. and Bronk Ramsey, S. 2008. LARGANTEA and the dating of Irish wedge tombs. *The Journal of Irish Archaeology* **17**, 1–17.

Schulting, R., Murphy, E., Jones, C. and Warren, G. 2011. New dates from the north and a proposed chronology for Irish court tombs. *Proceedings of the Royal Irish Academy* **112C**, 1-60.

Scott, M. 2000. Bayesian methods: what can we gain and at what cost? *Radiocarbon* **42 (2)**, 181.

Shanks, M. and Tilley, C. 1987a. Abstract and substantial time. *Archaeological Review from Cambridge* **6 (1)**, 32-41.

Shanks, M. and Tilley, C. 1987b. *Social theory and archaeology*. Cambridge: Polity Press.

Shanks, M. and Tilley, C. 1992. *Reconstructing archaeology: theory and practice*. Second edition. London: Routledge.

Shee-Twohig, E. and Ronayne, M. 1993. Prehistory: a present perception. In E. Shee Twohig and M. Ronayne (eds.), *Past perceptions: the prehistoric archaeology of south west Ireland*, 1-5. Cork: Cork University Press.

Sheehy, J. 1980. *The rediscovery of Ireland's past: the Celtic revival 1830-1930*. London: Thames and Hudson.

Sheridan, J.A. 1995. Irish Neolithic pottery: the story in 1995. In I. Kinnes and G. Varndell (eds.), *'Unbaked urns of rudely shape': essays on British and Irish pottery for Ian Longworth*, 3-22. Oxford: Oxbow Books.

Sheridan, J.A. 2003. French connections I: spreading the marmites thinly. In I. Armit, E. Nelis and D. Simpson (eds.), *Neolithic settlement in Ireland and western Britain*, 3-17. Oxford: Oxbow Books.

Sheridan, J.A. 2004a. Neolithic connections along and across the Irish Sea. In Cummings, V. and Fowler, C. (eds.), *The Neolithic of the Irish Sea: materiality and traditions of practice*, 9-21. Oxford: Oxbow Books.

Sheridan, J.A. 2004b. Going round in circles? Understanding the Irish Grooved Ware 'complex' in its wider context. In H. Roche, E. Grogan, J. Bradley, J. Coles and B. Raftery (eds.), *From megaliths to metals: essays in honour of George Eogan*, 26-37. Oxford: Oxbow Books.

Sheridan, J.A. 2006. A non-megalithic funerary tradition in early Neolithic Ireland. In M. Meek (ed.), *The modern traveller to our past: festschrift in honour of Ann Hamlin*, 24-31. Southport: DPK.

Sheridan, J.A. 2007a. Green treasures from the mountains. *British Archaeology* **96**, 23-27.

Sheridan, J.A. 2007b. From Picardie to Pickering and Pencraig Hill? New information on the 'carinated bowl Neolithic' in northern Britain. In A. Whittle and V. Cummings (eds.), *Going over: the Mesolithic-Neolithic transition in north-west Europe*, 441-492. Oxford: Oxford University Press.

Sheridan, J.A. 2010. The Neolithisation of Britain and Ireland: the big picture. In B. Finlayson and G. Warren (eds.), *Landscapes in Transition*, 89-105. Oxford: Oxbow Books.

Sheridan, J.A. 2011. Comments on 'Animals, people and places: the continuity of hunting and gathering practices across the Mesolithic-Neolithic transition in Britain'. *European Journal of Archaeology* 14 (3), 389-91.

Sheridan, J.A. 2012. Neolithic Shetland: a view from the 'mainland'. In D. Mahler (ed.) *The border of farming and the cultural markers*, 6-36. Copenhagen: National Museum of Denmark.

Sheridan, J.A. 2013. Early Neolithic habitation structures in Britain and Ireland: a matter of circumstance and context. In D. Hoffman and J. Smyth, *Tracking the Neolithic house in Europe: sedentism, architecture, practice*, 283-300. London: Springer.

Sherratt, A. 1989. V. Gordon Childe: archaeology and intellectual history. *Past and Present* 125, 151-85.

Sherratt, A. 1995. Reviving the grand narrative: archaeology and long-term change. *Journal of European Archaeology* 3 (1), 1-32.

Sherratt, A. 1996. 'Settlement patterns' or 'landscape studies'? Reconciling reason and romance. *Archaeological Dialogues* 3, 140-59.

Sherratt, A. 1997. Climatic cycles and behavioural revolutions: the emergence of modern humans and the beginning of farming. *Antiquity* 71, 271-287.

Shore, J., Bartley, D. and Harkness, D. 1995. Problems encountered with the ¹⁴C dating of peat. *Quaternary Science Reviews* 14, 373-83.

Siggins, L. 1990. By helicopter to the old bog road. *The Irish Times*. 18 July: p. 8.

Siggins, L. 2014. Hunting axe up to 5,000 years old thrown up by storms. *The Irish Times*. 20 January.

Silverman, H. and Small, D. (eds.) 2002. *The space and place of death*. Arlington, VA: Archaeological Papers of the American Anthropological Association 11.

Simpson, D. 1991. Ballygalley: Neolithic settlement. In I. Bennett (ed.), *Excavations 1990: summary accounts of archaeological excavations in Ireland*, 11. Bray: Wordwell.

Simpson, D. 1993. Ballygalley. *Current Archaeology* **134**, 60-2.

Simpson, D. 1995. The Neolithic settlement site at Ballygalley, Co. Antrim. In C. Mount and E. Grogan (eds.), *Annus Archaeologiae: 37-44*. Dublin: Organisation of Irish Archaeologists.

Simpson, D. 1996. The Ballygalley houses, Co. Antrim, Ireland. In T. Darvill and J. Thomas (eds.), *Neolithic houses in northwest Europe and beyond*, 123-32. Oxford: Oxbow Books.

Simpson, D., Conway, M. and Moore, D. 1990. The Neolithic settlement site at Ballygalley, Co. Antrim. Excavations 1989, interim report. *Ulster Journal of Archaeology* **53**, 40-9.

Simpson, D., Conway, M. and Moore, D. 1994. Ballygalley: Neolithic settlement and industrial site. In I. Bennett (ed.), *Excavations 1993: summary accounts of archaeological excavations in Ireland*, 1-2. Bray: Wordwell.

Simpson, D., Conway, M. and Moore, D. 1995. Ballygalley (Croft Manor): Neolithic-Bronze Age settlement/industrial site. In I. Bennett (ed.), *Excavations 1994: summary accounts of archaeological excavations in Ireland*, 2-4. Bray: Wordwell.

Sisson, E. 2009. The Aran Islands and the travel essays. In P. Mathews (ed.), *The Cambridge companion to J. M. Synge*, 52-63. Cambridge: Cambridge University Press.

Sklar, L. 2002. Physics, metaphysics, and method in Newton's dynamics. In R. Gale (ed.), *The Blackwell guide to metaphysics*, 1-18. Oxford: Blackwell.

Sklenář, K. 1983. *Archaeology in Central Europe: the first five hundred years*. Trans. I. Lewitova. Leicester: Leicester University Press.

Smith, A. 2003. Landscape representation: place and identity in Nineteenth-century Ordnance Survey maps of Ireland. In P. Stewart and A. Strathern (eds.), *Landscape, memory and history: anthropological approaches*, 71-88. Pluto Press, London.

- Smith, C. 1992. *Late stone age hunters of the British Isles*. London: Routledge.
- Smith, L. 2004. *Archaeological theory and the politics of cultural heritage*. London: Routledge.
- Smith, L. 2006. *Uses of heritage*. London: Routledge.
- Smith, L. and Waterton, E. 2012. *Constrained by common sense: the Authorised Heritage Discourse in contemporary debates*. In J. Carman, R. Skeats and C. McDavid (eds.), *The Oxford Handbook of Public Archaeology*, 153-71. Oxford: Oxford University Press.
- Smith, Q. 1993. *Language and time*. Oxford: Oxford University Press.
- Smolin, L. 2013. *Time reborn*. London: Penguin Books.
- Smyth, J. 2006. The role of the house in early Neolithic Ireland. *European Journal of Archaeology* **9** (2-3), 229-257.
- Smyth, J. 2011. The house and group identity in the Irish Neolithic. *Proceedings of the Royal Irish Academy* **111C**, 1-31.
- Smyth, J. 2013a. Tides of change? The house through the Irish Neolithic. In D. Hoffman and J. Smyth, *Tracking the Neolithic house in Europe: sedentism, architecture, practice*, 301-328. London: Springer.
- Smyth, J. 2013b. Tara in pieces—change and continuity at the turn of the third millennium BC. In M. O’Sullivan, C. Scarre and M. Doyle (eds.), *Tara from the past to the future: towards a new research agenda*, 408-16. Wordwell: Dublin.
- Smyth, J. 2014. *Settlement in the Irish Neolithic: new discoveries on the edge of Europe*. Prehistoric Society Research Paper 6. Oxford: Oxbow Books.
- Spaulding, A. 1960. The dimensions of archaeology. In G. Doyle and R. Carneiro (eds.), *Essays in the science of culture in honor of Leslie A. White*, 437-56. New York: Crowell.
- Spikins, P. 2008. Mesolithic Europe: glimpses of another world. In G. Bailey and P. Spikins (eds.), *Mesolithic Europe*, 1-17. Cambridge: Cambridge University Press.
- Stace, C. 2010. *New flora of the British Isles*. Third edition. Cambridge: Cambridge University Press.

Starnini, E. 2008. Material culture traditions and identity. In D. Bailey, A. Whittle and D. Hofmann (eds.), *Living well together? Settlement and materiality in the Neolithic of south-east and central Europe*, 101-7. Oxford: Oxbow Books.

Steier, P. and Rom, W. 2000. The use of Bayesian statistics for ¹⁴C dates of chronologically ordered samples: a critical analysis. *Radiocarbon* **42** (2), 183-98.

Stolze, S., Dörfler, W., Monecke, T. and Nelle, O. 2012. Evidence for climatic variability and its impact on human development during the Neolithic from Loughmeenaghan, County Sligo, Ireland. *Journal of Quaternary Science* **27** (4), 393-403.

Stout, M. 1996. Emyr Estyn Evans and Northern Ireland: the archaeology and geography of a new state. In J. Atkinson, I. Banks and J. O'Sullivan, *Nationalism and archaeology*, 111-27. Glasgow: Cruithne Press.

Swindles, G., Galloway, J., Outram, Z., Turner, K., Schofield, J., Newton, A., Dugmore, A., Church, M., Watson, E., Batt, C., Bond, J., Edwards, K., Turner, V. and Bashford, D. 2013. Re-deposited cryptotephra layers in Holocene peats linked to anthropogenic activity. *The Holocene* **23** (10), 1493-1501.

Synge, J. M. 1911 [1907]. *The playboy of the western world: a comedy in three acts*. Dublin: Maunsel and Company.

Tarbett, C. and Crone, J. 1987. Pepperhill (BGE): Neolithic habitation site. In I. Bennett (ed.), *Excavations 1986: summary accounts of archaeological excavations in Ireland*: 14-5. Bray: Wordwell.

Tarbett, C. and Gowen, M. 1988. Tankardstown South: Neolithic settlement. In I. Bennett (ed.), *Excavations 1987: summary accounts of archaeological excavations in Ireland*, 21. Bray: Wordwell.

Taylor, R. 1987. *Radiocarbon dating: an archaeological perspective*. Orlando: Academic Press.

Telford, R., Heegaard, E. and Birks, H. 2004. All age-depth models are wrong: but how badly? *Quaternary Science Reviews* **23**, 1-5.

Theocharis, D. 1967. *I avgi tis Thessaliskas proistorias*. Volos: Filarhaios Etaireia Volou.

- Thomas, J. 1988. Neolithic explanations: the Mesolithic-Neolithic transition in Britain and southern Scandinavia. *Proceedings of the Prehistoric Society* **54**, 59-67.
- Thomas, J. 1990. Monuments from the inside: the case of the Irish megalithic tombs. *World Archaeology* **22 (2)**, 168-178.
- Thomas, J. 1996. Neolithic houses in Britain and Ireland—a sceptical view. In T. Darvill and J. Thomas (eds.), *Neolithic houses in northwest Europe and beyond*, 1-12. Oxford: Oxbow Books.
- Thomas, J. 1998. Review of 'Neolithic landscapes: Neolithic Studies Group seminar papers 2'. *Antiquity* **72**, 455-6.
- Thomas, J. 1999. *Understanding the Neolithic*. London: Routledge.
- Thomas, J. 2004. *Archaeology and modernity*. London: Routledge.
- Thomas, J. 2007. Mesolithic-Neolithic transitions in Britain: from essence to inhabitation. In A. Whittle and V. Cummings (eds.), *Going over: the Mesolithic-Neolithic transition in north-west Europe*, 423-439. Oxford: Oxford University Press.
- Thomas, J. 2008. The Mesolithic-Neolithic transition in Britain. In J. Pollard (ed.), *Prehistoric Britain*, 58-89. Oxford: Blackwell.
- Thomas, J. 2013. *The birth of the Neolithic in Britain*. Oxford: Oxford University Press.
- Thomsen, C.J. 1836. *Ledetraad til Nordisk Oldkyndighed*. Copenhagen: Royal Danish Society of Antiquities.
- Thompson, E.P. 1966. *The making of the English working class*. New York: Vintage.
- Titley, A. 2006. The novel in Irish. In J.W. Foster (ed.) *The Cambridge companion to the Irish novel*, 171-188. Cambridge: Cambridge University Press.
- Tobin, R. 2003a. Corbally. In I. Bennett (ed.), *Excavations 2001: summary accounts of archaeological excavations in Ireland*, 184-5. Bray: Wordwell.
- Tobin, R. 2003b. Houses, enclosures and kilns—excavations at Corbally, County Kildare. *Archaeology Ireland* **17(3)**, 32-7.

- Tobin, R. 2004. Corbally: enclosure with burials, kilns. In I. Bennett (ed.), *Excavations 2002: summary accounts of archaeological excavations in Ireland*, 241-2. Bray: Wordwell.
- Tolan-Smith, C. 2008. Mesolithic Britain. In G. Bailey, and P. Spikins (eds.), *Mesolithic Europe*, 132-57. Cambridge: Cambridge University Press.
- Tresset, A. 2003. French connections II: of cows and men. In I. Armit, E. Nelis and D. Simpson (eds.), *Neolithic settlement in Ireland and western Britain*, 18-30. Oxford: Oxbow Books.
- Trigger, B. 1984. Alternative archaeologies: nationalist, colonialist, imperialist. *Man* **19** (3), 355-370.
- Trigger, B. 1989. *A history of archaeological thought*. Cambridge: Cambridge University Press.
- Trigger, B. 1995. Romanticism, nationalism and archaeology. In P. Kohl and C. Fawcett (eds.), *Nationalism, politics, and the practice of archaeology*, 263-79. Cambridge: Cambridge University Press.
- Trigger, B. 1998. *Sociocultural evolution: calculation and contingency*. Oxford: Blackwell.
- Turner, V. 2012. *Location, form and function in Shetland's prehistoric field systems*. Unpublished Ph.D. thesis, University of Stirling.
- Tweddle, J., Edwards, K. and Fieller, N. 2005. Multivariate statistical and other approaches for the separation of cereal from wild Poaceae pollen using a large Holocene dataset. *Vegetation History and Archaeobotany* **14**, 15-30.
- Twohig, D. 1978. Cork City excavations 1974-77. *Bulletin of the group for the study of Irish historic settlement* **5**, 19-22.
- Vander Linden, M. 2011. In constant motion? Recent advances in mathematical modelling and radiocarbon chronology of the neolithisation of Europe. In A. Hadjikoimis, E. Robinson and S. Viner (eds.) *The dynamics of Neolithisation in Europe: studies in honour of Andrew Sherratt*, 25-45 Oxford: Oxbow.
- Verrill, L. 2006. *Later prehistoric environmental marginality in western Ireland: multi-proxy investigations*. Unpublished Ph.D. thesis, University of Edinburgh.

Verrill, L. and Tipping, R. 2010a. A palynological and geoarchaeological investigation into Bronze Age farming at Belderg Beg, Co. Mayo, Ireland. *Journal of Archaeological Science* **37**, 1214-25.

Verrill, L. and Tipping, R. 2010b. *Use and abandonment of a Neolithic field system at Belderrig, Co. Mayo, Ireland: evidence for economic marginality. The Holocene* **(20)** **7**, 1011-21.

Waddell, J. 1978. The invasion hypothesis in Irish prehistory. *Antiquity* **52** **(205)**, 121-8.

Waddell, J. 2000. *The prehistoric archaeology of Ireland*. Second edition. Bray: Wordwell.

Waddell, J. 2005. *Foundation myths: the beginnings of Irish archaeology*. Bray: Wordwell.

Waddell, J. 2010. *The prehistoric archaeology of Ireland*. Third edition. Bray: Wordwell

Waddington, C. and Davies, J. 2002. An Early Neolithic settlement and Late Bronze Age burial cairn near Bolam Lake, Northumberland: fieldwalking, excavation and reconstruction. *Archaeologia Aeliana* **30**, 1-47.

Waddington, C. (ed.) 2007. *Mesolithic settlement in the North Sea basin: a case study from Howick, north-east England*. Oxford: Oxbow Books.

Wagenmakers, E.-J., Wetzels, R., Borsboom, D., van der Maas, H. and Kievit, R. 2012. An agenda for purely confirmatory research. *Perspectives in Psychological Science* **7** **(6)**, 632-38.

Walker, M. 2005. *Quaternary dating methods*. Chichester: John Wiley & Sons.

Walsh, F. 2006. Neolithic Monanny, County Monaghan. In J. O'Sullivan and M. Stanley (eds.), *Settlement, industry and ritual: proceedings of a public seminar on archaeological discoveries on national road schemes*, 7-17. Dublin: National Roads Authority.

Warburton, J., Holden, J. and Mills, A. 2004. Hydrological controls of surficial mass movements in peat. *Earth Science Reviews* **67**, 139-56.

Warren, G. 2005a. *Excavations in 2005 at Belderrig, Co. Mayo*. Dublin: School of Archaeology, University College Dublin.

Warren, G. 2005b. *Mesolithic lives in Scotland*. Stroud: Tempus.

Warren, G. 2006. *Fieldwork in Belderrig, Co. Mayo: 2006 report*. Dublin: School of Archaeology, University College Dublin.

Warren, G. 2008. *Fieldwork in Belderrig, Co. Mayo: 2004-2008*. Dublin: School of Archaeology, University College Dublin.

Warren, G. 2009a. Belderrig: a 'new' Later Mesolithic and Neolithic landscape in northwest Ireland. In N. Finlay, S. McCartan, N. Milner, C. Wickham-Jones (eds.), *From Bann Flakes to Bushmills: papers in honour of Professor Peter Woodman*, 143-152. Oxford: Oxbow Books.

Warren, G. 2009b How can we understand researchers' perceptions of key research developments? A case study focusing on the adoption of agriculture in Ireland. *World Archaeology* **41** (4), 609-625.

Warren, G. 2009c. Times of change: the Mesolithic and Mesolithic-Neolithic transition in northwest Ireland. In P. Crombé, M. Van Strydonck, J. Sergant, M. Boudin and M. Bats (eds.), *Chronology and evolution within the Mesolithic of north-west Europe: proceedings of an international meeting, Brussels, May 31st - June 1st 2007*, 635-52. Newcastle: Cambridge Scholars Publishing.

Warren, G. 2010. Summary. In K. Driscoll, M. McClatchie, A. McGowan, L. O'Donnell and H. Roche (eds.), *Neolithic and Bronze Age landscapes of north Mayo: report 2010*, 188-9. Dublin: UCD School of Archaeology.

Warren, G. 2011. Introduction. In S. Caulfield, G. Byrne, N. Dunne and G. Warren (eds.) 2011. *Excavations on Céide hill, Behy and Glenultra, north Co. Mayo, 1963-1994*, 1-4. Dublin: UCD School of Archaeology.

Warren, G. 2013. The adoption of agriculture in Ireland: perceptions of key research challenges. *Journal of Archaeological Method and Theory*. **20** (4), 525-51.

Warren, G. and Rice, K. 2007. *Excavations in 2007 at Belderrig, Co. Mayo: stratigraphic report*. Dublin: UCD School of Archaeology.

Warren, G. and Rice, K. 2008. *Excavations in 2008 at Belderrig, Co. Mayo: stratigraphic report*. Dublin: UCD School of Archaeology.

Warren, G., McIlreavy, D., Rathbone, S. and Walsh, P. 2009. *Archaeological excavations at Behy (E747): stratigraphic report*. Dublin: University College Dublin.

Warren, G., Caulfield, C., Byrne, G. and Dunne, N. 2011. The chronological development of the Céide Hill landscape in prehistory. In S. Caulfield, G.

Byrne, N. Dunne and G. Warren (eds.) 2011. *Excavations on Céide hill, Behy and Glenultra, north Co. Mayo, 1963-1994*, 132-40. Dublin: UCD School of Archaeology.

Watson, G. 2009. Celticism: Macpherson, Mathew Arnold and Ireland. In S. Ó Síocháin (ed.), *Social thought on Ireland in the nineteenth century*, 147-66. Dublin: University College Dublin Press.

Wertsch, J. 2002. *Voices of collective remembering*. Cambridge: Cambridge University Press.

Whelan, K. 1992. Beyond a paper landscape: J.H. Andrews and Irish historical geography. In F.H.A. Aalen and K. Whelan (eds.), *Dublin city and county: from prehistory to present*, 379-424. Dublin: Geography Publications.

Whelan, K. 1993. The bases of regionalism. In P.Ó Drisceoil (ed.), *Culture in Ireland: regions, identity and power*, 5-62. Belfast: Institute of Irish Studies.

Whelan, K. 1997. Settlement patterns in the west of Ireland in the pre-famine period. In T. Collins (ed.), *Decoding the landscape*, 60-78. Galway: University College Galway.

Whelan, K. 2011. The modern landscape: from plantation to present. In F.H.A. Aalen, K. Whelan, and M. Stout (eds.), *Atlas of the Irish rural landscape*. Second edition, 73-111. Cork: Cork University Press.

Whitefield, A. 2009. *Neolithic life on the Ben Bulbin tablelands*. Unpublished M.A. thesis, National University of Ireland, Galway.

Whitehouse, N., McClatchie, M., Barratt, P., Schulting, R., McLaughlin, R. and Bogaard, A. 2010. INSTAR –cultivating Societies. *Archaeology Ireland* **24** (2), 16-19.

Whitehouse, N., Schulting, R., McClatchie, M., Barratt, P., McLaughlin, T.R., Bogaard, A., Colledge, S., Marchant, R., Gaffrey, J. and Bunting, M.J. (in press). Neolithic agriculture on the European western frontier: the boom and bust of early farming in Ireland. *Journal of Archaeological Science*.

Whittle, A. 1988. *Problems in Neolithic archaeology*. Cambridge: Cambridge University Press.

Whittle, A. 1990. Prolegomena to the study of the Mesolithic-Neolithic transition in Britain and Ireland. In D. Cahen and M. Otte (eds.), *Rubané et cardinal*, 209-227. Liège: ERAUL 39.

Whittle, A. 1996. *Europe in the Neolithic: the creation of new worlds*. Cambridge: Cambridge University Press.

Whittle, A. 1998. People and the diverse past: two comments on 'Stonehenge for the ancestors'. (Response to Michael Parker Pearson and Ramilisonina 1998, *Antiquity* **72**, 308-326). *Antiquity* **72**, 852-855.

Whittle, A. 2003. *The archaeology of people: dimensions of Neolithic life*. London: Routledge.

Whittle, A. 2005. Lived experience in the Early Neolithic of the Great Hungarian Plain. In D. Bailey, A. Whittle and V. Cummings (eds.), *(un)settling the Neolithic*, 64-70. Oxford: Oxbow Books.

Whittle, A. 2007a. The temporality of transformation: dating the early development of the southern British Neolithic. In A. Whittle and V. Cummings (eds.), *Going over: the Mesolithic-Neolithic transition in north-west Europe*, 377-98. Oxford: Oxford University Press.

Whittle, A. 2007b. Going over: people and their times. In A. Whittle and V. Cummings (eds.), *Going over: the Mesolithic-Neolithic transition in north-west Europe*, 617-28. Oxford: Oxford University Press.

Whittle, A. 2011. Grand narratives and shorter stories. In A. Hadjikoimis, E. Robinson and S. Viner (eds.) *The dynamics of Neolithisation in Europe: studies in honour of Andrew Sherratt*, 10-24 Oxford: Oxbow.

Whittle, A., Keith-Lucas, M., Milles, A., Noddle, B., Rees, S. and Romans, J. 1986. *Scord of Brouster: an early agricultural settlement in Shetland*. Oxford: Oxford University Committee for Archaeology.

Whittle, A., Barclay, A., Bayliss, A., McFadyen, L., Schulting, R. and Wysocki, M. 2007. Building for the dead: events, processes and changing worldviews from the thirty-eighth to the thirty-fourth centuries cal. BC in southern Britain. *Cambridge Archaeological Journal* **17** (1) (suppl.), 123-47.

Whittle, A., Bayliss, A. and Healy, F. 2008. The timing and tempo of change: examples from the fourth millennium cal. BC in southern England. *Cambridge Archaeological Journal* **18** (1), 65-70.

Whittle, A., Bayliss, A. and Healy, F. 2010. Event and short-term process: times for the Early Neolithic of southern Britain. In D. Bolender (ed.), *Eventful archaeologies: new approaches to social transformation in the archaeological record*, 68-87. Albany: State University of New York Press.

Whittle, A., Bayliss, A. and Healy, F. (eds.) 2011a. *Gathering time: dating the Early Neolithic enclosures of Southern Britain and Ireland*. Oxford: Oxbow Books.

Whittle, A., Healy, F. and Bayliss, A. 2011b. Gathering time: causewayed enclosures and the Early Neolithic of southern Britain and Ireland. In A. Whittle, A. Bayliss and F. Healy (eds.), *Gathering time: dating the Early Neolithic enclosures of Southern Britain and Ireland*, 1-16. Oxford: Oxbow Books.

Whittle, A., Bayliss, A. and Healy, F. 2011c. Gathering time: the social dynamics of change. In A. Whittle, A. Bayliss and F. Healy (eds.), *Gathering time: dating the Early Neolithic enclosures of Southern Britain and Ireland*, 848-914. Oxford: Oxbow Books.

Wickham-Jones, C. 2005. Summer walkers? Mobility and the Mesolithic. In N. Milner and P. Woodman (eds.), *Mesolithic studies at the beginning of the 21st century*, 30-41. Oxford: Oxbow Books.

Wickham-Jones, C. 2014. Coastal adaptations. In V. Cummings, P. Jordan and M. Zvelebil (eds.), *The Oxford handbook of the archaeology and anthropology of hunter-gatherers*, 694-711. Oxford: Oxford University Press.

Wilde, W. 1850. *The beauties of the Boyne and its tributary the Blackwater*. Second enlarged edition. Dublin: James McGlashan.

Wilde, W. 1857. *A descriptive catalogue of the antiquities of stone, earthen and vegetable materials in the museum of the Royal Irish Academy*. Dublin: M. H. Gill.

Wilde, W. 1861. *A descriptive catalogue of the antiquities of animal materials and bronze in the museum of the Royal Irish Academy*. Dublin: Hodges and Smith.

Wilde, W. 1862. *A descriptive catalogue of the antiquities of gold in the museum of the Royal Irish Academy*. Dublin: Hodges and Smith.

Willcox, G. 2004. Measuring grain size and identifying Near Eastern cereal domestication: evidence from the Euphrates valley. *Journal of Archaeological Science* **31**, 145-50.

Wishart, D. 2004. Period and region. *Progress in Human Geography* **28 (3)**, 305-19.

Wood, P. 2003. Science in the Scottish Enlightenment. In A. Broadie (ed.), *The Cambridge companion to the Scottish Enlightenment*, 94-116. Cambridge: Cambridge University Press.

Woodman, P. 1977. Recent excavations at Newferry, Co. Antrim. *Proceedings of the Prehistoric Society* **43**, 155-200.

Woodman, P. 1983. The Glencloy Project in perspective. In T. Reeves-Smith and F. Hamond (eds.), *Landscape Archaeology in Ireland*, 25-34. Oxford: BAR British Series 116.

Woodman, P. 1985. *Excavations at Mount Sandel, 1973-77*. Belfast: HMSO.

Woodman, P. 1992. Irish archaeology today: a poverty amongst riches. *Irish Review* **12**, 34-9.

Woodman, P. 1993. The prehistory of south-west Ireland: an archaeological region or a state of mind? In E. Shee Twohig and M. Ronayne (eds.), *Past perceptions: the prehistoric archaeology of south west Ireland*, 6-15. Cork: Cork University Press.

Woodman, P. 1994. Towards a definition of Irish Early Neolithic lithic assemblages. In N. Ashton and A. David (eds.), *Stories in stone*, 213-218. London: Lithic Studies Society, British Museum.

Woodman, P. 1995. Who possesses Tara? Politics in archaeology in Ireland. In P. Ucko (ed.), *Theory in archaeology – a world perspective*, 278-97. London: Routledge.

Woodman, P. 2000a. Hammers and shoeboxes: new agendas for prehistory. In A. Desmond, G. Johnson, M. McCarthy, J. Sheehan and E. Shee Twohig (eds.), *New agendas in Irish prehistory: papers in commemoration of Liz Anderson*, 1-14. Bray: Wordwell.

Woodman, P. 2000b. Getting back to basics: transitions to farming in Ireland and Britain. In T.D. Price (ed.), *Europe's first farmers*, 219-59. Cambridge: Cambridge University Press.

Woodman, P. 2003. *Pushing back the boundaries*. John Jackson Lecture 2003. Dublin: Royal Dublin Society.

Woodman, P. 2004. Some problems and perspectives: reviewing aspects of the Mesolithic period in Ireland. In A. Saville (ed.), *Mesolithic Scotland and its Neighbours: the Early Holocene prehistory of Scotland, its British and Irish context and some northern European perspectives*, 285-97. Edinburgh: Society of Antiquaries of Scotland.

Woodman, P. 2005. It's too light to be right. In N. Milner and P. Woodman (eds.), *Mesolithic studies at the beginning of the 21st century*, 126-143. Oxford: Oxbow Books.

Woodman, P. 2009. Challenging times: reviewing Irish Mesolithic chronologies. In P. Crombé, M. Van Strydonck, J. Sergant, M. Boudin and M. Bats (eds.), *Chronology and evolution within the Mesolithic of north-west Europe: proceedings of an international meeting, Brussels, May 31th - June 1st 2007*, 195-216. Newcastle: Cambridge Scholars Publishing.

Woodman, P. and Anderson, E. 1990. The Irish Later Mesolithic: a partial picture. In P. Vermeersch and P. Van Peer (eds) *Contributions to the Mesolithic in Europe*, 377-387. Leuven: Leuven University Press.

Woodman, P., Doggart, R. and Mallory, J. 1991/2. Excavations at Windy Ridge, Co. Antrim, 1981-82. *Ulster Journal of Archaeology* **54-5**, 13-35.

Woodman, P., McCarthy, M. and Monaghan, N. 1997. The Irish Quaternary Fauna Project. *Quaternary Science Reviews* **16**, 129-159.

Woodman, P., Anderson, E. and Finlay, N. 1999. *Excavations at Ferriter's Cove, 1983-95: last foragers, first farmers in the Dingle Peninsula*. Bray: Wordwell.

Woodman, P. and McCarthy M. 2003. Contemplating some awful(ly interesting) vistas: importing red cattle and red deer into Prehistoric Ireland. In I. Armit, E. Nelis and D. Simpson (eds.), *Neolithic settlement in Ireland and western Britain*, 31-9. Oxford: Oxbow Books.

Woodman, P. and Milner, N. 2003. Baylet, Donegal. I. Bennett (ed.), *Excavations 2001: summary accounts of archaeological excavations in Ireland*, 62-3. Bray: Wordwell.

Woodman, P. and O'Shaughnessey J. 2003. Killuragh, Co. Limerick 93E0175. *Significant unpublished Irish archaeological excavations 1930-1997*. Available at: www.heritagecouncil.ie [last accessed: 1 November 2011].

Worsaae, J.J.A. 1847a. An account of the formation of the museum at Copenhagen, and general remarks on the classification of the antiquities found in the north and west of Europe. *Proceedings of the Royal Irish Academy (1836-1869)* **3**, 310-15.

Worsaae, J.J.A. 1847b. An account of the formation of the museum at Copenhagen, and general remarks on the classification of the antiquities found in the north and west of Europe (continued). *Proceedings of the Royal Irish Academy (1836-1869)* **3**, 327-44.

Worsaae, J.J.A. 1849 [1848]. *The primeval antiquities of Denmark*. Trans. W. Thorns. London: Parker.

Wylie, A. 1989. The interpretive dilemma. In V. Pinsky and A. Wylie (eds.), *Critical traditions in contemporary archaeology: essays in the philosophy, history, and socio-politics of archaeology*. Cambridge: Cambridge University Press.

Wylie, A. 1996. The interplay of evidential constraints and political interests: recent archaeological research on gender. In R. Preucel and I. Hodder (eds.), *Contemporary archaeology in theory: a reader*, 431-459. Oxford: Blackwell.

Wylie, A. 2002. *Thinking from things: essays in the philosophy of archaeology*. Berkeley, CA: University of California Press.

Wylie, A. 2007. Philosophy of archaeology; philosophy in archaeology. In S. Turner and M. Risjord (eds.), *Handbook of the philosophy of science*. Volume 14, *The philosophy of anthropology and sociology*, 517-549. Amsterdam: Elsevier Science.

Yeats, J. B. 1912. *Life in the west of Ireland*. Dublin: Maunsell.

Yoffee, N. and Sherratt, A. 1993. Introduction: the sources of archaeological theory. In N. Yoffee and A. Sherratt (eds.), *Archaeological theory: who sets the agenda?* 1-10. Cambridge: Cambridge University Press.

Zohary, D. and Hopf, M. 2000. *Domestication of plants in the Old World*. Oxford: Oxford University Press.

Zvelebil, M. 1996. Farmers; our ancestors and the identity of Europe. In P. Graves-Brown, S. Jones and C. Gamble (eds.), *Cultural identity and archaeology*, 145-166. London: Routledge.

Zvelebil, M. 1998. What's in a name: the Mesolithic, the Neolithic and social change in the Mesolithic-Neolithic transition. In M. Edmonds and C. Richards (eds.), *Understanding the Neolithic of north-western Europe*, 1-36. Glasgow: Cruithne Press.

Zvelebil, M. 2004. Who were we 6000 years ago? In search of prehistoric identities. In M. Jones (ed.), *Traces of ancestry: studies in honour of Colin Renfrew*, 41-60. Cambridge: McDonald Institute for Archaeological Research.

Zvelebil, M. and Lille, M. 2000. Transition to agriculture in eastern Europe. In T. D. Price (ed.), *Europe's first farmers*, 57-92. Cambridge: Cambridge University Press.

