



# Head for the Hills: Nucleated Hilltop Settlement in the Irish Bronze Age

James O'Driscoll<sup>1</sup> 

Accepted: 20 March 2023 / Published online: 13 April 2023  
© The Author(s) 2023

## Abstract

In Bronze Age Ireland, the settlement record almost exclusively comprises individual, isolated farmsteads dotted throughout the island (Ginn in *Emania*, 21: 47–58, 2013; Ginn, *Mapping society: Settlement structures in Later Bronze Age Ireland*, Archaeopress, 2016). Recent studies have shown that these are incredibly homogeneous, with the nearly 700 excavated examples showing no signs of significant variation in terms of size or density and little in the way of high-status material culture. This conflicts with other evidence from this period, which points to an elite culture inferred from extensive long-distance trading, the manufacture of high-status goods and the construction of massive communal monuments such as hillforts. The latter comprise some of Europe's largest and most impressive monuments and are often recognised as regional centres of power and authority. Until recently, these monuments have received little attention in Ireland and have rarely been integrated into the broader study of Irish Bronze Age settlement patterns. Indeed, it is at hillforts, which might be regarded as the permanent settlement of an elite and a central space for a disparate community, that we should find larger structures and more nuanced evidence for settlement hierarchies if they exist. This paper aims to collate the settlement evidence within Irish hillforts and other unenclosed upland settlements, integrating this within the broader narrative of the contemporary settlement pattern. It is argued that a clear hierarchy of settlement is apparent at some of the densely settled Irish hillforts, and that these formed central spaces for a disparate community where architecture formed the main arena for the display of status and group identity.

**Keyword** Nucleated settlement · Bronze Age settlement · Hillforts · Hierarchies

The settlement record of Bronze Age Ireland almost exclusively comprises individual, isolated farmsteads scattered throughout the island (Ginn, 2013, 2016), a picture which is broadly reflected in other settings across Britain (Ashmore, 2001;

---

✉ James O'Driscoll  
james.odriscoll@abdn.ac.uk

<sup>1</sup> Department of Archaeology, University of Aberdeen, Aberdeen, Scotland

Brück, 2002; Drewett, 1979; Musson, 1970) and north-west Europe more generally (Brück & Fokkens, 2013, p. 91; Chytráček, 2007; Kristiansen, 2018). Following the ‘fairly scant’ evidence for definitive Bronze Age settlement in Ireland up until the late 1980s (O’Kelly, 1989, p. 222), an avalanche of data obtained from infrastructural projects has dramatically changed this picture. We now have nearly 700 excavated Bronze Age houses and nearly 200 dated examples (Ginn, 2016). A number of important studies (see Cleary, 2007; Ginn, 2016) have attempted to collate this information, though they have mainly focused on the dating, architecture, distribution and general significance of these structures, with no consideration of how contemporary settlement conglomerations within hillforts, or other unenclosed hilltop settlements, fit into this pattern. This paper aims to assess and highlight these conglomerations, presenting a number of case studies which highlight the potential presence of a hierarchical pattern of settlement. It will then attempt to integrate this new evidence into the broader pattern of isolated settlement which has become so common in the Irish lowlands.

## The Bronze Age House in Ireland

The European Bronze Age is characterised by a number of distinct domestic architectural traditions, with large, elongated longhouses in Scandinavia contrasting with the smaller rectangular buildings in central and south-east Europe and the circular architecture of Ireland, Britain and north-western France (Brück & Fokkens, 2013, p. 84). Brück and Fokkens (2013, pp. 82–84) argue that this variation is not surprising, considering that the house at this time became central to the construction of personal and communal identity and broader familiar social structures.

Typically, in an archaeological setting, the remains of a Bronze Age house in Ireland comprise a circular setting of load-bearing post-holes, possibly with a central hearth and occupation deposits (Doody, 2000, pp. 10–11; Cleary, 2007, p. 139). There is little evidence for the external stone walls that are more typical of the roundhouses found in Britain. On average, these are between 6 and 8 m in diameter and would have been laced together with wattle and sealed with daub. They would have had a thatched conical roof, with a single entrance usually in the south-eastern side. Floors mainly comprised beaten earth. In some instances, foundation and abandonment deposits are found placed within the post-holes or threshold of the houses, indicating the significance of these structures to the households that built them and the important ideological role they played.

The nature of these structures means they are rarely visible on the surface and are therefore found either through remote sensing, or, more often, by excavation in advance of infrastructural projects such as roads or pipelines. When they are identified, they tend to occur in isolation in lowland settings, though groups of two or three have been identified, such as at Ballybrown Lower in Co. Cork (Cotter, 2005; O’Driscoll, 2013), while others had smaller ancillary buildings (Cleary, 2007, p. 139). Some, such as Ballybrown Lower, were also enclosed by larger wooden fences or palisades, though the size of these features suggests they were probably not defensive in function, and may have been used to corral cattle. Economically,

Bronze Age structures show little in the way of high-status occupation or indeed any material culture. The evidence, therefore, strongly suggests these were the dwellings of average subsistence farmers.

The first systematic study of Bronze Age houses in Ireland was undertaken by Doody (2000), who recorded only 78 excavated examples. This number was to increase to nearly 700 within twenty years (Ginn, 2016, p. 8), spread throughout the country. This pattern, while not as dense as distributions in Denmark and the Low Countries, where farmsteads are found every few hundred metres (Earle & Kolb, 2010; Brück & Fokkens, 2013, p. 90), suggests a relatively even and comprehensive spread of sites.

Since then, there have been a number of important studies and attempts to collate these excavations, many of which remain unpublished. Cleary's (2005, 2007, 2018) analysis of the corpus tends to focus on the interaction and incorporation of ritual and symbolic elements with everyday life, highlighting evidence for foundation or closing deposits within structures, while Ginn's (2013, 2016) more recent work has taken a broader approach, concentrating on the chronology and landscape setting of these monuments.

While structures in the preceding Chalcolithic have been identified, such as at Ross Island, Co. Kerry (O'Brien, 2004) or Roughan Hill, Co. Clare (Jones, 1998), it is not until the Bronze Age that we see the proliferation of detectable domestic structures. Even then, there was a gradual introduction of this architecture in the Early Bronze Age, around 2200–1750 BC, before it became more established in the Middle (1700–1200 BC) and Late Bronze Age (1200–800 BC), eventually declining in the Early Iron Age (800–400 BC) (Doody, 2000, p. 11; Ginn, 2016, pp. 39–54). While the dynamics of this chronology have not yet been fully addressed in any comprehensive manner, Ginn (2016, pp. 39–54) has identified clear peaks and troughs in settlement activity during the *floruit* (Middle and Late Bronze Age) of this tradition, reflecting a similar dynamic identified for other contemporary monuments such as burnt mounds (see Hawkes, 2018).

## Ireland in the European Bronze Age

In Ireland, the Bronze Age houses that have been identified are incredibly homogeneous, with no signs of the significant variation in terms of size, density or material culture that might help to distinguish a settlement hierarchy. Fernández-Götz (2014, p. 28) suggests that elite structures are most often distinguished by their size, and the dearth of large structures at Irish sites is notable. This absence of demonstrably high-status settlement, in either Ireland or Britain, has led some scholars (such as Ginn, 2013, pp. 53–54; Lock, 2011; Hamilton & Manley, 2001, p. 13) to question the existence of elites. They argue that important people may have been regular members of society who were only differentiated for special occasions, or that collective rule (see Blanton & Fargher, 2008) dominated. They suggest that other large, contemporary monuments such as hillforts (O'Brien & O'Driscoll, 2017), burnt mounds (Hawkes, 2018) or trackways (Plunkett et al., 2013), were built by a disparate heterarchical community as a means to connect resources and people and act

as central spaces where communal activities took place, with the added benefit that these communal works created and engendered group identity. Lock (2011, p. 355) suggests we should not underestimate the importance of participation in communal work and the social relationships this can create, viewing hillforts, for example, as ‘structures that mediated a peaceful and harmonious life within small scale agricultural communities’.

The degree to which these local farmers were autonomous is questionable, however, as the material culture of the Bronze Age points to a higher level of social organisation involving a wealthy aristocracy that controlled significant economic resources: a chiefdom. Regional distributions of monuments and artefacts seen as indicative of this elite culture may support this hierarchical model. The distribution of richly furnished individual (rather than group) burials in Northern and Central Europe, for example, led Gilman (1981, pp. 1–3) to believe that there is ‘no doubt’ that social inequalities emerged in this period. The more recent discovery of two clusters of cremated and inhumated burials found near the trading and industrial settlement of Frattisina in Northern Italy, which revealed two high status burials with warrior material culture, is a striking example of these higher status ‘warrior-chief’ burials (Cavazzuti et al., 2019, p. 629).

While this position is generally supported by archaeologists (for example, see Earle, 1977; Barrett, 2012; Kristiansen, 1993, 1999, 2018; Kristiansen & Larsson, 2005; Harding, 2018), how these inequalities evolved, and how elites maintained their privileged position, remains a major source of contention. Gilman (1981, pp. 7–8) concluded that elites emerged as protectors and managers of large-scale communal works and commodity exchange. This, he argues, would explain the hereditary character of the class of ‘higher-order regulators’, as the best leader may not necessarily be the son of the current leader. More recently, Horn and Kristiansen (2018, pp. 2–3) argued that the importance of securing regular supplies of bronze required new social institutions, leading to the rise of aristocratic society. Conversely, Earle (1977, p. 227) argues that elites were the manifestation of exploitative relationships that appropriated part of the economic product of subservient producers. This argument sees elites develop as coordinators of economic mobilisation and redistribution, and maintain this position through tribute and taxation.

Regardless of how they came to be in their privileged position, elites exploited the underlying social classes to maintain their standing. Kristiansen (1993, p. 19) argues that they ruled through a retinue of warriors, controlling, undermining, and exploiting farming communities through tribute and taxation. In decentralised stratified societies such as those found in Bronze Age Atlantic and Urnfield Europe, towns are generally absent and subsistence production is decentralised with individual farms scattered throughout the landscape (Kristiansen, 1993, pp. 19–20). In Kristiansen’s model, craftworkers are often under the patronage of elites, who rule over their chiefdom at central places where trade and re-distribution of goods takes place. Controlling these elements of society was integral to the success of an elite, with political power being linked with access to prestige goods—the material items which distinguish the higher society from lower substrates. A chief had to mobilise the necessary economic means to participate in trading networks to attain these goods, which usually consisted of exploiting and, if possible, expanding their

economic base, though raiding to capture cattle and people was also necessary. This, in turn, led to warrior culture becoming embedded in these societies, and weapons becoming an important display symbol.

At a local level, the isolated farms within the landscape consisted of extended families divided into two or three domestic units (Kristiansen, 1993, p. 28) with the head of this unit being a representative to a higher local chief. Recent isotopic and DNA analysis of several farmstead-related cemeteries in southern Germany (Mittnik et al., 2019) have revealed a striking pattern of high-status families associated with lower-status individuals, vividly evoking images of a hierarchical social system which the media, not wholly incorrectly, interpreted as evidence for Bronze Age slaves. Each household consisted of a high-status core family with unrelated low-status individuals, possibly slaves. The significantly higher incidence of non-local but wealthy females suggests that they were being used to strengthen long-distance alliances. This new evidence reveals complex hierarchical, social and political systems that comprised many different levels. Importantly, however, Taylor (2021, p. 14) has pointed out that ‘we see only the tip of the iceberg in the co-burial of (typically) wives and servants with their husbands and owners’, and that slavery, as well as even more complex social ordering (such as that seen from the beginning of the early medieval period in Ireland and Britain: Hemer, 2021, p. 50) was likely a part of everyday life.

Equating the number of weapons deposited in warrior burials with the number of farmsteads in Denmark around 1500–1100 BC, Horn and Kristiansen (2018, pp. 3–4) argue that each one of these isolated farms would have had a warrior. The high-status young men of these households likely formed part of larger warbands (Harding, 2018, pp. 20–21; Kristiansen, 2018, p. 24) associated with an elite. The incredible battle site in Tollense, north-east Germany, where nearly all of the recovered human remains are young adult males, attests to this (Lidke et al., 2018, p. 157). Kristiansen (2018, pp. 34, 39) suggests these warbands were fifteen to twenty strong and were mostly used to carry out small-scale raids and protect trading expeditions (also see Horn & Kristiansen, 2018, p. 4), with Harding (2018, pp. 20–21) arguing that the rise of fortified sites at the beginning of the Late Bronze Age is an indicator that these bands were becoming more prevalent and lethal.

It seems that highly stratified societies with a warrior elite at their apex quickly spread throughout Bronze Age Europe, peaking in the Late Bronze Age when we see a significant increase in the construction and destruction of hillforts (O’Driscoll, 2018; Primas, 2002). These societies were underpinned by long-distance trade networks and alliances, with the elites attempting to control the movement and production of prestige goods from their hillforts—they employed a warrior retinue, made up of young men from the disparate farmsteads spread out in the hinterland of the hillfort, who protected or undertook trading ventures, collected tax and tribute and took part in small-scale raiding of competing communities; they sustained craftworkers under their patronage; they facilitated long-distance trade; they redistributed goods to maintain local political support; and they co-ordinated large-scale community level projects such as the construction and maintenance of their hillfort. Beyond this scale of hierarchy, the local farms had their own ladder of stratification, with the head of a household that contained several generations of family, having peasants

and slaves, as well as non-local marital partners necessary to solidify alliances. Even these farmsteads may have had inter-hierarchical systems. Large houses found at sites like Legård, Denmark, for example, led Kristiansen and Larsson (2005) to suggest that social disparity existed between farmsteads (an interpretation rejected by Brück & Fokkens, 2013, p. 88). It is possible that wider kin groups who settled in nearby farmsteads maintained their own social hierarchy, with larger houses a visible reminder of leaders within these broader family trees, thus providing another layer of social ordering. While it might seem there is no corresponding evidence for this in Ireland, no studies have systematically compared the morphological size of these structures.

While explicit evidence for household ordering at the scale described above is currently lacking in Ireland, the presence and distribution of metallurgical goods and other high-status items certainly supports the broader warrior elite hierarchical model and implies Ireland was deeply embedded in a complex and extensive trading network that was probably maintained by elites (Fig. 1). The presence and distribution of bronzes supports this hierarchical model (Fig. 2). The distribution of Late Bronze Age vessels ornamented with conical rivets (MacWhite, 1945, fig. 6); U-notched (Herzsprung) and V-notched shields (Henderson, 2007, pp. 82–85; Coles, 1962); bag-shaped axes (Henderson, 2007, p. 77; Eogan, 1995, p. 134); flesh-hooks (Needham & Bowman, 2005, p. 101); Irish cauldrons (Gerloff, 2010); glass and amber beads, disc-headed pins and Irish gold ornaments such as dress fasteners, gold bracelets (Henderson, 2007, p. 77) and lock-rings (Eogan, 1969, p. 93); as well as foreign stylistic influences on items such as Irish gorgets (Eogan, 1981), show Ireland was deeply embedded within an extensive trading network of high status goods that stretched throughout Atlantic and Urnfield Europe.

This extensive contact also facilitated the spread of ideas and ideology. More specifically, the manufacture and distribution of common weapon types such as swords and spears reveal that leaders throughout Europe subscribed to a warrior culture, universally accepting the social values and material culture that supported it (Cunliffe, 2008, p. 232). This is attested by the huge numbers of contemporary bronze weapons found throughout Europe. While this could represent an ideological culture focused more on material display than practical use (Harding, 2012, p. 193; Neustupný, 2006), Kristiansen (1999, p. 188) argues that ‘there can be no rituals or symbols without the reality of what they signify’. Swords developed from a practical standpoint, moving from longer, narrow designs prone to hilt fracture, to shorter, wider leaf-shaped blades designed to be used in combat (Gener, 2018). This practical interpretation is supported by use-wear analysis, which indicates that over 90% of Late Bronze Age Irish swords show signs of edge damage (Bridgford, 1997, p. 106; Osgood, 1998, p. 13; Osgood & Monks, 2010), compared with about 75% of Scottish examples (Bridgford, 2002) and approximately 50% of swords from south-east England (Thorpe, 2006, p. 155). This corresponds with a high percentage of dirks and rapiers from the River Thames which show signs of use (York, 2002). A ritual interpretation, therefore, does not explain the proliferation, evolution and practical use of more advanced weapon types in the Late Bronze Age, and the sheer number of swords and other weapons like the spearhead and axehead in Ireland, with the total number of known Irish weapons second only to Denmark. The weapon

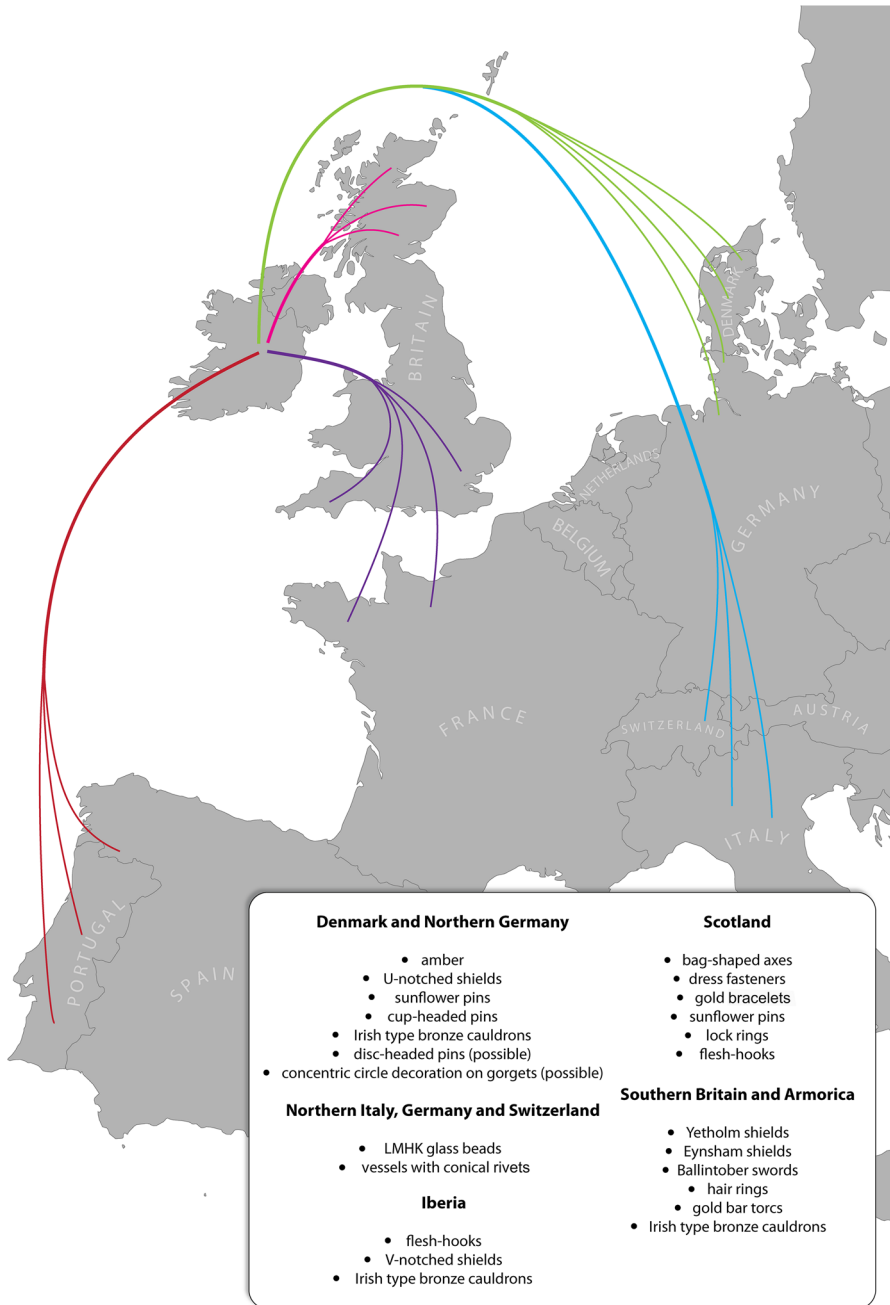
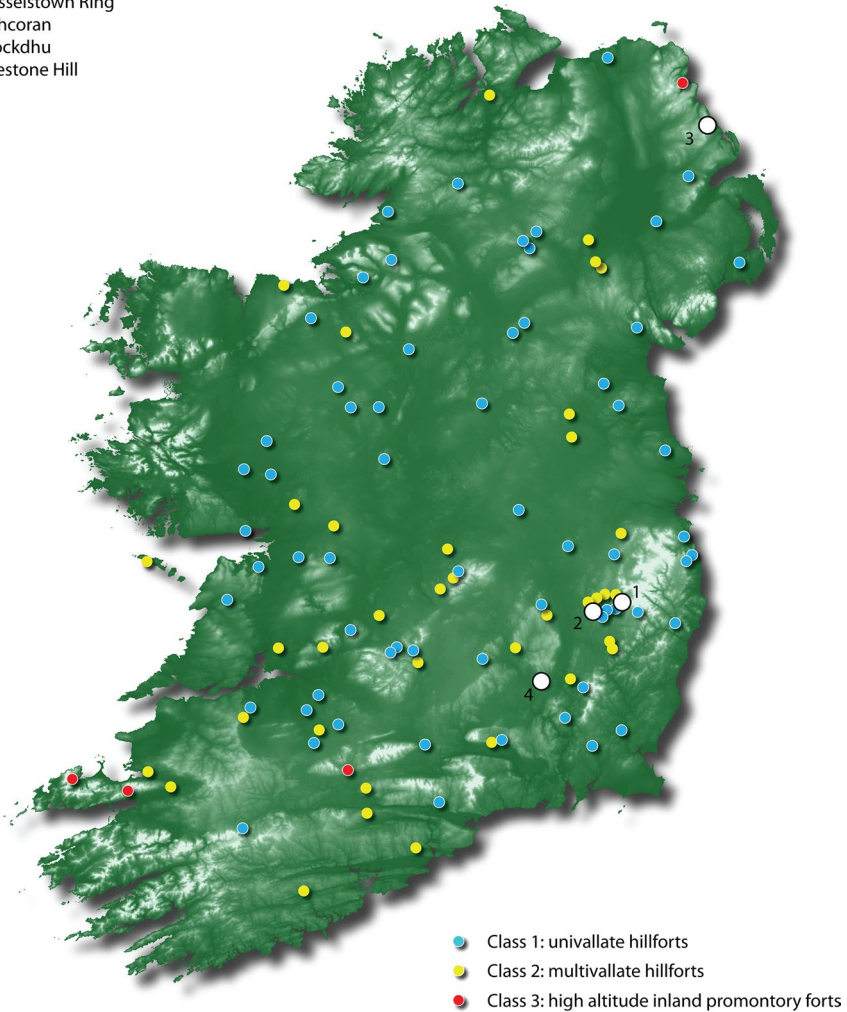


Fig. 1 Examples of long-distance trade in Ireland during the Bronze Age

- 1: Brusselstown Ring
- 2: Rathcoran
- 3: Knockdhu
- 4: Freestone Hill



**Fig. 2** Irish hillforts with location of case studies

evidence alone suggests that Ireland was deeply connected with Atlantic Europe at this time and subscribed to a shared ideology centred on the attainment of high-status goods and a warrior identity (Cunliffe, 2008, p. 232). The European Bronze Age, and in particular the Late Bronze Age, is often considered to have seen a dramatic increase in the exploitation of natural resources, maximisation of agricultural productivity and competition over trade routes (Earle, 2002; Brück & Fontijn, 2013, p. 202). The gradual introduction of bronze into all spheres of life led to a dependence on regular supplies (Horn & Kristiansen, 2018, pp. 2–3). This dependence, coupled with the limited natural availability of ores, provided a stimulus for the development of exchange networks and facilitated the evolution of politicised economies



concerned with the production, display and consumption of prestige goods (Van De Noort, 2013, p. 382; Yates, 2007, p. 120).

Indeed, these systems were symbiotic. Rare metal objects represented the materialisation of social and political power (Kristiansen & Larsson, 2005, p. 37) and elites consolidated the production and exchange of this material to increase their status. This is apparent in the strategic siting of Irish hillforts overlooking natural routeways and the presence of intensive craft-working and high-status objects derived from long distance-trade at these sites (O’Driscoll, 2017) (see below), but also in the careful manipulation of exchange relations between elites and the common populace (Sharples, 2007, p. 123) and the intensive expansion of farming activities (see below) to accumulate sufficient surplus to build and maintain elites and their hillforts. Cunliffe believes an ability to control the movement of raw materials was an important factor in elites maintaining their power, and the hillforts of this period, one of the few truly pan-European monument types, may have been a key element in this regard.

## The Irish Hillfort

Hillforts comprise some of this region’s largest and most impressive monuments and are often recognised as regional centres of power and authority. They are defined by one or more concentric lines of earthworks, stone walls and/or wooden palisades, which enclose an area often several hectares in size. In some cases, their placement in the landscape can be linked with natural route-ways and/or natural resources, representing an ever-increasing need to control trade networks and the procurement, exploitation and supply of natural resources (see, for example, Brown, 2009, p. 201; Brück, 2007, p. 31; Brück & Fokkens, 2013, p. 95; Fonte et al., 2011; Grogan, 2005, 2014, p. 68; Hamilton & Manley, 2001, p. 31; Murrieta-Flores, 2012, p. 114; O’Driscoll, 2017), though domestic and ritual functions may also have been expressed through hillfort construction.

In Europe, the concept of enclosing a hilltop is a recurring feature from the Neolithic period onwards. However, it was not until the end of the Early Bronze Age that fortified hilltop settlements began to be built (Harding, 2007), such as Bruszczewo, Poland (Jaeger & Czebreszuk, 2010) or Götschenberg at Bishofshofen in Austria (Lippert, 1992). Hillforts were mainly constructed in three periods: the Early to Middle Bronze Age transition (1800–1600); the Middle to Late Bronze Age transition (1300–1000); and the end of the Bronze Age/Early Iron Age (800–600) (Primas, 2002).

Primas (2002, p. 50) describes the 1300–1000 horizon as an unprecedented intensification of construction. While early Bronze Age hillforts were rare in western Europe and would contract again in the third horizon (O’Driscoll, 2016, p. 91), in the Middle/Late Bronze Age phase they were widely dispersed, with hillforts being built throughout Atlantic and Urnfield Europe. They were usually located in strategically important positions, built close to good quality agricultural land and natural resources (Härke, 1979, p. 31) or overlooking important natural routeways (Jockenhövel, 1975; O’Driscoll, 2017), with growing evidence to suggest that many sites

became centres for specialised craftworking (Härke, 1979, p. 30; Jiran et al., 2013, p. 792; Lull et al., 2013, p. 612), such as Dún Aonghasa in Ireland (Cotter, 2012) or Senhora da Guia de Baiões in Beira Alta (Lull et al., 2013, p. 612). Many show evidence for violence and destruction, with Harding (2001, p. 334) and Bogucki (2004, pp. 88–89) both suggesting that ‘almost all’ of the Urnfield hillforts in Central Europe were rapidly destroyed, with artefact assemblages often indicating a single phase of occupation that rarely exceeded one hundred years. Hillforts like Toor More in Ireland (O’Brien et al., 2016a), Biskupin in Poland (Harding, 2001, p. 335) or Heunischenburg in Germany (Thorpe, 2013, p. 240), for example, show evidence for comprehensive burning of their enclosing elements, with more visceral evidence for violence and destruction found at Velim in the Czech Republic (Harding et al., 2007, p. 154), where a hostile attack on the hillfort resulted in many deaths before the site was burnt down (Harding et al., 2007, p. 145).

Considering this prolonged period of construction, and despite the problems of classification and terminology, Ralston (2006) suggests there may be up to 30,000 hillforts in Europe. In Ireland there are approximately 110 recorded examples (Fig. 2). About 20 have been excavated, though only just over half of these have provided secure dating for their construction and use (see O’Brien & O’Driscoll, 2017, pp. 321–342). This small sample places them exclusively within the Middle/Late Bronze Age, with no evidence for a construction horizon in the Early Bronze Age or Iron Age as seen in other parts of Europe. Much of the evidence we do have corresponds well with the wider European data.

The archaeological and environmental record suggests that Irish hillforts were the focus of intensive agricultural activity, long-distance trade and high-status craft production. Whenever a palaeo-environmental study has been undertaken near a hillfort, it has shown intensive clearance and exploitation of land in its immediate environs. At Mooghaun, Co. Clare, woodland had been almost completely removed and replaced by pasture and some cereals around the time the fort was built (O’Connell et al., 2001; Molloy, 2005, p. 284). A contemporary clearance event occurred at Haughey’s Fort, Co. Armagh, again around the time the fort was constructed (Weir, 1987a, 1987b, 1993, 1994). The study showed that cereals made up 6% of the open landscape, which is amongst the highest known percentage from prehistoric Ireland and indicates that arable agriculture was an important component of the economy (also see Plunkett, 2006, p. 65). Similar studies at Rahally, Co. Galway (Mullins, 2008); Lyles Hill, Co. Antrim (Simpson & Gibson, 1989, p. 215); Croghan Hill, Co. Offaly (Plunkett, 2009, p. 274); Ballylin, Co. Limerick (Plunkett, 2006, pp. 65–66); and Lurigethan, Co. Antrim (Weir, 1993, p. 21) indicate intensive land clearances, representing a large expansion in farming activity associated with the construction and settlement of Irish hillforts (O’Driscoll, 2016, pp. 65–67).

The environmental evidence strongly indicates that the immediate environs of Irish hillforts were being exploited for agricultural purposes. In certain instances, where more extensive excavation of the interior has been undertaken, features associated with the storage of agricultural produce have been identified. At Haughey’s Fort, large pits within a substantial structure at the centre of the hillfort contained large amounts of carbonized grain (Mallory, 1995). At Downpatrick, Co. Down (Proudfoot, 1954, 1955), carbonized grain was found in wattle-lined pits within the

hillfort. Geophysical survey at Toor More, Co. Kilkenny (O'Brien et al., 2016a) and Ballylin, Co. Limerick (O'Brien et al., 2016b) has revealed substantial numbers of possible pits near the summit of the hillforts. Yates (2007, pp. 2–4) suggests that wealth in the Late Bronze Age resulted from the successful management of available resources, particularly agricultural produce, with intensive farming possibly leading to rapid economic growth. Cunliffe (1995, p. 90; 2013, pp. 252, 257–258) also considers control of agrarian surplus as connected to the maintenance and expansion of elites, used for feasting or to acquire high status goods outside the local territory. Kristiansen (1993) argues that these 'archaic states' developed in regions where surplus can be generated and controlled before being converted into large-scale ritual activities such as building ceremonial centres, organization of craft production, and centralized trade.

While the common Bronze Age house has shown little evidence for exotic material culture or craft-working indicative of elite occupation or patronage, when sufficiently large-scale excavation has been undertaken, we see this activity at contemporary Irish hillforts. At Dún Aonghasa, 460 moulds and crucible fragments were recovered (O'Carroll, 2012, p. 28), while at Rathgall several thousand clay mould fragments were identified (Raftery, 1976, p. 345). Both assemblages are noteworthy for the range of artefacts being produced. Weapons and tools were being manufactured at Rathgall, including socketed spearheads, spearheads with shallow lozenge-shaped cross-sections, swords, palstaves, socketed bag-shaped axes and possibly rapiers (Raftery & Becker, 2023). Other objects, such as knives, razors and pins, were also being cast. At Dún Aonghasa, two different types of socketed spearhead, swords and socketed axes, as well as knives, bracelets, pins and studs/buttons were being made (O'Carroll, 2012). Interestingly, two of the three socketed axe moulds had decoration near the socket, possibly indicating their use as ceremonial objects. Mallory (1995, pp. 80–81) has posited that the small traces of gold found within pits at the centre of Haughey's Fort may have been fragments of industrial waste, intended to be utilised in the ornamentation of some objects. More recent analysis of the bronze and gold items by Brandherm (2014) and Warner (2014) reveals that there is probably a metal workshop area within the hillfort where bronze casting and gold working took place. Approximately 18 fragments of clay moulds used to produce leaf-shaped bronze swords were recovered from limited excavation at the nearby and contemporary King's Stables votive pond (Lynn, 1977). Mallory and Baban (2014, p. 26) argue that the sword moulds were probably cast by the residents of Haughey's Fort.

A similar situation occurs throughout Europe around 1400 BC, when new centres of bronze and craft-working arose (Bowen, 1972, p. 52), many within hillforts. Jiráň et al. (2013, p. 792) have noted the high frequency of metalworking at hillforts in the Czech Republic and Austria during the Late Bronze Age. A similar situation is apparent in France, where hillforts such as Fort-Harrouard and Saint-Pierre-en-Chastre were centres for the intensive production of prestige goods (Mohen & Bailoud, 1987; Brun, 1993, p. 178). The numerous mould fragments from Fort-Harrouard constitute the largest assemblage of such material in France. These fragments indicate the large-scale production of weapons, which Brun (1993, p. 178) suggests may have been intended for export. Burgess and O'Connor (2008, pp. 46–48) have

noted that an unusually large proportion of Late Bronze Age metal artefacts have come from *castros*, another term for hillfort in Iberia, inferring that these hilltop sites were utilised as craft-working centres; one example is Senhora da Guia de Baiões in Beira Alta hillfort in Portugal (Lull et al., 2013, p. 612). Many contemporary German hillforts also produce evidence for craft-working, such as the Hunenburg hillfort near Waterstedt, Germany (Heske, 2007; Heske et al., 2010; Jockenhövel, 2013, p. 741). Osgood and Monks (2010, p. 66) suggest that by the end of the Late Bronze Age much of the production of goods seems to have taken place at fortified sites and this is seemingly reflected at some hillforts in Ireland. Vandkilde (2004, p. 32) suggests that such sites should be interpreted as protected centres of crafts and trade, presided over by local elites.

The intensive surge in agricultural practices within the environs of the Irish hillforts and the storage of excess produce, therefore, may have been a means of maintaining craft-workers, and as such, controlling the production of and access to prestige goods. Many of these mass-produced items may have been exported and exchanged for foreign exotica, and again we have evidence for this at Irish hillforts. Scientific analysis of amber beads recovered at Dún Aonghasa shows they originate from the Baltic. Similarly, amber beads from Rathgall, including a composite bead with gold mounting, are probably of foreign origin (Raftery & Becker, 2023, p. 161). Eighty-eight complete and fragmentary glass beads from Rathgall confirm that the hillfort community was involved in long-distance exchange. Glass beads from two hillforts in Ireland, Rathgall and Freestone Hill, Co. Kilkenny, are closely matched by examples from a small number of sites in Germany (Hartmann et al., 1997); France (Gratuze et al., 1998); Switzerland (Henderson, 1988); Northern Italy (Henderson, 1988; Brill, 1992; Towel et al., 2001; Angelini et al., 2004, 2009); and, to a lesser extent, Britain (Henderson, 1988). These beads contain low magnesium oxide (MgO) and high potassium oxide (K<sub>2</sub>O) levels (LMHK) (Henderson, 1988) and have been linked with the glass workshop at the contemporary site of Frattesina, Northern Italy (Angelini et al., 2004, p. 1183).

Excavations at Haughey's Fort recovered a possible handle from a Central European bronze bucket and a possible bronze pin from Northern Europe (Mallory, 1991, p. 21; Warner, 2006, p. 24; Mallory & Baban, 2014, p. 26; Brandherm, 2014). Approximately 700 m south-west of Haughey's Fort, a hoard in the townland of Tamlaght, dated typologically to the end of the Late Bronze Age, comprises a sword and two bronze vessels: a Fuchstadt type bowl and Jenisovice type cup, that appear to have been manufactured in Northern Germany (Mallory & Baban, 2014, p. 26; Warner, 2006, 2013, p. 38). An Iberian-style gold neck-ring was found 600 m east of Haughey's Fort, which probably dates to the Middle/Late Bronze Age transition (Warner, 2013). The variety of finds indicates that Haughey's Fort had trading links with various regions of Continental Europe. A portion of a similar Iberian style neck ring was found in a hoard recovered within the interior of Downpatrick. Panels of engraved herringbone design on the neck ring are comparable to Iberian neck rings of Berzocana type (Almagro-Gorbea, 1995, p. 140; Eogan, 1994; Waddell, 1998, pp. 198–199), indicating potential links with Western France. A total of three hoards were recovered at Downpatrick, and Warner (2013, p. 37) suggests that a number of objects may have been imported from Iberia. A bar toggle found at Rathgall is

strikingly similar to numerous examples found in southern Denmark and Northern Germany and is most likely an import from that area (Raftery, 1976; Waddell, 1998, p. 270).

The construction of many Irish hillforts c.1400–1100 BC coincided with an upsurge in the hoarding of personal ornaments (O'Brien & O'Driscoll, 2017, p. 413), and the distribution of hoards more generally reveals a general proximity to multivallate hillforts that might be indicative of material deposition at territorial limits. The general picture suggests that wealth was concentrated near hillforts, though only Downpatrick, Co. Down and Dún Aonghasa, Co. Galway have produced hoards within their interiors. Hoards in close proximity to Irish hillforts, such as the famous Mooghaun North hoard of gold material 1.9 km to the north of Mooghaun hillfort, or the Tamlaght hoard near Haughey's Fort, may have been deposited around the time these hillforts were abandoned, while other hoards contemporary with the possible use of hillforts could have been deposited for safekeeping in times of conflict or as votive deposits to re-enforce boundaries and territories. The deliberate and comprehensive burning of many Irish hillforts (O'Driscoll, 2018, pp. 87–89), such as Clashanimud, Co. Cork or Toor More in Co. Kilkenny, might be seen as evidence for warfare (O'Brien, 2012, p. 221). The act of destruction was deliberate and premeditated, with considerable numbers of people and resources needed to set and maintain fires over perimeters often kilometres in length (for example, Toor More has a composite perimeter of 1.43 km, which was comprehensively destroyed by fire). Arkush (2011, p. 67) and O'Driscoll (2018) have argued that a hillfort, being the political and residential centre of an elite and its chiefdom, would have become an inalienable part of a competitive, warrior-focused social system, and an inevitable target of rival communities.

The excavation evidence certainly points to hillforts being important nodal points for societies throughout Europe in the Middle and Late Bronze Age, linking them with the sprawling long-distance exchange networks, exotic foreign artefacts, intensive agricultural practices and the manufacturing of prestige goods. Indeed, O'Driscoll (2017, 2018) suggests they may have been deliberately positioned in the landscape to attract traders and assert the authority of an elite over the movement of goods and people. On a broader scale, the hillfort appears to sit at the pinnacle of a militarised, hierarchical society (the chiefdom) that developed throughout Europe in the Bronze Age (Earle, 1977, 2002, p. 42; Kristiansen, 1993; Horn & Kristiansen, 2018, p. 1). The elites who controlled these forts and the communities associated with them may have resided there permanently with a retinue of warriors, craftworkers and other significant individuals, while the disparate community spread throughout the immediate landscape would gather at the fort at certain periods throughout the year (O'Driscoll, 2018). They would have been constructed by this community, which could have been in excess of 10,000 people (Service, 1962). This would have been a considerable undertaking. For example, Lock et al. (2005, p. 143) have provided labour estimates for Segsbury Camp in Oxfordshire, England, a multi-phase fort approximately 11 ha in size. Nearly 19,800 cubic metres of chalk was quarried and piled to create the enclosing elements, representing 9359 person days, or 212 people working for 44 days. This does not include the time it would take the hillfort builders to acquire, prepare and move wood included in the construction, which

would have considerably increased the time and effort required (Sharples, 2010, pp. 116–117).

Considering the clear proclivity for materiality and status display during this period, we might consider domestic architecture as one of the core arenas for elaboration and display, yet this does not seem to be the case. Ginn (2013) suggests that the nearly 700 excavated houses in Bronze Age Ireland show little to support the hierarchical model of society that is widely presented in the literature. Brück's (1999, pp. 145–147) analysis of Middle Bronze Age settlements in Southern England produced a similar picture and this is reflected more broadly throughout temperate Europe (Brück & Fokkens, 2013, pp. 86, 91; Kristiansen, 2018). This pattern continues into the Iron Age, which remained a fundamentally rural world populated by independent farmsteads (Fernández-Götz et al., 2014, p. 12). In areas where we do find larger domestic structures, such as in north-west Germany or Denmark, they are relatively scarce and have been interpreted as the residences of a chiefly elite (Kristiansen & Larsson, 2005).

So how do we resolve this discrepancy? The material culture and broader archaeological evidence in Ireland point to an elite class within a hierarchical social system, though high-status domestic dwelling of any sort remains elusive. Most researchers (such as Ginn, 2016 and Cleary, 2007) have failed to properly consider settlement evidence from hillforts and other unenclosed upland settlements. Indeed, it is at hillforts—often regarded as the permanent settlement of an elite, and where we find evidence for intensive agriculture, the manufacture of high-status weapons, tools and personal ornaments, as well as exotic objects obtained from long-distance trade—that we should find larger structures and more nuanced evidence for settlement hierarchies.

## Settlements Within Irish Hillforts

To date, much of the discourse about Irish hillforts has revolved around broader issues such as chronology and function (see O'Brien & O'Driscoll, 2017). While this has been an important first step in terms of laying the groundwork for more nuanced studies, the massive scale of these monuments is prohibitive to further research. What limited evidence we do have regarding the interior of these sites is both complex and diverse.

At one end of this spectrum, there are forts that show little or no evidence for any type of activity other than the building of the hillfort itself. At Clashanimud, Co. Cork (Fig. 3), a bivallate hillfort some 8.9 ha in size was securely dated to the Late Bronze Age (O'Brien & O'Driscoll, 2017). The excavations showed that the inner defences comprised a large bank surmounted by a palisade with an external rock-cut ditch that would have created a barrier some 6–7 m high, incorporating several thousand oak posts (O'Brien, 2012, p. 221). The outer enclosing element comprises an earthen bank that was topped with a light wooden fence with an external ditch (O'Brien, 2012, p. 221). Its entire 1.74 km composite perimeter was destroyed by fire. Thirty-seven small excavation trenches within the interior of the hillfort, as well as gradiometry survey, revealed no evidence for occupation or internal structures.



**Fig. 3** Clashanimud hillfort, Co. Cork (Bing Maps accessed May 14, 2020)

While this may hint at a ritual function for Clashanimud, the lack of occupation activity may also be a result of the limited scale of the interventions; however, this is almost certainly not the case at Rahally, Co. Galway.

Rahally comprises a large trivallate hillfort positioned on a low glacial ridge, occupying an area of approximately 14.24 ha. About 30% of the entire monument and 53% of the inner enclosure was excavated. The hillfort was securely dated to the Late Bronze Age (Mullins, 2008, p. 26), though curiously, there was no obvious sign of any internal activity. While it could be argued that significant Early Medieval settlement, in the form of at least three ringforts (two of which occupied the central enclosure), truncated earlier activity, a more likely explanation is that the hillfort mainly acted as a ritual centre, and as such, large scale domestic occupation did not occur. This interpretation is supported by a large, 30 m gap in the northern section of the inner enclosure, which incorporates a wet marshy area that extends northwards. A late La Tène artefact, possibly some horse equipment, was recovered from this context, suggesting that it may have acted as a possible votive pond. A series of low-rise earthworks comprising a large funnel-shaped avenue identified outside the area of excavation to the north-east may also hint at non-domestic activity (Mullins, 2008, p. 27, illus. 2). Large amounts of animal bone in the ditch fills suggest the site was certainly used, possibly for feasting.

Large-scale excavations at Rathgall, a large quadrivallate hillfort 6.08 ha in size, produced an extensive assemblage of crucible and clay mould fragments, as well as various bronze, gold and amber objects attesting to the intensive production of prestige goods and long-distance trading during the Late Bronze Age (Raftery, 1976, pp.

341, 350). Contemporary burials attest to the potentially non-domestic nature of the fort. No obvious domestic structures were identified, though the excavation focused on the centre of the inner enclosure, and therefore, other areas of the fort remain to be investigated.

Excavations at the 10.42 ha trivallate hillfort of Haughey's Fort revealed the monument was constructed in the Late Bronze Age (Mallory, 1995, p. 75) and occupation of the interior is largely contemporary (Mallory, 1995, pp. 75, 78; Mallory & Warner, 1988). Large pits containing substantial amounts of carbonized grain as well as coarse-ware pottery, fragments of quern stones, metal artefacts and fragments of gold and bronze were identified near the centre of the site. The majority of these pits were positioned within a large (25–30 m) structure usually interpreted as a ritual building. Similar large post structures have been identified at Glanbane, Co. Kerry (O'Driscoll, 2016, pp. 58–60). We could also interpret these massive timber-built structures as elite dwellings or structures used for elite rituals, though further excavation is needed in order to clarify their nature.

While it is clear that hillforts were used for many different activities, a considerable number of sites show signs of having been occupied by domestic buildings. Thirty-one hillforts show surface evidence for settlement activity, though only nine of these sites have more than ten visible structures within their interiors. With further excavations and survey, more extensive settlements are likely to be discovered, as indicated by the investigations at Dún Aonghasa. Here, a 5.8 ha cliff-top hillfort shows two main construction phases. The first comprises the construction of three of the enclosing elements and dates to the Late Bronze Age. The second undated phase comprised the construction of a fourth enclosing element and *chevaux de frise* (see Cotter, 2012, p. 55, fig. 3.7; Warner, 2012). Although no upstanding structural remains exist, upon excavation, up to ten buildings were identified (Cotter, 2012, pp. 262–272).

Knocknashee hillfort presents evidence for over fifty circular structures within the confines of the 22 ha univallate hillfort. The houses seem to be grouped into two clusters separated by a 40 m wide corridor of unoccupied land. Brandherm et al. (2018, pp. 30–33) has interpreted this as evidence for the use of the hillfort by two separate communities. More detailed analysis of the size and distribution of the settlement awaits publication.

At Mooghaun hillfort in Co. Clare, a large trivallate hillfort some 11.05 ha in total area, excavations have securely dated the enclosing elements to the Late Bronze Age (Grogan, 2005, pp. 118, 144, 188). Contemporary occupation evidence and coarse-ware pottery was identified in numerous excavated areas, including two houses abutting the middle enclosing bank, though the excavator links these with the initial building phase rather than subsequent occupation (Grogan, 2005, pp. 183–184). These structures were not visible before excavation, and considering only a small proportion of the hillfort was excavated, it is likely that more extensive occupation evidence exists.

Photogrammetry survey at the incredible inland promontory fort of Caherconree, Co. Kerry (Fig. 4), has also produced evidence for settlement nucleation (O'Driscoll, 2019a, 2019b). At 659 OD in the Slieve Mish Mountains, Caherconree is the second highest hillfort in Ireland or Britain. It is positioned on a distinct topographical spur





**Fig. 4** Caherconree hillfort, Co. Kerry

projecting from the western face of a mountain and comprises a single drystone wall cutting off the eastern approach to the promontory, occupying an area of 1.22 ha. The site was mythologised in the early medieval period as the fort of Cú Roí (Caherconree translating as the fort (Caher) of Cú Roí (Conree)), a non-historical figure who played an important role as a pagan ruler over Munster, the southern region of Ireland (Cotter, 2012, p. 18). Seven D-shaped structures have been recorded at the fort, abutting the inner and external face of the inner wall. Six additional house sites were recorded by photogrammetry survey inside the fort and another five examples abutting the external face. A further 8 structures were identified immediately outside the fort to the south and east. These structures were small, ranging between 1.86 and 4.34 m. The deep peat deposits (over 0.7 m in depth in places) in the interior of the fort have almost certainly obscured our record of this settlement, which may be much more extensive.

Aerial photography at other sites, like Lurigethan, Co. Antrim and Glasbolie, Co. Donegal, for example, hint at other large-scale settlements inside Irish hillforts, though more detailed topographical analysis is needed to map these sites in detail. The sites that have received more thorough study, however, reveal a common pattern in the structured layout of these settlements and evidence for hierarchical settlement.

## Dense Settlement Conglomerations at Irish Hillforts: A Series of Case Studies

### Brusselstown Ring, Co. Wicklow

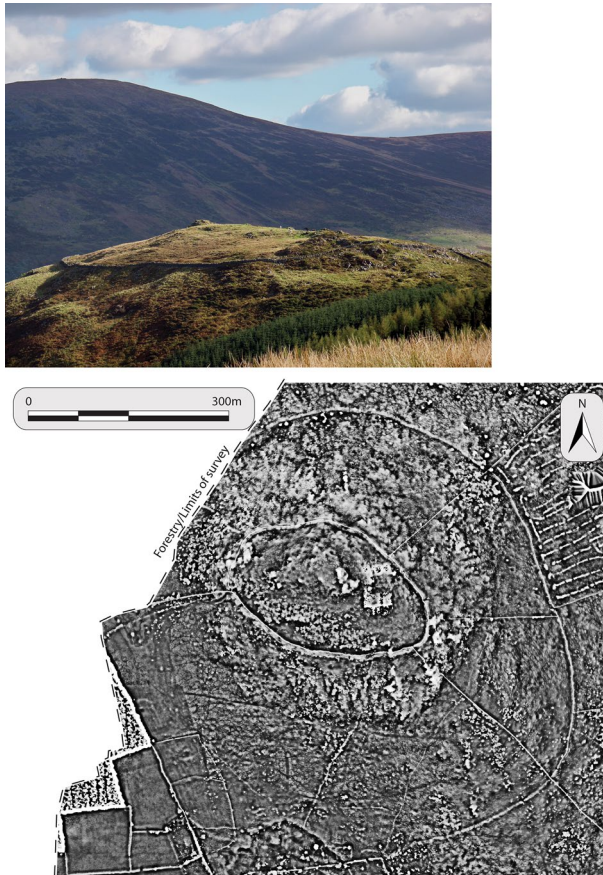
In Baltinglass, Co. Wicklow, surrounding the meandering Slaney River, a cluster of large and elaborate hilltop fortifications crown the summits of a series of prominent hills projecting from the south-western edge of the Wicklow Mountains. The group has been described by Condit (1992) as ‘Ireland’s hillfort capital’, seemingly having the single largest concentration of these monuments in the country. More recent excavations, however, have revealed a more complex use history (O’Brien & O’Driscoll, 2017). Three of the forts, namely Spinans Hill 1, Hughstown and Rathcoran, have been dated to the Early Neolithic, forming the three largest monuments of this time period known in Ireland. Two others, Rathnagree and Sruhaun, date to the Middle Bronze Age, and therefore represent the earliest known hillforts in Britain or Ireland, while another, Tinoran, is Late Bronze Age and represents the largest dated hillfort in Ireland. Three forts remain undated, including Kilranlagh, Spinans Hill 2 and Brusselstown Ring. The latter is particularly important, as recent survey has revealed the largest upland nucleated settlement known in prehistoric Ireland.

Brusselstown Ring is a large bivallate hillfort with widely-spaced stone walls enclosing a total area of 41.19 ha (Fig. 5), its morphology typical of a large Bronze Age hillfort. The inner enclosure sits on a natural oval terrace surrounding an area of 4.63 ha. It consists of a stone bank varying in width between 5.3 and 11.7 m and up to 1.2 m high in places. The outer rampart is located 124–305 m outside the inner example and comprises a less substantial stone bank, the eastern and south-eastern section of which is incorporated into modern field systems. This is best preserved to the north, where the stone bank averages 10.2 m in width and is more comparable in size to the inner enclosing element.

There are records of two structures inside the inner enclosure and 24 examples immediately outside that rampart to the south (Grogan & Kilfeather, 1997). These are apparent as circular scoops or platforms terraced into the side of the hill further defined by a setting of roughly laid stones or boulders (Condit, 1992, p. 20; O’Brien & O’Driscoll, 2017, p. 200). Condit (1992, pp. 16–20) noted another concentration of settlement immediately outside the hillfort on its northern side, consisting of enclosures, house sites and field walls, though much of this is now under forestry.

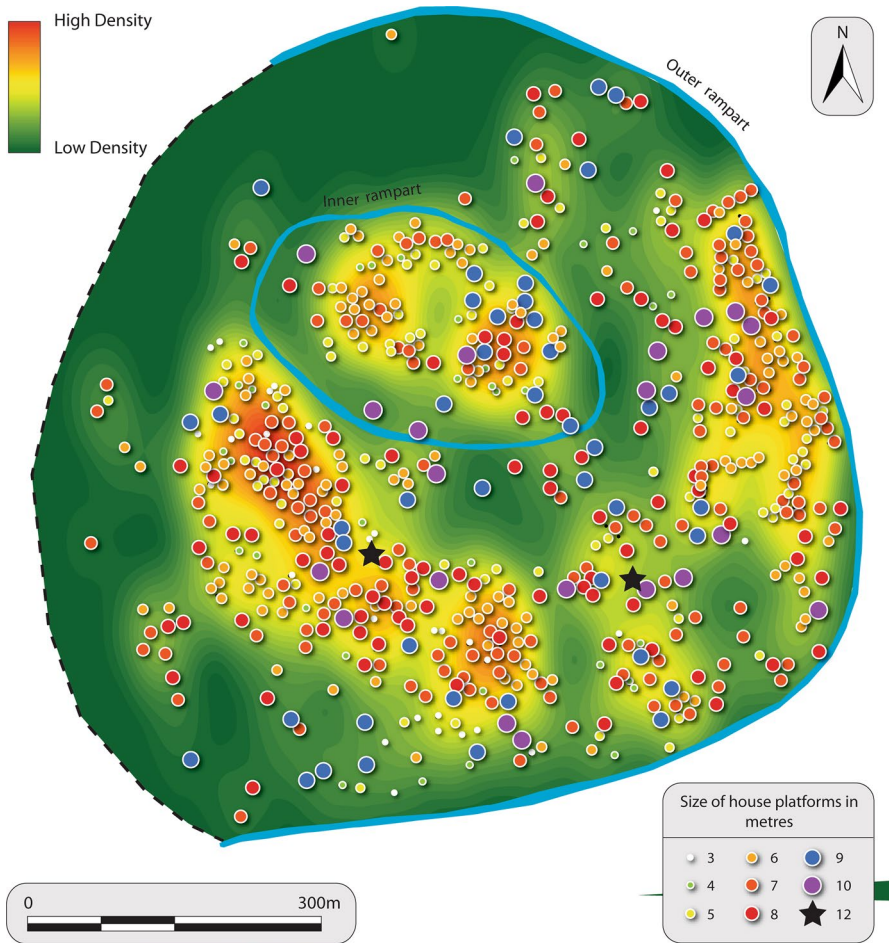
A GPS survey in 2013, followed by a high-resolution drone-derived photogrammetry in 2017, identified a massive cluster of additional terraced platforms concentrated within Brusselstown Ring (Figs. 5 and 6; Table 1). A total of 607 platforms were identified, constituting one of the largest settlements of possible prehistoric date in Ireland or Britain. The limited number of overlapping structures, as well as many examples appearing in rows (see Fig. 7, for example), suggests that many of these platforms could be contemporary, and their confinement within the hillfort suggests they could be broadly contemporary with the fort.

The settlement is relatively evenly spread on the southern and eastern slopes of the hillfort, though dense scrub growth probably obscures identification of more



**Fig. 5** Brusselstown Ring, Co. Wicklow, photograph (above) and Simple Local Relief Model (below)

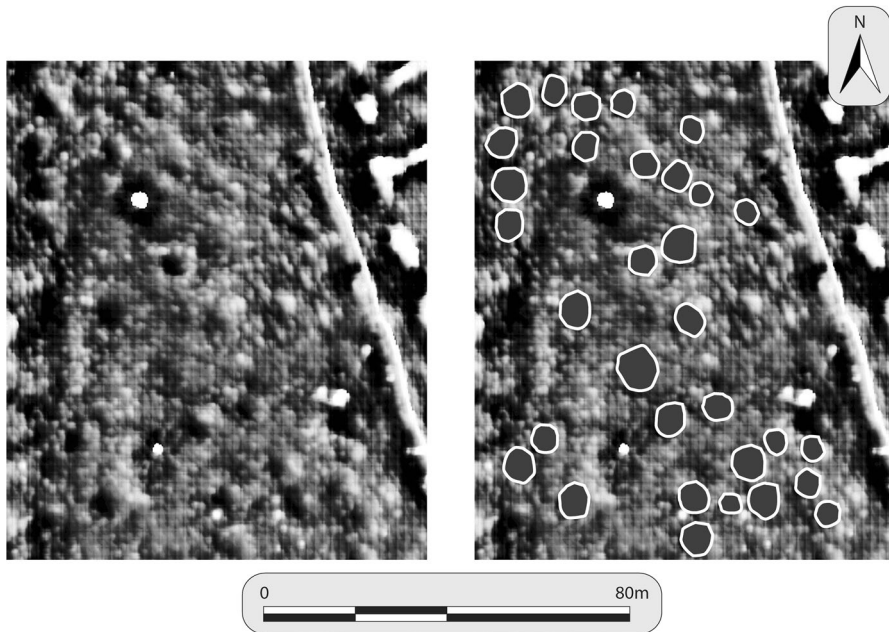
dense activity at the north and western sides. Generally, however, settlement was densely packed into every area that could be used, with small pockets of rock outcrop or severe slopes inhibiting habitation of those areas. Despite this, there are clear clusters of settlement within the hillfort. Of the total number, 98 platforms are positioned within the inner enclosure and a further 509 between the inner and outer enclosing elements. These features consist of flat, circular areas 3–12 m in diameter. The majority of the structures range 6–8 m in diameter (64.3% of the settlement), supporting Cleary’s examination of Irish Bronze Age structures which highlights the clear dominance of structures of comparable size (2007, p. 139). Additionally, there are a substantial number ranging 3–5 m (24.1% of the settlement). Cleary (2007, p. 139) suggests that these are commonly found associated with larger houses and could have formed ancillary structures. Twenty-three platforms, comprising 3.8% of the total settlement, are 10 m in diameter and only two structures (0.3% of the settlement) measure 12 m. These 23 house sites are evenly distributed throughout the settlement, although it is notable that the



**Fig. 6** Location, size and density of house platforms at Brusselstown Ring

**Table 1** Number and percentage of house platforms at Brusselstown Ring, Co. Wicklow

Size of huts	Number of huts	Percentage
3	29	4.8
4	35	5.8
5	82	13.5
6	141	23.2
7	155	25.5
8	94	15.5
9	46	7.6
10	23	3.8
12	2	0.3



**Fig. 7** Example of house platforms on eastern side of Brusselstown Ring

two largest examples are not positioned within the inner enclosure, instead being located at the edge of large concentrations of settlement. This, however, may be a consequence of the thick overgrowth within a large portion of the interior. Dense clusters of smaller house sites often accompany larger examples.

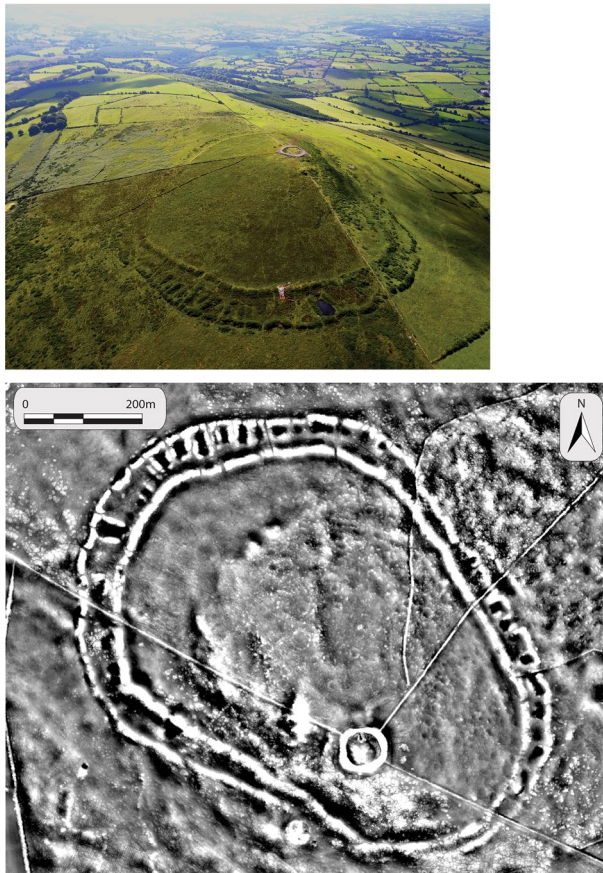
At first glance, the difference between a house measuring 8 m (the largest of the ‘average’ sized buildings) and 12 m in diameter (the largest identified structure at the site) does not seem significant; however, the former would have a total area of 50.27 m<sup>2</sup>, less than half the 113.1 m<sup>2</sup> footprint of the latter. Variation in the size of structures may reflect an element of social stratification, which cannot be identified when comparing isolated settlements dotted throughout the landscape. The largest cluster of house sites at Brusselstown Ring is positioned immediately to the south of the west-facing entrance and forms a corridor for access to the hillfort interior. The terrain to the east and south falls away sharply and this area remains largely clear of habitation. Similarly, the area immediately to the south, east and north of the inner enclosing elements comprises severe slopes, covered with large glacial erratics that would have limited settlement space. Beyond these areas, in flatter terrain to the south and east, less condensed settlement occurs.

There are no structures abutting or within 10 m of the external face of the inner enclosing elements at Brusselstown Ring. The bank is positioned at the edge of a sharp drop in slope at the south-east, east, north and north-west, and this probably affected the distribution of structures in these areas. More suitable terrain is available in the south and south-west, however, that area does not seem to have been settled. It may have been kept clear to allow better visibility of the defences from other

hillforts in the area or from low-lying, settled regions in the landscape. Direct, unobstructed visibility of impressive displays of status and resource consumption would have been an important element of competitive display.

### Rathcoran, Co. Wicklow

A similar pattern of settlement can be seen at Rathcoran fort on the southern summit of Tuckmill Hill which directly overlooks the modern town of Baltinglass (Fig. 8). Rathcoran comprises two large banks 8–22 m apart, occupying a total area of 10.06 ha. LiDAR shows that the banks vary in terms of their size and spacing, ranging from a maximum of 3.1 m in height and 12 m in width on the northern side, to 0.2 m in height and 3.4 m in width at the south. A total of 39 narrow breaks in both enclosing elements have been identified. These are often positioned on either side of rectangular pits and associated quarry material located in-between the banks. Two larger, corresponding gaps in the inner and outer banks at the north, measuring



**Fig. 8** Rathcoran, Co. Wicklow, photograph (above) and Simple Local Relief Model (below)

3.2 m wide, may form an entrance. These curious breaks have led Cooney (2002, p. 75) to suggest that Rathcoran is a causewayed enclosure. This interpretation has been supported by on-going excavations at the site, which have highlighted that the enclosure was built in the Early Neolithic. However, radiocarbon dating has also confirmed activity at the site during the Late Bronze Age.

Within the interior of the fort, approximately 124 possible house platforms have been identified by a combination of LiDAR, GPS, photogrammetry and gradiometry survey (Figs. 8 and 9; Table 2), three of which were previously recorded by Condit (1992). Here again there are no examples of overlapping structures, suggesting these could be broadly contemporary. Considering that Early Neolithic houses of this period are distinctly rectangular in shape (Smyth, 2014), and there is an absence of domestic structures until the Late Neolithic in Ireland (Bergh, 2015, p. 28), it is probable that the cluster of houses within Rathcoran are Late Bronze Age in date.

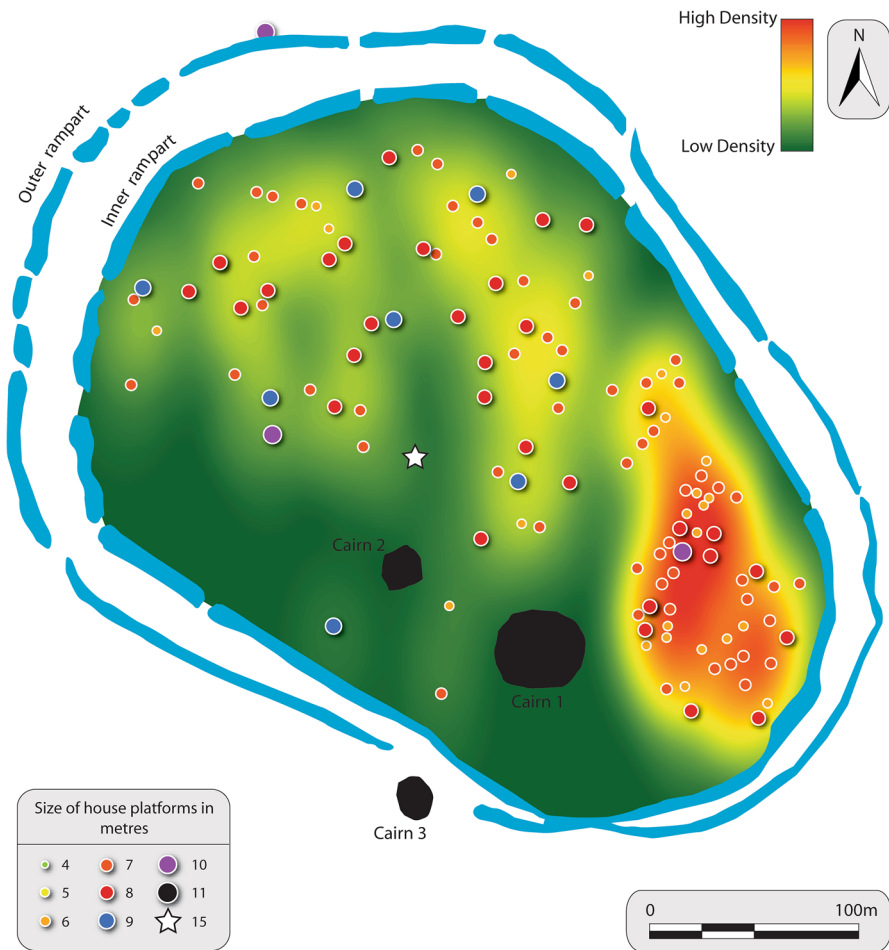


Fig. 9 Location, size and density of house platforms at Rathcoran

**Table 2** Number and percentage of house platforms at Rathcoran, Co. Wicklow

Size of huts	Number of huts	Percentage
6	23	18.5
7	58	46.8
8	31	25
9	8	6.5
10	3	2.4
15	1	0.8

The majority of these comprise circular terraces cut into the natural slope and range from 6 to 15 m in diameter. Some structures are visible in the geophysical results as circular/curvilinear sets of pit-like features, which often correspond with the circular platforms on the surface. The imaging of these possible houses using geophysical methods is influenced by the variable depth of blanket peat on the hill. Dense heather and gorse prevented collection of adequate LiDAR data at the south-west where there are few identifiable house structures. A small portion of the interior at the south-east is clear of vegetation and in this area a dense settlement was recorded. This variability probably reflects the collected data and ground conditions, and a similar density could be expected for much of the fort.

Approximately 90.3% of the potential structures at Rathcoran measure 6–8 m in diameter. A group of structures of approximately 5 m diameter, which could be interpreted as ancillary structures, are clustered in the south-east of the interior where ground conditions were favourable for surveying. There is a more uniform distribution of structures if these examples are removed. Comparable structures may exist in other areas obscured by vegetation. The majority of the remaining sites exhibit a dominance of structures measuring 7–8 m in diameter. Similar to Brussels-town Ring, a smaller number of structures, comprising 9.7% of the total settlement, are larger and are spread evenly throughout the interior. These are generally associated with denser areas of occupation.

There are no recorded structures within 30 m of the passage tomb at Rathcoran. This area may have been kept clear of occupation to highlight the monument and differentiate it from normal occupation. It could also have been a sacred area which was taboo for everyday residence. The majority of structures are at least 10 m from the inner bank of the hillfort. Only at the north-west, where the enclosing elements are largest, are there any examples of structures within this zone.

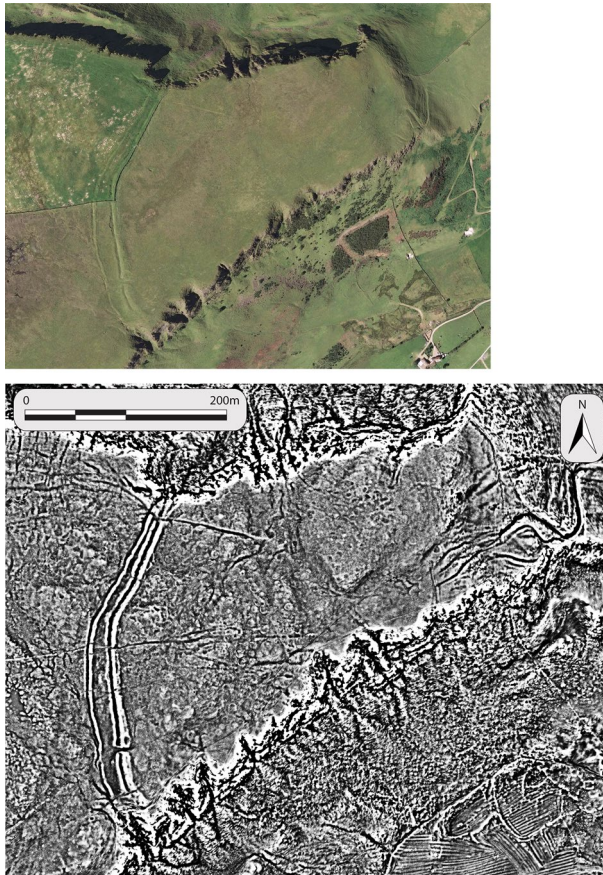
One exceptional structure is seemingly the focal point of the interior and is distinguished from other possible house sites by its prominence and size. It is positioned centrally within the interior and comprises a circular platform defined by a contiguous series of boulders approximately 15 m in diameter. It is the third highest house site within Rathcoran and is positioned strategically, overlooking the west, north, east and south-eastern portions of the interior, making it the most visible structure inside the fort. It seems to be deliberately separated from other house sites, with no other examples identified within a 25 m radius. The possible northern entrance of the fort is partially aligned on the structure. Although there are a number of house



sites between the large structure and the possible entrance, these are unlikely to have obstructed visibility, due to the commanding position and elevation of the structure. There is a path created by an absence of house sites, extending from the entrance towards the central structure, and this is lined by two substantial house sites. Immediately outside the hillfort, approximately 10 m north-east of the northern entrance, a third substantial structure may have been positioned to control access to the interior. It is tempting to suggest that the large, central structure was the residence of an important person/elite. The remainder of the inhabitants may have comprised kin groups, with more substantial structures housing the heads of each group.

### Knockdhu Co. Antrim

Survey and excavation at the large, high-altitude inland promontory fort at Knockdhu, Co. Antrim (Macdonald, 2008, 2016; McNeary, 2012) has also revealed an extensive settlement of mostly Late Bronze Age date (Fig. 10). The site comprises



**Fig. 10** Knockdhu, Co. Antrim, photograph (above) and Simple Local Relief Model (below)

two banks with external ditches, both with traces of an inner ditch and outer counter-scarp bank, cutting off the western approach of an incredible topographic spur defined by steep natural cliffs at the north, east and south, the fort being some 8.21 ha in total area. The enclosing elements are closely spaced at the northern end but gradually separate as the works extend southward. Macdonald (2008) notes that although the enclosing elements are visually impressive, the banks are relatively slight features that have been carefully positioned to exploit the promontory's natural topography and maximise the impact of their appearance.

Excavation revealed two main phases of phases of construction. Macdonald (2016) has argued that the inner rampart and its counter-scarp bank were probably contemporary, though dates from underneath the rampart returned 1409–1221 BC, suggesting a Middle Bronze Age date, while a sample from underneath the counter-scarp dated 1008–858 BC. A sample from underneath the outer rampart returned a date of 1426–1293 BC. These dates broadly place the construction of the fort around the Middle and Late Bronze Age, a typical date range for the Irish hillfort. The second phase of activity is represented by an extension of the inner bank and the re-cutting of its associated ditch after it had accumulated a substantial amount of silt. The latest radiocarbon date obtained near the base of this re-cut provides a *terminus post quem* of 740–389 BC. Excavations at the entrance of the hillfort at a break in the inner rampart revealed a 1.9 m wide gap defined by a roughly cobbled surface and a large post-hole, probably for a wooden gate. A sample from the fill of the post-hole returned 1118–930 BC. Sealing the post-hole, a series of heat-modified clay deposits containing charcoal were revealed. These probably relate to the burning of the post-hole, which may have connected to a wooden palisade that further defined the crest of the inner rampart (Macdonald, 2016).

There have been approximately 70 possible house structures identified within the interior of Knockdhu, the majority being revealed by high-resolution LiDAR commissioned by the Northern Ireland Environmental Agency (McNeary, 2012). Five of these have been excavated, four of which appear to date to the Late Bronze Age and may be broadly contemporary with the construction and occupation of the hillfort (Macdonald, 2016). One structure dates to the Late Neolithic/Early Bronze Age (dates from a hearth produced ranges of 2425–2201 and 2459–2206 BC and a charred hazelnut from a wall-slot returned a date of 2459–2206 BC), indicating that the promontory was periodically exploited prior to the construction of the enclosing elements, though it is also possible that this structure was re-occupied in the Late Bronze Age.

Re-evaluation of this LiDAR data using more recent developments in GIS landscape modelling, as well as additional high-resolution photogrammetry survey, has revealed a much larger settlement of up to 167 possible house platforms (Figs. 10 and 11; Table 3). The distribution of the visible settlement is interesting. We see a number of house platforms align and abut each other in rows, possibly implying a defined settlement plan (see Fig. 12, for example). At the centre of the settlement, two discontinuous rows of houses are separated by about 4.2 m, hinting at the presence of trackways/streets that would have serviced these structures.

Exactly 50% of the settlement ranges between 6 and 8 m in diameter, Cleary's 'average' size for Bronze Age house structures, though this increases to 74% if

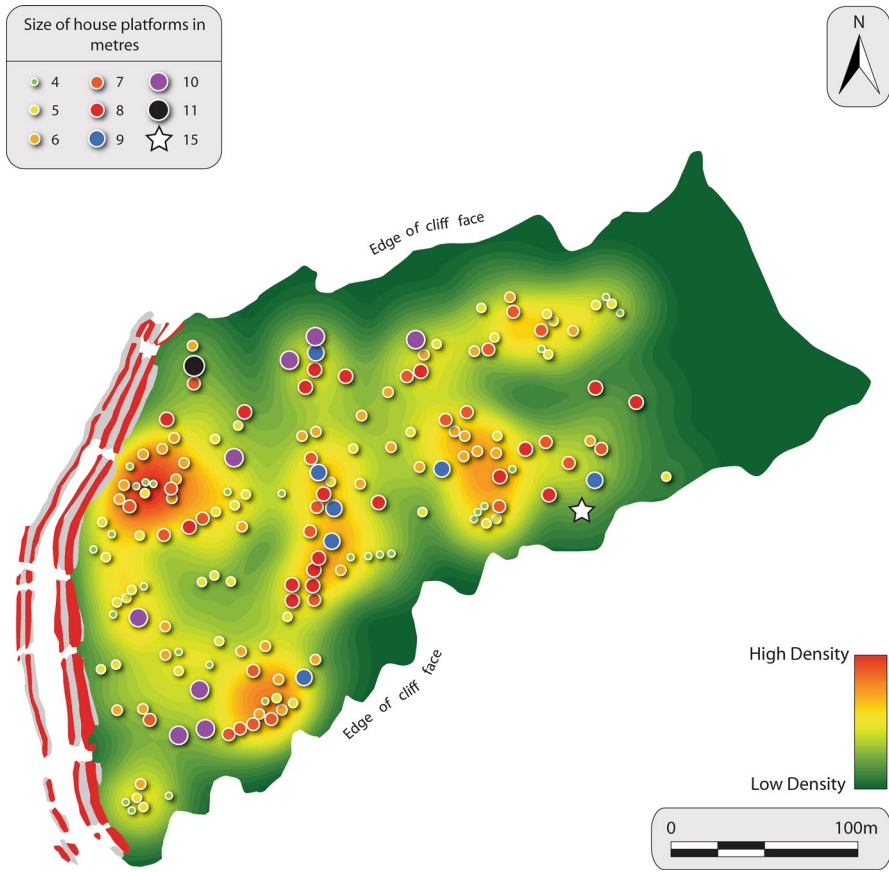
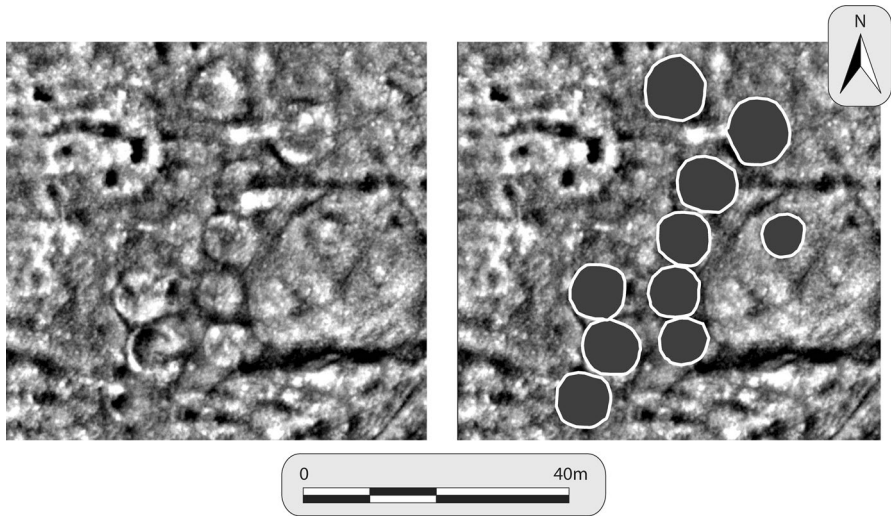


Fig. 11 Location, size and density of house platforms at Knockdhu

**Table 3** Number and percentage of house platforms at Knockdhu, Co. Antrim

Size of huts	Number of huts	Percentage
4	27	16.2
5	40	24
6	39	23.6
7	25	15
8	19	11.4
9	7	4.2
10	8	4.8
11	1	0.6
12	1	0.6



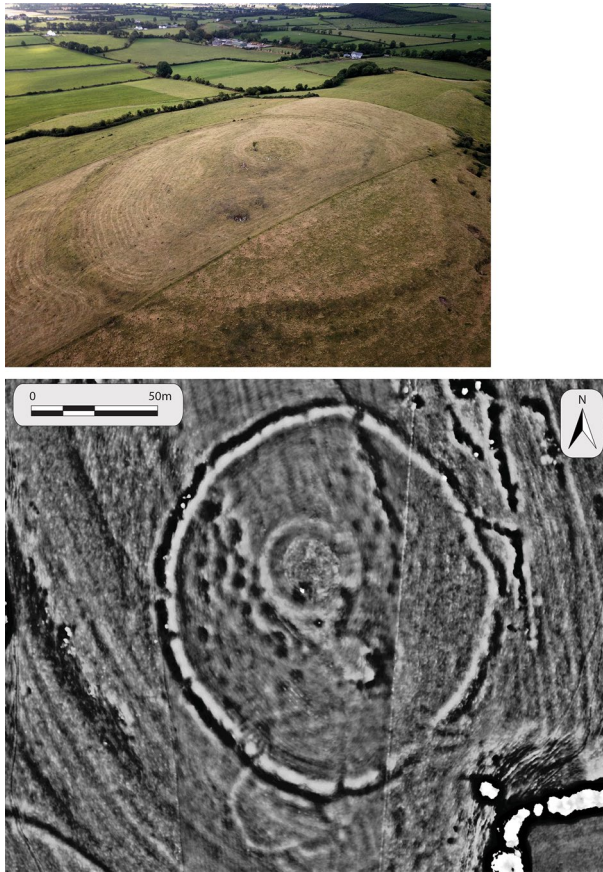
**Fig. 12** Example of a row of house platforms at centre of Knockdhu

possible houses measuring 5 m in diameter are included. Here again, we have a considerable number of structures measuring 4 m in diameter which possibly acted as ancillary buildings. While these usually occur in close proximity to larger houses, there is an isolated row of four examples at the southern part of the interior which possibly suggests that structures of this size may also have been used for habitation. At the opposite end of the scale, just over 10% of the settlement is above ‘average’, with two houses 11 m and 12 m in diameter. These larger buildings again seem to be located at the edge of clusters of houses, with the 11 m and 12 m houses isolated at the north-western and south-eastern ends of the interior.

### Freestone Hill

Freestone Hill is a small univallate hillfort comprising a single low bank with an external ditch with traces of a counterscarp bank, enclosing an oval area of 1.64 ha (Fig. 13). The enclosing elements do not follow the contours of the hill, rather the hillfort slopes partially to the south. The interior rises steeply towards a flat centre where a circular wall 18 m in diameter was surrounded by a larger 37 m × 30 m oval enclosure (Raftery, 1969, p. 6). Underneath these enclosures, the remains of a Bronze Age cairn were identified.

In the late 1940s, the site became the first Irish hillfort to be excavated, the investigation being undertaken by Bersu and published later by Raftery (1969). Excavation revealed that the hillfort ditch was rock-cut and had an irregular profile that varied from V-shaped to flat-bottomed. It was approximately 1.3–2.5 m wide (averaging 2 m) and 0.75–2 m in depth (Raftery, 1969, p. 33). The bank was composed of stone and gravel and measured 2.5–4 m wide at its base, rising 0.5–1 m above the old ground surface (Raftery, 1969, p. 34). Coarse-ware pottery was discovered



**Fig. 13** Freestone Hill, photograph (above) and Simple Local Relief Model (below)

underneath the bank and within the ditch fill. Cleary (1993, 2012, p. 23) suggests that this pottery type can now be seen as indicative of the Irish Middle and Late Bronze Age. Excavation of the interior revealed no discernible post-built structures, although some shallow depressions excavated near the centre contained spreads of artefacts and ‘dark’ soil, and may be considered occupation areas. Raftery (1969, p. 41) identifies four similar features that remained unexcavated. Excavation of the central area revealed the truncated remains of an Early Bronze Age cairn. This measured 23 m in diameter and was probably contained by a kerb of stones, with a second concentric band of stone 3 m inside this (Raftery, 1969, p. 7). Three inhumations (a child, a young adult, possibly female, and an unidentified example), 13 cremations and two possible cremations were excavated within or immediately outside this cairn (Raftery, 1969, pp. 7–9). South of the cairn, at least five food vessels and a ‘considerable number’ of worked flints were identified (Raftery, 1969, pp. 11–16).

Surrounding the cairn was a large circular enclosure that Ó Floinn (2000) suggests was contemporary with the hillfort. Later Iron Age occupants built a smaller enclosure

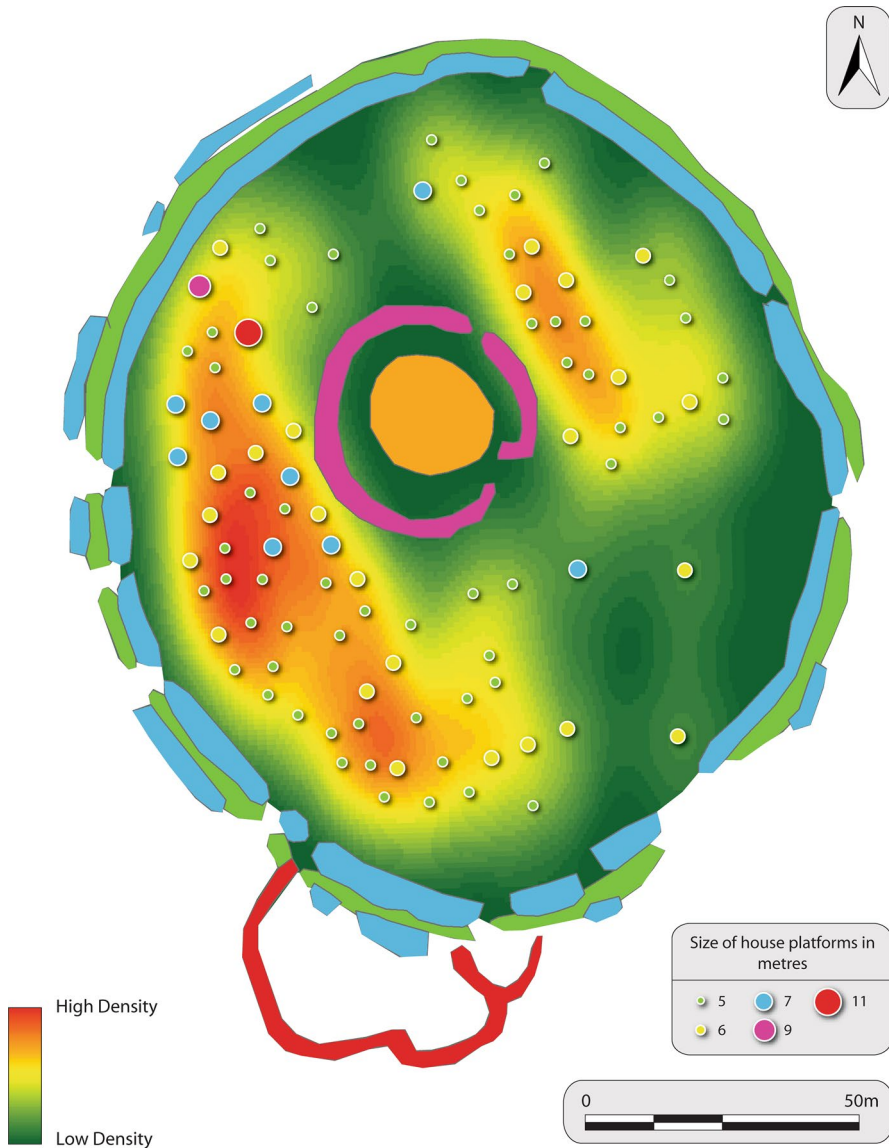
within this and dismantled the central cairn (Raftery, 1969, p. 7). Freestone Hill was originally dated to the Iron Age due to the recovery of Roman artefacts within this smaller central enclosure (Raftery, 1969; Bateson, 1973, p. 45). Although the assemblage is clearly representative of a strong Iron Age presence, the discovery of coarse ware pottery underneath the hillfort bank, in the ditch fill and within occupation areas (Raftery, 1969, p. 91) implies that the original construction and occupation of the hillfort date to the Late Bronze Age, something which Raftery (1976, pp. 58–59) later conceded. Ó Floinn (2000) suggests that the ceramic assemblage, as well as other artefacts such as four blue glass beads (Henderson, 1988, p. 442), date the construction and occupation of the hillfort to the Late Bronze Age. A single radiocarbon date (810–550 BC) from an occupation layer confirms Late Bronze Age/Early Iron Age occupation (Raftery, 1995; Waddell, 1998, p. 270), though this was an uncontextualised sample thought to be from occupation deposits on one of the platforms.

While the archaeology of the hilltop is complex, and clearly much of the central part of the hillfort has been disturbed by the Late Iron Age enclosure, recent photogrammetry survey has revealed a much more extensive settlement than the four platforms Raftery (1969, p. 41) identified (Figs. 13 and 14; Table 4). A total of 91 possible circular platforms were recorded, though the western section of the fort (under tall grass) and the central area truncated by the Late Iron Age enclosure, a combined area of approximately 0.48 ha, may also have been densely occupied. A flat area to the north of the interior may also have had more houses than the present survey revealed, with the topography here obscuring the detection of any such features. There are no examples of any overlapping platforms, suggesting these could be broadly contemporary.

The settlement at Freestone Hill is somewhat comparable with Knockdhu, with a much larger percentage of smaller house platforms. Approximately 61.5% of the total recorded settlement consists of platforms measuring 5 m in diameter. While this is just outside Cleary's (2007, p. 139) 'average' house size, considering their high frequency at other hillforts such as Knockdhu, as well as Rathcoran and Bruselstown Ring, we might now regard these as fitting within this 'average' size grouping. Strikingly, 97.8% of the house platforms recorded at Freestone Hill measure between 5 and 7 m in diameter, with no recorded 8 m diameter platforms. There is much less variation in the size of platforms, with only two examples outside this 'average' size grouping, measuring 9 m and 11 m in diameter. Both of these are located at the north-west of the interior, at the edge of a large cluster of smaller houses platforms. While it is possible that further complexity and variation may have been destroyed by the Later Iron Age enclosure or obscured by vegetation on the eastern side of the hillfort, the present distribution differs from the other case studies in being more homogeneous in terms of the size and distribution of house platforms, with only two buildings of larger size.

## Other Bronze Age Nucleated Settlements in Ireland

While the case studies outlined above set out evidence for dense settlement at some Irish hillforts, it is clear that this was not a phenomenon confined to this site type. What is becoming more apparent, however, is the propensity for settlement



**Fig. 14** Location, size and density of house platforms at Knockdhu

nucleation to occur on hilltops during the Bronze Age. This is evidenced by Bergh's (2015) study of the settlements at Mullaghfarna and Turlough Hill (Bergh, 2015). Bergh (2015, p. 25) has recorded some 150 possible structures on the exposed plateau of Mullaghfarna, located on the eastern part of a prominent mountainous ridge in Co. Sligo. Sample excavations of three structures produced both Neolithic and Bronze Age finds, a sequence reproduced by radiocarbon dating, though the latter narrowed this range to the Middle Neolithic (c. 3300–2900 BC) and the Late Bronze

**Table 4** Number and percentage of house platforms at Freestone Hill, Co. Kilkenny

Size of huts	Number of huts	Percentage
5	56	61.5
6	24	26.4
7	9	9.9
8	0	0
9	1	1.1
10	0	0
11	1	1.1

Age (c.1200–900 BC) (Bergh, 2015, pp. 25–26). These structures were built on, or dug into, the underlying karst limestone bedrock, the formation processes of which have subsequently disturbed and intermixed the archaeological deposits, making it impossible to determine exactly when these structures were built. The presence of the nearby passage tomb cemetery of Carrowkeel, within a kilometre of the plateau, has led scholars such as Macalister (1912) to argue that these were the dwellings of the tomb builders. Bergh (2015, p. 28), however, points out that there is an absence of domestic structures from the Middle Neolithic and that the cluster likely represents Late Bronze Age activity. Ongoing study of the site by Bergh has revealed a number of interesting distributional patterns, the most notable being the limited number of overlapping structures, suggesting that most of these could be broadly contemporary (Bergh, 2015, pp. 26–29). Distributions range from single isolated structures to those occurring in pairs and larger clusters. They are mostly circular and range from 6 to 20 m in size, with a limited number of larger 17–20 m examples. Bergh also noted a wide range of constructional details present throughout the cluster. Bergh (2015, pp. 28–30) concludes that, while it is impossible at present to clarify the nature of these structures, they might have been used at certain times of the year for gatherings and other ancestor rituals linked with the nearby passage tombs.

Approximately 140 possible structures have been recorded on Turlough Hill, a prominent ridge at the eastern edge of the Burren karst landscape (Bergh, 2015, p. 30). The hill is divided into two summits: the eastern summit being dominated by a massive undated enclosure which shows characteristics of an Early Neolithic causewayed enclosure, with the western summit being defined by house structures. The latter are mostly circular in shape and range from 6 to 11 m in diameter (Bergh, 2015, p. 30). There is less diversity in terms of construction techniques here, and most occur in small groups of three to four houses. Notably, approximately 90 houses are recorded in the western half of the summit surrounding a large cairn, with the remainder positioned in the eastern half around a large multivallate enclosure, the two groups being separated by a narrow ridge. Bergh (2015, p. 33) has interpreted this separation as evidence for two ritually divergent groups who came together at certain times of the year. Unfortunately, there is no dating information available for this group of structures, though a Late Bronze Age date, like that of Mullaghfarna, is probable.



Bergh (2015, p. 34) has highlighted the importance and symbolic role of mountains and upland locations in prehistoric Ireland, and has linked the large clusters of structures at Mullaghfarna and Turlough Hill with important seasonal gatherings of communities. As such, these are not seen as ordinary domestic settlements or ‘villages with a view’, though we have no hard evidence to argue either way. The idea that these exposed plateaus were too inhospitable for year-round settlement is a valid point, though our understanding of what constitutes hospitable is substantially influenced by modern thinking. Rathbone (2013, p. 44) has contested the idea that either location constitutes a high-altitude site in absolute terms, as they are only 220 m (Mullaghfarna) and 275 m (Turlough Hill) above sea level. Further afield, the densely populated hillforts of Tap O’ Noth (with over 800 platforms) and Eildon Hill (with over 500 platforms) are located at considerably higher elevations of 563 m and 404 m OD respectively. However, rather than height being a limiting factor for settlement at Mullaghfarna and Turlough Hill, it is the absence of easily accessible farmland on the summit and slopes, and the open wind-swept nature of these locations that may have proved a deterrent to permanent occupation. Conversely, the ‘power’ of the ancestors played a significant role in the social and cosmological order of tribal societies (Waddell et al., 2009, p. 205), and as such, the creation of a visible link by living next to these ancestors may have drawn groups to these locations. The question of seasonal versus year-round occupation is a central one, as the concept of a village implies permanent occupation (Rathbone, 2013, p. 41).

Conglomerations of structures are not confined to upland zones, as attested at Corrstown, Co. Derry (Ginn, 2013; Ginn & Rathbone, 2011; Rathbone, 2013). This is often cited as the only Bronze Age village known in Britain or Ireland, with Bradley et al. (2016, p. 187) and Brück and Fokkens (2013, p. 92) suggesting it is unparalleled in north-west Europe. Here, approximately 73 structures were found in flat coastal land near the modern town of Portrush. They were somewhat equal in size and organised in groups around at least one (possibly two) large metalled roadway and smaller tributary tracks. Many of the individual buildings showed evidence of having been rebuilt on repeated occasions, implying prolonged activity at the site, with radiocarbon dates highlighting the main period of activity as c. 1370–1250 BC (Rathbone, 2013, pp. 48–50). The finds from the site, including flints and coarseware pottery, have been described as mundane and monotonous, and no obvious high-status objects were identified (Rathbone, 2013, pp. 48–50). While the site has been interpreted as a village of neither high- nor low-status individuals (Ginn & Rathbone, 2011; Rathbone, 2013), a single structure near the centre of the settlement was enclosed by a substantial ditch (Ginn & Rathbone, 2011, pp. 202–217). Although this did not produce any material culture to indicate its significance, and morphologically it seems to broadly correspond with the surrounding contemporary structures, the fact that it was delimited in some way from such a homogeneous group of buildings must have imparted special meaning. Was this the home of an elder or an elite?

Comparing the three largest known and most comprehensively studied Bronze Age nucleated settlements in Ireland, we see significant variations between the upland sites of Mullaghfarna and Turlough Hill and the lowland settlement at Corrstown. The upland sites may comprise a hierarchical cluster of communities and kin

groups under an elite (or elites), forming central spaces for a disparate community who, probably at certain times of the year, lived at a prominent location that also acted as the permanent settlement for an elite. As such, we see a greater variation in terms of size, morphology, construction techniques and distribution. The lowland settlement consists of a permanent conglomeration of common subsistence farmers, possibly with a single elite, with this durability and stability leading to a more cohesive group identity and subsequently a lack of architectural variability within the settlement. Brück and Fokkens (2013, p. 84) describe houses as key elements in the creation and maintenance of social identity and cultural values. The absence of any considerable differentiation in isolated farmsteads dotted throughout the island, and the clear visibility of such at central spaces, may reflect this social competition in terms of group and kin-based identity. In this regard, study of settlements at central spaces such as hillforts may help us to reveal a more diverse pattern of occupation linked with hierarchical institutions, and may even help us to identify the elusive settlement of the elite.

## Discussion

At all of the case studies, the lack of overlapping house platforms, and in some instances the clear organisation into rows, suggests that these settlements were largely contemporary. At each site, there is a clear variation in terms of the size of the structures, with all of the settlements having many more ‘average’ sized house platforms and fewer larger examples, possibly reflecting an internal settlement hierarchy. Only Freestone Hill, where nearly a third of the interior is obscured by vegetation or truncated by later archaeological features (and as such, may not be properly represented), showed any parallels with the lowland settlement of Corrstown. Its settlement seems to be more constricted than the other upland nucleated settlements and of a similar size to Corrstown, and may also have shared a lack of variation in terms of the size of the individual house platforms. It is notable that Freestone Hill is immediately surrounded by good quality, habitable farmland, whereas the other examples are located in more extreme and exposed locations. The easy accessibility of this site may have provided more stability for the community that occupied it, leading to it becoming a permanent, long-lived settlement with little architectural variability in a similar vein to the lowland village of Corrstown. Regardless, each case study, as well as the unenclosed upland nucleated settlements of Mullaghfarna and Turlough Hill and the lowland settlement at Corrstown, show evidence for a limited number of large house platforms or structures, and these seem to flank clusters of smaller houses. Might we recognise these as the houses of elites or other high-status people?

It is extremely rare in prehistoric Ireland and Britain (Oswald et al., 2006, p. 97), or indeed in any ‘village’ setting in contemporary Europe (Brück & Fokkens, 2013, p. 93), to be able to even tentatively identify elite settlement. At Yeavinger Bell hillfort in Northumberland, England, a dense cluster of over 125 house platforms has been recorded. Two of these stand out in terms of their size and location, being much larger than other examples and located at either side of the entrance to the fort.

Oswald et al. (2006, p. 97) interpret these as the homes of two powerful figures in the community. Although the site has not been scientifically dated, morphological comparisons with Eildon Hill in the Scottish Borders and the dense group of over 500 structures there might indicate a potential Late Bronze Age date for Yeavinger Bell (Rideout et al., 1992), though analysis of the artefactual assemblage suggests that a Late Iron Age/early medieval date is more probable, given the recent dating of the large, densely populated hillfort of Tap O' Noth to the third–sixth century AD. A similar scenario is apparent at Hambleton Hill in Dorset, England, where survey of a large intensively occupied hillfort with approximately 365 recorded house platforms revealed two much larger buildings some 15 m in diameter, positioned prominently within the interior (Stewart & Russell, 2017, p. 90). Hod Hill, another large hillfort in Dorset, encloses at least 250 circular structures. About half of the interior has been damaged by deep cultivation and the construction of a Roman camp, and as such, the settlement was likely much larger. Geophysical survey revealed a dendritic road system dividing the internal area, with each block associated with one or two larger structures defined by an enclosure (Stewart & Russell, 2017, p. 97). These were located at the edge of each block, and Stewart and Russell (2017, p. 97) interpret them as high-status dwellings. We could suggest that they represent the heads of individual kin groups who, at certain times of the year, lived at this central space. We see more distinct evidence for such delineation at the sixth and fifth century BC *Fürstensitze* site of Heuneburg, where the division of the outer settlement into several quarters may represent the separation of different kinship groups (Fernández-Götz, 2014, p. 30).

The internal organisation of the Bronze Age pile dwellings of Unteruhldingen-Stollenwiesen, southern Germany (Schöbel, 1996) or Cortaillod-Est, Concise-sous-Colachoz or Auvernier-Nord, Switzerland (see Menotti & Leuzinger, 2013), for example, shows an incredible degree of conformity and order in the layout, indicative of a significant degree of social control. Houses at these sites were laid out in closely spaced rows and flanked by narrow alleyways. They were mostly uniform in size, though a few were clearly larger than others. The layout of such sites suggests that these were tightly knit communities in which architecture was used to create a sense of social cohesion and group identity (David El-Biali, 1992), though clear evidence for higher-status individuals within those communities existed. In this regard, the parallels with Corrstown are obvious.

While these parallels are clearly chronologically and geographically separated from the Irish sites, they show a strikingly similar pattern of hierarchical settlement concentrated within hillforts and contemporary fortified sites. Indeed, despite the differences in date range, all of these prehistoric sites were built and occupied at a time when chiefdoms and hierarchical societies seem to have dominated their respective regions. Each site, therefore, may be interpreted against such a background, with these settlements comprising a number of different kin groups who were originally scattered throughout the landscape, with each distinct cluster of houses representing an individual kin group with the head of each family and the elites differentiated by larger flanking structures. In certain instances, groups may have further promoted their individual identities by using different construction techniques (Bergh, 2015, pp. 28–30) or by using more ephemeral methods, such as painting (Brück &

Fokkens, 2013, p. 85). As in contemporary Central and Eastern Europe, the layout of such sites suggests they were used to create and exploit social cohesion and community identity and reinforce social control (Brück & Fokkens, 2013, p. 92). The settlement layout reflected and reinforced social inequalities through physical living experiences within a nucleated settlement (Davis, 2019, p. 81), irrespective of whether these are permanent or seasonal conglomerations. This, however, raises an important question which currently has no definitive answer. Were these permanent or semi-permanent settlements, or seasonally accessed monuments used for rituals and assemblies?

This in turn provokes questions about how we define these settlement conglomerations; can they be described as villages or proto-urban centres? Recently, there has been a resurgence of studies relating to early ‘urbanism’ and the creation of villages and cities in temperate Europe (see, for example: Rathbone, 2013; Armit et al., 2014; Collis, 2014; Fernández-Götz et al., 2014; Sharples, 2014; Fernández-Götz & Ralston, 2017; Gaydarska, 2017, pp. 179–182; Fernández-Götz, 2018). Traditionally, the development of urban settlements was linked with the *Oppida*, large enclosed settlements originating in the second and first centuries BC (Collis, 1984). However, over the past few decades, research has shown this to be a simplistic interpretation, both with regards to temporality and morphology. It is now recognised that such developments took place much earlier and were not necessarily restricted to enclosed sites (Collis, 2014, p. 15; Fernández-Götz et al., 2014, pp. 9–10). Most scholars would argue that a significant phase of urbanisation took place in the sixth and fifth centuries BC, with the impressive *Fürstensitze*, or ‘princely seats’, emerging as regional centres of power in an area stretching from Závist in Bohemia to the Heuneburg in Southern Germany and Bourges in Central France (see Fernández-Götz et al., 2014, p. 3). Many scholars (such as Collis, 2014; Fernández-Götz, 2014, p. 30; Fernández-Götz & Ralston, 2017, p. 259) now view these *Fürstensitze* as the earliest examples of urbanisation in Western Europe.

Others, such as Rathbone (2013), have less convincingly argued for earlier origins in the Neolithic and Bronze Age in north-western Europe, highlighting much smaller settlement conglomerations such as that at Jarlshof in Shetland, Scotland (Hamilton, 1956). More extensive settlements have been found on the European continent during the Bronze Age, often associated with fortified hilltop sites, such as Fort Harrouard or Catenoy, both in northern France (Mohen & Bailloud, 1987, p. 138; Mordant, 2013, p. 579). Other lowland ‘villages’ have also been discovered, such as Malleville-sur-le-Bec in north-western France (Marcigny & Ghesquière, 2008) or the river and lake pile-dwelling ‘villages’ found just north of the Alps (Mordant, 2013, p. 579). Indeed, aggregation of a large number of people relative to the norm of a specific time period is a far more common settlement pattern than previously realised (Gaydarska, 2017, p. 183) and the case studies above reflect this pattern in the Irish Bronze Age.

However, there are significant issues regarding definition, with *centralisation*, *villages* and *cities* very different concepts which fall broadly under the remit of *urbanisation*, a term which is no less difficult to define (Gaydarska, 2017, pp. 178–179). This difficulty is compounded by authors compiling a variety of checklists (for a summary, see Fernández-Götz et al., 2014), with diverse and subjective criteria such

as: dense and compact layout of buildings; administrative and political separation; a variability of archaeological structures; economic diversity; long-distance contacts; long-lasting continuity of urban space; defined public space; protection and leadership; crafts and trade; the inclusion of religious institutions; and evidence that the settlement acted as a regional centre (Kolb, 1984; Gringmuth-Dallmer, 1996; Andreev, 1989; Sharples, 2014, p. 230; García Sanjuán et al., 2017, pp. 252–253). Many of these checklists were developed in the Mediterranean, and the wooden architecture of most European Iron Age centres will hardly ever provide reliable data on urbanity (Fernández-Götz et al., 2014, p. 6). Consequently, a more relevant list of criteria for temperate Europe should rely more upon the physical aspects of the surviving archaeology, such as the apparent layout, size, density and diversity of buildings in the settlement (Fernández-Götz et al., 2014, p. 8). Most researchers have stressed that settlement size is of paramount importance (Fernández-Götz et al., 2014, p. 8; Rathbone, 2013, p. 40; Sharples, 2014, p. 231), though Collis (2014) and Gaydarska (2017, pp. 180–181) both argue that demonstration that a site is a ‘central place’—something which may be revealed by identifying evidence for long-distance exchange or specialised craft production (Sharples, 2014, p. 230)—is essential in differentiating urbanity from ‘over-nucleated agglomerations of populations’. Here again we have considerable subjectivity regarding size, with Flatrés (1971) suggesting a figure of 20 independent structures justifying a ‘village’, while Cowgill (2004, p. 528) sees a population of at least a few thousand as a necessary requirement for a society to be classed as urban. Others see more nuance, distinguishing between ‘low’ and ‘high’ density urbanism (Chile, 1950; Fletcher, 2009, 2012), the former having fewer than 50 people per hectare and the latter more than 50 (Moore, 2017, p. 286). The dense clustering of house platform evidence in the Irish examples above certainly corresponds with the latter. Conversely, discussing the massive fortified settlement at Valencina, south-west Spain, García Sanjuán et al. (2017, p. 254) suggest that that the size of the settlement is not important, placing emphasis on the seasonal and/or occasional occupation at the site and as such, suggesting it was not an ‘urban’ centre. Combining these perceived core concepts, ‘centrality’, ‘relative population size’ and ‘permanent occupation’, Fernández-Götz and Krausse (2013, p. 480) propose a broad definition for a ‘city’, describing it as ‘a numerically significant aggregation of people permanently living together in a settlement which fulfils central place functions for a wider territory’.

It is now accepted, however (not only in this instance but in archaeology in general), that a checklist to define sites is an intrinsically flawed concept. Trying to impress modern views on what ancient urbanism *should* look like is counterproductive. As Sharples (2014, pp. 230–231) notes, the contrast between a densely settled Bronze or Iron Age hillfort and a normal farmstead must have been ‘dramatic and enormous’, yet rarely are the former considered within broader discussions of urbanism in Europe, principally due to this checklist approach (for a more expansive critique of this see Sharples, 2014). Sharples (2014, p. 231) consequently proposes that we need to stop trying to enforce our modern impression of what an urban centre *should* look like, as the diversity of evidence is simply too great, and instead, we should focus on the relative size of the settlement. He argues that the critical point of urban settlements is to bring people together who had previously resided in dispersed settlements. Furthermore, Gaydarska

(2017, pp. 180–181) argues that a simple urban/non-urban division does not capture the complexity of either, while Moore (2017, p. 281) highlights the negative effect that trying to pigeon-hole sites with such a broad and subjective term can have on the deeper understanding of these sites.

The large conglomerations of structures at Mullaghfarna, Turlough Hill, Rathcoran, Brusselstown Ring, Knockdhu and Freestone Hill certainly stood out against a background settlement pattern of individual isolated lowland farmsteads. When considering the broader evidence from contemporary hillforts like Rathgall, Haughy's Fort, or Dún Aonghasa, which suggests that some hillforts formed core centres where long-distance trade and high-status craft-working took place, some Irish hillforts correspond with Collis' (2014) and Fernández-Götz and Krausse's (2013) definition of 'urban centres' or 'cities', though we cannot at present clearly distinguish whether these sites were permanent or seasonal settlements.

Whatever terminology we use, it does not diminish the importance of these sites. These hillforts were distinctly different from the lowland settlements in every way, and this is the key to understanding these sites: upland hilltop locations vs. lowland settings; dense nucleated settlement vs. isolated farmsteads; evidence for settlement hierarchy vs. no hierarchy; centralised high-status craft production vs. limited/basic production; long-distance trade and evidence for attainment of prestige goods vs. limited material assemblage. We must also be aware of the social difference, with the intensification of face-to-face interaction, communal activities and a probable range of social regulatory mechanisms necessary at dense settlements (Brück & Fokkens, 2013, p. 93).

We might now fit the densely settled Irish hillforts within the broader picture of the Irish Bronze Age. Like other Irish hillforts, these acted as a residence for an elite who controlled the movement of goods and people within a defined territory and ruled over a disparate community dotted throughout the landscape. However, in these instances, the disparate communities controlled by these elites gathered together and occupied (either permanently or occasionally) these hillforts, distinguishing themselves and their kin from other groups through the layout and architecture of their houses. Fernández-Götz and Ralston (2017, p. 259) link the *Fürstensitze* sites with hierarchies, seeing the pattern of settlement as an expression of, and a catalyst for, increasing social inequality. Indeed, Brück and Fokkens (2013, p. 93) argue that the simple presence of a 'village' is an indication of some form of coercive power. We might ascribe a similar reason to the development of settlement nucleation in Bronze Age Ireland, where settlement nucleation, hierarchies and social inequalities like those so vividly described by Kristiansen (1999) and Mitnik et al. (2019), for example, may be seen in the archaeologies of hillforts.

## Conclusion

Large conglomerations of house structures start to appear in Europe around the Middle to Late Bronze Age. In Ireland, we have evidence for these in low-lying unenclosed settings like Corrstown, as well as examples in upland hilltop locations in both enclosed and unenclosed contexts. At Corrstown, the homogeneous

architecture suggests a more egalitarian society with a single elite, whereas in upland terrain there is significant evidence for hierarchical settlement and distinct differentiation in construction styles and internal clustering. These differences might reflect the permanence of these settlements, with Corrstown probably representing a permanently settled village with a well-defined group identity. Sharpley (2014, p. 231) has noted a similar pattern of homogeneous settlement within the developed hillforts of Southern England, and has also interpreted this as a consequence of the permanence of these settlements and the cohesive identity this creates. Similarly, Davis (2013, 2019, p. 82) has argued that ‘practically identical’ buildings of similar size and shape built during the densely occupied phases of Danebury hillfort in Wessex, England, were used to blur the distinctions between individual households and strengthen the importance of the larger community. A similar situation may also be apparent at Freestone Hill. Conversely, the upland settlements like Mullaghfarna or Brusselstown Ring may characterise a more transient settlement that was permanently occupied by an elite and craftworkers, but was used by the disparate community associated with it only at certain times of the year, and as such, we see a variety of different construction techniques and clustering within the settlement, probably representing different kinship groups displaying group identity through architecture and settlement distribution. In this regard, there seems to be more importance placed on the household rather than communal cohesion. At Brusselstown Ring, Rathcoran and Knockdhu we see more distinct evidence for large, strategically positioned structures, which further suggests hierarchical settlement, with these dwellings possibly representing heads of kin groups or the permanent resident elite.

While we must be cautious about interpreting such conglomerations of structures as contemporary, considering the distinct lack of overlap and distributions, we might suggest that what we see on the surface is a blurry snapshot of the final phase of use at each site, which, through further survey and excavation, becomes clearer. This is proving true at our ongoing excavations of the large, Late Roman Iron Age hillfort at Tap o’ Noth in Aberdeenshire, Scotland, where excavations are revealing the dense internal settlement expanded over a period of a few hundred years. This culminated in the final distribution of house platforms we see on the surface today, with older platforms being re-used in later periods when new platforms were also being constructed. A similar scenario could conceivably be suggested for some of the Bronze Age hillforts in Ireland.

With the presentation of this new evidence from Irish hillforts, we can now suggest that the house remains at Mullaghfarna and Turlough Hill are not quite as unusual within Irish or European archaeology as Bergh (2015, p. 34), Bradley et al. (2016, p. 187) or Brück and Fokkens (2013, p. 92) suggest, and fall more broadly in line with the emerging European discourse of boom-and-bust urbanism during the Bronze Age. Indeed, we might begin to change the perception that contemporary communities in south-east Europe had ‘a greater degree of social complexity’ (Brück & Fokkens, 2013, p. 93) than their northern counterparts.

**Funding** The surveys at Brusselstown Ring were funded by an Irish Research Council funded PhD scholarship and a Heritage Council ‘Community Heritage Grants Scheme 2017’.

## Declarations

**Conflict of interest** The author declares that they have no conflict of interest.

**Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article’s Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article’s Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

## References

- Almagro-Gorbea, M. (1995). Ireland and Spain in the Bronze Age. In J. Waddell & E. Shee-Twohig (Eds.), *Ireland in the Bronze Age* (pp. 136–148). The Stationery Office.
- Andreev, Y. (1989). Urbanisation as a phenomenon of social history. *Oxford Journal of Archaeology*, 8(2), 167–177.
- Angelini, I., Artioli, G., Bellintani, P., Diella, V., Gemmi, M., Polla, A., & Rossi, A. (2004). Chemical analysis of Bronze Age glasses from Frattesina di Rovigo, Northern Italy. *Journal of Archaeological Science*, 31, 1175–1184.
- Angelini, I., Polla, A., Giussani, B., Bellintani, P., & Artioli, G. (2009). Final Bronze Age glass in northern and central Italy: Is Frattesina the only glass production centre? In J. Moreau, R. Auger, J. Cahbot, & A. Herzog (Eds.), *36<sup>e</sup> symposium international d’archéométrie* (pp. 330–337). Université Laval.
- Arkush, E. (2011). *Hillforts of the ancient Andes: Colla warfare, society, and landscape*. University Press of Florida.
- Armit, I., Horsley, T., Gaffney, C., Marty, F., Thomas, N., Friel, R., & Haye, A. (2014). Exploring urbanisation in the southern French Iron Age through integrated geophysical and topographical prospection. In M. Fernández-Götz, H. Wendling, & K. Winger (Eds.), *Paths to complexity: Centralisation and urbanisation in Iron Age Europe* (pp. 15–23). Oxbow Books.
- Ashmore, P. (2001). Settlement in Scotland during the second millennium BC. In J. Brück (Ed.), *Bronze Age landscapes: Tradition and transformation* (pp. 1–9). Oxbow Books.
- Barrett, J. (2012). Are models of prestige goods economies and conspicuous consumption applicable to the archaeology of the Bronze to Iron Age transition in Britain? In A. Jones, J. Pollard, M. Allen, & J. Gardiner (Eds.), *Image, memory and monumentality. Archaeological engagements with the material world: A celebration of the academic achievements of Professor Richard Bradley* (pp. 6–17). Oxbow Books.
- Bateson, D. (1973). Roman material from Ireland: A reconsideration. *Proceedings of the Royal Irish Academy*, 73, 21–97.
- Bergh, S. (2015). Where worlds meet: Two Irish prehistoric mountain-top ‘villages.’ *Il Capitale Culturale: Studies on the Value of Cultural Heritage*, 12, 21–44.
- Blanton, R., & Fargher, L. (2008). *Collective action in the formation of pre-modern states*. Springer.
- Bogucki, P. (2004). Late Bronze Age urnfields of Central Europe. In P. Bogucki & P. Crabtree (Eds.), *Ancient Europe: 8000 BC–AD 1000. Encyclopaedia of the barbarian world* (pp. 86–91). Charles Scribner’s Sons.
- Bowen, E. (1972). *Britain and the western seaways*. Thames & Hudson.
- Bradley, R., Haselgrove, C., Van Der Linden, M., & Webley, L. (2016). *The later prehistory of north-west Europe: The evidence of development-led fieldwork*. Oxford University Press.



- Brandherm, D. (2014). Late Bronze Age casting debris and other base metal finds from Haughey's Fort. *Emania*, 22, 59–68.
- Brandherm, D., McSparron, C., Kahlert, T., Bonsall, J., Wilkinson, A., & Kytmanow, T. (2018). The hill of the fairies. *Archaeology Ireland*, 32(3), 30–33.
- Bridgford, S. (1997). Mightier than the pen? (An edgewise look at Irish Bronze Age swords). In J. Carman (Ed.), *Material harm: Archaeological studies of war and violence* (pp. 95–115). Cruithne Press.
- Bridgford, S. (2002). Bronze and the first arms race: Cause, effect or coincidence? In B. Ottaway & E. Wager (Eds.), *Metals and society: Papers from a session held at the European Association of Archaeologists Sixth Annual Meeting in Lisbon 2000* (pp. 123–132). Archaeopress.
- Brill, R. (1992). Chemical analysis of some glasses from Frattesina. *The Journal of Glass Studies*, 34, 11–22.
- Brown, I. (2009). *Beacons in the landscape: The hillforts of England and Wales*. Oxbow Books.
- Brück, J. (1999). Houses, lifecycles and deposition on Middle Bronze Age settlements in Southern England. *Proceedings of the Prehistoric Society*, 65, 145–166.
- Brück, J. (2002). Settlement, landscape and social identity: The Early–Middle Bronze Age transition in Wessex, Sussex and the Thames Valley. *Oxford Journal of Archaeology*, 19(3), 273–300.
- Brück, J. (2007). The character of Late Bronze Age settlement in southern Britain. In C. Haselgrove & R. Pope (Eds.), *The Earlier Iron Age in Britain and the near continent* (pp. 24–38). Oxbow Books.
- Brück, J., & Fokkens, H. (2013). Bronze Age settlements. In H. Fokkens & A. Harding (Eds.), *The Oxford handbook of the European Bronze Age* (pp. 82–101). Oxford University Press.
- Brück, J., & Fontijn, D. (2013). The myth of the chief: Prestige goods, power, and personhood in the European Bronze Age. In H. Fokkens & A. Harding (Eds.), *The Oxford handbook of the European Bronze Age* (pp. 197–215). Oxford University Press.
- Brun, P. (1993). East–West relations in the Paris Basin during the Late Bronze Age. In C. Scarre & F. Healy (Eds.), *Trade and exchange in prehistoric Europe* (pp. 171–182). Oxbow Books.
- Burgess, C., & O'Connor, B. (2008). Iberia, the Atlantic Bronze Age and the Mediterranean. In S. Celes­tino, N. Rafel, & L. Armada (Eds.), *Contacto cultural entre el Mediterráneo y el Atlántico (siglos XII–VIII ANE): La precolonización a debate* (pp. 41–58). Consejo Superior de Investigaciones Científicas.
- Cavazzuti, C., Cardarelli, A., Quondam, F., Salzani, L., Ferrante, M., Nisi, S., Millard, A., & Skeates, R. (2019). Mobile elites at Frattesina: Flows of people in a Late Bronze Age 'port of trade' in northern Italy. *Antiquity*, 93, 624–644.
- Chile, G. (1950). The urban revolution. *The Town Planning Review*, 21(1), 3–17.
- Chytráček, M. (2007). Die Höhensiedlungen der Bronze- und Urnenfelderzeit an der oberen Radbuza in Westböhmen. *Bericht Der Bayerischen Bodenkmalpflege*, 47(38), 15–31.
- Cleary, K. (2005). Skeletons in the closet: The dead among the living on Irish Bronze Age settlements. *Journal of Irish Archaeology*, 14, 23–42.
- Cleary, K. (2007). Irish Bronze Age settlements: Spatial organisation and the deposition of material culture. Unpublished PhD thesis (vol. 2), University College Cork.
- Cleary, K. (2018). Broken bones and broken stones: Exploring fragmentation in Middle and Late Bronze Age settlement contexts in Ireland. *European Journal of Archaeology*, 21(3), 336–360.
- Cleary, R. (1993). The Later Bronze Age in Lough Gur: Filling in the blanks. In E. Shee-Twohig & M. Ronayne (Eds.), *The prehistoric archaeology of south-west Ireland* (pp. 114–120). Cork University Press.
- Cleary, R. (2012). Pottery. In C. Cotter (Ed.), *The western stone forts project: Excavations at Dún Aonghasa and Dún Eoghanachta* (Vol. 2, pp. 8–28). Wordwell.
- Coles, J. (1962). European Bronze Age shields. *Proceedings of the Prehistoric Society*, 27, 156–190.
- Collis, J. (1984). *Oppida: Earliest towns north of the Alps*. Charlesworth & Co.
- Collis, J. (2014). Urbanisation in temperate Europe in the Iron Age: Mediterranean influence or indigenous? In M. Fernández-Götz, H. Wendling, & K. Winger (Eds.), *Paths to complexity: Centralisation and urbanisation in Iron Age Europe* (pp. 15–23). Oxbow Books.
- Condit, T. (1992). Ireland's hillfort capital: Baltinglass, Co. Wicklow. *Archaeology Ireland*, 6(3), 16–20.
- Cooney, G. (2002). From Lilliput to Brobdingnag: The traditions of enclosure in the Irish Neolithic. In G. Varndell & P. Topping (Eds.), *Enclosure in Neolithic Europe* (pp. 69–82). Oxbow Books.
- Cotter, C. (2012). *The Western Stone Forts Project: Excavations at Dún Aonghasa and Dún Eoghanachta* (Vol. 1). Wordwell.

- Cotter, E. (2005). Bronze Age Ballybrown. In J. O'Sullivan & M. Stanley (Eds.), *Recent archaeological discoveries on national road schemes 2004* (pp. 37–43). Wordwell.
- Cowgill, G. (2004). Origins and development of urbanism: Archaeological perspectives. *Annual Review of Anthropology*, 33, 525–549.
- Cunliffe, B. (1995). *Danebury, an Iron Age Hillfort in Hampshire: Vol. 6. A Hillfort community in perspective*. CBA Research Report 102.
- Cunliffe, B. (2008). *Europe between the Oceans: 9000 BC–AD 1000*. Yale University Press.
- Cunliffe, B. (2013). *Britain begins*. Oxford University Press.
- David El-Biali, M. (1992). L'habitat de l'âge du Bronze en Suisse: Tentative de synthèse. In C. Mordant & A. Richard (Eds.), *L'habitat et l'occupation du sol à l'âge du Bronze en Europe* (pp. 359–376). Ed. du Comité des travaux historiques et scientifiques.
- Davis, O. (2013). Re-interpreting the Danebury assemblage: Houses, households and community. *Proceedings of the Prehistoric Society*, 79, 353–375.
- Davis, O. (2019). Danebury and the Heuneburg: Creating communities in Early Iron Age Europe. *European Journal of Archaeology*, 22(1), 67–90.
- Doody, M. (2000). Bronze Age houses in Ireland. In A. Desmond, G. Johnson, M. McCarthy, J. Sheehan, & E. Twohig (Eds.), *New agendas in Irish prehistory: Papers in commemoration of Liz Anderson* (pp. 135–159). Wordwell.
- Drewett, P. (1979). New evidence for the structure and function of Middle Bronze Age roundhouses in Sussex. *Archaeological Journal*, 136, 3–11.
- Earle, T. (1977). A reappraisal of redistribution: Complex Hawaiian chiefdoms. In T. Earle & J. Ericson (Eds.), *Exchange systems in prehistory* (pp. 213–229). Academic Press.
- Earle, T. (2002). *Bronze Age economics: The beginnings of political economies*. Westview Press.
- Earle, T., & Kolb, M. (2010). Regional settlement patterns. In T. Earle & K. Kristiansen (Eds.), *Organising Bronze Age societies* (pp. 57–84). Cambridge University Press.
- Eogan, G. (1969). 'Lock-rings' of the Late Bronze Age. *Proceedings of the Royal Irish Academy*, 67, 93–148.
- Eogan, G. (1981). The gold vessels of the Bronze Age in Ireland and beyond. *Proceedings of the Royal Irish Academy*, 81, 345–382.
- Eogan, G. (1994). *The accomplished art: Gold and gold-working in Britain and Ireland during the Bronze Age (c. 2300–650 BC)*. Oxbow Books.
- Eogan, G. (1995). Ireland and the external world during the Later Bronze Age. In J. Waddell & E. Sheehy Twohig (Eds.), *Ireland in the Bronze Age* (pp. 128–135). The Stationery Office.
- Fernández-Götz, M. (2014). Understanding the Heuneburg: A biographical approach. In M. Fernández-Götz, H. Wendling, & K. Winger (Eds.), *Paths to complexity: Centralisation and urbanisation in Iron Age Europe* (pp. 24–34). Oxbow Books.
- Fernández-Götz, M. (2018). Urbanisation in Iron Age Europe: Trajectories, patterns, and social dynamics. *Journal of Archaeological Research*, 26, 117–162.
- Fernández-Götz, M., & Krause, D. (2013). Rethinking Early Iron Age urbanisation in Central Europe: The Heuneburg site and its archaeological environment. *Antiquity*, 87, 473–487.
- Fernández-Götz, M., & Ralston, I. (2017). The complexity and fragility of Early Iron Age urbanism in west-central temperate Europe. *Journal of World Prehistory*, 30, 259–279.
- Fernández-Götz, M., Wendling, H., & Winger, K. (2014). Introduction: New perspectives on Iron Age urbanisation. In M. Fernández-Götz, H. Wendling, & K. Winger (Eds.), *Paths to complexity: Centralisation and urbanisation in Iron Age Europe* (pp. 2–14). Oxbow Books.
- Flatrés, P. (1971). Hamlet and village. In R. Buchanan (Ed.), *Man and his habitat: Essays presented to Emyr Estyn Evans* (pp. 165–185). Barnes & Noble.
- Fletcher, R. (2009). Low-density, agrarian-based urbanism: A comparative view. *Insights*, 2(4), 2–19.
- Fletcher, R. (2012). Low-density, agrarian-based urbanism: Scale, power, and ecology. In M. Smith (Ed.), *The comparative archaeology of complex societies* (pp. 285–320). Cambridge University Press.
- Fonte, J., Valdez, J., Lemos, F., & Cruz, G. (2011). Citânia de Briteiros e médio vale do ave (NW de Portugal): SIG e análise arqueológica do território. *Anejos De AEspA*, 59, 359–366.
- García Sanjuán, L., Scarre, C., & Wheatley, D. (2017). The mega-site of Valencina de la Concepción (Seville, Spain): Debating settlement form, monumentality and aggregation in Southern Iberian Copper Age. *Journal of World Prehistory*, 30, 239–257.
- Gaydarska, B. (2017). Introduction: European prehistory and urban studies. *Journal of World Prehistory*, 30, 177–188.

- Gener, M. (2018). Carp's-tongue swords and their use: Functional, technological and morphological aspects. In C. Horn & K. Kristiansen (Eds.), *Warfare in Bronze Age society* (pp. 136–152). Cambridge University Press.
- Gerloff, S. (2010). *Atlantic cauldrons and buckets of the Late Bronze Age and Early Iron Ages in Western Europe*. Prähistorische Bronzefunde II, 18. Stuttgart: Franz Steiner Verlag Stuttgart.
- Gilman, A. (1981). The development of social stratification in Bronze Age Europe. *Current Anthropology*, 22, 1–23.
- Ginn, V. (2013). Power to the people: Re-interpreting Bronze Age society. *Emania*, 21, 47–58.
- Ginn, V. (2016). *Mapping society: Settlement structures in Later Bronze Age Ireland*. Archaeopress.
- Ginn, V., & Rathbone, S. (2011). *Corrstown: A coastal community. Excavations of a Bronze Age village in Northern Ireland*. Oxbow Books.
- Gratze, B., Louboutin, C., & Billaud, Y. (1998). Les perles protohistoriques en verre du Musée des Antiquités Nationales. *Antiquités Nationales*, 30, 13–24.
- Gringmuth-Dallmer, E. (1996). Kulturlandschaft und Siedlungssysteme. *Siedlungsforschung*, 14, 7–31.
- Grogan, E. (2005). *The North Munster project* (Vol. 1). Wordwell.
- Grogan, E. (2014). High and low: Identity and status in Late Bronze Age Ireland. In V. Ginn, R. Enlander, & R. Crozier (Eds.), *Exploring prehistoric identity in Europe: Our construct or theirs?* (pp. 60–71). Oxbow Books.
- Grogan, E., & Kilfeather, A. (1997). *Archaeological inventory of County Wicklow*. The Stationery Office.
- Hamilton, J. (1956). Jarlshof, a prehistoric and Viking settlement site in Shetland. In R. Bruce-Mitford (Ed.), *Recent archaeological excavations in Britain* (pp. 197–222). Routledge.
- Hamilton, S., & Manley, J. (2001). Hillforts, monumentality and place: A chronological and topographic review of first millennium BC hillforts of south-east England. *Journal of European Archaeology*, 4(1), 7–42.
- Harding, A. (2001). Reformation in barbarian Europe. In B. Cunliffe (Ed.), *The Oxford illustrated history of prehistoric Europe* (pp. 304–335). Oxford University Press.
- Harding, A. (2007). Enclosing and excluding in Bronze Age Europe. In A. Harding, S. Sievers, & N. Venclova (Eds.), *Enclosing the past: Inside and outside in prehistory* (pp. 97–115). J. R. Collis.
- Harding, A. (2018). Bronze Age encounters: Violent or peaceful? In C. Horn & K. Kristiansen (Eds.), *Warfare in Bronze Age society* (pp. 16–22). Cambridge University Press.
- Harding, A., Šumberová, R., Outram, A., & Knüsel, C. (2007). *Velim: Violence and death in Bronze Age Bohemia: The results of fieldwork 1992–95, with a consideration of peri-mortem trauma and deposition in the Bronze Age*. Prague Institute of Archaeology.
- Harding, D. (2012). *Iron Age hillforts in Britain and beyond*. Oxford University Press.
- Härke, H. (1979). *Settlement types and patterns in the West Hallstatt Province*. BAR 75. Archaeopress.
- Hartmann, G., Kappel, I., Grote, K., & Arnold, B. (1997). Chemistry and technology of prehistoric glass from Lower Saxony and Hesse. *Journal of Archaeological Science*, 24, 547–559.
- Hawkes, A. (2018). *The archaeology of prehistoric burnt mounds in Ireland*. Archaeopress.
- Hemer, K. (2021). To tread the parts, and traverse the moors: Investigating slavery in early medieval western Britain. In F. Biermann & M. Jankowiak (Eds.), *The archaeology of slavery in Early Medieval Northern Europe* (pp. 43–52). Springer.
- Henderson, J. (1988). Glass production and Bronze Age Europe. *Antiquity*, 62, 435–451.
- Henderson, J. (2007). *The Atlantic Iron Age: Settlement and identity in the first millennium BC*. Routledge.
- Heske, I. (2007). Eine steinerne Sichelgussform aus der jungbronzezeitlichen Außensiedlung der Hünenburg bei Watenstedt, Ldkr. Helmstedt. *Nachrichten aus Niedersachsens Urgeschichte*, 76, 29–39.
- Heske, I., Grefen-Peters, S., Posselt, M., & Wiethold, J. (2010). Die jungbronzezeitliche Außensiedlung der Hünenburg bei Watenstedt, Lkr. Helmstedt. Vorbericht über die Ausgrabungen 2005–2007. *Prähistorische Zeitschrift*, 159–190.
- Horn, C., & Kristiansen, K. (2018). Introducing Bronze Age warfare. In C. Horn & K. Kristiansen (Eds.), *Warfare in Bronze Age society* (pp. 1–15). Cambridge University Press.
- Jaeger, M., & Czebreszuk, J. (2010). *Does a periphery look like that? The cultural landscape of the Unetice culture's Kościan group. Landscapes and human development: The contribution of European archaeology* (pp. 217–236). Graduate School at the University of Kiel.
- Jiráň, L., Salaš, M., & Krenn-Leeb, A. (2013). The Czech lands and Austria in the Bronze Age. In H. Fokkens & A. Harding (Eds.), *The Oxford handbook of the European Bronze Age* (pp. 785–812). Oxford University Press.

- Jockenhövel, A. (1975). Zu befestigten Siedlungen der Urnenfelderzeit aus Süddeutschland. *Fundber. Hessen, 14*, 19–62.
- Jockenhövel, A. (2013). Germany in the Bronze Age. In H. Fokkens & A. Harding (Eds.), *The Oxford handbook of the European Bronze Age* (pp. 723–745). Oxford University Press.
- Jones, C. (1998). The discovery and dating of the prehistoric landscape of Roughan Hill in Co. Clare. *Journal of Irish Archaeology, 9*, 27–43.
- Kolb, F. (1984). *Die Stadt im Altertum*. Beck.
- Kristiansen, K. (1993). Chiefdoms, states, and systems of social evolution. In T. Earle (Ed.), *Chiefdoms: Power, economy, and ideology* (pp. 16–43). Cambridge University Press.
- Kristiansen, K. (1999). The emergence of warrior aristocracies in later European prehistory and their long-term history. In J. Carman & A. Harding (Eds.), *Ancient warfare* (pp. 175–190). The History Press.
- Kristiansen, K. (2018). Warfare and the political economy: Europe 1500–1100 BC. In C. Horn & K. Kristiansen (Eds.), *Warfare in Bronze Age society* (pp. 23–46). Cambridge University Press.
- Kristiansen, K., & Larsson, T. (2005). *The rise of Bronze Age society: Travels, transmissions and transformations*. Cambridge University Press.
- Lidke, G., Brinker, U., Jantzen, D., Dombrowsky, A., Dräger, J., Krüger, J., & Terberger, T. (2018). Warfare or sacrifice? Archaeological research on the Bronze Age site in the Tollense Valley, Northeast Germany. In C. Horn & K. Kristiansen (Eds.), *Warfare in Bronze Age society* (pp. 153–167). Cambridge University Press.
- Lippert, T. (1992). *Der Götschenberg bei Bischofshofen, Eine ur- und frühgeschichtliche Höhensiedlung im Salzachpongau*. Mitteilungen der Prähistorischen Kommission der Österreichischen Akademie der Wissenschaften, Band 27.
- Lock, G. (2011). Hillforts, emotional metaphors, and the good life: A response to Armit. *Proceedings of the Prehistoric Society, 77*, 355–362.
- Lock, G., Gosden, C. & Daly, P. (2005). *Segsbury Camp: Excavations in 1996 and 1997 at an Iron Age Hillfort on the Oxfordshire Ridgeway*. Oxford University School of Archaeology, Oxford.
- Lull, V., Micó, R., Rihuete Herrada, R. & Risch, R. (2013). Bronze Age Iberia. In Fokkens, H. & Harding, A. (Eds.), *The Oxford Handbook of the European Bronze Age* (pp. 594–616). Oxford University Press, Oxford.
- Lynn, C. (1977). Trial excavations at the King's Stables, Tray townland, County Armagh. *Ulster Journal of Archaeology, 40*, 42–62.
- Macalister, R. (1912). Report on the exploration of Bronze Age cairns on Carrowkeel Mountain, County Sligo. *Proceedings of the Royal Irish Academy, 29*, 311–347.
- Macdonald, P. (2008). *Knock Dhu, Ballyhackett, Antrim*. <http://www.excavations.ie/report/2008/Antrim/0019062/>. Accessed 19 April 2020.
- Macdonald, P. (2016). Excavations at Knock Dhu promontory fort, Ballyhackett, Co., Antrim 2008. *Emania, 23*, 33–52.
- MacWhite, E. (1945). Irish Bronze Age trumpets. *Journal of the Royal Society of Antiquaries of Ireland, 75*, 85–106.
- Mallory, J. (1991). Excavations at Haughey's Fort: 1989–1990. *Emania, 8*, 10–26.
- Mallory, J. (1995). Haughey's Fort and the Navan complex in the Late Bronze Age. In J. Waddell & E. Shee Twohig (Eds.), *Ireland in the Bronze Age* (pp. 73–86). The Stationery Office.
- Mallory, J., & Baban, G. (2014). Excavations in Haughey's Fort East. *Emania, 22*, 13–32.
- Mallory, J., & Warner, R. (1988). The date of Haughey's Fort. *Emania, 4*, 36–40.
- Marcigny, C., & Ghesquière, E. (2008). Espace rural et systèmes agraires dans l'Ouest de la France à l'Âge du bronze: Quelques exemples normands. In J. Guilaine (Ed.), *Villes, villages, campagnes de l'Âge du bronze* (pp. 256–278). Errance.
- McNeary, R. (2012). Archaeological applications of airborne LiDAR in Northern Ireland. Case study: Knockdhu, Co. Antrim. <http://www.archaeolandscapes.eu/index.php/ro/studii-de-caz/lidar/228.html>. Accessed 02 May 2020.
- Menotti, F., & Leuzinger, U. (2013). Houses and domestic life in the Circum-Alpine region Bronze Age. In M. Madella, G. Kovács, B. Kulcsarne-Berzsenyi, & I. Briz I Godino (Eds.), *The archaeology of household* (pp. 131–158). Oxbow Books.
- Mittnik, A., Massy, K., Knipper, C., Wittenborn, F., Friedrich, R., Pfrenkle, S., Burri, M., Carlichi-Witjes, N., Deeg, H., Furtwängler, A., Harbeck, M., von Heyking, K., Kocumaka, C., Kucukkalipci, I., Lindauer, S., Metz, S., Staskiewicz, A., Thiel, A., Wahl, J., ... Krause, J. (2019). Kinship-based social inequality in Bronze Age Europe. *Science, 366*, 1–12.

- Mohen, J., & Bailloud, G. (1987). La vie quotidienne : Les fouilles du Fort-Harrouard. In J. Picard (Ed.), *Collection L'Âge du bronze en France*. (Vol. 4). Picard.
- Molloy, K. (2005). Holocene vegetation and land-use history at Mooghaun, south-east Clare, with particular reference to the Bronze Age. In E. Grogan (Ed.), *The North Munster project: Volume 1. The later prehistoric landscape of south-east Clare* (pp. 255–287). Wordwell.
- Moore, T. (2017). Alternatives to urbanism? Reconsidering *Oppida* and the urban question in Late Iron Age Europe. *Journal of World Prehistory*, 30, 281–300.
- Mordant, C. (2013). The Bronze Age in France. In H. Fokkens & A. Harding (Eds.), *The Oxford handbook of the European Bronze Age* (pp. 571–593). Oxford University Press.
- Mullins, G. (2008). Three thousand years of human activity at Rahally, Co. Galway. In J. O'Sullivan & M. Stanley (Eds.), *Roads, rediscovery and research: Proceedings of a public seminar on archaeological discoveries on national road schemes* (pp. 25–35). National Roads Authority.
- Murrieta-Flores, P. (2012). Understanding human movement through spatial technologies: The role of natural areas of transit in the late prehistory of south-western Iberia. *Trabajos de Prehistoria*, 69(1), 103–122.
- Musson, C. (1970). House-plans and prehistory. *Current Archaeology*, 10, 267–275.
- Needham, S., & Bowman, S. (2005). Flesh hooks, technological complexity and the Atlantic Bronze Age feasting complex. *European Journal of Archaeology*, 8(2), 93–136.
- Neustupný, E. (2006). Enclosures and fortifications in Central Europe. In A. Harding, S. Sievers, & N. Venclová (Eds.), *Enclosing the past: Inside and outside in prehistory* (pp. 1–4). J. R. Collis.
- O'Brien, W. (2004). *Ross Island: Mining, metal and society in early Ireland*. National University of Ireland.
- O'Brien, W. (2012). *Iverni: A prehistory of Cork*. The Collins Press.
- O'Brien, W., Hogan, N., & O'Driscoll, J. (2016a). Archaeological investigations at Toor More (Corrandhu) hillfort, Co., Kilkenny. *Journal of the Royal Society of Antiquaries of Ireland*, 144–145, 7–26.
- O'Brien, W., Hogan, N., & O'Driscoll, J. (2016b). Archaeological investigations at Ballylin hillfort, Co. Limerick. *North Munster Antiquarian Journal*, 56, 1–26.
- O'Brien, W., & O'Driscoll, J. (2017). *Hillforts, warfare and society in Bronze Age Ireland*. Archaeopress.
- O'Carroll, F. (2012). Clay moulds. In C. Cotter (Ed.), *The Western Stone Forts project: Excavations at Dún Aonghasa and Dún Eoghanachta* (Vol. 2, pp. 28–41). Wordwell.
- O'Connell, M., Molloy, K., & McMahon, H. (2001). Reconstructing prehistoric farming activity and human impact at a fine spatial resolution: Palaeoecological investigations at Mooghaun, Co. Clare, Western Ireland. In P. Schauer (Ed.), *Beiträge zur Siedlungsarchäologie und zum Landschaftswandel* (pp. 161–186). Universitätsverlag Regensburg.
- O'Driscoll, J. (2013). Ballybrowney Lower: A geophysical survey. In K. Hanley & M. Hurley (Eds.), *Generations: The archaeology of five national road schemes in County Cork* (Vol. 1, pp. 93–96). Wordwell.
- O'Driscoll, J. (2016). The Baltinglass landscape and the hillforts of Bronze Age Ireland. Unpublished PhD thesis, University College Cork, Ireland. <https://cora.ucc.ie/handle/10468/3532>.
- O'Driscoll, J. (2017). Landscape prominence: Examining the topographical position of Irish hillforts using a cumulative viewshed approach. *Journal of Archaeological Science: Reports*, 16, 73–89.
- O'Driscoll, J. (2018). A multi-layered model for Bronze Age hillforts in Ireland and Europe. *Journal of Irish Archaeology*, 26, 77–100.
- O'Driscoll, J. (2019a). Picture perfect: Using drone technology and photogrammetry techniques to map the western stone forts of Ireland. *Journal of Field Archaeology*, 44(2), 126–146.
- O'Driscoll, J. (2019b). A case study for landscape applications of drone and photogrammetry techniques: Faha and Caherconree hillforts, Co. Kerry. *Journal of the Kerry Archaeological and Historical Society*, 18(2), 1–28.
- O'Kelly, M. J. (1989). *Early Ireland: An introduction to Irish prehistory*. Cambridge University Press.
- Ó Floinn, R. (2000). Freestone Hill, Co. Kilkenny: A re-assessment. In A. Smyth (Ed.), *Seanachas: Studies in early and Medieval Irish archaeology, history and literature in honour of Francis J. Byrne* (pp. 12–29). Four Courts Press.
- Osgood, R. (1998). *Warfare in the Late Bronze Age of north Europe*. British Archaeological Reports.
- Osgood, R., & Monks, S. (2010). *Bronze Age warfare*. The History Press.
- Oswald, A., Ainsworth, S., & Pearson, T. (2006). *Hillforts: Prehistoric strongholds of the Northumberland National Park*. English Heritage.

- Plunkett, G. (2006). Hekla 3, environmental downturn and Irish Late Bronze Age hillfort connections revisited. *Emania*, 20, 62–67.
- Plunkett, G. (2009). Land-use patterns and cultural change in the Middle to Late Bronze Age in Ireland: Inferences from the pollen record. *Vegetation History and Archaeobotany*, 18, 273–295.
- Plunkett, G., McDermott, C., Swindles, G., & Brown, D. (2013). Environmental indifference? A critique of environmentally deterministic theories of peatland archaeological site construction in Ireland. *Quaternary Science Reviews*, 61, 17–31.
- Primas, M. (2002). Taking the high ground: Continental hill-forts in Bronze Age contexts. *Proceedings of the Prehistoric Society*, 68, 41–59.
- Proudfoot, B. (1954). Excavations at the Cathedral Hill, Downpatrick, Co., Down, 1953. *Ulster Journal of Archaeology*, 89, 97–102.
- Proudfoot, B. (1955). Excavations at Cathedral Hill, Downpatrick, Co., Down: Preliminary report on excavations in 1954. *Ulster Journal of Archaeology*, 90, 57–72.
- Raftery, B. (1969). Freestone Hill, Co., Kilkenny: An Iron Age and Bronze Age cairn: Excavation Gerhard Bersu. *Proceedings of the Royal Irish Academy*, 68, 1–108.
- Raftery, B. (1976). Rathgall and Irish hillfort problems. In D. Harding (Ed.), *Hillforts: Later prehistoric earthworks of Britain and Ireland* (pp. 339–357). Academic Press.
- Raftery, B. (1995). The conundrum of the Irish Iron Age pottery. In B. Raftery, V. Megaw, & V. Rigby (Eds.), *Sites and sights of the Iron Age: Essays on fieldwork and museum research presented to Ian Matheson Stead* (pp. 149–156). Oxbow Books.
- Raftery, B., & Beaker, K. (2023). *A Hillfort Through Time: Excavations at Rathgall, Co. Wicklow*. Wordwell, Dublin.
- Ralston, I. (2006). *Celtic fortifications*. Tempus.
- Rathbone, S. (2013). A consideration of villages in Neolithic and Bronze Age Britain and Ireland. *Proceedings of the Prehistoric Society*, 79, 39–60.
- Rideout, J., Owen, A., & Halpin, E. (1992). *Hillforts in southern Scotland*. Historic Scotland.
- Schoebel, G. (1996). *Die Spätbronzezeit am nordwestlichen Bodensee. Taucharchäologische Untersuchungen in Hagnau und Unteruhldingen 1982–1989*. Kommissionsverlag, Konrad Theiss Verlag.
- Service, E. (1962). *Primitive social organisation: An evolutionary perspective*. Random House.
- Sharples, N. (2007). Building communities and creating identities in the first millennium BC. In C. Haselgrove & R. Pope (Eds.), *The earlier Iron Age in Britain and the near continent* (pp. 174–184). Oxbow Books.
- Sharples, N. (2010). *Social relations in prehistory: Wessex in the first millennium BC*. Oxford University Press.
- Sharples, N. (2014). Are the developed hillforts of southern England urban? In M. Fernández-Götz, H. Wendling, & K. Winger (Eds.), *Paths to complexity: Centralisation and urbanisation in Iron Age Europe* (pp. 224–232). Oxbow Books.
- Simpson, D., & Gibson, S. (1989). Lyles Hill. *Current Archaeology*, 114, 214–215.
- Smyth, J. (2014). *Settlement in the Irish Neolithic: New discoveries at the edge of Europe*. Oxbow Books.
- Stewart, D., & Russell, M. (2017). *Hillforts and the Durotriges: A geophysical survey of Iron Age Dorset*. Archaeopress.
- Taylor, T. (2021). The arrogation of slavery: Prehistory, archaeology, and pre-theoretical commitments concerning people as property. In F. Biermann & M. Jankowiak (Eds.), *The archaeology of slavery in Early Medieval Northern Europe* (pp. 9–22). Springer.
- Thorpe, N. (2006). Fighting and feuding in Neolithic and Bronze Age Britain and Ireland. In T. Otto, H. Thrane, & H. Vandkilde (Eds.), *Warfare and society: Archaeological and social anthropological perspectives* (pp. 141–165). Aarhus University Press.
- Thorpe, N. (2013). Warfare in the European Bronze Age. In H. Fokkens & A. Harding (Eds.), *The Oxford handbook of the European Bronze Age* (pp. 235–247). Oxford University Press.
- Towel, A., Henderson, J., Bellintani, P., & Gambacurta, G. (2001). Frattesina and Adria: Report of scientific analyses of early glass from the Veneto. *Padusa*, 37, 7–68.
- Vandkilde, H. (2004). Spišský Štvrtok. In Bogucki, P. & Crabtree, P. *Ancient Europe: 8000 B.C.–A.D. 1000. Encyclopaedia of the Barbarian World*. Charles Scribner's Sons, New York. 30–33.
- Van de Noort, R. (2013). Seafaring and riverine navigation in the Bronze Age of Europe. In H. Fokkens & A. Harding (Eds.), *The Oxford handbook of the European Bronze Age* (pp. 382–397). Oxford University Press.
- Waddell, J. (1998). *The prehistoric archaeology of Ireland*. Wordwell.

- Waddell, J., Fenwick, J., & Barton, K. (2009). *Rathcroghan: Archaeological and geophysical survey in a ritual landscape*. Wordwell.
- Warner, R. (2006). The hoard and the Creeveroe axe: Two new finds of Late Bronze Age date from near Navan, Co. Armagh. *Emania*, 20, 20–28.
- Warner, R. (2012). The radiocarbon dates from Dún Aonghasa. In C. Cotter (Ed.), *The Western Stone Forts project: Excavations at Dún Aonghasa and Dún Eoghanachta* (Vol. 2, pp. 211–224). Wordwell.
- Warner, R. (2013). A lost, Iberian-style, Bronze Age gold neck-ring from near Navan, Co. Armagh. *Emania*, 21, 36–39.
- Warner, R. (2014). The gold fragments from Haughey's Fort, Co., Armagh: Description and XRF analysis. *Emania*, 22, 69–76.
- Weir, D. (1987a). The earlier limits of Loughnashade. *Emania*, 2, 25–28.
- Weir, D. (1987b). Palynology and the environmental history of the Navan area: A preliminary study. *Emania*, 3, 34–43.
- Weir, D. (1993). Dark Ages and the pollen record. *Emania*, 11, 21–30.
- Weir, D. (1994). The environment of Emain Macha. In J. Mallory & G. Stockman (Eds.), *Ulidia: Proceedings of the first international conference on the Ulster Cycle of Tales* (pp. 171–180). December Publications.
- Yates, T. (2007). *Land, power and prestige: Bronze Age field systems in southern England*. Oxbow Books.
- York, J. (2002). The life cycle of Bronze Age metalwork from the Thames. *Oxford Journal of Archaeology*, 21, 77–92.

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.