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<th>Geomagnetic survey on the Hill of Tara, Co. Meath, 1998-9</th>
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Discovery Programme Reports

6
1. GEOMAGNETIC SURVEY ON THE HILL OF TARA, CO. MEATH, 1998–9

JOE FENWICK AND CONOR NEWMAN

Pl. 1—Aerial photograph of Tara from the south-east. A combination of raking sunlight and frost reveals the ditched pit circle as an arcuate, low-relief depression to the west of Ráith na Senad (photo courtesy of Jacqueline O’Brien).

Introduction

Further geomagnetic survey of the Hill of Tara was carried out by the Centre for Archaeological Survey, NUI, Galway, in collaboration with the Discovery Programme. The surveys were implemented in two stages in November 1998 and May 1999 and comprised reconnaissance magnetic susceptibility survey and high-resolution magnetic gradiometry. The survey utilised a ‘common archaeological grid system’ of 10m squares (panels) aligned to and synchronised with 10m multiples of the National Grid. Both techniques were initially applied over a rectangular panel (200m north–south by 100m east–west) immediately to the west and north-west of Ráith na Senad, where, along with a host of interesting features, the western half of a large and obviously important new oval enclosure was revealed. Passing a few metres to the south of the Tech Midchúarta and curving around to the south of Duma na rGiall, it was instantly apparent that this monument was large enough to enclose the whole churchyard at Tara. The gradiometry survey was therefore further extended to the south and east in order to fully map it and some of the surrounding ground, including a significant portion of the northern half of Ráith na
Fig. 1—Symbol plot of magnetic susceptibility. Volume-specific measurement of each sample point is represented by a circle whose diameter is directly proportional to the numeric value.
Geomagnetic survey on the Hill of Tara, Co. Meath, 1998–9

The area covered had not previously been subjected to geophysical survey and the purpose of this paper is to report on the results of this survey, to present preliminary comparative analyses and to comment on the implications of this work for our understanding of Tara.

**Magnetic susceptibility**

A reconnaissance magnetic susceptibility survey was undertaken using a Bartington MS2 and MS2D field loop. Measurements were taken at 5m intervals along north–south parallel transects set 5m apart within a 195m by 95m area to the west and north-west of Ráith na Senad. The resulting image is therefore generated from a total of 800 readings of magnetic susceptibility.

This survey was undertaken to detect general magnetic trends across the hillside in order to identify areas of anthropogenically enhanced susceptibility which could then be targeted for higher-resolution fluxgate gradiometry survey. Higher susceptibility values due to anthropogenic factors are largely a result of activities which involved intensive burning, for example a hearth, kiln or furnace (Clark 1990, 100–1). Such features and activities can usually be detected as areas of relatively high susceptibility values contrasting with those of the natural background levels. Surprisingly, and despite considerable past activity, clearly evidenced by the wealth of archaeological monuments on the hill, the image displays no significant contrasts or specific areas of enhanced values of magnetic susceptibility (Fig. 1).

**Fluxgate gradiometry survey**

The magnetometer survey was undertaken using a Geoscan FM36 fluxgate gradiometer. Readings were taken at 0.5m intervals, south to north, along parallel transects set 0.5m apart. This amounts to a total of 400 readings per 10m by 10m panel. The survey is therefore at twice the resolution of previous magnetometer surveys conducted on the hill during the course of the original Tara Survey (undertaken by GeoQuest Ltd between 1992 and 1995). The combined survey consists of a total of 474 panels, amounting to nearly 190,000 individual measurements of magnetic gradient, and covers an irregular area of over 4.5ha with maximum dimensions of 320m north–south by 280m east–west (Fig. 2).

These data have undergone a number of simple processing procedures. Survey panels have undergone de-drifting and edge-matching procedures to provide as close to a seamless join as possible between adjacent panels. The data range has been de-spiked to remove excessively high and low magnetic anomalies which are likely, for the most part, to be caused by ferrous litter. In addition, it has been clipped to the statistical bulk of the data set in order to isolate or enhance some of the weaker magnetic anomalies of archaeological significance. No filters have been applied and therefore the resulting image is essentially that of the raw survey data which have undergone only editorial manipulation. The resulting image is one of extraordinary clarity and displays a wealth of subsurface magnetic anomalies, many of which are clearly of archaeological significance.

**Archaeological interpretation**

Much of the hilltop was subjected to extensive ridge-and-furrow cultivation in the past. The evidence of this can be traced as low-relief undulations on the surface of the fields today. It is likely, therefore, that many of the archaeological features lying close to the surface (perhaps up to 0.5cm deep) will have been substantially destroyed or completely erased. Similarly, features set deeper in the subsoil will have been truncated to the depth of the ploughzone horizon but may remain relatively undisturbed in the underlying subsoil layers. Volume-specific measurement of magnetic susceptibility employing a field loop, though probing only to a depth of about 0.2m, was deemed appropriate in this context as it can, nonetheless, detect thin lenses or spreads of magnetically enhanced material even if disturbed from their original context.

Though at first glance the magnetic susceptibility image may appear rather disappointing, the distinct lack of anomalous zones does seem to suggest that this part of the hill did not see any significant domestic, industrial or ritual activity involving intensive burning (Fig. 1).

The pattern of ridge-and-furrow cultivation is also evident in the gradiometry image as faint, alternating parallel bands of positive and negative magnetic gradient (Fig. 2). The survey confirms the surface indications that the hilltop was formerly subdivided into a number of individual, roughly rectangular, plots or fields (Newman and Fenwick 1997, 35–8, figs 12 and 13). These and some of the more recent disturbance in the geophysical image will be identified before discussing other features of potential archaeological significance.
Fig. 2—Grey-scale image of the 1998–9 fluxgate gradiometry survey, dominated by the remarkably clear signature of the ditched pit circle (31:33:71).
The area to the west and north-west of Ráith na Senad is divided into three distinct plots on either side of a disused field boundary. This boundary is visible as a broad, linear, low-relief depression running north–south on the ground surface, and is also displayed as a broad negative lineation in the gradiometry image. The cultivation ridges run parallel on either side of the dividing boundary, with the exception of a third field or plot in the north-west corner of the image, where the ridge-and-furrow cultivation pattern runs at right angles, east–west, to the principal boundary.

The cultivation pattern to the north of Ráith na Senad and east of the disused field boundary running along the eastern bank of the Tech Midchúarta is evident as a low-relief surface feature and also appears as a faint banding of alternating negative and positive magnetic lineations oriented east–west. Interestingly, there are also faint traces in the gradiometry image of a cultivation pattern running at right angles to this which possibly reflects an earlier episode of cultivation within the same plot but whose subsurface presence was not completely erased by the penultimate ridge- and-furrow pattern. The pattern within the small triangular field between the carpark and the path leading to the churchyard (i.e. north-east of the churchyard), though having no readily apparent surface expression, appears to be oriented north–south in the gradiometry image. The ridge-and-furrow cultivation pattern in the long rectangular field to the east of the churchyard and Ráith na Ríg extends downhill, west to east, towards the modern road. Within this field are also a number of disused field boundaries (running east–west) which, like the fossil cultivation pattern, run perpendicular to the road.

The ridge-and-furrow pattern to the south of Ráith na Senad and within the northern sector of Ráith na Ríg is subdivided into two distinct areas. One lies to the east of Duma na nGiall and here the ridge-and-furrow cultivation runs north–south, parallel to the field boundary which adjoins Ráith na Ríg. Though this pattern is more distinctive within Ráith na Ríg, it appears to continue over the ramparts to fill the triangular area up to the churchyard wall. The second system lies to the west of Duma na nGiall and has an east–west orientation within Ráith na Ríg. In this instance, however, it stops short of the rampart. It is clear from the gradiometry image that a number of magnetic anomalies must lie below, and therefore pre-date, this cultivation horizon as none display obvious surface evidence or interference with the ridge-and-furrow overprint.

The most clearly defined of these anomalies is a large oval enclosure that dominates the centre of the image (Figs 2 and 3). This feature is expressed as a broad negative–positive–negative magnetic band (typically from −4 to +4 nT/0.5m), about 5m in width, to either side of which is a series of regularly spaced, roughly circular, discrete positive magnetic anomalies (Fig. 4). These anomalies, 1.5–2m in diameter, are spaced approximately 4m apart, centre to centre, around the entire circumference of the ring and roughly 8m apart across the dividing lineation. The enclosure is on a monumental scale. With maximum dimensions of 210m north–south by 175m east–west, and enclosing an area of some 3ha, it extends from the southern end of the Tech Midchúarta southwards to encompass Ráith na Senad, most of St Patrick’s churchyard and Duma na nGiall within its circuit. Physical obstructions, such as graves, headstones, railings and the overburden of accumulated material, render the interior of the churchyard unsuitable for surveying.

The negative–positive–negative lineation can be traced as a broad low-relief depression to the west and north of Ráith na Senad (Pl. 1). It is likely, therefore, that this anomaly represents a fosse whose fill is composed of a significant volume of magnetically enhanced sediments. In addition to burnt material, topsoil in general is inherently more magnetically susceptible than the underlying B horizon. The presence of decaying organic matter may also have a bearing, though perhaps to a lesser degree, on the magnetic quality of soil sediments in the fosse. It is likely, however, because of the extraordinary clarity of the magnetic signature of this feature, that the fosse contains significant quantities of burnt material. In addition, there is the distinct possibility that, like the substantial fosses defining Ráith na Senad or Ráith na Ríg, it may be rock-cut. On the summit of the hill the upper surface of the bedrock occurs, on average, about 1m below the present ground surface (Cummins 1997, 256). By contrast, the underlying Lower Carboniferous limestone has little or no inherent magnetic presence, and therefore the proportionately greater volume of magnetically enhanced material within a rock-cut fosse will register particularly clearly. The discrete equi-spaced magnetic anomalies, up to 300 in total, on either side of the fosse may represent pits or possibly post-pits for large upright timbers. A similar explanation may be advanced for their particularly clear geomagnetic expression. Between them, therefore, these two sets of anomalies can be interpreted as a large fosse on either side of which are regularly spaced pits, and this is provisionally described hereafter as a ditched pit circle.
Fig. 3—Interpretational line map of some of the most clearly defined archaeomagnetic anomalies.
Fig. 4—Upper: Detail of the western sector of the ditched pit circle (31:33:71).
Lower: Three-dimensional representation of the gradiometry data values for the same area. Magnetic polarity has been inverted so that positive anomalies appear as troughs and negative anomalies as peaks.
(31:33:71). Interestingly, there is no obvious evidence of an entrance or formal approach to this monument. It may, unfortunately, be the case that this lies somewhere within the unsurveyed area in the churchyard.

In addition to the large enclosure, a number of smaller, less dramatic—though no less important—circular, arcuate and linear positive magnetic anomalies can be distinguished in the image. Many are just discernible above the threshold of background noise and are particularly difficult to distinguish without the benefit of viewing them on a computer screen. Only the more obvious features will be discussed here, though it is evident, on more detailed inspection, that there may be many other features of potential archaeological significance in the gradiometry data.

A number of strong magnetic anomalies within the interior of the enclosure are due to modern features and can therefore be ignored. These features have been edited out of the data set as the strength of their signal would tend to overwhelm or mask some of the more subtle magnetic features of archaeological significance. The memorial cross surrounded by railings, commemorating the 1798 rebellion, in the southwestern corner of the enclosure exhibits a considerable magnetic presence and has been removed from the data set. The magnetic signatures of the steel supports for the signs marking Ráith na Ríg and Duma na nGiall, both lying immediately to the north of Duma na nGiall, have also been deleted from the image, as has that of the Féinsa pillar to its north-west. In addition, Duma na nGiall itself and areas to its east and north were not surveyed as the gate, the steel reinforcements and the wire mesh used to consolidate the reconstituted mound all contribute spurious strong magnetic signals. The majority of the remaining features visible in the image are, however, of potential archaeological significance.

A number of these features occur within the ditched pit circle. However, only peripheral parts of Ráith na Senad were subjected to geophysical survey as this monument has been extensively excavated in the past (Ó Riordáin 1961). It was traversed by a wall, now removed, running south-west/north-east, marking the Castletown Tara/Castleboy townland boundary. The position of this wall can be traced in the gradiometry image as a broad, rather noisy band of randomly dispersed dipolar anomalies. This pattern is likely to reflect a concentration of ferromagnetic objects—perhaps the buried remains of corroded wire. That part of the monument lying to the north of the townland boundary (in Castletown Tara) remains as an extant earthwork, whereas to the south (Castleboy) it has been all but erased. The outer ramparts in this south-eastern quadrant can still, however, be discerned as a low-relief earthwork. The gradiometry survey of this part of the monument reveals two of the outermost concentric fosses as faint, broad, positive magnetic bands separated by a narrow, more distinct lineation, perhaps representing the subsurface remains of a substantial slot trench or palisade which may have functioned as a bank revetment.

The area immediately north of Ráith na Senad displays a significant concentration of magnetic disturbance, principally strong dipolar anomalies. If these are of archaeological significance, they may indicate that this area saw intense burning, possibly associated with metalworking, or a significant concentration of ferrous objects. These features may equally, of course, be due to a concentration of ferrous litter of relatively modern date which may be of no archaeological consequence. It is interesting to note, however, that there are also significant anomalous magnetic sources, many of which display large discrete dipolar signatures, around the periphery of the churchyard, and particularly along its northern boundary and the field boundary extending from it to the west. It is recorded that during the Battle of Tara in 1798 the rebel forces were entrenched in some of the field boundaries and archaeological earthworks on the hill (Steen 1991). Some of them retreated to the churchyard, where they came under sustained fire from Crown forces. There is the distinct possibility, therefore, that some of the anomalous sources around the churchyard and field boundary may be the remnants of grapeshot or cannon balls fired at the rebel forces during the course of the confrontation.

At the southern part of the image the rampart of Ráith na Ríg is clearly defined. Interestingly, the external bank appears to be effectively transparent to magnetic gradiometry survey, but the internal foss is expressed as a broad negative-positive-negative magnetic band. Parallel to this is a narrow, unbroken, sharply delimited, positive magnetic line representing the palisade trench (feature 62 in Roche, this volume; hereafter F62) identified by Ó Riordáin during excavations in the late 1950s. Curiously, there is a very localised area of intense magnetic disturbance to the north-east of Duma na nGiall. This area, composed of a concentration of magnetic dipoles, correlates with the area of metalworking identified in recent excavations below the bank of Ráith na Ríg (Roche 1999). Though the majority of point-source magnetic anomalies may represent metalworking detritus, a
number of the larger discrete anomalies may possibly correspond to the location of individual furnaces.

Immediately to the south of the ditched pit circle is a slender positive magnetic arcuate lineation, running roughly east-west, which continues beyond the limits of the present survey and possibly encircles the conjoined monuments of the Forrad and Tech Cormaic. Interestingly, this feature appears to reflect the curvature of the rampart of Ráith na Ríg, and its scale and the nature of the magnetic signature are remarkably similar to those of a palisade trench F62. This feature, therefore, may also represent the remains of a palisade trench. There are other amorphous areas of magnetic disturbance, several faint linear features and a number of strong dipolar anomalies within Ráith na Ríg, but none provides an easily recognisable or coherent pattern. Certainly, the gradiometry image of parts of the interior of Ráith na Ríg seems to exhibit evidence of activity, but it would appear that many of these areas have been considerably disturbed by later cultivation.

A number of more easily identifiable archaeological features, appearing as annular anomalies, occurs within the confines of the ditched pit enclosure (31:33:71). A circular, positive magnetic anomaly (31:33:75), defined as a broad annulus 2–3m wide and approximately 13m in diameter, occurs adjacent to the south-eastern quadrant of Duma na Giall. This is a ring-ditch, the north-western quadrant of which was investigated during the excavation of the passage tomb (Muiris O'Sullivan, pers. comm.). A more clearly defined slender annulus (31:33:76), composed of an unbroken ring 1m wide and roughly 14m in diameter, occurs in the south-eastern quadrant of the ditched pit enclosure. A more ephemeral example (31:33:77), approximately 7m in diameter, occurs in the extreme north of the enclosure and appears to be aligned with the southern end of the Tech Midchúarta.

In the north-west of the image, and outside the ditched pit circle, is a series of additional annular anomalies. The most clearly defined are three conjoined circles (31:33:72, 31:33:73 and 31:33:74) to the west which appear as broad magnetic bands, roughly 2m wide, with approximate diameters of 18m, 12m and 14m respectively (Fig. 5). These features appear to have been significantly disturbed by the ridge-and-furrow cultivation. The deeper furrows have, in places, cut through the circular anomalies, giving them the appearance of being composed of a series of contiguous arcs. Other, more ephemeral circular anomalies apparent in the image may have been truncated almost to the point of total obliteration.

In addition to the predominantly north-south, corduroy patterning of the plough furrows, a number of lineations, some quite faint, are evidenced. With the exception of a prominent north–south lineation (Figs 2 and 3) lying slightly to the west of the mid-line, which is the remains of an early field boundary (Newman 1997, fig. 12), the remaining lineations cross the surveyed area in a general east-west direction. These clearly pre-date the surviving ridge-and-furrow pattern because they have no surface expression. Eight (or possibly nine) are orientated north-west/south-east and, at the south end of the surveyed area, are arguably quite regularly spaced. The remaining two are orientated in the opposite direction, roughly east-north-east/west-south-west, but they are not quite parallel with one another. There is a fairly strong likelihood that these are agricultural features, particularly the group orientated north-west/south-east. It would be premature, however, to write off all of these features as the remains of relatively recent agriculture.

It should be noted that magnetic gradiometry will detect only those archaeological features whose magnetic signature is sufficiently distinct for them to be recorded above the natural background noise. A clear reminder of this is the apparent transparency of mounds 31:33:20 and 31:33:21. These monuments, though extant as topographical features, remain effectively invisible to geomagnetic methods, though not to resistivity, as demonstrated previously (Newman 1997, 14–16).

Discussion

Annular features

This latest geophysical survey has revealed a host of interesting new features. The arcuate and annular anomalies (31:33:72–7) can, as before, be provisionally described as ring-ditches and therefore may be of Bronze Age date, though this form may have a very long chronology (see Newman 1997, 160–70). In general, they may be considered as funerary monuments, though even this is open to question in many cases. Overlapping of adjacent specimens is a recurring feature of such monuments, as seen, for example, elsewhere at Tara (e.g. 31:33:41–2) and most recently at Elton, Co. Limerick, and possibly also at Chancellorsland (Doody 1999). It seems highly unlikely that this is coincidental, a function of their having so slight a physical presence that the exact whereabouts of earlier ones have simply been
Fig. 5—Upper: Details of the three conjoined positive magnetic rings (31:33:72–4) lying to the west of Ràith na Senad. Lower: Three-dimensional representation of the gradiometry data values for the same area with magnetic polarity reversed.
overlooked or forgotten. Rather, it suggests close affiliation, perhaps of a familial nature, among such groups and is therefore worthy of further consideration.

A reasonable case can be made for suggesting that these and the previously recorded barrow and ring-ditch monuments in this area (namely 31:33:6, 31:33:20-2 and 31:33:72-4) encircle the newly identified hengiform enclosure and, in so far as their positioning is concerned, that they have taken their cue from this earthwork (Figs 2 and 3). Moreover, the occurrence of at least three annuli (31:33:75-7) around the internal perimeter of the ditched pit enclosure may indicate another such ring of burial monuments. Further discoveries, of course, may disprove this, but in the meantime it is a worthwhile hypothesis in that it adheres to the notion that the position of monuments, particularly in so dense a concentration as on the Hill of Tara, can be determined by the location of significant earlier monuments. It would also suggest that they are later than the ditched pit circle, which might be suspected anyway on the grounds of comparative chronologies.

It is finally worth noting that this present survey 'ground-truths', albeit a posteriori, an annular positive magnetic anomaly, for, as we have seen, the magnetometry survey also covered a ring-ditch (33:31:75) to the south-east of Duna na nGiall, one quadrant of which was previously excavated by de Valera. Full publication of this excavation will doubtless allow for more detailed concordance of geophysical and excavated evidence than is presently possible, but in the interim the results should inspire confidence in the ability of geophysics to record genuine archaeological features in a meaningful and accurate way.

**Ditched pit circle (31:33:71)**

The image is, of course, dominated by the very large and impressive new enclosure 31:33:71, the geophysical presentation of which suggests, as we have already seen, two rows of regularly spaced pits on either side of a fosse (Fig. 6). While it is not yet known whether or not the pits and the fosse originally supported upright timbers, the exceptional clarity of the signature invites comparison with the growing corpus of palisaded enclosures and pit and timber circles from Ireland and Britain. Studied most recently by Alex Gibson (1994; 1996; 1998), these monuments frequently occur in ceremonial complexes and present very similar architectural motifs, factors that incline many commentators to the view that they are possibly just variations on a theme, one driven by religious conventions.

Mindful of the fact that in the present state of knowledge the monuments themselves cannot sustain too rigid a classification, Gibson applies a general distinction between timber circles and palisaded enclosures on the basis of shape and, implicitly, size. At one extreme is Hindwell II, Radnorshire, an enormous oval-shaped palisaded monument enclosing a massive 34ha (Gibson 1996; 1998; Gibson et al. 1999). Although somewhat dwarfing them, Hindwell II is classified along with enclosures such as those at Mount Pleasant, Dorset (Wainwright 1989), and West Kennet, Wiltshire (Whittle 1991). The size and irregular elliptical plan of these monuments suggest that they are, first and foremost, enclosures: their primary job is to demarcate, on a grand scale, sacred and/or secular spaces. Though evidently of quite singular dimensions, the effectiveness of such boundaries probably depended more on social dictates and religious mores than on physical impedance, especially where they defined religious space. This is borne out by the fact that some of these enclosures, e.g. Forteviot (Harding and Lee 1987) and Walton (Gibson 1995), are defined by most unpalisade-like, widely separated posts. At the other end of the typological spectrum are the sometimes diminutive timber circles, such as the 7m-diameter timber circle at Hungerford and the 8m-diameter circle on Conygar Hill (Gibson 1994, fig. 33). Most timber circles are indeed circular, and oval and elliptical shapes are quite rare. It is highly probable, therefore, that the prescribed or ideal shape was circular (see Gibson 1994, 192). Consequently, shape is, for Gibson, an important criterion in distinguishing between timber circles and palisaded enclosures. Being far more open-plan, timber circles are not as manifestly demarcating as palisaded enclosures, though evidently one of their primary functions was to demarcate sacred spaces. Insofar as most timber circles consist of fairly widely spaced, free-standing posts, they describe spaces that are delimited on a conceptual level.

Sites occupying the middle size ranges (i.e. the smaller of Gibson's palisaded enclosures) challenge such loose divisions: large, elliptical monuments, such as at Ballynahatty (BNHS in Hartwell 1998) and now Tara 31:33:71, could, with some justification, be classified either way. Indeed, it is examples such as these that argue against imposing too rigid a classification. The frequency with which these middle-range enclosures are associated with religious monuments and ritual complexes means, in all probability, that they too have a significant religious dimension and are unlikely to be radically different from timber circles. That said, sites such as
Ballynahatty, where both forms are combined, suggest specificity of function and hierarchy—equivalent, perhaps, to the progression in sanctity of medieval ecclesiastical enclosures from *sanctus* to *sanctissimus* (Doherty 1985; although see also Swift 2000).

Gibson (1998) arranges the palisaded enclosures of Neolithic Britain and Ireland into three groups on the basis of different constructional procedures evidenced by the relative proximity of the perimeter post-holes to one another. His first group is characterised by distinct and quite widely spaced post-holes, whereas the second and third types have closely spaced post-holes and continuous bedding trenches respectively. From this last group can be distinguished what Gibson refers to as ‘fenced sites’. Dating from the earlier Neolithic period, the latter are defined by continuous trenches of relatively modest proportions, probably capable of supporting posts no taller than about 3m in height, which contrast sharply with the monumental scale of the remaining palisaded enclosures. ‘Fenced sites’ aside, radiocarbon dates from the remaining three types suggest a general progression from enclosures with widely spaced post-holes, through specimens with overlapping post-holes, to those defined by trenches supporting contiguous palisades. It is also worth considering that each of the three types would have exhibited significantly different superstructures.

The widely spaced post-holes of Gibson’s first group may, in many cases, have originally presented as ellipses or circles of free-standing posts, whereas the superstructure of sites with continuous bedding trenches would have been more palisade- or stockade-like, comprising an unbroken barrier that physically limited access and visibility into the interior (though Gibson’s suggestion that the free-standing posts may have supported horizontal plank shuttering introduces the possibility that these too would have presented a similar barrier).

Allowing for the fact that full ground-plans are available for only a small number of sites, if any pattern is emerging it is that the largest palisaded enclosures, such as those at Hindwell II, Walton and Forteviot (Gibson 1998, fig. 6.5), tend to have a single row of posts or palisade, whereas the smaller ones, such as those at Ballynahatty, Dunragit (*ibid*.; Hartwell 1998) and now Tara 31:33:71, are more often defined by twin rows. A case can be made, therefore, for considering a more explicit distinction between the latter and the larger, single-palisade sites. Indeed, the theme of twinning or pairing posts recurs throughout this group and the timber circles (Gibson (1994) even distinguishes a double-post class of timber circles) and appears to operate in a number of different ways. For instance, in the case of Ballynahatty, Co. Antrim
(Hartwell 1998), the double-ringed ‘sanctum’ (BNH6) of phase 2 was within a large oval enclosure, similarly defined by a double row of radially paired posts (BNH5). At Newgrange, Sweetman (1985) uncovered six concentric rows of post-holes and pits arranged into two distinct groups, comprising four outer circuits (nos 1–4) separated by a little over 2m from two remaining inner circuits (nos 5 and 6). Although total consistency appears to be lacking, Sweetman has suggested that circuits 1 and 3 originally held posts, while circuits 2 and 4 and 5 and 6 may not have been intended for such a purpose and were, instead, originally burial pits.

The morphology and size of the new enclosure at Tara, as indicated by the geophysics, strongly suggest that it is most closely related to those at Newgrange and Ballynahatty, a connection that would in turn imply a later Neolithic/early Bronze Age date (Hartwell seems disinclined to lend much credence to the early date, 3018–2788 cal. BC, returned for BNH5). That parallels such as these are more than just morphological is attested by the fact that both the Newgrange and Tara specimens enclose undifferentiated passage tombs (the association is repeated at Ballynahatty) and by associated Grooved Ware and Beaker assemblages at some of the excavated sites.

Extending well into the Iron Age, however, timber circles in Ireland appear to have a considerably more protracted existence than in Britain, and this raises the possibility that Tara 31:33:71 could date from the later prehistoric period. Timber circles of Iron Age date, such as the ‘Forty Metre Structure’ at Navan Fort and the ‘Mauve Phase’ structures at Knockaulin (O’Malley 1990), can be quite elaborate. The known examples describe very regular but quite modest circles, the largest one being at Navan Fort. A comparable motif has been identified in the gadiometry survey on the summit of Rathcroghan mound, Co. Roscommon (Fenwick et al. 1999). In this instance there is a 32m-diameter pit circle comprising large, radially paired pits/post-holes. Of further possible relevance is the fact that Rathcroghan mound itself is surrounded by a very large ditched enclosure over 370m in diameter. Lastly, a comparable structure has been postulated by Cooney and Grogan (1991, 36) in the case of Ráth na Senad. In his recent review of the dating evidence Gibson (1998) has also highlighted the existence in Ireland and Britain of a number of timber circles and palisaded enclosures of middle and later Bronze Age date. At Haughey's Fort, Co. Armagh, for example, a triple arc of posts consisting of two outer rows of stake-holes and an inner row of larger post-holes was uncovered (Mallory et al. 1996). Though parallel to one another in plan, and therefore arguably contemporary, radiocarbon dating places the stake-holes at between 2450 and 1550 BC, while the post-holes date from 1250–900 BC. Taken at face value, this feature is also comparable to Tara 31:33:71.

Comparisons such as these emphasise the post and/or pit aspect of Tara 31:33:71. The earthwork component, however, is clearly of great significance in its own right and, in so far as it gives this monument its lasting physical presence, continued to be important for some considerable time after the putative posts had been removed or rotted. Fortunately, traces of the fosse survive topographically (Pl. 1) and were captured in the recent detailed survey, although they were not recognised for what they were. At the surface it measures about 4–5m wide, which is slightly narrower than the excavated fosse of Ráth na Rig, though obviously its depth is still unknown. It is the existence of the fosse that suggests comparison with the broader family of henges or hengiform monuments. However, far from being mutually incompatible, as is obvious from some of the foregoing examples, a recurring association exists between henges and embanked enclosures and timber circles, one which in Ireland endures into the early centuries AD, as demonstrated at Kaffin Fort, Co. Meath (Newman 1993). Irish Iron Age timber circles, however, tend to be relatively small and to adhere closely to a true circle in plan, and this may be an important distinguishing characteristic. Moreover, in the case of earlier prehistoric circles (at least) timber and stone verticals appear to have been effectively interchangeable, though one medium was obviously more durable than the other, with the result that the range of relevant comparanda can be legitimately widened to include variations such as embanked stone circles, circle henges (sic: Condit and Simpson 1998) and select monuments less amenable to conventional classification such as Lugg, Co. Dublin (Kilbride-Jones 1950), and Phase 3(i) at Navan Fort, Co. Armagh (Lynn 1997, 14–16). Current analysis of this broad family of henges (e.g. Clare 1986) emphasises variability of form, allowing for numerous combinations of any or all of the three constituent architectural motifs (fosse, bank and posts, standing stones and pits) and thus would comfortably accommodate Tara 31:33:71.

Nevertheless, the majority of such sites have banks, however slight (e.g. Reanscreeen South, Co. Cork; Fáby 1962). There is, so far, no evidence that the ditched pit circle at Tara had a bank, either hard by the fosse (which would have a direct bearing on the relationship of the pits to the fosse) or at some remove
from it, and in this respect the monument finds an
interesting, if comparatively late, companion in Phase
3(i) at Navan Fort. Here Waterman uncovered a
penannular ditch (46m in diameter, 4.3–5.5m wide
and 1.1–1.2m deep) inside which was a more or less
concentric circle of large, regularly spaced pits
(ranging from 3.5m to 1.8m in width and around 4m
apart) which are believed to have once held upright
posts, some or all of which were deliberately removed
before they decayed. Analysis of associated Coarseware
and two radiocarbon dates from the primary silt of the
ditch suggest that this element may date from between
the ninth and fourth centuries BC, but the contemporaneity
of the pits, which is argued on the
basis of their being concentric with the ditch and on
the presence of Coarseware pottery in the pit fills, is
not certain. Radiocarbon dates from two of the pits are
at variance with each other by a number of other
centuries (from the mid-seventeenth century BC to
around the birth of Christ) but at maximum range
allow for overlap with the dates returned for the ditch
date the ninth and eighth centuries BC (Lynn
1997, 189ff). This latter appears to be the preferred
dating of the editorial team. The question of the
possibility of this monument has not been
satisfactorily resolved, but in the absence of evidence
to the contrary, and considering the later history of the
site, a religious purpose is distinctly possible. An
earlier though similar configuration is evidenced at
Stonehenge (Phase 1), comprising a penannular ditch
with internal bank and 56 so-called ‘Aubrey Holes’
(possibly slightly later than the earthwork) (Cleal et al.
1995).

In summary, therefore, the weight of evidence
suggests that Tara 31:33:71 is a form of henge
monument (aplying the word henge in its broadest
definition) and that it is prehistoric. In terms of its size
and shape it fits in best with earlier prehistoric
monuments, but the possibility of a date as late as the
early centuries BC cannot be ruled out, particularly in
an Irish context.

configuration and juxtaposition of the ditched pit enclosure
(31:33:71)
The monument, as revealed, is situated slightly to
the east of the spine of the hill, which runs
north–south. This may partly explain its elongation
along this axis. It encloses Ráith na Senad and Duma
na nGiall, intersects with Ráith na Ríg and passes
close by the south end of Tech Midchúarta—
relationships which, in their own right, raise
interesting possibilities. In considering these, it is
important to bear in mind that the outline of the
ditched pit circle is likely to have been readily visible
for some time (the fosse still survives today as a low-
relief, arcuate depression to the west of Ráith na
Senad) and must have been acknowledged by the
builders of some later monuments. It is strongly
suspected that the positioning of monuments
generally is not a random act, and it is highly
significant that in this case Ráith na Senad is centrally
located within the newly identified monument, even
though they may be separated in time.

The possibility that 31:33:71 is quite early in the
monument sequence at Tara may be reflected in the
fact that, according to the geophysical image, it does
not appear to have cut or truncated any monuments
(though the strength of its ‘signature’ might effectively
obliterate or mask lesser features). It is quite possible
that its incorporation of Duma na nGiall is deliberate,
and therefore that the ditched pit circle post-dates the
passage tomb. Supporting this suggestion is the fact
that the pit circle at Newgrange, which compares
quite well with the Tara specimen, also encloses an
undifferentiated passage tomb and so it is possible that
this type of couplet is a recurring motif.

Enclosure 31:33:71 is positioned very close to the
southern end of Tech Midchúarta, appearing to pass
fractionally to the south of the remains of a possible
low, ploughed-out, terminal bank identified
previously (Newman 1997, 104). This means that any
attempt to ascertain the relationship between the two
monuments by excavation at this point is unlikely to
resolve this issue (particularly given that the terminal
bank is ploughed over and would be difficult to
distinguish through excavation in any case). The
enclosure does not appear to be gapped or altered in
any way at this point. In other words, neither
monument appears to ‘acknowledge’ the presence of
the other and as a result it is not possible to suggest a
relative chronology. Moreover, the classification and
dating of Tech Midchúarta is quite problematical,
though it has been suggested that it might be a cursus
monument (Condit 1995; Newman 1997, 150–2). In
very broad terms cursus monuments are generally
(though by no means always) dated earlier than pit or
timber circles and henges, and if Tara follows this trend
it can be postulated that 31:33:71 might be later than
Tech Midchúarta.

A clear terminus post quem is indicated, however, by
the fact that the ditched pit circle is truncated by the
internal fosse of Ráith na Ríg, which has recently
been dated to within the last few centuries BC
(Roche 1999; this volume), and this could be quite
easily tested with excavation at the junction of the
two monuments. One possibility is that the
construction of the later monument implies that the ditched pit circle had become obsolete by the Iron Age and was simply ignored. However, in as much as Ráith na Ríg intersects with it, this conforms to an established pattern of the incorporation of earlier monuments into the fabric of later ones, often producing a figure-of-eight shape. Since this is an important recurring motif at Tara, and indeed at all of the so-called ‘royal’ sites, it was possibly an intentional consequence of the positioning of Ráith na Ríg. Moreover, looking at the respective ground-plans of the two monuments, it is tempting to conclude that what they have in common is an explicit desire to incorporate Duma na nGiall, which was obviously of considerable importance well into the medieval period. It has been noted that the rampart of Ráith na Ríg bulges outwards slightly in order to proclaim the deliberate incorporation of Duma na nGiall within its circuit (Newman 1997, 68). A similar case might be advanced on behalf of the ditched pit circle. In this respect, it is noteworthy that the builders of the enclosure deliberately chose an area whose eastern sector slopes significantly in preference to the relatively flat, level ground on the summit of the ridge little more than 50m to its west.

The potential significance of the fact that 31:33:71 encloses both Ráith na Senad and the church grounds cannot be overstated, not least because it raises intriguing questions about factors that might have determined the location of both and about the compound importance of Ráith na Senad, which is the last of at least four distinct phases of activity on this spot. The ‘central’ point of 31:33:71 corresponds with the central area of Ráith na Senad but it is unlikely to be contemporary with the latest phase of the latter (the multivallate earthwork) on account of the chronological conflict that arises between the date of the Romano-British material associated with the latest phase of Ráith na Senad and the somewhat earlier date for Ráith na Ríg, which, as we have seen, appears to cut 31:33:71. Furthermore, it has also been suggested, on topographical grounds, that Ráith na Senad is later than Ráith na Ríg (Newman 1997, 230).

Three pre-earthwork phases were identified during the excavations of Ráith na Senad in the 1950s. The third or penultimate phase in the developmental sequence saw the site being used as a flat cemetery. O’Brien (1990, 38) suggests that the mixed burials date from the first/second century AD, placing them somewhat later than Ráith na Ríg and therefore also later than the ditched pit circle. The second phase of Ráith na Senad is evidenced by the construction of palisaded circles comparable in some measure with those at Navan Fort and Knockaulin (Cooney and Grogan 1991), though how much earlier than the Phase 3 cemetery is unknown. The dating of the Knockaulin and Navan specimens suggests, inter alia, general contemporaneity between this phase of Ráith na Senad and the construction of Ráith na Ríg, though precise details have yet to be ascertained. Of interest in this context is Cooney and Grogan’s suggestion of the existence of a double-post timber circle within one of the enclosures. Dating aside, the configuration of this proposed circle and the ditched pit circle would be very reminiscent of the Ballynahatty structures, and a connection cannot be ruled out at this early stage.

The first phase of Ráith na Senad comprises a small ring-ditch, co-extensive with the central area of the earthwork. Though the majority of such earthworks date from the earlier and later Bronze Age, comparative analysis suggests that the form was in use from the Neolithic to the later Iron Age/early historic period transition, and this at least introduces the possibility of a connection with 31:33:71.

Enclosure 31:33:08

Previous geophysical survey in the interior of Ráith na Ríg revealed the existence of two (possibly three) narrow, arcuate lineations which, it was tentatively suggested, might all belong to a palisaded enclosure (31:33:08). These occurred to the east of Tech Cormaic and to the north-west of the Forrad respectively, so that the postulated enclosure was seen to encircle these two monuments, though it was not considered to have been connected with them (Newman 1997, 75–85). In the north-western quadrants a second such lineation, outside the first, was also recorded, suggesting the possibility that there had been two concentric rings. The anomalies, however, are very faint in this area, cautioning against too assertive an identification. In contrast, to the east of Tech Cormaic the anomalies are very strong, presenting a distinct signature.

It was speculated at the time that this putative enclosure might be one and the same as that reported (but not illustrated) by de Paor (1957) and Longworth (1960) to have been found in the old ground surface beneath Duma na nGiall. This can now be disregarded because, according to a plan of pre-tomb features used by Muiris O’Sullivan to illustrate a lecture on the excavations presented at the Dublin Castle conference on Tara in April 1998, the small enclosure referred to by de Paor extended to the west of the passage tomb. This now places a further question mark over the
existence of the proposed outer ring as this is the one that we speculated projected beneath the tomb. The current geophysical survey has, however, confirmed the westward continuation of the distinct anomaly first recorded to the west of Tech Cormaic, thus preserving the possibility that at least the inner enclosure exists. In fact, this now seems most probable, and therefore we recommend retaining the original number (31:33:08) to describe this feature.

In terms of their respective geophysical signatures, 31:33:08 compares well with the palisade trench that runs around the internal perimeter of Raith na Rig (F62, after Roche, this volume). Excavation reveals the latter to be as much as 90cm wide and 1.9m deep (Roche 1999, 27), and this is a useful indication of the possible dimensions of 31:33:08. The comparisons do not end there, however, for both features follow the same ground-plan (albeit on different scales) and, in particular, both have a distinctive angle, or elbow, in the north-eastern quadrant. It can be argued that the ‘elbow’ in F62 derives from an equivalent angle in the ground-plan of Raith na Rig, which it follows so faithfully. However, no such pre-emption can be argued in the case of 31:33:08, unless it is postulated that it too takes its cue from Raith na Rig or, as seems more likely under the circumstances, from F62.

This, of course, has implications for the dating, and therefore the role, of both trenches because it introduces the possibility that they are contemporary with one another. The case has previously been made for suggesting that F62 dates from substantially later than the construction of Raith na Rig and that its role was to convert a hengeiform enclosure into an ostensibly defensible one. In terms of these speculations, therefore, much now hinges on the relationship between the innermost trench (33:31:08) and the Forrad and Tech Cormaic. On present evidence, all that can be said is that, as projected, 31:33:08 appears to skirt very close to the eastern side of Tech Cormaic, though whether it is overlain slightly by the outer bank is unknown. This will be ascertained in due course through further geophysical prospection. If, however, 31:33:08 does indeed encircle Tech Cormaic, then it can be argued that it appears very late in the history of the complex and opens up a debate, touched on earlier, concerning the hierarchies of concentric enclosures such as those documented in the case of early medieval monasteries but now a recurring feature of prehistoric religious and secular monuments.

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