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Campbell, E. , Driscoll, S. , Gondek, M. and Maldonado, A. (2019) An Early Medieval and prehistoric nexus: the Strathearn Environs and Royal Forteviot project. In: Blackwell, A. E. (ed.) *Scotland in Early Medieval Europe.* Sidestone Press: Leiden, pp. 85-102. ISBN 9789088907524.

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Deposited on: 23 April 2019

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AN EARLY MEDIEVAL AND PREHISTORIC NEXUS: THE STRATHEARN ENVIRONS AND ROYAL FORTEVIOT PROJECT

INTRODUCTION

The lower valley of the River Earn (Perthshire) is one of the most significant areas in Scottish archaeology. It holds one of the country's densest concentrations of early prehistoric ceremonial monuments, as well as being at the centre of the development of the early Scottish kingdom. Forteviot is documented as the site of the ninth-century '*palacium'* of Cináed son of Alpín (Kenneth MacAlpin), one of the first kings of a united Scotland, who died there in AD 858. The site remained an important royal centre until the 12th century, though it diminished in importance in relation to the nearby royal inauguration site at Scone (Duncan 2003; Driscoll 2004). The 9th century was a pivotal period in Scottish history, as the Gaelic west and Pictish east coalesced into the newly-imagined kingdom of *Alba* (Scotland) (Broun 2005; Woolf 2007), so the siting of a royal palace there is of great significance to understanding the process of kingdom formation. The Forteviot area also has an outstanding collection of early medieval sculptured stone monuments, and there is an Early Christian copper-alloy hand-bell in the parish church, one of only six in Scotland. The stone monuments include the Dupplin Cross, a large free-standing highly-decorated cross which has an inscription dedicated to Constantin I, king of Picts, who died around AD 820 (Forsyth 1995) (Illus 1). The *Strathearn Environs and Royal Forteviot* (SERF) project at the University of Glasgow was set up in 2006 to investigate this remarkable concurrence of early medieval royal and prehistoric ceremonial centres, along with the landscape which moulded human activity there over a period of at least five millennia. Excavations and surveys around Forteviot were carried out by SERF over a five-year programme from 2007−11, after which the focus of the investigations moved to the adjacent small town of Dunning, which has a similar large complex of ceremonial prehistoric monuments. Interim reports on all the

excavations are available online (SERF Project), and the full excavation reports will be published in a series of monographs. This paper gives summary results of the early medieval excavations with a discussion of the main issues raised, focussing on three areas: the barrow cemeteries, the church, and the early medieval interventions in prehistoric monuments. The excavated sites lie mainly within two cropmark complexes; the Western Complex which consists mainly of early prehistoric burial and ceremonial monuments; and the Eastern Complex, which includes dug-grave cemeteries along with round and square barrows (Illus 2). These two foci lie immediately south of the modern village of Forteviot (NGR NO 052 175)

THE BARROW CEMETERIES

The Eastern Complex was first recognised by Leslie Alcock (1980; 1982) to have examples of what were then considered to be distinctively 'Pictish' types of burial monument. These included both square and round barrows, alongside areas of dug graves in rows, as well as a large square enclosure of uncertain date and an apparent boundary ditch to the north. The cemeteries were investigated in two places, Sites K and J, the boundary ditch in Site M, and the square enclosure also in Site K (Illus 3). A further pair of square barrows was excavated on the southern edge of the Western Complex at site B. All the cemeteries were badly affected by plough damage, but the evidence suggested that the monuments may have been upstanding until the agricultural improvements of the 18th century. The gravel subsoil resulted in very poor preservation of organic material, and skeletons in particular only survived as occasional fragments of dental enamel, making dating difficult.

The square barrows on Sites B and J both consisted of co-joined pairs, a common feature of this period, and three had interrupted corners. Although square barrows and cairns have long been considered to be a characteristic feature of Pictish burial practice, they are now recognised as occurring in most other areas of contemporary Britain and Ireland (Maldonado 2011; 2013). Most of these barrows are small low mounds, rather than the larger 'monumental barrows' often associated with rich burials which are widespread in northern Europe (Carver 2002). Both joined pairs of barrows had the western barrow as the original, with the eastern one added later, suggesting a possible family relationship between the inhumations, and a deliberate remembrance of this family significance (Williams 2007a, 159). Significant features included four-post structures around the two central barrow burials on Site J, and a stone lining to a log burial in another central burial on Site B. One of the row graves on Site K was also a log burial, in this case charred on the interior before burial. Log burials have become increasingly recognised in early medieval Scotland, with large numbers at Whithorn (Dumfries and Galloway) (Hill 1997) and Thornybank (Midlothian) (Rees 2002), and they are also a feature in some Anglo-Saxon, Welsh and Irish cemeteries. It has been suggested they are associated with high-status graves and contemporary literary references suggest that burial in 'a withered oak' may have a symbolic aspect (Maldonado 2011: 103−5; Williams 2007b, 234). The practice is first recorded in the Bronze Age and is widespread, as early medieval log coffins, sometimes decorated, survive intact at sites such as Landevennec (Finistère, France) and Oberflacht (Baden-Württemberg, Germany; Williams 2007b, 234, fig 2). The Forteviot round barrow on Site J had a central grave with charred branches deposited in the fill, again a practice attested elsewhere in Anglo-Saxon England and in northern France (Halsall 1995, 6-9; Williams 2006, 129). The four-post structures on Site J could be interpreted as mortuary structures or an enclosure like the one at Thornybank (Rees 1992). Again there are parallels in other areas of Britain: at several sites in Kent (Hogarth 1973;

O'Brien 1999: 139−41), Apple Down (Sussex; Down and Welch 1990) and Castledyke South, Barton-on-Humber (North Lincolnshire; Drinkall and Foreman 1998). There is also an example on the Continent at München-Aubing (Dannheimer 1967). The misalignment of the four-post structure with the central burial may indicate that it post-dates the actual interment of the body. The charred log burial is very unusual but is paralleled by a charred coffin at Snape (Suffolk; Filmer-Sankey and Pestell 2001). Apart from the charred branches mentioned above, the only finds within the graves were small groups of quartz pebbles at the head and foot of the western barrow burial on Site B, a feature seen in several other early medieval burials in Scotland such as at Whithorn and the Isle of May (Maldonado 2011, 230). However, a Bronze Age flint barbed and tanged arrowhead from the fill of Unenclosed Grave 8 on Site J seemed to be a deliberate deposition. Both the central barrow graves on this site also had flint artefacts in the fill, and given the lack of flint lithics in the topsoil of this site, these may also have been deliberate depositions. In total these burial practices give an interesting insight into both burial rites and ongoing commemorative practices around the graves. Rather than being distinctively Pictish, these seem part of a nexus of practices which developed in late prehistoric society in Britain and beyond, but with regional differences in adoption.

Whether these burials are Christian is debateable, particularly given the lack of clarity in the process of adoption of Christianity in Scotland (Maldonado 2013, 6−7). The burials are generally supine inhumations aligned west–east with head to west, they respect other burials, and do not contain grave goods, but none of these features are now considered sufficient to characterise specifically Christian burials in the Early Medieval period (O'Brien 2009). Although none of the burials could be dated directly as insufficient bone material survived, a range of dates were obtained from the grave fills which cover the period from the 5th to 9th

centuries. No coherent pattern could be resolved, but the burial in the round barrow and the charred log burial were the earliest, dating to the 4th to 6th century (SUERC-29209, 1580 ± 30; SUERC-29214, 1635 ± 30); while Unenclosed Grave2 on Site K gave a date in the 8th to 9th centuries (SUERC-22856, 1210 ± 30). The earlier dates fall within the normal range for barrow cemeteries and unenclosed field graves in Scotland (Maldonado 2011), but the later run into the period when the Church was taking an active interest in promoting burial within consecrated ground and discouraging the use of ancestral burial sites (O'Brien 1995; 2009). It may be that the importance of the Forteviot prehistoric monument complex exerted a strong pull to retain burial close to it. As we shall see below, burial was also taking place at Forteviot within the area of the Medieval (and putative Early Medieval) churchyard, suggesting a range of practices were tolerated.

The layout of the cemeteries is very unusual, being spread over a large area with a number of different foci (Illus 4), something not seen on other Pictish sites (cf Alexander 2005, illus 32). The aerial photographic evidence shows that there were at least 10 square barrows, 3−4 round barrows and at least 40 dug graves within the wider Forteviot cropmark complexes, spread over a distance of some 800m. There are two other noticeable features of this layout: firstly, a concentration around but not within the large square enclosure on Site K; and secondly, that no burials were within the area of the prehistoric monuments in the Western Complex, despite the evidence presented below for extensive early medieval interventions in these monuments. The northern boundary ditch of the complex in Site M gave radiocarbon dates in the 7/9th century, and its situation suggests that there was a rectilinear enclosure around the area of the modern village of Forteviot, separating a neck of land between the floodplains of the River Earn and the Water of May from the adjoining terraces. This enclosure may have been monastic, or the inner bounds of the documented royal palace. It has been postulated

that the outer bounds of the royal estate were marked by the positions of the Dupplin and Invermay Crosses on opposite sides of the River Earn (Aitchison 2006, fig 17). These prominently marked the entry points to the royal estate and can be regarded as comparable to threshold markers in Continental royal palaces such as Aachen and Ingelheim which had high symbolic importance (Airlie 2014).

The square enclosure measured an exact 30.5m square externally, and excavation confirmed that the 2m wide ditches were remarkably regular in their line and form, showing they had been precisely laid out. In excavation, the ditches were V-shaped with flat bottoms, again very regular in profile. No internal features contemporary with the ditch were identified in excavation or on aerial photographs, and the ditch fills were remarkably clean and free of any occupation evidence. Unfortunately this meant no direct dating evidence was recovered, but did illustrate that this was not a normal settlement enclosure. Roughly square enclosures of approximately this size are a feature of Iron Age settlement of eastern Lowland Scotland (eg Haselgrove 2009), but none of these share the precision of layout and construction of the Forteviot example. The clustering of the early medieval burials around the enclosure, but not within it, suggests it was contemporary with or earlier than these burials, and that it had some significance for early medieval society. Some early medieval barrows have outer enclosures similar in size to Forteviot. The only excavated example is at Beverly Field, Rhynie (Aberdeenshire), which has two similar large square enclosures with square barrows outside of them, but initial results are inconclusive as to the date of construction (G Noble pers comm). The closest formal parallel is at Cuiltburn (Perthshire), 16 kilometres to the east of Forteviot (Wooliscroft and Hoffman 2001), situated at the side of the Roman road along the Gask Ridge. This site was dated to the 1st century AD, but its function was enigmatic. Both the Cuiltburn and Forteviot sites have features which are reminiscent of the *temenos* sanctuary enclosures of Roman-Celtic temples, though these often have double enclosures

(Lewis 1965). Further afield, single-ditched enclosures of this size and shape are found in Germany (*Viereckschanzen*), The Netherlands and northern France (*enclose cultuels*) associated with important later Iron Age sites (Collis 1984; Gerritsen 2001, 162−173). These appear to be sanctuary sites for ritual assemblies, possibly associated with the creation or commemoration of ancestors. Several excavated examples in The Netherlands date to the 1st century AD (Gerritsen 2001, 162). The dimensions and shapes of these enclosures closely resemble the Forteviot enclosure, and two of them are surrounded by later square burial monuments much as at Forteviot, though there the burials also date to the 1st century AD. One of the most interesting of these is at Nijmegen-Kops Plateau, where the cult site is linked to an early prehistoric complex, and has been suggested to be a staging place in burial rituals, a liminal place where ancestors were created (Gerittson 2001, 168−9; Fontijn 2003). It may be that the Forteviot enclosure is a similar cult site, constructed by the Roman soldiers familiar with such sites from their Batavian homeland (the nearby Gask Ridge Roman forces were Batavian), and deliberately situated at Forteviot as this was still a major cultic or assembly site of the region associated with the major prehistoric monument complex. A scatter of Roman period finds have come from the topsoil in and around Forteviot.

THE EARLY MEDIEVAL CHURCH

The Forteviot arch, dating to the 9th century, is one of the most significant pieces of sculpture from early medieval Scotland (Illus 5). Its form shows that it is from part of a large stone-built structure, but there has been debate as to whether this was a church, a chapel-royal, or a secular palace, and other possibilities include a baptistery or a burial monument. Pre-Romanesque stone-built churches are extremely rare in Scotland (see Foster, this volume), and secular stone buildings unknown, so the presence of the arch re-enforces Forteviot's

position as an important royal centre in the 9th century, whatever the exact nature of the building it came from. Excavations in 2011 around the present parish church revealed that this 18th-century building was constructed on the remains of a medieval predecessor, probably in the 13th century. The northern part of the east wall was underlain by burials dated to the 11th/12th century, showing that an earlier church must have stood on the site. An early boulder foundation on a slightly different alignment may represent this earlier, narrower church building, but the evidence is not strong and it may be part of the 13th-century foundations.

Excavations on Site Q, immediately to the south of the medieval churchyard, revealed a series of dug graves in rows, similar to those found in the barrow cemeteries, and with similarly poor bone preservation, which contrasted with the good preservation of the 11th/12th-century burials described above. Associated with these burials were the remains of a wooden structure or structures which included a row of post-holes and a beam-slot for a sill-beam (Illus 6). This seems likely to have been either an early wooden church or shrine, given that the graves respected its position. Similar simple wooden structures are known from a number of Scottish and Irish early Christian sites (Thomas 1971; Ó Carragáin 2010, 15−26). Unfortunately no dating evidence was recovered, and no other area was available for excavation due to an extension of the modern cemetery, but the form and preservation of the graves differs from the medieval burials under the church, and is similar to the graves in the field cemeteries of Site J and K. It seems that there was an early burial focus in the area of the medieval church, and that this may have functioned alongside the field cemeteries to the south.

The Forteviot arch is unweathered, despite being found in an abandoned channel of the Water of May, near the parish church, around 1800 (Jamieson 1830, 207). It is clear that it had always been inside a building, forming part of a doorway, chancel arch or altar screen.

Antiquarian accounts of palace ruins being washed away by floods from the Water of May (Aitchison 2006, 37–48) clearly refer to much later buildings, but have caused some commentators to assume the early royal church/chapel was destroyed and the arch washed into the river. The unworn condition and placement of the arch suggest a different scenario. The arch was part of a royal complex of buildings on the site, bounded by the boundary ditch seen on aerial photographs and excavated on Site M. The arch was incorporated into the medieval church in the 13th century, when the original stone building was demolished, possibly as part of a shrine associated with the 10th-century handbell relic, or the royal tomb of Cináed. During the Reformation, the arch was preserved from destruction by burial in an abandoned meander of the river, much as the Ruthwell Cross (Dumfries and Galloway) was saved from destruction by the actions of a local minister (Farrell & Karkov 1992). This may have happened during one of the periods of rebuilding of the east wall of the church in the 17th century recorded in documentary sources (Meldrum 1926, 279), and evidenced in the 2011 excavations where a doorway into an added eastern chamber was blocked up.

INTERVENTIONS IN EARLY PREHISTORIC MONUMENTS

The prehistoric monuments in the Western Complex include at least three large henge monuments, one mini-henge, a timber circle, a cremation cemetery, a double-ditched enclosure with central triple cist, several standing stones, and numerous pits, all situated within or around a massive palisaded enclosure. This large enclosure is one of only five in Scotland, but similar monuments occur in Ireland and Scandinavia (Noble & Brophy 2011a; 2014). Numerous radiocarbon dates show a striking pattern of use of the two complexes (Illus 7). The prehistoric use begins in the middle Neolithic and continues into the later Bronze Age, and consists of burial and other ceremonial activities. The absence of dates

throughout most of the 1st millennium BC initially suggests that the monuments were completely abandoned before becoming the focus for early medieval burial practices around and outside the decayed monuments.

One of the most surprising results of the excavations in the prehistoric monument complex was the discovery of numerous early medieval interventions in the prehistoric monuments. Each of the three henge monuments had a massive central pit dug into it – these pits had no obvious function, but their location suggests early attempts to discover tombs such as the impressive Early Bronze Age dagger burial uncovered in Henge 1 in 2009 (Noble & Brophy 2011b). Even more surprising was the fact that another pit contained cremated human bone dated to the 7/9th centuries, an exceptionally late date for cremation practices. It may be that the disposal of the bone within the prehistoric complex reflected a deviance from normal burial practices. In this context it is interesting that some of the other examples of late cremation in Scotland have also involved utilisation of prehistoric monuments or artefacts such as Bronze Age urns (Maldonado 2013, 12). Further evidence of unusual activities was found in the central cist of the double-ditched enclosure on site F. Although initially the site of a Bronze Age burial, the cist had been uncovered and filled with burnt material in the 5th/6th century. It is possible that the barbed-and-tanged arrowhead found in the early medieval grave on Site J was obtained from this cist, and may have gained cultic significance from its association with the ancient site. In another case, the upper part of one of the massive post-holes of the palisaded enclosure had been reused in the Early Medieval period for the disposal of burnt material, showing both that the post-holes were still visible as hollows in the landscape, and that they were seen as special places for the disposal of certain types of material. In all, at least twelve of these interventions were discovered, all only recognised due to an intensive radiocarbon dating programme, as no early medieval artefacts were found

within the features (Table 1). A recurring feature of these pits is the presence of burnt material, often including cereals. While some of these are the result of cremation activities others are more puzzling, and cannot be explained as domestic refuse, as there is no settlement evidence anywhere within the complexes at any period. However, it is noticeable that many of the other dates from the Forteviot excavations are also from burnt deposits (Illus 7), suggesting some type of continuity of assembly practices over long periods of time which involved burning rituals, even if the burial practices were discontinuous.

DISCUSSION

The Forteviot excavations have shown that the prehistoric monument complex was an important focus for ceremonial and burial activity, not just in the early prehistoric period, but also in the early medieval period (cf Driscoll 1998). The co-location of prehistoric and Late Iron Age/Early Medieval cultic sites is known from other areas of Europe, for example in Ireland at sites such as Tara (Co Meath) and Navan (Co Armagh). However, unlike at these sites, at Forteviot the early medieval burials all lie outside of the prehistoric monuments, and indeed have one focus around a possible Roman-period enclosure. Also in contrast to the sites of Continental royal palaces, elite dominance is mainly not articulated through very large building complexes such as Charlemagne's palace at Aachen (North Rhine-Westphalia), but through monumental sculpture set in the landscape. The other unusual aspect of the Forteviot evidence is the active digging into, and re-use of, the earlier monuments in the early medieval period for a variety of purposes, some of which may have had pagan overtones linked to fire festivals.

The archaeological evidence from Forteviot invites comparison with other early medieval royal sites in Britain in Ireland, where there are instructive similarities and striking contrasts. The greatest resonances are seen in the Gaelic world, where prehistoric ritual monuments are

frequently associated with locations linked to kingship ceremonies in the middle ages. Such connections between the early medieval era and the more ancient past are rarer in England and southern Britain, but this is not the only contrast. In Ireland it is rare for royal sites to have a church, while the early ecclesiastic presence at Forteviot is one of its most distinctive features, one that it shares with sites in Francia (Airlie 1994).

In recent years there has been a lively interest in the archaeology of royal ceremonial sites and places of popular assembly in Ireland, where the rich historical evidence allows sites to be identified with confidence and for their religious and cosmological significance to be appreciated (Wailes 1982; Warner 2004; FitzPatrick 2004; Schot et al 2011). The most famous of these sites is undoubtedly the Hill of Tara, with its particularly rich mythological and historical evidence and a great density of monuments (Newman 1997; Bhreathnach 2005), but it is far from unique. Studies of the Provincial royal centres Emain Macha (Co Armagh; Lynn 2003), Dun Alinnie (Co Kildare; Johnson & Wailes 2007), Rathcroghan (Co Roscommon; Waddell et al 2009) and Cashel (Co Tipperary; Gleeson 2012), all reveal links with an ancient past and as well as the construction of Early Medieval structures for kingship and assembly. At a local level it is possible to identify places of assembly and ceremony which were used by lesser rulers to govern their realms well into the Middle Ages drawing upon on similar cosmological traditions. Taken as a whole this material is diverse, but nevertheless it is possible to identify a number of traits which are shared by many of the sites (Waddell 2011). These features include topographical situations which provide expansive views, prehistoric burial mounds, large artificial enclosures, mounds for assembly and processional ways leading to structures with a figure-of-eight plan. For purposes of comparison with Forteviot, the key features are the large enclosure and the burial mounds. At Tara and Emain Macha, where the enclosure ditch is on the interior of the boundary bank, it has been argued that not only are they intended to mark out a sacred space, but they are

designed to contain things with in the enclosure (Newman 2011). At Forteviot the sacred boundary was originally defined by hundreds of massive oak posts, which long after their decay continued to define a sacred space. A long sequence of burials dating from the middle Neolithic through to the late Bronze Age, and the construction of several henge monuments, show continuing reinvention and remodelling of this ceremonial space (Brophy & Noble 2012; Nobel & Brophy 2014). Most remarkably, given the long span of time between the Neolithic and the Iron Age, is the positioning of burials of Iron Age or early medieval form just outside the Neolithic post-defined enclosure. We believe that an enclosing bank must have remained visible until it was removed by modern agriculture. The prehistoric burial mounds and earthworks were also of great interest to the Picts, judging from the efforts expended excavating, reusing and recycling material from them.

Reasonable people have been sceptical of the possibility of transmission of sacred knowledge over millennia, but archaeological evidence, particularly radiocarbon dates, have revived interest in the possible continuity of at least interest in, and awareness of, the sacred nature of some special places from the early prehistoric through to the early medieval periods (Waddell 2014). The key point in this context is the notion that burial mounds served as portals to the otherworld and as such were potential sources of sacred knowledge and power. The excavation of deep pits within prehistoric monuments during Pictish times is perhaps best interpreted as an effort to engage with the Otherworld, in mythological terms, the ultimate source of legitimacy.

The other relevant feature at Forteviot which is characteristic of the Irish ritual landscape is the use of fire rituals to mark season festivals (Samhain, Imbolc, Beltane and Lughnasadh). Although in modern times popular attention focuses on Beltane (1 May), the widespread occurrence of burnt grain in these deposits make it more likely that the burning at Forteviot was associated with Samhain (1 November), which was not only a harvest festival, but also

associated with popular assembly. The large number of burning episodes at Forteviot is one the site's most striking features, but was only revealed as a result of digging extensively and a comprehensive programme of radiocarbon dating funded by Historic Scotland.

The Irish material also throws up a number of contrasts with Forteviot. Permanent residences are not an essential or frequent feature of the majority of Irish 'Royal' sites. The most conspicuous exceptions, Knowth, Brú na Bóinne (Co Meath; Byrne et al 2008) and Clogher (Co Tyrone; Warner 1988), are unusual in many respects and neither was a provincial royal place. Churches are also a rarity at Irish royal sites, again Clogher with its nearby monastery is an exception, but so too is Cashel, a royal site crowned by a later great church. However, it is much more characteristic for important churches to be located at some distance from the royal sites, which were presumably centres of pagan religious practice at the time of conversion.

When looking south for comparative material on royal centres, the main analogy is with the residence, assembly place and cult centre at Yeavering (Northumbria), which some now consider to be a hybrid British/Anglo-Saxon site (Hope-Taylor 1977; Frodsham and O'Brien 2005; O'Brien 2012; Noble et al 2013, 1146). However, more examples of close relationships of Anglo-Saxon royal sites with prehistoric monuments are being recognised, for example at Sutton Courtney (Oxfordshire) and Grateley (Hampshire), though in England more often the relationship with prehistoric sites is to assembly places, burial and particularly execution sites (Semple 2013, 194−222

Forteviot appears to acquire permeant royal residence, probably linked to or within a monastery, but certainly with a church. It seems to reflect some elements of a Continental concept of a palace, as a permanent establishment, suitable for the holding a royal court, blessed and in some way protected by the presence of the church (Airlie 1994). However, it

has its own unique Scottish twist, as it is located at, and respects, a site of great antiquity, marked by many prehistoric burial monuments, and is demarcated in the landscape by massive stone crosses. Thus it reflects a particular local fusion of elements combined from Continental and Celtic approaches to the expression of royal power, deliberately forged as part of the process of creating a new political entity, the nascent kingdom of the Scots.

Acknowledgements

The project was partly sponsored by the British Academy (LRG: 45610); Historic Scotland (Archaeology Funding Programme) and the University of Glasgow. The research of SERF has benefited from partnerships with the University of Aberdeen, the University of Chester, the Royal Commission on the Ancient and Historical Monuments of Scotland, Perth and Kinross Heritage Trust, and Dunning Historical Society.

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List of illustration captions

Illus 1 Dupplin Cross and other early medieval sculpture from Forteviot, drawn by Ian Scott

Illus 2 Forteviot Cropmark Complexes, with excavated areas referred to in the text

Illus 3 Aerial view of site K under excavation, showing a round barrow and part of the square enclosure

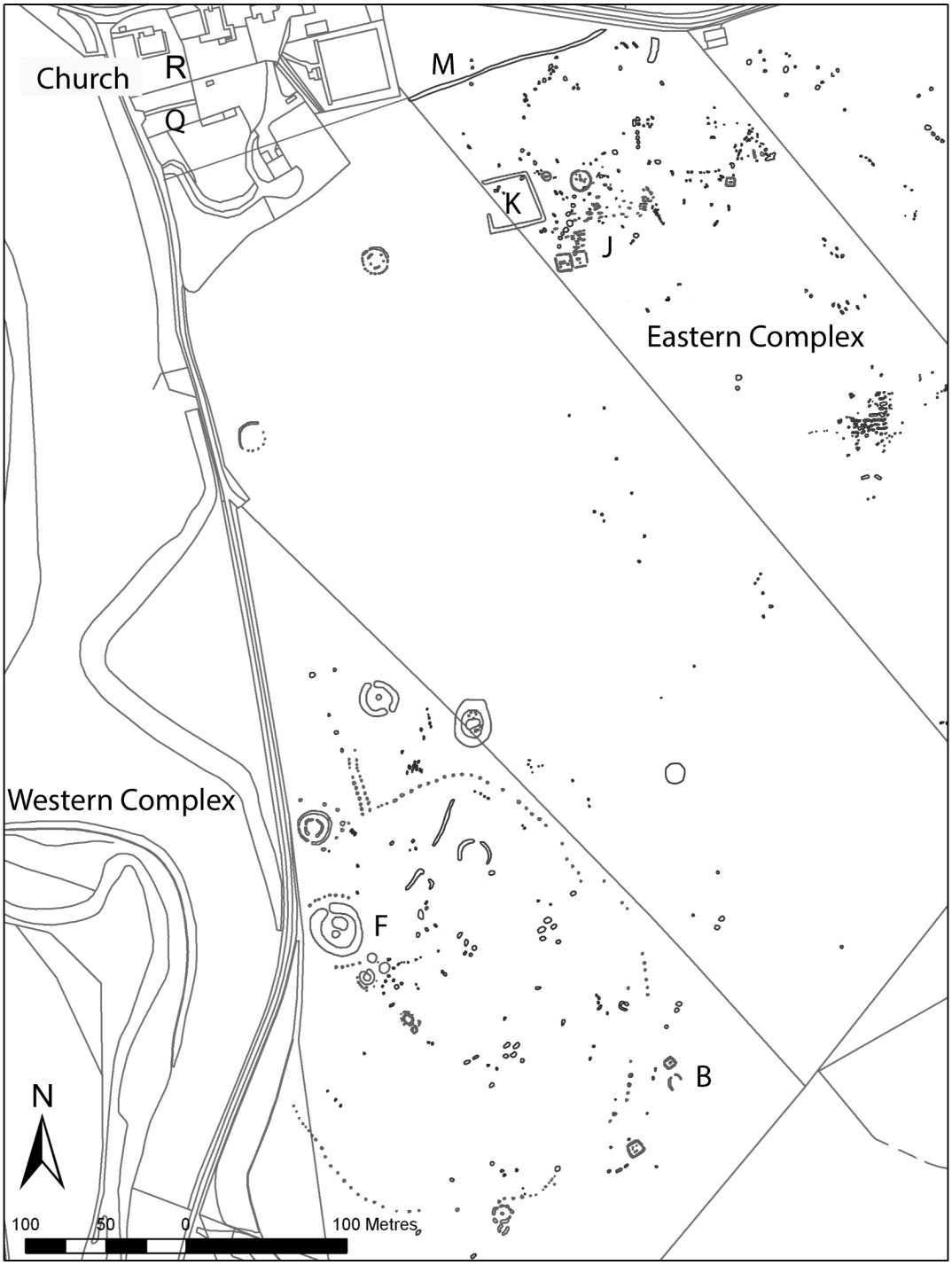
Illus 4 Early Medieval cemeteries and interventions in prehistoric monuments

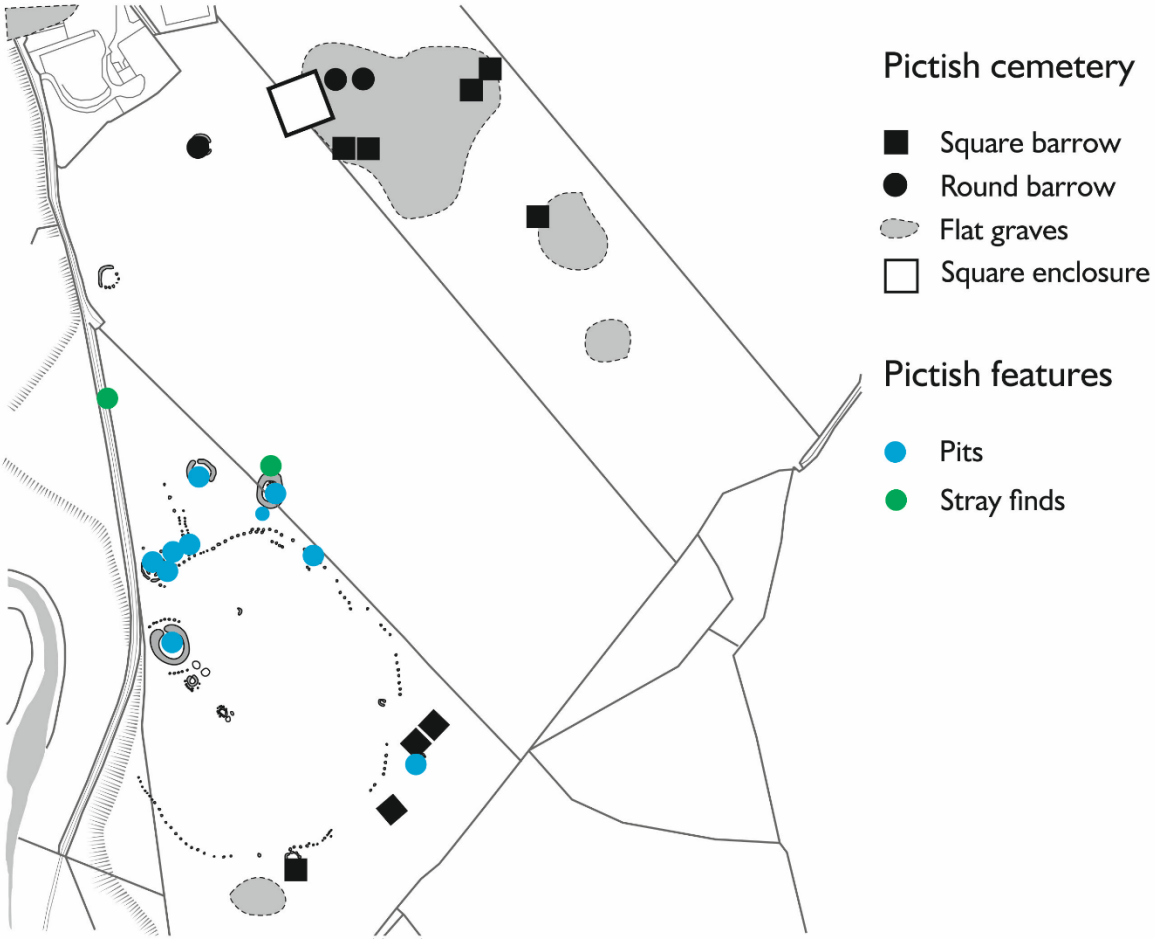
Illus 5 The Forteviot arch, drawn by Ian Scott

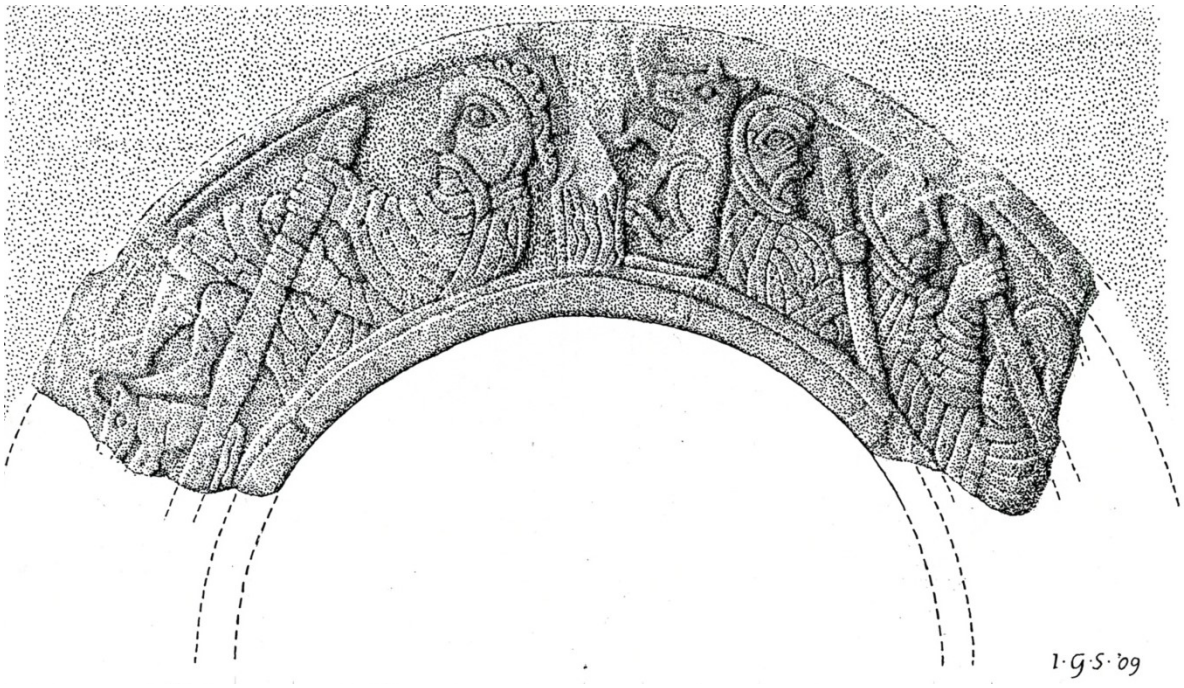
Illus 6 Early Medieval structures and graves on Site Q, Forteviot parish church

Illus 7 All radiocarbon dates from Forteviot excavations, burning episodes in red

Table 1 Details of early medieval interventions in prehistoric monuments

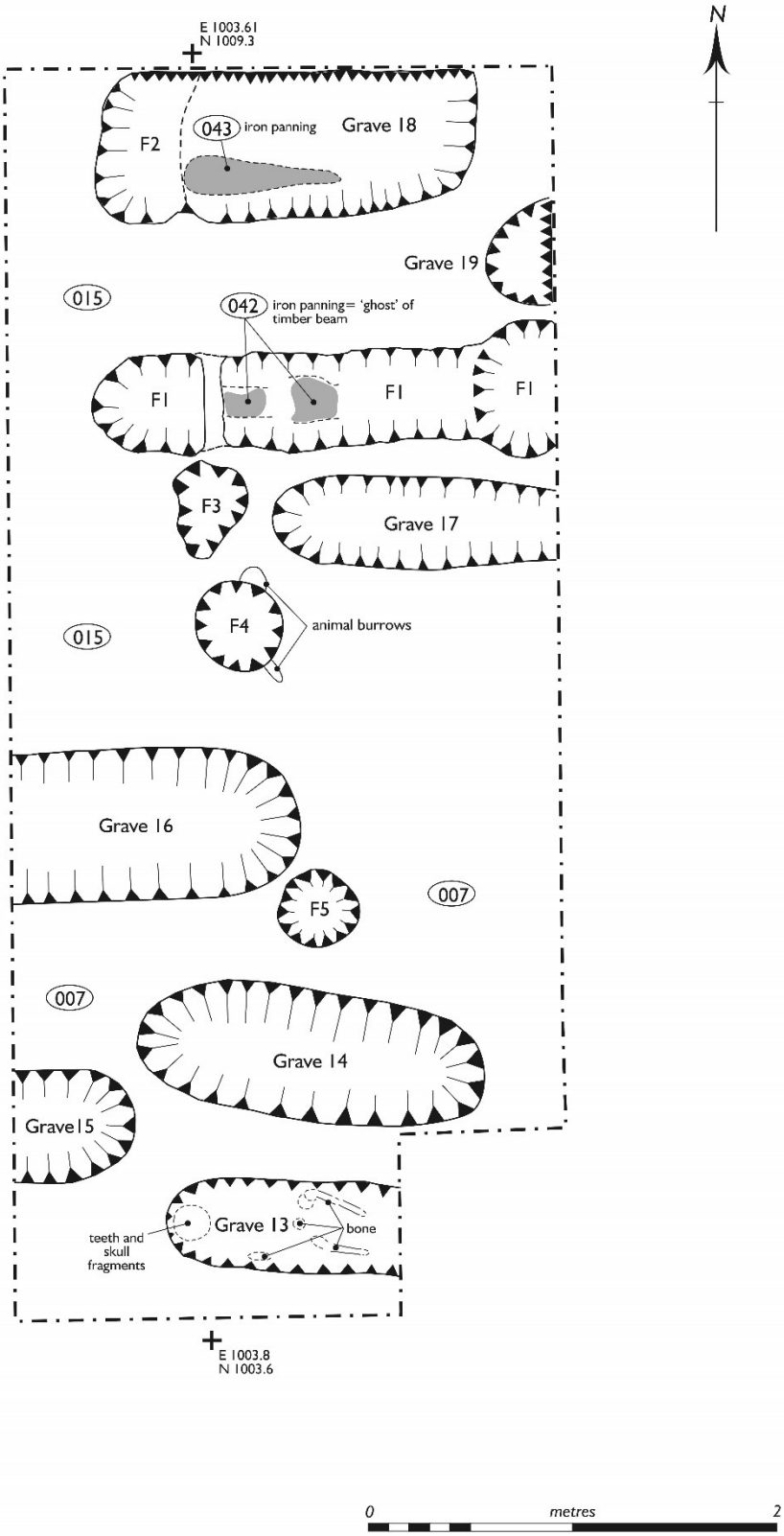

Church
R
Q
M
K
J
Eastern Complex
Western Complex
F
B
N
100
50
0
100 Metres

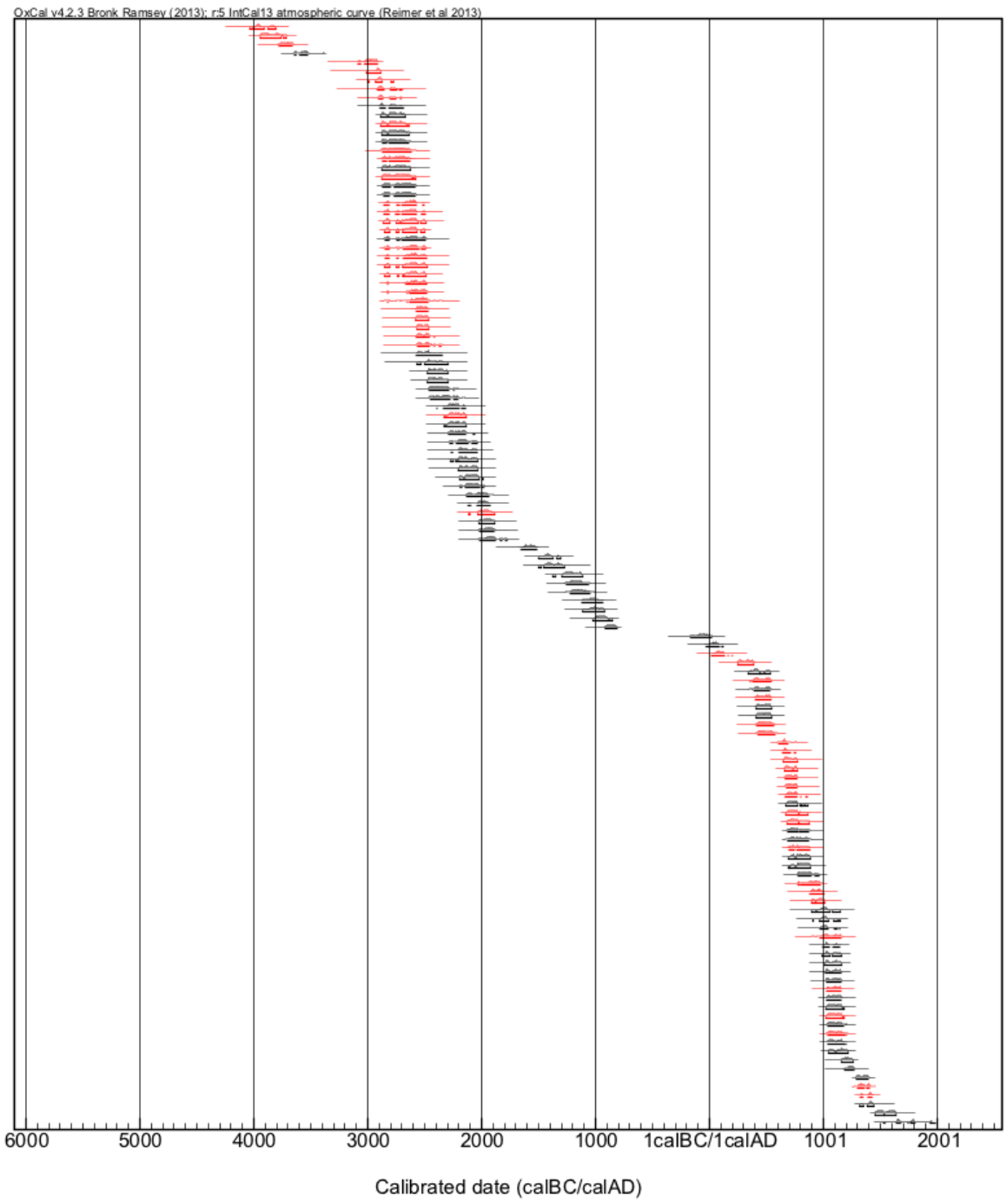

Pictish cemetery
Square barrow
Round barrow
Flat graves
Square enclosure
Pictish features
Pits
Stray finds


I·G·S·'09

Forteviot Churchyard 2011 (CH11.01)

Plan of Trench




OxCal v4.2.3 Bronk Ramsey (2013); r:5 IntCal13 atmospheric curve (Reimer et al 2013)
6000
5000
4000
3000
2000
1000
1calBC/1calAD
1001
2001
Calibrated date (calBC/calAD)

Site	feature	size (m)	Depth (m)	dates Cal AD (2 σ)	charcoal	grain
B	small pit	1.5 x 0.7	0.1	610-690; 660-790	ash, hazel	barley, oats
C	small pit	0.4 x 0.2	0.3	410-540; 390-540	hazel	
Henge 1	massive pit	10.5 x 10.7	1.5	650-780; 680-790	heather, willow, ash; oak, hazel	
F	large pit	3.1 x 1.9	0.6	420-580; 420-570	alder, hazel	barley, oats
F	cist	1.0 x 0.4	0.7	400-550; 380-540	oak, hazel	oats, barley
F	large pit	2.5 x 1.9	0.6	640-720; 670-830	alder, hazel	
F	large pit	3.5 x 2.4	0.6	890-1020; 810-980	oak, heather, birch, hazel	barley
G	pit	1.7 x 0.8	0.4	640-780	alder, hazel	barley, ?wheat
G	pit and paving	0.8 x >0.3	0.3	40BC-AD120; 10-170	hazel, wllow, alder	
Henge 2	massive pit	12.0 x 5.0	2.2		oak	
K	small pit	0.4 x 0.4	0.2	1310-1440; 1290-1420	ash, oak	wheat
Henge 3	massive pit	10.0 x 5.0		unexcavated		

Table 5.1