
A rectilinear timber structure and post-ring at Carsie Mains, Meikleour, Perthshire

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with a contribution by J Miller and S Ramsay

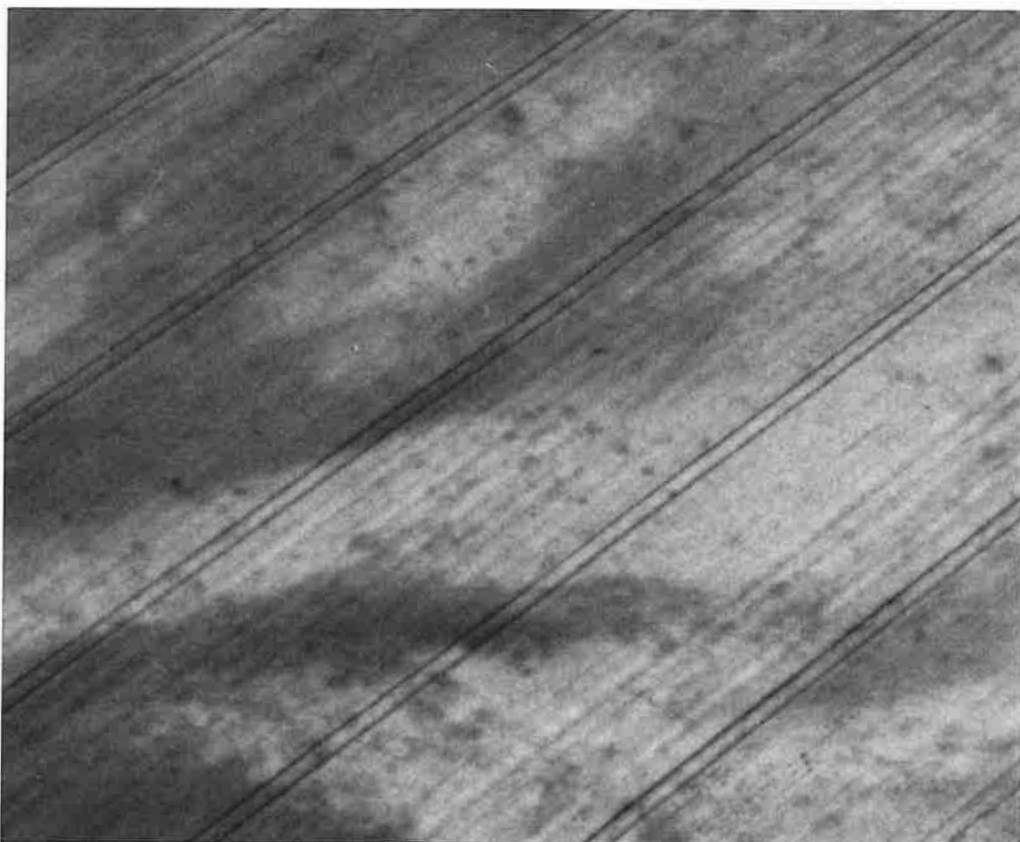
Introduction

The excavation at Carsie Mains was undertaken in September 2002 as part of the First Farmers Project, based at the University of Stirling and funded by the Arts and Humanities Research Board. The work was undertaken by a team from that university, from the University of Glasgow and the Perthshire Society of Natural Science, Archaeology Section.

The Carsie site lies at NGR NO 177 417 in a relatively flat arable field at an elevation of c 55m OD (Illus 1). It is situated in an extensive area of fluvioglacial deposition which originated as outwash from the valleys of the Tay, Lunan and Erich. The high concentration of cropmarks in the area between Meikleour and the outskirts of Blairgowrie is due to this distinctive fluvioglacial landscape underlain by sands and gravels. The local soils belong to the Corby Series, an iron podzol developed on coarse fluvioglacial deposits containing rocks dominantly of Highland origin. On aerial photographs, palaeochannel patterns are very clear on

the fluvioglacial outwash. These channels are typically incised c 0.5m and are distinctive in having poorer drainage conditions than the main area of outwash. One of these channels was visible running between the circle and the structure. On excavation it was found that the subsoil in the channels was finer and more silty than the sands and gravel of the general outwash area. The higher moisture and organic matter levels cause such palaeochannels to be very evident on aerial photographs. Evidence of drainage limitation is expressed in mottling in a subsurface horizon as demonstrated in the soil profile description from the site (Table 1).

The site, as recognized from the air, comprised two main elements (Illus 2). The first was a ring of 15 pits (found on excavation to be post-holes) about 13m in diameter, described in the National Monuments Record as a 'pit-circle'. The second was interpreted as a structure made up of two lines of pits (once again proven to be post-holes), with hints of one end formed by a pair



Illus 2 Aerial photograph of the site. (© RCAHMS)



Illus 1 (above) Location map, showing the Carsie Mains site, the location of the comparable rectilinear structures at Littleour and Carsie Bridge, the lithic scatter at Nethermuir, and the Cleaven Dyke; (below) trench plan.

Table 1 Soil profile.

horizon	depth	description
Ap	0–33cm	dark to very dark brown (7.5YR 3/2) cultivated horizon, sandy loam, few small to medium rounded to sub-rounded stones
B(h)(g)	33–48cm	Brown to dark brown (7.5YR 4/4) with strong brown (7.5YR 5/6) and brown to dark brown (7.5 YR 4/2) concentrations, loamy sand, abundant small to medium rounded to sub rounded stones, especially in lower part of horizon, organic staining round stones, common mottles in upper part of horizon
Bs	48–54cm	Brown (7.5 Y/R 5/6) medium sand with lenses of very small rounded to sub rounded stones
B	54–62cm	Brown (7.5 Y/R 5/4) medium sand, stone free
B/C	62–70+cm	Brown to strong brown (7.5 Y/R 4/4) sand and very small to small rounded to sub rounded stones

of posts; it was described as a ‘mortuary enclosure (possible)’, probably on the basis of its resemblance to other structures of similar shape and of Neolithic date, as best exemplified by the excavated example at Littleour, some 1.5km to the SSW of Carsie (Barclay and Maxwell 1998). None of these sites, however, has produced firm evidence of a mortuary function.

Two linked areas, one (the western) over the circle and the other (the eastern) over the rectilinear structure, were machine-stripped of topsoil and then hoed and repeatedly trowelled.

Excavation

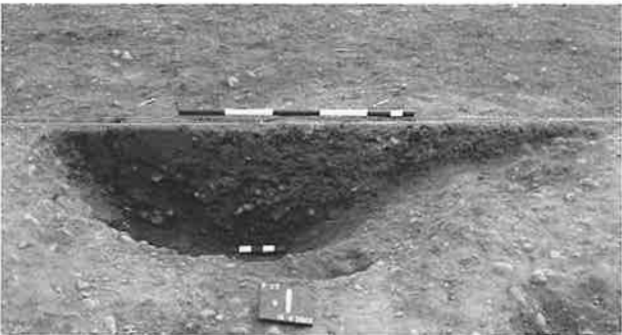
Tree-throw pits

On cleaning the surface of the trenches (in particular the eastern), features defined by crescents of silt became apparent. Few had been visible on the aerial photographs. The excavation of these silty patches revealed undifferentiated fills. Once the site had lain open for a week, areas of difference within the apparently natural subsoil began to appear and continued to become visible until the end of the excavation; where we had recorded two or three discrete patches of silty sand, differential drying would suddenly reveal that they were fills of a much larger pit, largely filled with gravel scarcely differentiable from the undisturbed subsoil. The eastern trench contained at least 11 of these; the western trench contained at least three. We suspect that some of the other ill-defined features in both trenches were further examples.

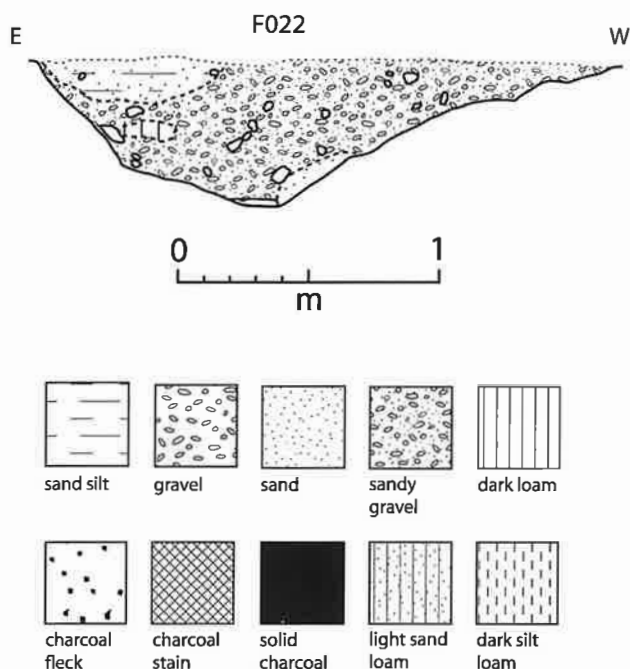
We interpreted these as tree-throw pits, and this on-site interpretation was confirmed by Professor Donald Davidson of the University of Stirling, who drew our attention to a valuable survey of the nature and appearance of tree-throw pits on archaeological sites (Langohr 1993). While these features have been found frequently in southern Britain (references in Evans et al 1999) they have not often been observed in Scotland. Langohr writes, ‘In a horizontal section we nearly always observe an asymmetrical ellipsoid or nearly half-circular shape’. These pits gradually disappear through human,

animal or other natural action; their filling, age, the weakness of the original soil horization and the strength of subsequent soil processes affect their visibility. The pits observed at Carsie have the characteristics illustrated by Langohr, the fills reflecting the re-deposition of the soil profile into the pit from the upended root-mat, the silt sand being the remnant of the contemporary topsoil; the apparent similarity (differentiated only slightly by colour) between the silt sand element of the tree-throw pits and the upper parts of most pits of human origin derives from their common origin in the contemporary topsoil, subsequently affected by soil processes. The size of disturbed area falls well within Langohr’s observed maximum dimensions (1.2–1.5m deep and up to 9m across).

We excavated, at least in part, five of the tree-pits in the eastern trench (eg F022: Illus 3, 4), and three in the western, and had the opportunity of examining the stratigraphic relationship between tree-throw pits and pit/post-holes in both trenches. Interestingly, in the eastern trench three post-holes of the rectilinear structure were found to have been partly overlain by tree-pits (F002; F009; F045); in only one case did a post-hole of the structure (F032: albeit one we left unexcavated) appear to be visible within the topmost fill of what might have been a tree-pit, implying that the post-hole had been cut through the filled tree-pit. One excavated tree-throw (F092) sits within the east end of the rectilinear structure; we discuss the possible significance of this below. In the western trench, up to five post-holes were



Illus 3 Tree-pit F022.



Illus 4 Section of tree-pit F022; conventions used throughout.

visible before excavation cut into the top of filled tree-pits; we excavated three examples (F105; F106; F117) and this relationship was confirmed.

The excavation of one of the tree-pits in the eastern trench (F052) produced three pieces of struck flint. Amelia Pannett has kindly provided the following comment on the flint:

‘None of the flint has been worked, although the largest piece has clear edge damage along the right side of the ventral surface (inner surface), resulting from use. The next largest piece also has a very small area of edge damage, but this is more likely to be post-depositional. Both of the larger pieces have been struck from a core that has been used to produce blades, and it is possible that all the pieces were struck from the same core. Little can be said about the smallest fragment. The pieces are most likely to be early Neolithic in date.’

Langohr notes the value of glades formed by wind-throw as natural habitats, and their use in hunting. We cannot tell how extensive the area cleared of trees was prior to the construction of these sites.

The eastern trench: the rectilinear structure

After cleaning, we detected around 100 features in the eastern trench, including the tree-pits already mentioned (Illus 5, 8). We investigated almost half of these, mainly up to half section, but some were fully excavated. We concluded that 24 features were definitely and four probably of human origin. The description below is predicated upon the features forming part of a unified structure; however, this interpretation is by no means certain.

The side walls

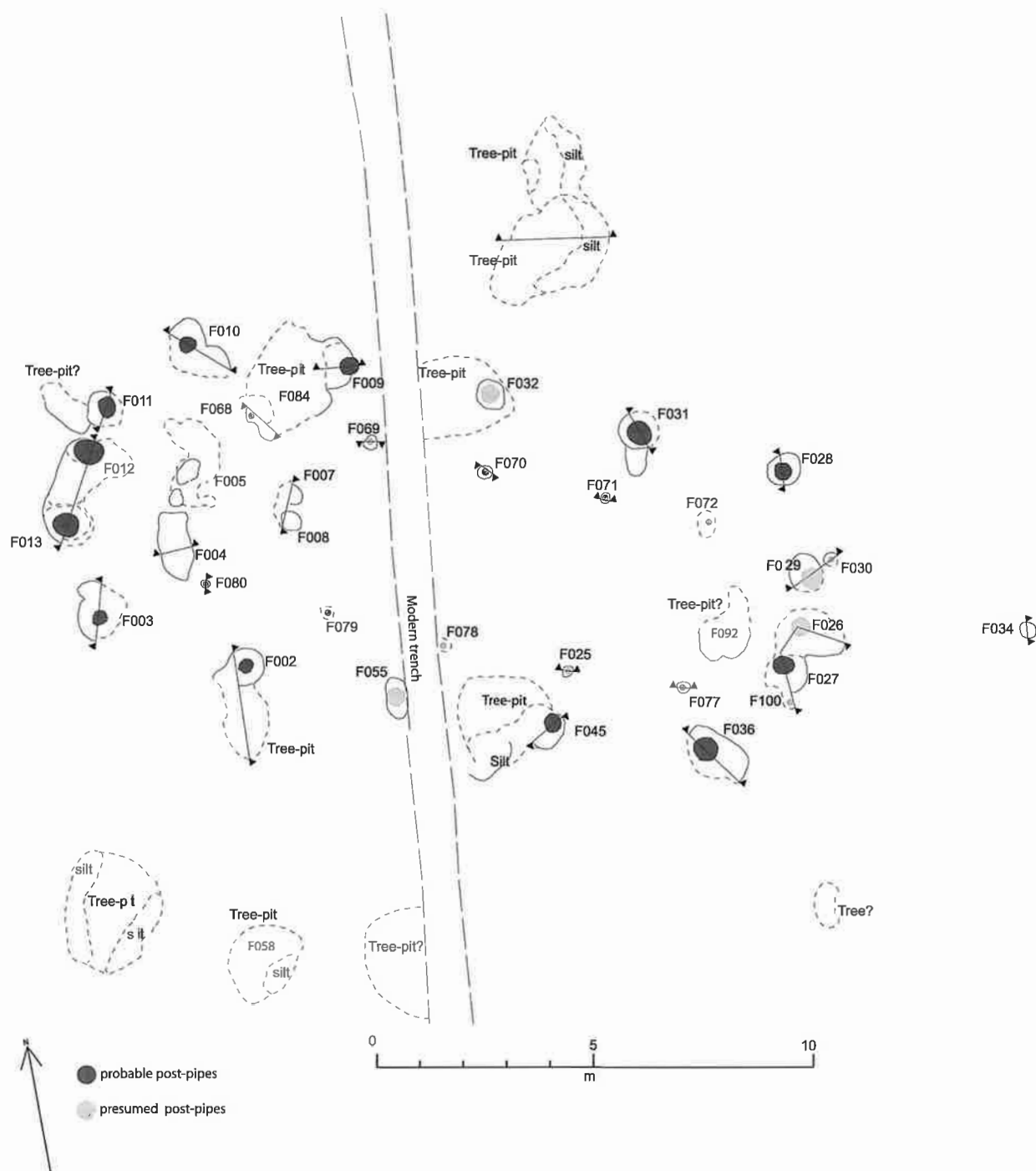
There are five post-holes on both sides (Illus 5, 6). We excavated four on the north (F010, 009, 031, 028 (Illus 7); leaving F032 unexcavated) and four on the south (F003, 002, 045, 036; leaving F055 unexcavated). The dimensions are summarized on Table 2. There was no evidence for these posts having been burned *in situ*.

The ends

Both ends seemed to conform to a single pattern: three posts arranged as a double post-hole to the south and a single post-hole to the north. The single post-hole at the west end, F011, measured 0.75m in diameter and 0.84m deep, with a post-pipe about 0.55m across; it seems likely to be earlier than the natural feature to the west, which may be part of a tree-throw pit. The double post-hole (F012/013) was a large sub-rectangular feature measuring some 2.5m NNE/SSW by 1.6m WNW/ESE, with a maximum depth of 0.65m. It contained two post-holes: the northern, F012, measured some 1.7m NNE/SSW and a maximum of 1.6m WNW/ESE and 0.65m deep, with a post-pipe about 0.45m across against the north side of the cut. F013 measured a maximum 0.9m in diameter and 0.55m deep with a post-pipe about 0.56m across. In section F012 appears to be later, but we believe this reflects a short sequence of construction. The south side of F012 may be a ramp.

At the east end, the presumed double post-hole (F026/027) measured a maximum of 2m NNE/SSW by 1.65m WNW/ESE and 0.48m deep. The northern of the pair (F026) measured a maximum of 1.19m in diameter and 0.48m deep. The post-pipe was unclear. F027, the southern post-hole, measured a maximum of 1.1m in diameter and 0.48m deep, with a post-pipe about 0.5m across. The rest of the fill consists of a series of horizontal gravel fills and it is unclear if this is merely an extension of these post-holes or a separate gravel-filled pit feature (see below). This complicated feature appears to represent the east end of the rectangular structure alongside F029, and smaller post-holes F030 and F100 (the latter appeared to cut the south edge of F027). While F027 seems to be fairly discrete in terms of section and plan, F026 is more ambiguous, and may be a post set into a larger pit than it requires (cf F012 at the opposite end of structure). The gravel dumps between F026 and F027 may represent the fills of a large pit that post-holes were subsequently dug into, or merely elaborate packing for F026. The single post setting (F029) to the north measured a maximum of 0.7m in diameter and 0.45m deep, with an unclear post-pipe about 0.55m across.

At both ends there is a probable triple post-setting (F011/012/013; F029/026/027) with the single post to the north in both cases. In each case the gravel dumps could be the fill of a large pit that was subsequently re-used for posts; or packing for perhaps substantial architectural components. The presence of extra posts at the east end (F030 and F100), which may also be considered as part of the ‘aisle post’ group, should be noted.



Illus 5 Plan of the east trench.

'Aisle' posts

There were 10 or 12 features on two lines parallel to, and c 1.5m from, the sides of the structure (Illus 5, 6). Nine were excavated and their dimensions are summarized on Table 3. There was no evidence of them having been burned. F068 contained a quantity of small roundwood charcoal, but not, apparently, the remains of a post burnt *in situ*.

Other features within and around the structure

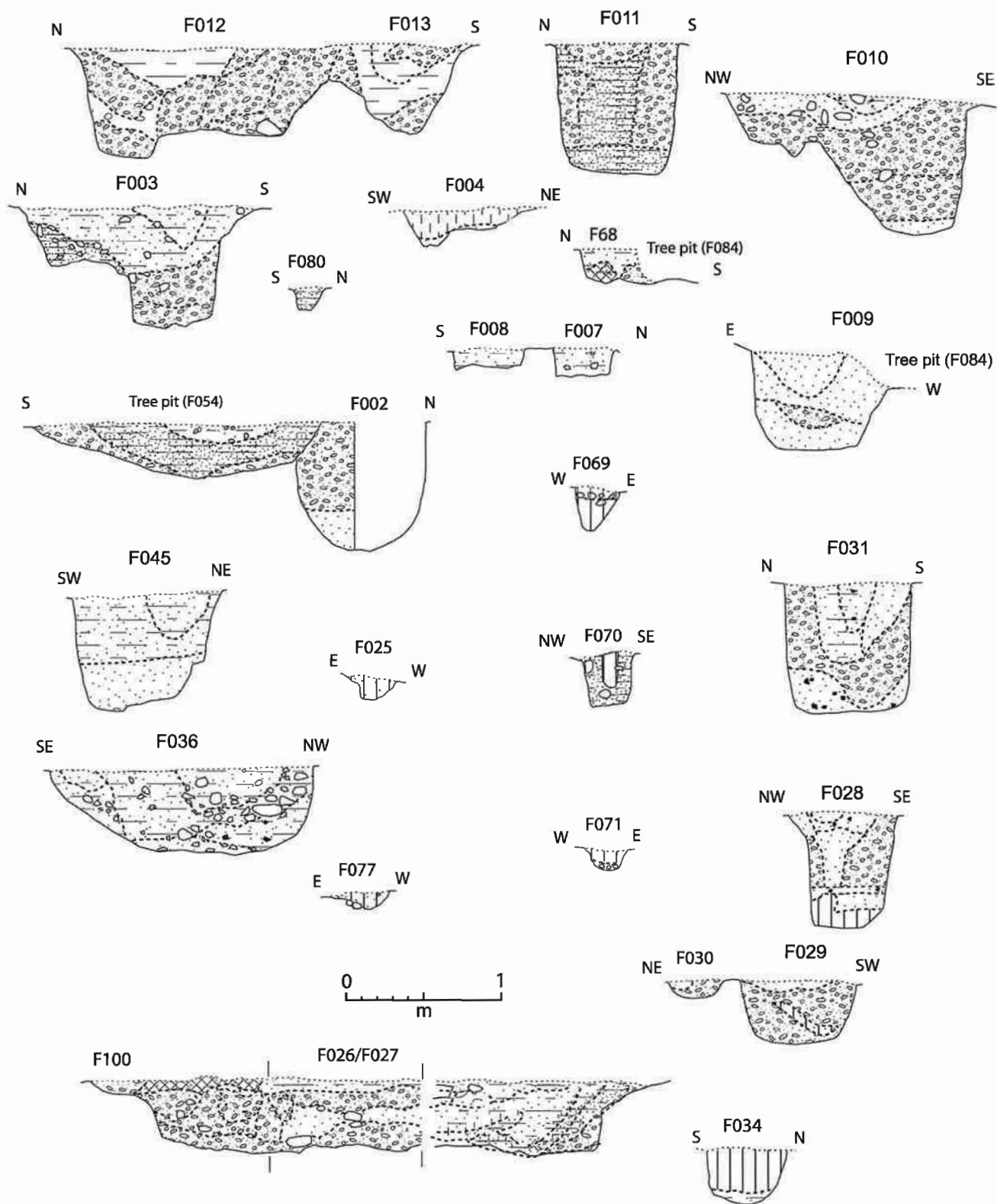
Within the western part of the structure was a group of features the character of which was not made entirely clear by excavation. F004 was a sub-rectangular feature measuring a maximum of 1.6m north/south by 0.75m east/west and 0.12m deep stepping down to a possible slot some 0.22m wide, at most 0.23m deep, running along the west side of the feature. It appears to be a

Table 2 *Feature dimensions of excavated post-holes of the 'wall' of the rectilinear setting.*

number	plan dimensions (m)	post-pipe diameter (m)	depth (m)	notes
<i>north side</i>				
010	0.8	0.47	0.42	Single phase post-hole. Adjacent shallow feature? Ramp or other structural element? cf F003 and F031
009	0.85	0.55	0.75	Single phase post-hole. Partly obscured by later tree-pit
031	0.85	0.58	0.85	Single phase post-hole. Adjacent shallow feature. Ramp or other structural element? cf F010 and F003
028	0.73	0.44	0.75	Single phase post-hole. No adjacent shallow feature
<i>south side</i>				
003	0.75	0.45	0.78	Single phase post-hole. Adjacent shallow feature? Ramp or other structural element? cf F010 and F031
002	0.7		0.8	Single phase post-hole; south edge disturbed by later tree-pit
045	0.9	0.4	0.78	Single phase post-hole. Partly obscured by silt layer which may be part of unexcavated tree-pit
036	1.6 x 1	0.65	0.52	Single phase post-hole. Both larger in plan and shallower than other post-holes of the sides. Possibly adjacent shallow feature as in F10 and F31

Table 3 *Dimensions of the 'aisle' post-holes of the rectilinear structure.*

number	plan dimensions (m)	depth (m)	notes
<i>north side</i>			
68	0.35	0.22	Fill 'b' is a deposit of burnt material including small-section wood. Disturbed on NE side by tree-pit F084. Radiocarbon sample from fill 'b'. AA-53270: 4435±70 BP
69	0.25 x 0.18	0.3	
70	0.3	0.33	Although fill a looks like a post-pipe it is more likely to be a disturbance filled with topsoil
71	0.17	0.12	This is little more than a heavily truncated feature with topsoil captured in it. Stones on base and W edge (fill 'b') against cut may be significant
30	0.3	0.15	Part of east end?
<i>south side</i>			
80	0.22	0.19	
25	0.15	0.12	
77	0.3	0.1	Stones on base (fill 'b') against cut may be significant
100	0.34	0.09	Part of east end?



Illus 6 Sections of features in the east trench.

fairly shallow pit within which a deeper slot ran north/south for its complete length, perpendicular to the axis of the rectangular structure. Although its maximum depth (and the lower of the two fills) may represent an overcut by the excavator into a sand subsoil, it is still likely that this was either a slot holding a fence or partition, or a number of stakes or small posts (indicated through variable depth of 'slot'). F005/081, just to the north, was, an amorphous feature or collection of



Illus 7 Post-hole F028 on the boundary of the rectilinear structure.

features covering an area measuring 2m north/south by anything from 0.2m to 1m across, and more convincing in plan than when excavated. Depths of various elements investigated ranged from 0.19m to 0.01cm. It appeared to consist of, from south to north, a circular feature measuring some 0.4m in diameter and 0.19m deep; a shallow and narrow slot too ephemeral to clearly define; and a shallow elongate hollow measuring some 0.9m NW/SE by 0.45m NE/SW with a maximum depth of 0.09m. These features may be the remnants of a partition or internal division of the structure. It is possible that 'aisle' posts F080 and F068 mark the ends of such a partition.

To the east was a pair of possible post-holes approximately on the axis of the structure. F007 was a sub-circular feature measuring a maximum of 0.36m in diameter and 0.21m deep situated on the axis of the structure. F008, immediately to the SSW, measuring 0.46m in diameter and 0.14m deep. The pair may represent a double post-hole, or a sequence of two post-holes, perhaps one replacing the other.

All other excavated features within the structure were natural and there were only two features outside the structure that seemed certainly or possibly of human origin. F034 was a sub-circular feature, probably a post-hole, measuring a maximum of 0.51m north/south by 0.4m east/west and 0.25m deep. It could be interpreted as extending the northern lie of aisle posts, although it



Illus 8 The rectilinear structure after excavation from the west.

Table 4 *Dimensions of the post-holes of the timber ring.*

number	plan dimensions (m)	post-pipe diameter (m)	depth (m)	notes
101	0.8	0.62	0.5	
102	0.9	0.4	0.5	
103	0.82	0.52	0.58	post burnt <i>in situ</i> . Radiocarbon sample taken from burnt crust on edge of post. AA-53288: 4485±40 BP
105	1.15	0.6	0.53	cuts through fill of tree-pit F139
106	0.9	0.58	0.55	cuts through fill of tree-pit F146. Radiocarbon sample from hazel nutshell from fill b (post-packing). AA-53271: 4455±50 BP
112	0.8	0.3	0.36	cuts through fill of tree-pit F117
115	0.94	0.6	0.36	

Table 5 *Radiocarbon dates.*

feature/sample number	lab number	ID	BP	$\delta^{13}\text{C}$	2 sigma cal BC
Rectilinear setting / F068 (035)	AA-53270	<i>Corylus</i> charcoal	4435±70	-26.9 ‰	3350–2910
Timber circle / F106 (027)	AA-53271	<i>Corylus avellana</i> nutshell	4455±50	-24.8 ‰	3350–2920
Timber circle / F103 (040)	AA-53288	<i>Quercus</i> charcoal	4485±40	-23.6 ‰	3350–3020

is slightly offset from that line. It had a fill more rich in charcoal than other features on site. F061 was a pit measuring c 0.75m in diameter and 0.3m deep. It is not certainly of human origin.

The western trench: the pit-circle

After cleaning we detected about 50 features in the western trench (Illus 9–12). We investigated about 20 of these, mainly up to half section, but some were fully excavated; others proved to be nothing more than shallow pockets of different natural soils. Of the features excavated only those of the circle were found to be certainly of human origin; all others were natural. As in the eastern trench, we identified a number of tree-pits—probably four. A feature within the circle, F128, contained oak charcoal and may be a very truncated post-hole.

The circle consisted of 15 post-holes, of which we excavated seven. The dimensions of the excavated features are summarized in Table 4. Only one post showed signs of burning *in situ* and only limited amounts of charcoal were found in the other post-holes.

Radiocarbon dating

Three samples were submitted for radiocarbon dating (Table 5; Illus 13). From the rectilinear structure the sample was of small-section young wood from fill 'b' of F068. From the timber circle one sample was charcoal from a structural element of the ring (the burnt outer crust of a post in F103); the other was a hazel nutshell from the post-packing.

The material dated from the two sites was, as far as the method can determine, contemporary, implying

that the rectilinear structure and the timber circle were broadly contemporary.

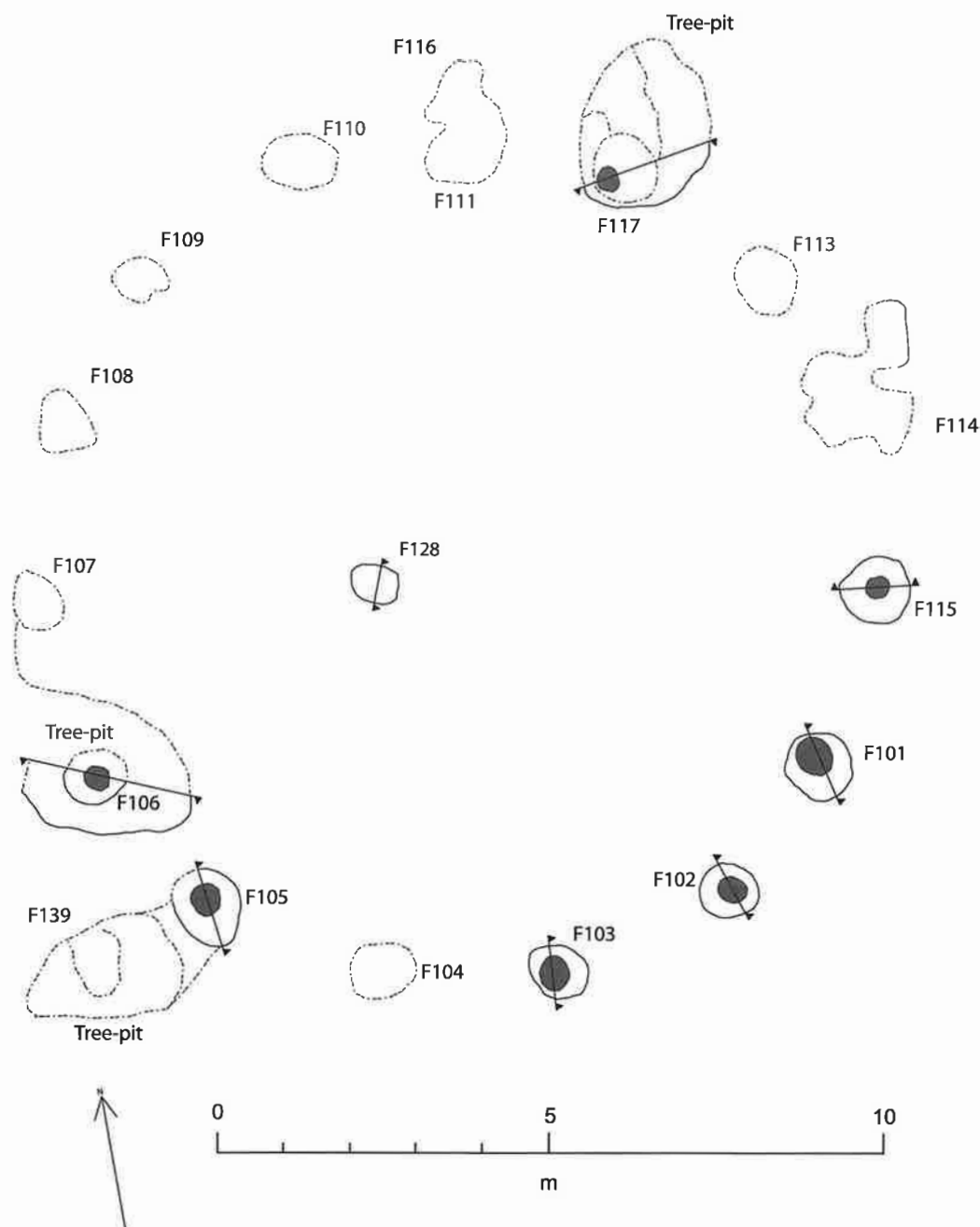
The botanical remains

Jennifer Miller and Susan Ramsay

Samples were all from contexts that were highly unlikely to have retained any waterlogged remains contemporaneous to the occupation of the site. Consequently all samples other than spot finds were floated for the recovery of carbonised plant remains. The dried flots and retents were then sorted using low power microscopy and a representative sample of charcoal and all seeds removed for identification. Charcoal was studied initially at variable magnifications of between x4 and x40, in order to observe the anatomy of the transverse section, and to assist in the cutting of clean faces on the radial and radial longitudinal sections. Subsequently the anatomy of these surfaces was observed at the higher magnification of x200 using the reflected light of a Zenith metallurgical microscope. Identification was by comparison to the text and photographs in Schweingruber (1990).

Cereal grains and other seeds were identified at magnifications of between x4 and x40 using a stereoscopic microscope. Identification was by close reference to the extensive modern reference collection at Glasgow University and to the texts of Beijerinck (1947), Jacomet (1987) and Zohary and Hopf (1993). Higher plant nomenclature follows Stace (1997) apart from cereals, which conform to the genetic classifications of Zohary and Hopf.

Results for the east and west trenches are shown in Tables 6 and 7 respectively. They are categorized by



Illus 9 Plan of features in western trench.

feature grouping in the tables and discussed as such in the text below.

East trench

Side walls of rectangular structure

The most frequently recorded charcoal type from these fills was oak (*Quercus*), although fragments were very small. These may be residual fragments of oak posts used in the building of the structure. The only other charcoal types identified occasionally were birch (*Betula*), hazel (*Corylus*) and alder (*Alnus*), although again these fragments were very small. The only sample containing a noticeably different assemblage was from F002, fill 'b', which was the only feature examined from

the entire site to contain any cereal grains. The only cereal identifiable to specific variety from this feature was naked barley (*Hordeum vulgare* var *nudum*), although it is very likely that all the more poorly-preserved cereal grains recorded from this feature were also naked barley. A soil thin section was taken through this deposit by Donald Davidson, who confirms it is amorphous carbonised material containing some identifiable bone fragments. There were no other carbonised plant macrofossils in any of the samples examined from this group of features, and consequently it is not possible to attach any significance to the presence of cereals in F002 other than evidence of human activity and providing some support for the suggested Neolithic date of the site.

Table 6 Results of the analysis of the botanical remains from the east trench.

N no Y yes

group	I	I	I	I	I	I	I	I?
feature number	2b	3a	3b	3c	28c	28e	31d	55c
sample number	012	069	071	073	005	008	003	011
sample type	bulk	bulk	bulk	bulk	bulk	bulk	bulk	bulk
taxon								
charcoal								
<i>Alnus</i> (alder)								3 (<0.05 g)
<i>Betula</i> (birch)	1 (0.05 g)	2 (0.05 g)	3 (0.05 g)				5 (0.1 g)	1 (<0.05 g)
<i>Corylus</i> (hazel)	2 (<0.05 g)		1 (<0.05 g)			2 (0.05 g)		4 (0.05 g)
<i>Pinus sylvestris</i> type (Scots pine)								
<i>Quercus</i> (oak)	5 (<0.05 g)	8 (0.05 g)	1 (<0.05 g)	3 (0.1 g)	1 (<0.05 g)	18 (0.1 g)	14 (0.15 g)	2 (<0.05 g)
<i>Salix</i> (willow)								
indeterminate bark								
indeterminate	1 (<0.05 g)	1 (<0.05 g)						
total carb veg	15 ml	5 ml	<5 ml	5 ml	<5 ml	15 ml	20 ml	5 ml
single entity								
available for AMS	Y	Y	N	?	N	N	Y	N
cereals (c)								
<i>Hordeum vulgare</i> var <i>nudum</i> (naked 6-row barley)	29							
<i>Hordeum vulgare</i> cf var <i>nudum</i>	13							
<i>Hordeum vulgare</i> s.l. (6-row barley)	27							
indeterminate cereal	7							
macrofossils (c)								
indeterminate rhizome								
<i>Poa</i> sp (meadow grass)								
seeds (m)								
<i>Chenopodium album</i> (fathen)	2							
<i>Fallopia convolvulus</i> (black bindweed)								
<i>Montia fontana</i> (blinks)		1						
<i>Persicaria maculosa</i> (redshank)	1							
<i>Spergula arvensis</i> (corn spurrey)								
<i>Stellaria media</i> (chickweed)		1						
<i>Viola</i> subg. <i>Viola</i> (violet)		2						
miscellaneous								
<i>Coenococcum geophyllum</i> (fungal spore)								
insect								
modern veg	++	+++	+++	+++	+	++	++	+
pot								

group	II	II	II	II	III	III	III	III
feature number	68b	68b	69b	70a	11b	12L	13f+g	27n
sample number	034	035	039	037	090	092	091	082
sample type	bulk	spot	bulk	bulk	bulk	bulk	bulk	spot

taxon**charcoal**

<i>Alnus</i> (alder)								
<i>Betula</i> (birch)	13 (0.35 g)		19 (1.05 g)	1 (<0.05 g)	11 (0.4 g)	1 (<0.05 g)	1 (<0.05 g)	
<i>Corylus</i> (hazel)	8 (0.3 g)	1 (0.4 g)	1 (0.05 g)	5 (0.05 g)	1 (<0.05 g)			
<i>Pinus sylvestris</i> type (Scots pine)					1 (<0.05 g)			
<i>Quercus</i> (oak)				1 (<0.05 g)			2 (<0.05 g)	
<i>Salix</i> (willow)								1 (<0.5 g)
indeterminate bark								
indeterminate						2 (<0.05 g)	1 (<0.05 g)	
total carb veg	40 ml	5 ml	20 ml	10 ml	10 ml	<5 ml	<5 ml	5 ml
single entity								
available for AMS	Y	Y	Y	N	Y	N	N	Y

cereals (c)

<i>Hordeum vulgare</i> var <i>nudum</i> (naked 6-row barley)								
<i>Hordeum vulgare</i> cf var <i>nudum</i>								
<i>Hordeum vulgare</i> sl (6-row barley)								
indeterminate cereal								

macrofossils (c)

indeterminate rhizome								
<i>Poa</i> sp (meadow grass)								

seeds (m)

<i>Chenopodium album</i> (fathen)								
<i>Fallopia convolvulus</i> (black bindweed)								
<i>Montia fontana</i> (blinks)								
<i>Persicaria maculosa</i> (redshank)	1							
<i>Spergula arvensis</i> (corn spurrey)								
<i>Stellaria media</i> (chickweed)								
<i>Viola</i> subg <i>Viola</i> (violet)								

miscellaneous

<i>Coenococcum geophyllum</i> (fungal spore)								
insect								
modern veg	++		++	++	++	++	++	
pot								

Table 6 (continued)

group	III	III	IV	IV	IV	V	V	V
feature number	27n, q, k	29a	4a	5a	8a	15b	22b	92b
sample number	083	055	051	065	048	086	001	088
sample type	bulk	bulk	bulk	bulk	bulk	bulk	bulk	bulk
taxon								
charcoal								
Alnus (alder)								
Betula (birch)	1 (<0.05 g)		2 (<0.05 g)					
Corylus (hazel)	8 (0.05 g)							
Pinus sylvestris type								
(Scots pine)			1 (<0.05 g)					
Quercus (oak)	1 (<0.05 g)	10 (0.1 g)						4 (0.05 g)
Salix (willow)						1 (0.1 g)	20 (1.4 g)	
indeterminate bark						9 (0.2 g)		
indeterminate	3 (0.1 g)				1 (<0.05 g)			
total carb veg	<5 ml	<5 ml	<5 ml	<5 ml	<5 ml	5 ml	30 ml	5 ml
single entity available								
for AMS	N	N	N	N	N	Y	Y	N
cereals (c)								
Hordeum vulgare var nudum								
(naked 6-row barley)								
Hordeum vulgare								
cf var nudum	13							
Hordeum vulgare sl								
(6-row barley)	27							
indeterminate cereal	7							
macrofossils (m)								
indeterminate rhizome								
Poa sp (meadow grass)								
seeds (m)								
Chenopodium album								
(fathen)	2							
Fallopia convolvulus								
(black bindweed)			1	4				
Montia fontana (blinks)		1						
Persicaria maculosa								
(redshank)	1							
Spergula arvensis								
(corn spurrey)								
Stellaria media								
(chickweed)		1						
Viola subg Viola (violet)		2						
miscellaneous								
Coenococcum geophyllum								
(fungal spore)								
insect								+
modern veg	++	++	+	++	++	++	+	++
pot			2 (0.15g)					

Table 6 (*continued*)

group	VI	VI
feature number	34b	61a
sample number	007	043
sample type	bulk	bulk
taxon		
charcoal		
<i>Alnus</i> (alder)		
<i>Betula</i> (birch)		
<i>Corylus</i> (hazel)		
<i>Pinus sylvestris</i> type (Scots pine)		
<i>Quercus</i> (oak)	19 (2.2 g)	
<i>Salix</i> (willow)	1 (<0.05 g)	
indeterminate bark		6 (0.05 g)
indeterminate		
total carb veg	15 ml	5 ml
single entity available for AMS	?	N
cereals (c)		
<i>Hordeum vulgare</i> var <i>nudum</i> (naked 6-row barley)		
<i>Hordeum vulgare</i> cf var <i>nudum</i>		
<i>Hordeum vulgare</i> sl (6-row barley)		
indeterminate cereal		
macrofossils (c)		
indeterminate rhizome	1	
<i>Poa</i> sp (meadow grass)		
seeds (m)		
<i>Chenopodium album</i> (fathen)		
<i>Fallopia convolvulus</i> (black bindweed)		
<i>Montia fontana</i> (blinks)	1	
<i>Persicaria maculosa</i> (redshank)		
<i>Spergula arvensis</i> (corn spurrey)	27	2
<i>Stellaria media</i> (chickweed)		
<i>Viola</i> subg <i>Viola</i> (violet)	8	3
miscellaneous		
<i>Coenococcum geophyllum</i> (fungal spore)		
insect		
modern veg	+	++
pot		

Table 7 Results of the analysis of the botanical remains from the west trench.

N no Y yes

group	VIII	VIII	VIII	VIII	VIII	VIII	VIII	VIII	XI
feature number	102b	102c	103b	103b	103b	103b	105a	106b	128a
sample number	025	026	022	032	036	040	019	027	033
sample type	bulk	bulk	bulk	bulk	bulk	spot	bulk	spot	bulk
taxon									
charcoal									
Betula (birch)		2 (<0.05 g)							
Corylus (hazel)		1 (<0.05 g)							
Quercus (oak)	6 (<0.05 g)	1 (0.05 g)	>100 (3.9 g)	>100 (8.2 g)		>100 (3.5 g)	>100 (1.2 g)	>30 (1.0 g)	5 (<0.05 g)
indeterminate									1 (<0.05 g)
total carb veg	5 ml	<5 ml	150 ml	200 ml	100 ml	20 ml	15 ml	<5 ml	5 ml
single entity									
available for AMS	N	?	?	?	?	?	?	Y	N
macrofossils (c)									
Corylus avellana									
(hazel) nutshell							1 (<0.05 g)	1 (0.1 g)	
seeds (m)									
Chenopodium album									
(fathen)	2	2			1		4		
Rubus fruticosus									
(bramble)	4						1		
Spergula arvensis									
(corn spurrey)	1								
miscellaneous									
Coenococcum geophyllum									
(fungal spore)							+		
earthworm egg capsule			1					2	
insect		+					+		
modern veg	++	+	+	+	+		+		++

End features of rectangular structure

As with the post-holes of the sides, charcoal fragments recovered were very small and few in number. No single charcoal type was predominant in this post-hole grouping, with birch, hazel, oak, willow (*Salix*) and Scots pine (*Pinus sylvestris*) type all present, although pine was only recorded as a single fragment. The absence of a single predominant charcoal type from the fills of the end features of the structure means that it is not possible to determine whether any intentional selection of wood taxa for these posts occurred.

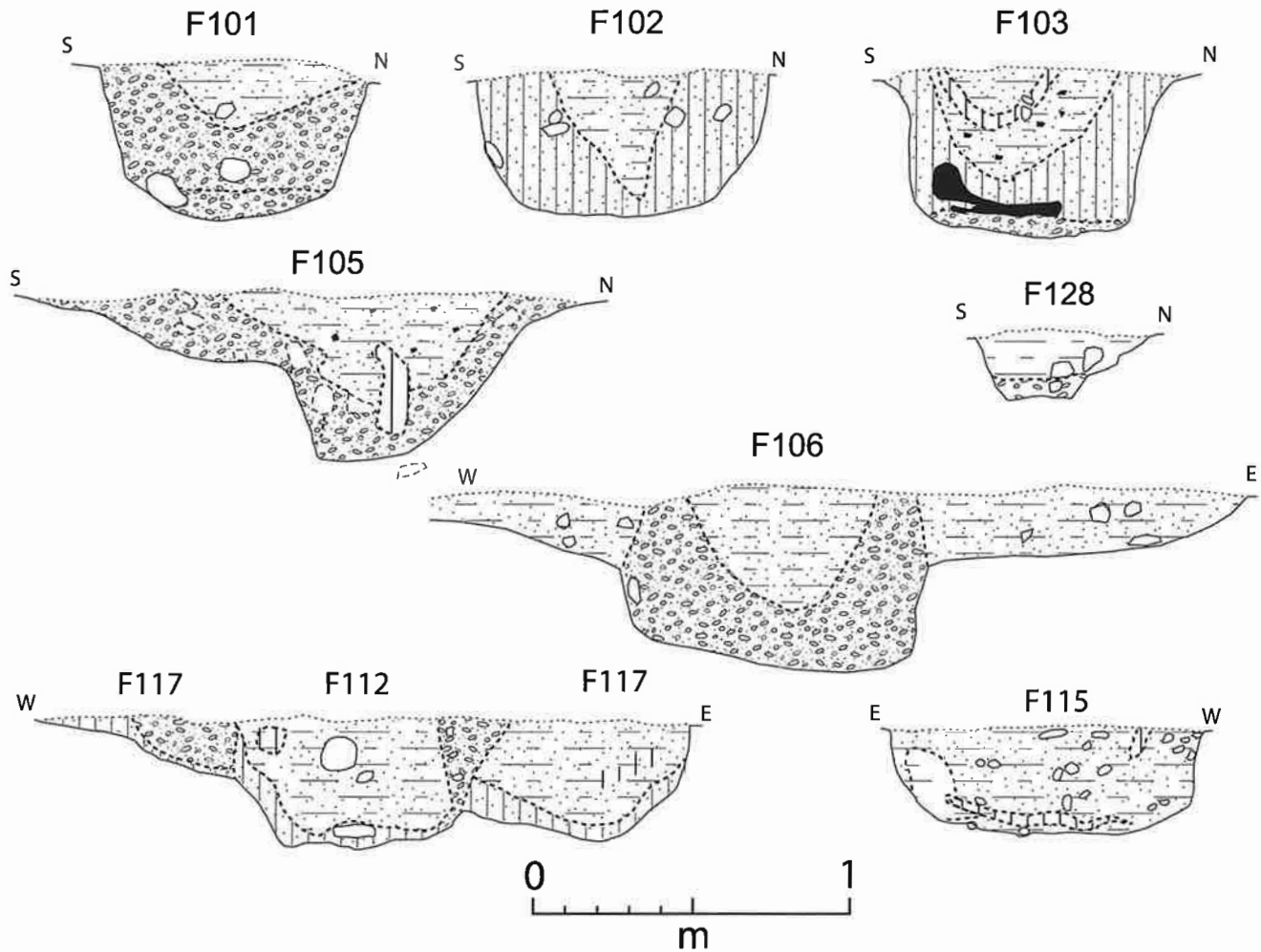
‘Aisle’ posts of the rectangular structure

Fills examined were noticeably different from the samples from the side walls, in that oak was only recorded as a single small fragment. In contrast, charcoal

fragments of birch and hazel were recorded frequently; this material might be interpreted as the remains of wattle panels. Alternatively, different woods had been used for the internal posts, because of the small diameter of posts required. A single fragment of hazel roundwood from F068 (sample 35) was sent for AMS radiocarbon dating. There were no other carbonised remains in any of these fills.

Internal features of rectangular structure

Samples from F005 and F008 produced no identifiable carbonised remains. F004(a) did contain a little charcoal, although in very small quantities. Oak was most frequently identified, together with a very little birch and Scots pine type, which may be indicative of residual structural elements. Nothing more can be surmised from this sparse assemblage.



Illus 10 Sections of features of the timber circle.



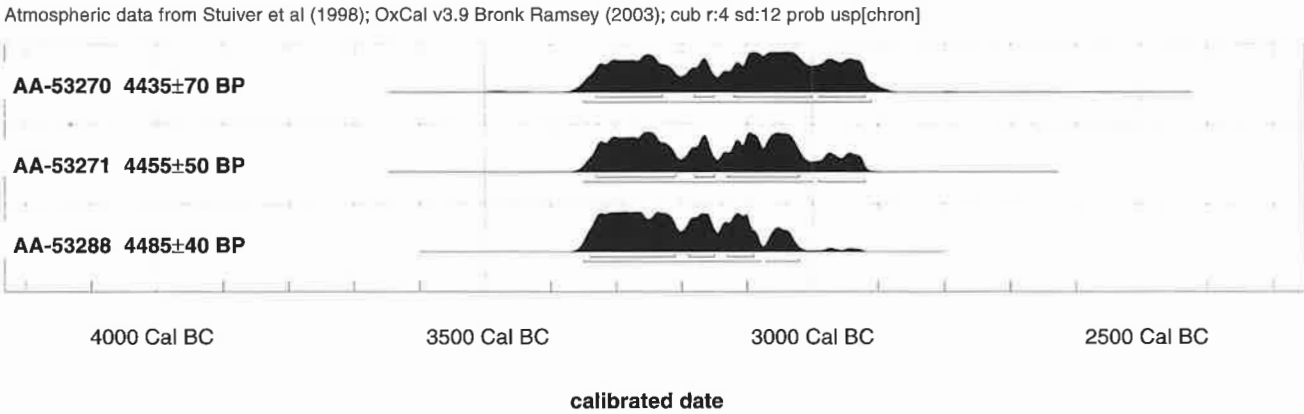
Illus 11 One of the post-holes of the timber circle, F102.

Tree-throw pits in the eastern trench

Features 015 and 022 both contained primarily charcoal of willow, suggesting that this may have been a natural phenomenon relating to the original tree. The presence of burnt bark fragments in F015(b) adds more weight to this theory. The occurrence of burnt remains within the tree-throw pits would suggest that fire may have played a part in the removal of woodland from the site, although it is unlikely that growing trees were burned, as this is an almost impossible task (Rackham 1986, 72). F092 included a small quantity of oak charcoal. The presence of oak charcoal, together with the significant location of this feature within the eastern end of the rectangular structure, may suggest that it cannot be dismissed as solely a tree-pit, but may have some structural significance.



Illus 12 *The timber circle after excavation, from the south-east.*



Illus 13 *Radiocarbon calibrations, undertaken using OxCal 3.9.*

Features outwith rectangular structure

Feature 034 lies outwith the eastern end of the structure, but the significant presence of oak charcoal from within the fill would suggest that this feature might have contained an oak post, possibly burnt *in situ*. A burnt rhizome fragment and small meadow grass (*Poa* sp) seed found within the sample examined may be residual from grassy vegetation surrounding the post at time of burning. In contrast, F061 contained only a few fragments of indeterminate burnt bark.

West trench

Post-holes of timber circle

These features are post-holes of the timber circle in the west trench. F102 fills contained very small quantities of birch, hazel and oak charcoal, although an animal burrow was observed in the uppermost fill of this feature, suggesting that the lower fills (b and c) may be disturbed. In comparison, F103 samples contained large quantities of charcoal, all of which was identifiable as oak. This confirms the on-site interpretation of this feature as a post burnt *in situ*. A fragment of oak charcoal from sample 40 from F103 was sent for AMS radiocarbon dating in order to assign a date to the construction of the timber circle. F105 also contained quantities of oak; while this feature may also be the remains of a burnt post, the sample also contained a single fragment of hazel (*Corylus avellana*) nutshell, as did F106(b); the latter sample was radiocarbon dated.

Features within timber circle

F128(a) was a sub-circular feature which was interpreted on site as either a natural hollow or truncated post-hole. The small amount of identifiable charcoal from this feature was all oak, lending weight to the suggestion that this feature is a truncated post-hole.

Discussion of the botanical remains

The carbonised remains from the east trench in general were not abundant. Unfortunately, those from the end features of the rectangular structure were insufficient to enable any confident interpretation of selection of wood types used for the construction of these features. However, the carbonised assemblage from the side walls of the structure suggested that these were constructed from oak posts. There is also a strong indication that the internal aisle posts, and/or other structural elements supported by them, were of hazel and birch. The spatial differences in the wood taxa recorded between the side walls and the internal aisles of the hypothetical rectangular structure would suggest that selection of wood types was undertaken, probably based on the particular attributes of each tree type.

The only evidence for food remains from the rectangular structure comes from F002, fill 'bb', in the form

of naked six-row barley (*Hordeum vulgare* var *nudum*). The naked form of six-row barley is commonly encountered from sites dating to the early and late Neolithic periods, and has been identified from Balbridie in Deeside, Boghead in Moray, and further afield (Dickson and Dickson 2000). However, there was a total absence of any associated arable weed seeds or chaff from this or any other feature. In addition, there was no hearth evidence or general scatter of occupation debris that would be expected in a domestic situation. No plant taxa normally associated with either roofing or flooring materials were found, which might point towards an un-roofed interpretation for the structure. However, the absence of such material could be the result of depositional processes.

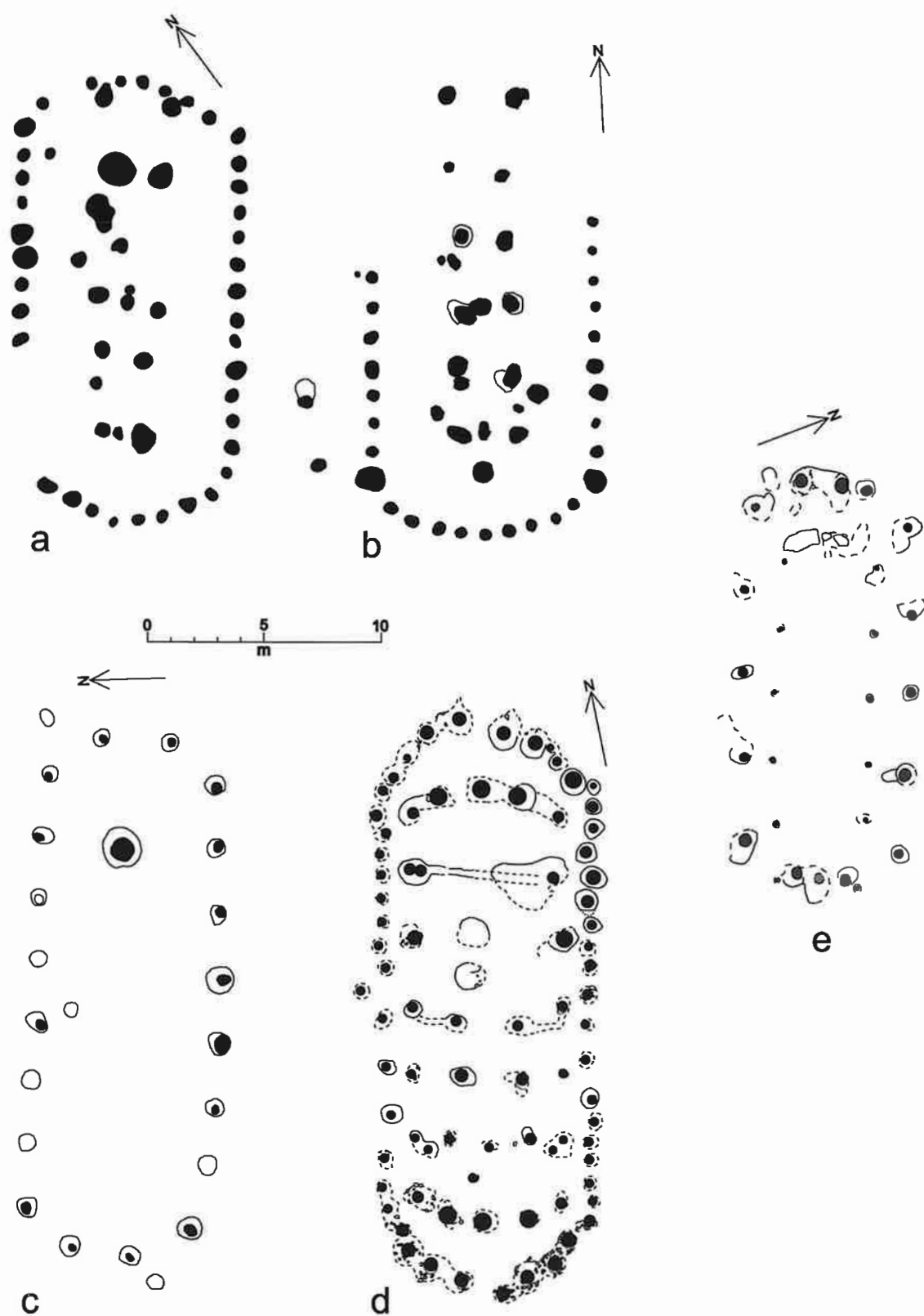
The carbonised assemblage from the west trench consisted primarily of oak charcoal with tiny amounts of hazel nutshell. The features examined were all post-holes, the majority of which contained quantities of oak charcoal, but with limited evidence for having been burnt *in situ*. As with the carbonised assemblage from the rectangular structure in the east trench, there was little or no evidence of domestic activity, in the form of food remains, hearths or other habitation detritus.

The carbonised remains from the rectangular structure in the east trench and the timber circle in the west trench show only minimal evidence that could be interpreted as domestic activity, in the form of a few naked six-row barley grains and hazel nutshell fragments. In contrast, there is strong evidence for the burning of what may have been structural elements. The excavators note, however, that there is no clear evidence for the intense *in situ* burning found at, for example, the timber hall at Claish, Stirling (Barclay et al 2002).

Discussion

The rectilinear structure

Before excavation we believed, from the evidence of the aerial photographs, that the rectilinear structure was likely to be a relatively featureless timber enclosure of the kind excavated at Littleour (Illus 14c) (Barclay and Maxwell 1998), where internal features were restricted to a single large axial pit and a late Neolithic pit containing Grooved Ware. One of the excavators (Barclay) had investigated two straight-sided, round-ended structures at Balfarg Riding School, Fife (Illus 14 a, b) (Barclay and Russell-White 1993). There, the structures were interpreted as unroofed enclosures surrounding changing patterns of two- and four-post platforms, perhaps used for the exposure of the dead. On the other hand the two present authors had excavated, in 2001, the Neolithic building at Claish (Illus 14d) (Barclay et al 2002) and hoped that Carsie might cast further light on this type of structure. However, the structure we revealed was one that had similarities to both Claish and Littleour. We have discussed the broader context of the timber structures of east-central Scotland in the Claish



Illus 14 Comparable plans of rectilinear structures:

a, b Balfarg Riding School 1 and 2

c Littleour

d Claish

e Carsie Mains

report (ibid, 114–27) and do not wish to repeat the arguments in detail here. In summary, we would argue that there is an architectural ‘vocabulary’ in use for the construction of rectilinear, round-ended timber structures with a variety of functions in the early to mid Neolithic, and that these structures reflect a cosmology shared by communities in Perthshire and Fife. The structure at Carsie is of another, but once again related, pattern.

The lack of pottery is in distinct contrast to Claish, but comparable to Littleour. One of us (Barclay) has excavated widely in the Neolithic of this area (six separate interventions: (Barclay and Maxwell 1991; 1998; Barclay and Wickham-Jones 2002)) and only three tiny scraps of probably Neolithic pottery have been found; the earlier part of the Neolithic of lower Strath Tay may be virtually aceramic, or at least pottery might not have been deposited on non-domestic sites. The absence of stone tools might be considered an impediment to an interpretation as a domestic structure, but this dearth is a characteristic of early Neolithic sites in the area (Saville 2002, 89–90); the field in which the Carsie structure lies has, however, produced quantities of struck stone (Hallyburton and Brown, pers comm).

There is no evidence of the sort of intense burning noted at Claish (Barclay et al 2002) and as a result there was no securely contexted structural material suitable for dating. The single suitable dating sample was of small roundwood in one of the ‘aisle’ posts; it could not be securely tied to the feature in which it was found, and could represent material lying on the site surface that had found its way into an earlier feature.

The possible contrast between the different wood found in the ‘wall’ and ‘aisle’ posts might be a merely practical decision, related to the size of timbers used, but the possibility that there was a more profound, symbolic, meaning, related perhaps to different attributes assigned to different trees, should be borne in mind at this and other similar sites. Apart from anything else, different woods would decay at different rates (G Noble, pers comm).

What then is the Carsie structure? On site, the co-location of the ‘wall’ posts and the ‘aisle’ posts, with virtually no other features around, suggested to us that they could form an aisled roofed building. However, David Hogg (pers comm) notes that the separation between the outer wall posts is large, and this would produce a considerable separation between assumed trusses; therefore, roofing the structure would be more difficult than at, for example, Claish. There may be a screen at the western end (F004), reflecting to some extent the arrangements seen at Claish (Barclay et al 2002) and Balbridie, Aberdeenshire (Fairweather and Ralston 1993). The function of the pair of possible posts near the axis (F007/008) is not clear. The possible tree-pit (F092) at the eastern end of the structure is on the long axis. The options appear to us to be:

i a roofed aisled building; the difficulties implied in erecting a roof might be addressed by suggesting that

any roof might have been temporary; or
ii an open structure formed by the ‘wall’ posts and the ends; the ‘aisle’ posts could represent internal divisions within this space, or even a different phase of structure, built on a smaller plan; whichever came second seems to have been built with reference to the first.

The excavated evidence does not allow us to tell which is more likely.

Axial posts are a feature of Neolithic enclosures in eastern Scotland. There was an axial post at Littleour (Barclay and Maxwell 1998, 58) and at Douglasmuir (Kendrick 1995). At Balfarg Riding School an axial post was the only feature showing through a mound, containing Grooved Ware, that covered the second of the two round-ended, straight-sided structures (Barclay and Russell-White 1993, 88). While there is no certain axial post at Carsie, the possible tree-throw pit at the eastern end (F092) attracts attention. It is not beyond the realms of possibility that a pre-existing tree was put to the same use as a post, nor that the practice of using an axial post developed from the earlier practice of enclosing growing trees within structures.

The timber circle

There is no reason, from the surviving excavated evidence, to interpret the Carsie ring as anything other than a circle of free-standing posts. Circular timber buildings are not, as far as we know, part of the tradition of the Neolithic and Early Bronze Age in this part of Scotland. Timber rings of this size have, however, been interpreted as the main structural elements of later prehistoric roundhouses. At Romancamp Gate the timber rings of such houses measured 8.5–11.5m in diameter (Barclay 1993).

Timber circles have long been seen as an adjunct to henge monuments in Britain. The recognition of free-standing timber rings in Scotland has been one effect of archaeological aerial photography since the mid-1970s, although one had already been excavated at Croft Moraig in Perthshire (Piggott and Simpson 1971; Barclay 2000). Their identification as late Neolithic and Early Bronze Age ceremonial structures was discussed by Harding in his survey of henge monuments (Harding 1987), although he raised the problem of differentiating sites identified from the air from the remains of later prehistoric roundhouses. Tolan undertook a survey of the Scottish material then known, identifying 32 sites (Tolan 1988) which could be of either type: the excavation of one of her sites indeed proved it to be Iron Age in date (Barclay 1993). The number of pit or post circles listed in the National Monuments Record is now 80 and a re-examination of these sites has recently been undertaken (Millican 2003).

Within henges, Mercer had identified at least one timber ring at Balfarg, and in the report for that site,

made a cogent argument for the 'stone' circle at Cairnpaple actually being of timber (Piggott 1950; Mercer 1981; Barclay 1999). Two timber rings were found inside the henge enclosure at North Mains (Barclay 1983); at the time the larger (ring A) was seen as part of the henge structure, while the smaller ring B was seen as later. Now the excavator has followed Gibson (1998) in seeing ring B as primary; additionally, a recent radiocarbon date has demonstrated that there is a gap of several centuries between the erection of ring A at North Mains and the construction of the surrounding earthwork (Barclay, forthcoming). Excavations at Machrie Moor stone circles showed that two of the circles had been preceded by timber rings associated with Grooved Ware (Haggarty 1991).

The most significant work on timber circles yet undertaken is by Gibson (1992a; 1992b; 1992c; 1994; 1998). In particular, he has considered how they were constructed, suggesting that a free-standing timber ring, if not holding a fence or screen, would be best appreciated as a ring if the uprights were linked. Carsie provides no clues to its superstructure. At Balfarg, Mercer (Mercer 1981, 149–50) argued that the depth of the post-holes of the timber ring could guide us as to the lengths of posts visible above ground. At that site this approach suggested that the posts were higher in the south-west, reflecting the arrangements at the recumbent stone circles of north-east Scotland. Conversely, the excavator of North Mains argued that the depths of post-holes there (which had no pattern) reflected an attempt to create an even height of post top, setting posts of different lengths to different depths into the ground (Barclay 1983, 181). At Carsie five of the excavated post-holes were about half a metre deep, the two others being around 0.3–0.4m deep. There was no discernible pattern in depth and no conclusions can be drawn about the height of the timbers. There is limited evidence for at least some of the posts of the circle being burned; if they were free-standing this would have been difficult.

The two dates from the timber circle are comparable with those in the earlier part of the tradition, as at Machrie Moor (Haggarty 1991, 63: eg GU-2316 3350–2920 cal BC) and earlier than those in henges (eg North Mains: Barclay 1983, 259–60: eg GU-1435 2900–2200 cal BC). Carsie has more in common with the Site II at Machrie (single ring, no pottery) than with Site I (complex multiple setting associated with Grooved Ware). While Grooved Ware was found near Carsie at Littleour, it is around a millennium later than Carsie (2350–2030 cal BC: AA-229906: Barclay and Maxwell 1998, 59).

Tree-pits and woodland

As noted above, excavation of one of the tree-pits in the eastern trench produced three pieces of struck flint. While these might at first be dismissed as residual (and it will be remembered that the field has produced flint from surface survey) no other struck stone was found

anywhere in the excavated area. Evans et al (1999) describe similar discoveries in eastern England and suggest a pattern of deliberate deposition reflecting a relationship with woodland or its clearance.

As noted above, excavation and surface observation suggested that three post-holes of the rectilinear structure were partly overlain by tree-pits (F002; F009; F045) while one post-hole of the structure (F032) was visible within the topmost fill of a probable tree-pit, implying that the post-hole had been cut through the filled tree-pit. In the western trench, up to five post-holes seem to have been cut through filled tree-pits. Were it not for F032 in the eastern trench, then we might argue that, if the tree-pits all relate to a single period, that woodland had been re-established after the construction and use of the rectilinear structure and deforested again by the time the timber ring was erected. But the situation seems to have been more complex: a pair of timber-built monuments, possibly both standing at the same time, set in woodland which had existed before the monuments and continued in existence after they had rotted, and was presumably in existence around them while they stood. Evans et al (1999, 250) make an assumption about the length of time ('centuries') that the bole of a wind-thrown tree would remain visible in the landscape, but provide no evidence for this assertion. It is impossible to know how much time had elapsed between the falling of the trees and the digging of the post-holes through the filled-in pits at Carsie, but there do not seem to have been tree-boles *in situ* to restrict digging.

Conclusion

The greatest significance of the excavation perhaps lies in the light cast on other sites with the same superficial appearance on aerial photographs. Sites like Carsie are classed as 'mortuary enclosures' by RCAHMS, largely, it appears, on the basis of the Littleour and Balfarg Riding School excavations, although neither site had any evidence of a mortuary function. The Carsie excavation provides further confirmation that the group of early and mid-Neolithic structures that use the same architectural 'vocabulary', and which can therefore appear superficially similar, contains a considerable range of structural types. Some of the other so-called 'mortuary structures' may be structures of the same type as Carsie.

The timber circle is the first excavated example in this part of Perthshire, and the excavation provides dates that can be compared with other examples, but otherwise it adds little to our understanding of this enigmatic class of monument.

The relationship of the two structures to the woodland that pre-dated them, and probably surrounded them, is of considerable interest, particularly if the rectilinear structure was indeed built around a growing tree.

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Abstract

The excavation of two cropmark sites revealed by aerial photography proved them to be a rectilinear post setting and a timber ring. Radiocarbon dating placed them both in the period around 3350–2910 cal BC. The only artefacts were burnt broken flints from a tree-hole. Post-holes of the two structures were dug through pre-existing treethrow pits, and were themselves disturbed by later treethrow pits.

Keywords

house

Neolithic

post-ring

rectilinear structure

timber-ring

tree-throw