

The excavation of plough-truncated features at Loanleven, Perthshire

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with a contribution by Stephen Carter

ABSTRACT

The excavation of a series of large pits, ostensibly part of a longer alignment, and other plough-truncated features, is described. No dating evidence for the alignment was recovered.

LOCATION (illus 1)

The site, 5 km north-west of Perth, was by Loanleven quarry, on a gravel terrace at approximately 45 m above OD (NO 0540 2590–0570 2580). It lies on braided river-channel sands and gravels, in a field immediately west of Methven Loch.

INTRODUCTION

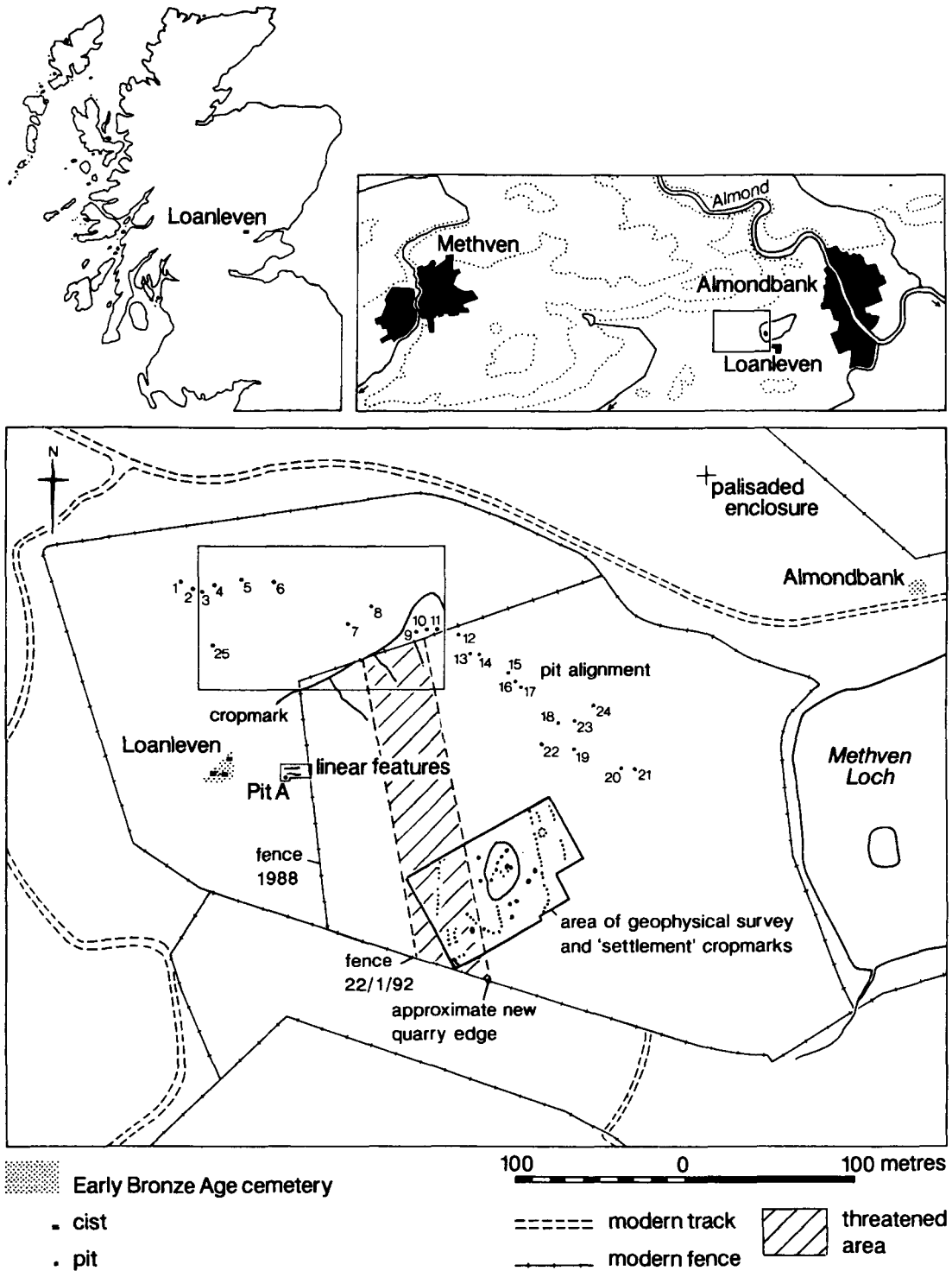
The site was first plotted from aerial photographs (OS/78/112,005–006) in 1988, in connection with work on the enclosed EBA cemetery at Loanleven (Lowe 1988; in press). Plough-truncated features, including an alignment of pits, were subsequently excavated for Historic Buildings & Monuments in October 1988 and February 1990 in response to the continued threat of quarrying. An obscure feature, possibly an enclosure, has been plotted to the south of the pit-alignment at NO 0561 2572. A geophysical survey of this anomaly was undertaken (Gater 1990). The results of the survey are ambiguous and future work on this site is planned.

1988 EXCAVATION

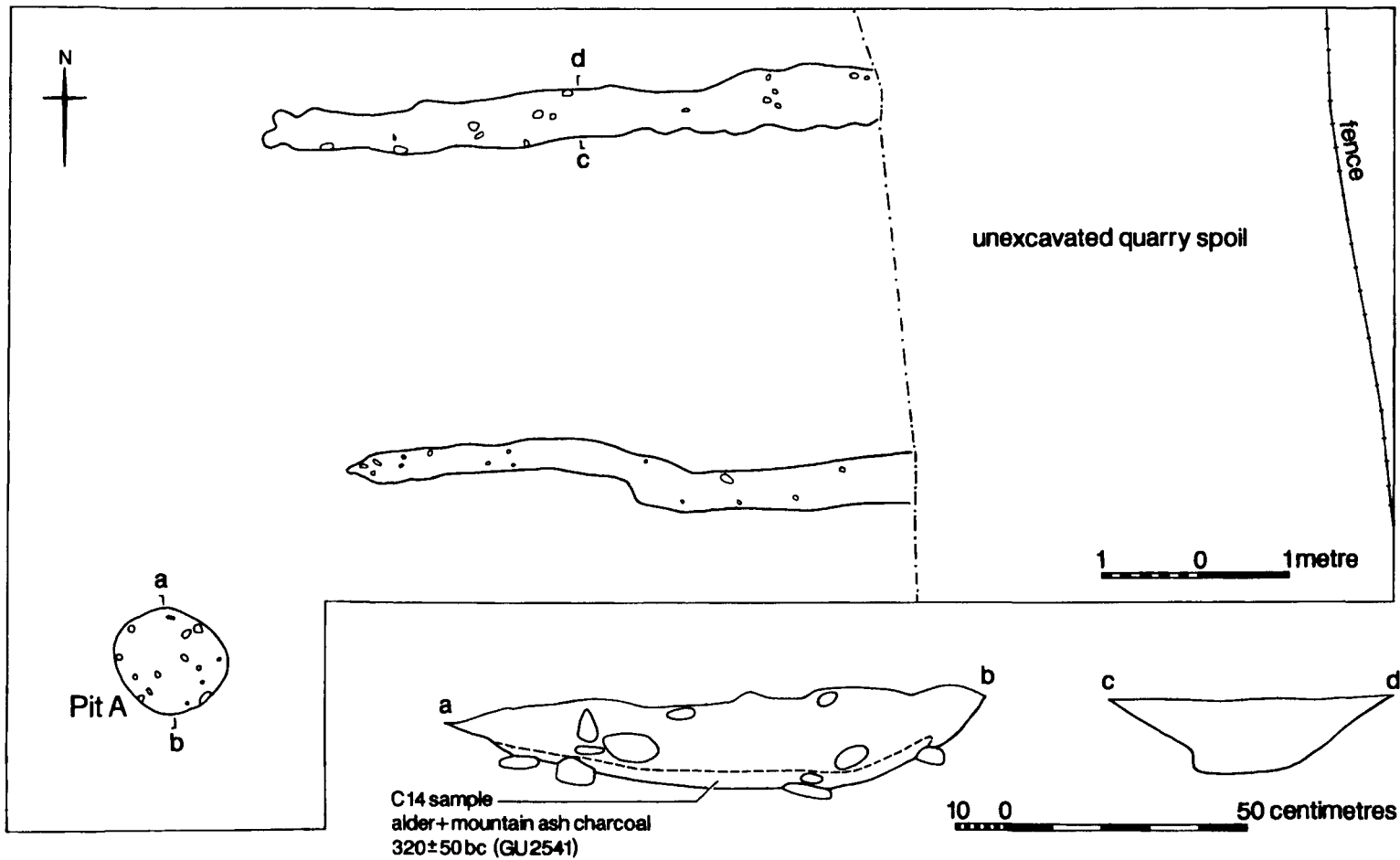
A small pit, possibly a cooking pit, and the vestigial remains of two linear slots were excavated. The features were located approximately 35 m east of the EBA cemetery (illus 1).

The pit (Pit A) was 1.1 m in diameter and up to 0.2 m deep (illus 2). The upper fill consisted of dark brown silty clay with a few small to medium rounded stones. Charcoal flecks, small fragments of burnt bone and a few burnt stones were also noted. This overlay a burnt deposit, up to 50 mm thick, which was extremely rich in the charcoal of alder and mountain ash. This deposit filled the base of the pit, extended part of the way up the sides and had clearly been burnt *in situ*. It has been radiocarbon-dated to 320 ± 50 BC uncal (GU-2541).

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ILLUS 1 Location plan. Based upon the Ordnance Survey map © Crown Copyright



ILLUS 2 Plans & sections of Pit A and linear feature

Two long, shallow slots (illus 2) were located nearby. They were set roughly parallel, 3–3.2 m apart, and were 0.6 m wide, up to 0.2 m deep and at least 6 m long, disappearing beneath unexcavated quarry spoil. The slots were flat-bottomed with asymmetrically sloping sides. No associated finds or deposits were noted and the function of the slots is unknown.

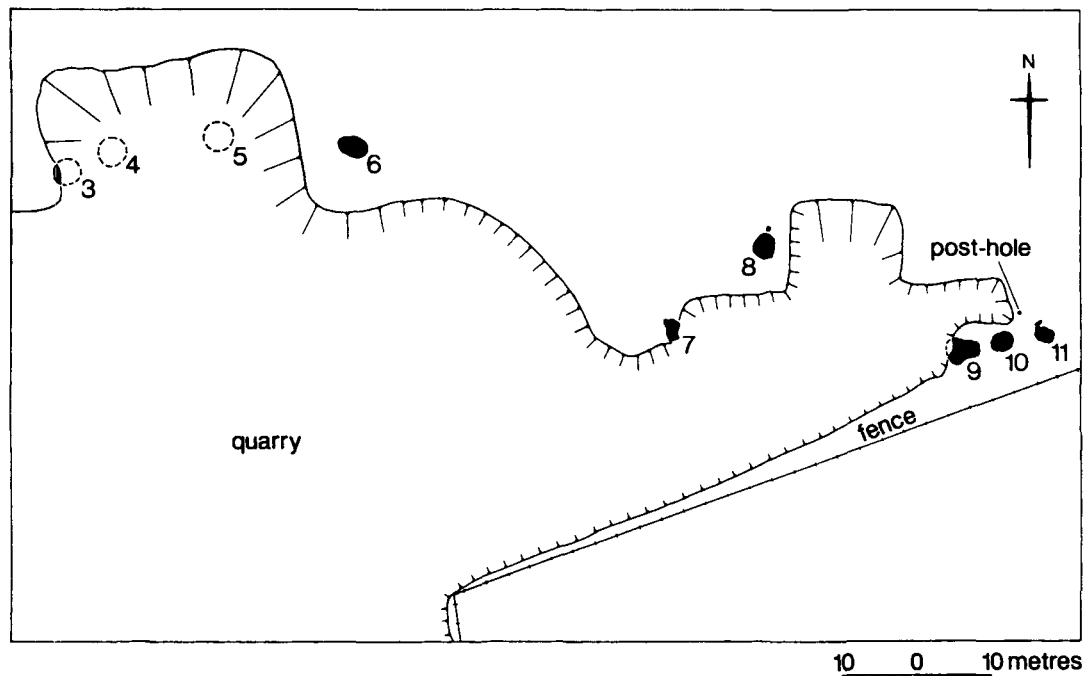
1990 EXCAVATION (illus 3 & 4; Table 1: fiche 1: F2–4)

Seven large pits were located and excavated. Two others (Pits 4 & 5), 3–4 m in diameter, had been surveyed in 1988 and removed by quarrying in 1989. Pits 5, 6 & 10 were not recorded on the RCAHMS transcription of the aerial photographs.

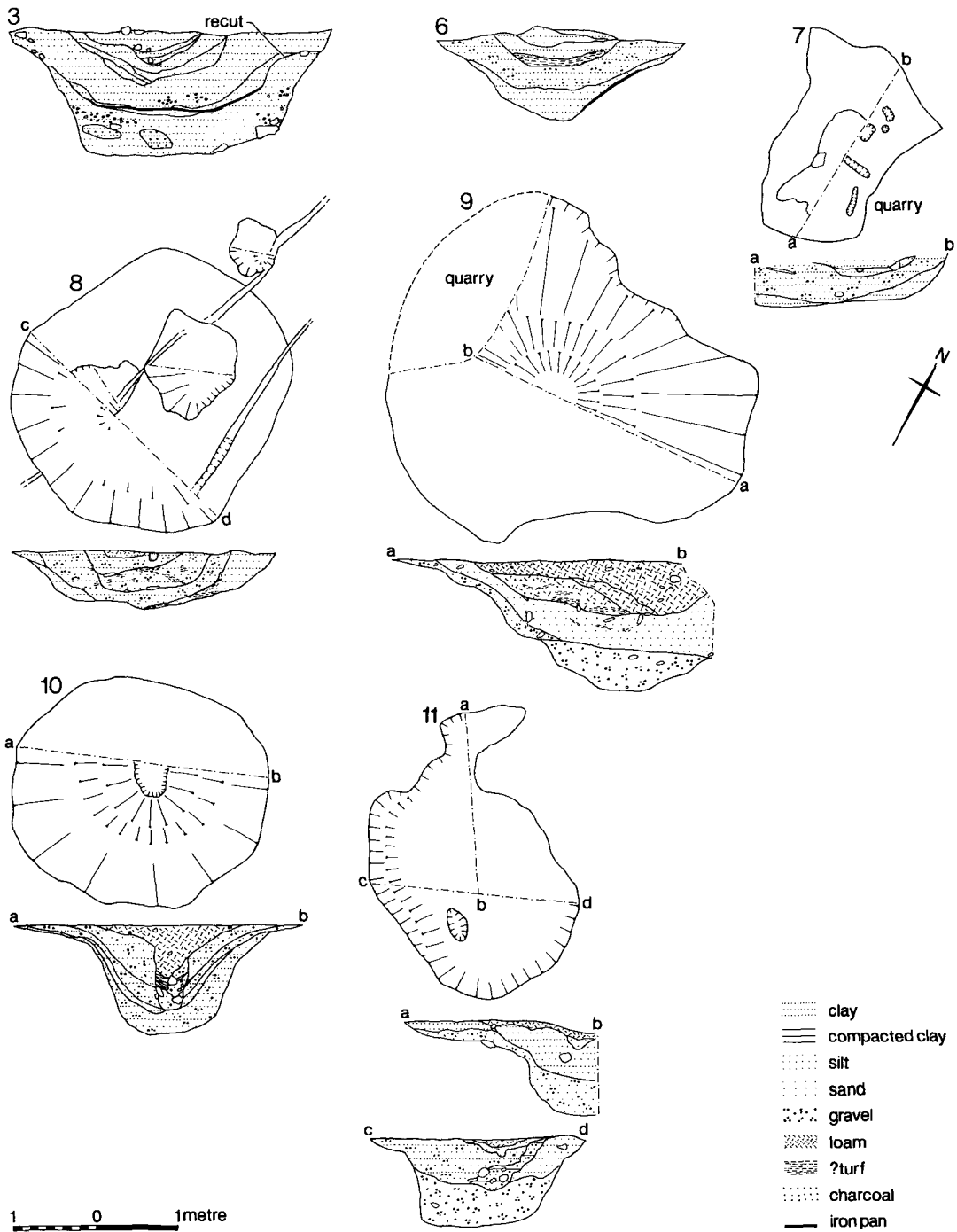
The site had been stripped of topsoil, 0.3–0.45 m deep, prior to quarrying and the pits were marked out against the gravel subsoil as roughly circular patches of dark grey clay loam. This deposit, interpreted as the base of the modern field soil, survived in hollows over the centre of the pits, the result of compaction of the underlying fills. Small amounts of charcoal flecks were noted in most of the deposits excavated. No artefacts, however, were recovered.

Pits 1 & 2 formed the west end of the crop-mark. Both features were covered by the quarry topsoil-tip and could not be examined. Pits 12–24, at the east end of the crop-mark, are located in a cultivated field to the south of the quarry and were not available for excavation. Pit 25, removed by quarrying in 1989, was located near the west end of the crop-mark.

Pit 3 (illus 4) was first located in October 1988. It was roughly sub-circular and measured 4 m along its longer NW/SE axis and 3.3 m transversely. Most of it had been removed by quarrying and only the west side of the pit survived in the quarry face.



ILLUS 3 Detailed site plan of excavated pits plus edge of quarry as at Feb. 1990 (from 1:200 base plan)



ILLUS 4 Plans & sections of Pits 3, 6, 7, 8, 9, 10 & 11

The pit had been recut at least once. The primary pit was roughly 3 m wide and at least 1.2 m deep. The fill consisted of an extremely stony silty clay with discrete patches of grit and grey clay with comminuted charcoal. Several medium to large sub-rounded stones lay at the base and along the side of the cut on the north side of the pit. No depositional structure to the fill was observed, suggesting that the pit was backfilled soon after being dug.

The recut pit was approximately 3.3 m across and 1 m deep. The lower deposits consisted of a stony and compacted reddish- and yellowish-brown silty clay with some charcoal flecks. Patches of gravel were also noted. No structure to these deposits, however, was observed and the pit may likewise have been rapidly backfilled. The upper deposits consisted of a series of less stony, banded deposits, thin lenses of dark brown and brown sandy and silty clay with some small rounded stones, indicative of a more gradual silting.

PIT 6 (illus 4) was roughly oval, up to 4.05 m long, 2.75 m wide and 1.7 m deep. The basal deposit consisted of light brown clayey silt, virtually stone-free. This was overlain by a stony deposit which, in turn, was covered by a stone-free band, up to 10 cm thick, of dark grey silty clay. The identification of this deposit as a turf-regeneration level is supported by the results of the loss-on-ignition test. The buried turf-line was subsequently overlain with a moderately stony, greyish-brown and reddish-brown sandy clay.

PIT 7 (illus 4) had been greatly damaged by gravel extraction and only part of the north and west sides of the feature remained. It was at least 3.75 m north/south by 1.3 m transversely, and 0.5 m deep.

The primary fill consisted of brown sandy clay, virtually stone-free. This was overlain by a stony deposit, similar in composition to the natural gravels but with a reduced small stone content. No structure to this deposit was observed. It may represent a primary levelling up of the pit.

A shallow depression, up to 1 m across and lying to the north of the centre of the pit, was subsequently filled with a stone-free dark brown silty clay deposit. Five small rectangular slots and stake-holes were cut into this and the underlying deposit and were filled with greyish brown silty clay. Lumps of oak charcoal (B A Crone, pers comm) were recovered from the fill of one of the rectangular slots. These features may have been inserted as a temporary support for the erection of a timber post to the east. No archaeological evidence for such a feature, however, was discerned within the remaining pit stratigraphy.

PIT 8 (illus 4) was roughly sub-circular and measured 3.4 x 2.85 m and was 0.65 m deep. The primary fill consisted of reddish-brown and brown silty clay with some small rounded stones. The deposit contained both within it, and along part of the boundary with the overlying deposit, several thin grey sandy clay lenses. In places they directly overlay the floor of the pit and are interpreted as turves or turf-regeneration levels, indicating possibly that the pit was left open for some time. This material was subsequently covered with a moderately stony dark brown silty clay, mixed with patches and lenses of dark grey silty clay, possibly turves or the remains of an old turf-line.

A post-hole was located immediately to the north of the pit. It was roughly 0.6 m in diameter, up to 90 mm deep and contained traces of a small pipe, 0.25 m in diameter, on its east side. It may have served as an above ground marker for the pit.

Both the post-hole and the pit were cut by cultivation-marks. These extended roughly north/south across the area, 1.35 m apart centre to centre. The cultivation-marks were 80–100 mm wide and 40 mm deep with an asymmetrical V-section profile. The plough-marks had dragged the dark fill material to the south, thus indicating the direction of cultivation.

PIT 9 (illus 4) was the largest of the pits excavated, and although partially damaged by quarrying, sufficient remained to indicate that it was roughly pear-shaped with its longer axis aligned east/west. The pit was 4.5 m long, 4 m wide on the west, 2.25 m wide on the east and up to 1.55 m deep. Slight ledges, probably constructed to facilitate the removal of the spoil, were located on the east side of the pit at 0.6 m, 1.2 m and 1.45 m above the floor.

The basal deposit consisted of coarse gravel with some charcoal flecks and a few medium sub-rounded stones. The deposit extended in a horizontal manner, on a level with the first ledge at 0.6 m above the base of the pit. This deposit was overlain by a band of gravelly sand which extended along the east side of the pit. These deposits, similar in composition to the natural gravels but with a reduced small stone content, may represent a primary levelling up of the pit.

The primary deposits were overlain by a moderately stony brownish-orange sandy silt. Several

turnes, apparent as stone-free dark greyish-brown silt lenses, up to 0.2 m long and 50 mm thick, were also noted in this deposit. Additional turnes or the remains of a turf-regeneration level were recorded in the overlying charcoal-flecked silty loam deposits which formed a low mound to the west of the centre of the pit. There was no indication, however, that this feature was a structural device and there is no evidence to suggest that this pit ever held a timber post.

PIT 10 (illus 4) was roughly circular, 2.70–3 m in diameter and 1.3 m deep. The primary fill consisted of a loose stony deposit, similar in composition to the natural gravel subsoil. This may indicate that the pit was partially backfilled soon after it was opened, suggesting that it may have been dug too deep for the post. Several very large sub-rounded stones were located immediately above this deposit, in the centre of the profile.

A central post-pipe was recognized by a stone-free black silty loam deposit which overlay the pit and filled the void left by the post. The line and full extent of the post-pipe, 0.4–0.6 m in diameter and 0.85 m deep, was partially obscured by its collapse and the subsequent infiltration of adjacent deposits. Its line, however, was indicated by the vertical disposition of the deposits on the west side of the pit and the large stones, part of the original post-packing, which were present towards the base of the pipe.

A small stake-hole, cut into the natural subsoil, was located about 2 m to the north of Pit 10. It was oval, 0.25–0.32 m across and 0.25 m deep.

PIT 11 (illus 4) was oval, with a small ramp, 1 m long and 0.6 m wide, on its north side. The pit was 2.6 m along its longer axis, 2 m transversely and 1.05 m deep. The primary deposit consisted of yellowish-brown sandy gravel, similar in composition to the natural gravel subsoil. This filled the pit to a depth of 0.5 m and extended over and into the ramp on the north side. No structure was noted in this deposit. It may represent an early levelling up of the pit.

A large oval stake-hole, with sides 0.4 m and 0.2 m long and 0.13 m deep, was cut into the primary fill on the south-west side of the pit, diagonally opposite the ramp and angled towards it. It was filled with greyish brown and black gravelly sand and may represent a support, possibly for a post, which remained in place as the pit was backfilled. A possible post-pipe, although largely obscured by soil movement within the pit, possibly the result of the post's extraction, may be represented by the large stones in the centre of the transverse pit section.

SOIL ANALYSES

Stephen Carter

INTRODUCTION

Four simple analytical techniques have been applied to samples from the pits in an attempt to characterise the sediments and propose possible methods for their deposition.

METHODS

All analyses were carried out with samples in a field moist condition. Particle size distribution was determined by wet sieving using a 2 kg sample in three size classes (<2 mm, 2–16 mm, & >16 mm). pH was determined in a 1:2.5 soil to distilled water mixture. Loss on ignition used c 10 g of oven dry soil ignited at 400 °C for four hours. The determination of phosphate used a spot test for easily available phosphate (Hamond 1983). Samples were rated on a three-point scale (Hamond 1983, 57) using addition of the two reagents to the sample:

Time for colour to develop (sec)	Phosphate rating
0–30	High
30–90	Medium
90+	Low

RESULTS

Complete tables of results are in the site archive and only selected results are discussed here. pH values range between 5.4 and 7.4, the majority between 6 and 7. They do not add to the interpretation of the site and are not discussed further. Spot phosphate values span the complete range and there is no clear pattern to the data within each pit. Table 2 (fiche 1: F5) summarizes the frequency of the results for each pit and, clearly, some are dominated by low ratings and others by higher ratings. There is no simple explanation of this variation between pits but it may reflect differences in their function or the nature of the material that filled them.

Loss on ignition results are generally very low (>2%) and samples with higher results (2–7%) are those identified on site as buried turves or the upper humose fills of many of the pits. The results support the field interpretation of these layers as the base of the modern soil beneath the cultivated A horizon.

The particle size distribution results provide useful information about specific deposits and the pits as a whole. Nine samples of undisturbed gravels adjacent to the pits were analysed as a control and they form a well-defined textural group. They contain at least 60% >2 mm particles (stones) and at least 38% is small stones (2–16 mm). Only two other samples, the primary fills of Pits 10 & 11, match these criteria.

The majority of pit fills contain at least 40% fine earth (<2 mm). An exceptional scatter of samples contain less than 30% fine earth and more than 40% medium and large stones but unlike the natural gravels the small stone content is less than 30%. These are the lowest fills of Pit 9 and the secondary fill of Pit 7.

With the exception of these three samples all pit fills could be derived from the undisturbed gravels by relative enrichment with fine earth. The most likely source of this earth is the soil overlying the gravels. The texture of the fills of any one pit tend to be related although there is a great deal of overlap between pits. Pit 8 for example is characterized by a relatively high small stone content (30–40%) whilst Pit 6 has fills with more than 60% fine earth with a notably high clay content. These differences reflect localized variation in gravel and soil textures contributing to the fills. Within each pit the top fill has a relatively fine texture and the lowest fill is relatively coarse in all but two pits (Pits 3 & 8).

CONCLUSIONS

The texture of the undisturbed gravels is distinctive and is matched only by two of the pit fills. These two primary pit fills were probably laid intentionally immediately after the pits were dug using fresh spoil. Pits 10 & 11 are the only two with evidence of a post and this early backfilling could be levelling up of a pit too deep for the post.

Most pit fills could be a mixture of the gravel spoil from the pit and the overlying soil. Only in the cases of the pits with posts is the evidence for intentional backfilling unequivocal. The presence of turves in the fills of Pits 8 & 9 is in itself not proof of backfilling as they could have fallen from the eroding pit sides. The top, organic rich, finer fills are clearly the base of the present soil infilling a depression in the pit fills. This could form due to settling after backfilling or as a result of natural, slow filling of the pit. It is not possible to state whether these pits were backfilled or not.

THE DATING OF THE PITS

The small cooking pit, Pit A, has been radiocarbon-dated to 320 ± 50 BC uncal (GU-2541). No dating evidence for the large pits, however, was forthcoming. The pits were filled with redeposited gravel, mixed to varying degrees with fine earth and possibly other contaminants from the contemporary land surface. No bulk sieving of the fills, therefore, was undertaken since none of the charcoal or macroplant material recovered would have been taphonomically secure. Insufficient charcoal was retrieved from the rectangular slot in Pit 7. Pollen was also poorly preserved and no artefacts were recovered.

The pits are thus undated. The general alignment of the crop-mark, however, may suggest (whatever their date) that the majority of the features are probably broadly contemporary.

THE FUNCTION OF THE PITS

Extremely little data is forthcoming with regard to the function of the pits. Pit 10 clearly held a large timber post. The stake-hole and slot features in Pits 7 & 11 may suggest that they too were similarly furnished. The basically horizontal disposition of the fill material in the other pits, however, seems to preclude this possibility, an argument which has also been proposed for the pits at Eskbank (Barber 1985, 151–3). A domestic function, as storage or rubbish pits perhaps ancillary to lost structures, seems unlikely since the pits were not lined and no artefacts were found. A sepulchral or ritual function remains possible, although no affirmative evidence can be presented in this context.

DISCUSSION

The crop-mark site at Loanleven is represented by a series of large pits, roughly aligned NW/SE and 300 m long. It may be significant that the alignment is juxtaposed between the Loanleven and Almondbank cist cemeteries, two roughly contemporary EBA sites (Lowe 1992; Stewart forthcoming).

The Loanleven pits can be resolved into a number of smaller sub-groups. Pits 1–4, 9–11 & 15–17, for example, seem to form closely related clusters, 5–8 m apart. Pits 22–24, although widely spaced, appear to intersect the main alignment at right angles. Clearly, the possibility exists that not all of the alignment has registered on the aerial photograph transcription, as is certainly the case with Pits 5, 6 & 10. On the other hand, the number of putative pits required, as it were, to fill the gaps in the alignment seems so high that it would be unreasonable to attribute their absence to the vagaries of crop-marking. Certainly, no pits existed in the area between Pit 6 and Pits 7 or 8 and none was reported by the quarry staff in the area between Pits 7 or 8 and Pit 9. It is considered likely therefore that the visible crop-mark presents a fairly full account of the alignment.

The Loanleven alignment is quite unlike any other previously recorded pit-alignment and its classification, therefore, is difficult. Excavations at Eskbank, Lothian (Barber 1985) and Marygoldhill, Borders (Strong 1988) have suggested that the pits were quarry-pits associated with the construction of linear earthworks of the late pre-Roman Iron Age and the terms ‘pit-defined’ or ‘pitted boundaries’ have been introduced to describe these kinds of sites (Halliday *et al* 1981: Halliday 1982, 75). It has been argued, however, that several of the pits at Marygoldhill Site 2 held posts and that they were related to an earlier form of enclosure (Strong 1988, 128). The Meldon Bridge (Borders) pit-alignment was shown to have formed a Neolithic palisaded enclosure (Burgess 1976). A similar date and function has been argued, on less substantive grounds, for the Ewart 1 pit-alignment in Northumberland (Miket 1981). The use of ramps is paralleled at North Mains, Strathallan (Barclay 1983, 127–33) and has been discussed by Mercer (1981, 149–57).

The Loanleven pits are extremely large, 3–4 m across on average. Their nearest parallels, in terms of size, come from the Henge Period IV pits at the nearby site of North Mains, Strathallan (Barclay 1983, 143–5). The Loanleven pits are also irregularly spaced, at anything from 5 m to 50 m apart (Table 1: fiche 1: F2–4). This is in marked contrast to the excavated pit-alignments at Eskbank, Marygoldhill Site 2, Meldon Bridge and Ewart 1 where the pits are both smaller and more regularly spaced at between roughly 3 m and 4 m intervals. This in itself may suggest that the Loanleven alignment represents neither the subsurface remains of a linear earthwork nor (clearly) part of a continuous timber stockade. These differences, alone, may suggest a revision of the monument’s identification to type, in particular, and, indeed, a re-analysis of the pit-alignment phenomenon, in general.

CONCLUSION

It is clear from the work at Eskbank and Meldon Bridge that the crop-mark phenomenon of pit-alignments subsumes monuments of different types, functions and dates. The interrupted alignment at Loanleven may represent an addition to this broad class of monument. Future work will be required, however, before the full range of alignments or structures defined by pits, their dates and their functions, can be better understood.

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