
The excavation and analysis of a field dyke at Cragganester, Loch Tayside

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with a contribution from Dr Fiona H Crystall

Introduction

Power-line upgrading by Hydro-Electric Plc took place in Cragganester on the north side of Loch Tay. This is an area of landscape designated as a Scheduled Ancient Monument, as an example of medieval or later rural settlement. Before the maintenance work took place a programme of archaeological work was undertaken by Glasgow University Archaeological Research Division (GUARD) which entailed the demarcation of archaeologically sensitive areas together with limited archaeological excavation of threatened deposits. This work was undertaken in July 1996, with reinstatement following in December that year. The fieldwork was arranged with the National Trust for Scotland and Historic Scotland and funded by Hydro-Electric Plc.

Background

The power line in question runs between Errochty and Killin. As part of its upgrading access was required to each of the five pylons within the scheduled area at Cragganester. There were three proposed access routes to the pylons within the scheduled area (Illus 1). Routes 1 and 3 were to take light vehicles with no significant impact on archaeological deposits. Route 2 was intended to provide access for heavy vehicles/machinery which would cause a post-medieval earthen enclosure dyke to be damaged at two points. Mitigation measures designed to ensure minimum disturbance were drawn up and implemented in consultation with Historic Scotland.

Methodology

At an initial meeting between Hydro-Electric Plc and GUARD the routes of the three proposed access points were provisionally outlined. Field assessment undertaken by GUARD revealed three

areas of sensitive archaeological deposits requiring demarcation. As access for heavy machinery was required along the route excavation of the affected portions of the dyke (two access points) was required in order to preserve the affected lengths through record. Scheduled Monument Consent was given by Historic Scotland, on behalf of the Secretary of State for Scotland.

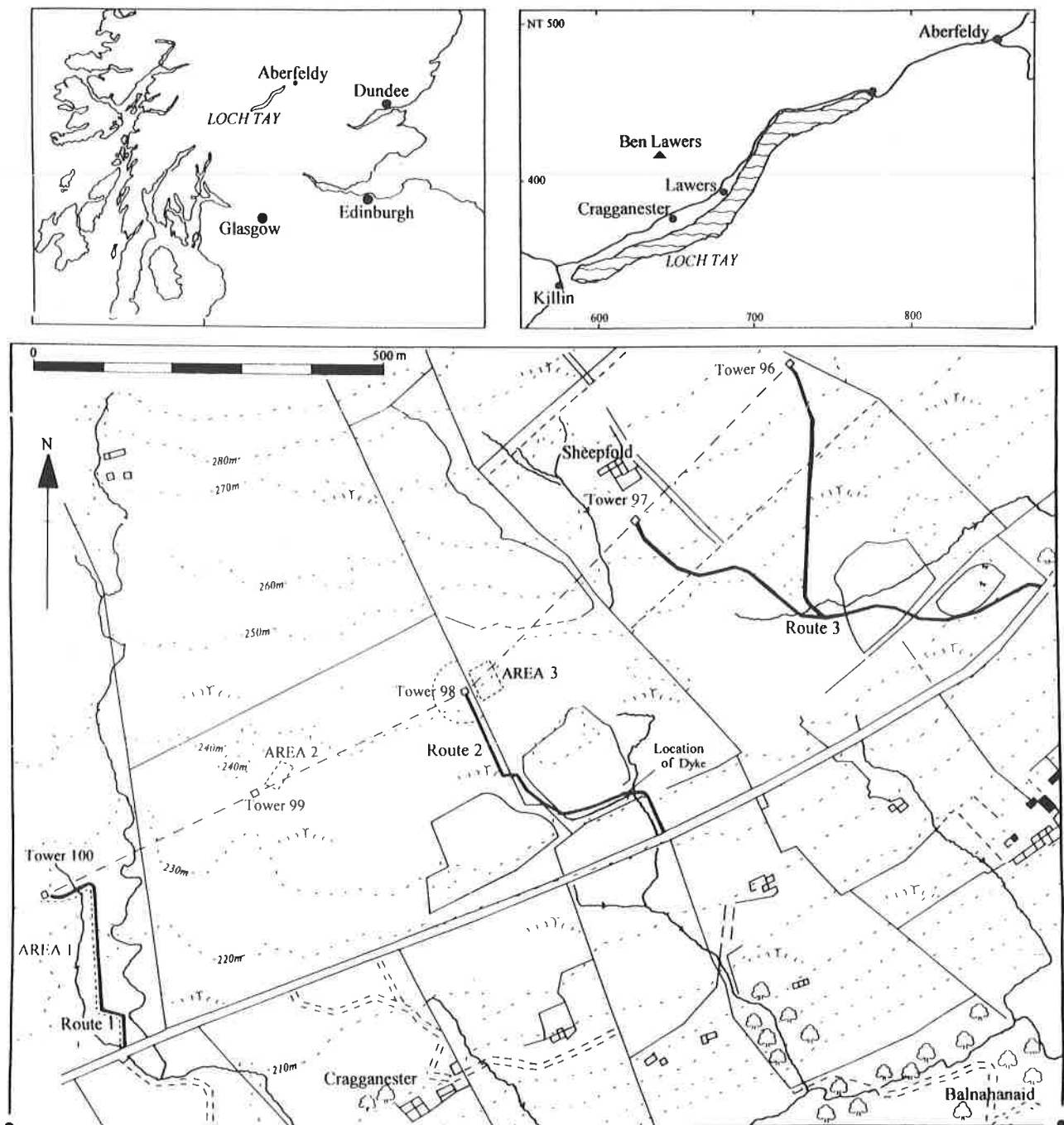
Demarcation

Demarcation was undertaken around the three archaeologically sensitive areas (Illus 1). Area one (NGR NN 655 382) had been previously identified as having archaeological deposits present, which were considered to represent a group of up to seven sunken structures (Atkinson et al 1997a). Archaeological deposits within area two (NGR NN 6578 3848) had been identified during the initial field assessment and comprised of a circular structure c 6 m in diameter, and a possible rectangular sunken structure, 5 m by 3 m. Area three (NGR NN 6607 3860) had also been identified during the initial field assessment as potentially containing archaeological deposits which appeared to comprise of a series of banks forming square or subrectangular enclosures. Demarcation was achieved by means of high visibility tape attached to road irons, inserted into the ground no more than 0.15 m deep.

Excavation

Two access points (for route 2) were required to cross an earthen enclosure dyke. In order to minimise vehicle impact excavation of a 6 m length of dyke was planned. The details of the construction of the dyke would effectively be preserved through record.

The turfs were removed by hand and kept sep-



Illus 1. Location map.

arate for reinstatement. The core of the dyke was excavated by hand. Where the old land surface was present it was sampled for palaeo-environmental evidence. Soil sample tins were taken in area 2 from the section of the dyke for micro-morphological analysis to assist in the interpretation of the deposits.

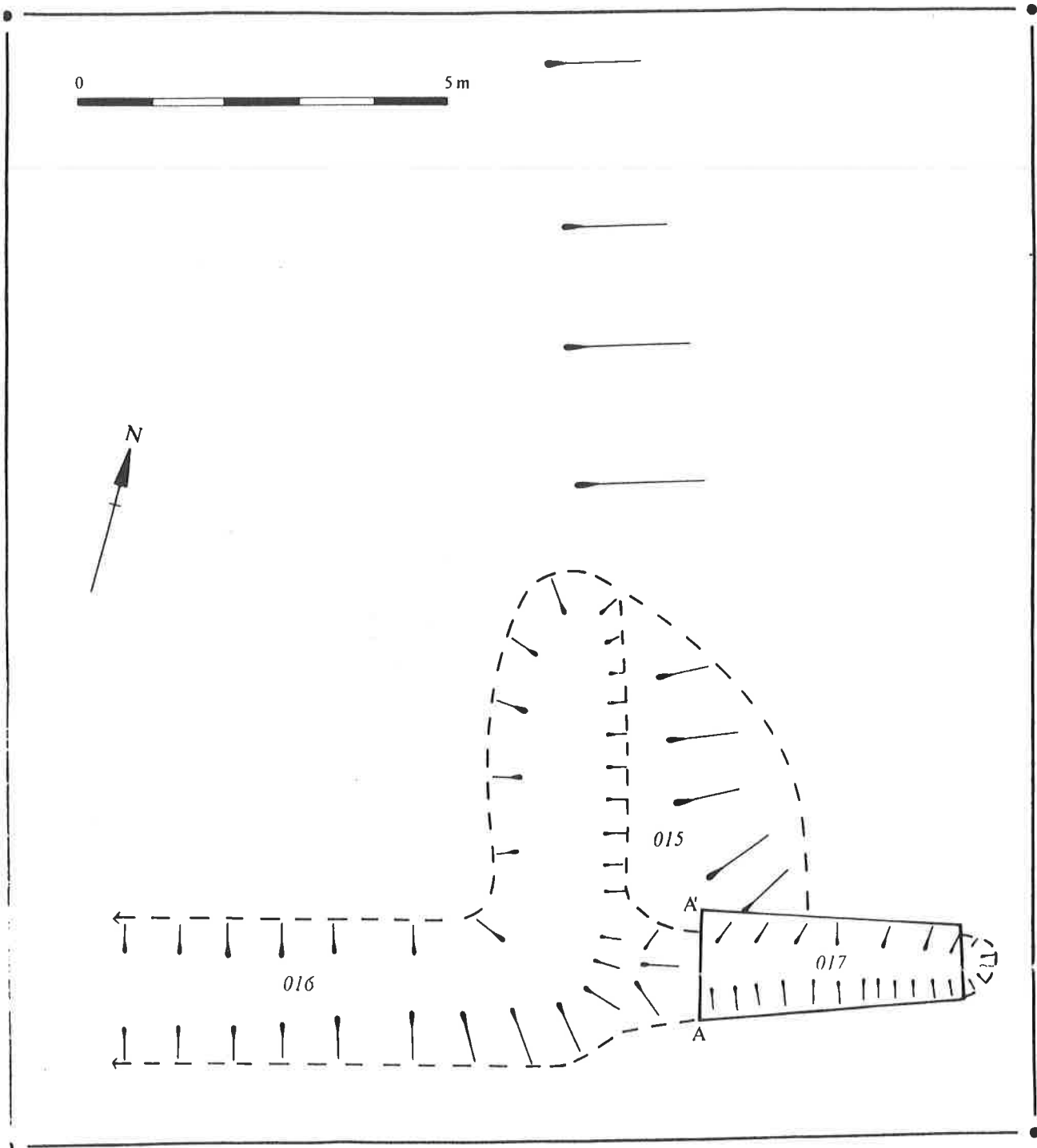
Results of excavation

The two points at which access route 2 crossed the enclosure dyke (016) were distinguished as area 1 and area 2. Area 1 was located on the western portion of the main enclosure dyke (016), while

area 2 was situated on the south-east corner of the enclosure and involved the excavation of an 'arm' (017) off the main enclosure dyke (Illus 2).

Area 1

The 6 m length of dyke (016) was not observable at this point from surface remains which was made more difficult with the stump of a collapsed tree being present. A sondage measuring 0.90 m by 1.10 m was excavated by hand at this point. After the removal of turf and topsoil no substantial trace of a bank could be observed. After the excavation of the sondage no trace of a bank was observed in section.



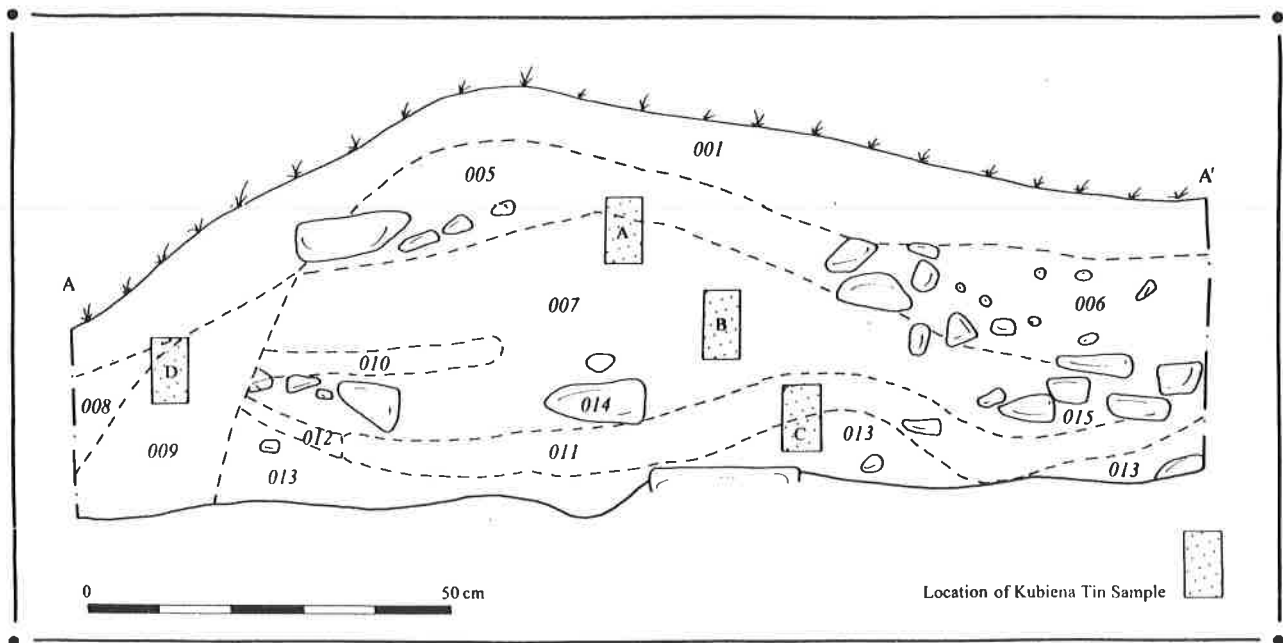
Illus 2. Trench location.

Area 2

The length of dyke at this point appeared to represent an arm (017) extending from the south-east corner of the main body of the enclosure dyke (016) towards a stone bridge crossing a burn. Surface examination of the length of dyke (017) indicated that the northern face sloped gently while the greater part of the southern face was almost vertical. It would appear that the southern face was vertical due to later disturbance of the dyke (017). As the southern face was vertical along the west-

ernmost c 3.5 m of dyke (017), and was more rounded in profile towards the eastern end, it appears that any disturbance was limited in extent. The dyke appeared to narrow towards the east and appeared to terminate on the surface at a distance of c 5 m from the south-east corner of the enclosure. Situated in the corner between the two dykes was what appeared to be a grass-covered stone spread (015).

As the dyke (017) terminated on the surface



Illus 3. East-facing section through dyke.

about 2 m before the edge of the burn it was only necessary to excavate a 3.6 m portion of the dyke. The section was located at a point where any later disturbance to the southern face appeared minimal. The portion thought to establish a relationship between the two dykes was preserved in-situ.

Excavation of the dyke (017) revealed several important points. It appears that the old land surface (011) is preserved beneath the bank and that prior to the erection of the bank large flat stones (014), up to 0.40 m in length, were laid on the old land surface (011). The bank appears to have been constructed of turf and soil. It is possible that there was a turf revetment (009) on the southern face of the dyke (017). Although this deposit may represent slippage from the originally higher dyke. Interpretation of the deposits is made difficult as the appearance of the section through the dyke may have been modified through processes of secondary transformation (see Chrystall below). The old land surface appeared to continue to run away to the south-east towards the bridge, suggesting that the dyke (017) itself may have extended towards the bridge prior to later disturbance.

Also of note was the grass-covered spread of stone (015) to the north of the dyke (017), which may be contemporary with its construction. The stones (015) are visible in section sealed beneath what may be slip (006) of the dyke (017).

Reinstatement

Upon completion of the work by Hydro-Electric the stretch of earthen dyke was reinstated by hand utilising the original materials. A biodegradable membrane was employed to consolidate the dyke in order to allow the turf to regenerate and prevent

any collapse or erosion. All demarcation materials were removed without damaging underlying archaeological deposits.

Soil micromorphology report

Dr Fiona H Chrystall

General soil survey information

The soils found in the foothills of Ben Lawers, along the western shore of Loch Tay are part of the most extensive map unit 498 (Macaulay 1982) of the Strichen Association which covers much of eastern Scotland. These till deposits are developed on schists of the Dalradian Assemblage. The soils are mainly characterised as humus-iron podzols with some brown forest soils and gleys and have limited potential for agricultural crops due to limiting climatic factors.

Sampling and analysis

Four undisturbed soil samples were taken for micromorphological analysis (Illus 3). Four soil thin-section slides (A-D) were prepared and described using a light box and a hand-held magnifying glass before micromorphological description using an Olympus BX50 light microscope over a range of magnifications and using both plane- and cross-polarised light.

Interpretation

The similarity of the mineral assemblage in each of these slides suggests that no material has been imported from outwith the immediate vicinity of Ben Lawers during the building of this construc-

tion (Courty et al 1989). The minerals present are entirely consistent with the mapped parent materials and till deposits of this area (Bil 1996). The high degree of alteration of mineral grains and the presence of ferruginous, amorphous and cryptocrystalline nodules, coatings and infillings indicate that significant weathering and water movement has occurred in this soil profile, leading to the solution, movement and precipitation of iron from the iron-rich olivine present in this till. This is aided by the loamy sand texture of the soil. The presence of a thin iron pan and significantly more ferruginous, amorphous and cryptocrystalline coatings and infillings in slide D may be because this sample was taken towards the outer extent of the dyke where overland and through flow is likely to be greater as run off follows the contours of the dyke (Illus 3).

Silt or clay coatings or cappings have been used as evidence of human disturbance in several contexts (Courty et al 1989). The complete lack of any silt or clay coatings or cappings means that no interpretation of the methods of construction of this dyke can be made. This is probably due to loss of this evidence with bioturbation through time rather than because it never existed. Although little in the way of excremental pedofeatures was recorded, this does not mean that there has been no biofaunal activity in the past. Indeed, the spongy microstructure of three of these slides is primarily due to the high coalescence of oribatid mite excrement which could not be distinguished as discrete features and thus cannot be classed as mamillate excremental pedofeatures. This is an inherent problem with attempting soil micromorphological description without immediately delving into the realms of interpretation. This spongy microstructure could, thus, be interpreted as evidence of significant biofaunal activity in the past which indicates that these soils were possibly originally much more organic than they now appear. Significant comminution of organic material from soil fauna in the past could account for the relative lack of organic material in these soils today. However, it must also be noted that the agricultural potential of these soils is most severely limited by the adverse climatic conditions rather than the soil fertility and it is unlikely that these soils have ever carried sufficiently lush vegetation to greatly enhance the organic content of the soils.

These soils contain no charcoal, bone or other human artefacts to indicate that the materials used to build this dyke came from settlement features such as middens, hearths or recycled roofing material. However, this is not surprising given that no settlement structure can be easily associated with this series of three large enclosures. It is much more likely that these enclosures were constructed using turf from the immediate vicinity, although those areas from which the turf could have been

stripped cannot now be easily identified. This is in contrast to the landscape at Badentarbat near Achiltibuie in Wester Ross where there is clear evidence of a landscape stripped of its surface topsoil outwith the substantial head dyke which encloses the main area of cultivation (Chrystall 1998).

Summary

The soils from this cross-section of an enclosure dyke (017) now provide few micromorphological clues to the construction methods and materials used to create it. However, it can be said with some confidence that the dyke (017) was built using natural topsoil and turf from the surrounding area as no 'foreign' minerals or inclusions were present in the soil samples analysed. The soils contained in this structure are consistent with the descriptions given for the natural soils of this area by the Macaulay Institute for Soil Research from their survey published in 1982. However, this interpretation would be greatly enhanced by comparison with similar soil thin sections sampled from the area surrounding this structure. Research proposals and funding is currently being gathered for an ambitious programme to investigate the landscape of Ben Lawers, of which Cragganester is a part. The slides described here may form the basis of a soil thin-section database which may lead to more complete understanding of past human activities in this area.

Discussion

The sondage excavated across the point where the dyke (016) was thought to be in area 1 revealed no traces which could be considered to represent the dyke itself. This is probably due to disturbance through the growth and collapse of a tree at this point which destroyed the bank. The collapse of the tree would have been followed by a period of further erosion of archaeological deposits with material being washed down the slope to the west.

The second section of dyke (017) excavated represents an interesting morphological detail of the main enclosure. It is not clear what the chronological relationship between the two elements is. It is possible that they are contemporary, but the possibility that the main enclosure dyke (016) is later must be considered. A similar 'arm' can be observed coming from the south-west corner, which suggests that they may represent the only visible portions of a linear feature partially sealed by a later enclosure. It is, however, also entirely possible that these 'arms' represent later additions to the enclosure which effectively further delineate the landscape. It is unclear what the stone setting (015) represents, it may be related to field clearance although it could be structural.

Cragganester lay within the Breadalbane offi-

ciary of Crannich (Farquarson 1769; Morrison 1985) and formed part of Weem parish. Farquarson's survey of North Loch Tayside of 1769 indicates that the enclosure dyke contained a plantation of young pine trees (Scots pine). Scots pine was valued for its hardy nature and ability to grow almost anywhere (Robertson 1799, 232). It is, therefore, probable that the enclosure dyke was constructed as part of a tree planting programme in order to keep stock out (Anderson 1967, 99). The change in stock balance of cattle:horse:sheep from 2:1:0 to 1:1:1, between 1727 to 1780 in Breadalbane (Dodgshon 1998, 211, table 8.1), may relate to a need to enclose plantations to protect them from grazing sheep.

The establishment of enclosed plantations may also, however, relate to a formalisation of views of the nature of landscape and its human occupation. Much of Loch Tay was renowned for the variety of trees grown within plantations, with mixed plantations of larch and Scots pine being 'interspersed with a vast number of beeches, elms, sycamores, limes, chestnuts, both horse and Spanish, spruces, Weymouth pines, silver firs, geans, laburnums, white beams andc.' (Duff 1845, 460). The establishment of such mixed plantations during the 18th century were not simply concerned with the provision of wood as foreign imports were readily and more cheaply available (Smout 1997, 17–18). Rather, such plantations were a visible display of the status of landowners through use of more unusual species of trees. It is possible that the plantation at Cragganester represented one such display. Analysis of a palaeobotanical sequence from flax retting pits at Boggeyhollow, Cragganester shows an increase in foreign tree species during the 18th century (Atkinson et al forthcoming). The plantations are indicated on the first edition Ordnance Survey map and shown to contain numerous trees. In contrast, today only a handful of Scots pine survive which are possibly remnants of the original plantation.

Concluding comments

The programme of archaeological work successfully minimised the impact of the development on archaeological deposits. Those which were adversely affected were effectively preserved through record. The excavation of the length of dyke represents a small contribution to the study of medieval or later rural settlements, with particular significance to the programme of research currently being undertaken in the area (Atkinson et al 1997; 1998; 1999).

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Abstract

Upgrading of power lines by Hydro-Electric Plc within the bounds of the Scheduled Ancient Monument Cragganester, Tayside, led to a programme of archaeological work. This work was undertaken by Glasgow University Archaeological Research Division (GUARD), in order to avoid an adverse impact on archaeological deposits. The work included the demarcation of sensitive areas and the excavation of a portion of an enclosure dyke, and its subsequent reinstatement. This paper reports on the results of the programme of work and subsequent post-excavation analysis involving the use of soil micromorphological techniques.

Keywords: post-medieval, field systems, soil micromorphology, Loch Tayside