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# A radiocarbon dated pit alignment at North Straiton, near Leuchars, Fife

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## Introduction

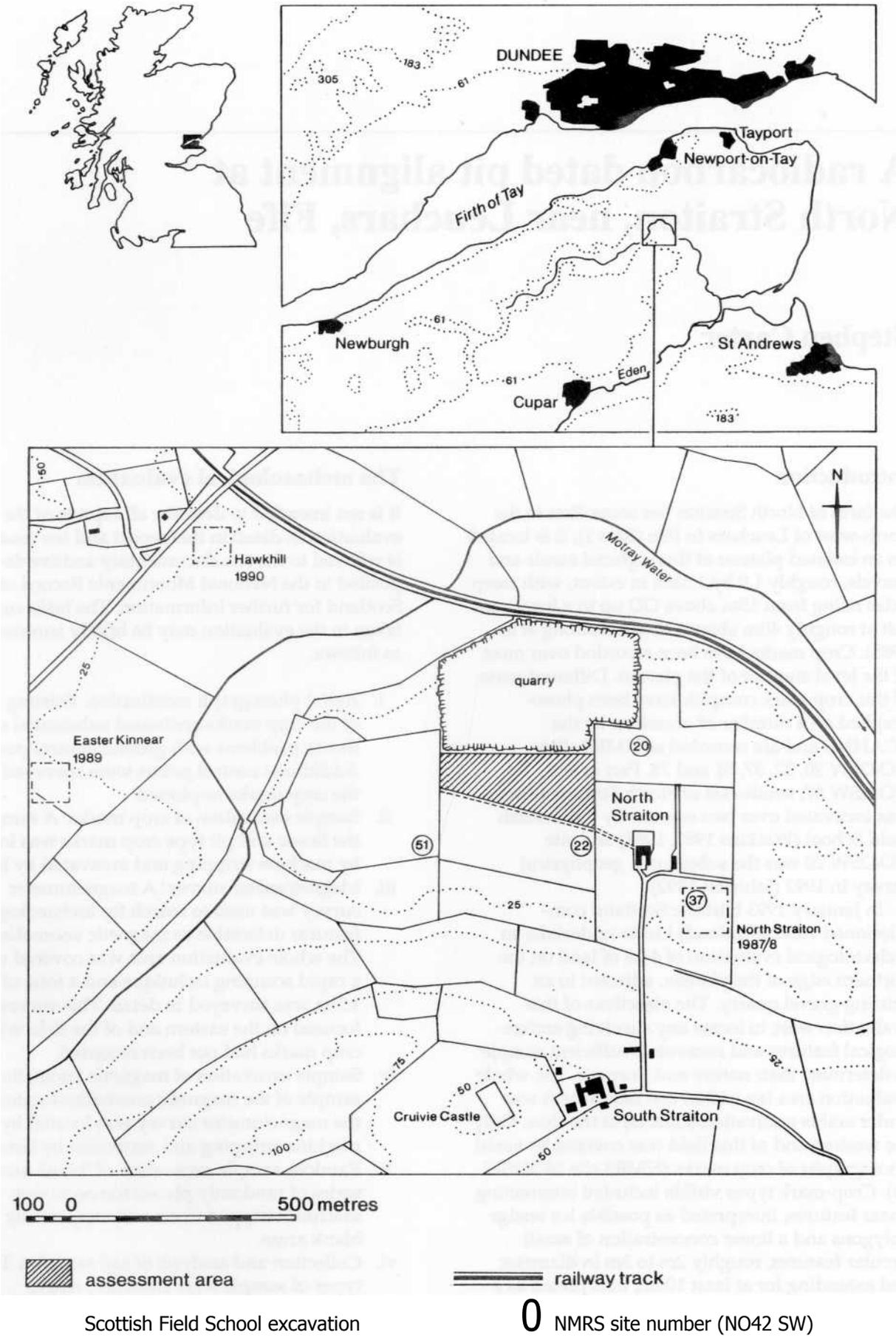
The farm of North Straiton lies some 4km to the north-west of Leuchars in Fife (Illus 1); it is located on an isolated plateau of fluvioglacial sands and gravels, roughly 1.0 by 1.5km in extent, with steep sides rising from 15m above OD up to a level summit at roughly 40m above OD (Armstrong et al 1985). Crop marks have been recorded over most of the level summit of the plateau. Different parts of this crop mark complex have been photographed on a number of occasions by the RCAHMS and are recorded as NMRS sites NO42SW 20, 22, 37, 51 and 73. Part of site NO42SW 37, south-east of North Straiton farm, was excavated over two seasons by the Scottish Field School (Watkins 1987, 1988) and site NO42SW 20 was the subject of a geophysical survey in 1992 (Johnson 1992).

In January 1993 Historic Scotland commissioned AOC (Scotland) Ltd to undertake an archaeological evaluation of 4 ha of land on the northern edge of the plateau, adjacent to an existing gravel quarry. The objectives of this evaluation were to locate any surviving archaeological features and excavate a sufficient sample to determine their nature and purpose. The whole evaluation area lay within one field which was under arable cultivation (carrots) at the time. Only the western end of this field was covered by aerial photographs of crop marks (NMRS site NO42SW 73). Crop-mark types visible included intersecting linear features, interpreted as possible ice wedge polygons and a linear concentration of small circular features, roughly 2m to 3m in diameter and extending for at least 100m, interpreted as a possible pit alignment (Illus 2). In this report, the evaluation and its findings are briefly described but attention is primarily focused on the pit alignment crop mark.

## The archaeological evaluation

It is not intended to describe all aspects of the evaluation in detail in this report and the reader is referred to the site documentary archive deposited in the National Monuments Record of Scotland for further information. The tasks undertaken in the evaluation may be briefly summarised as follows.

- i. Aerial photograph rectification. Existing plots of the crop marks contained substantial errors due to problems with ground control points. Additional control points were surveyed and the crop marks re-plotted.
- ii. Sample excavation of crop marks. A sample of the linear and pit type crop marks was located by machine stripping and excavated by hand.
- in. Magnetometer survey. A magnetometer survey was used to search for archaeological features detectable as magnetic anomalies. The whole evaluation area was covered using a rapid scanning technique and a total of 1.5ha was surveyed in detail. This survey was focused on the eastern end of the field where crop marks had not been recorded.
- iv. Sample excavation of magnetic anomalies. A sample of the magnetic anomalies located in the magnetometer survey was located by machine stripping and excavated by hand.
- v. Random sample excavation of 'blank areas'. A series of randomly placed transects was machine stripped to examine apparently blank areas.
- vi. Collection and analysis of soil samples. Two types of sample were collected, where possible, from each excavated context. These were standard bulk samples for flotation and wet sieving and routine soil samples for chemical and physical analyses.



Illus 1. Location maps.

These tasks yielded a range of valuable results. Linear crop marks, as anticipated, were found to have been created by ice wedges (Gemmell and Ralston 1984; Armstrong et al 1985). The magnetometer survey (Shiel 1993) did not detect any archaeological features and most magnetic anomalies were caused by the fluvio-glacial sediments that underlie the site. Excavation revealed a variety of natural and man-made features not visible as crop marks or magnetic anomalies. Definite man-made features included a post-medieval ridge and furrow system and earlier possible rectilinear enclosures. No settlement or other focus of activity was identified.

Aerial photographs of crop marks on the Straiton plateau have revealed two concentrations of prehistoric settlement south-west and south-east of the evaluation area (NMRS sites N042SW 51 and 37) with a scatter of structures to the south and east (NMRS sites N042SW 22 and 20) (Illus 1). The evaluation area may therefore be characterised as an unoccupied or cultivated area between settlements. Excavation by the Scottish Field School of parts of site N042SW 37 revealed Bronze and Iron Age structures (Watkins 1987; 1988), suggesting that it remained a focus of settlement for a considerable period of time. It is hoped that the findings of the evaluation will be incorporated into a future publication of the Field School's investigations at North Straiton. This will be a more appropriate place to deal with the wider issues that they raise.

## The pit alignment

### The crop mark

The pit alignment was recorded as a crop mark in a series of aerial photographs taken in 1989 (RCAHMS negatives B21154-62). It consisted of a linear concentration of small circular marks, roughly 2m to 3m in diameter, extending for at least 100m. A transcription of the pit alignment and other crop marks is presented in Illustration 2. From this transcription, it is clear that almost half of the crop mark area photographed in 1989 had already been destroyed by the expansion of the gravel quarry, including much of the possible pit alignment, before the evaluation was undertaken in 1993. Only seven transcribed crop mark pits lay within the evaluation area; the remainder of the surviving pits lay beyond the field fence on the north side. The area containing these pits had not been quarried yet but deep stripping of the topsoil in preparation had apparently destroyed all traces of these features.

### Excavation

Geophysical survey failed to detect the crop mark

pits on the ground but one was encountered in a sample excavation trench (Trench II, Illus 2). This pit (F 1000) was the largest pit-type feature encountered in the evaluation (Illus 3). It was an irregular oval, 3.3m x 1.8m and up to 0.5m deep with gently sloping sides. Fills F 1001-1003 consisted of alternating layers and lenses of orange sand and gravel and grey brown sandy loam with charcoal concentrations. The fills were half-sectioned and then bulk-sampled for the recovery of dateable material (artefacts and ecofacts). These samples were processed by wet sieving and flotation and only wood charcoal and other carbonised plant remains were recovered. A small assemblage from F 1003 consisted of three small legume seeds (*Vicia/Lathyrus spp*), a few fragments of hazel shell (*Corylus avellana*) and fragments of monocotyledon stem tissue. All identified fragments of wood charcoal proved to be oak (*Quercus spp*); a sub-sample of the oak charcoal from F 1001 was submitted for radiocarbon dating and the following determination obtained:

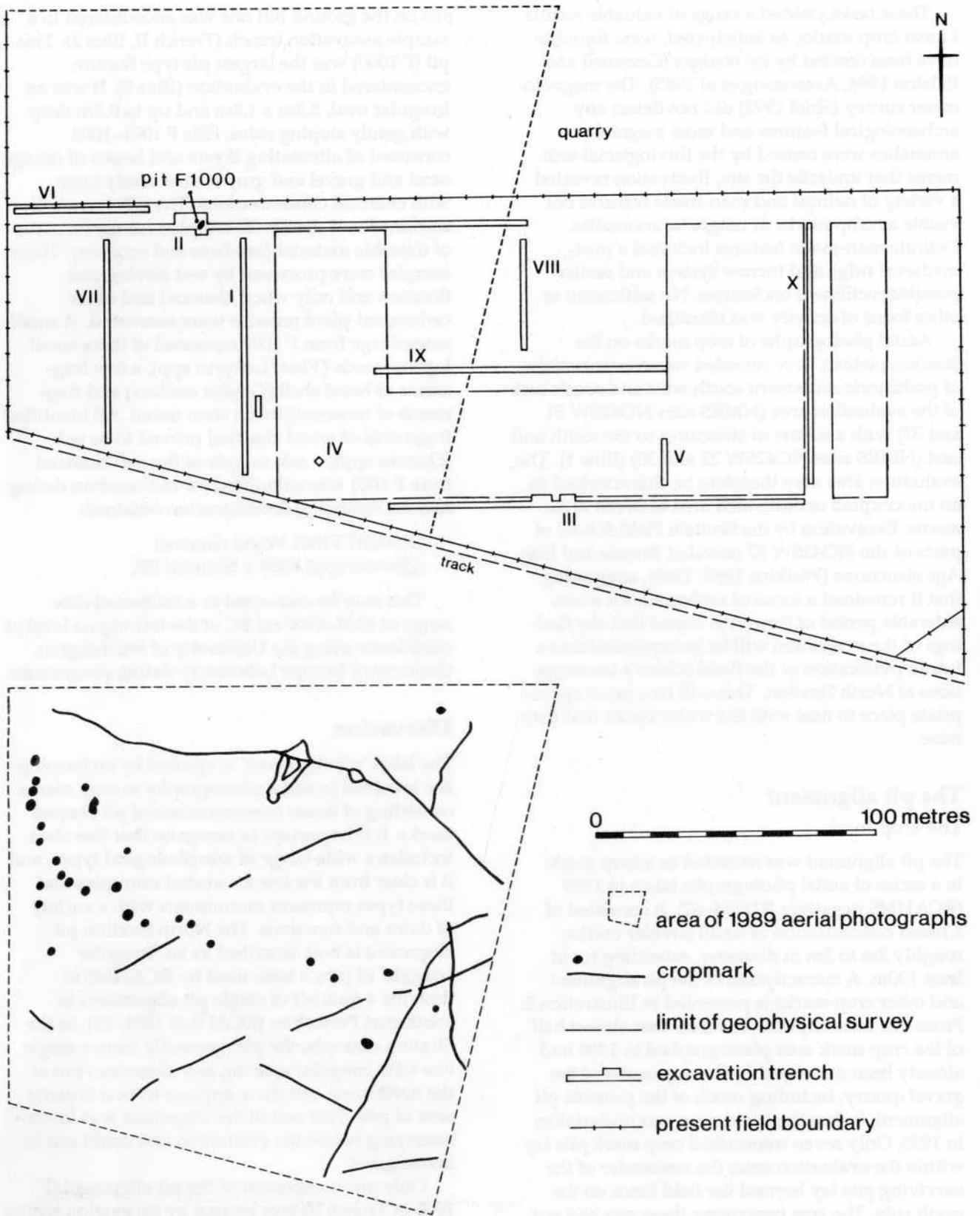
GU-4207 F1001 Wood charcoal  
(*Quercus spp*) 4360 ± 50 uncal BP.

This may be converted to a calibrated date range of 3258-2900 cal BC at the two sigma level of confidence using the University of Washington, Quaternary Isotope Laboratory dating programme.

## Discussion

The label 'pit alignment' is applied by archaeologists involved in aerial photography to crop marks consisting of linear concentrations of pit shaped marks. It is important to recognise that this class includes a wide range of morphological types, and it is clear from the few excavated examples that these types represent monuments with a variety of dates and functions. The North Straiton pit alignment is best described as an 'irregular straggle' of pits, a term used by RCAHMS to describe a number of single pit alignments in south-east Perthshire (RCAHMS 1994, 29). In the Straiton example, the pits generally form a single line with irregular spacing and alignment but at the north-west end there appears to be a broader area of pits. This end of the alignment was lost to quarrying before the evaluation and could not be investigated.

Only one component of the pit alignment (F 1000 in Trench II) was located by excavation within the evaluation area; the size, depth and the nature of its fills are consistent with the pit type crop marks. It is a shallow irregular oval feature and, making allowance for plough truncation, was originally up to 5m across but not more than 0.8m deep. It is clear from the radiocarbon date that this pit filled up at some time in the late-Neolithic

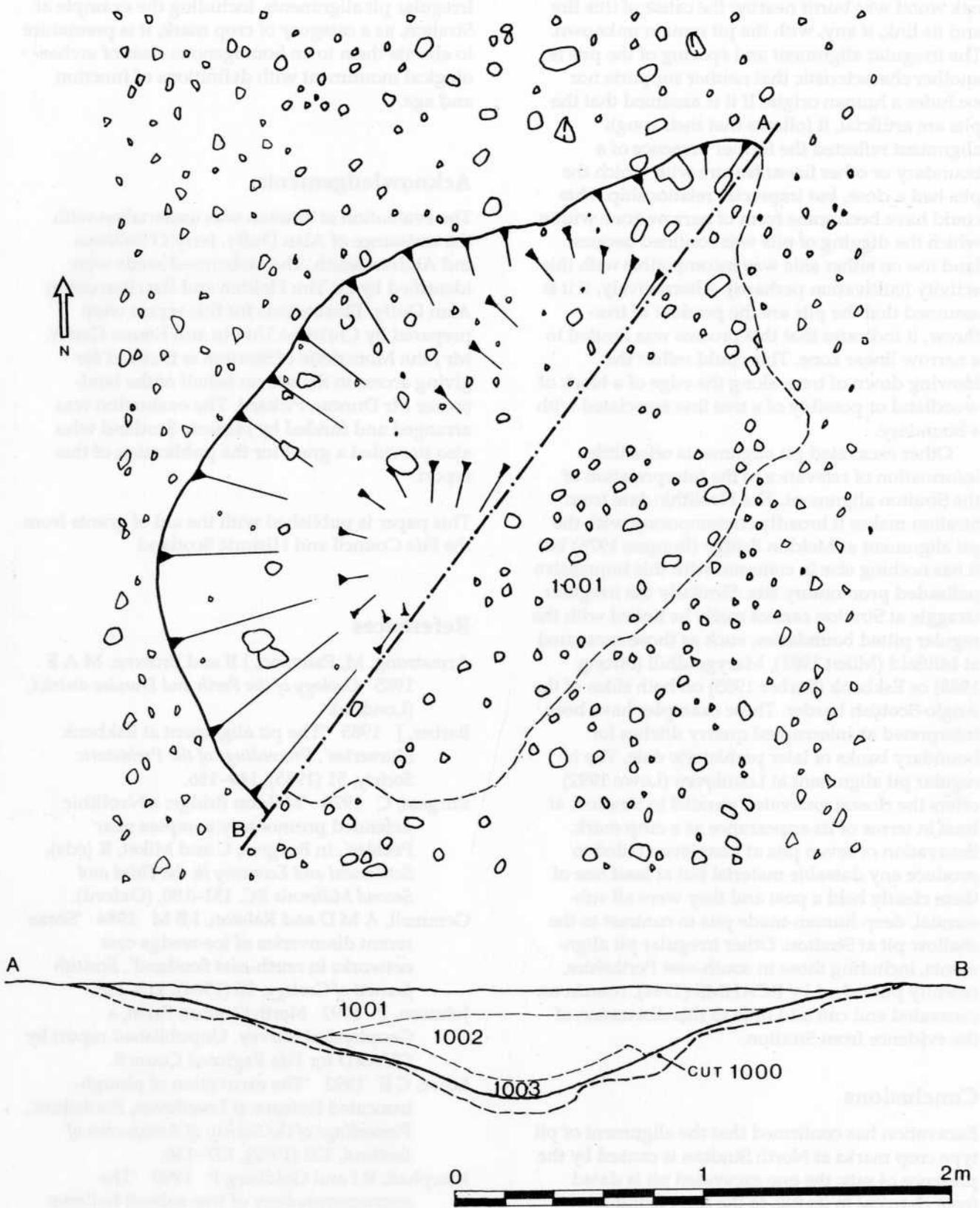


Illus 2. General plan of the evaluation area and rectified plot of the crop marks.

period but the available information suggests little about its origin and function.

Two principal interpretations may be proposed: either that the pit (and therefore the alignment)

was made by people or that the pit was created by natural processes. The shape of the pit and the composition of its fills neither support nor reject a deliberate human origin. Its size and shallow



*Illus 3. Plan and section of pit F 1000.*

irregular profile are reminiscent of a naturally occurring tree-throw pit and the fills could be the product of either human or natural deposition processes (see Macphail and Goldberg 1990 for a

general discussion and examples of pits encountered during archaeological excavation). The presence of abundant oak charcoal in the fill simply demonstrates that a substantial quantity of

oak wood was burnt nearby; the cause of this fire and its link, if any, with the pit remain unknown. The irregular alignment and spacing of the pits is another characteristic that neither supports nor excludes a human origin. If it is assumed that the pits are artificial, it follows that their rough alignment reflected the former presence of a boundary or other linear feature with which the pits had a close, but imprecise relationship. This could have been some form of narrow zone within which the digging of pits was confined because land use on either side was incompatible with this activity (cultivation perhaps). Alternatively, if it is assumed that the pits are the product of tree-throw, it indicates that this process was limited to a narrow linear zone. This could reflect the blowing down of trees along the edge of a block of woodland or possibly of a tree line associated with a boundary.

Other excavated pit alignments offer little information of relevance to the interpretation of the Straiton alignment. The Neolithic date from Straiton makes it broadly contemporary with the pit alignment at Meldon Bridge (Burgess 1976) but it has nothing else in common with this impressive palisaded promontory site. Similarly the irregular straggle at Straiton cannot easily be linked with the regular pitted boundaries, such as those excavated at Milfield (Miket 1981), Marygoldhill (Strong 1988) or Eskbank (Barber 1985) on both sides of the Anglo-Scottish border. These examples have been interpreted as interrupted quarry ditches for boundary banks of later prehistoric date. The irregular pit alignment at Loanleven (Lowe 1992) offers the closest excavated parallel to Straiton, at least in terms of its appearance as a crop mark. Excavation of seven pits at Loanleven failed to produce any dateable material but at least one of them clearly held a post and they were all substantial, deep human-made pits in contrast to the shallow pit at Straiton. Other irregular pit alignments, including those in south-east Perthshire, recently published by RCAHMS (1994), remain unexcavated and can add little to this discussion of the evidence from Straiton.

## Conclusions

Excavation has confirmed that the alignment of pit type crop marks at North Straiton is caused by the presence of pits; the one excavated pit is dated from charcoal in its fills to the late Neolithic period. Both natural and human origins are proposed for the alignment but there is no evidence from the evaluation or from comparison with similar excavated and unexcavated crop mark pit alignments that allows a convincing argument to be made in favour of either interpretation. Therefore, whilst it is possible to recognise

irregular pit alignments, including the example at Straiton, as a category of crop mark, it is premature to elevate them to an homogenous class of archaeological monument with definitions of function and age.

## Acknowledgements

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## Abstract

*An archaeological evaluation of 4 ha of arable land at North Straiton, Leuchars, Fife was undertaken in January 1993 by AOC (Scotland) Ltd. It involved crop mark transcription, geophysical survey, excavation and sampling. An irregular alignment of pit type crop marks, recorded on aerial photographs, was found to have been largely destroyed by expansion of an adjacent gravel quarry. One of the pit type crop marks was excavated and a radiocarbon date of  $4360 \pm 50$  uncal BP was obtained from charcoal in the pit fill. Both natural and human origins may be proposed for the alignment but there is no evidence from the evaluation that allows a convincing argument to be made in favour of either interpretation. The evaluation was arranged and funded by Historic Scotland and Fife Regional Council.*

Key words: pit alignment, Leuchars, crop mark