Archaeological work on the Fife Water Pipelines, 1995: the excavation of Bronze Age, Roman and medieval sites

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Introduction

In the summer of 1995, GUARD were commissioned by Fife Regional Council Engineering Department to undertake archaeological watching briefs during programmes of work to install new trunk water mains between New Inn and Tarvit Reservoir, near Cupar, and between Balmullo and Newport, in Fife (Illus 1). The main aim of the project was to monitor construction work and, where appropriate, excavate and / or record any significant archaeological remains encountered. Some scope had also been allowed in the specification for archaeological prospection, prior to the watching brief proper taking place, in order to identify specific areas of potentially high archaeological sensitivity. Scrutiny of the existing aerial photographic coverage, followed up where appropriate by limited geophysical survey was the methodology suggested to achieve this. In the event significant concentrations of sensitive archaeological remains were identified at three discrete locations along the Cupar pipeline route: Kirkton, Scotstarvit and Edenwood. Following consultation with the commissioning body and the local authority archaeologist, a programme of excavation for each of these sites was drawn up and carried out. Along the Balmullo route the only significant archaeological material identified was from post-medieval activity at Forgan Smithy; a short excavation was undertaken here.

The specialist reports which appear here are shortened versions of the originals, which may be consulted in the archive now housed in the National Monuments Record for Scotland. All funding for the work was provided by Fife Regional Council Engineering Department and the project was monitored for Fife Region by the Fife Archaeological Service.

Background

The archaeological work undertaken on the Fife water pipeline construction programmes was called for in the context of National Planning Policy Guideline 5: Archaeology and Planning, Planning Advice Note 42 and the Fife Structure Plan, all of which see archaeology as a part of the environment to be protected and managed. Since it was clear that the new pipelines would pass close to and / or through areas of known archaeology (see below), Fife Regional Council Engineering Department consulted with the council’s archaeology service and an appropriate course of action was agreed leading to the preparation of a specification for archaeological works. The principal aim of the project was to ensure the identification and recording of all archaeological material lying in the path of the proposed pipeline. The area to be affected by the pipeline measured c.13km in length between Glenrothes and Cupar, much of which followed the existing line of the A92, and 6.7km in length between Balmullo and Newport (Illus 1). In all cases the working corridor width was 14m.

Several sites of archaeological significance were known to exist on these routes. The Cupar route started 0.5km north-east of Balfarg henge (Barclay and Russell-White 1993), situated within one of the most important prehistoric landscapes in Scotland; and ran close to or through crop marks at Kirkton of Cults, including a souterrain (NO 341 098); a single crop mark at Cults Burn, presumed to rep-
resent a plough-truncated prehistoric funerary structure (NO 343 100); a crop mark complex at North Scotstarvit (NO 353 108), including a variety of probable prehistoric landscape features; and a Roman military marching camp at Edenwood, across one corner of which the pipeline was due to pass (NO 358 113). Along the Balmullo route important known sites included several crop mark complexes at Strathburn (NO 437 232), Comerton Home (NO 434 251), Leuchars / Wormit (NO 436 226), and South Friarton (NO 432 253), each of which had been provisionally interpreted as representing the remains of settlement.

Along the Cupar route it was agreed that all watching brief activity would be preceded at certain points along the route by programmes of geophysical survey to try to identify those areas along the pipeline route which might contain archaeological remains. In the event, three discrete concentrations of archaeological remains were encountered during the watching brief, prompting an additional phase of rescue excavation. The archaeological work on the Cupar route took place between late June and early September 1995. The archaeological work on the Balmullo to Newport route was undertaken between early September and early November 1995.

The archaeological works

The Fife Regional Council's specification for the Cupar route stipulated that the main construction programme would involve stripping topsoil by machine across an area 6m to 7m wide for the full length of the pipeline, followed by the cutting of a centrally located trench (1m wide by 2m deep) for the water main. It was anticipated that an archaeological presence would be maintained on the basis of one to two visits per week for the duration of the twenty to twenty-five week programme. In the event of the discovery of significant archaeological remains, the trenching work could be stopped in a limited area to facilitate recording for a maximum period of one full day. The only
planned exceptions to this were in the vicinity of the crop marks at Kirkton of Cults and Cults Burn and in the vicinity of the Roman marching camp at Edenwood, where it was stipulated that any reasonable amount of time would be allowed to permit full archaeological recording to take place.

In the event, the pipeline corridor extended to a width of some 9m. Generally, archaeological inspection took place every two to three days, though in areas where sensitive archaeological remains were known to exist, especially at Scotstarvit and Edenwood, a constant presence was maintained during topsoil stripping. Because of the delay between topsoil stripping and archaeological monitoring, which at most extended to three days, there was concern that wind blown sand and the effects of vehicle movement across the stripped areas might mask archaeological material. As a consequence, on several occasions during the watching brief, topsoil-stripping operations were monitored for a full day. At no time during these control exercises were archaeological features observed which would not have been detected during the normal watching brief programme.

In the case of the Balmullo route it was stipulated that a constant archaeological presence would be maintained during the topsoil stripping phase of the construction programme. In the event, the corridor created by the topsoil stripping was on average 7m wide and 0.2-0.3m deep.

There was a high possibility of archaeological remains along the stretch of the pipeline route which lies immediately adjacent to the Leuchars / Wormit crop mark complex. However, due to circumstances beyond the control of GUARD, a 250m long stretch of pipe was inserted by the contractors through the field south-west of St Michaels sand and gravel pit without an archaeologist present. It is therefore impossible to gauge whether or not significant archaeological remains were affected by the construction programme in this area.

Geophysical survey
Robert James and Gavin MacGregor

Method and background. The solid geology of the area comprises sedimentary Old Red Sandstone conglomerate, while the drift geology is composed of recent and Pleistocene morainic glacial deposits, consisting of fluvo-glacial and moulndy sands and gravels. Due to the character of the drift geology the survey was conducted, in the main, using electrical resistivity. A Geoscan electrical resistivity meter (RM 15) was used. The survey was conducted over full or fractional 20m by 20m grids according to available space, at a sampling density one metre, giving a good compromise between the criteria of rapid collection and clear graphical resolution. At the Roman marching camp at Edenwood, geomagnetic prospection was employed, with the express aim of locating associated hearths or ovens. Here a Geoscan fluxgate gradiometer (FM 36) was employed. The results of the survey were processed using the software package ‘GEOPLIT II’.

In the event it was only possible to undertake geophysical survey at Kirkton, Edenwood and Kettlebridge, Scotstarvit having previously been stripped. At Kirkton an area of 510m x 20m along the route was surveyed, while at Edenwood 288m x 20m was surveyed; at Kettlebridge an area of only 60m x 7m in length of corridor was surveyed.

Results. Geophysical anomalies were identified during at both Kettlebridge and Kirkton but there proved to be no correlation between these and archaeological features. In contrast, the survey at Edenwood identified the length of ditch of the marching camp which ran through the pipeline corridor and a potential area of burning inside the camp. However, as this feature lay outside the stripped area it was not possible to establish its nature. Significantly, the geophysical survey supported the evidence from both aerial photographs and excavation that the south-east return of the ditch was not present at Edenwood (see further, section 3 below).

On balance, the geophysical survey was only moderately successful, perhaps due to the nature of the subsoils and the extremely dry conditions.

A Bronze Age cemetery at Kirkton

During the watching brief an archaeological feature [002] was identified at Kirkton (Illus 2). This was half-sectioned to reveal a quantity of cremated bone in a pit. The presence of a burial deposit near a crop mark thought to be a barrow (NMRS NO 31 SW 088) suggested there may have been other associated deposits in the vicinity. Therefore, a stretch of corridor 25m in length was cleaned by hand, centring on the cremation deposit. This revealed another three features [013, 021, 031] within the immediate vicinity of [002] (Illus 3 and 4).

The excavated features
One cremation burial [002] (003) lay in an
Illus 2. Kirkton – location map.

elongated oval pit 0.75m by 1.25m with a maximum depth of 0.25m (Illus 4). The pit had a flat bottom 0.2m by 0.8m.

A heaped deposit of cremated human bone had been placed on the base of a pit, and comprised very large, clearly identifiable fragments of bone including skull, patella, and teeth. The bone appears to have been carefully collected, and the lack of obvious pyre material in the deposit may indicate that it had been washed. Analysis of the deposit (see Roberts below) revealed that it contained a minimum of four individuals: one female aged 25–50 years, one (?) male aged 25–40 years, a child aged 4–7 years and a foetus aged c 7 months.

Amongst the cremated bone was a single unburnt flint point, and two other fragments of flint (see below), together with part of a copper-alloy awl (see below). The rest of the fill was composed of a light-brown sand.

A second small cremation deposit (030) [031] about 0.8m east of [002], had been badly truncated and disturbed by a combination of ploughing and the recent topsoil stripping, which had spread it over an area 0.85m by 0.4m (Illus 4). The deposit (030) had exceptionally well-defined edges, measuring 0.28m by 0.36m. It is possible that the cremated bone had originally been held in an organic container which had decayed. The cremated bone appeared to have been sorted from the pyre material in the same manner as that described above (003). The feature was sectioned and the deposit was found to survive to a maximum depth of 0.05m. No definite cut could be distinguished other than a diffuse and irregular area (031) which may be a product of mineral staining.

The cremation deposit, weighing only 13.3g, was found to contain a minimum of one individual: a mature adult of unknown sex (see Robertis below).

The third feature located was a sub-circular pit [013], measuring 1.2m by 1.1m by 0.3m deep, which contained a setting of medium sub-angular stones (014), each up to 0.4m long (Illus 3 and 4). The stones were set into a moderately compact, dark red-brown sand (011) which filled [013]. Originally seven stones had been set as uprights around a base stone to form a sub-rectangular box 0.85m by 0.6m externally, though ploughing had disturbed the setting, having removed one of the uprights. The fill (010) was a loose red-brown sand.

The function of the stone structure (014) is unclear. The stones were unburnt and the fill (010) contained no charcoal, suggesting that it was not used as a fire box. Similarly, the construction was poor, and having no clay luting, the box could not have served as a water holder. Although no fragments of bone were recovered, its relationship to the other features suggests that it may have served, perhaps even symbolically, as a cist during mortuary rituals. A small cist containing cremation deposits at Barns Farm (Watkins 1982) had similar dimensions to this one.

The fourth feature located was a grave pit [021], though the full complexity of the feature only became apparent after sectioning took place (Illus 3 and 4). In plan the cut [021] for the pit was an irregular sub-oval measuring 2m by 1.7m. The
sides were steeply cut, at points almost vertical, to a flat, if uneven, base some 0.3m deep. In the west side of the pit was an oval scoop 0.08m deep, set within the base. It measured 0.8m by 0.6m. In the east side of the pit a sub-rectangular slot with near vertical sides [045], 0.4m by 0.12m, was cut into the base to a depth of 0.1m. A Food Vessel (043) had been placed at the western end of the pit. It lay on its side with its mouth to the east and although complete it had been broken in antiquity, probably due to the weight of material above it.

The fill of the pit was clearly composed of two elements, at one time, perhaps, separated by an upright plank (025) inserted into a slot [045] (Illus 4). The eastern portion had been back-filled with several layers of sand tipped in towards the centre from the east (023, 026, 028) and (022, 024, 027, 029) tipped in from the west.

Bronze Age graves have been found elsewhere in Fife, such as the three graves excavated at Barns Farm (ibid, 70–9). Notably, grave 2 at Barns Farm also contained a simple bi-partite Food Vessel crushed on its side at the edge of the grave (ibid, 76). It is possible that an inhumation had been placed in the Kirkton pit, of which no visible trace has survived even as a soil stain. Time constraints precluded sampling for phosphate analysis, which may have indicated whether an inhumation had been placed in the grave. Excavation of Bronze Age graves has shown that they frequently contained coffins, but in this case the only indication of a coffin was the sub-rectangular feature observed in plan after the initial cleaning. If it represents the traces of a coffin, it is somewhat smaller than many of the other previously excavated examples. Although this could be due, in part, to heavy truncation of the feature, two other factors may account for the small size of the putative coffin. The first is that it may have been intended to accommodate the body of a child or small person; the second is that the profile of the coffin may have changed with depth, as has been suggested for grave 2 at Barns Farm (ibid, 75, fig 11).

The cremations

Julie Roberts

Deposit 003. This deposit contained large fragments of bone, in good preservation, including several complete skeletal elements. The size of the fragments ranged from c 2mm to 100.7mm in diameter, and almost all skeletal elements were represented, with the exception of the sternum, which may have been present but was too fragmentary to be recognised. Selective burial of certain bones does not appear to have been practised and the under-representation of some elements is likely to have been due to pre- and / or post-depositional taphonomic processes rather than deliberate choice (Roberts 1995). A minimum number of four individuals can be identified within the deposit: one female aged 25–50 years, one male aged 25–40 years, a child aged 4–7 years and one foetus aged c 7 months.
Cremation and burial practice. The majority of the bones from deposit 003 were white in colour, indicating that they had been cremated to a temperature in excess of 700°C. The exceptions to this included three fragments of occipital bone; two were dark grey in colour and joined together to form the (?) male occipital protuberance, and one, thought to be female, had a brown / grey nuchal area (the posterior part of the skull). In addition to the occipital fragments, part of an
ethmoid (nose) bone and the posterior part of a calcaneus (heel) bone were also dark grey in colour. The darker colour of these fragments indicates that they were not completely cremated, probably because they did not receive an adequate oxygen supply during the cremation process. The ethmoid bone would have been protected by the outer bones of the cranium, whilst the other elements mentioned may have been in contact with a surface through which the oxygen could not circulate. The particular bones affected, ie the back of the head and a heel, might be an indication that the bodies were laid on their backs at the time of cremation, possibly with the funerary pyre built over them.

The warpage, curved cracking and transverse checking present on the majority of the bones is an indication that they were fleshed at the time of cremation, and the dark grey / brown colour of the few less burnt fragments is further evidence that they were not left exposed prior to this event. It can be stated, therefore, that the four individuals from deposit 003 were all cremated shortly after death, before their flesh was allowed to decay. The circumstances surrounding their actual death and interment are less clear. The archaeological evidence shows that they were buried together in a single event, which presupposes one of two scenarios. The four may have all died at the same time, possibly of some illness or trauma which left no trace on the skeletal record. They were then all cremated shortly afterwards, either together or separately, and their bones were collected, mixed together and buried in a single grave. Alternatively, the four died at different times and each individual was cremated shortly after his or her death. Their bones were then stored until they could be buried all together in a single grave. There is no way of knowing how long the bones might have been stored, but there is no evidence of weathering on their surfaces, suggesting that they were protected from the elements during this phase of the mortuary ritual.

The inclusion of the foetus in the burial may have been incidental if it had belonged to the female member of the group and was in utero at the time of her death. Alternatively, it may represent a formal burial. Past cultures are known to have differed in their attitudes towards the formal burial of infants under a certain age. For example, it is well attested that the Romans inhumed rather than cremated infants before the age of teething, usually beneath the floors of buildings. This was because it was considered that until a child could walk and talk it did not possess a soul and therefore did not require special burial rites (Philpott 1991).

Pathologies. Among evidence for pathologies was porotic hyperostosis on the foetal / neonatal and the female adult; ante-mortem tooth loss in the male and female adults; trauma to the right thumb of the male; degenerative arthritis of adult vertebrae, probably due to strenuous lifting and hauling, and periostosis of the juvenile's long bone.

Deposit 030. This poorly preserved deposit consists primarily of fragments of long bone, rib and unidentified trabecular bone, in fragments ranging from <2mm to 19.4mm maximum diameter. There were no repeated skeletal elements in it and no great differences in the size and robusticity of bones which might distinguish a child from an adult, and therefore it was possible to identify a minimum number of only one individual.

The presence of a third molar with fully developed roots indicated that the individual was an adult of over 21 years of age. Slight sclerosis of the apex of the root of a mandibular incisor and the presence of osteophytes around the facet of the atlas, which articulates with the dens, suggested that the adult may have been mature or elderly, ie 40 + years; however, there is no further evidence to support this conclusion.

There were no sexually dimorphic elements present on which to base an estimate of sex, although the third molar and the incisor root were both quite small. The sex of this adult therefore remains unknown.

As with deposit 003, the predominant colour of the bones was white, indicating that they had been heated to temperatures in excess of 700°C. Most of the fragments were too small to show signs of warpage and cracking, although one was slightly ‘checked’.

Pathologies. The only pathology identified was the degenerative change to the atlas, which may have been a result of the normal ageing process.

The lithics
Mike Donnelly

Three pieces of struck flint were recovered from the cremation deposit (003). One flake (Sf 03), a small piece of knapping debris, has been burnt severely producing a gloss over much of its surface. Another piece (Sf 04) appears to have undergone some form of surface alteration; it has an orange brown surface in two places, entirely distinct from its own colour which is light grey. This piece may originate from a larger polished object. The evidence of direction of applied force, the shape of the piece and in particular the orientation of the discoloured surfaces suggest that it originates from close to the end of a larger object. Furthermore, the fracture observed at the proximal end of this removal suggests impact rather than snapping, resembling the 'step bending fractures' discussed by Fischer (1985).

By far the most impressive piece is the re-
known from Fife, with lithics occurring in 20 of the 136 recorded examples (Donnelly 1991). These include knives at Rumgally (Tenant-Gordon 1932; 1933), discoidal scrapers at Barns Farm, Dalgety (Watkins 1982) and four barbed-and-tanged arrowheads at Dairsie (Anderson 1887).

Although many pieces of flint have been recovered in association with Bronze Age burials, small, carefully worked flakes or knives are rare; most pieces recovered measure around 40–50mm in length. Perhaps the best comparison for the flake from Kirkton is the snapped flint flake discovered with urn XII at Brackmont Mill (Mears 1937, 263). The piece from Kirkton appears not to have been used in any fashion that would leave a macroscopic trace. This is not a universal trait, as many pieces included in burial or votive contexts have been utilised. Clearly the practices involving the accompaniment of lithic material alongside cremated individuals are many and varied. However, the rules, if any, governing these practices are unclear or vague at best. Lithics from unaccompanied cremations are extremely rare although pieces burnt along with the individual are often fragmentary and extremely difficult to spot (McKinley 1994), and it may well be that many such examples have been missed in the past.

The copper-alloy fragment
Gavin MacGregor

A fragment of copper alloy was found during the sieving of bulk samples of the cremation deposit (003) at Kirktoun. The size and form of the fragment suggest it represents the middle portion of an awl. The piece (0.2g) is 11.6mm long and changes shape from square in cross section at one end, widening slightly in the middle and by the opposite end is circular in section (Illus 6). It is 1.6mm wide at the square end, 2.2mm wide at the midrib, and 2mm wide at the round end. It is likely that the end with the square profile was hafted in a wooden or bone handle and the end with the circular profile terminated in a point. Within the terms of Thomas’s (1968) classificatory system developed for copper-alloy awls, the Kirkton awl would be best considered as a type 2D. Although a variety of forms of copper-alloy awls are known throughout the Bronze Age, dated comparable examples are predominantly from the early Bronze Age. The radiocarbon dates associated with two other Scottish examples suggest a currency of the first half of the 2nd millennium BC (Peltenburg 1982; Stewart and Barclay 1997).

There are 17 certain or probable early Bronze Age copper-alloy awls known from Scotland. However, the small size of many of them and the unlikelihood that they would survive in a recognisable state if cremated, combined with unsystematic excavation of many burials, will mean that
the number actually deposited in these contexts is under-represented.

The closest geographical example can be found relatively nearby at Kirkcaldy (Childe 1944 109). Copper-alloy awls are found as frequently accompanying inhumation as cremation burials. They are typically found incorporated in funerary deposits in flat cemeteries. Copper-alloy awls have been found in association with a range of different forms of pottery vessel, but most frequently with Food Vessels. Where an awl is not associated with pottery vessels, it may be found accompanied by a jet necklace. Awls associated with Food Vessels and / or jet necklaces account for nearly half (47%) of all known examples. In two other cases (Kirkton and Dalgety Bay) the awls were unaccompanied by pottery vessels but were found in Food Vessel cemeteries.

The Food Vessel
Gavin MacGregor

The Food Vessel has a simple, bi-partite form and an everted, rounded rim with a simple internal bevel (Illus 7). It has a height of 167mm, with an internal rim diameter of 174mm and weighs 2022g. The base is 30mm thick with the wall thickness varying between 10–14mm. Although complete, the vessel had broken post-depositionally and is currently represented by 30 sherds.

The outer surface ranges from pale orange to buff in colour, while the interior is grey. The firing profile suggests that the vessel was fired upside down in an open fire. The fabric comprises a coarse clay with fairly well-sorted inclusions of angular to sub-angular rock fragments (c 15%, up to 5mm) and poorly sorted sub-angular grog (less than 5%, up to 4mm). The inclusions are distributed medium to medium / densely. A smooth slip, c 2–3mm thick appears to have been applied to the surfaces, although it is less continuous on the interior where inclusions protrude through it.

The exterior has been decorated with four rows of stabbed decoration probably using a rod of bone or wood. The upper two rows comprise triangular stabs, between 15–18mm long, applied at an angle. The third row consists of circular stab marks, 6mm wide. The lowest row consists of oblique stab marks, 6mm wide, applied from beneath the shoulder. The internal bevel of the rim is decorated with a single row of angular stabs. For part of the circumference the decoration has been reapplied, creating a cross motif. It would appear that two different tools were utilised during the decoration of the vessel, with the rim decoration and upper two rows of body decoration made with one implement and the lower two rows with another, probably a split bone.

The interior of the vessel is partly encrusted with black carbonised material. It is likely that this deposit relates to the use of the vessel, either from ‘cooking’ or from the presence of liquids in the vessel during burial (Barclay no date). Of the other examples of staining on the interior of Food Vessels only one has patches on opposite sides of the pot, which is also from Fife, at Kirby Green Farm (PSAS 1970, pers comm, G Barclay). In some cases interior stains on funerary vessels may have developed post-depositionally through the adsorption of liquids. In contrast, however, it is almost certain that where carbonised remains are
found on the interior of funerary vessels, they derive from pre-depositional processes. There has, therefore, been some debate over whether Bronze Age funerary vessels were constructed specifically for use in the burial context or whether they were appropriated from other contexts (MacGregor, forthcoming). Samples were, therefore, taken from the Kirkton Food Vessel for analysis of any chemical residues present (see Taylor below).

Parallels and date. The Kirkton Food Vessel represents another addition to the rapidly increasing number of Food Vessels known from the east coast. Locally, the form of the urn can be compared to that found at Greenhill, Balmerino (Hutcheson 1902). Closer parallels for both the form and decoration can be found in the Food Vessels from cists II and XI at Almondbank, Perthshire (Stewart and Barclay 1997, 26, ilius 3, SF 1 and 10). The geographically closest radiocarbon dated example of a Food Vessel is that from Aberdour Road, Dunfermline (Close-Brooks 1972). Here a date of 3581 ± 40 BP (SRR-292), which calibrates to cal BC 2032-1773 at two sigma (calibrated on OxCal v2.01), was obtained from collagen within bone from the associated crouched inhumation (ibid, 135). Farther afield, a similar date of cal BC 2129-1684 (3556 ± 80 BP; SRR-590) was also obtained from human bone from Almondbank cist II (Stewart and Barclay 1997). It is probable that the Kirkton Food Vessel is of a comparable date to the above examples.

Residue analysis of the Food Vessel

Marcia Taylor

Residue analysis was undertaken on the Food Vessel with the intention of establishing whether it had been utilised prior to burial. Analysis was undertaken on three samples from sherds from the base (sherd K), middle (sherd H) and rim (sherd C) of the vessel using the technique of gas liquid chromatography (GLC) and gas liquid chromatography / mass spectrometry (GLC/MS).

Sherd C: GLC/MS spectra shows the presence of 22 identifiable compounds within the sample taken from Sherd C. This includes 17 saturated and unsaturated lipids. Of these, 10 lipids are present in sufficient quantities to make identification possible without speculation. As well as the lipids there are five discernible alkanes. One other partially identified compound is present, which appears to be a naturally occurring quinone with a molecular weight of 212. Efforts to trace this peak to a certain substance have been unsuccessful.

Sherd H: GLC/MS spectra shows the presence of 11 identifiable compounds in the sample taken from Sherd H. This includes nine saturated and unsaturated lipids. Of these, three lipids are present in sufficient quantities to make identification possible. As well as the lipids there are two discernible alkanes. The rest of the compounds displayed on the graph are accounted for by trace lipids and alkane compounds, impurities and / or phthalates. One such compound which is present in sufficient quantities to discern is Bis (2-ethylhexyl) Phthalate.

Sherd K: GLC/MS spectra shows the presence of 26 identifiable compounds within the sample taken from Sherd K. This includes 22 saturated and unsaturated lipids. Of these, 14 lipids are present in sufficient quantities to make identification possible. As well as the lipids there are four discernible alkanes, one of which is identifiable. The compound with the molecular weight of 212 is present in larger quantities but still without any more specific detail as to its true nature. Its structure consists primarily of dominant ions 212, 197, and 155. As with the previous sherd samples, the rest of the compounds displayed on the graph are accounted for by trace lipids and alkane compounds, impurities and / or phthalates.

Conclusions. The nature of the residues suggest that at some time in the life history of the vessel it had been used as a container. Lipids associated with leaf waxes and seed oils and other vegetable matter are present in the residue samples analysed. Lipids associated with waxes, rather than fats, are present in good degrees of preservation. This suggests they are associated with the vessel’s use. A logical method of sealing a porous clay vessel is to smear the interior surface walls with waxes or fats. This is most commonly done when the vessel is to be used to hold or store liquids. Residues resulting from animal sources are not excluded from the Kirkton samples analysed. Lipids indicative of milk and milk fats are present in the samples, although these can equally be attributed to seed oils.

This leads to some speculation that the encrusted deposit visible on the interior is not associated with the use of the vessel but results from depositional or post-depositional process. The unusual opposed pattern of the visible residue tends to support this conclusion. If this patterning is a true reflection of the deposit and not a result of preferential survival conditions then we must seek another explanation for its deposition.

A possible indication of the source of the encrustation could be inferred from the presence of 6-Pentadecenoic acid and Margaric acid. Both these fatty acids have been found to be present in human hair fat along with Arachidic acid (Weitkamp et al 1947). However, some doubt has been cast upon this, with the possibility of Penta-
decenoic acid and Margaric acid being degrada-
tions of other (even carbon numbered) fatty acids,
not true fatty acids in their own right (Hilditch and
Williams 1964).

Discussion

An early Bronze Age cemetery at Kirkton. Excavation
at Kirkton has produced evidence of an early
Bronze Age cremation cemetery. Its full extent,
however, is not clear. It is possible that the features
excavated represent a discrete group, but it is more
likely that they are part of a more extensive ceme-
tery. The crop-mark evidence of a barrow only
150m away suggests the area has seen extensive
Bronze Age funerary activity. Of particular note
about the Kirkton grave is that an upright wooden
marker had been incorporated into it. This may
have been to ensure that it could be found later, a
focus for other deposits in the close vicinity.
Whether this was the case it would also have
served as a visible reminder of the burial from
other points in the landscape. It should, in any
case, not be forgotten that the features at Kirkton
were utilised within a landscape where other
monuments already existed or would sub-
sequently be constructed.

Located in the field to the north of the Kirkton
cemetery is a complex range of crop marks, some
of which can be considered domestic in character.
It is entirely possible that the individuals buried at
Kirkton lived there. The evidence of possible
funerary sites in the area suggests that there may
be a dispersed linear group of monuments, run-
ned broadly parallel to the course of the river
Eden, which saw ritual activity during the late
Neolithic and Bronze Age. The nearest known
Bronze Age burial site is at Pitlessie, c 800m to
the south-west of Kirkton. In 1927 a small cist
was discovered there containing a deposit of cremated
human bone (Gordon 1927). A possible small ring
ditch, situated 28m to the south-west of Kirkton is
visible on an aerial photograph (NO 31 SW 81A
28675). Also of note is the presence of two probable
hengiform monuments to the south-west of Kirk-
ton. The first is 500m distant at Pitlessie (NO 30
NW 138), while another is located a further 2km
away at Balmalcolm Farm (NO 30 NW 77). To
the north-east of Kirkton, c 2.9km distant at Eden-
wood, are a further two mounds (Kenworthy
1977). As a group these monuments extend over a
length of some 5.6km, and may perhaps bear some
similarity to ritual monuments of the same period
known from Kilmartin in linear groups over a
corridor of some 5km, from Upper Largie to
Ballymeanoch.

A major centre of ritual activity at Balfarg / Bal-
birnie is located only 8km, a few hours walk, to the
south-west of Kirkton (Barclay and Russell-White
1993). It has been noted that there is an apparent
gap in the distribution of late Neolithic and Early
Bronze age activity between Balfarg and Ladybank
(ibid, 200). Indeed the remains encountered at
Kirkton support the impression that there is a
concentration, albeit more dispersed in nature, of
ritual activity of the period in the Howe of Fife. It
is probable that the Bronze Age cemeteries within
the Howe of Fife were used by families and com-
munities who had either been to or knew of Bal-
farg. The linear group of monuments to which
Kirkton may relate may have delimited a route for
the dead and the living between different parts of
Neolithic and Bronze Age Fife.

Ritual activity at Kirkton. Excavation has produced
information about four very different archaeological
features: a grave pit, a cremation burial, a
cremation deposit and a stone box. Unfortunately,
no samples suitable for radiocarbon dating were
retrieved either during excavation or during the
processing of bulk samples. Although it is impos-
sible to be certain of the chronological relationship
between these four features, it is likely that they
were broadly contemporary in date. The examples
of dated copper-alloy awls and Food Vessels from
Scotland show that they were in contemporary
circulation and use, clearly exemplified by the
Almondbank cist 2 burial (Stewart and Barclay
1997). The Almondbank burial, however, shows
the potential complexity of funerary rites, as the
bronze awl was found amongst cremated bone
which lay beneath the skull of the inhumation. It
is, however, probable that the two burials were
placed in sequence as part of a single funerary
ritual (contra McAdam 1982, 122).

The clearest parallel for the group of features at
Kirkton is found at Barns Farm (Watkins 1982). It
would not be difficult to imagine the partial view
of the cemetery at Barns Farm that would have
emerged if it had been discovered during a
pipeline operation. Indeed, if found in this way the
group of features G3, C6, P8 and P9 would present
a striking similarity to those at Kirkton. It is,
however, the variations between this group of
features and those excavated at Kirkton which may
be most informative. The cist at Dalgety Bay
contained two deposits of cremated bone, one of
which contained a copper-alloy awl; although
grave 3 contained no Food Vessel, the other graves
in the cemetery did. Pit 8 contained the partial
remains of a single cremated individual, while
other pits in the cemetery contained a variety of
different deposits of human remains. Clearly, the
comparative groups of features at Barns Farm and
Kirkton have many similarities, but there is a
variability in how the different material compon-
ents have been utilised.

It is clear that in the Bronze Age there was a
limited range of artefacts that were deposited in
funerary contexts. These were often employed in stereotypical groupings but at other times they are found separately. It would appear that there was a degree of fluidity in how these artefacts could be utilised in the funerary context. It would be a mistake, however, to consider that all deposits containing these artefacts are purely funerary in nature. It is important to consider these remains in terms of what they may represent, not only in the context of acts of burial, but also what they tell us about the events which took place before burial. The nature of many Bronze Age burial deposits suggests that there may have been a temporally extended sequence of events prior to interment which can be broadly distinguished as belonging to a mortuary phase or funerary phase (MacGregor, forthcoming). It is possible that the temporally extended nature of some Bronze Age mortuary rituals meant that, due to changes in circumstances, some mortuary deposits never received a full funerary ceremony. It would, therefore, not be difficult to imagine that the stone box at Kirkton did serve or could have served in the same fashion as Barns Farm cist 6, with the cremation finally having been transferred to a pit at the appropriate time for final burial. Stone boxes may have served as temporary storage for cremations until the appropriate time to be bury multiple individuals. Similarly, the putative organic container used to bury some of the cremated bones at Kirkton may have been a temporary deposit until full burial was required. Some of the mortuary deposits from these kinds of contexts would then have been combined to receive a full funerary treatment, others would have been utilised as token deposits, while others would have been left in their mortuary contexts.

Multiple individuals are frequently found in Bronze Age cremations. We must consider why this practice of multiple interment was undertaken. As noted above, in the case of the four individuals buried together at Kirkton, it is possible that they died and were subsequently cremated at the same time or that they died at different times and each individual was cremated shortly after his or her death, and all were later buried together. It would be very difficult to establish which of these scenarios is true. Perhaps, in this case, more important than the actual sequence of events which took place was the ultimate choice of interring four individuals together. What might this choice tell us of beliefs during the period? A familiar interpretation would conclude that the individuals in the Kirkton burial represent a family group. Although not impossible, this situation would conveniently reflect our own contemporary attitudes towards what a family group is. It should be clear, however, from the variety and complexity of different types of family within our own society that this need not be the case.

In each case, analysis of the features excavated at Kirkton and their contents suggests a distinct sequence of events during their active use, prior to the point at which they became a social memory. As fragmentary glimpses of different stages of mortuary and funerary ritual they provide an insight into the richness and complexity of how the living treated the dead in the Bronze Age at Kirkton.

- The empty stone box, a container, found within the cemetery hints at its previous use as a temporary ossuary.

- A cremation pyre was built and fired. After the fire died the bones were carefully collected, only to be split into smaller portions. One small deposit of cremated bones from one individual may have been contained in a small leather or cloth bag as part of the mortuary ritual, but never recovered.

- Into the grave, which may have contained a small coffin for a child, a Food Vessel was placed: containers within containers. The residue analysis has indicated that the Food Vessel had seen use prior to burial. The presence of vegetable leaf and / or insect waxes on its interior suggests that it may have been deliberately treated to reduce its porosity, sealed so that it would contain liquids more successfully. The back-filling of the grave, covering the body, may have knocked the pottery vessel on its side. An upright wooden marker may have testified to the location of the grave.

- There may have been several pyres, each associated with a particular individual, or there may have been one great pyre, large enough to hold the four individuals. It may have been that an item was placed in the burial for each individual. The burial of four individuals (a woman and unborn baby, a child and a man) with four very different artefacts (an unburnt fragment of awl, an unburnt point, a fragment of a larger polished artefact and a small burnt fragment of flint) suggests that a perceived association between each individual and artefact. These meanings may have been complex and symbolic or they may have evoked no more than simple memories about each person who had passed away.
Dark Age and medieval settlement at Scotstarvit

The archaeological features present at Scotstarvit were spread along a 90m length of pipeline corridor (Illus 8 and 9). After the initial topsoil stripping, the most visible archaeological feature was linear in character, c. 4m wide, running for 36m through the pipeline corridor. The time lapse between stripping and excavation had allowed a deposit of blown sand to build up across the site, to a depth of up to 0.15m; this was removed mechanically. After this initial clean it became

Illus 8. Scotstarvit – location map.

apparent that there were at least two different parts to the linear feature: to the south a spread of midden-like material and to the north a series of linear features.

The features
The spread and structure (Illus 10)
After the initial clean a large spread (10m by 4m) of mid-dark brown loamy silt (048) was distinguishable. This was excavated in four spits, each 0.1m deep. Flecks of charcoal were present throughout this deposit with occasional fragments of burnt bone; these were most densely concentrated in the lowest spit. Unfortunately, two modern drainage ditches running through the deposit had disturbed some of the features.

The first spit excavated produced 25 sherds of medieval pottery and part of a decorated spindletwirl. The second produced another 24 sherds of medieval pottery and revealed the top of a stone setting 7m long by 0.5m wide (049). The next spit completely exposed the stone setting and 12 more sherds of medieval pottery were recovered.

The stone setting (049) was half-sectioned. In places it survived three courses deep and appeared originally to have been built with larger facing stones containing a core of smaller stones and earth. One sherd of medieval pottery was recovered from the core. There was very little other stone within the spread (048), and it seems probable that although the linear stone setting (049) had been significantly disturbed it was never substan-

tial, perhaps representing a footing for a timber or turf building.

During the removal of the stone setting (049) a further two sherds of medieval pottery were recovered. Sealed beneath the spread (048) were three curvilinear features (051, 053 and 055) (Illus 11). Two (051, 053) ran parallel east to west, 2m apart, each having a rounded terminal on the west. The third (055) ran north to south, perpendicular to the terminal end of (053). The three features appeared to define the extent of the hollow within which the spread (048) lay.

One trench (051) ran for 5m and varied in width between 0.6–1.0m. Upon excavation the feature had a maximum depth of 0.28m. The base was flat, 0.2m wide, from which the sides sloped gently upwards. A post pipe was seen within section (057) (Illus 12). Also present at this point in the base of the trench were five stake holes (064, 066, 068, 072, 070). Although only a limited portion of the trench was excavated the remains observed are highly suggestive of the foundations of a timber structure. A piece of daub and a fragment of burnt bone were recovered from the upper fill (050).

Another trench (053) ran for 3.5m with a fairly regular width of 0.6m. It was sectioned towards its western end and here the depth was 0.13m. The profile was flat-bottomed with a steep-cut (052) side to the north and a gentle slope to the south (Illus 12). No clear indication of structural remains was present.

The third trench (055) was 0.55m wide. The northern terminal had been destroyed by later
field drains but it clearly respected the terminal of one of the other trenches (053). This trench had a maximum depth of 0.18m and was gently rounded in profile [054] (Illus 12). No clear trace of structural remains was observed in the slot excavated through the trench (055).

Palisade and ditches (Illus 10)

To the south of these features, initial observation during topsoil stripping discerned one feature present, possibly a ditch. After cleaning, a series of broadly parallel features extending some 20m across the trench were discernible. These had been badly plough truncated. Two sondages were excavated across the set of linear features in order to characterise them. They comprised two main elements: a slot trench to the south and a ditch to the north.

The first sondage was excavated to investigate one of two perpendicular arms running off to the south-east from the main linear feature. There appears to be an initial cut [032] for both the linear elements and the perpendicular arm, to a depth of 0.3m (Illus 12). Clearly showing in section was a rectangular lens (039), 0.25m by 0.12m, which appears to be the remains of a sill-beam which had been placed in the trench and had rotted in situ. It is probable that the perpendicular element represents the remains of the base of an A-frame palisade construction. A sherd of medieval pottery was recovered from the lower fill (047).

The last event indicated by the section was the digging of a ditch represented by a cut [045], 0.7m wide and 0.13m deep, which had a mixed grey/orange sandy silt fill (046). This may correlate with the linear element [086] in the second sondage. A sherd of medieval pottery was recovered from the fill (046).

The second sondage was excavated at a point where the individual linear features could be clearly distinguished. These were only visible due to heavy truncation. Three linear features were distinguished. The feature to the west was a possible ditch [087], c.1.05m wide and 0.14m deep, with a mixed grey/brown silty sand fill (080). About 0.4m to the east was another possible ditch [086], 0.75m wide and 0.14m deep, with a red/brown sand silt fill (082). The third linear feature was a narrow slot trench [085] 0.22m wide with a depth of 0.08m; it had a red/brown silty sand fill (084). The slot [085] is probably the equivalent of (037). It appears that 086 cut 084.

Of particular importance in phasing the different elements was the relationship between the linear elements (080) and the trench (051) and it is thus unfortunate that no stratigraphic relationship between the two could be discerned. The spread (048) sealed both 051 and the southern part of the linear elements. However, the coverage of the
ditch (080) by 048 probably relates to later movement of deposits after the site fell out of use.

Cereal drying kiln [003] (Illus 10)
The kiln extended some 5m from the edge of the trench and was c. 2.5m wide. Its bowl was circular in plan with steep sides [003]. At a depth of 1.5m there was a ledge upon which were placed large stones (079). The southern portion of the feature comprised a sloping, stone-lined channel forming the flue, which descended from the old ground level to the ledge, over a distance of c. 2m. Ten large subangular stones, up to 0.25m by 0.35m by 0.5m in size, were situated against the wall of the flue. Four stones were on the southern side of the flue and six on the northern side, where they formed two courses. A sherd of medieval pottery was recovered from the fill (004).

At the very base of the bowl was a circular deposit of charcoal-rich black loam / sand silt (078), c. 0.6m diameter and 0.02-0.03m deep. This probably represented material which had fallen through the drying platform. The presence of substantial quantities of carbonised heather within the deposit suggests that it may have formed either part of the drying platform which was accidentally burnt or the fuel for the fire set at the mouth of the flue prior to the abandonment of the kiln.

After abandonment, the kiln was deliberately back-filled, evident through a series of tip lines visible in the section (Illus 12). The fill was a grey / black loam / fine sand 2m deep (004). It is probable that this was originally derived from turfs that had formed the superstructure of the kiln.

Other features (Illus 10)
Between the northern and southern spreads were three other features [001, 005 and 025].

Pit [001] (Illus 10): This pit was oval in plan and measured 0.55m by 0.45m. The western side sloped gradually, whereas the other sides were steeply cut to a depth of 0.30m. The pit had a round base and was filled with a loose brown sand / silt (002). No artefacts were present within the fill (002).

Pit [005] (Illus 10 and 12): This was a sub-oval pit, measuring 1.25m by 1m. The cut [005] was a wide U-shape with a maximum depth of 0.22m. The lowest level comprised a layer of heat-modified natural sand (018), above which was a charcoal-rich deposit (017). A second layer of charcoal (010) sealed it (017). The only find from this pit was a fragment of slag from a layer of yellow / brown silt sand (015) in the upper portion of the pit. It seems possible that this pit was used as a bowl furnace (see below).

Pit [025] (Illus 10 and 12): Situated 7m to the west of pit 005 was another pit apparently associated with industrial activity. The pit had been recut on possibly two occasions. The first cut [021] could only be observed in section. The details of the earliest phase were not clear, as the first recut [025] had removed most of the evidence of the first phase. It was clear, however, from the heat-affected natural subsoil (020) beneath (021) that burning had taken place. The first recut [025] was not very clear at the point where the feature was half-sectioned, and again most the information was destroyed by the secondary recut [027]. The charcoal-rich fills of the last phase of activity suggest the use of fire within the pit. Several pieces of slag were recovered from this feature. The events represented by the series of recuts and fills may be due to its reuse as a bowl furnace.

The northern spread (Illus 10)
A spread of dark sandy silt which extended over a length of about 18m within the stripped corridor was cleaned to reveal two small concentrations of sandy silt. Cleaning of the area revealed that there were two main elements to the spread, both of which had been plough damaged and disturbed by the topsoil stripping. During the initial clean, one flint and fifteen sherds of late medieval pottery were recovered. Two sondages were dug through the two smaller patches to establish their nature. The first sondage revealed dark grey / brown sandy silt (077) filling an irregularly cut (076) hollow to a maximum depth of 0.21m. The second sondage revealed a dark grey / brown sand silt (074) filling an irregularly cut hollow (075) to a depth of c. 0.08m. To the east there was a linear feature cut to a depth of 0.26m with a width of c. 0.5m. It is possible that this element represents the base of a severely plough-truncated ditch with a tail of material dragged to the east. Medieval pottery was recovered from the fills (077 and 074).

The medieval ceramics from Scotstarvit
Robert S Will

An assemblage of 104 sherds was recovered during the excavation at Scotstarvit. Although many of the sherds are quite small and fragmentary, they are not worn or badly abraded. The sherds have been examined visually and worked for joints, although few joins were found and no complete vessels or profiles were recovered.

The largest fabric types present are Scottish White Gritty wares. These fabrics are thought to have been made at various sites in Fife, Lothian and the Borders (Haggarty 1980; 1984) and to date from the 12th to 15th centuries. The earliest dated group of Scottish White Gritty wares was found at Kelso Abbey. The Kelso material comprises well-made, thin-walled and straight-sided cooking pots and date to the later 12th century. To date, only
one kiln site has been excavated: at Coulston in East Lothian (Brooks 1980) where straight-sided, barrel-shaped and globular cooking pots were identified. Although no kiln sites have been excavated in Fife, several possible sites have been identified from field-walking around Tentsmuir and Balchristie. Excavations at St Andrews (Lewis 1997) and Inverkeithing (Wordsworth 1983) have recovered complete pots and profiles of vessels suggesting that the more globular-shaped cooking pots may be a Fife regional style. This assemblage seems to be from the later 13th or 14th century and the vessels were probably made locally.

The vessels represented are cooking pots and jugs, with many of the cooking-pot sherds having sooting or fuming marks. Sherds from the cooking pots tend to be unglazed while the jugs are often partially glazed. The glazes tend to yellow or green, and several sherds are decorated with applied vertical strips with a brown glaze. One sherd may have a white slip on the exterior. One grooved strap handle has stabbing marks; this was for practical reasons to aid the thicker clay of the handle to dry out and stop warping in the kiln, as well as for decoration. The use of stabbing and slashing to do this may be a Fife trait, as numerous examples have been recovered from excavations in St Andrews (Haggarty and Will 1997; Hall 1997).

The spindle-whorl
Gavin MacGregor

A stone spindle-whorl (Illus 13) was found during the first clean of the southern spread. It is 32mm in diameter with a central hole, 9mm in diameter at the top narrowing to 8mm at the base, and has a weight of 12.3g. It appears that the spindle-whorl has split with only a thickness of 10mm.

The surface has been decorated with pairs of incised vertical lines between which run horizontal lines, forming ladder decoration. Similar examples have been found at other medieval sites along the east coast of Scotland. A stone spindle-whorl with incised vertical lines was recovered during the excavation of a rural settlement at Rattray (Murray and Murray 1993, 198 fig 45 no 290). An example from 13th-century deposits at Meal Vennel, Perth is decorated in zones created by pairs of vertical lines (Cox 1996, 785, illus 26 no 566). Ladder decoration is present on a spindle-whorl found within the topsoil during excavations at Castlecliffe, St Andrews (Lewis 1996, 645, illus 33, no 80).

Significantly the presence of the spindle-whorl indicates the production of wool and presumably the rearing of sheep at Scotstarvit.

The radiocarbon dates

Three samples were submitted from Scotstarvit to Beta Analytic for radiocarbon dating (Table 1).

Accelerator dates were obtained for the two bowl furnaces (017, 28). It would appear that they were broadly contemporary in use, with the slightly earlier date from 017 relating to the dating of Pomoideae rather than Hordeum vulgare. Sufficient quantities of burnt heather were available from the basal deposit (078) of the cereal drier for a radiometric date.

Palaeo-botanical analysis
Diane Aldritt

The Pictish / Dark Age phase. One of the closest excavated sites to Scotstarvit which has produced archaeo-botanical remains is Easter Kinnear (Driscoll 1997). Hearth material from Phase 2 at this site, although derived from mixed wood, provided a radiocarbon date of cal AD 541–684 (GU-3035). This date is approximately contemporary with the pit dates from 005 and 025 at Scotstarvit, although 005 produced a slightly earlier range of cal AD 343–612 (Beta-108702). A direct comparison can be made between the material from both sites. At Easter Kinnear, Dickson (1997) identified large quantities (in excess of 150) of grains of six-row hulled barley (H vulgare var vulgare) and abundant grains of hulled barley (H vulgare sl) from the Phase 2 hearth. Lower numbers of Avena sp were found, with the absence of any chaff remains precluding a distinction between wild and cultivated. The predominant cereal remains recovered from the two pits at Scotstarvit (005 and 025) which fall into the Pictish period were of Hordeum vulgare var vulgare, with some twisted grains present (six-row hulled barley). Context 017 [023] in pit 005 had 191 H vulgare var vulgare, 203 H vulgare sl (hulled barley), 75 Avena sativa (cultivated oats) and 103 Avena sp (oats).

In terms of deposition in these early contexts at Scotstarvit, the cereal grains could be readily interpreted as discarded waste from accidental charrings during crop processing. If so, this is most likely to have occurred during the final drying process, after threshing, winnowing and a small
Table 1. Radiocarbon dates from Scotstarvit and comparative dates.

<table>
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<th>Context</th>
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<th>Calibrated at 2 sigma*</th>
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<td>cal AD 541–684</td>
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* Calibrated using OxCal v2.01.

degree of sieving. The deposits in context 017 and 010 in pit 005 contained barley, oats and residual amounts of wheat. These are unlikely to have become mixed in a single charring event, therefore pit 005 may have been re-used as a rubbish dump on numerous occasions. This is probably also true, to a lesser extent, in contexts 028 and 031 in pit 025. Another interpretation for the presence of charred grain material, and other waste from cereal crop processing, is they may have been re-cycled for use as fuel in small-scale industrial processes on site. A mixed agricultural regime was probably in place from quite an early period at Scotstarvit. In the medieval phase samples, one sees the continuation of these practices, but with an apparent bias in the context sampled towards *Avena sativa* (cultivated oat) as a cereal crop.

The high medieval phase. The main cereal types found in Scotland during this phase are of a similar nature to those found in the earlier period, with mostly *Hordeum, Avena* and *Triticum* (Boyd 1988). The dated sample from Scotstarvit (cal AD 1043–1282, Beta-108704) was dominated by *Avena sativa* preserved in its glume bases, together with lesser amounts of *Avena strigosa* (bristle oat). One single find of *Avena fatua* was present as a weed in the crop sample. The *Avena strigosa* may also have been an opportunistic weed in the sample. This suite of carbonised cereals, the majority still enclosed in its chaff after harvesting, together with its accompanying abundant arable weeds, represents a single charring event. It is a unique moment of preservation, encompassing crop, arable weeds and heath material used as fuel.

It is an important discovery but does not provide a complete picture of the crop regime at the time. Although potentially residual, the few barley grains left in the kiln were probably from the processing of a previous harvest. Around harvest time large quantities of cereal may have passed through the kiln before being winnowed, sieved, and stored ready for transportation or consumption on site. Grain could also have been partially dried to delay spoilage, and then transported for full processing elsewhere. The large-scale processing of cereal crops for long-distance transport and storage would have required purpose-built corn-drying kilns on a scale far greater than that employed on a domestic level (van der Veen 1989). This suggests a highly developed infrastructure, co-ordinating the movement of produce between town and countryside.

Plants of arable and disturbed ground. The ubiquitous combination of weeds of arable land, *Chenopodium album* (fat hen), *Spergula arvensis* (corn spurrey), and *Persicaria lapathifolia* (pale persicaria), were found in low numbers throughout the majority of samples. It is only with context 078 that the heavy contamination load present in cereal crop yields caused by weeds prior to processing can be fully appreciated. In particular *Chrysanthemum segetum* (corn marigold) was present in great abundance in 078. This brightly coloured cornfield weed was regarded as a noxious pest in the past, and during the 12th century, Henry II issued an ordinance against 'Guidle Weed', ordering its eradication from crop fields (Mabey 1996, 374), such was the perceived problem. The large numbers of *Spergula arvensis* in 078 suggest that the crop was harvested quite low on the straw, as this is a low-growing plant, rather than taking the cereal straw and ears separately.

Heathland plants. The tradition of collecting peat and heathland materials for use as fuel and sometimes construction purposes (eg wall and roofing material) has been much documented (Fenton 1978). The use of heathy turves at Scotstarvit was shown by the presence of large quantities of *Calluna* (heather) material – in particular the deep basal roots of this plant found in 078. Rhizomes, probably of *Cyperaceae* type (sedges), were also found carbonised. The use of heathy turves usually occurs as a response to a lack of other suitable burning materials. This has important repercussions on the availability of this valuable resource, with the rights to dig turves being regulated by a landowner. In the early phase samples carbonised wood from cf *Sorbus* (rowan), *Salix* (willow), *Corylus* (hazel), and *Alnus* (alder) was identified.
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This may tentatively suggest some change in resource management and use of woodland over time. The preference for heath fuels in the later phases may be a response to lack of woodland resources.

Wetland plants. The Alnus (alder) and Salix (willow) present in the early phase samples suggest wet or boggy conditions. In addition, the find of macrofossils of various Carex sp (sedges), Isoplepis setacea (bristle club rush) and Rorippa sylvestris (creeping yellow-cress) in 017, and the cf Juncus bufonius capsule (toad rush) and Eleocharis sp (spike rush) in 016, are all indicative of wet, boggy or marshy ground in the vicinity of the site and its arable fields. An interesting comparison can be made between the later phase material from 078 which contained Stachys sp (woundworts), Galeopsis sp (hemp-nettles) and Potentilla sp (cinquefoils), which all include wetland varieties, and the work carried out by Hinton (1991) on modern weed-crop assemblages from Shetland. Hinton discovered various wetland and damp grassland weed species growing in poorly drained arable fields on the island of Unst, Shetland, in what were ostensibly intended as fields of Avena striosa (bristle oat). So whilst the drier heathland macrofossils probably arrived at the site with heather and turves collected for fuel, it is possible that some of the more moisture loving species may have grown on damp field edges and within the marshier areas of the cultivated crop.

Urban-rural connections. By the early medieval period it is certain that complex issues of ownership of land, trade and exchange of goods and services linked the growing towns and cities to their rural surroundings. Expanding medieval burghs within easy travelling distance from Fife included Perth, lying at the mouth of the Tay and St Andrews on the coast, both allowing easy access to goods transported by boat. Excavations carried out on medieval remains in Perth, spanning the 13th to 15th centuries, have produced carbonised
### Table 3. Carbonised plant macrofossils from Scotstarvit.

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<td><em>Cirsium sp</em></td>
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<td><em>Scirpus cf lacustris</em></td>
<td>Common club rush</td>
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<td><em>Indet Cerealia Poaceae</em></td>
<td>Cereal</td>
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<td><em>Bromus sp</em></td>
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<td><em>Dactylios decumbens</em></td>
<td>Heath grass</td>
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<td><em>Indeterminate weed</em></td>
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<td><em>Rhizomes cf Cyperaceae</em></td>
<td>Sedge roots</td>
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<tr>
<td>3</td>
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<tr>
<td>Modern seeds</td>
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<tr>
<td>Carbonised insect eggs</td>
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<td>Beetle elytra (non carb)</td>
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*Avena sp* (oat) and *Hordeum vulgare* (barley) grains (Fairweather 1996). From the excavated kilns at Mill Street, Perth (c 15th century), Robinson (1995) also identified *Hordeum* and *Avena*, together with 23 taxa of arable and wasteland weeds. The absence of cereal chaff (glumes, rachis and florets) and also straw, suggested that this crop was in a well-advanced stage of processing, and was probably being given a final drying prior to storage (Robinson 1995).

Cereal crops were undoubtedly a valuable resource in the early medieval period, and their harvesting, transportation and processing, were labour intensive tasks. The organisational role of village and town dwellers in co-ordinating these labours should not be underestimated. It is reflected in both Scotland and England in the construction of large-scale kilns, often in towns, to meet the growing demands of consumption by people who were no longer directly connected with the agricultural production of their own food. Increasing demand led inevitably to increasing...
pressure on available land resources, resulting in more marginal land areas being employed. Perhaps this is reflected in the presence of *Avena strigosa* (bristle oat), whether as an adventitious weed or a crop in its own right, from 078: this cereal can tolerate poorer, wetter soils than others, whilst the more fertile agricultural land was devoted to wheat growing.

**Conclusion.** The samples from the Pictish phases at Scotstarvit show a mixed agricultural regime, involving barley, oats, and wheat. This probably involved small-scale agricultural production together with some light industrial activities such as smelting. This effectively laid the foundations for subsequent larger-scale agricultural activities, which by the 11th century at least had reached a scale of production that required the construction of a corn-drying kiln. The nature of the pipeline excavation ultimately meant that the full extent of this production could only be estimated, but the activities certainly would have extended into the adjacent modern fields. By the high medieval phase, centres of production such as Scotstarvit would have established highly developed and complex links with their neighbouring urban communities. Control over agricultural production may already have shifted from the occupants of the countryside into the regional control of towns and cities.

**Burnt bone**

**Julie Roberts**

Three small deposits of burnt bone were recovered (from 048, 051 and 022) during excavation at Scotstarvit. The preservation of the bone was extremely poor and very little information could be gleaned from the remains. It was only possible to suggest a species for one fragment of bone. This was from 051 and may be human.

**Burnt and industrial debris**

**Irene Cullen**

The slags recovered were dominated by bloom-working debris which indicate smithy working of iron blooms into wrought iron objects. Two pieces were recovered during surface cleanings of the north area, while another was recovered from the fill (053) of a construction slot [052]. All three of the pieces were, therefore, probably residual. Their presence may indicate that a smithy had existed in the general area.

One small piece of bloomery debris was recovered from an upper fill (015) of a feature [005] which probably functioned as a bowl furnace. However, the very small amount of bloomery debris present suggested that the furnace had been cleaned out of slags after its final usage. The presence of heat-modified sand below 018 and two deposits of charcoal (010, 017) at the base of the feature also indicate use as a smelting furnace.

Another, similar feature nearby [021] had been obscured by two recuts [025, 027]. The fill of the first recut consisted of a dark grey sand (028), which contained a sizeable lump of clay furnace lining. The clay lining had a smooth, oxidised outer surface where it had been in contact with the surrounding soil and a rough, blackened inner surface from the reducing conditions within the furnace. A small amount of slag was found adhering to the inner surface of the lining. The clay lining showed no signs of a vitreous glaze, suggesting that it had not been in direct contact with the hottest part of the furnace. The furnace lining was 28mm thick. No other slags were found in the feature, but it had been further disturbed by the final recut [027]. The underlying sands here also showed signs of having been heat affected.

The iron-working debris found at Scotstarvit indicates that a range of iron-working activity had taken place in the general area. Two probably bowl furnaces were located within the confines of the excavated area and the further working of iron blooms may have occurred nearby.

**Discussion**

**A rural settlement.** The excavation at Scotstarvit has provided a rare glimpse of the nature of lowland Scottish medieval settlement (Yeoman 1991). It is worth bearing in mind that interpretation of the settlement activity at Scotstarvit must be based on a very partial view of the remains. Only a (unknown) proportion of the archaeological features present at Scotstarvit were excavated, and these have undoubtedly been truncated through a number of processes which may have destroyed the remains of later phases of activity. However, it is clear that the features observed in the southern spread relate to a series of structures. It appears that there were at least two phases of construction. The first phase involved the digging of a scoop within which construction trenches, probably holding wattle and daub walls, were dug (050, 052, 054) (Illus 11). It is not clear if the scoop’s excavation was contemporary with the erection of the first structure. The form of the structure is not entirely certain but the construction would suggest that during its first phase its walls were bowed in plan.

Another phase of construction is represented by the linear stone setting (049) (Illus 10). This may represent a denuded wall base for a turf construction, an element of either a dwelling or farm building. Although only a small proportion of the structure was observed, it suggests that the building was rectangular in form.

The artefactual remains recovered from the
structure at Scotstarvit suggest that the settlement was in use during the early part of the medieval period. When the settlement scoop was first established is not entirely clear, but the incorporation of Scottish White Gritty ware in constructional features suggests it was medieval rather than Pictish in origin. The discovery of fragments of burnt bone, medieval pottery including cooking pots and jugs, and a spindle-whorl from inside the deposits within the structures suggest that they represent domestic occupation. It seems unlikely that the artefactual remains represent the later use of an abandoned building as a dump for rubbish from elsewhere. Rather, this material probably relates to the build-up of occupation deposits within a structure used as some form of dwelling. It is, therefore, likely that the structure represented a house rather than a barn or byre.

The presence of a sherd of medieval pottery in the ditch (046) suggests it was siting up during the occupation of this structure. The phase when the palisade and ditch were constructed is unclear, but it may relate to the first phase of the structure, as the building technique employing construction trenches may be broadly contemporary. Consultation of aerial photographs (NMRS F6940-2 and F7848) suggests that the ditch and palisade may be visible, and that they form an irregular sub-rectangular enclosure, 60m north-east to south-west by 25m south-east to north-west, within which lies the corn-drying kiln (Illus 9). The date obtained from the cereal-drying kiln of cal AD 1043–1282 suggests that it may be contemporaneous with the first phase structure. The cannot, however, be proven due to the insensitivity of the chronology of White Gritty ware.

The closest parallels to Scotstarvit are the Pictish and medieval Easter Kinnear and Hawkhill, both in north-east Fife (Driscoll 1997). At Easter Kinnear a sequence of three house forms was recognised. Earliest were sub-rectangular scooped structures, which appear to have been cellars of timber houses. These were replaced by sub-rectangular timber buildings constructed of earth-fast timber and wattle. The last form recognised were drystone rubble-walled rectangular buildings, contemporary with the appearance of White Gritty ware. This sequence suggests a Pictish currency for scooped structures, with rectangular structures emerging by the Middle Ages. The sequence of structures at Scotstarvit contrasts with this change in building traditions. The evidence from Scotstarvit suggests that the scooped structure was later then those at Easter Kinnear and Hawkhill.

Food and fire. The extensive nature of cereal cultivation in Pictish and medieval Fife is clear (Whittington et al 1991). Medieval and post-medieval drying kilns are well known in Scotland, with examples having been excavated at Barbush (Barclay et al 1982), Capo (Gibson 1988; Taylor 1996) and Chapelton (Pollock 1985). One of the most important contributions to this knowledge from the excavation at Scotstarvit has been the production of a significant quantity of cereal remains from a lowland rural context. The contrast between the predominance of barley in the Dark Age contexts and oats from the medieval contexts is particularly striking. Taken at face value, it may suggest that there was a shift in the crop regime between these two periods.

The iron-working debris and archaeological evidence from Scotstarvit indicate that the smelting of ore had taken place in the area excavated and that smithing had probably also been practised nearby. The two pits with evidence of metal-working activity are of particular interest, not only due to their date (4th to 7th centuries AD) but as an indicator of small-scale metal-working, which may be related to a nearby settlement of the period.

Perhaps more significant, however, is the presence of substantial quantities of carbonised cereal grains from both bowl furnaces. It is unlikely that these grains were later dumped in abandoned pits. Rather it would appear that they were deliberately incorporated as fuel. It may seem an unlikely situation that cereal production was so high that a surplus could be used for this purpose. Ethnographic evidence indicates the symbolically charged nature of metal-working (Childs and Killick 1993). Smurfs were often seen as taboo, led migrant lives and undertook smelting and smithing away from settlements. This suggests that such activities were not purely 'industrial', but were understood in relation to and as embedded in other areas of social life. The presence of cereal grains in the bowl furnaces may have been due to this magical nature of metal-working and the association of cereal production with birth, growth and sustenance through death. In such circumstances, barley may have been a particularly potent symbol through its use in the production of beer.

The Scotstarvit bowl furnaces indicate the danger of considering metal production as a purely economic or industrial process. It can be a highly charged act of alchemy, which might have been understood in reference to belief systems that ran through all areas of life. In this case, the use of barley as a fuel may relate to an act of sacrifice rather than a surplus or glut of food.

Conclusion

The remains of medieval settlement excavated at North Scotstarvit are an addition to the small corpus of evidence for medieval rural settlement in Scotland. Its contribution has particular relevance to some of the research issues in the region of the east central Lowlands, highlighted in a recent
study commissioned by Historic Scotland (Atkinson 1995, 22). The archaeological evidence encountered in the pipeline corridor suggests it crossed the northern edge of a more extensive medieval settlement. Further archaeological investigation in the area would be a valuable undertaking, which would complement recent research in north-east Fife (Driscoll 1997).

The Roman camp at Eden Wood

Gavin MacGregor and Alan Leslie

The route of the pipeline corridor crossed the south-east corner of Edenwood Roman marching camp (Illus 14). Enclosing an area of about 62 acres, the camp is generally considered to be one of a series of early 3rd-century date, a remnant of the punitive campaigns undertaken by Emperor Septimius Severus (Maxwell and Wilson 1987, 36; St Joseph 1973, 231-3; 1977, 143-5), although to date no incontrovertible dating evidence to demonstrate this premise has yet been found at any of the ‘63-acre-series’ camps.

The Roman marching camp ditch

From aerial photographs held by the NMRD it had been anticipated that the camp ditch would be encountered at two points along the pipeline corridor. Crop marks indicate that the south-east corner of the camp should lie just south of the line followed by the pipeline corridor and, therefore, that stretches of the adjacent south and east sides should have been exposed in the area to be stripped.

In the event, the line of the south ditch was very distinct, running diagonally through the corridor for a distance of 15m (Illus 15). Here the surviving ditch was up to 3m wide, and excavation of a section through it demonstrated it to have a characteristic V-shaped cut, 0.80m deep (Illus 15). Four different elements could be distinguished within the fill. The uppermost layer (016) was a compact, stony, dark-brown loam with a maximum depth of 0.27m. Sealed within it was a dump of compact, pink / red clay (017), which had been tipped inwards from the northern side. A compact mixed light-brown / grey stony loam clay (018), with a maximum depth of 0.30m, was also sealed by the upper layer (016). At the very base of the ditch was a compact, mixed dark-brown stony loam / clay (019) with a maximum depth of 0.30m. There was no indication of the presence of turf within the section.

Where the ditch was revealed it had been backfilled with material that may have originated from an internal bank. There was no in situ evidence for an internal bank, which if originally present has presumably been destroyed by being thrown back into the ditch and by later ploughing. If a counterscarp had been originally present, it had also been destroyed by cultivation.

Farther to the east along the same section of exposed ditch a large boulder, 0.9m by 0.35m, lay within the upper fill on the southern side. A slot was rapidly excavated around it to reveal that it lay to a depth of 0.6m. At this point the profile of the ditch had become stepped and flat-bottomed (Illus 15). It appears that the original ditch diggers had left the boulder where they found it. No artefacts were recovered during the excavation of the ditch.

At the point where the crop-mark evidence suggested the east ditch would be found, no indication of its presence was observed after topsoil removal. A slot was excavated by hand, 7m by 0.3m, to a depth of 0.7m, to examine whether or not the ditch had been sealed beneath later deposits. No evidence of the ditch surviving at this point was found. The reason for this absence is not entirely clear; possibly it was removed through the lowering of levels during the construction of the adjacent road, although some aerial photographs of the site appear to show a break in the line of the crop mark at this point.

Interior features

Three other features were encountered within the stripped corridor in what would have been the interior of the camp. While these features may be associated with the Roman occupation of the site, on purely stratigraphic grounds it is equally possible that they represent either earlier or later human activity.

Located 3.5m from the inside edge of the ditch were two large, amorphous pits [010, 012] (Illus 15). The first investigated [010] was situated on the northern edge of the pipeline corridor, partially extending into the northern baulk. It proved to be a large, irregularly shaped pit 1m by 0.5m. The sides were cut almost vertically, curving into an uneven base. The eastern portion was 0.25m deep while the western portion was 0.4m deep. There was evidence of burning within the pit on the eastern side, as the natural sand was scorched red.


Although the fill (011) was generally a uniform mid-brown sandy silt, there was a clear lens of burnt material at a depth of 0.2m, which tipped into the western portion. No artefacts were recovered during the excavation of this feature.

The second large pit (012) was irregular in plan, broadly 4m by 2m, the edges of which were difficult to establish due to a very mixed horizon across the general area. During excavation of the southern half of this feature the wrapper from a chocolate bar was recovered from the fill. The most likely explanation is that this feature was the large, irregular ‘banana shaped’ pit, originally excavated in the late 1980s by Gordon Maxwell (pers comm).

Further to the east there was a small fire pit (006) (not illustrated), of which only the base survived. In plan the feature was sub-oval, 0.5m by 0.55m. On the surface several small- and medium-sized angular elongated stones were sloping into the upper fill of the feature, a dark, medium sand flecked with charcoal (007). Other stones protruded from the natural into the base of the feature and the point of greatest depth (0.2m) may have been a stone hole. Evidence of burning in the pit was evident from the scorching of the natural to a depth of 0.03m beneath the cut (006). No artefacts were recovered during the excavation of this feature.

**Discussion**

The results from the work at Edenwood demonstrate a pattern becoming familiar from large-scale archaeological interventions at Roman temporary camp sites. Although heavily plough truncated over the intervening centuries, traces of what seem to represent internal activity contemporary with the use of the camp by the Roman soldiers were revealed; it is only unfortunate that the evidence of burning located was not accompanied by material suitable for radiocarbon dating to bolster a link, which is stratigraphically impossible to demonstrate. The remains of internal features, previously thought unlikely to survive due to the ravages of agriculture, have also recently been discovered at equally unpromising sites such as Inveresk (Monktonhall Junction; DES 1985), Beattock (Speller and Leslie 1994) and Pathhead (Leslie and Will 1998).

Otherwise, the main issue to arise from this investigation is the ‘missing’ east ditch. Since the aerial photographic evidence appears to be confirmed by the excavated evidence, it seems reasonable to conclude that no ditch was ever created at this point, for reasons which remain obscure. The most usual explanation of a break in the perimeter ditch is the provision of an entrance, although the location in this case is very close to the angle of the camp, a position which would be virtually unique when compared with the known positions of camp gates at other sites in general, and other examples of 63-acre camps in particular. Reykross is one example of an unusual gate configuration, and there are many other examples where the precise gate locations remain unknown, so the possibility that this was a deliberate decision can not be discounted. Another possibility is that the camp was left unfinished for one reason or another. Certainly the presence of the large boulder within
Illus 15. Edenwood – post-exavation plan and sections.

the ditch on the south side, and the less formalic treatment of the ditch at this point, could lend weight to the speculation that the camp was created in something of a hurry. This and the unfinished perimeter ditch might reflect some now obscure threat or pressure. To this could be added the apparent use of clay as a rampart material, presumably derived straight from the excavated ditch material without turf enhancement, again reflecting speed and expediency rather than perfect training manoeuvres. If Edenwood is indeed a remnant of the Severan campaigns, then the need for urgency may be found in the explanation and motivation of the activity of the Roman army as presented by Cassius Dio. Following the putative line of march indicated by other examples of the ‘63-acre series’, Edenwood does seem to be something of a detour; perhaps there was a pressing need for the part of the task force encamped here to rejoin the main body very rapidly. Future comparison with other examples of the series may reveal if similar evidence for ‘rushed jobs’ exists elsewhere.
Forgan smithy

Duncan Abernethy, Iain Banks, Alan Leslie, Gavin MacGregor and Eland Stuart

Two discrete areas of activity (areas A and B) were identified within 40m of one another on Smithy (NO 435 256) during the watching brief (Illus 16). Limited excavation was undertaken at each of these sites in order to characterise the nature of the archaeological deposits.

Area A

In area A there appeared to be a single linear feature running east to west through the pipeline corridor. This was investigated through the excavation of two slot trenches across its width. These revealed a greater complexity to the main linear feature; rather than a single linear feature, three separate features were present (Illus 17). The first was a distinct line of stones and cobbles (013) which appeared to have been set in a small cut (017), perhaps forming a field boundary. To the north of this was a V-shaped ditch (010) perhaps originally c. 1m deep by 1.8m wide, which in slot two appeared to have small boulders packed in the basal layers. Although the relationship between 010 and 013 is unclear the presence of a short berm between them, 0.60m wide, may suggest they were planned and constructed contemporaneously. The material covering 013 and filling the upper levels of 010 appeared to be the same, a firm brown sandy silt with occasional inclusions of small stones (009). Several finds were recovered from 009, including three sherds of Scottish post-medieval reduced ware and six struck lithics, together with fragments of clay pipe and modern ceramics. This material had been capped in places by deposits of clay (011), as had the stones and cobbles; one deposit was truncated by the cut for the latest ditch (014), indicating the latter to be the latest event in the sequence.

With the silting up of 010, a later ditch (016) was cut on the same alignment but slightly to the north. This relatively steep-sided ditch measured originally perhaps 1.5m wide by 0.7m deep with a deposit of stones (019) at the base, presumably to aid drainage. The thin clay layer (020) underlying these stones indicated that this was the likely function of 019. The primary fill consisted of a dark clay sand (012). The southern side of (016) truncated the northern side of 010 and also cut through the deposit of silty sand and clay (011) which overlay 010 and thus demonstrated the sequence of events.

Area B

Several discrete ‘features’ were present in Area B (see Illus 16), situated some 40m south (ie upslope) of Area A. A broadly oval-shaped feature (023), measuring c. 0.5m by 4m and situated in the middle of the stripped corridor, lay immediately north of a c. 5m wide spread of material (008) which covered the full width of the stripped area. Adjacent to 023 on its eastern edge and extending to run beneath the edge of the stripped corridor, a semi-circular feature (022) was also observed. On the surface all three ‘features’ appear to comprise a very similar dark brown to black silty sand, which stood out clearly against the background natural subsoil, an orange-brown silty sand.

A small shell midden lay within the largest spread (008) and from around this were retrieved sherd of late medieval green glaze pottery and some fragments of patinated glass. In addition to this, one sherd of 17th- or 18th-century tin glaze pottery, one sherd of green glaze pottery and one sherd of a red fabric medieval pot were recovered from the surface of 008.

Three slot trenches were excavated within the complex of feature constituting Area B, both to characterise the individual features and to ascertain the nature of any stratigraphic relationships which might exist between them. The first of these (slot 3), measuring c. 8.3m by 0.6m, was situated on a north / south alignment so as to investigate 008, the southern half of 023 and any relationship which might exist between the two. The second (slot 4), measuring c. 3m by 0.6m was situated on an east / west alignment so as to investigate the north-eastern quadrant of 023 and 022 and any relationship that might exist between the two. The third (slot 5), measuring c. 1.8m by 0.3m, was placed across the north half of 022 on a north / south alignment.

Slot 3 revealed the same material (023), a dark brown silty sand, filling a deeply cut round-bottomed feature, possibly a pit or a ditch (024) which had been covered by a shallow spread of dark brown silty sand. The lower fills comprised a complex series of lenses quite distinct from 023, containing a rusty sickle blade, two rusty nails and a fragment of modern pottery. Slot 3 also showed feature 008 to represent a shallow spread of midden deposits. There was no clear stratigraphic relationship between the two although 023 prob-
ably overlay 008. Slot 4 showed 023 at this point to represent only a shallow spread of dark brown silty sand, attaining a depth of c. 0.2m depth, and containing both late medieval and post-medieval green-glaze pottery sherds, together with the base of a glass bottle probably of early 18th-century date. There was no stratigraphic relationship between 022 and 023. Slot 5 revealed 022 at this point to constitute a mixture of clay and stone beneath the dark brown silty sand, within which were found a fragment of quern stone, a possible sharpening stone and a possible burnishing stone.

The lithics
Mike Donnelly

A total of nine pieces were recovered from Forgan Smithy. These consisted of five pieces from context 009, two from context 010 and two surface finds from near the church. Although this is a very small assemblage, it represents 53% of the lithics recovered from the length of the pipeline route. Six of these pieces are flint, with two pieces of agate and another that is probably flint.

Of particular note is the dominance of narrow blade forms, occurring in four of the pieces [Sfs 08, 09, 11 and 14] and represented in the remaining negative removal scars on another piece [Sfs 13]. Furthermore, cores are remarkably prevalent, with three examples from this area (33.3% of the total) and a split pebble which might be a failed effort to create a core [Sf 10]. Bladelet scars dominate these cores.

The assemblage is unbalanced with a bias towards cores, with little evidence of knapping debris or regular flakes and blades. The area outwith the corridor may have been rich in lithics with some material spilling into the area cut by the route but it is more likely that many pieces have been missed, especially during topsoil stripping operations.

Narrow blade assemblages. The assemblage is of a Mesolithic character, but the small size of the assemblage and the lack of recognisable diagnostic forms suggest caution. Blades are often a component of later prehistoric assemblages, and recently many early Neolithic assemblages have been found to contain blades. At Lunanhead in Angus, a broad-blade assemblage has been tentatively dated to the early Neolithic (Wickham-Jones and MacKenzie 1996), and a similar group of blades.
Illus 17. Forgan Smithy – Area A post-excavation plan and section.

and blade-like flakes is known from Allanfearn in loose association with an early Neolithic mound (Cullen, forthcoming). Small assemblages of narrow blades, often featuring pitchstone, are also known (Atkinson 1996; Ward 1997).

If the assemblage is Mesolithic, its pieces find their closest parallels in Fife at the site of Morton, Tayport (Coles 1971). This assemblage is far larger and included many scrapers, microliths and burins. Conical, semi-conical and cylindrical blade and bladelet cores were also common here. Further evidence of Mesolithic activity in Fife is known from Tentsmuir (Lacaille 1937; 1944) and more recently from Fife Ness (Dalland 1997) as well as in the Firth of Forth at the Isle of May (Donnelly, forthcoming).

The medieval and post-medieval ceramics at Forgan smithy

Robert Will

Twenty-seven sherds of Scottish post-medieval reduced ware were recovered and date from the 16th or 17th century. These vessels tend to be jugs with reduced grey or black fabrics and a thick green exterior glaze, often with a neck cordon and inscribed wavy decoration (Haggarty 1980). Although these vessels are generally reduced, some have areas of oxidisation and four oxidised sherds were recovered, one of which may be from a shallow bowl. Although this sherd includes part of the base, there is no evidence for a rim and the identification as a bowl is based on the internal glazing.

One sherd from a slip-decorated platter was recovered. These vessels date to the 17th and 18th centuries and were made at a number of sites within Britain and mainland Europe. One other probable post-medieval body sherd was also recovered.

Two sherds of badly abraded tin-glazed earthenware were recovered, with only very small patches of glaze remaining. Judging by the well-sorted fabric and well-made body these sherds probably date to the 18th or 19th centuries.

Discussion

The remains encountered at Forgan Smithy represent evidence of post-medieval activity. In area A there is evidence of field division. It would appear that the wall (013) and ditch (010) were contemporary and together formed a field boundary. At a later date the boundary was maintained through the excavation of a new length of stone-filled drainage ditch (017).

The ditches located in Area A are probably best explained as a local form of drainage ditch. Such features, comprising a filled-in ditch with a basal layer of stone or rubble, represent a common method of drain construction in Fife, where they are often referred to as cundies, a colloquial term of conduit. The location of the feature, running across the bottom of a slope, seems to support this
conclusion, and a number of similar examples were subsequently observed during the topsoil stripping operation, though none were as deep as the example excavated. The finds from the ditch fill presumably derive from the plough soil disturbed at the time of the drain’s construction. Thus, while the worked flints do indicate prehistoric activity, probably in the general vicinity, there was no other evidence of prehistoric activity within the stripped corridor.

Of the features comprising Area B, the finds retrieved from the fill of a pit or ditch (024), sealed by midden material (023), indicates that it is a relatively recent construction, while features 008 and 022 both appear to represent material laid down at some point in the 18th century; all seem likely to be broadly contemporary.

No evidence of structural remains was observed and most of the material recovered, together with the nature of the deposits, appears to be the result of dumping or middening, probably linked to contemporary agricultural activity.

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**Conclusions**

Besides the issues discussed during the interpretation of the individual sites, this programme of archaeological work raises further issues relating to the nature of contemporary archaeological practice.

**Crop mark evidence:** The archaeological work undertaken on the Fife water pipelines was heavily informed by aerial photographic evidence. At both Edenwood and Scotstarvit there was an excellent correlation between aerial photographic evidence and excavated archaeological features. Although the Bronze Age cemetery at Kirkton was not visible on aerial photographs, its close proximity to other crop-mark features is notable. It serves as a reminder that aerial photographs can only show a proportion of archaeological remains present in any area. It was, therefore, unfortunate that the stripping of the area of construction corridor adjacent to the crop-mark complex at Leuchars / Wormit was not conducted under archaeological supervision.

**Linear route archaeology:** The constraints of a construction corridor means that any site encountered within it will generally only be partially observed and excavated. This bias makes it difficult to confidently interpret the nature of many of the sites encountered on such projects. It can be claimed, however, that the value of linear route archaeology is in its ability to give a broad sample of the nature of archaeological remains across a landscape. It is not, however, an entirely random sample; the planning system attempts to ensure that the minimum of impact, normally through avoidance, is made upon monuments of regional and national importance. However, when factors are involved other than purely archaeological concerns, this is not always possible. None the less, the archaeological monitoring of such large developments is an essential undertaking, as it is not always possible to anticipate what will be encountered and destroyed along such routes.

Ultimately the construction of new trunk water mains has resulted in excavation at several archaeological sites, each of which has made a useful contribution to our understanding of the activities of people in the past in Fife. The variety of sites and issues of their interpretation highlight the rich archaeological heritage of this region of Scotland.

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Abstract

This paper presents the results of the excavation and subsequent post-excavation analysis of several archaeological sites by GUARD including a Bronze-Age cemetery at Kirkton, Dark-Age activity and medieval settlement at Scotstarvit, and the Roman marching camp at Eden Wood.

Keywords: Bronze-Age cemetery, Roman marching camp, medieval settlement