

# The excavation and survey of prehistoric enclosures at Blackhouse Burn, Lanarkshire

Olivia Lelong\* & Tony Pollard\*

with contributions by A Crone, D Jordan & S Ramsay

## ABSTRACT

*Limited excavations were carried out in 1985–6 on a large, subcircular enclosure and a smaller adjacent one, built on the edge of an ancient bog, on Pettinain Hill in Lanarkshire. These investigations established that the larger monument had been built by erecting a double row of timber posts and piling a stony bank between the two rows; the preserved, waterlogged stumps of oak posts were found in post-holes on either side of the bank. The bank was later elaborated, with stones pitched around the standing posts and, in a final stage, it was capped once the posts had decayed. Excavations on the bank defining the much smaller, adjacent enclosure, built just within the bog, found it had been built by digging holes in the peat and building a stone structure above. An oak post from the large enclosure was dated to 4035 ± 55 BP (2697–2453 cal BC). The authors suggest the large monument had its origins in an early Neolithic tradition of transhumance and that its builders were drawn and held to the upland basin by the presence of water there.*

*The excavation was directed by Peter Hill; the project has been funded throughout by Historic Scotland and its predecessor department (SDD/HBM).*

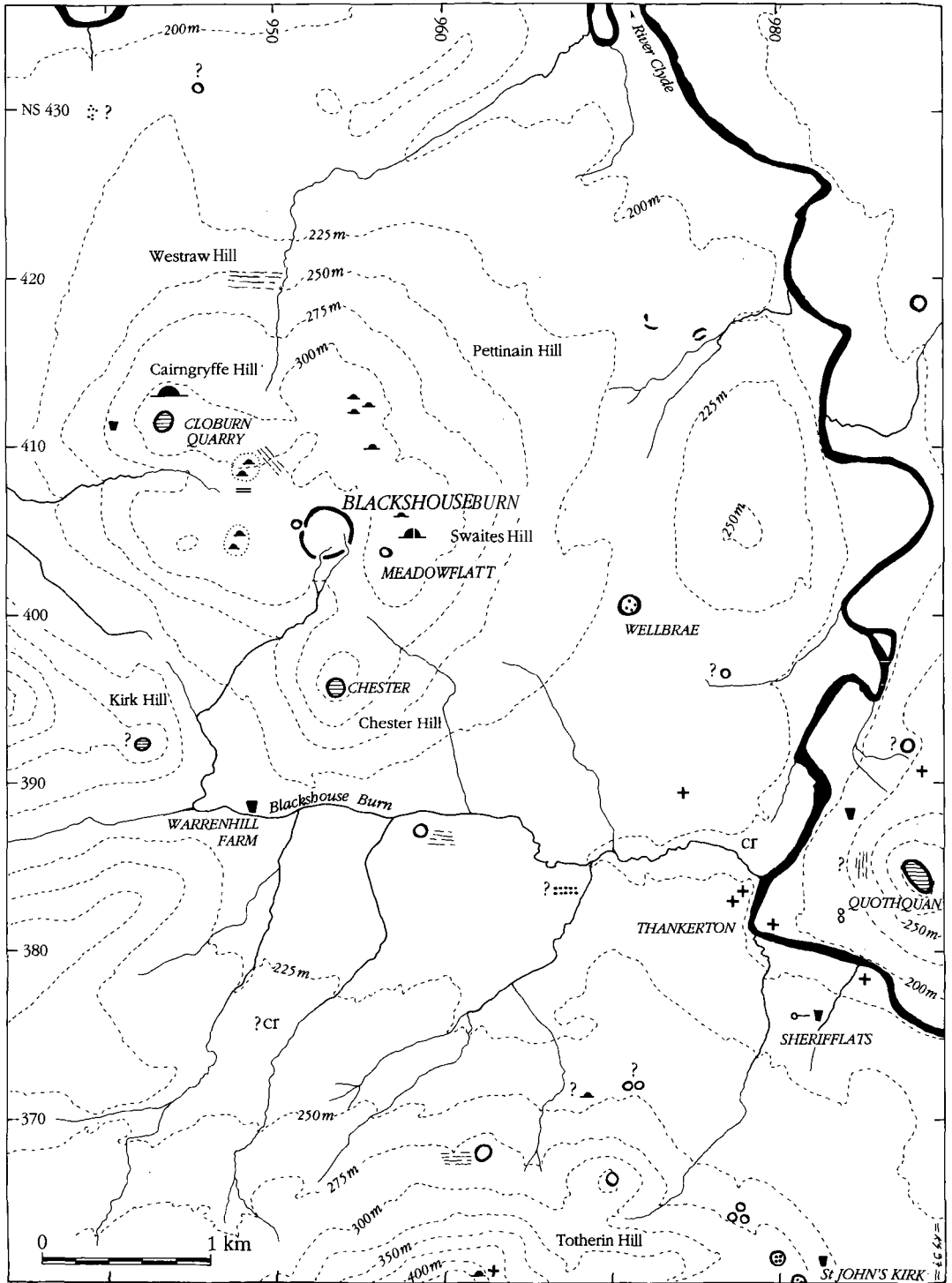
## INTRODUCTION

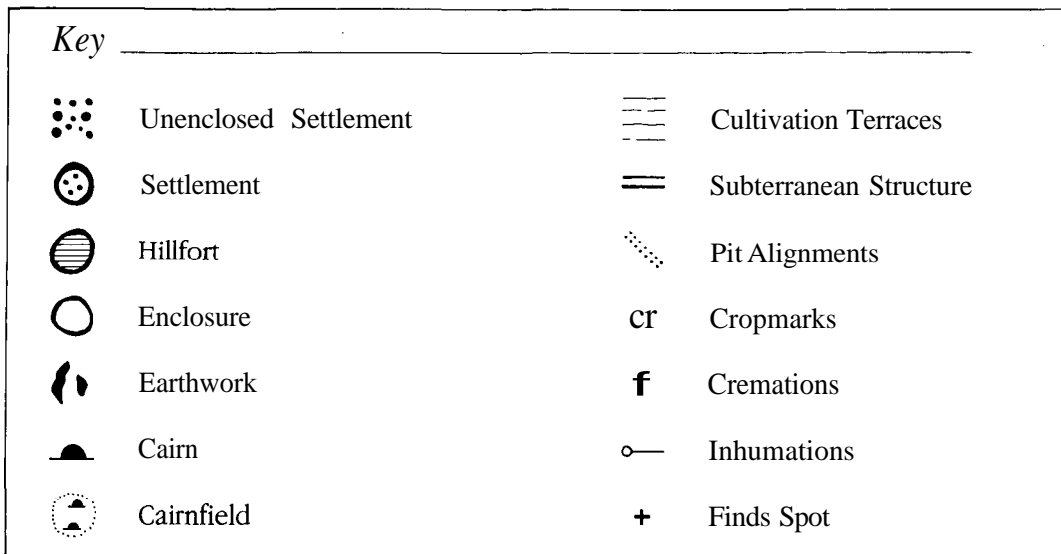
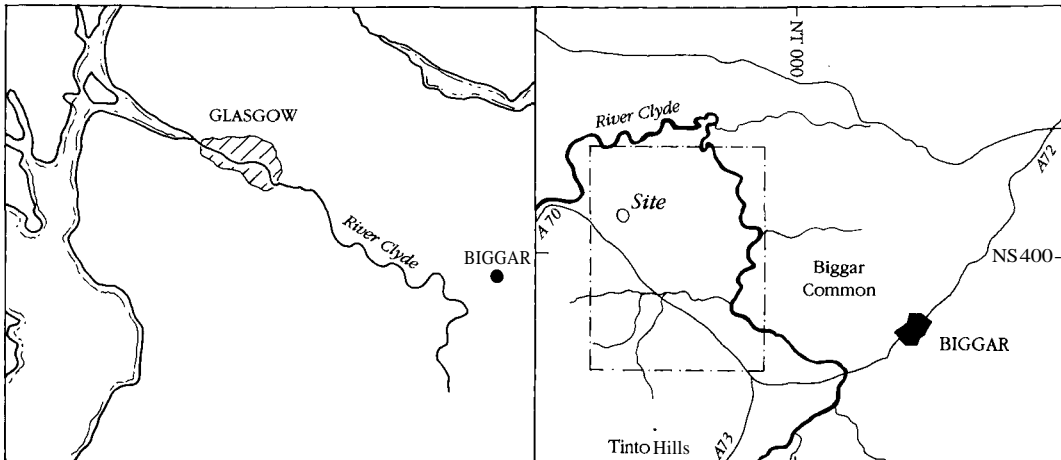
Described as ‘one of the strangest monuments in Lanarkshire’ (RCAHMS 1978, 78), the enormous, banked enclosure at Blackhouse Burn and a much smaller neighbouring enclosure lie in an upland basin in Upper Clydesdale (NGR: NS 9528 4046). This report begins by setting the monuments in their topographic, geological and archaeological contexts. It then returns to focus on the monuments, presenting the excavation results and environmental and dating evidence. In the final section, the report places the larger monument in its cultural context and discusses how it might have developed from and worked within particular, local histories.

## LOCATION, TOPOGRAPHY AND GEOLOGY

The monuments at Blackhouse Burn lie in a glacially modified landscape of rolling hills and fertile river valleys, through which the River Clyde has worn a broad, open corridor (illus 1). Where the Clyde winds north past Tinto Hill and then bends abruptly south-west, an area of high

\* Glasgow University Archaeological Research Division (GUARD), Gregory Building, University of Glasgow, Glasgow G12 8QQ

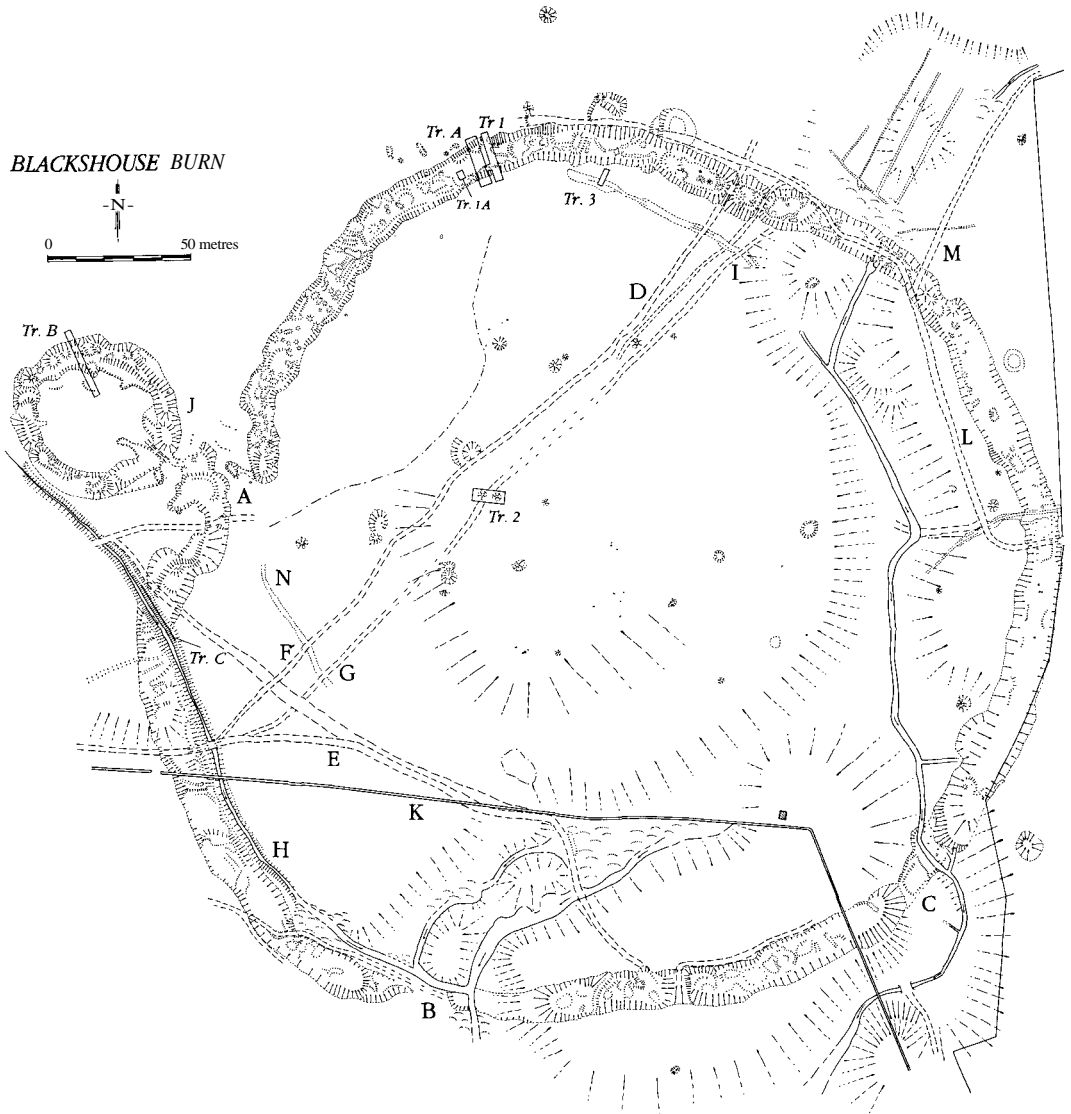




ILLUS 1 (above and facing) The site location and context. (Based on the Ordnance Survey map © Crown copyright)

ground lies cradled in the bend, defined on the west by a small, nameless valley. These uplands, called here Pettinain Hill (after Christison 1890), comprise a broad ridge curving north to east and then south, and sheltering a high basin nearly 1 km wide and c 800 m deep. The ridge climbs to four low crests: Cairnryffe Hill, Westraw Hill, Swaites Hill and Chester Hill.

The larger, subcircular, banked enclosure lies at the south end of the basin, extending east from its southern lip to the foot of the ridge, and inside it spring the double heads of the Blackhouse Burn. The stream flows out of the enclosure on the south-west, descending the uplands to run south down the adjacent valley before turning sharply east, emptying into the River Clyde 3.5 km on.



ILLUS 2 Survey plan of the enclosures, with trench locations

Within the enclosure, the two heads of the burn flow through its lower, southern portion, the western fork skimming a tongue of higher, drier ground which makes up the northern part of the interior (illus 2). The west edge of the enclosure skirts a stretch of wet ground. Eighteenth- and 19th-century accounts (Ferguson 1794; Christison 1890) describe this as a swamp, and a peat survey carried out during the excavations confirmed that it had been an extensive bog, possibly even a shallow lochan, when the enclosure was built, and remained marshy until drainage in the 19th century. The bog presumably once drained to the north-west, as the topography would have blocked drainage to the east. A much smaller, subcircular enclosure abuts the large one just

within the edge of this ancient bog (NGR: NS 9509 4054) and another lies c 190 m to the south-east on the higher ground at Meadowflatt (NGR: NS 9562 4035); both are defined by low, stony banks. Several small cairns have been built both inside the large enclosure and to the south and west of it, and funerary cairns and another enclosure occupy the crests of the ridge which half-encircles the basin (illus 1).

Pettinain Hill is composed of stratified metamorphosed sedimentary rocks of Silurian age, mainly conglomerate with intervening sandstones, overlain by patches of greywacke (BGS 1:63,360, Sheet 23). The pebbles within the conglomerate are well rounded and highly resistant to weathering. The matrix of the conglomerate and sandstone weathers to a light-coloured sand in which feldspars and quartz predominate, releasing clay and mobile ions in the process. Overlying the rock is a thin, consolidated, glacially deposited till, mainly derived from the Silurian sediments and including intact lumps of sandstone matrix and pebbles. It is pink and sandy where unaltered, but it becomes clay-rich when weathered due to the clay released by mineral decay.

The solid geology has implications for both the large and small enclosures, as both are composed mostly of stone, and different types of stone — conglomerate and sandstone — were used to build separate sectors of the large one. Although there is slight evidence of quarrying in the vicinity of the enclosure, the quantities of stone required to build it suggest that its fabric was mostly derived from elsewhere on the hill.

The soils found on the hill vary, but they essentially comprise various podzols and peaty podzols (Macaulay Institute 1982). Until recently, the basin and surrounding rising ground were largely unimproved heather moorland. In the 1970s and 1980s this land was improved: the ground east of the large enclosure was reseeded, and liming transformed the vegetation from heather to rough grass. The ground west of the enclosures is still mostly unimproved heather moorland, although patches of higher ground have been ploughed and reseeded, and the flanks of Pettinain Hill are mostly under cultivation. The field in which the large enclosure lies is improved but uncultivated grassland, currently grazed.

#### SURVEY OF THE MONUMENTS

Survey of the main enclosure and the small, adjacent one, undertaken as part of the programme of excavation, revealed their complex topography. This account is based on the plan produced during the survey and on the account by Hill (1985a) of his first season's work.

The large enclosure is defined by a low, stone bank, varying from 8 m to 14 m in width, which describes an irregular circle with an internal diameter of up to 300 m and a circumference of c 970 m (illus 2). On the ground the monument appears to be made up of fairly straight stretches of bank, and the survey confirms this, showing slight angles joining these stretches. The bank is very low, in places standing less than 1 m high; the excavated part never stood higher than c 1.5 m. It appears to have been extensively robbed of stone for neighbouring dykes, and along some stretches only the flanks survive intact, although its wasted appearance may not be due simply to robbing. Ferguson (1794, 39) describes stone robbers finding inverted urns in cists containing waterlogged cremated remains — possibly a later, Bronze Age insertion in the bank (see Discussion, below). The small enclosure, a plump oval in plan, has a maximum internal diameter of c 40 m, defined by a low, turf-clad bank with stones protruding from it.

The small enclosure has a possible entrance on the north-east (illus 2, J), where an inturned section of bank seems to lead from the direction of a possible entrance (A) into the large enclosure. This, the large enclosure's most likely entrance, pierces the bank on its west side; the bank is inturned on the north side of the entrance and out-turned on the south, where its low, hummocky

appearance might indicate a collapsed structure. Another possible entrance (B) is on the south, near the western fork of the Blackhouse Burn where it leaves the enclosure, and a third (c) is on the south-east, where the eastern fork leaves the enclosure; both are suggested by amorphous breaks in the bank. Two other possible entrances, on the north and south-west, both appear to be later breaks through the bank, related to the paths which cross the interior.

Of the paths, one (D) appears as a sunken way and leads north through one of the breaks in the bank; this path is cut by a shallow drain (I) running across the northern part of the enclosure. The other trackways are rutted, and appear relatively recent. Running east/west across the south part of the interior is an old cart track (E), depicted on 19th-century estate maps, which once joined the villages of Thankerton and Pettinain. Other, minor tracks (F, G, L & M) connected the farms on the flanks of Pettinain Hill with each other, the high ground and the main cart track.

The shallow drain (i), running east/west across the northern part of the interior, was probably dug to draw water away from the low, rough ground to the west. It cuts the sunken way (D) and is in turn cut by two of the minor rutted tracks (F & G). Another drain (H) with an upcast bank was dug deeply and obliquely through the south-west sector of the bank and the old cart track (E), draining the bog to the west; this drain was exploited to provide a section through the bank during the excavations. The latest feature is a march dyke (κ) which divides the southern quarter of the enclosure, on Blackhouse Farm, from Meadowflatt Farm in the northern part. The dyke does not appear on the first edition Ordnance Survey map (surveyed in 1858), but it does appear on the second edition of 1898. It cuts across the cart track, but other minor tracks lead to a gateway through the wall, now blocked.

To summarize, the relative chronology of the site's recent history is (1) the use of the sunken way; (2) the use of the cart track, the north/south tracks and possibly the shallow drain; (3) abandonment of the cart track as a major route, but continued use of the minor tracks; (4) excavation of the deep drain and continued use of the minor tracks; (5) construction of the march dyke, and diversion of the minor tracks to run through the gateway; and (6) blocking of the gateway and the end of traffic.

The drainage of the bog through the deep drain (H) can be precisely dated through early accounts. Ferguson (1974, 39) describes the small enclosure as lying within the bog, 'connected with the large camp by a passage made through the moss'. Almost 100 years later, these conditions still prevailed. Christison (1890, 329), reporting fieldwork carried out in 1889, describes the smaller enclosure as 'planted entirely in marsh, which even occupies the inside of it'. Now, however, the small enclosure stands on dry ground. The deep drain must have been dug, therefore, between 1889 and 1898 — after Christison visited the site, but before the march dyke was built across it and was mapped by the Ordnance Survey. The survival of the swamp until the late 19th century proved important to the archaeology of the large enclosure; the wet conditions preserved the wooden stumps of posts sealed beneath the bank, and drainage has undoubtedly threatened any still surviving on the west side of the enclosure.

Inside the large enclosure the survey identified several features possibly associated with its ancient use. These include at least one possible pathway (N), 19 stone mounds and many rocks protruding through the turf (illus 2). Two 'ponds' were also identified, although apparently not recorded by the original field survey, in the western part of the enclosure, one defined partly by an upcast bank. Their proximity to the bog suggests exploitation of the prevailing wet ground conditions, perhaps to create pools of standing water.

The 19 stone mounds recorded in the interior are all quite small, less than 5 m in diameter and generally under 0.3 m high. Most lie on the central shelf, although three form a group on the east side of the interior. Several seem to be surrounded by shallow ditches, recalling some of the

smaller burial cairns recorded in Lanarkshire and Peeblesshire (eg Maxwell 1974). The two excavated mounds, however, appeared before excavation to be surrounded by ditches, but proved to be small discrete piles of stones laid directly on the old ground surface, with no associated ditches.

#### ARCHAEOLOGY OF PETTINAIN HILL

The programme of investigation included a preliminary survey of the surrounding uplands, supplementing the earlier work of the Royal Commission (1978), as well as that of Christison (1890), Childe (1941) and Stevenson (1976). The picture compiled from these sources shows the uplands were densely occupied, both for farming and for the treatment of the dead, the latter certainly in prehistory.

Immediately around the large enclosure are several features which might have been built in reference to it, associated with activities there (illus 1). About 300 m to the west is a group of six small cairns, none standing more than 0.6 m high (RCAHMS 1978, 46). About 190 m to the south-east of the large enclosure, lying on higher ground and overlooking it, is another small enclosure, Meadowflatt (*ibid.*, 153), which has an internal diameter of c40m and a very slight, turf-clad bank. It seems, from its appearance and position, to be directly related to the Blackhouse Burn complex: the Meadowflatt enclosure is just visible, always breaking the horizon, from most points inside the large enclosure.

At the south end of the ridge, on Chester Hill, is a circular enclosure defined by two banks and a ditch (RCAHMS 1978, 97-8). Usually regarded as Iron Age on the basis of its form, it could also be compared to henges, and its position within this complex ancient landscape suggests it may have an earlier origin, even if the surviving earthworks are later in date.

Along the ridge to the north-east, upslope from the Meadowflatt enclosure, are two cairns. One, Swaites Hill, is very low and appears spread and mutilated, while the other, the Hero's Cairn, appears as a small enclosure (RCAHMS 1978, 64). Excavated by Stevenson (1976), it proved to be a robbed cairn, with a cist partly exposed and disturbed inside it. Part of a Food Vessel was found in the cist, associated with a cremation. Also scattered along the ridge are at least 26 other cairns recorded by the Royal Commission (1978, 64-5). These are thought to form part of a system comprising other small clearance cairns and field systems. The preliminary survey directed by Peter Hill found about 90 other features on Swaites Hill. These include the remains of field systems, made up of field banks, lynchets, small cairns and a trackway, several small structures and traces of both narrow and broad rig and furrow (Hill 1985b).

At the north-west end of the ridge, on Cairngryffe Hill at Cloburn, the survey found and recorded what were first thought to be a house platform and associated field system, which were threatened by quarrying on the south face of the hill. Because of this threat the platform was partly excavated in 1986-7, and proved to be a ring cairn sealing cremations associated with Bronze Age ceramics, which in turn sealed early Neolithic pottery (Lelong & Pollard, this vol). Also on Cairngryffe Hill stood a complex earth and stone structure, excavated by Childe (1941) and interpreted by him as a fort; it was later destroyed by quarrying. Several cists containing an enlarged Food Vessel and two other cinerary urns were found on Cairngryffe Hill in the 19th century; they may have formed part of a flat cemetery (Morrison 1968). At least 12 small cairns have also been recorded on the south-east slopes of the hill, while a waterlogged, stone-lined trench lies at the foot of the hill, in the basin (NMRS, NS 94 SW no 12). To the north on Westraw Hill, cultivation remains, including cairns and banked and ditched field boundaries, have also been recorded (NMRS, NS 94 SW No 50).

## THE BROADER ARCHAEOLOGICAL CONTEXT

The archaeological remains on these uplands lie in a landscape abounding with remains from prehistory. This part of Upper Clydesdale has a topographic coherence of its own, with the uplands of Pettinain, Biggar Common and Tinto Hill flanking and defining the broad, open valley of the River Clyde (illus 1). The low ground along the river would have been a natural corridor for travel in prehistory, while the fertile land of the valley and the slopes of the uplands would have attracted settlement.

On the west side of the Clyde, c 1 km east of Blackshouse Burn on the slopes of Pettinain, two adjacent excavated enclosures at Wellbrae appeared to be a late Neolithic settlement and funerary enclosure. In the former were post-holes and pits containing carbonized seeds and pottery, including late Neolithic Impressed Ware, and stone axeheads and other tools. In the latter was a cremation accompanied by a stone axehead and a Beaker (*DES* 1991, 65). Another settlement has been excavated upstream along the Clyde's west bank to the north-east of Blackshouse Burn. There, ring ditches and pits at Clachan Burn, Annieston (NGR: NT 001 365), produced sherds of coarse pottery dating to the second millennium BC (*DES* 1992, 69).

Expanding this limited gazetteer of excavated sites are abundant ring ditches, enclosures and earthworks, identified from aerial photographs and surface remains along both banks of the Clyde within a 6 km range of Blackshouse Burn (RCAHMS 1978). There have also been numerous finds of flint and chert tools and stone axeheads (*ibid*; MacFadzean *et al* 1984). Many of the sites known south of Symington were discovered during comprehensive archaeological surveys in advance of the construction of the M74 (Ward 1991a; 1992a & b). Several ring-ditches, enclosures and finds of flint tools and prehistoric pottery are also known from the north-facing slopes of Pettinain Hill, along the east-flowing stretch of the Clyde (RCAHMS 1978). To the south-west of Blackshouse Burn, on the north- and south-facing slopes of the Tinto hills, are several enclosures which might have had a ritual purpose, as well as some cultivation remains, a burnt mound (Ward 1993) and at least one unenclosed platform settlement. Dominating these slopes and the adjacent valleys is the grand cairn topping Tinto Hill (RCAHMS 1978; MacFadzean 1986; Ward 1993).

While most of these sites are undated, their general character and the density of finds in this area suggest the long and complex occupation of this side of the Clyde in prehistory. Finds of Mesolithic tools show people at least travelled and hunted these lands before they took up farming, and the evidence of Bronze Age funerary sites shows that they continued to live and care for their dead here well into the second millennium BC.

At Elmwood Nursery, St John's Kirk, 1 km south-east of Blackshouse Burn, two intercutting cremation burials, one in a pit and one in a stone cist, were broadly dated to the Bronze Age (CFA 1992, 70). At Boatbridge Quarry, Thankerton, also c 1 km to the south-east, two cists containing inhumation burials, one accompanied by a Beaker, were excavated (Clarke & Ritchie 1971; Clarke, Ritchie & Ritchie 1984). At Sherifflats, 200 m west of Boatbridge Quarry, Food Vessels and cinerary urns were found with cremations in a gravel pit (Anderson 1878-9), while at Warrenhill Farm, just 0.4 km south-west of Blackshouse Burn, six cinerary urns were found with cremations (Irving 1855).

While the valleys and slopes on this side of the Clyde are densely sprinkled with archaeological remains from prehistory, across the river on Biggar Common is an upland area extremely rich in evidence of settlement and funerary practice from the earlier Neolithic into the Bronze Age. Fieldwalking in the wake of forestry ploughing found surface scatters and concentrations of Western Neolithic pottery and worked flint, chert and pitchstone, as well as



several round cairns and a long mound (Sheridan 1989, 60). The long mound proved to be an early Neolithic monument which sealed a late Mesolithic stake-built structure and several early Neolithic bonfires; later burials had been inserted in the mound (Johnston 1997, 189-98). Excavation of some of the artefact scatters on Biggar Common found large amounts of Western Neolithic and other pottery, stone tools and the traces of at least three early Neolithic structures (*ibid*; Ward 1991b, 66-7).

The abundant evidence from this part of Upper Clydesdale and its surrounding uplands, from the earlier Neolithic into the Bronze Age, indicates dense occupation involving the commitment implied by settlement, as well as long-held traditions and places for caring for the dead. The enclosures at Blackhouse Burn, along with the surrounding cairns and other remains, must have been important to that occupation. The ancient archaeological landscape on Pettinain is central to this part of the Clyde valley and its surrounding uplands, both geographically and visually, and the scale of the monuments suggests they were invested with long-term meaning for a large number of people. This local importance of the enclosures is considered at greater length in the Discussion, below.

### EXCAVATIONS IN 1985-6

In 1985, the owner of the northern (and major) part of the Blackhouse Burn enclosure asked for scheduled monument consent to plough and plant forestry on his share of the monument. To assess the potential impact of this, Peter Hill undertook a two-week programme of excavation, survey and sampling on behalf of the former Central Excavation Unit (SDD/HBM). The programme had four components:

- (1) a detailed topographic survey of the large and small enclosures;
- (2) a phosphate survey of the interior;
- (3) the excavation of a section through the large enclosure bank;
- (4) the excavation of features revealed by the surveys.

Three trenches were opened in May and June 1985 (Hill 1985c; illus 2). The first, Trench 1 (17.5 m by 3 m), was a section through the bank of the large enclosure on its north-west side, at a point where a relatively undisturbed length joined a stretch which appeared severely robbed. This section, extending 4 m into the interior, was excavated in plan through part of the bank's stone matrix. At the end of the excavation, short of time, the excavators dug a metre-wide *sondage* down to subsoil along the length of the trench, against its west-facing section. This revealed two massive post-holes, one on the bank's inner flank and one on its outer flank; both contained the waterlogged stumps of oak posts. Searching for evidence that the post on the inner flank was part of a regular post-setting, they dug an extension to the trench on its west side, 1.5 m square. There they discovered a third post-hole, which contained fragments of a rotten post. Finally, to test the survival of features such as posts in the apparently robbed-out stretch of the bank, a small trench (1a) was opened 10 m south-west of Trench 1. This exposed complex features, but because of time constraints these were left unexcavated and unrecorded.

In the interior, Trench 2 (1.2 m by 0.45 m) was opened over two stony mounds, recorded during the survey, to establish what kind of activity they represented and whether they might be broadly contemporary with the bank. These lay on the central plateau near its western edge, 2 m apart. Each measured about 3 m in diameter and appeared as a low, grassy mound.

Trench 3 was a narrow slot (0.6 m by 0.4 m), opened across a possible drain (1) in the north-west part of the enclosure, about 1 m from the inner edge of the bank. Its aim was to establish the nature of the feature and its relationship, if any, with the bank.

These generally fruitful explorations prompted the peat and flora surveys, as well as the preliminary survey of the archaeology of Pettinain Hill undertaken in September 1985; the phosphate survey, however, had proved uninformative, showing evenly high background levels of phosphate both inside and outside the enclosure. The first season of excavation had revealed the complex construction and phasing of the enclosure bank and the remarkable preservation of organic material below it, with the chronological potential it promised, as well as the undisturbed state of features in the interior. Three trenches were opened in a second season over six weeks in May, June and July of 1986. During this time excavation also began on the ring cairn at Cloburn Quarry, discovered on Cairngryffe Hill during the survey (see Lelong & Pollard, this vol).

The first of these new trenches, Trench A (18.3 m by 5.5 m), stretched across the main enclosure bank, parallel to and immediately west of the 1985 trench but separated from it by a baulk 0.8 m wide (except where it encountered the 1.5 m square extension to that trench). The excavators hoped that by exposing this larger area and carefully recording the deposits in plan they would better understand the structural development and complexity of the bank as well as the relationship of the wooden posts to its stony matrix. They might also, they hoped, gain not only absolute dates for the posts but an absolute chronology connecting any successive timber structures.

To supplement the findings of this section across the bank and take advantage of an earlier disturbance of it, another trench was opened in the south-west part of the large enclosure. Trench C followed the side of a drain (H) cut obliquely through the bank in the 19th century, aligned NNW/SSE. The excavators cleaned and recorded a section of its north-east face, over a span of 24 m.

The third 1986 cutting, Trench B (24 m by 2 m), was dug through the bank of the small circular enclosure to elucidate the construction of that bank and the nature of this monument.

## EXCAVATION RESULTS

This discussion of the excavations' findings is organized according to the site's layout. Trenches 1 (1985) and A and C (1986), all cut through the main enclosure bank, are described first. The discussion turns next to Trenches 2 and 3 (1985), opened in the interior. Finally it treats Trench B (1986), which was cut through the bank of the small, adjacent enclosure.

### *Main enclosure bank: Trenches 1 (1985) & A (1986)*

Before excavation, this north-west stretch of bank appeared as a gently rounded ridge, with a slight depression in the outer face and a much deeper one toward the inside of the enclosure. A few stones protruded through the turf on its surface. Upon removing the turf and topsoil, the excavators encountered a stony matrix which could be distinguished, as excavation progressed, as discrete dumps of material. The upper stones were supported by a matrix of mixed mineral and organic soil which also overlay them and had filtered down between them. Below this horizon the stones were generally clast-supported, with stones supporting each other rather than being supported by a soil matrix. Four phases of use and construction emerged from the excavations:

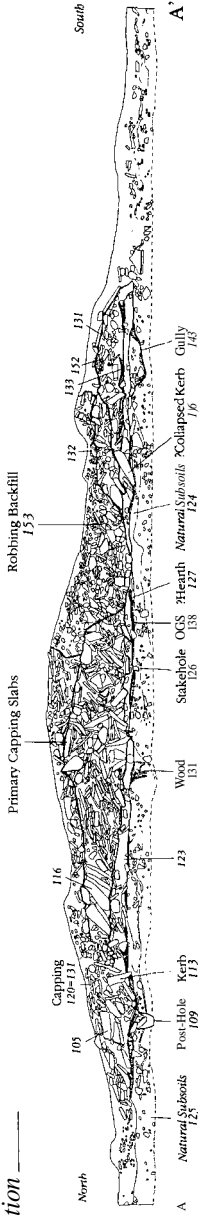
Phase 1: pre-bank activity, including light structures and a hearth;

Phase 2: the timber posts erected and the stony bank built between them;

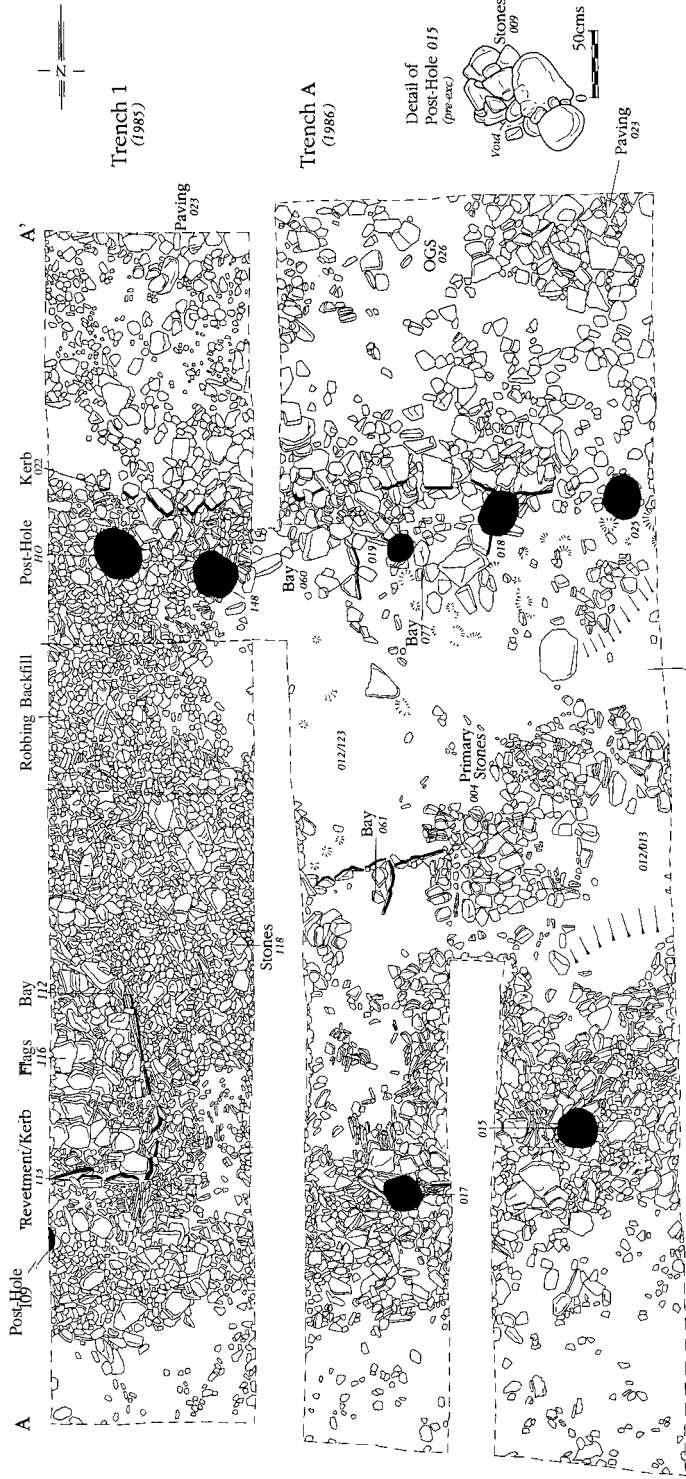
Phase 3: stones heaped around the standing posts, broadening the bank;

Phase 4: stones laid to cap the bank after the posts had decayed.

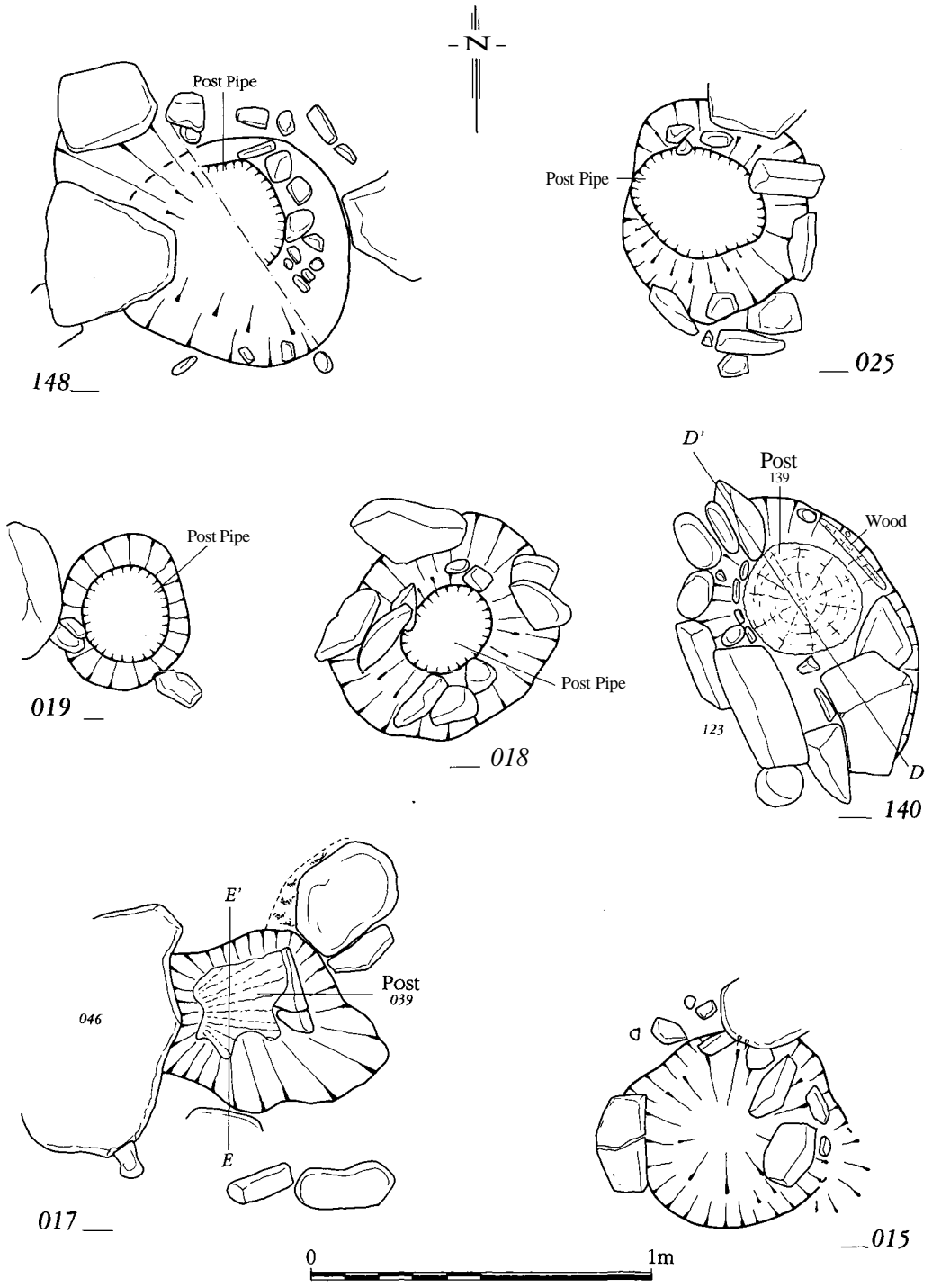
*Section*



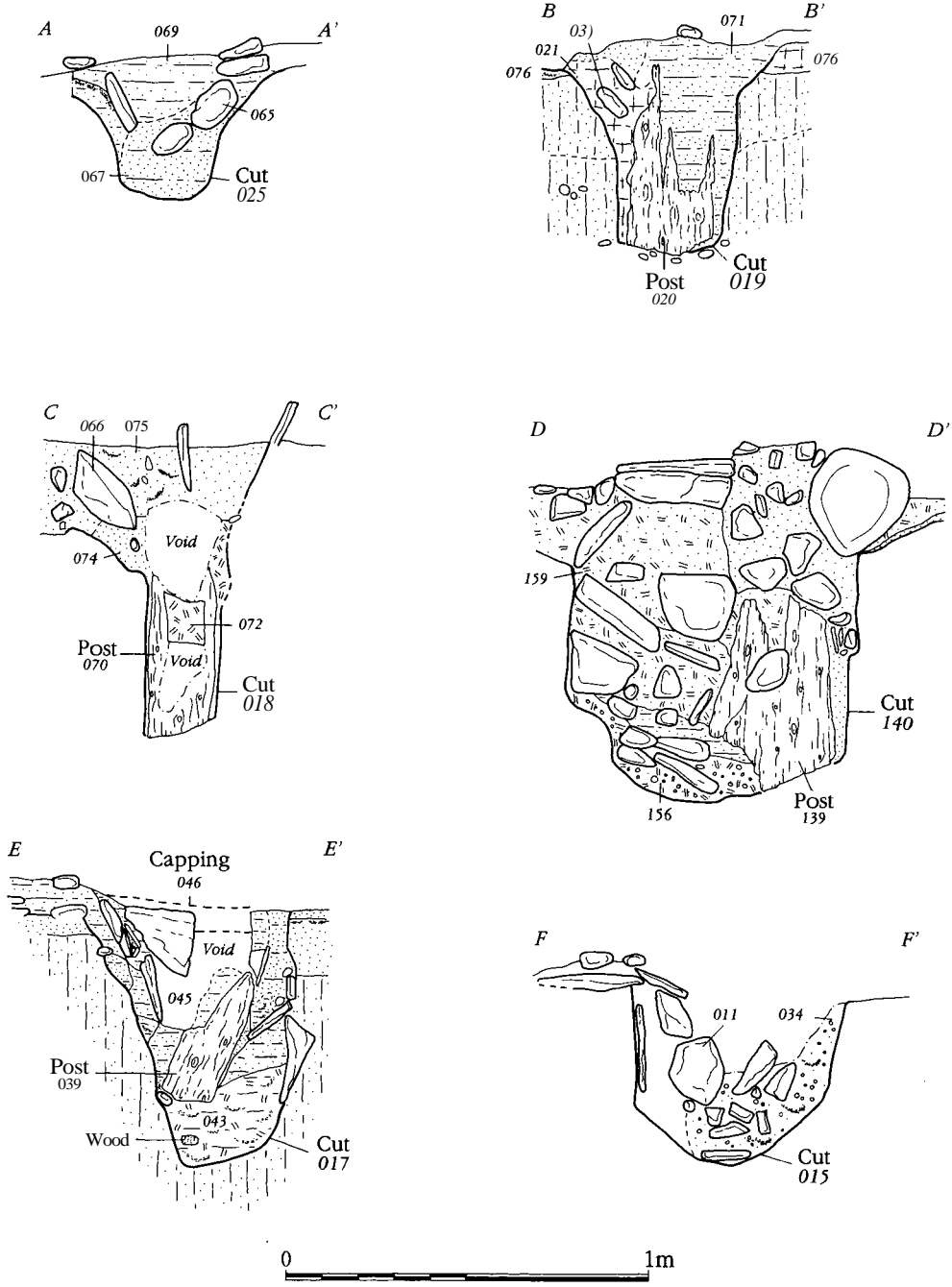
*Plan*



ILLUS 3 South-west facing section through Trench 1, with plan of Trench 1/A and detail of post-hole 015



ILLUS 4 Trench 1/A post-holes in plan



ILLUS 5 Trench 1/A post-holes in section

Phase 1 (**illus 3**) The old ground surface exposed during the excavations had seen human activity before the bank was built above it. Beneath what would later be the core of the bank in Trench 1, a stake-hole (126) had been cut and several small slabs (127) laid on the surface near it (**illus 3**). This was tentatively interpreted by the excavators as the remains of a hearth, because of charcoal and fragments of unburnt bark concentrated in the greasy clay (138) above the slabs (and also apparently sealing the stake-hole); the stones themselves, however, were unburnt. The clay also sealed a tree-hole (130), which contained a root already in decay by the time the clay formed: it was covered with perfectly preserved wood louse faeces.

The greasy clay covered the expanse of old ground surface later sealed by the bank and exposed in this trench, and it also appeared at least patchily in Trench A (024 & 029). The soil beneath the greasy clay comprised two horizons. The upper stratum (124), a pale grey sand, and the lower one (125), a red-brown sandy clay, made up the B horizon, under which lay glacial till (**illus 3**). Nineteenth-century drainage of the adjacent bog had lowered the water table, and so the smaller particles in the upper part of the B horizon had washed down into the lower part, leaving the upper elluviated (leached of finer material) and the lower illuviated (having received the finer particles and become clay-rich) (see Jordan, below). The absence of a buried A horizon on the surface of the leached subsoil led the excavators to suspect that the turf had first been stripped from the ground, and that the greasy clay had developed on a surface left exposed for some time before the bank was built. However, gleying and modern leaching may have removed evidence of such a horizon, as well as other signs of activity preceding the bank.

Also cut into this ground surface in Trench A were a hollow (028) with a charcoal-rich fill (027) and 11 possible stake-holes. Most of these stake-holes were scattered widely and formed no discernible pattern. If they were cut to support a structure, its nature could not be established, either during or after excavation — a common problem with putative ephemeral structures. Finally, to the south of the slabs and stake-hole in Trench 1, under what would later be the inner flank of the enclosure bank, a gully (143) was cut and slabs (142) pitched against its south-facing side; it appeared to have partly silted up (**illus 3**).

Phase 2 (**illus 3, 4 & 5**) In this phase, post-holes were dug and oak posts were erected in two lines, defining this part of the enclosure, and a bank of stones was built between the lines of posts.

The first post-hole discovered (140) was dug just west of the gully (143); it was 0.82 m deep and 0.8 m in diameter. The original diggers seem to have dumped the upcast from that hole into the gully. In the hole they planted a massive oak post (139), with a rounded, axe-dressed base, 0.4 m in diameter; it was found in 1985 as a waterlogged stump. Four other post-holes (148, 019, 018 & 025) were dug to the west of the one discovered first, in a line extending along what would become the inner edge of the enclosure bank. These were not spaced at perfectly regular intervals, but lay between 0.8 m and 1.4 m apart (**illus 3**). They were of similar dimensions, averaging 0.6 m in diameter and 0.8 m deep (**illus 5** for section drawings).

All but one (025, the smallest) contained the decayed remains of a substantial wooden post, packed into place with small slabs. All the holes had silted up once the posts had decayed, and their upper fills were composed of weathering cones. (The excavators suspected that extensive robbing of the stones above the empty post-hole (025) had exposed the post, causing its complete decay.) Around two of the post-holes (140 & 019) a deposit, consisting of charcoal-rich clay (133 & 076), had developed on the surrounding surface while the posts were still standing (on the evidence of subsequent dumps of stone around the posts).

To the south of these inner posts a stony surface had been laid above a patchy, charcoal-rich, trampled layer (026) on the old ground surface. This spread took the form of cobbling just south of the posts, but continued as closely spaced paving which extended into the enclosure's interior. While later robbing of the inner flank's stones made it difficult to determine how far north this stony surface extended, it seems to have at least lapped the inner row of posts and appears to have respected them. It was certainly overlain by the latest phase of bank construction. Given these relationships, the paving may have been laid when the posts were being erected, although this cannot be demonstrated from the excavated evidence.

A line of posts corresponding to those on the inner flank, but more widely and irregularly spaced (from 1.4 m to 2.7 m apart), defined what would become the bank's outer flank. Three posts were found on that side, one in the 1985 trench, just clipped by the west-facing section (**illus 3**), and two in 1986 (**illus 3**).

The two westernmost post-holes (015 & 017) both measured about 0.5 m in diameter and were between 0.45 and 0.7 m deep; they contained the scraps of wooden posts as well as packing stones. Again, the ground around at least one of the post-holes (017) had been left bare and become mottled and trampled (013) during or after the post's erection.

Along the outer flank, several pieces of evidence support the contention that the builders erected their posts first and then assembled the bank between the inner and outer post rows. Visible in Trench 1 (1985) was a line formed of flagstones (113), set end-to-end on edge on the old ground surface; this ran along the line of the bank, just south of the easternmost post-hole (109), forming a kind of outer kerb or revetment to the bank (illus 3). Its line coincided with the inner side of the other posts (015 & 017), and a similar revetment formed of flags set on edge appeared in the baulk sections beside those post-holes. A very large slab with an apparently natural curved notch in one edge lay flat on the ground, just west of the middle post-hole (017). This slab not only respected the post-hole, but the builders appeared to have laid it so that the notch curved precisely around the post. Resting on the slab and protruding from the section was a flagstone (046) set upright to form part of the kerb. Stones had been heaped on the large slab and pitched against the outside of the upright, as if to support it.

The bank built between the lines of posts — either immediately after the posts were erected or some time later — survived to its original height, plus a later addition, only along the outer flank. (Later robbers seem to have extracted larger stones from the core and inner flank, leaving the smaller stones behind, an event documented by Ferguson (1794, 39-40) and proved by the frequent stone-holes found in the ground beneath the robbing backfill.)

Although the bank's inner flank was badly disturbed and depleted by robbing, a few clues to its original extent survived. The soil (133) which developed during this phase on the ground surface around the posts, exposed in the 1985 west-facing section, appears in that section to curl up at its north edge (illus 3). This seems to delineate the inner edge of the original bank, which extended out from, but did not envelope, the inner line of posts.

The excavators also noted pitched stones forming a line just north of the posts and suggested that hurdling or planking may have once retained this bank material. A few primary stones of the bank left behind by the robbers are visible in the section drawing, just north of the inner posts and resting directly on the old ground surface (illus 3); one large, pitching slab (136) might once have stood upright, forming a kerb like that found on the outer flank, but having slumped once its retaining planking or hurdling decayed or was removed.

These structural elements together form a picture of a stony bank extending between the two lines of posts, and defined at least on its outer side by a neat flagstone revetment. The fabric of the bank was composed with some care. The builders set more flagstones on edge, end-to-end, in lines running across the axis of the bank. One such line (112) joined the flagstone revetment found in Trench 1, forming a kind of bay (illus 3). Other bays (or fragments of them; eg 061) were left behind in the bank's core by the robbers, who removed the stones from around them; the flags, set into the old ground surface, were presumably more difficult to dislodge. Other bays (077 & 060) along the inner flank of the bank seemed to frame or at least respect two post-holes (019 & 018). The excavators traced remains of other possible flagstone bays in the severely robbed core and inner flank exposed in Trench 1.

After constructing the bays, the builders dumped stone inside them to form the bank, but not entirely indiscriminately. In Trench 1, they first dumped sandstone flags (116) inside the flagstone bay, and then fine conglomerate slabs (117) (illus 3). Outside this bay they put angular sandstone blocks (118). In the core of the bank only small backfilled rubble survived, but in Trench A the builders had stacked uprights in neat heaps and wedged boulders between them. In the core, some groups of large boulders (004) belonging to the primary bank remained, as well as a stack of slabs apparently dumped along the outer flank by someone standing in the core. Finally, the builders capped these dumps of stone with a layer of slabs, laying them flat and one deep; these are visible in the section drawing (illus 3).

**Phase 3 (illus 3)** In the next phase of construction, the builders added more stone to the bank, giving it extra breadth and enveloping the bases of the still-standing posts. During excavation of both the inner and

outer flanks, the post-holes were first observed as places where groups of slabs lay pitched against each other, as if around a central point. This pitching was particularly noticeable around the post-holes on the outer flank (015 & 017) (illus 3). Also visible in Trench 1's west-facing section were a dump of stones and loam (132) on the inner flank, a heap of clast-supported stones (152) dumped against this to the north, and some slabs (105) piled and tipping above the post-hole (109) on the outer flank (illus 3). The stones and loam dumped on the inner flank lay directly on the soil (133) which had developed on the exposed surface around the posts.

The builders appear to have piled stones around the bases of the posts while they were still standing, perhaps even propping some stones upright against the timbers. In doing this they widened the bank on both its inner and outer faces. They gave this newly broadened bank a neat inner edge by laying large, angular boulders (005, 022) on the ground, overlapping the paving (026) in the interior and clearly respecting the standing posts. They may have given the bank's outer edge a similar kerb, but this is less clearly defined in the excavation record.

Phase 4 (illus 3) By this phase of construction, the posts had decayed so that only their stumps remained. The builders elaborated the stony bank once more, adding some height and a final capping. After the posts had decayed and the heaps of stone around their bases had collapsed inward over the stumps, the builders laid a skin of slabs, one or two deep on the flanks but thicker over the core, above the existing bank. This survived robbing only on the outer flank and the adjacent part of the core (120), and on the very inner edge of the inner flank (131). Elsewhere, these slabs were robbed; the hole left by the robbers, filled with small rubble, is visible in the section drawing (illus 3).

In the 19th century, when the adjacent bog was drained, the descending water table left the surviving lowest stories of the bank in a layer of iron- and manganese-stained sand (122), its upper part loose and its lower part compacted. The loose, upper sand was interpreted as the weathering products of the stones above, stained by the formerly high-water table; the lower, compacted sand appeared to be the remains of sandstone lumps decayed from long immersion in the wet conditions.

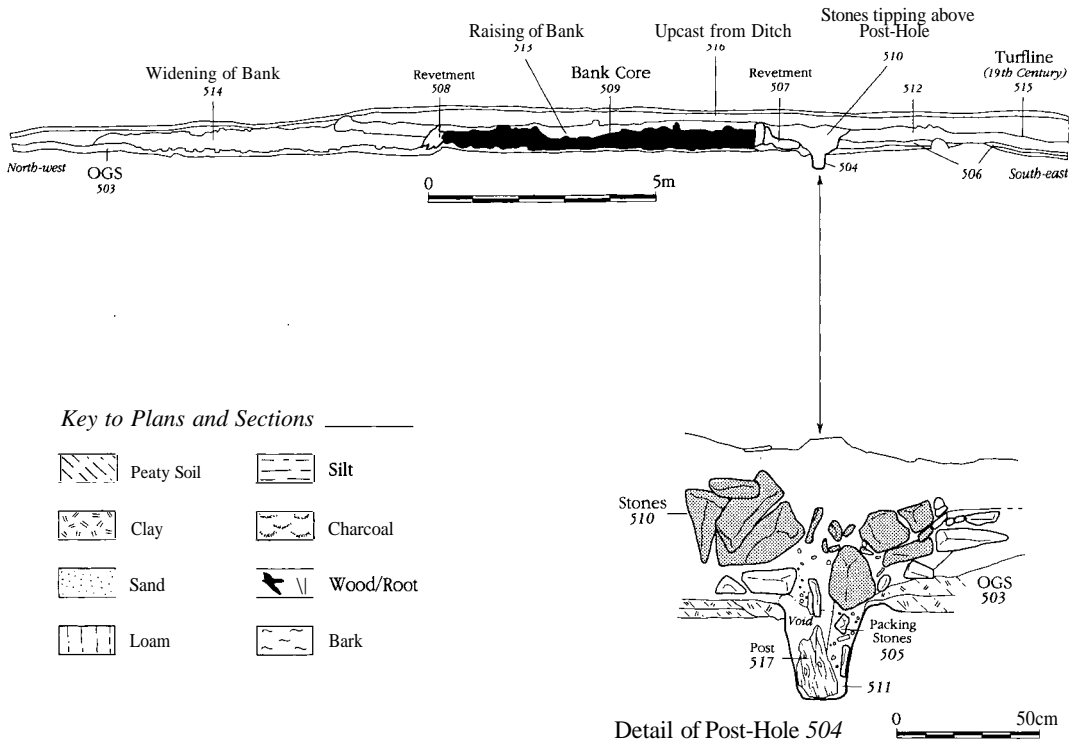
#### *Main enclosure bank: Trench C (1986)*

In opening this trench, the excavators cleaned back one side of a drainage ditch cut through the south-west part of the enclosure in the 19th century, thus gaining an oblique section through the bank. Because of its oblique line, this trench was not as informative as Trenches 1 and A; however, its findings supplement those of the other trenches and illuminate the ground conditions preceding the bank's construction. Although the evidence from this trench could not be clearly resolved into phases, its structural elements bore close similarities to those found in the other sections through the bank and seem to correspond to the phases evident there. This discussion again treats the archaeological events from the earliest to the latest; a schematic, interpretative section drawing (illus 6) illustrates the discussion.

The old ground surface (illus 6) The surface sealed by this part of the bank, a grey-blue peaty clay (503), gave no clear clues to the nature of human activity preceding its construction, although it contained charcoal and abundant wood remains and did suggest the nearby presence of standing water at that time (Ramsay, below). Below it the grey, clay-rich sand of the B horizon (502) contained lenses of charcoal which may have represented archaeological intrusions later masked by leaching; alternatively the charcoal could have leached down into that stratum (Jordan, below). The till-derived subsoil was not differentiated here into an upper, leached horizon and a lower, clay-rich one, as in Trenches 1 and A.

Along the eastern part of the section, the old peaty surface was missing. This absence might indicate the turf was stripped under part of the bank before it was built, although no clear cut in the peaty soil was observed. The excavators considered the possibility that the peaty surface resulted from the area's having





ILLUS 6 Trench C interpretative south-west facing section, post-hole section and key

been deliberately covered with a mat of organic matter, such as brush or wood, before the bank was built. However, given the good preservation of organic remains on this surface but the absence of the clear constituents of such a mat, it seems more likely that those who built the bank first encountered a boggy surface. There is some evidence that they first spread stones on the wet ground, perhaps to consolidate it: toward the inner flank, small slabs (506) lay flat upon the old ground surface.

**Post-hole (illus 6)** In the first phase of construction, as in Trenches 1 and A, a post stood on the inner flank, defining that edge of the bank. The post-hole (504), dug into the old ground surface, may have been one of the earliest events, perhaps contemporary with the paving beside it on the interior. It was somewhat smaller than most of those found in the other trenches (illus 6), only 0.28 m in diameter and 0.35 m deep; it too held the remains of a wooden post (517). Those raising the post had tucked small packing stones (505) into the hole around its base. Just west of this they laid a thick slab (507) on the ground, and against the slab they set an upright flag, apparently creating an inner revetment or kerb to the bank's core like that observed in the other trenches.

**The bank (illus 6)** The core of the bank was created by packing large, angular boulders (509) close together on the old ground surface. The builders sharply defined the bank along its outer edge by pitching slabs (508) steeply against these boulders, rather than by revetting it with upright flags as elsewhere. Around these lowest stones, which were very weathered, lay stratified, dark brown, clay-rich sand (519), probably the remains of decayed stones as well as weathering products percolated from the stones above.

In a second phase, as in Trenches 1 and A, slabs were tipped around the post standing along the inner edge of the bank. Above the post-holes lay a collection of blocky slabs (510); the higher ones tipped away

from a central point above the post, while the lower ones tipped down toward it. This deposit was very like the stones observed around and above the post-holes in Trenches 1 and A, and here also it appears that the builders widened the bank in a second phase of construction, so that its stony fabric enveloped the bases of the standing posts.

Above the possible paving slabs on the inner flank, small slabs lay flat among rounder stones (512). These were apparently added at the second or third phase of construction, perhaps at the same time as the stones were heaped around the standing post. Above the large stones of the bank's core sat small rounded stones (513), again presumably a late, second or third phase of the bank's development. Finally, to the west of the slabs pitched against the bank's primary core, defining its original outer edge, stretched a deposit of angular stones and some smaller slabs (514). The builders, then, elaborated the bank on its outer side as well, perhaps at the same time as they extended its bulk on the inner side.

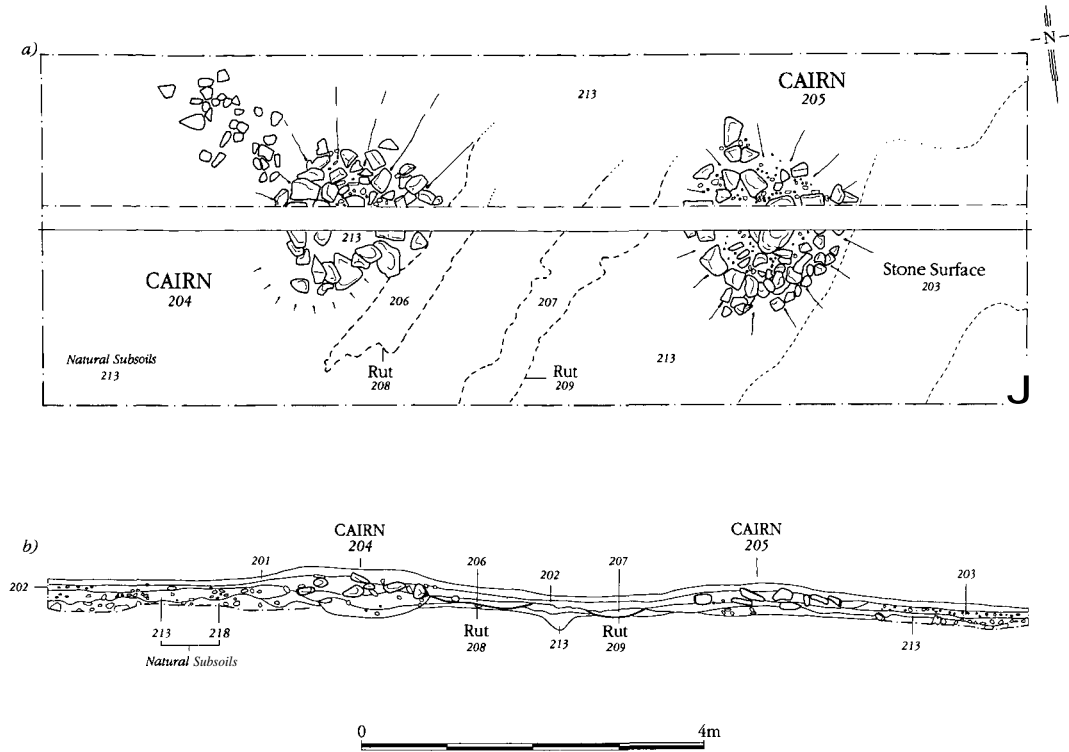
They do not seem to have carefully capped the bank at any point, as they did elsewhere. Indeed, this part of the bank appeared much more casually built than the other; more soil made up the fabric here, suggesting those building this section were short of stone, or possibly just using a simpler construction method.

**Nineteenth century (illus 6)** In the 19th century, when a modern landowner had a ditch cut obliquely through the bank to allow the adjacent bog to drain east into the Blackhouse Burn, the diggers piled their upcast (516) on top of the bank beside the ditch. The surface of the 19th century turf (515) is visible in the section drawing (illus 6) below this upcast. It preserves the contours of the bank as it survived in the 19th century, and this profile bears no apparent robbing cuts.

#### *Interior of the large enclosure: Trench 2 (1985)*

This small trench, opened over two possible cairns in the interior, revealed a simple sequence for their construction and proved the lack of later cultivation in this part of the interior. The soil on which the two stone heaps were built was a brown forest soil, a small area of which was found sealed beneath one of the stones of the eastern heap, but otherwise the excavators found that for the most part the stones lay upon the surface of the B horizon. This was distinguishable as two strata, as in Trenches 1 and A: a grey, leached, sandy clay (213), its surface stained patchily with iron pan, above a red-brown, illuviated clay (218). As elsewhere, the distinction probably came about as the water table was lowered through local drainage in the 19th century. Some charcoal was found concentrated in a small, natural hollow in the lower stratum, otherwise filled with the grey sandy clay. Any firmer evidence for archaeological activity sealed beneath the stone heaps was probably eradicated by chemical changes in the soil brought about by the water table's reduction.

**The cairns (illus 7)** The eastern heap proved to be a roughly circular setting of stones, about 3 m in diameter (illus 7). The stones (205) had been laid one deep, and the cairn given clearly defined, straight edges. It appeared disturbed on its southern side, and its centre may have been robbed, as the stones were sparse there. The other heap lay 2 m to the west. It was nearly as large (2.8 m in diameter) and rather less angular in plan (illus 7). Its edges were also well defined, and it too appeared to have been robbed (or else originally constructed that way), as its centre was relatively empty of large stones. Here, too, the stones (204) had been laid one deep, above a shallow, natural hollow filled with sandy clay identical to the upper layer of the B horizon (illus 7). Sealed beneath this upper, grey layer, just west of the heap, was a small sherd of AOC (all-over cord impressed) Beaker, presumably brought down into the B horizon by worm action. This sherd might date to anywhere between about 2600 and 1800 BC (Kinnes *et al* 1991, 39), so it was probably deposited there around the time the bank was being built or at some later phase in the enclosure's use.



ILLUS 7 Trench 2 pre-excitation plan and north-facing section

**Trackway (illus 7)** Between the two stone heaps ran two parallel, linear, compact concentrations of small pebbles in a peaty matrix (206 & 207). These ran obliquely across the trench, NE/SW; each was 0.2-0.3 m wide and they lay about 0.5 m apart (illus 7). They were interpreted as the ruts of a cart track which ran between the cairns.

**Stone surface (illus 7)** In the south-east corner of the trench, a compact spread of pebbles (203) was initially thought to be the remains of another track (illus 7). However, it bore no ruts, and appeared to be a deliberately laid surface, perhaps contemporary with the ancient use of the enclosure. A layer of peat (202) covered this surface, the track ruts and the stony mounds.

While the evidence from this trench shows the stones of the so-called cairns were deliberately set in two groups, it neither clearly shows the broader intentions of those who set them there nor confirms that they were contemporary with the enclosure bank. Although a Beaker sherd was found in close proximity to the western cairn, it was in a disturbed position and need not be associated with either cairn. The rutted track running between the stone heaps may be of some antiquity, but the ruts did form after peat had accumulated in the enclosure's interior, suggesting they post-date its ancient use. The cairns are comparable in size and manner of construction to Cairn 7, excavated on Biggar Common (Ward 1991b, 66-7), but both that structure and the Blackhouse cairns are of uncertain date and purpose.

#### *Interior of the large enclosure: Trench 3 (1985)*

This trench was a small section through a feature interpreted from surface remains as a drain (1) which lay in the northern part of the enclosure, just within the bank. The trench confirmed the

interpretation, showing that the ditch's upcast had been spread beside it and the ditch itself had silted up and been cleared out several times. No dating evidence was found.

*The small enclosure: Trench B (1986) (illus 2 & 8)*

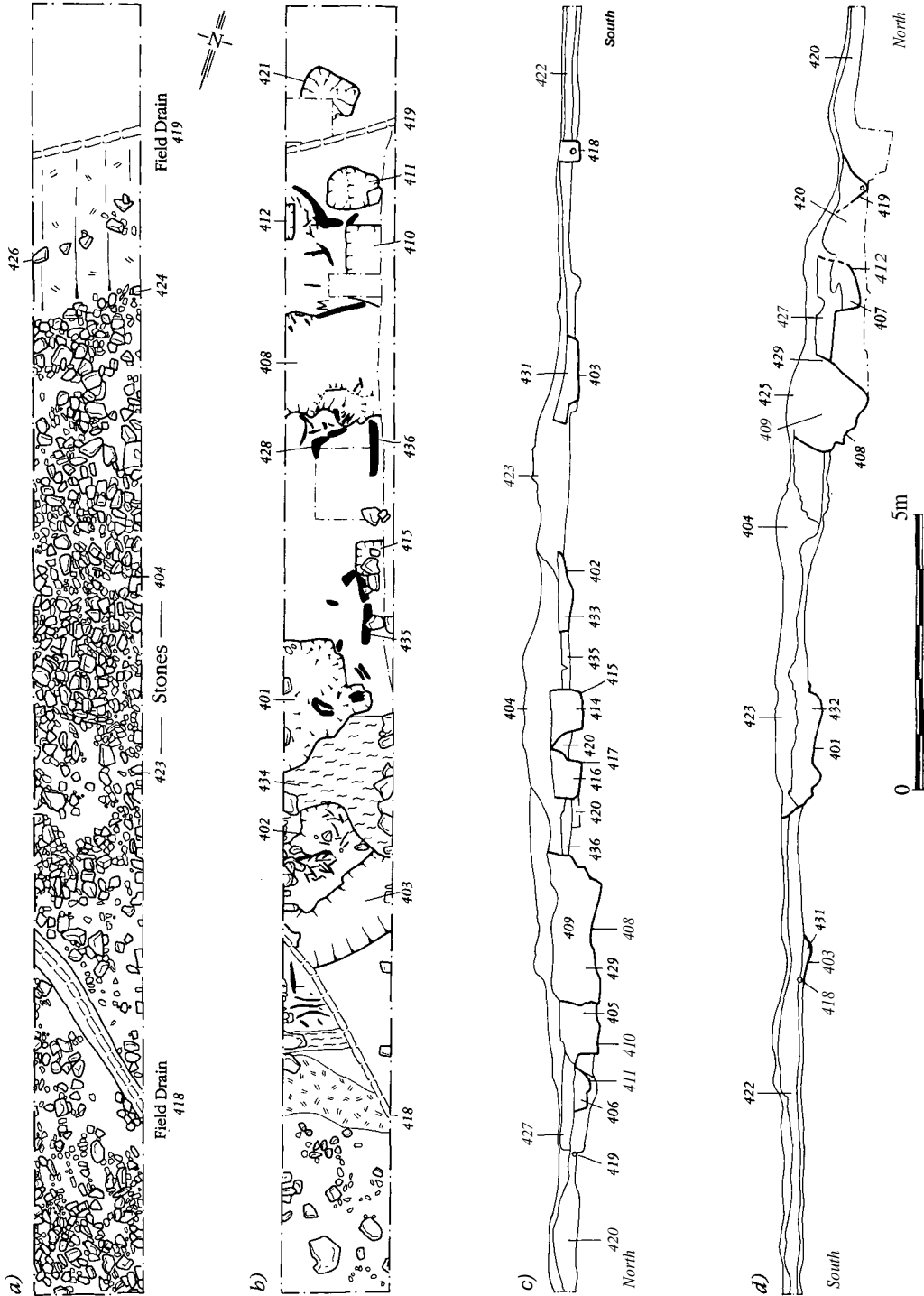
The small enclosure was built just within the limits of the ancient bog which bordered the large enclosure (illus 2). Trench B, a narrow slot through its bank, revealed an unusual and not wholly intelligible sequence of construction. Before this enclosure was built, the surface of the bog was hummocky peat (420), covered with decaying tree roots and a thin layer of rotten branches and other vegetation (434). The earliest events exposed in the trench were several holes dug into the peat, most of them down to the surface of the underlying till. Those dug on the outer side of the enclosure were of very different character from those cut on the inner side (illus 8).

Along or just beyond the outer edge of the bank, three holes (410, 411 & 412) had been dug through the roots on the bog's surface. Each had been dug using the same or similar tools, and given straight edges and neat corners (illus 8). The end of the western pit (412) had been cut with four consecutive and adjacent strokes of the digging tool, the marks of which were still visible in the peat; its flat base had been filled with peat and pieces of wood, and clay had been dumped above (407). The other holes (410 & 411) had similarly straight edges, and also bore the marks of the digging tool. The former (410) had been backfilled with a mixture of clay, small stones, cut pieces of wood and some peat (405); in the shallower hole (411), silt had accumulated in its base, stones had been laid against its south face and finally peat and wood had been dumped into it (406). In all three cases, the fills were denser than the surrounding peat. The clay had evidently been quarried from elsewhere, possibly from along the edge of the bog; those quarrying it probably dug down through peat and decayed wood, and this material seems to have got mixed with the clay they extracted.

To the south of these three holes, below what would be the bank's outer flank, a broader, deeper hole (408) ran across the trench, slicing through a log and a tree root lying on the peat to the south (illus 8). This hole was about 2 m wide, and its base skimmed (but did not penetrate) the underlying till, up to 1 m below. Stones (429) had been packed against its base and sides, and clay and peat dumped in afterward. When the sides were cleaned during excavation, this fill came peeling away from sharply cut vertical scars in the peat, made with a slicing tool like the one used to dig the three other holes; a descending series of step-like cut marks could be traced down the west and east sides of the pit's south face. Resting, as if carefully laid, on one of the steps between these vertical cuts were six pieces of wood of about equal length (c 0.15 m). The ends of two appeared pointed, as if they had been stakes. Five of the sticks lay side by side, with the sixth at right angles to the others. These might have been laid as a mat on the step, to aid traction or provide a dry surface — perhaps a temporary seat.

It is possible that these holes were dug to facilitate construction of the enclosure bank, allowing water to be bailed out of them, leaving the surrounding ground drier. The 'causeway' between the pits would have allowed room for someone working on the construction to stand or walk. The holes were then backfilled with firmer material, perhaps to consolidate the surface of the bog around the enclosure, making the structure more stable. However, this is not an entirely convincing interpretation, as peat is not easily drained.

To the south of this large pit or ditch, two other squarely cut holes may have supported a putative superstructure (illus 8). One shallow hole (417), about 1 m wide, had been sliced through the same log (436) whose other end was cut by the large pit (408), and had been backfilled with stones and clay (416). The stones had been stacked against its slanting south side, forming a



ILLUS 8 Trench B pre- and post-excavation plans and sections

rough face which appeared in section to continue above it. Immediately to the south of this, a deeper hole (415) was cut through another, thinner log (435). It contained a mixture of silty clay and peat, with a few stones. At its south edge, resting on the thin log, lay stones several courses deep, also forming a rough face on that side which rose above the top of the cut.

The stones above the edges of these holes, which made up the bulk of the bank, seemed during excavation to be part of a tumbled heap (or several heaps), mixed with clods of clay; the alignment of stones with the edges of cuts beneath was visible only in section. The interpretation which emerged during post-excavation analysis is consistent with observations made during excavation. It seems likely that the foundations of a drystone wall skin were set against the south side of the shallower hole (417), which was then filled with firm material. Another hole (415) was dug just beside it, and another wall face laid on the surface of the bog beyond its south side. This second hole was filled with clay and peat between the two stone skins, providing a firm earthen core for a stone structure. Lying above these features, the apparent jumble of stones (404) mixed with clods of clay may have formed the wall fabric, later tumbled and ruined so that it appeared structureless on excavation. The broad ditch or pit (408) outside this low wall might have drawn water away from it, and the stones (424) clustered above the pit might have tumbled from the structure.

Spread above the smaller, squarish holes along the outer flank was a deposit of clay (427), forming the slope of the bank and then petering out above the peat to the north. This, too, might have encouraged water to run off the bank; alternatively, the clay might have been a bonding agent within the stonework, subsequently washed out and redeposited.

At the centre of the bank, several curving holes had been crudely dug into the peat. Two (401 & 402) seemed to be rough pits; the former showed the marks of the digging tool in its peaty sides. Both had been backfilled with a mixture of stones, peat, pieces of wood and, in the case of the larger pit (401), clay. Overlying them was a heap (or several heaps) of stones, mixed with lumps of clay and peat (423). This might have tumbled from the superstructure at the centre of the bank, and here too the holes could have been cut to drain water and make construction easier, like those outside it, although they were more roughly dug than the others. South of these was a broad, shallow, irregular slot (403), running obliquely across the trench and partly penetrating the peat; its north edge curved erratically, but in general it seemed to mark the inner edge of the bank. It had been filled with the ubiquitous mixture of stones, wood and peat. The excavators also observed a sharp cut (438) through the peat to the surface of the till in the base of the shallow slot. Above and partly within it, at the south end of the trench, lay a spread of flat stones (422), tentatively interpreted as possible paving of the interior. Otherwise, however, the small excavated part of the interior was featureless.

The lack of unifying stratigraphy in this trench made it impossible to establish a sequence of relationships between most of the dug features, but the similar ways in which they were dug and the similar tools used to dig them suggest they were part of the same project. That project seems to have involved digging ditches or pits of uncertain function and building a stone structure of some kind, possibly with two drystone skins around an earthen core.

On the evidence of the marks in the peat, the tool used to dig these holes was about 0.12m wide, its back flat or very slightly curved and its toe sharply rounded. The cuts sloped out from the top to the bottom as if the blade had been thrust in at an angle. If the tool were a spade, then in each case the digger stood on the bog surface and dug away from her or himself. However, several details make another tool a more likely candidate. There were no leverage marks on the south face of the large pit (408), and the pitting effect, especially on that face but also in the base of the pit 410, suggest the blade was pulled sharply upward after it bit into the peat. It seems more

likely, therefore, that the tool was a mattock. Whatever it was, it was sharp and sturdy enough to slice cleanly through peat and rotten logs, but not strong enough to penetrate the till, as all of these cuts stopped at its surface.

Finally, the latest features observed in this trench were two ceramic field drains, laid in the 19th or 20th century, one at the south end of the trench (418) and one at the north end (419), with a sump possibly associated with the latter.

## ENVIRONMENTAL ANALYSIS

### SOILS

David Jordan

The site is mapped as lying on soils of the Linhope series (Macaulay Institute 1982). These are freely drained brown forest soils developed in drifts derived from greywackes and shales of Ordovician and Silurian age. The till which underlies the site is actually derived from coarser sediments than these. The local soils include peaty gleys, non-calcareous gleys and imperfectly drained brown forest soils as well as occasionally podzolic brown forest soils. The soil around the excavated areas of the large enclosure bank is a non-calcareous gley while that examined in the centre of the enclosure is a shallow brown forest soil of low base status.

### *The main enclosure bank*

Two sections were cut through the bank, both in the western part of the enclosure which drains toward the bog. The water table is high, and soils around the sections are groundwater gleys. The bank sections were very complicated, and schematic descriptions are offered in order to pick out the main points of soil interest (depth of profile is measured from the bank top).

**Section 1 (Trench 1, 1985)** This section was cut back from the west-facing section of the trench.

- A 0–10 cm. The surface Ah horizon of mixed mineral and organic matter which overlay and had filtered down into the stones of the bank.
- B 10–90 cm. Bank structure. Platy blocks of conglomerate, 80% to 90% sandstone matrix by volume of stone, clast-supported (stone supporting stone instead of matrix-supported).
- C 90–106 cm. Around the lowest stones of the bank was a layer of loose, granular, finely stratified sands and clays. It respected and curved around the stones of the bank, which were much more weathered in this material than above it. The upper part of this layer was loose, the lower part compact.
- D 106–120 cm. The stones projected slightly into a stratum containing further archaeological stratification, including charcoal. This layer was light grey sand, occasionally stained brown by iron compounds. Post-holes containing post bases were cut through it. The posts were well preserved except for a decaying upper 15 cm.
- E 120–143 cm. A mid red-brown sandy clay loam, mostly unstratified but with a few archaeological disturbances.
- F Mid grey-brown till.

In broad terms, the profile beneath the bank was differentiated into an upper, eluviated, light-coloured, clay-poor horizon and a lower, illuviated, darker-coloured, clay-rich horizon, probably due to the lowering of the soil water level through 19th-century drainage. Bands of charcoal and uncarbonized organic matter were occasionally found in the upper horizon. These appear not to have been influenced by pedogenesis beneath the bank and represent now otherwise invisible stratigraphic units. The other clues of

colour and texture upon which archaeologists normally rely in interpreting archaeological stratigraphy were unreliable in these horizons.

In the central portion of the bank, organic material derived from the modern Ah topsoil had filtered down between the upper stones. Below this, the stones were separated and were much as when first deposited, except for a powdery and weathered surface. The freshness of the surface detail on the stones was such that weathering cannot have removed more than a few millimetres of their surfaces. Between the lowest stones, above the buried soil surface, was a sandy and iron-stained deposit, its lower part more compact and its upper looser and drier; similarities in composition between this material and grains found on the surfaces of the stones above show the former derived from the decay of the stones. This sandy debris was stratified, suggesting phases of weathering and deposition, and its stratigraphy respected the stones of the bank. A similar stratum, probably derived from bank weathering, was located beneath the main bank of the Eildon hill-fort (Owen 1987), and such strata may be characteristic of banks with a proportion of clast-supported structure.

The soil which preceded the bank construction appears to have been a gley; water would not have ponded above its surface for any length of time. Thus the water which entered the bank itself must have risen into it from the soil below. Two processes might have played a part in this. Firstly, the compaction of the soil beneath the bank will have constricted pore space and made drainage more difficult, thus increasing soil wetness; secondly, the sand may have caused water to be drawn up by capillary attraction.

**Section 2 (Trench C, 1986)** The second section was cut back from the side of a drainage ditch which runs through the bank. This section divides into:

- A 0-2 cm. Grass and root mat.
- B 2-8 cm. Ah horizon developed on upcast from the ditch.
- C 8-28 cm. Upcast from the ditch, mid-yellow to white sandy clay.
- D 28-46 cm. Buried Ah, granular, organic-rich.
- E 46-82 cm. Bank matrix. Mostly conglomerate slabs, some supported by soil. Abundant roots and soil matrix.
- F 82-93 cm. Horizontally stratified complex of sand, silt and clay lenses.
- G 93-101 cm. Almost entirely organic, compacted, horizontally laminated material including what appeared to be wood laminae. This layer had a complex stratigraphy, the detail of which was obscured by vertical cracks and areas disturbed by stones above.
- H 101-109 cm. Mid to dark grey sandy clay with a complex stratigraphy, incorporating charcoal and very highly weathered conglomerate.
- I 109-115 cm. Light grey sandy clay loam with many very highly weathered stones.
- J Till.

Section 2 differed from Section 1 in several ways. The upcast from the ditch which sealed it had a secondary soil sequence developing in it, superimposed on the strata of the bank. The bank itself was built with a greater proportion of soil-derived matter, and the soil which it buried had had a rather different formation history from that of Section 1. The bank at Section 2 also lay over a much greater depth of till-derived sands. These sands lacked the differentiation into an upper leached horizon and a darker lower horizon which had received matter leached from above. All the strata beneath the bank had been subject to the downward movement of water, and the mineral matter within it was highly weathered as a result. The good preservation of organic matter beneath the bank (in unit G) shows that the soil on which it was built must have been a gley.

To sum up, the two bank sections show that the bank was built at or near the bog margin on its western side. It was built on gleys similar to those found today although, if anything, the water table was higher than it is now. The soil beneath the bank was disturbed in places by previous archaeological activity. The bank itself had decayed slightly since construction, and the weathering products had found their way down to overlie the buried surface of the pre-bank soil. Soil from above had also percolated down into the bank. Recent drainage may be the cause of differentiation of the soil beneath the bank into an elluviated



upper horizon and an illuviated lower horizon. This differentiation appears to have destroyed much of the archaeological stratigraphy beneath the bank, and the form and rate of soil formation within and beneath the bank will have changed as a result.

#### POLLEN ANALYSIS

Susan Ramsay

Evidence for the reconstruction of the past environment of the Blackshouse Burn area comes from pollen analysis of peat samples from the bog, adjacent to the site, and from the old ground surface on which the main enclosure bank was built.

#### *Samples from the bog*

The pollen analysis of the bog was carried out by Brian Moffat in 1986 and he has kindly provided the preliminary results of his analyses for this report. Peat sequences from both the middle (Blackshouse Burn I) and edge (Blackshouse Burn II) of the bog were analysed and radiocarbon dated. The peat extends back to between 8000-9000 BP, and therefore covers most of the post-glacial period. However, preliminary pollen diagrams (not published) do not show the vegetation changes in detail, as only summary pollen results were available for analysis.

The preliminary pollen diagrams prepared by Moffat show a wooded landscape in the earlier part of the post-glacial (7500-9000 BP) with *Betula* (birch) and *Corylus* (hazel) the most likely dominants at this time. From the diagrams it would appear that after 7500 BP woodland cover began to decline and there was a corresponding increase in Ericoid shrubs, probably *Calluna vulgaris* (heather), as well as grasses and sedges. If this woodland decline is, in fact, anthropogenic in origin, this would provide evidence for Mesolithic activity in the area.

Similar woodland disturbances were noted by Boyd (1983) on Arran, where declines in tree pollen were accompanied by increases in open ground species, in particular heather. These vegetation changes were dated to the Mesolithic period and were considered to be the result of human impact in removing some of the tree cover and also using fire, particularly on fen/wet grassland, to drive out game. This burning in turn would have favoured the growth of heather, in particular, because of its resistance to fire. It is unlikely that fire was ever used to any great degree to clear standing woodland as, according to Rackham (1986, 72), 'British woodlands (except pine) burn like wet asbestos'. The preliminary pollen diagram from the bog centre shows these more regional vegetation changes most clearly, as it has not been swamped by local pollen produced by the lagg vegetation growing around the bog margins.

Moffat identified grains of flax pollen as well as liver fluke ova in three pollen samples covering approximately 6500-7500 BP. These flax pollen grains have probably come from the species *Linum catharticum* (fairy flax) rather than *Linum usitatissimum* (cultivated flax). Pollen from cultivated flax has often been found in pits used for retting the tough flax stems to produce fibres; however, this cultivated flax is not known in Scotland before the Neolithic period (Bond & Hunter 1987). If this flax pollen had come from a later retting pit dug into older peat there would have been disturbances in the peat sequence, but no such discontinuities were noted. It is considered, therefore, that this flax pollen came from fairy flax (*Linum catharticum*), a small herbaceous plant (< 0.25 m in height) which grows on grasslands, heathlands and moors throughout Britain (Clapham *et al* 1987). The increasingly open landscape may have favoured this particular species.

The liver fluke ova must be interpreted with caution, as identification of parasite eggs is problematic. If they are liver fluke ova it does not necessarily imply that pastoral agriculture was being practised on the site, as there is no evidence that these parasite eggs came from a domesticated herbivore.

Woodland did not regenerate around Blackhouse Burn after its initial decline. This may have been a result of a deterioration in climate, but it could also reflect the presence of grazing animals, not necessarily domesticated, in the area. Tree seedlings could not easily have become established in these circumstances and heather, sedge and grassland communities would have become dominant. This grass/heathland landscape seems to have continued, with only minor changes, up until the top of the peat sequences. The preliminary bog-edge diagram suggests that grass/sedge became more dominant than Ericoid shrubs, but the opposite is noted in the bog-centre diagram. It is likely that on the bog itself, heather became the dominant species but that the bog-edge diagram reflects changes around the bog and that grassland was becoming dominant in the region as a whole.

It is likely that the top of the peat sequence has been truncated, as the radiocarbon dates suggest that 4000 years of peat would have to be present in the top 20-30 cm if it were complete. The increase in damaged pollen grains at the top of the bog-edge diagram would imply increased microbial activity as a result of drying out of the bog surface, probably as a result of drainage of the bog in the 19th century. This would have caused increasing decomposition and loss of the surface layers of peat.

A more complete vegetation history of the site could be obtained from more detailed pollen information showing individual pollen taxa rather than summarised data. Unfortunately, this detail was not available to the author and it has not been possible, in consequence, to present detailed histograms.

#### *Sample from the old ground surface under the main enclosure bank*

A sample of peaty clay (503), from the ground surface sealed by the south-west part of the main enclosure bank, was removed from Trench C for radiocarbon dating in 1986. Although it was not subsequently dated, it was analysed for pollen in 1997 by the author. The results are shown in Table 1.

The pollen from this context shows a high proportion of trees and shrubs, in particular birch and hazel. Of note are the relatively low percentages of oak and elm and the absence of alder from the spectrum. Oak and elm arrived in Scotland at approximately 8000-9000 BP, but alder did not colonize this area before approximately 6500-7000 BP. It is suggested, therefore, that this pollen sample dates to sometime between 7000-8000 BP. The pollen spectrum from this site fits in with the correspondingly aged regions of Moffat's pollen diagrams from the bog. The only major difference is that the ground surface pollen spectrum shows no evidence of the Ericoid shrubs which feature so prominently in the bog diagrams. This may be because species such as heather were confined solely to the bog, although it is difficult to explain why Ericoid pollen is completely absent here.

Evidence for the wet nature of the local environment is seen in the high percentage of sedge pollen. Sedges indicate a variety of habitat types, but the majority are colonisers of waterlogged or damp sites. The presence of standing water nearby is indicated by the presence of pollen of *Myriophyllum alterniflorum* (alternate water-milfoil), an aquatic species found in base-poor lakes,

TABLE 1

Pollen from the ground surface under the main enclosure bank

Pollen type	% total pollen (excluding spores)
Trees and Shrubs	
<i>Betula</i> (birch)	30.1
<i>Coryloid</i> (hazel/bog myrtle)	18.0
<i>Crataegus</i> type (hawthorn type)	0.2
<i>Pinus</i> (pine)	2.5
<i>Quercus</i> (oak)	0.2
<i>Salix</i> (willow)	1.9
<i>Ulmus</i> (elm)	1.0
Grasses and Sedges	
<i>Poaceae</i> (grass)	3.1
<i>Cyperaceae</i> (sedge)	33.1
Herbs	
<i>Filipendula</i> (meadowsweet)	0.4
<i>Galium</i> type (bedstraw type)	0.2
<i>Potentilla</i> type (cinquefoil type)	0.2
<i>Ranunculus</i> type (buttercup)	0.2
<i>Rumex acetosella</i> type (sheep's sorrel type)	0.2
<i>Valeriana officinalis</i> (common valerian)	0.2
Aquatics	
<i>Callitriche</i> (water-starwort)	0.4
<i>Myriophyllum alterniflorum</i> (alternate water-milfoil)	1.1
Damaged grains	7.1
Spores*	
<i>Equisetum</i> (horsetail)	0.3
<i>Filicales</i> (ferns)	
<i>Sphagnum</i> (bog moss)	2.4

\*Spores expressed as a % of 'total pollen including spores'

ponds, slow streams and ditches, particularly in the uplands (Stace 1997). *Callitriche* (water-starwort) pollen was also identified, but although this genus of plants can be totally aquatic it can also colonize muddy patches of ground.

Although the main enclosure bank sealed this context (503), it does not follow that this pollen spectrum must be that of the immediate pre-construction environment. The excavators considered the possibility that some turf had been stripped before the bank was built. This could have removed many hundreds of years worth of organic material from the site, leaving a much older surface directly beneath the bank. It has also been postulated that the bank was built onto a boggy surface; the presence of *Sphagnum* (bog moss) spores in the pollen spectrum supports the idea that this area was boggy at some point before the bank's construction.

### Conclusions

The combined results of the pollen analyses from the bog adjacent to the site and from the old ground surface under the main enclosure bank provide an idea of the vegetation changes which have occurred in the environs of Blackhouse Burn during the greater part of the post-glacial period. The area was wooded in the earlier post-glacial with birch and hazel predominating but with willow in the wetter areas. Areas of standing water were present, perhaps with muddy banks.

Human impact on the vegetation is suggested from approximately 7500 BP, when the tree cover began to decline and there was an increase in the representation of Ericoid shrubs (heather) and grasses/sedges. The increase in heather suggests that fire was used by Mesolithic people in the area, perhaps to flush out game. However, the summary pollen analyses from the bog are not detailed enough to pick up the more subtle pollen signals for subsequent agricultural activity in the area. There does not appear to have been any woodland regeneration after the initial clearance/decline began, and as a result the area remained as an open landscape for the greater part of the post-glacial period.

## ARTEFACTS

### POTTERY

Olivia Lelong

A small, highly abraded sherd of pottery was recovered from the upper horizon of subsoil in Trench 2, where it had probably been brought down by weathering. The sherd has a fine, soft, micaceous fabric, and its core is reduced, indicating it was fired for a relatively short time, probably in an open bonfire. Both surfaces, however, are oxidized, so the pot stood upright as it was fired and oxygen could reach both its interior and exterior. The sherd bears four rows of faint, twisted cord impressions on its exterior. It appears to be a fragment of an AOC (all-over-cord impressed) Beaker (Clarke 1970)(not illus).

Given the doubts which now attend formerly established Beaker chronologies, only a broad dating bracket can be given for this sherd. It probably dates to between 2600 and 1800BC (Kinnes *et al* 1991), so it might have been deposited inside the large enclosure while it was being built or at any point in the following eight centuries. Its tiny size and weathered state do suggest it was exposed to considerable abuse from the elements and perhaps traffic before it became lodged in the upper subsoil horizon. It could originally have been part of a midden deposit, brought into the enclosure to enrich the soil; in any case it does not appear to have been found in its primary place of deposition.

### WORKED STONE

Tony Pollard

#### *Chert and quartz*

Only nine pieces of struck, or possibly struck, stone were recovered from the excavations, including eight pieces of chert and one piece of quartz. None of these is diagnostic and some appear little, if at all, modified from their natural state. Although a couple of possible cores were present, the majority represent rough debitage and provide no evidence for retouch or utilisation. Both the quartz and the chert could have been picked up locally from the soils exposed beside the burns or from the stream beds themselves. Only limited contextual information (that given below) was recorded. From the core of the bank in Trench 1 came a fragment of quartz, possibly natural, and a small, pyramidal fragment of chert debitage. A possible chert core and a fragment of probable debitage were found beneath the track in Trench 2, while a chert core was found in the topsoil. Two chert waste flakes (one burnt) were found in the fill of the ditch in Trench 3. Other pieces recovered were most likely natural in origin.

One broken quartz pebble was recovered, but its context was not recorded. The rounded end of this pebble displays no evidence for its use as a hammer stone, as in the case of a number recovered from the nearby cairn at Cloburn (Lelong & Pollard, this vol). However, the edge of the very even fracture does display several small removal scars. The pebble is similar to many which can be seen eroding from the clay soils exposed in local stream beds and protruding from lumps of conglomerate included in the matrix of the enclosure bank.

### *Stone discs*

More interesting than the few pieces of chert and quartz are two stone discs. They both came from topsoil, although in which trench is not recorded. Both are made from locally obtained sandstone, with roughly circular edges formed by a series of straight facets. This was achieved by percussive removal of material from the edges of the pieces. One is 65 mm in diameter and 10 mm thick, and the other is 60 mm in diameter and 7 mm thick. The faces of the larger piece are flat, while those of the smaller are slightly bevelled, giving it a convex profile.

The function of these artefacts is uncertain. The generic term 'pot lid' may be a misnomer, as these discs are far too small to cover most known prehistoric vessels, other than pygmy cups. Other possible functions include gaming pieces, although this is a term generally applied, again possibly incorrectly in many cases, to any small stone disc; these may be a little too large to be categorised as such. It is obvious when handling the pieces that their shape and size makes them a perfect fit between the average thumb and forefinger and their weight would make them ideal throwing stones, used in the same way that flat pebbles are skimmed across the surface of water. Whether such implements could have been used as weapons is impossible to say, and their purpose may have been much more benign, perhaps to urge on stubborn cattle, or simply as objects of fun. These latter suggestions are not intended as definitive interpretations, but are offered merely to demonstrate the possibility of alternative interpretations to those usually suggested.

## DATING EVIDENCE

### RADIOCARBON DATES

One radiocarbon date was obtained from the large enclosure's bank. This came from the outer heartwood of the oak post stump standing in the easternmost post-hole (140) on the bank's inner flank (Trench 1/A). It yielded a radiocarbon date of 4035 ± 55 BP. This was calibrated using the 1993 calibration curve on the OxCal software package (v 2.01; Stuiver *et al* 1993) to 2863-2404 BC at the two-sigma level of confidence. There is an 88% probability that the oak was cut down between 2697 and 2453 cal BC.

The extent of the ancient bog was determined by means of a peat survey during the 1985 season, and two peat columns were taken from it, one from its centre and one from its edge. Seven radiocarbon dates were obtained from two columns. These were calibrated using the 1993 calibration curve on the OxCal software package (v 2.01), giving a range of dates from 2186 to 7924 cal BC for the bog centre column and 1752 to 7547 cal BC for the bog edge column.

The sample from the bog edge (GU-2292), in which Moffat identified flax pollen (possibly fairy flax (*Linum catharticum*)) as well as possible liver fluke ova, was dated to 5571-5004 cal BC; its pollen spectrum appeared to equate to that of the peat sample taken from beneath the main enclosure bank in Trench C (Ramsay, above); this early date could, however, be due to stripping of the turf and topsoil before the bank was built.

TABLE 2

Radiocarbon dates from Blackshouse Burn

Lab no	Material dated	BP	$\delta^{13}C\text{‰}$	Calrange
GU-1983	<i>Quercus</i> (oak) post from posthole 140, Trench 1 (1985)	4035±55	-25.3	2697-2453
GU-2287	Bog centre column, depth 20.5-22.5 cm	3850 + 50	-26.8	2459-2186
GU-2288	Bog centre column, depth 56.5—58.5 cm	7260 + 60	-27.7	6178-5978
GU-2289	Bog centre column, depth 102-104 cm	7700 + 80	-28.3	6698-6266
GU-2290	Bog centre column, depth 131-133 cm	8710±80	-25.9	7924-7548
GU-2291	Bog edge column, depth 21.5-23.5 cm	3580 + 50	-26.7	2100-1752
GU-2292	Bog edge column, depth 41-43 cm	6380 + 130	-27.8	5571-5004
GU-2293	Bog edge column, depth 83-85 cm	8430 + 60	-28.0	7547-7307

## DENDROCHRONOLOGICAL ANALYSIS OF THREE WOODEN POSTS

Anne Crone

*Samples*

Samples from two posts retrieved during the excavations had been in storage since 1986. They consisted of slices, some 100 mm thick, which had been cut from the posts and were simply labelled 'Sample 1' and 'Sample 2', with no other site information attached to them. Although originally waterlogged, they had since dried out completely, causing shrinkage and distortion to the cross-section. A third post, labelled 017, was also located. This had survived whole but was also desiccated and split. A slice was removed from this post also for analysis.

**Sample 1** Almost half of the roundwood post survives. The sapwood and the outermost heartwood rings have decayed away and the maximum radius, from pith to outer surface, is 85 mm. The surviving fragment is 150 mm across.

**Sample 2** A wedge survives, forming approximately a third of the original roundwood post, but has split into two pieces. Like Sample 1, the sapwood and the outermost heartwood rings have decayed away and the maximum radius, from pith to outer surface, is now 140 mm. The surviving wedge is 185 mm across.

**Post 017** This roundwood post is 0.62 m long and tapered toward the top as a result of timber decay while in the post-hole. The sapwood has decayed away but the curvature of the outer surface of the post indicates that the heartwood/sapwood boundary is still present, although fragmented. The maximum radius of the post, from pith to heartwood/sapwood boundary, is now 14 cm.

*Analysis*

The surfaces of the samples were prepared for measurement by fine sanding. The ring-pattern was enhanced by rubbing powdered chalk into the polished surface, a procedure which highlights both the large springwood pores and the smaller latewood pores. The samples were measured on a Henson measuring table and the measured ring-widths were logged onto a PC using a data-capture programme, TREERING (McNeill 1992). Cross-matching and chronology construction were undertaken using DENDRO (Tyers 1990), supported by visual cross-matching.

The ring-patterns of the samples were very different from each other. The ring-pattern of Sample 1 contained bands of very compressed rings which were extremely difficult to measure. These usually occur when there has been little or no deposition of summerwood, either because

of defoliation by insects or poor weather during the growing season. The large springwood pores are consequently compressed against each other and it becomes very difficult to determine where each annual ring starts or ends (for example see Baillie 1982, pl2a). Two separate radii were measured to check that no mistakes had been made and a ring-pattern, 116 years in length, was constructed. However, it still remains a possibility that the recorded ring-pattern contains errors. In contrast, the ring-pattern of Sample 2 was relatively fast-grown, with wide rings and no bands of compressed rings. The measured sequence was 107 years long. The sample from Post 017 was also relatively fast-grown but with occasional small bands of compressed rings. The measured sequence was 117 years long.

The ring-patterns of the three samples were cross-matched against each other, visually and statistically, but no acceptable position of best match was found. Consequently a site master could not be constructed. The individual sequences were then run against a series of master chronologies from northern Ireland and England, but no consistent correlations were found.

### *Conclusions*

It is possible that there are pronounced differences between the ring-patterns of the samples because they grew at different times (ie they were not fully contemporary with each other), but in the absence of any correlation between the sequences it is impossible to determine their temporal relationship to one another. Alternatively, their different growth patterns may result from their having grown in different micro-climates.

The failure to date the individual sequences against the reference chronologies is disappointing, given the scarcity of suitable material from Neolithic occupation deposits in Britain and Ireland (Hillam *et al* 1990). The tree-ring sequences from Blackshouse Burn are the first to be found in a Neolithic context in Scotland and will be stored for future analysis in the hope that they may one day form the foundation for a Scottish Neolithic tree-ring chronology.

## BLACKSHOUSE BURN IN PRACTICE

Stepping back from the data produced from the limited excavations, survey and specialist analyses, a composite picture of the two monuments emerges. Early activity in the basin possibly involved light, stake-built structures and a hearth (Phase 1), as well as vegetation clearance (perhaps to flush out game) around the bog and its standing water. Other traces of activity pre-dating the monuments' construction may have been removed by leaching and gleying of the buried soils.

Later, two rows of massive oak posts were erected — possibly marking out the entire circumference of what would become the enclosure (although on the basis of limited excavation we do not know this) — and a low, stony bank was built between them (Phase 2). Then, while the posts were still standing, this bank was widened by heaping stones around their bases (Phase 3). Finally, after the posts had decayed, more stone was added to the bank, raising its height to c 1.5 m (Phase 4).

This sequence of events was established by excavation in two sectors of the enclosure, the north-west and the south-west. Other sectors might have been built differently, or at different times. The overall plan, with its fairly straight stretches joined by slight angles, does suggest the whole was built in segments, either by different groups or over a period of time. For the small, adjacent enclosure, holes were first excavated in the ground at the edge of the bog, these were filled with firmer material and a stone structure was built on this surface. The post-glacial

woodland, cleared sometime before the enclosures were built, never regenerated, and the surrounding land remained open grassland and bog.

The large enclosure's construction contains certain paradoxes. It is vast; the survey plan and photograph (illus 2) convey this to some extent, but walking into the enclosure for the first time one is still taken aback by its scale (up to 300 m in diameter and almost a kilometre in circumference). Indeed, at several places inside the monument its topography and size make it impossible to see from one side to the other. Despite its mammoth scale, in places it was built with great attention to detail, with flags set on edge to form neat bays within the bank, and these bays filled with different kinds of stone, suggesting that different gangs of workers built their own sections and collected their stone from different places in the locality of the site. These bays and various dumps of stone would not, however, have been visible when the bank was finished, as its capping would have masked them.

In other places, it seems constructed to an uneven standard; the section recorded in Trench C revealed much more soil in the bank's matrix than in the other trenches. Long stretches of the bank are very low and hummocky, as if unfinished. Although stone robbing might account for some of its appearance, it does not explain it fully, particularly along the western edge which skirted the bog and where the water table was high until recent drainage. Until those improvements, it seems unlikely that farmers would have brought horses and carts into that mire to collect stone, especially when they could have robbed the better-drained sections of bank to the east. Some robbing — we are not sure where — is documented in the 18th century (Ferguson 1794, 39), 100 years before the bog was drained. The spreading mass of stones between the small enclosure and the large one, beside the latter's inturned entrance, was interpreted by the Royal Commission (1978, 78) as spoil heaps left by robbers. By the same argument, however, this seems an unlikely place for robbing. Those piles of stone might as well be interpreted as the remains of a drystone structure which supported a timber superstructure associated with the entrance or the small enclosure and which, once the timber decayed, collapsed into its present undistinguished state (A Barlow, pers comm).

If the double rows of oak posts continued all the way around the perimeter of the enclosure, and if they were spaced similarly to the excavated examples, then many hundreds of posts could have stood at one time. It seems unlikely that one tree would have been cut down to make each post, given the evidence that an oak could grow (in eastern England) to a length of 20.4 m without branching (Wainwright & Longworth 1971, 223). The three posts to which dendrochronological analysis was applied each represented trees with life spans of over 100 years (Crone, above), so they may have been quite tall, although their height would depend to a large extent on their growing conditions. How high could these posts have stood, given the depth of their post-holes? Burgess (1976) assumes that at least one-third of each oak post at the Neolithic enclosure of Meldon Bridge would have been embedded in its post-hole, allowing the top two-thirds to stand above ground. This seems a rather conservative estimate, but if we accept it, then the posts at Blackhouse Burn could have stood up to 1.6 m high. We know that builders in this period were prepared to erect substantial uprights of stone which were set in very shallow sockets; these posts, therefore, may have been much taller. Heaping stones around the bases of the standing posts may have been an attempt to stabilize them; it follows from this that the posts could have stood to ambitious heights.

The timber posts certainly formed a double row along part of the enclosure, and — above the bank — these may have been free-standing, or alternatively have been joined by horizontal planks or hurdling attached to their flanks or linking their tops; they might also have been painted or carved (cf Catherall 1976, 4). Were they all standing at the same time? Dendrochronological



analysis of three stumps did not find correlations between the three tree-ring sequences to suggest that these trees grew at the same time (Crone, above), but neither did it find evidence to the contrary. It is possible that the trees' life spans did overlap but that they grew up in different microclimates, thus developing different ring sequences. Without more dating evidence it is impossible to say for certain, but the stratigraphic coherence of the bank in its two excavated sections creates a strong impression that all of the excavated posts were erected at roughly the same time (most before the stony bank was built or while it was being built) but before the bank was broadened by heaping stones around all of the posts.

It may be possible to determine how long the timber posts stood, and therefore the length of the bank's first phase. The posts were massive, but they stood in damp ground and in the open, where they were vulnerable to wind and to fluctuations in temperature and humidity. Wainwright & Longworth (1971), calculating the life of timber posts at Durrington Walls, used the Forest Products Research Laboratory's experiments, which found that timbers of larger diameter survived longer than thinner posts. *Quercus robur* is one of the most durable kinds of oakwood, although its sapwood decays much faster than the heartwood (*ibid*, 224). Accounting for this decay, they estimated that oak posts with large diameters would survive about 15 years for each inch of radius (*ibid*, 225). Using this formula, the posts excavated at Blackshouse Burn, with their diameters of up to 0.3 m, should have stood for perhaps 130 years. Other posts (such as Post 109 in Trench 1) may have been erected later, but while the original posts were still standing, and therefore during this period; this may show that new posts were added over time. There was no evidence that new posts were inserted into old post-holes, replacing decayed posts.

Those using the monument finally capped the bank after the posts had decayed, and probably not long afterward. The section through Trench 1 (illus 3a) showed that the stones heaped around the post had already collapsed above the post-hole by the time the bank was capped, as the capping (where it had survived robbing) was *in situ*, not slumped. This capping was laid, then, after the decay and collapse were complete, but before any soil profile had developed on the stony bank. Nothing survived to indicate how long the monument held meaning for people after this. It might have been two generations or ten, but they did seem in the earlier Bronze Age to re-direct their monument-building efforts onto the surrounding ridge, and perhaps also to the adjacent small enclosure.

The small enclosure contrasts markedly with the large one in the manner of its construction. Its builders thought ahead about how to build on such wet ground, and their carefully dug and backfilled drainage holes (if this interpretation is assumed) and consolidated foundation slots suggest they intended a structure more elaborate and fragile than a simple stony bank. They chose its position, too, with great precision, almost to the metre: this small ring sat just within the ancient bog. The builders could have made their job much easier by moving several metres to the north-east, for example, but clearly it was important that the enclosure sat on the edge of the wet ground. Although no dating evidence was recovered from the small enclosure, its distinctive construction suggests it was built at a different time than its larger neighbour; however, their opposed entrances do indicate that the smaller one was built with reference to the larger. Its small size suggests a less ambitious project, involving fewer people. Its careful siting on the bog's edge recalls a veneration for water known elsewhere during the Bronze Age (see Coles & Harding 1979; Coles & Coles 1996). The interior of that enclosure was investigated only in a limited way; it could contain deposits of a votive nature.

Finally, for all the monuments' grandeur, the work at Blackshouse Burn leaves us with impressions of small moments, individual actions: the large slab, which would have been visible during the first phase in the life of the large enclosure's bank, placed flat on the ground to curve

just so around the edge of a standing post; the mattock-dug holes in the peat under the small enclosure, some dug with precision, some with much less care, and the mat made of short lengths of wood, laid on a peaty step in one deep hole perhaps so that the person working in it could rest on a dry seat.

#### COMPARABLE SITES

Before offering a closer examination and interpretation of Blackhouse Burn in practice, the discussion turns first outward, to similar sites elsewhere from the later Neolithic. Comparisons to the large enclosure can be drawn in several different directions. Its character and position suggest the monument was used for ritual rather than domestic purposes; however, as we discuss below, that distinction is in some ways redundant when applied to the Neolithic in Scotland.

With its large size, circular plan, bank and timber revetment or palisade, the large enclosure might plausibly be classified as a henge. While the site was not included in Burl's (1969) gazetteer and discussion of henges, it does appear in Clare's (1986 & 1987). In sheer size Blackhouse Burn is comparable to the grand henges of Durrington Walls or Avebury in Wiltshire or Forteviot in Strathearn, among others (Clare 1986, 295). In its importance and ritual complexity it might compare to the henge at Balfarg in Fife (Mercer 1981a). Its timber element also recalls Priddy, Carviak, Fall Hill and the Cocksbarrow (Clare 1986, 302). Like other henges, at least one entrance faces south-east (Barclay & Russell-White 1993, 199). It has a known (albeit secondary or intrusive) mortuary element, in the form of the cremations apparently uncovered by stone robbers beneath the bank (Ferguson 1794, 39), similar to Borwick (Clare 1986, 303).

In another direction, Blackhouse is similar to very large banked enclosures from the later Neolithic. These include Lyles Hill, County Antrim, where a low, mainly earthen bank was piled between parallel revetments and topped with a single and in places double row of posts; the bank and palisade ran around the edges of a knoll, and enclosed a low cairn. This contained cremations, in cists and also scattered and inserted in its fabric, as well as funerary vessels (Evans 1953, 6-29). Blackhouse Burn might also be compared to large earthwork enclosures elsewhere in Scotland, some of which may have Neolithic elements as yet undiscovered, such as Leadketty in Perthshire and Dundonald in Ayrshire (A Barlow, pers comm; Halpin 1992). In scale these monuments recall the causewayed enclosures of southern Britain and, like henges, may descend from that tradition (Evans 1998a).

In the massive timber posts which helped define it, Blackhouse Burn is also reminiscent of the large promontory enclosure at Meldon Bridge in Peeblesshire (Burgess 1976). There, timber posts up to 0.6 m in diameter were planted to form a free-standing barrier c 500 m long on the spit of land between the Meldon Burn and the Lyne Water. The enclosure was approached by a timber-lined avenue, and inside it were pits, two of them lined with crushed pottery, as well as several cremations and at least one possible building. Although interpreted by the excavator as defensive, it seems more likely to have been a specially defined ceremonial centre, given its vulnerability to the rising ground immediately beyond the timber barrier.

Particularly striking about Meldon Bridge is its definition on two sides by water. In this sense Blackhouse Burn can be compared in yet another way: the large enclosure is clearly positioned to encircle the double heads of the Blackhouse Burn, while the small enclosure sat in a bog, and possibly on the edge of standing water. This reference to water sources also appears at Balfarg, where the ceremonial complex lies bracketed between two burns (Barclay & Russell-White 1993, 50).

Finally, the way the bank of the main enclosure was constructed, its flagstone bays filled with dumps of stone, recalls the chambered tomb at Point of Cott in Orkney (Barber 1988). (The bank's fabric, however, was not made up mostly of voids, as the tomb's was.) It also might resemble the barrow at North Mains in Perthshire (Barclay 1983), where light fences or hurdles created bays, and turves and subsoil were dumped inside them. Shepherd (1996, 45) has suggested that at the Neolithic ring mound of Midtown of Pitglassie, the segmentation observed in its construction would have allowed continued access for some time before the bank was finished. In all these cases, the construction bays were not visible in the finished monuments, suggesting that the process of construction was important to the builders, as well as the product.

The small enclosure at Blackhouse Burn bears some comparison with a Late Bronze Age structure at Bargerosterveld, in Drenthe, The Netherlands. There a ring of stones 4 m in diameter was set on waterlogged ground in a marsh; oak planks were laid inside it and what appears to have been a horned timber structure was built on the stone footings (Coles & Harding 1979, 521). Several hoards of metal found nearby may have been votive deposits. Similarly at King's Stables in Northern Ireland, an artificially embanked pool or boggy hollow was found to contain ritual deposits (Hamlin & Lynn 1988).

This brief review of the kinds of sites comparable with Blackhouse Burn may give some idea of the range of late Neolithic and Bronze Age enclosures, with all the variety and subtlety of meanings they must have held for those who built and used them. Rather than pursuing comparanda — especially as we do not really know what the class we call henges, for example, actually meant in the later Neolithic — it seems more fruitful to look at the monument within its own context (cf Barclay 1995, 4). It is likely that those living in different regions developed their own traditions of monument-building in particular ways, to express and accommodate their own views of the world (Barclay 1989; Bradley 1993; Harding 1991, 147). Just as there is no single 'Scottish Neolithic,' there is no single definition, function or label which can presently be imposed on the enclosures at Blackhouse Burn.

#### THE MONUMENT'S HISTORY

It is generally recognized that the adoption of farming in Britain was not a sudden change, but a subtle and complex process, which involved not only economic implications but also brought about fundamental, if gradual, changes in the ways people understood and experienced the world (eg Barclay 1997; Pollard 1996; Thomas 1988; Thomas 1991). Bradley (1991) has discussed how hunter-gatherers' and farmers' different relationships with nature might have been expressed in different forms of monument. Those building large monuments intervened in the natural world, re-ordering it in a substantial way, and this physical scarring must have both developed from changes in, and also had profound effects upon, their conceptions of the world (*ibid.*, 136; see also Evans 1988b, 93). Interventions on that scale would have seemed appropriate to those whose world-views already accommodated exploiting nature, as farmers do. With their agricultural systems depending on sustained interference with natural processes and the handing down of seed, livestock and knowledge from generation to generation, they needed to construct monuments which incorporated and commemorated their ancestors, taking the long view of human time (Bradley 1991, 135).

For hunter-gatherers, who 'belonged' to nature and to whom such continuity was perhaps less vital, places could act as natural monuments, a focus for rituals (see Ingold 1986). As Bradley (1991) argues, monuments as culturally constructed places and places as natural monuments began with very different ideas, but 'the process of "becoming Neolithic" involved the gradual

merging of these categories' (*ibid*, 136). As we will argue, the large enclosure at Blackshouse Burn seems one monumental manifestation of this process and this merging in Upper Clydesdale.

Like Bradley's places perceived as natural monuments, the Blackshouse Burn large enclosure uses the topography of an upland position, although not for its extensive views. In its position in the basin, the low Pettinain ridge half-embraces it on the east, creating a kind of amphitheatre, with the enclosure at stage-left. From inside the enclosure the lip of the basin hides all but the tops of the hills across the valley — Tinto, Kirkhill and Carmichael— and distance gives them the illusion of being at the same height as the ridge behind, completing the circle it begins. The large enclosure seems almost to echo this low, encircling curtain of hills.

Approaching the monument from the adjacent valley, the path of least resistance follows the burn uphill. At a point about 300 m from the lip of the basin, as the burn kinks, the enclosure begins to come into view. Here, one can only see the stretches of bank flanking the burn's northern fork, breaking the skyline, and they remain there on the horizon until one is within less than 100 m of them. (The small enclosure at Meadowflat to the right also comes into view at the same time, breaking the horizon here and thereafter from almost all points inside the enclosure.)

While the monument is virtually hidden from the valley below, from the ridge above it is anything but hidden: not visible from all points on it, but certainly spread out below for anyone conveniently placed to see, and bristling with posts and marked out with stone — neither of which would have hidden activities inside — it would have been striking. The enclosure is redolent of local knowledge. It does not advertise itself, either from above or below, but if one knew how to get there, from the ridge, or by following the burn up from the Clyde, one could approach it. It appears, then, to have neither particularly invited nor excluded, but it must have been prominent in a conceptual landscape which had long been familiar to those inhabiting it.

The scale of the large enclosure also speaks of long, established knowledge of the place. A place does not overnight acquire meanings deep and large enough to warrant building an enclosure on this scale, with the enormous and probably communal effort it required. Once built, those meanings had enough momentum to carry the monument through use, modification and elaboration over perhaps hundreds of years, and to overflow into the surrounding landscape in the form of the burial cairns peppering the ridge and basin. It seems likely, then, that people had been coming here for a long time before the monument was built.

Of the several possible entrance candidates, the two most likely ones lead directly to or from water: one on the south-west, where the banks are elaborated and inturned, leading to the small enclosure and thence to the bog; and one on the south-east, where the burns leave the enclosure. Entering or leaving the monument, then, one confronted water. The hollow in which the monument lies offers a natural route between the surrounding hills (a feature exploited more recently in the cart track which ran through the enclosure). People may have had a long tradition of moving along this route before the monument was built. These uplands could have proved rich hunting grounds during the Mesolithic, and perhaps even into later periods, with game congregating on the higher ground during the summer months. The burns would have provided water, and the presence of a lochan or bog (suggested by the pollen analysis) would have made it even more attractive, providing a clearing in the forest cover and drawing game, such as deer and water fowl.

Later, with a water source and the higher, drier ground around, people keeping cattle and sheep might have found these uplands suitable for summer grazing. Pollen evidence supports the replacement of woodland with a more open, grassy landscape (Ramsay, above). If the adoption of farming began with the gradual and selective adoption of domesticates, including livestock herds, as Bradley (1991) and others have argued, then generations of the earlier Neolithic in

southern Scotland might have known a long tradition of transhumance. With groups from different settlements using different parts of these expansive uplands, gathering at the summer grazings may have been a central social event.

In any case, water was essential for their survival on these uplands. That the enclosure bounds the twin sources of the burn, rather than just stretches of it, expresses water's fundamental importance here most eloquently. Springs are often regarded as special places, and even in Christian practice are sometimes marked by shrines; their important role in pagan belief systems, particularly as symbols for birth and purity, is well attested (Buxton 1994). The Blackhouse Burn might have been linked in the minds of those using the enclosure to rituals connected with the fertility of humans or livestock. In its link with the River Clyde they might have seen a metaphor for links among their own communities.

Any interpretation of the monument's origins must take into account the enclosure's position around water, and its air of local knowledge and long memory. If these were its origins, it remains to untangle what the act of enclosure meant to those who undertook it.

Evans (1988b) has teased out strands of what the act of enclosure meant in the earlier Neolithic, as expressed in causewayed camps. Enclosure differentiates between what is inside and outside, creating a boundary that can be both physical and cognitive. A major act of enclosure and construction like that at Blackhouse Burn meant a substantial re-working of the natural world: physically, in building such an enormous structure, using constituents of the natural world such as trees and boulders to do it; and conceptually, in the expression of cultural order or its inevitable restructuring which such a communal project must have involved. Evans (*ibid*, 93) has suggested that through such acts societies objectify themselves, projecting a kind of code or 'skeleton' of their social structure in a physical trace, where before they carried this code only in their collective memory and knowledge: 'Formal enclosure and monumental construction essentially enshrines [*sic*] an action and thereby landscape lasts as a social framework and medium.'

The process of 'becoming Neolithic' in Scotland probably involved (to varying degrees in different regions) several changes, including congregation in larger settlements, breaking and working the ground perhaps using communal effort, and managing herds of livestock while continuing to hunt, fish and gather locally available wild food. This process involved much more than changing daily or annual practices. It involved people's gradually associating themselves with domesticated land and animals more than with wild, redefining their relationship to the wildscape which became landscape (Evans 1988b, 94; Fowler 1981), as their practices required and in a way that in turn shaped their lifeways. A place — the basin and its surrounding uplands — which had been important to them for generations continued to have meaning, but that meaning altered with their changing views of the world. They came to want to enclose the heads of the burn, to formalize and physically express their collective memory of the place and the practices and rituals it meant to them.

From the manner of the enclosure's construction, clearly the process and social context of building it was as important as the final structure. The flagstone bays and the segmented appearance of the enclosure in plan suggest that people from different families or settlements built different sections. The segments also might indicate the process was an ongoing one, taking many years. The trees and stones used to build it could have been cut or picked up while land on the ridge was being cleared for cultivation, making the enclosure, in a literal sense, a monument to the farmers' changed relationship with the land. The individual or small group labour suggested by the bays was masked by the bank's capping, and this might have made it a symbol of social cohesion. No monuments approaching Blackhouse Burn in size are known in Upper

Clydesdale, and so people may have come from considerable distances to whatever gatherings were held there. The extraordinary concentration in the Biggar area of stone axeheads from elsewhere in Britain and Northern Ireland suggests people, or at least goods, did travel to the area (Clough & Cummins 1988).

At some point people incorporated cremated human remains in the bank. Ferguson (1794, 39-40) describes stone robbers, digging through the bank, finding boxes formed of stone slabs containing inverted urns covering 'some soft, slimy matter', possibly cremated bone lying on the wet, sandy subsoil. The later burial of the dead beneath the bank is reminiscent of inhumations in the ditches of causewayed enclosures (Smith 1971). The incorporation of the dead into these boundaries suggests that they were already considered liminal and perhaps dangerous zones, which demanded certain actions from or changes in anyone crossing them and entering the space they defined. The cist which Ferguson (1794) describes could have been built as part of the original fabric of bank, but the practice of placing cremations beneath inverted urns in a cist does appear to be a Bronze Age rather than Neolithic idea. This means that people dug down through the stony bank in the Bronze Age to place the remains of their dead beneath it. Adding the individual bodies to the communal body of the monument, they reaffirmed its circle of continuity between themselves and the past, even if their own world-views had radically changed since the basin first began to accumulate meaning.

## CONCLUSION

Evans (1988b, 94), in his discussion of causewayed enclosures, poses a question: if, before the adoption of agriculture, all nature was animated by the spiritual, where does that perceived spiritual world reside after much of nature is tamed? The ever-increasing evidence from excavations of Neolithic sites in Scotland, where deposits in pits we label 'ritual' lie next to structures we call 'domestic', suggests that the answer is 'almost everywhere'. Several writers on the Neolithic (eg Barclay 1995; Barrett 1989; Harding 1991) have bemoaned our general inability to weave evidence of ritual and subsistence into an understanding of what must have been an all-encompassing world view, where the two were closely linked in daily practices, both permeating all of life.

If anything, the work at Blackhouse Burn shows that these enclosures were an expression of this unity. As we argue here, the monuments began with the meaning people attached to a place, meaning perhaps bound up with fattening their stock there and meeting each other, things vital to their physical and social survival and to that of posterity, and the idea of water permeated that meaning. After a long period, as their relationships to the land, to nature and to each other changed and such an act became possible, they came together to express that meaning in a physical act of construction which created an enclosure both physical and cognitive. They need not have done anything inside it, but it is likely that anything they did there continued to express their ever-changing relationship to the place. From this point of view, the word 'ritual' is both redundant and deeply implicit in whatever we say about either monument.

## ACKNOWLEDGEMENTS

The excavations at Blackhouse Burn were supervised by Dave Pollack, Andy Barlow and Jenny Lee under the direction of Peter Hill. We would also like to thank those excavators who helped with the writing of this report. Peter Hill, who directed the excavation and survey, was generous

with his time and insight, as was Andy Barlow. Brian Moffat, who did the initial pollen analysis, also helped flesh out the picture.

The writing of this report was made possible by funds provided by Historic Scotland as part of their backlog programme, and the authors would like to thank Gordon Barclay for his encouragement and assistance at all stages of the work.

The illustrations are by Keith Speller; illus 2 and 3 are based on original ink-ups by Mary Kemp-Clarke and Dave Pollack, respectively. Back-up and project management were provided by GUARD, under whose auspices the work was carried out.

## REFERENCES

- Anderson, J 1879 'Notice of a small cemetery . . . containing deposits of urns and burnt bones, at Sheriff-flats, Lanarkshire, with notes on the classification of the different varieties of urns found in Scotland', *Proc Soc Antiq Scot*, 13 (1878-9), 107-24.
- Baillie, M G L 1982 *Tree-Ring Dating and Archaeology*. London.
- Barber, J 1988 'Isbister, Quanterness and the Point of Cott: the formulation and testing of some middle range theories', in Barrett, J C & Kinnes, I A (eds), 57-62.
- Barclay, G J 1983 'Sites of the third millennium BC to the first millennium AD at North Mains, Strathallan, Perthshire', *Proc Soc Antiq Scot*, 113 (1983), 122-281.
- Barclay, G J 1989 'Henge monuments: reappraisal or reductionism', *Proc Prehist Soc*, 55 (1989), 260-2.
- Barclay, G J 1995 'What's new in Scottish prehistory?', *Scott Archaeol Rev*, 9-10 (1995), 3-14.
- Barclay, G J 1997 *The Neolithic*, in Ralston, I B M & Edwards, K J (eds), 127-49.
- Barclay, G J & Russel-White, C J 1993 'Excavations in the ceremonial complex of the fourth to second millennium BC at Balfarg/Balbirnie, Glenrothes, Fife', *Proc Scot Antiq Scot*, 123 (1993), 43-210.
- Barrett, J C 1988 'The living, the dead and the ancestors: Neolithic and Early Bronze Age mortuary practices', in Barrett, J C & Kinnes, I A (eds), 30-41.
- Barrett, J C 1989 'Time and tradition: the rituals of everyday life', in Nordstrom, H-A & Knape, A (eds), 113-26.
- Barrett, J C & Kinnes, I A (eds) 1988 *The Archaeology of Context in the Neolithic and Bronze Age: recent trends*. Sheffield.
- Bond, J M & Hunter, J R 1987 'Flax growing in Orkney from the Norse period to the 18th century', *Proc Soc Antiq Scot*, 117 (1987), 175-81.
- Boyd, W E 1983 'Possible Mesolithic activity in the west of Arran: evidence from peat deposits', *Glasgow ArchaeolJ*, 10 (1983), 1-6.
- Bradley, R 1991 'Monuments and places', in Garwood, P *et al* (eds), 135-40.
- Bradley, R 1993 *Altering the earth: the origins of monuments in Britain and continental Europe*. Edinburgh (= Soc Antiq Scot Monogr Ser, 8).
- Bradley, R & Gardiner, J (eds) 1984 *Neolithic studies: a review of some current research*. Oxford (= BAR Brit Ser, 133).
- British Geology Survey I:63,360 Series, Sheet 23 (Solid & Drift).
- Burgess, C 1976 'Meldon Bridge: a Neolithic defended promontory complex near Peebles', in Burgess, C & Miket, R (eds), 151-79.
- Burgess, C & Miket, R (eds) 1976 *Settlement and Economy in the Third and Second Millennia BC*. Oxford (= BAR Brit Ser, 33).
- Burgess, C, Topping, P, Mordant, C & Maddison, M (eds) 1988 *Enclosures and defences in the Neolithic of Western Europe*. Oxford (= BAR Int Ser, 403).
- Burl, H A W 1969 'Henges: internal features and regional groups', *ArchaeolJ*, 126 (1969), 1-28.
- Buxton, R 1994 *Imaginary Greece*. Cambridge.
- Catherall, P D 1976 'Henge monuments: monument or myth?', in Burgess C & Miket, R (eds), 1-9.
- CFA 1992 Centre for Field Archaeology 'Elmwood Nursery', *Discovery Excav Scot* 1992, 70.

- Childe, V G 1941 'Examination of the prehistoric fort on Cairngryffe Hill, near Lanark', *Proc Soc Antiq Scot*, 75 (1940-1), 213-18.
- Christison, D 1890 'Forts, camps, and motes of the Upper Ward of Lanarkshire', *Proc Soc Antiq Scot*, 24 (1889-90), 281-352.
- Clapham, A R, Tutin, T G & Moore, D M 1987 *The Flora of the British Isles*. Cambridge.
- Clare, T 1986 'Towards a reappraisal of henge monuments', *Proc Prehist Soc*, 52 (1986), 281-316.
- Clare, T 1987 'Towards a reappraisal of henge monuments: origins, evolution and hierarchies', *Proc Prehist Soc*, 53 (1987), 457-77.
- Clarke, D L 1970 *Beaker Pottery of Great Britain and Ireland*, vols 1 & 2. Cambridge.
- Clarke, D V & Ritchie, A 1971 'Boatbridge Quarry', *Discovery Excav Scot* 1971, 28.
- Clarke, D V, Ritchie, A & Ritchie, G 1984 Two cists from Boatbridge Quarry, Thankerton, Lanarkshire', *Proc Soc Antiq Scot*, 114 (1984), 557-60.
- Clough, T H McK & Cummins, W A 1988 *Stone Axe Studies*, vol 2. London (=CBA Monogr Ser, 67).
- Coles, J & Coles, B 1996 *Enlarging the past: the contribution of wetland archaeology*. Edinburgh (= Soc Antiq Scot Monogr Ser, 11).
- Coles, J M & Harding, A F 1979 *The Bronze Age in Europe*. London.
- DES 1991 'Wellbrae', *Discovery Excav Scot* 1991, 65.
- DES 1992 'Annieston', *Discovery Excav Scot* 1992, 69.
- Evans, C 1988a 'Monuments and analogy: the interpretation of causewayed enclosures', in C Burgess *et al* (eds), 47-72.
- Evans, C 1988b 'Acts of enclosure: a consideration of concentrically-organised causewayed enclosures', in Barrett, J C & Kinnes, I A (eds), 85-96.
- Evans, E E 1953 *Lyles Hill: a late Neolithic site in County Antrim*. Belfast.
- Ferguson, J 1794 Parish of Pettinain, in Sinclair, J (ed), *The Statistical Account of Scotland*. Edinburgh.
- Fowler, P 1981 'Wildscape to landscape: "enclosure" in prehistoric Britain', in Mercer, R (ed), 9-54.
- Garwood, P, Jennings, D, Skeates, R & Toms, J (eds) 1991 *Sacred and profane: proceedings of a conference on archaeology, ritual and religion* (Oxford 1989). Oxford.
- Halpin, E 1992 'Harpercroft and Wardlaw Hill, Dundonald, Strathclyde', in Rideout, J, Owen, O A & Halpin, E (eds), *Hillforts of Southern Scotland*. Edinburgh.
- Hamlin, A & Lynn, C (eds) 1988 *Pieces of the past: archaeological excavations by the Department of the Environment for Northern Ireland 1970-1986*. Belfast.
- Harding, J 1991 'Using the unique as the typical: monuments and the ritual landscape', in Garwood, P *et al* (eds), 141-51.
- Hill, P 1985a *Excavation and Survey at Blackhouse Burn, Lanarkshire*. Interim report. NMRS archive. Edinburgh.
- Hill, P 1985b 'Swaites Hill', *Discovery Excav Scot* 1985, 38.
- Hill, P 1985c 'Blackhouse Burn', *Discovery Excav Scot* 1985, 38.
- Hillam, J, Groves, C M, Brown, D M, Baillie, M G L, Coles, J M & Coles, B J 1990 'Dendrochronology of the English Neolithic', *Antiquity*, 64 (1990), 210-20.
- Ingold, T 1986 *The Appropriation of Nature*. Manchester.
- Irving, G V 1855 'On ancient camps of the upper ward of Lanarkshire', *J Brit Archaeol Ass*, 10 (1855), 26.
- Johnston, D A 1997 'Biggar Common, 1987-93: an early prehistoric funerary and domestic landscape in Clydesdale, South Lanarkshire', *Proc Soc Antiq Scot*, 127 (1997), 185-254.
- Kinnes, I, Gibson, A, Ambers, J, Bowman, S & Boast, R 1991 'Radiocarbon dating and British Beakers: the British Museum programme', *Scott Archaeol Rev*, 8 (1991), 35-68.
- Macaulay Institute for Soil Research 1982 *Soil Survey of Scotland. South-east Scotland 1:250 000, Sheet 7*. Aberdeen.
- MacFadzean, H, MacFadzean, M & MacFadzean, D 1984 'Broadfield Farm, Lamington Quarry and Thankerton', *Discovery Excav Scot* 1984, 28.
- MacFadzean, H 1986 'Tinto Hill and Thankerton', *Discovery Excav Scot* 1986, 33.
- McNeill, D 1992 *TREERING Software*. Edinburgh.



- Maxwell, G 1974 'The excavation of ring-ditched enclosures in Annandale and Clydesdale', *Glasgow ArchaeolJ*, 3 (1974), 1-8.
- Mercer, R J 1981a 'The excavation of a Late Neolithic henge-type monument at Balfarg, Fife, Scotland', *Proc Soc Antiq Scot*, 111 (1981), 63-171.
- Mercer, R (ed) 1981b *Farming Practice in British Prehistory*. Edinburgh.
- Morrison, A 1968 'Cinerary Urns and Pygmy Vessels in south-west Scotland', *TransDumfriesshire Galloway Natur Hist Antiq Soc*, 45 (1968), 80-140.
- Nordstrom, H-A & Knape, A (eds) 1989 *Bronze Age Studies*. Stockholm.
- Ordnance Survey 1864 Lanarkshire, Sheet XXXIII, 6-in. map (1st edn).
- Ordnance Survey 1898 Lanarkshire, Sheet XXXIII NW, 6-in. map (2nd edn).
- Owen, O 1987 *An interim report on trial excavations on the fort on Eildon Hill, Roxburghshire, 1986*. Edinburgh.
- Pollard, T 1996 'Time and tide: coastal environments, cosmology and ritual practice in prehistoric Scotland', in Pollard, T & Morrison, A (eds), *The Early Prehistory of Scotland*. Edinburgh.
- Pollard, T 1997 'Excavation of a Neolithic settlement and ritual complex at Beckton Farm, Lockerbie', *Proc Soc Antiq Scot*, (1997) 127, 69-123.
- Rackham, O (1986) *The History of the Countryside*. London.
- Ralston, I B M & Edwards, K J (eds) 1997 *Scotland: environment and archaeology 8000 BC-AD 1000*. Chichester.
- RCAHMS 1978 Royal Commission on the Ancient and Historical Monuments of Scotland *Lanarkshire: an inventory of the prehistoric and Roman monuments*. Edinburgh.
- Sharpies, N 1992 'Aspects of regionalisation in the Scottish Neolithic', in Sharpies, N & Sheridan, A (eds), 322-31.
- Sharpies, N & Sheridan, A (eds) 1992 *Vessels for the Ancestors*. Edinburgh.
- Shepherd, A 1996 'A Neolithic ring-mound at Midtown of Pitglassie, Auchterless, Aberdeenshire', *Proc Soc Antiq Scot*, 126 (1996), 17-52.
- Sheridan, A 1989 'Biggar Common', *Discovery Excav Scot* 1989, 60.
- Simpson, D D A (ed) 1971 *Economy and settlement in Neolithic and Early Bronze Age Britain and Europe*. Leicester.
- Smith, I 1971 'Causewayed enclosures', in Simpson, D D A (ed), 89-105.
- Stace, C 1997 *New Flora of the British Isles*. Cambridge.
- Stevenson, J 1976 'Hero's Cairn', *Proc Soc Antiq Scot*, 107 (1975-6), 299-301.
- Stuiver, M, Long, A, Dra, R S & Devine, J M 1993 'University of Washington Quaternary Isotope Lab Radiocarbon Calibration Programme, Rev. 3.0.3' *Radiocarbon*, 35(1) (1993), 215-30.
- Thomas, J 1988 'Neolithic explanations revisited: The Mesolithic-Neolithic transition in Britain and south Scandinavia', *Proc Prehist Soc*, 54 (1988), 59-66.
- Thomas, J 1991 *Rethinking the Neolithic*. Cambridge.
- Tyers, I G 1990 *Dendrochronology Programs*. London.
- Wainwright, G H & Longworth, I H 1971 *Durrington Walls: excavations 1966-1968*. London (= *Soc Antiq London Res Rep*, 29).
- Ward, T 1990 'Biggar Common', *Discovery Excav Scot* 1990, 37.
- Ward, T 1991a 'Survey: A74 and M74 road development routes', *Discovery Excav Scot* 1991, 65.
- Ward, T 1991b 'Biggar Common', *Discovery Excav Scot* 1991, 66-7.
- Ward, T 1992a *The M74 Project (Archaeology): Upper Clydesdale through the ages*. Biggar Museum Trust.
- Ward, T 1992b 'Landscape survey M74 project', *Discovery Excav Scot* 1992, 64-70.
- Ward, T 1993 'Tinto End', *Discovery Excav Scot* 1993, 91.

*This paper is published with the aid of a grant from Historic Scotland*