NEOLITHIC PITS, HOWDEN RESERVOIR, HOPE WOODLANDS, DERBYSHIRE: EXCAVATION AND FIELDWALKING 1999

By BILL BEVAN
(Archaeology Service, Peak District National Park Authority, Aldern House, Baslow Road, Bakewell, Derbyshire DE45 1AE)

with contributions by ROWENA GALE

INTRODUCTION

A group of features on the bed of Howden Reservoir were brought to the attention of the Peak District National Park Authority Archaeology Service by Paul Ardron who discovered them while walking along the draw-down zone of the reservoir in 1997. Four patches of burnt stones and charcoal could be seen in the surface of the reservoir bed where recently it had been subject to erosion. They were provisionally interpreted as pits, dumps or hearths potentially of prehistoric date. Excavation was undertaken in 1999, when water-levels were low, to evaluate their nature, the extent of damage from rising/dropping water levels, to rescue material from them before they could suffer further damage and to take charcoal samples for radio-carbon dating. At the same time the surrounding area was fieldwalked for artefacts.

LOCATION AND LANDSCAPE

The features were situated on the western side of Howden Reservoir in the Upper Derwent Valley, Hope Woodlands parish, Derbyshire (NGR 416818 393850) (Fig. 1). This reach of the Upper Derwent is a steep-sided and sinuous valley, broken regularly by tributaries which have incised deep cloughs. The pits, situated at approximately 250m above Ordnance datum, occupied part of a narrow contour shelf which is about 30m wide and extends south of Linch Clough (Fig. 1). The ground either side of the shelf is steep, rising to the west to Ridge Nether Moor and dropping to the east to the pre-reservoir course of the River Derwent.

Howden Reservoir was created between 1901 and 1912 by the Derwent Valley Water Board (DVWB) to provide water for Sheffield, Derby, Leicester and Nottingham. The location of the pits is usually submerged, only being exposed when water levels are lowered. During the Medieval period this area was within the Royal Forest of the Peak and from at least the twelfth century until the creation of the reservoir it was settled by Wronksley Farm, situated 300m to the north-west in Linch Clough. The earliest map of the area, surveyed in 1627, depicts this location as enclosed farmland which it remained as until the valley was flooded. During this time the fields were probably used for pasture, though some low-levels of crop cultivation may have occurred as recorded elsewhere in the valley. There is therefore little likelihood of major ground disturbance having

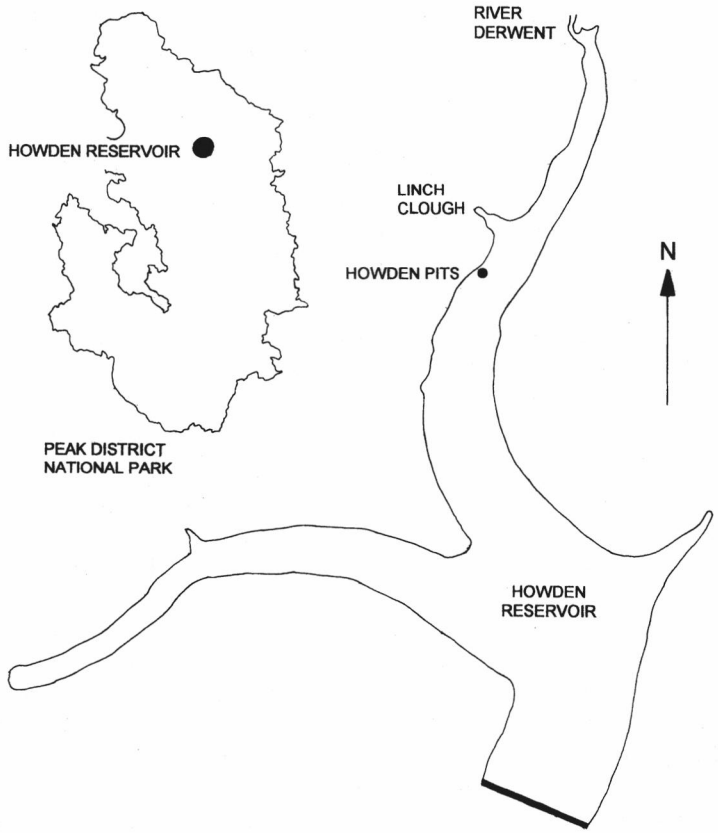


Fig. 1: Location of Howden Pits excavation.

occurred at the location of the pits except for some potential intermittent ploughing associated with pasture improvement or crop cultivation. Since the creation of the reservoir a substantial depth of topsoil and subsoil has been removed by water erosion. This has exposed interleaving layers of yellow-orange clay and sand subsoils into which the pits were originally cut.

HISTORY OF ARCHAEOLOGICAL WORK

The reservoir bottoms were surveyed for earthwork features during exceptionally low water levels in 1996 as part of the Upper Derwent Archaeological Survey, phase 1 (Sidebottom 1995; Bevan 1998). Such small and subtle features as the pits are not usually identified during this type of rapid survey and the only other archaeological feature identified in the vicinity was a prehistoric burial barrow dating to the Later Neolithic/ Earlier Bronze Age (approximately 2500–1500 BC), approximately 100m to the north of the pits (Barnatt 1996a; Bevan 1998).

The draw-down zones of the reservoirs have been fieldwalked for artefacts (stone tools, pottery etc.) from as early as the 1930s and continuing to the present day. Alistair Henderson and Paul Ardron have made the largest collections of material to the north

and south of Linch Clough, comprising hundreds of artefacts dating from the Mesolithic to the twentieth century. Material is concentrated on the narrow contour shelf where the pits are also located.

It was within this context of finds and their location on a shelf below a substantial depth of soil, now eroded, that the pits were assessed to be potentially regionally/nationally important features which required evaluation.

RESULTS OF EXCAVATION

Structural Features

Three features originally visible on the surface proved to be four individual sub-circular pits (Fig. 2). Three were filled with a mixture of burnt gritstones and charcoal (Features A–C) while the fourth was backfilled with relatively homogeneous subsoil material (Feature D) and was cut into one of the other pits (Feature C) so giving the initial impression of being one feature. A fourth feature identified prior to excavation (Feature E) was very superficial and appeared to be an animal burrow or tree bole within which a small amount of burnt material had been trapped. Further to this, three possible stakeholes were identified during excavation associated with feature A.

Feature A

This was the most northerly of the pits, lying approximately 11m from features B, C and D. The pit [contexts 2001, 2002] was 0.40 by 0.37m in diameter and 0.10m deep, and the sides and bottom had irregular small depressions. Along the eastern edge these formed a scalloped effect possibly created by the original excavator digging out the pit from the western side using a hand tool. The edges appeared unweathered and there was a lack of silt in the pit bottom suggesting that the pit was filled soon after excavation. It appears to have been backfilled in a single event with a grey-green silty clay, 50% of which comprised burnt gritstones and charcoal [contexts 2007, 2008]. The edges were not altered by heat implying that the material was relatively cool when deposited.

Two stakeholes [contexts 2003, 2004] were identified in the bottom of the pit, each filled with material similar to the fill of feature A [context 2007] but slightly darker [contexts 2009, 2010]. Both stakeholes were angled by 10° to the south-east. The stakeholes appeared to be sealed by the pit fill suggesting the stakes had been removed before the pit was backfilled. However, the similarity of the fills made it difficult to identify the stratigraphic relationship with certainty. The wooden stakes may have supported a small structure associated with the pit prior to its filling or even pre-dating the digging of the pit.

Feature B

An oval pit situated approximately 1.5m west of features C–D and measuring 0.6 by 0.51m wide and 0.21m deep [context 1004]. The edges were unweathered and there was a lack of silt in the pit bottom suggesting that the pit was filled soon after its excavation. The pit appears to have been backfilled [context 1003] in a single event with the same material as the pit was cut into, incorporating burnt gritstones and charcoal which form over 10% of its volume. Again, the pit edges were not altered by heat. The upper section of the pit had been disturbed, probably by burrowing animals. A radiocarbon date of

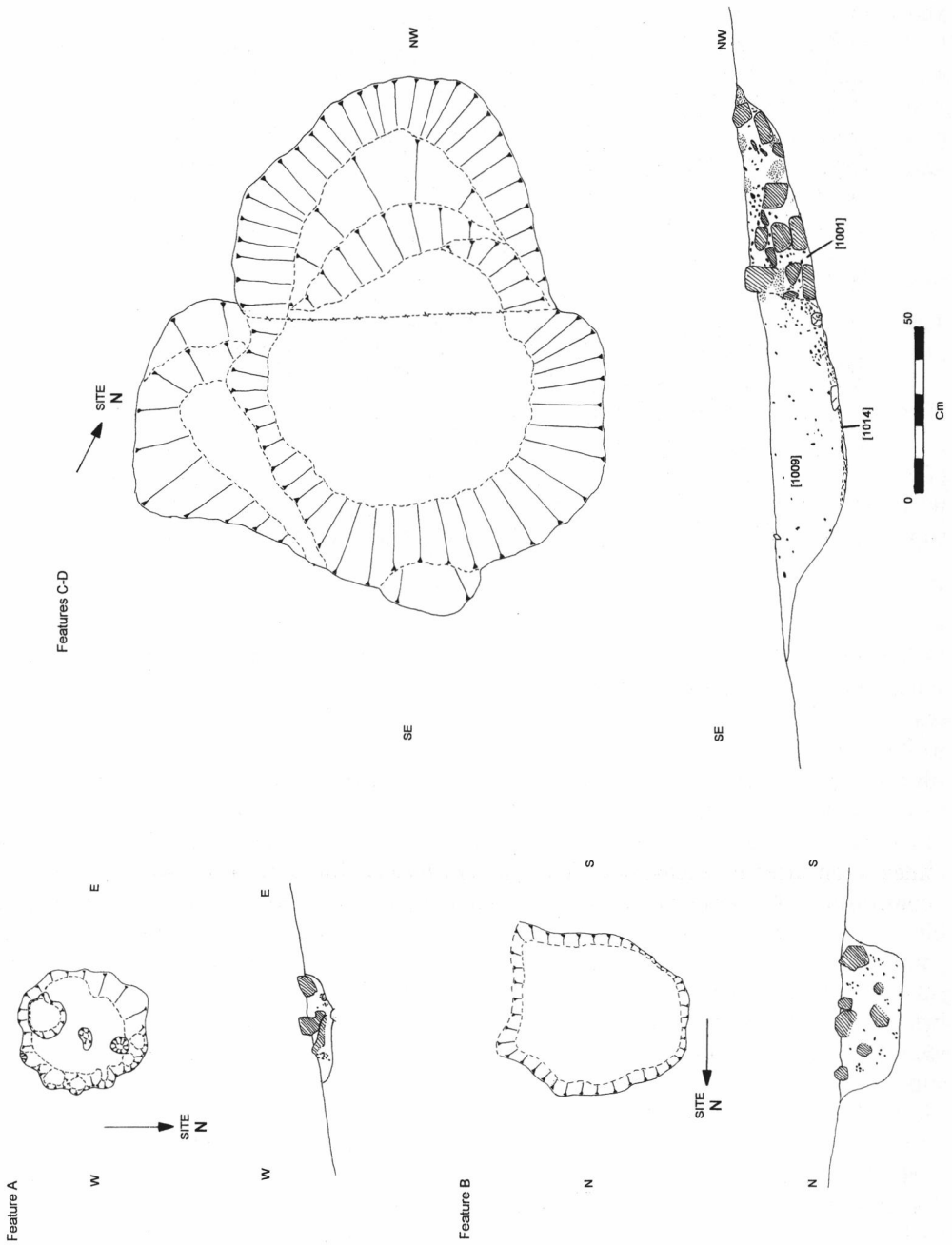


Fig. 2: Features A–D, plans and sections.

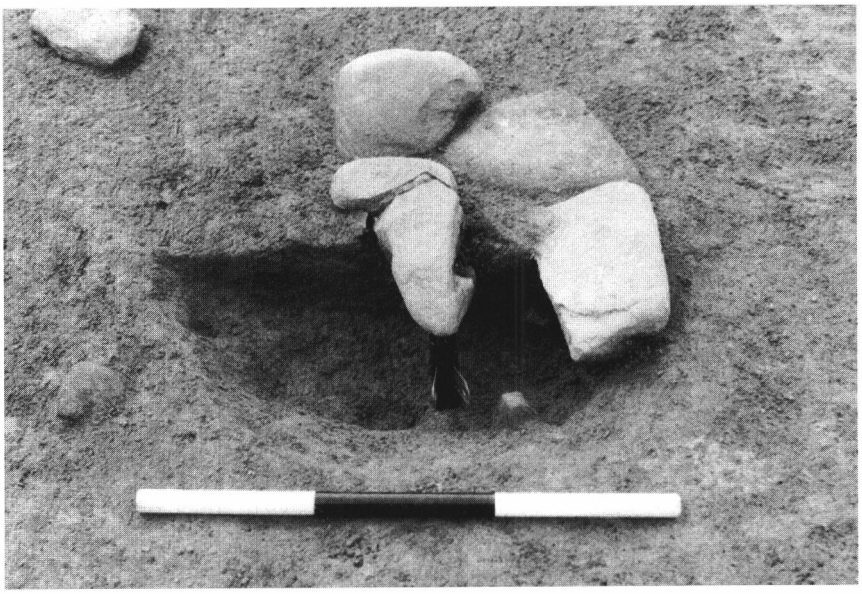


Plate 1: Cross-section through Feature A. Scale measures 30cm.

2570–2210 cal. BC (calibrated to 2 sigma) was obtained from charcoal situated in undisturbed fill at a depth between 0.15 and 0.21m.

Feature C

A D-shaped pit measuring 0.85m by 0.64m and 0.17m deep with smooth edges and a rounded bottom [context 1010], situated 1.5m east of feature B. The edges appeared unweathered and there was a lack of silt in the pit bottom suggesting that the pit was filled soon after its excavation. The pit was packed full with a grey-black sandy silt comprising 70% burnt gritstones and charcoal [contexts 1001, 1008]. This appears to have been deposited in one event and a lack of scorching in the pit shows that the burning was conducted away from the pit and the material had cooled before dumping. Radiocarbon dates of 2870–2445 and 2680–2200 cal. BC were obtained from charcoal situated in the fill at a depth of between 0.10 and 0.17m. The pit was truncated to the south by a later pit (Feature D) so forming the apparent D-shape of feature C.

Feature D

An oval pit measuring 1.42m by 0.74m and 0.21m deep with smooth sides forming a rounded bottom [context 1002]. The edges appeared unweathered and there was a lack of silt in the pit bottom suggesting that the pit was filled soon after excavation. The pit appears to have been backfilled in three episodes, the first with sand and unburnt gritstones in equal ratios [context 1018], followed by two deposits comprising purer sand with occasional gritstones and charcoal flecks [contexts 1009, 1011]. All of these are similar to material forming the subsoil into which the pits are cut. The pit was cut into the southern side of feature C, so disturbing burnt gritstone and charcoal material from this earlier pit which was found trampled into the bottom of feature D [context 1014].

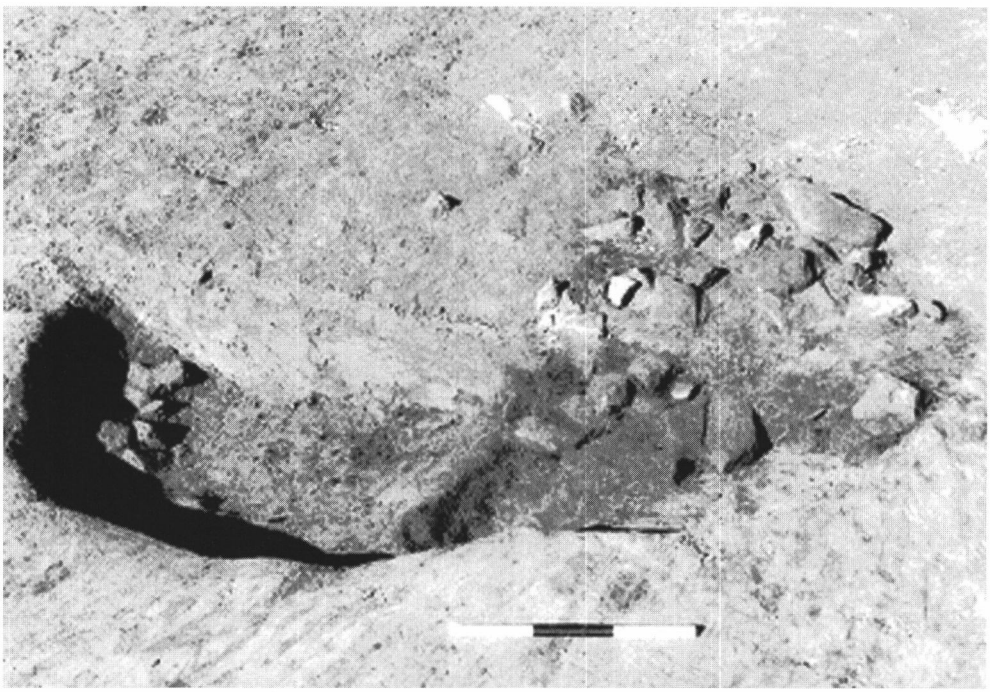


Plate 2: Cross-section through Features D (left) and C (right). Scale measures 30cm.

The edge of the pit which cuts across feature C is unusually straight compared to the other pit edges, suggesting that this was carefully undertaken. This pit is different to the others in size and nature of fill. There was insufficient non-residual charcoal and no artefacts in the pit fill to date how much later than feature C this pit was dug.

Feature E

The last of the identified features to be excavated turned out to be a series of irregular linear depressions [contexts 1006, 1007, 1015, 1016] filled with loam containing small amounts of burnt gritstone and charcoal flecks [contexts 1005, 1012, 1013]. These have been interpreted as animal burrows or tree root runs and not archaeological.

Species Identification

The charcoal was sent to Rowena Gale for identification of plant species and other organic components (Appendix B). The charcoal solely comprised tree species with the exception of one possible fragment of burnt bone. The following species were represented: oak, hazel and hawthorn/rowan (common), ash, alder and birch (infrequent), and elm, willow/poplar and bird cherry (rare).

Artefacts

No burnt plant macrofossils, bones, ceramics or other artefacts were found within the pits apart from tiny fragment of possible bone (Appendix B).

Dating

Charcoal from the lower levels of the fills of features B and C were radiocarbon dated (Appendix C). Taken together they show that the pits were created and filled during the mid third millennium BC which places them during the middle/later Neolithic. They are therefore the first non-funerary structures from the third millennium BC to be securely dated in the Peak District (charcoal from pits at Lismore Fields being earlier).

RESULTS OF FIELDWALKING

An area covering the draw-down zone between the shore and the level of the reservoir, and from Linch Clough to 100m south of the pits was fieldwalked and all artefacts plotted on a grid. Material from all periods was collected, but only the prehistoric artefacts are discussed here. Danny Hind analysed and interpreted the lithics.

14 pieces of flint and 12 pieces of chert were collected comprising 6 cores, 4 blades, 9 flakes (including truncated narrow flakes), 3 pieces of irregular waste, 2 end scrapers, and a single notched/retouched flake similar to those from sites such as Badger Slacks 2 in the Central Pennines (Myers 1986). The cores, narrow flakes and end scrapers are all suggestive of a Late Mesolithic or possibly Early Neolithic date (Hind 1999). The cores are carefully worked and three have more than ten bladelet scars on them, attributes which are typically linked with mobile groups who placed a premium on portability as well as the curation of raw material and tools (Myers 1986; Edmonds 1987). Most of these were found to the north of the pits, in a general scatter which stretched to Linch Clough.

Including the collections of Henderson and Ardron a total of 240 pieces of flint and chert have been discovered in the area south of Linch Clough (Hind 1998, 1999). These comprise 101 pieces of flint, 42 of which could be sourced to the Wolds, and 139 pieces of chert, of which 101 were fine-grained black chert. The nearest source for this type of chert is at Bradwell Dale, however today there is little exposed material of this quality in that area. If this was the case in the past then Bakewell, Lathkill Dale and Kirk Dale would be the more likely sources of this material.

Typologically, Hind identified 49 cores (including fragments), 28 blades, 5 core rejuvenation flakes, 39 retouched pieces, 62 flakes and 57 pieces of irregular waste. 37 of the cores are complete, of which 6 have only flake scars, 20 have blade scars and 11 have scars of both blades and flakes, demonstrating the importance of blade working on site. Different typo-chronological associations occur within the scatter, indicating that it is a palimpsest. However the prevalence of black chert, ratios of flakes to blades, truncation of flakes, and the presence of end scrapers, a microlith, a backed-bladelet and a micro burin indicate that the majority are Late Mesolithic to Early Neolithic. Only a few are diagnostically later pieces, including a single unfinished leaf-shaped arrowhead, a thumbnail scraper, a broad squat flake and possibly the 6 flake cores (Hind 1999).

INTERPRETATION

The group of pits form an important site for understanding Neolithic occupation and the contemporary landscape in the Upper Derwent Valley. They are the only structural

features securely dated to this period (Barnatt 1995), and only one of a tiny number of sites of any period, to be excavated in the Upper Derwent.

Interpretation of Pits

The pits survived as shallow, bowl-shaped, scoops in the subsoil, though they may only be the surviving bottoms of once deeper features. The lack of weathering of the pit edges and absence of silting in the bottom suggest that they were filled soon after they had been created. All but one appeared to be filled in a single event with material comprising a mix of sands, silts and clays with differing amounts of burnt gritstones and charcoal. The fills were not stratified except for Feature D. Charcoal and gritstones, reddened and cracked by heat, appeared to be randomly mixed suggesting that they were both derived from the same, or related, activities. In all pits, the charcoal comprised a mixture of local tree and scrub species (Appendix B). The gritstones were predominantly river-worn cobbles which could have been sourced from the nearby River Derwent or Linch Clough.

The sides and bottoms of the pits were not visibly scorched demonstrating that none of the material was burnt *in situ*. The material therefore appears to have been burnt on fires located elsewhere, then deposited in the pits after cooling. The density of stones, deliberate selection of riverworn cobbles and lack of other burnt plant microfossils suggests that these pitfills are not the simple deposition of material from general cooking or heating fires. Instead the stones could have been deliberately heated for such uses as to cook foodstuffs in water contained in pots or pits, or to create steam from water-filled troughs in sweat lodges (Barfield and Hodder 1987). The heating of water in pits or troughs has been identified for the Bronze Age, but not yet for the Neolithic. The evidence comprises burnt mounds which are usually located near to watercourses and are sometimes associated with the hearths and/or troughs themselves.

Other Neolithic Pits

Pits are fairly common features at Neolithic sites throughout Britain. The shallow, bowl-shaped morphology, a single fill deposited soon after the pit was created and presence of burnt material without evidence for *in situ* burning are also typical of Neolithic pits throughout Britain (Thomas 1991). They were once seen as simple rubbish disposal pits, but extensive work has now shown them to be very deliberately infilled (*ibid.*). The structural way many prehistoric pits are often filled, containing selected artefacts and sometimes with layers of different materials placed in at different times, shows that thought was given to the types of material and how they were deposited rather than them simply being receptacles for the functional disposal of 'rubbish'. The common contents of Neolithic pits are organic material, charcoal, burnt animal or human bones, charred plants, flints, pottery, burnt stones and unburnt soil. Overall, this suggests the pits were dug to deposit remains from middens or communal feasts located at domestic sites, including temporary settlements associated with gatherings at monuments. It has been suggested that the act of pit digging and depositing material related to eating and fires was a way for relatively mobile communities to 'fix' domesticity in the landscape and so a means of domesticating the wild (*ibid.*).

Within this group, there is only a small number filled exclusively with charcoal and/or burnt stones without the presence of pottery or lithics. The only excavated examples in the Peak District known to the author are eleven pits associated with settlement at

Lismore Fields, two of which were radiocarbon dated and pre-date the Howden pits by 700 to 3000 years (3690–3340 cal. BC to 1 sigma and 6175–5830 cal. BC to 1 sigma — Garton in prep.). The pits are comparable in size and shape to those at Howden, and similarly appear to be the remains of fires located beyond the pits which were tipped into the pits after cooling. Small amounts of pottery and flints were found in four of these pits. The pit dating to the fourth millennium BC was contemporary with timber buildings, while the pit dating to the sixth-seventh millennium BC was related to lithic scatters. Further afield, Neolithic pits analogous to those at Howden have been identified at Willington, South Derbyshire (Matt Beamish *pers. comm.*), Balfarg, Fife (Barclay and Russell-White 1993) and Crickley Hill, Gloucestershire (Snashall 1998).

Landscape Setting

The narrow shelf on which the pits occur is typical of the level areas which interrupt the steep slopes of the lower valley side along the River Derwent and various cloughs. The shelf begins about 100m south of Linch Clough, gently rises in altitude as it runs north then turns to follow the south side of Linch Clough for a short distance. Pollen data gives a general impression that valleys such as the Upper Derwent were dominanted by oak, alder, elm, hazel and willow during the fourth millennium BC (Tallis and Switsur 1990). The tree species identified in the charcoal from the pits provides more local detail, and comprised oak, hazel and hawthorn/rowan (common), with ash, alder and birch (infrequent), and elm, willow/poplar and bird cherry (rare) (Appendix B). Whether the relative frequency of species reflects the actual mix of local tree species or how much it relates to selectivity is unknown. It does demonstrate that the forest was mixed deciduous-dominated woodland of upland and wetland tree species. The density of the canopy is unclear, but probably it comprised a mosaic of thick mature woodland, managed clearings, regenerating woodland and scrub-lined watercourse edges.

The pits are situated above the confluence of the river and the clough. This location combines two important topographic features which would have been highly attractive for settlement — level ground and watercourses. Watercourses are notable navigational aids in dense forest and provide a range of resources such as water and fish while the riverside woodland fringe provides stable habitats containing edible seeds, greens, rhizomes and tubers, medicinal plants and herbs, and is attractive to animals. Similar habitats were created randomly by natural processes or deliberately by tree clearance and were a vital element of the lived-in forest landscape. Finds of prehistoric lithics cluster around these confluences throughout the Upper Derwent.

Settlement

The evidence for tool production suggests regular return to the area south of Linch Clough during the Late Mesolithic/Early Neolithic for settlement and activities such as meeting kin and other groups. This is also evident at the confluences of Abbey Brook and Ouzelden Clough with the River Derwent. These three sites are probably the largest known Late Mesolithic sites in the area situated under 300m OD and therefore provide important valley-based evidence to balance the dominance of upland sites (Hind 1999). However, the number of contemporary artefacts collected at Linch Clough, and elsewhere in the valley, is too small to aid interpretation of the pits.

The lack of middle to later Neolithic tools in comparison to earlier periods could also suggest that any contemporary settlement was very transient or that there were different attitudes to waste disposal which prevented the build-up of material around the settlement. Ethnographic work suggests that cultural practice towards the discard of lithics can vary enormously. In some groups the production of stone tools is closely associated with settlements while in others refuse location can be a reliable indicator of where activities were *not* carried out (Shennan 1985). Generally it is larger pieces which are found in fieldwalking and which may have been moved for disposal in prehistory, while the tiny waste from making tools, which could relate more closely to working locations may be adequately retrieved only through excavation or test-pitting.

No other structural features were identified by trowelling an area around the pits. Little is known about the actual layout or structures of settlements of this period in the Peak District. Most Neolithic settlements have been identified from scatters of stone implements and pottery found during fieldwalking or test-pitting which has shown that all topographic zones of the region were settled during the period. The exception to this is the well investigated mid fourth millennium BC settlement with rectangular timber buildings at Lismore Fields, Buxton (Garton 1991, in prep.), but this is approximately 1000 years older than the Howden pits. The nearest excavated later Neolithic settlement is at Willington, South Derbyshire, where pits, post-holes and pottery were found (Wheeler 1975), while there are other possible settlements at Swarkestone, Stenson and Melbourne (*ibid.*).

Recent research into the Mesolithic and Neolithic has interpreted populations as being mobile, moving around the landscape to a seasonal round (Barrett 1994; Bradley 1987; Edmonds 1995, 1999, 2001). Different areas would have been visited for hunting, pasturing livestock, cultivating crops, meeting with other communities and honouring ancestors. People claimed tenure over places and paths rather than land ownership in a modern sense (Barrett 1994; Ingold 1986; Tilley 1994). This approach to understanding the Neolithic has since been applied to the Peak District (Barnatt 1996b). The pits and lithics at Howden probably represent just some of the activities held at this regularly visited location over a long-time span.

APPENDIX A: STRATIGRAPHIC DESCRIPTION AND ANALYSIS
by Bill Bevan

The excavation was undertaken and recorded in accordance with the Peak District National Park Archaeology Service *Archaeological Excavation Site Recording Manual, version 1, 1996*. Deposits were described and interpreted using single-context record sheets, single- and multi-context drawings and both monochrome print and colour slide photographs.

Within the area excavated each pit was defined as a feature and the physical elements which made up each pit were assigned as contexts. A context describes an individual act of deposition or construction, for example the cutting of a pit or its filling with a soil is each a single event and therefore each is given a context description. Layers of soil, including naturally created soils, are also given individual context descriptions. Single-context recording allows the sequence of events which go to make up a group of features,

their individual characteristics and the artefacts they contain to be analysed. The following contexts were allocated:

Soil

1000 Yellow-grey sand and sandy silt which consists of subsoil redeposited across the reservoir bed, concentrating in bands along the draw-down zone corresponding with high water levels of the reservoir.
1017 Grey clay and sandy natural subsoil, undisturbed by reservoir action except for surface weathering. Very firm and compacted in places.

Feature A (contexts 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010)

2001 The cut of the pit, measuring 0.4m by 0.37m diameter and 0.1m deep. It is almost circular in plan with irregular sides and a rounded bottom. To the east the side has a scalloped appearance.
2002 An irregularity in the bottom of Feature A which forms a shallow, flat-bottomed depression 0.15m long, 0.12m wide and 0.02m deep, sealed by a flat gritstone.
2003 A circular stakehole, 0.06m diameter and 0.17m deep, coming to a pointed bottom, identified in the bottom of Feature A.
2004 An oval stakehole, 0.04m diameter and 0.12m deep, coming to a pointed bottom, identified in the bottom of Feature A.
2005 A possible circular stakehole, 0.04m diameter and 0.025m deep, coming to a rounded bottom, identified in the bottom of Feature A. The remains of the structure make it difficult to positively identify whether it was a stakehole or natural.
2006 The fill of 2005. Similar to the fill of Feature A (context 2007). It may be a natural variation in the subsoil.
2007 The fill of the pit, comprising a grey-brown silty clay containing approximately 50% charcoal and burnt stones. Appears to have been deposited in a single event, and seems to consist of material from a fire mixed with soil and put in the pit.
2008 The fill of the irregularity in the pit bottom (context 2002), consisting of grey-brown silty sand with charcoal included across the top of the fill and in patches throughout. It was recorded separately because the fill was slightly different to that of the remainder of the pit and sealed by a gritstone.
2009 The fill of a stakehole (context 2003). It is similar to the fill of Feature A (context 2007), though slightly darker, which suggests that the stake was driven into the ground after the pit was dug but removed prior to its filling. Alternatively the stakes may have pre-dated the digging of the pit.
2010 The fill of a stakehole (context 2004). It is similar to the fill of Feature A (context 2007), which suggests that the stake was planted into the ground after the pit was dug but removed prior to its filling. Alternatively the stakes may have pre-dated the digging of the pit.

Feature B (contexts 1003, 1004)

1003 Grey-yellow-green loamy sand with clay patches comprising the fill of the pit and containing over 10% charcoal and burnt gritstones. Appears to have been deposited in a single event, possibly the backfill of material which was initially dug out to create the pit.

1004 The cut of the pit, measuring 0.6m long, 0.51m wide and 0.21m deep. It is oval in plan and has smooth sides, irregular in places, with an oval bottom. To the east it has been disturbed by an animal burrow.

Feature C (contexts 1001, 1008, 1010)

1001 Grey-black sandy silt with charcoal and burnt stones comprising the main fill of the pit. The majority of the fill was charcoal and burnt stones implying that the deposit came from a fire. Lack of scorching in the pit suggests that this fire was elsewhere and that the pit was dug to dump this material within. The south of the pit has been truncated by Feature C so disturbing 1001.
1008 A dense lens of charcoal the same as and within context 1001.
1010 The cut of the pit, measuring 0.85m long, 0.64m wide and 0.17m deep. It is D-shaped in plan with regular, smooth edges and a rounded bottom. The D-shape may be the result of truncation of the pit by Feature D to the south.

Feature D (contexts 1002, 1009, 1011, 1014, 1018)

1002 The cut of the pit, measuring 1.42m long, 0.74m wide and 0.21m deep. It is sub-rectangular in plan with smooth, regular sides forming a rounded bottom. Where the pit cuts into Feature C the edge is more irregular.
1009 Main fill of the pit comprising yellow-orange-grey sand similar to the natural subsoil (context 1017). It appears to have been put into the pit during a single event and maybe is the same material excavated to create the pit then dumped back in.
1011 A small deposit of yellow-grey sandy clay with charcoal flecks, similar to and sitting on top of 1009.
1014 Grey silty clay containing charcoal deposited across the bottom and lower sides of the pit and underneath 1018 and 1009. It is material from the fill of Feature C (context 1001) which has been disturbed and redeposited during the cutting of Feature D.
1018 Orange-yellow sand, comprising approximately 50% stones. It underlies 1009 with the main difference being its stoniness and compactness. It overlies 1014. Possibly an initial and partial backfilling of the pit.

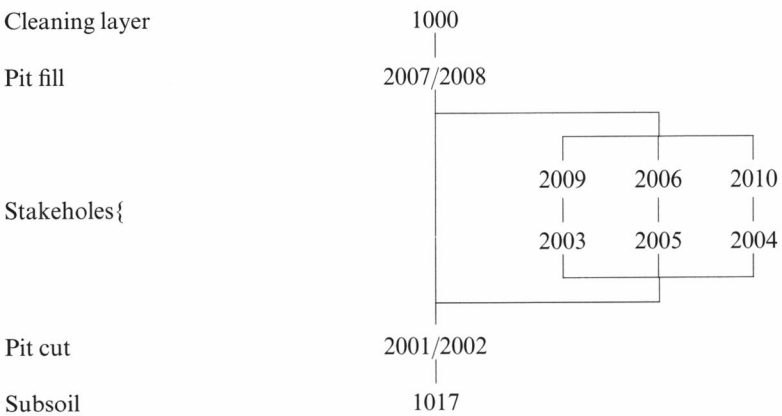
Feature E (contexts 1005, 1006, 1007, 1012, 1013, 1015, 1016)

1005 A deposit of grey sandy silt containing charcoal and burnt stones. It lies within both 1006 and 1007 as well as being thinly spread across the surface of the reservoir bed surrounding the features.
1006 A sub-circular cut within the subsoil, approximately 0.24m long, 0.14m wide and 0.06m deep. It has regular sides and a pointed bottom. It is a very indistinct and uncertain feature which may be the remains of a small pit or an animal burrow.
1007 A sub-circular cut within the subsoil, approximately 0.31m long, 0.28m wide and 0.11m deep. It has irregular sides and a rounded bottom. It is a very indistinct and uncertain feature which may be the remains of a small pit or an animal burrow.
1012 A green-brown loamy sand filling 1016.
1013 A green-brown loamy sand filling 1015.
1015 An irregular linear cut, approximately 1.1m long, 0.5m wide and 0.05m deep. It has irregular sides coming to a rounded bottom containing numerous depressions. Truncated remains of an animal burrow.

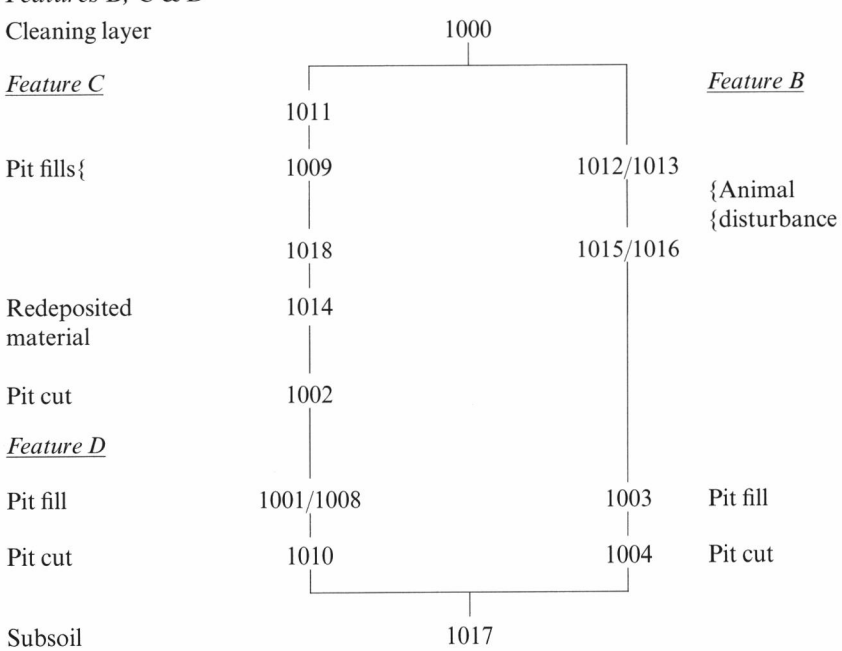
1016 An irregular linear cut, approximately 0.14m long, 0.07m wide and 0.11m deep. It has irregular sides coming to a rounded bottom, undercut in places, and containing numerous depressions. Truncated remains of an animal burrow.

Site Matrix

Feature A



Features B, C & D



APPENDIX B: CHARCOAL ANALYSIS
by Rowena Gale

Introduction

A group of Neolithic pits was sited on a narrow shelf on the steep western bank of the Upper Derwent River, now within Howden Reservoir. The pits contained charcoal and burnt stones but, apart from these, there was little evidence to indicate the function of the pits or any associated activity. The charcoal was mainly well preserved and sometimes extremely abundant. Identification of the charcoal was undertaken to indicate the character and type of fuel used at the site, to provide environmental data, and to isolate suitable material for radiocarbon dating. Thirty-four samples were selected for examination.

Materials and Methods

The charcoal samples included handpicked pieces and material processed from bulk soil samples. The latter was wet sieved (in house) using 6mm, 4mm and 2mm meshes, and frequently produced large quantities of charcoal. A few fragments measured up to 30mm in the longest axis (usually longitudinal but occasionally transverse). The charcoal was generally firm and well preserved, although none of the samples included whole sections of roundwood.

Samples were prepared for examination using standard methods. Fragments from each sample were fractured to expose fresh transverse surfaces and sorted into groups based on the anatomical features observed using a x20 hand lens. With the exception of hazel (*Corylus*) and alder (*Alnus*) (groups from which it is necessary to examine every fragment in detail), representative fragments from each group were selected for detailed study at high magnification. These were fractured again to expose the tangential and radial planes, supported in washed sand, and examined using a Nikon Labophot microscope at magnifications of up to x400. The anatomical features were matched to prepared reference slides.

When possible the maturity (i.e. heartwood/ sapwood) of the wood was assessed and the number of growth rings recorded. It should be noted that measurements of stem diameters are from charred material; when living these stems may have been up to 40% wider.

Oak heartwood was common to almost all features. In Table 1 heartwood is referred to as (h), while roundwood (Ø <20mm) is indicated by (r), and sapwood (including roundwood, Ø unknown) by (s).

Results

The results of the charcoal analysis are summarised in Table 1 and discussed in detail below. The anatomical structure of the charcoal was consistent with the taxa or groups of taxa given below. It should be noted that the anatomical structure of some related taxa cannot be distinguished with any certainty, for example, members of the Pomoideae (*Crataegus, Malus, Pyrus* and *Sorbus*) and Salicaceae (*Salix* and *Populus*). Classification follows that of *Flora Europaea* (Tutin, Heywood *et al* 1964–80).

Betulaceae. *Alnus* sp., alder; *Betula* sp., birch
Corylaceae. *Corylus* sp., hazel

Context	*Sample*	*Spit*	*Alnus*	*Betula*	*Corylus*	*Fraxinus*	Pomoid-eae	*Prunus*	*Quercus*	Salicac-eae	*Ulmus*
Fill of pit [1010]											
1001	103	1	–	–	39	2	27	–	38h	–	–
	104	1	2	3	92	15	78	–	5s, 125h	–	–
	160	1	–	–	36	–	18	–	2s,57h	–	–
	119	2	–	–	37	1	42	–	1s,6h	–	–
	120	2	–	1	58	7	82	–	1s,43h	–	–
	126	3	1	–	26	2	1	–	1r,16h	–	–
	164	3	1	–	81	3	36	(1)	1r,1s, 38h	–	–
	123	4	1	1	111	18	55	–	5s, 128h	–	–
Fill of pit [1002]											
1009	129	–	–	–	49	–	12	–	1s,41h	–	–
	133	1	–	4	–	2	1	–	12h	–	–
	153	2	–	–	4	–	2	–	15h	–	–
	151	3	–	–	8	–	2	–	8h	–	–
1011	136	–	–	1	8	1	5	–	1s,26h	–	–
1018	158	–	–	–	2	–	–	–	2r,10s	–	–
Base of pit [1002]											
1014	140	–	–	–	36	4	6	–	1s,44h	–	–
	159	–	3	–	15	1r	5	–	2s,31h	–	–
Pit [1004]											
1004	134	1	–	–	4	–	–	–	8h	–	–
1003	106	1	–	–	6	–	–	–	1s,40h	–	–
	107	1	1	1	10	1	–	–	4h	–	–
	108	1	–	–	8	1	2	–	17h	1	2s
	110	1	–	–	3	–	–	–	3h	–	1r
	111	1	–	–	–	–	–	1	1h	–	–
	132	1	–	–	6	–	2	–	2h	–	–
	112	2	–	–	–	–	–	–	3h	–	–
	116	2	–	–	–	–	–	–	1s,3h	–	–
	141	2	1	–	3	–	–	–	1?s,8h	–	–
	22	3	–	–	–	–	1	–	8h	–	–
	123	3	–	–	–	–	1	–	–	–	–
	143	3	–	–	13	–	(1)	–	25h	–	–
	150	4	–	–	–	–	–	–	2h	–	–
Feature [1005]											
1005	101	–	–	–	–	–	–	–	66h	–	–
Pits [2001] and [2002]											
2001	144	–	–	–	7	–	–	–	2s,16h	–	–
	146	–	–	–	12	–	–	–	2s,39h	–	–
2002	154	–	–	–	30	–	–	–	8h	–	–

Table 1: Upper Derwent King's Tree: charcoal from Neolithic pits. Key. r = roundwood (diameter <20mm); s = sapwood; h = heartwood. The number of fragments identified is indicated. ( ) = unverified identification.

Fagaceae. *Quercus* sp., oak
Oleaceae. *Fraxinus* sp., ash
Rosaceae. Subfamilies:
Pomoideae which includes *Crataegus* sp., hawthorn; *Malus* sp., apple;
Pyrus sp., pear; *Sorbus* spp., rowan, service tree and whitebeam. Although these taxa are anatomically indistinguishable, the local geology and topography suggest hawthorn and rowan as the most likely.
Prunus padus, bird cherry. The narrow homocellular rays were more typical of this species than of *P. spinosa* (blackthorn) or *P. avium* (wild cherry).
Salicaceae. *Salix* sp., willow and *Populus* sp., poplar. These taxa are anatomically similar.
Ulmaceae. *Ulmus* sp., elm.

The Pits

These consisted of a group of small, closely aligned features ([1002 — Feature D], [1004 — Feature B], [1005 — Feature E], [1010 — Feature C], [2001/2002 — Feature A]). Some pits were inter-cut. Charcoal was relatively frequent in three of the pits, but particularly abundant in pit [1010] (fill [1001]). The charcoal was fragmented and, while none of the samples contained complete segments of roundwood, a few comparatively large pieces of hazel (*Corylus*) included diameters of 30mm. It is probable that a large proportion of the non-oak charcoal derived from roundwood, but it was difficult to assess diameters and maturity (age). The structure of most fragments indicated moderate to slow growth, as illustrated by hazel roundwood (samples 160 and 126, both from [1001]) which included 20 fairly narrow growth rings within a diameter of 30mm, with all rings more or less similar in width. In contrast, fairly wide innermost growth rings were noted in oak roundwood (sample 126, [1001]), indicating fairly rapid early growth, but this was unusual.

Pit [1010] (Feature C)

The shallow pit [1010], which contained charcoal and burnt stones, had evidently been used as a dump for hearth debris. Its use as a fire pit was ruled out by the absence of burning or scorching to the base or sides of the pit, evidence that also established that the charred material had cooled prior to dumping. Charcoal was examined from eight samples from the fill [1001], from spits 1–4. Although a range of species was identified (Table 1) it was evident that oak (*Quercus*), hazel (*Corylus*) and member/s of the hawthorn/ rowan group (Pomoideae) were the dominant taxa, and that oak heartwood was more frequent than oak roundwood or sapwood. Other taxa included alder (*Alnus*), birch (*Betula*) and ash (*Fraxinus*), but these occurred only sporadically. A single degraded fragment was provisionally identified as *Prunus*. There was no apparent difference in species content between the spits.

Juvenile wood from samples <126> and <164> (spit 3), context [1001], provided the following dates: <126> — Cal BC 2680–2200 (Beta-137042)
<164> — Cal BC 2870–2445 (Beta-137043)

Pit [1002] (Feature D)

Pit [1002] was sited adjacent to, and inter-cut the south-east corner of, pit [1010]. Natural stones occurred at base level and charcoal (redeposited from [1001], the fill of

[1010]) had been trampled into the base and the sides of the pit, context [1014]. The function of this pit is unknown, and it appears to have been backfilled, probably fairly quickly, with three distinct deposits of sandy material ([1009], [1011] and [1018]), containing stones and small deposits of charcoal. The charcoal from the base [1014] and from the three fills was similar to that from the earlier pit [1010], with oak (*Quercus*), hazel (*Corylus*) and the hawthorn/ rowan group (Pomoideae) dominant over alder (*Alnus*), birch (*Betula*) and ash (*Fraxinus*).

Pit [1004] (Feature B)

This small pit was associated with a much larger pit lying some 70cm to the east. The pit was probably backfilled with a single deposit of natural soil, charcoal, burnt material and clay balls containing burnt stones, but was later disturbed by rabbits. The pit was excavated in 4 spits and charcoal flecks occurred at all levels, although never in any great quantity. Oak (*Quercus*) heartwood was present in almost every sample, and hazel (*Corylus*) was also fairly common. Alder (*Alnus*), birch (*Betula*), ash (*Fraxinus*), the hawthorn/ rowan group (Pomoideae), bird cherry (*Prunus padus*), elm (*Ulmus*) and willow/ poplar (*Salix/ Populus*) were infrequent. It is interesting to note that elm and willow/ or poplar were identified only from this context, albeit very sparsely (3 fragments of elm and 1 of willow/ poplar). A single small fragment may have been bone.

Juvenile wood from sample <123> (spit 4), context [1003], provided the following date:

<123> — Cal BC 2570–2210 (Beta 139758)

Pit [2001] (Feature A)

The pit fill included burnt stones and oak (*Quercus*) and hazel (*Corylus*) charcoal. The charcoal here differed to that from the pits described above, in that only oak and hazel appear to have been used. The absence of hawthorn/ rowan, which in other contexts occurred as frequently as hazel, was particularly conspicuous. It may be worth noting that several stakeholes occurred within the bounds of this pit, suggesting structural associations.

Feature [1005] (Feature E)

This feature incorporated a deposit of sandy silt, charcoal and burnt stones. A single sample of charcoal was examined and identified as oak heartwood, with some of the fragments originating from very slow-grown wood. The charcoal differed from that from other contexts at this site in the, apparently, exclusive use of oak.

Environmental Evidence

The pits were sited on a narrow shelf in the Upper Derwent valley, overlooking the river. Local soils were sandy with patches of silty clay, overlying millstone grit bedrock. In recent times the construction of the Howden Reservoir and afforestation of the hillsides with conifers has dramatically modified the landscape, although, by the nineteenth century, long-term provision for domestic and industrial fuel, and grazing livestock, had substantially degraded the natural tree cover and floristic diversity.

The Neolithic Landscape

The character and dominance of woodland communities in the Peak District is determined by the local geology, and marked regional differences occur between the lush rich flora of the limestone valleys and dales, and the thin acidic soils on the millstone grit (Marren 1992). The latter typically supports oak (*Quercus*), often with birch (*Betula*), and oak woodlands form the dominant tree cover.

Evidence of occupation at Upper Derwent King's Tree attests the exploitation of local woodland from at least the Neolithic period. Charcoal residues were abundant at the site, and clearly demonstrated that the area supported a wide diversity of trees and shrubs, including oak (*Quercus*), hazel (*Corylus*), the hawthorn/ rowan group (Pomoideae), alder (*Alnus*), birch (*Betula*), ash (*Fraxinus*), bird cherry (*Prunus*), willow/ poplar (*Salix/Populus*) and elm (*Ulmus*). The predominance of oak, hazel and hawthorn/rowan in the charcoal almost certainly corresponds to their frequency in the environment, although functional bias could also have played a part in this (see below).

Local topography would have determined where the various tree communities were situated. Oak woodland probably clothed the flanks of the valley, interspersed with hazel, rowan and hawthorn, perhaps also with ash, bird cherry and birch. Elm typically grows in deep, damp soils and was probably relatively infrequent. Alder, willow and poplar also require damp or waterlogged soils and may have grown densely along the valley floor and beside the river. The generally moderate to slow-growth rates noted in the wood structure of a large proportion of the charcoal, infer a fairly harsh environment.

The Use of Woodland Resources

Radiocarbon tests on charcoal from the lower fills of features B and C dated these two pits to the Neolithic period (*c.* 2870–2200 BC). The primary purpose or function of the pits, prior to backfilling, is not clear. Activities associated with the use of the fuel also remain conjectural, and, apart from a small piece of possible bone in pit [1004], there was no evidence to implicate cooking (e.g. general food debris and potsherds). A number of burnt stones (possibly heated for potboilers) were recorded in pit [1010], but not from the fills of the adjacent pit [1002]. There was some evidence to suggest that pit [1002] was backfilled with the same material that was excavated from it during its construction. If so, then the charcoal here may represent residual fragments lying around on the soil surface or, possibly, material from the earlier pit that was exposed when cut through by the subsequent excavation of pit [1002]. Burnt stones were also noted in pits [1003], [1005], [2001] and [2002].

The charcoal-rich deposits present in pit [1010] demonstrate that firewood was predominantly sourced from oak, hazel and hawthorn/rowan, with less use made of ash, alder and birch. While elm, willow/poplar and bird cherry were scarcely used. The potential of these woods as firewood may have influenced their selection to some extent, but availability would have been the most significant factor. For example alder, elm, willow and poplar wood burns comparatively slowly, whereas the other taxa identified provide high calorie wood fuel (Webster 1919; Porter 1992). In addition, oak heartwood tends to be denser than other woods and proportionately more efficient (Tillman *et al.* 1981). The high ratio of oak heartwood in the samples suggests, either, that it was particularly sought out or that most oak trees in the area were reasonably mature (there

was little evidence from the charcoal to indicate the use of narrow oak stems, roundwood or brushwood).

The non-oak charcoal was mostly too comminuted to assess the type of fuel used (i.e. brushwood/roundwood/branches etc.), although some hazel fragments indicated the use of roundwood estimated to be about 40mm (when living). Oak was almost certainly much wider, probably cordwood or trunkwood. The age at which oak heartwood forms varies and can begin in wood as young as 20 years or less. Fragments from the charcoal samples often included a dozen, or more, rings of heartwood and it seems likely that the wood from which these originated was considerably older, and was possibly gathered from mature or semi-mature oak trees.

Conclusion

Charcoal excavated from Neolithic pits sited on a narrow ledge in the Upper Derwent valley was attributed to fuel debris from an unknown activity (although possibly not cooking). The range of taxa identified included oak (*Quercus*), hawthorn/rowan (Pomoideae), hazel (*Corylus*), bird cherry (*Prunus padus*), alder (*Alnus*) and birch (*Betula*), ash (*Fraxinus*), elm (*Ulmus*) and willow/ poplar (*Salix/Populus*). The fuel used was predominantly oak (mostly heartwood) but also contained a high proportion of hazel and hawthorn/ rowan. The high frequency of these species in the fuel residues corresponds to a similar and characteristic dominance of these species on the sandy soils of the millstone grit.

APPENDIX C: CHARCOAL RADIOCARBON DATING

Three charcoal samples from two pits were sent to the radiocarbon dating service of Beta Analytic for standard radiometric analysis. The third pit did not contain enough charcoal to allow radiometric dating. All samples were obtained from the lower levels of the respective pit fills to reduce the risk of contamination from intrusive activities. These

Sample ID	Location	Measured radiocarbon date	Calendar dates calibrated to 2 sigma (95% probability)	Calendar dates calibrated to 1 sigma (68% probability)
Beta-139758, Sample 123	Feature B, Context 1003/spit 4	3920 +/- 60 BP	**2570–2210 BC**, *4520–4160 BP*	2475–2310 BC, *4425–4260 BP*
Beta-137042, Sample 126	Feature C, Context 1001/spit 3	3960 +/- 90 BP	**2680–2200 BC**, *4630–4150 BP*	2575–2330 BC, *4525–4280 BP*
Beta-137043, Sample 164	Feature C, Context 1001/spit 3	4050 +/- 70 BP	**2870–2445 BC**, *4820–4395 BP*	2645–2475 BC, *4595–4425 BP*

Notes: BP stands for before present, 'present' actually being 1950 AD. Conventional referencing is to quote two sets of dates — the date range in years BC/AD calibrated to 2 sigma and the measured radiocarbon date with +/- error as BP.

The results were calibrated by Beta using Intcal98 data.

lower fills were observed during excavation to be undisturbed. Radiocarbon years are converted to calendar years using calibration data published in *Radiocarbon* 40, 3, 1998 (Stuiver 1998) and the cubic spline fit mathematics published by Talma and Vogel (1993).

APPENDIX D: DESCRIPTION OF EXCAVATION ARCHIVE

The excavation archive is currently stored by the Archaeology Service of the Peak District National Park Authority, Bakewell, Derbyshire and may be viewed on request. It is planned to deposit the small finds with Sheffield City Museum, Weston Park, Sheffield.

ACKNOWLEDGEMENTS

I would like to thank the following: the Upper Derwent Officer Working Group for commissioning the excavation as part of Phase 2 of the Upper Derwent Archaeological Survey and Severn Trent Water for giving permission to conduct the excavation; Alice Ullathorne, Paul Ardron, Pauline Ashmore, Jill Govat and Stella McGuire for assisting with the excavation, fieldwalking and interpretation; Ken Smith and John Barnatt (both of Peak District National Park Authority Archaeology Service) for providing discussion and comment.

REFERENCES

Barclay, G. J. & Russell-White, C. J. (1993) Excavations in the ceremonial complex of the fourth to third millennium BC at Balfarg/Balbirnie, Glenrothes, Fife. *Proceedings of the Society of Antiquaries of Scotland* 123: 43–210.

Barfield, L. and Hodder, M. (1987) *Burnt mounds as saunas, and the prehistory of bathing.* Antiquity 61: 370–799.

Barnatt, J. (1995) Neolithic and Bronze Age radiocarbon dates from the Peak District. *DAJ* 115: 5–19.

Barnatt, J. (1996a) Barrows in the Peak District: a Review and Interpretation of Extant Sites and Past Excavations. *In* Barnatt, J. & Collis, J. *Barrows in the Peak District: Recent Research.* Sheffield. J. R. Collis publications.

Barnat, J. (1996b) Moving Beyond the Monuments: Paths and People in the Neolithic Landscapes of the Peak District. *Northern Archaeology* 13/14: 43–59.

Barrett, J. C. (1994) *Fragments from Antiquity: an Archaeology of Social Life in Britain, 2900–1200 BC.* Oxford UK/Cambridge USA. Blackwell.

Bevan, B. (1998) *Upper Derwent Archaeological Survey 1994–1997.* Unpublished report for the Upper Derwent Officer Working Group. 3 vols.

Bradley, R. (1987) Flint technology and the character of Neolithic settlement. In A. G. Brown and M. R. Edmonds (eds) *Lithic Analysis and Later British Prehistory*: 181–86. Oxford. British Archaeological Reports, British Series 162.

Bradley, R. and Hart, C. R. (1983) Prehistoric settlement in the Peak District during the third and second millennia BC; a preliminary analysis in the light of recent fieldwork. *Proceedings of the Prehistoric Society* 49: 177–94.

Edmonds, M. (1987) Rocks and Risk: problems with lithic procurement strategies. In A. Brown and M. Edmonds (eds), *Lithic Analysis and Later British Prehistory: some problems and approaches*: 155–80. Oxford. BAR British Series 162.

Edmonds, M. (1995) *Stone Tools and Society*. London. Batsford.
Edmonds, M. (1999) *Ancestral Geographies of the Neolithic: landscape, monuments and memory.* London. Routledge.
Edmonds, M. (2001) *Prehistory In The Peak*. Stroud. Tempus.
Garton, D. (1991) Neolithic settlement in the Peak District: perspective and prospects. In Hodges, R. & Smith, K. (eds) *Recent Developments in the Archaeology of the Peak District*: 3–22. Sheffield. J.R. Collis Publications.
Garton, D. in prep. *The Excavation of a Mesolithic and Neolithic Settlement Area at Lismore Fields, Buxton, Derbyshire*.
Grigson, G. (1958) *The Englishman's Flora.* Phoenix House. London.
Hind, D. (1998) *The Henderson Upper Derwent Collection*. Unpublished report for the Peak District National Park Authority.
Hind, D. (1999 *Linch Clough South: analysis of stone tools from UDKT99F and previous collections from Howden Reservoir Beach*. Unpublished report for the Peak District National Park Authority.
Ingold, T. (1986) *The Appropriation of Nature: Essays on Human Ecology and Social Relations*. Manchester. Manchester University Press.
Marren, P. (1992) *The Wild Woods: a regional guide to Britain's ancient woodland.* David and Charles.
Myers, A. (1986) *The Organisation and Structural Dimensions of Lithic Technology: theoretical perspectives from ethnography and ethnoarchaeology as applied to the Mesolithic of Mainland Britain with a case study from northern England*. Unpublished PhD dissertation, University of Sheffield.
Porter, V. (1992) *Small Woods and Hedgerows*. Pelham Books.
Renfrew, C. (1973) Monuments, mobilisation and social organisation in Neolithic Wessex. In C. Renfrew (ed.) *The Explanation of Culture Change: Models in Prehistory*. London. Duckworth.
Shennan, S. (1985) *Experiments in the Collection and Analysis of Archaeological Survey Data: the East Hampshire Survey*. Sheffield. Department of Archaeology and Prehistory.
Sidebottom. P. (1995) Howden, Derwent and Ladybower Reservoirs, Bamford, Derwent and Hope Woodland Parishes, Derbyshire and Bradfield Parish, South Yorkshire: archaeological survey 1995. Unpublished report for the Upper Derwent Officer Working Group.
Snashall, N. (1998) *The Interior of the Neolithic Enclosures at Crickley Hill*. Unpublished dissertation, University of Nottingham.
Stuiver, M. (1998) INTCAL98 radiocarbon age calibration. *Radiocarbon* 40, 3: 1041–83.
Tallis, J. H. and Switsur, V. R. (1990) Forest and Moorland in the South Pennine Uplands in the Mid-Flandrian Period: II The Hillslope Forests. *Journal of Ecology* 78: 857–83.
Talma, A. S. and Vogel, J. C. (1993) A simplified approach to calibrating C14 dates. *Radiocarbon* 35, 2: 317–22.
Thomas, J. (1991) *Rethinking the Neolithic*. Cambridge. Cambridge University Press.
Tilley, C. (1994) *A Phenomenology of Landscape.* Oxford UK/Providence USA. Berg.
Tillman, D. A., Amadeo, J. R. and Kitto, W. D. (1981) *Wood Combustion.* Academic Press.
Tutin, T. G., Heywood, V. H. *et al.* (1964–80) *Flora Europaea,* 1–5, Cambridge.
Webster, A. D. (1919) *Firewoods: their production and fuel values.* T. Fisher. Unwin, London.
Wheeler, H. (1975) Excavations at Willington, Derbyshire 1970–1972. *DAJ* 99: 58–220.

The Society gratefully acknowledges the financial support of the Peak District National Park Authority in the publication of this paper.