Biggar Archaeology group

Bringing the past to the present

Biggar Gap Project

Mesolithic chert quarry at Burnetland Farm

by Tam Ward
Biggar Archaeology Group January 2012

Abstract

The excavation of a Mesolithic chert quarry at Burnetland Farm, near Broughton village in Upper Tweeddale, Borders Region, Scotland.

The largest example of a group of quarry pits disposed across a steep hill slope produced a quantity of stone pounders, a few modified pieces of chert, and taken with radiocarbon dating of charcoal, the evidence indicates the procurement of radiolarian chert as a tool making material in the Late Mesolithic period.

Introduction

The quarries are dispersed across the steep SW flank of Burnetland Hill in the Parish of Broughton, Scottish Borders (Fig 1). The location of the excavated example is NT 09928 37585, and the group of quarries lies around the 300m OD contour. OS 1:10,000 map sheet NT 03 NE and OS 1:50,000 Landranger No 72

The small quarry pits of which there are at least eight, with associated spoil heaps were first recorded by the Biggar Archaeology Group (BAG) in 2004 (Ward, 2004) during the third phase of a re-survey of the Upper Tweed area. The four most prominent quarries lie in close proximity to each other and also to an unenclosed platform settlement located immediately down slope (Fig 2), which was also first recorded in the survey given above. The depressions are up to 5m in diameter and by c 0.3m deep and the rear scarps formed by the quarry pits are up to 1.5m high.

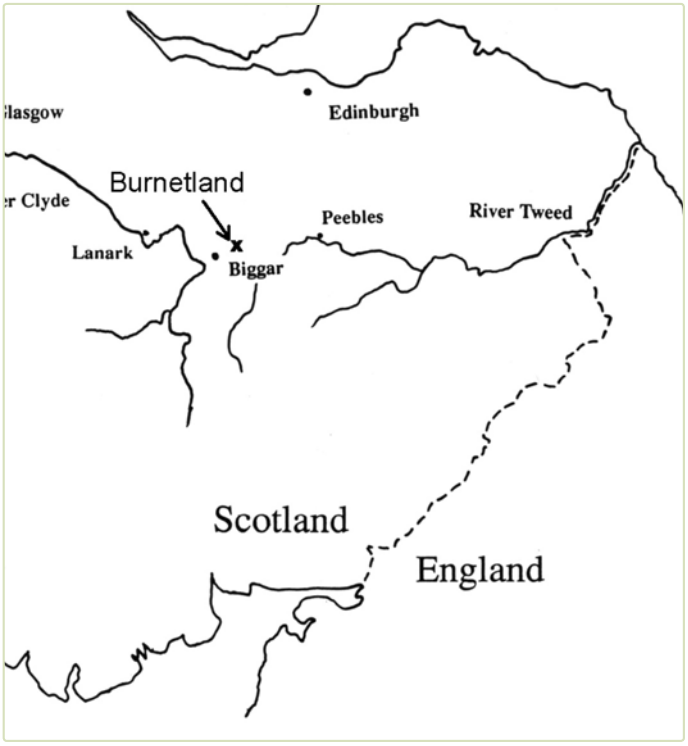

Fig.1 Location Map

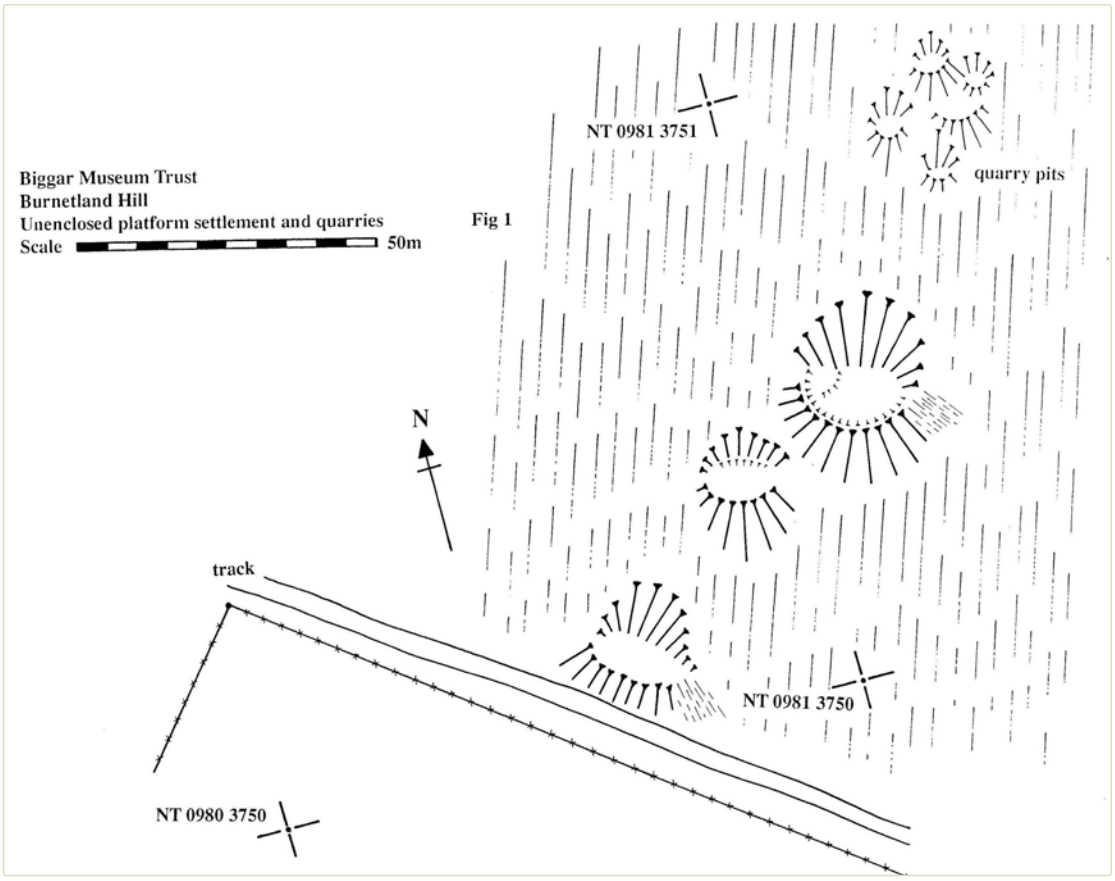

Fig.2

Although the small quarries were evident as such they could easily have been mistaken for early modern, hard rock quarry trial pits, but for the presence of an abundance of fractured chert lying on rabbit and sheep scrapes. Other more recent small quarries can be found at the base of the hill c100m to the east where greywacke was extracted to build dykes. Greywacke is the principal rock of the Southern Uplands and through which the chert is inter bedded just to the south of the Southern Uplands Boundary fault line. Chert is clearly absent from these rock quarries where the rock face exposures may still be seen.

Copious amounts of broken chert can be seen in various exposures caused by rabbit and sheep activity and it is possible to map the approximate areas of the otherwise invisible chert deposit. The veins, which are not exposed anywhere on the hill, run in a NE/SW alignment with the surface spread. Recent drainage channels cut c500m to the west of the site and at the base of the hill reveal pebbles of good quality chert in the soil profile; these are obviously derived from the source upslope.

However, there is a marked distinction in that no broken chert is seen here, only pebbles' in the soil. Interestingly at this location the three principal colours of chert are evident; being the most common blue/ grey variety and also brown and black examples, very seldom were tools fashioned from the latter two types. From a geological interest the different colours must all occur in veins in close proximity.

The site location has excellent views looking south and west across and along the Biggar Gap from its eastern end (Pl 1 & 2). This valley through which the Biggar Water flows to join the River Tweed, has long been assumed to have been a pre-historic route between east and west in southern Scotland, linking the valleys of the River Tweed in the east and the River Clyde in the west. However, there has never been any archaeological evidence presented to support that theory. Currently BAG are conducting annual fieldwalking along the Biggar Gap to establish if such evidence can be found, results to date are limited to lithic finds at the western end, near Biggar. These comprise of lithics dating to the Mesolithic and Neolithic periods.

The objective of the limited excavation reported here was to establish the date of the quarrying and if possible the methods used for extraction.

Proof that the quarries were the result of chert exploitation was evident in sheep scrapes cut into the quarry spoil heaps and also in nearby rabbit burrowing. A mass of compacted chert flakes and chunks could be seen in the exposures. Occasional pieces showed concoidal fracture indicating that they had been derived from percussion rather than by frost fracture or other weathering processes. Furthermore, it is known that radiolarian chert veins run through Burnetland Hill (Ordnance Survey, 1980) on a NE/SW alignment, surface indicators suggest that this is mostly the common blue/grey coloured variety (see Paterson 2010 for a geological description).

Given the proximity of the Bronze Age house stances below it was desirable to establish the true date of the quarrying activities, since it is known that chert was used throughout the Mesolithic, Neolithic and Bronze Ages. Lithic extraction sites of Bronze Age date have not been recorded in southern Scotland, despite the extraordinary concentration of visible sites dating to that period and found across most of the southern uplands landscape (RCAHMS 1967 & 1978) (Ward 1992, & 2004 op. cit.). A Mesolithic age seemed an attractive assumption given the nature of the broken chert which was visible in the exposures, being more akin to small blade production judging by the size of the debitage.

Plate 2 looking west

Survey

The quarry sites were recorded in an archaeological survey by BAG, this was The Broughton Heights Survey (Ward 1999) which itself is part of a major re-survey of Upper Tweeddale. The intended end product of that project which includes follow up research and excavation is to lay down a new level of data on the archaeological heritage of the area.

Plate 3 showing three trenches

Methodology

Given the relatively small size of the quarries, minimal excavation was proposed. In the event a principal trench (T1) (Pl 3) was opened on the uppermost and largest depression, and aligned with the quarry scoop and the apparent upcast from it. Two further but smaller trenches were opened (Fig 3); Trench 2 was aligned with T1 and Trench 3 was opened at an angle to the other two in order to cut a part of the upcast where a sheep scrape exposure already showed a section of prolific broken chert.

The entire work was done by hand tools and only trowels were used to excavate below the turf. Conditions did not allow for sieving of the spoil on site so great care was given to examine it for artefact type pieces of chert and for charcoal. Samples were taken for wet sieving as the work progressed and a sample was retrieved from the section column (Fig 3). The charcoal was separated from the chert by flotation and collected in 1mm and 0.3mm sieves. It was then dried at room temperature and bagged.

The arbitrary samples of chert debitage (Pl 4) which were retrieved were washed in 2mm grade sieves to remove any soil, and to allow for inspection, no part of the remainder of the samples was discarded. All of the spoil was carefully examined for obvious artefacts, that is to say, types which could be recognised by the excavators. This was done in the full knowledge that more obscure artefact types may not have been recognised.

Plate 4 showing a typical sample

Excavation

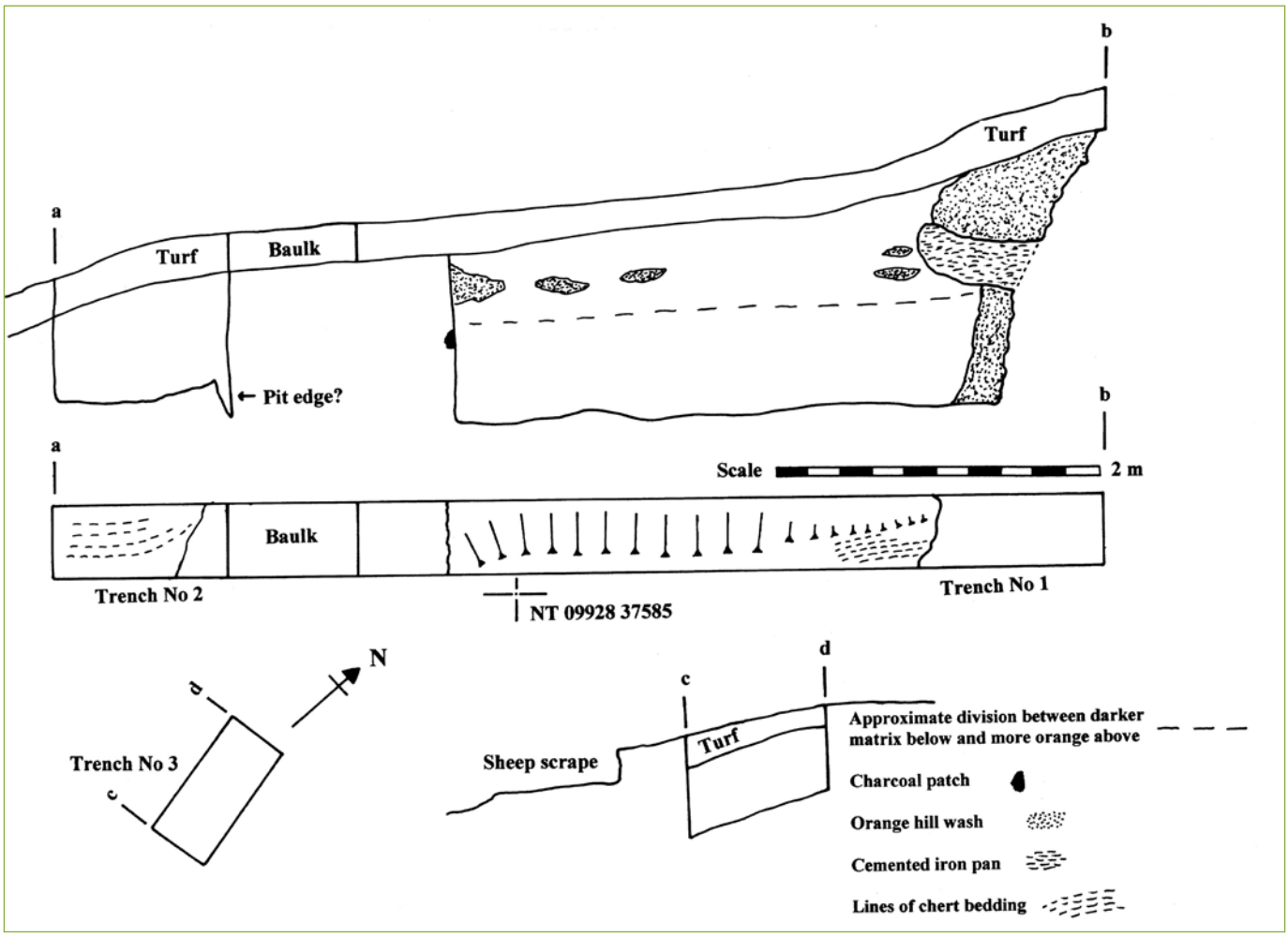

Fig 3

The most prominent quarry was chosen for a limited excavation and three trenches were opened in 2008, and cleared down to the bedrock which was solid radiolarian chert.

Trench 1

Trench 1 measured 5.4m long by 0.5m wide and was sited to run through the centre of the assumed quarry and to catch the rock face if possible. The maximum depth of the trench reached 1.95m deep at the uphill end where the back scarp of the quarry was evident, the lower end of the trench reached 1.25m in depth and for 0.6m at this end only the turf was removed. A baulk of 0.8m was left between T1 and T2.

Upon removal of the turf, about 0.2m deep, a concentrated bed of fresh, sharply broken chert was exposed. The compacted deposit extended for the entire depth of the trench but there was an apparent division approximately half way down where the material above a fairly level line (Fig 3) was seen to lie in a matrix of orange coloured hill wash/soil with also a few pronounced patches of this natural till. This material is the naturally derived weathered chert from the surface of the bedrock and coloured by iron staining. The material below the line was seen to be lying in a much darker matrix of soil, perhaps due to microscopic charcoal?

Charcoal fragments were noted throughout the chert deposit but a prominent patch of concentrated charcoal was noted in the lower end of the trench about half way down the section. This was sampled and when identified (Appendix I) was shown to consist entirely of oak.

Although not lying as a concentration as such, a quantity of charcoal fragments were retrieved from the basal deposits of the trench especially at the upper end, oak was again the dominant taxa but some hazel was also identified, a sample of the latter was submitted for an ASM date which gave the following result:

SUERC-17876 (GU-16473)

Burnetland Hill, Trench 1 basal north end

Charcoal – corylus

Radiocarbon age BC 5220+-35 -27.6%

68.2% probability

4045BC (68.2%) 3975BC

95.4% probability

4230BC (3.5%) 4200BC

4170BC (6.7%) 4120BC

4080BC 85.2%) 3960BC

Throughout the chert deposit, at least fourteen stone pounders (Pl's 5 - 7) were retrieved, these lay randomly throughout the deposit. The pounders ranged in size up to 160mm and were greywacke and sandstone; a complete description is given in the catalogue (Appendix II).

Plate 5 showing some of the pounders, BL2 (top), BL4, BL14 (centre) & BL12 & BL9

At the rear of the trench and about half way down at that point, a solid block of chert debris was cemented together by iron pan (Fig 3). This block was about 0.2m in depth and extended from the rock face for about 0.7m, forming an almost impenetrable mass. Lying immediately above and below this and also against the rock face were deposits of the orange coloured till including weathered chert fragments and being much more loosely consolidated than the main body of chert fill of the quarry.

The base of the trench was a fairly level (in section) floor of solid chert, although this did dip down towards the western side. Bedding was evident at the northern end and was seen to vary up to 75mm in width (Pl.8). Several fresh exposures on this bedding indicated that it had been subject to percussion, presumably by using the stone pounders. Most of the floor had a brown coloured weathered surface indicating that extraction had ceased at that level, possibly after a bedding layer had been removed. The quarry face was exposed after removal of the orange hill wash material and the solid chert rock was uncovered. Occasional fresh, broken surfaces in the chert indicated where extraction had taken place, however, both here and on the floor the chert surfaces for the most part were seen to be the weathered surfaces of joint or bedding planes.

Trench 2

Trench 2 was 1.05m long by 0.5m wide and reached a maximum depth of 1.05m. It was filled entirely with similar debris to the fill of T1.

Trench 3

T3 was 0.8m long by 0.4m wide; it reached a depth of 0.6m. The fill here was identical to that of the other two trenches, although no hammer stones were found.

Plate 6 Bun shaped pounder BL 12

Plate 7 Pounder with facetted sides BL 9

Plate 8

Discussion & Conclusions

Radiolarian chert has been acquired and utilised for tool production throughout the Mesolithic, Neolithic and Bronze Ages in the Southern Uplands of Scotland. This is because it occurs naturally as vein material and it is also found as scree on hill faces and as river transported pebbles, along the alignment of the Southern Uplands Fault Line, which runs in an NE/SW alignment from Dunbar to Girvan respectively (Ordnance Survey, 1980 op cit).

Although flint was brought into the area throughout the earlier pre-historic periods and in many cases formed the entire lithic assemblage on some sites, chert generally remained the dominant raw material for small tool production.

The work reported here forms part of two current projects run by the Biggar Group; the first is to identify sources of available chert in the valleys of the rivers Clyde and Tweed and to establish how much, or if any pre-historic exploitation took place at each location, and the second is to establish what Mesolithic activity can be traced along the Biggar Gap.

The Biggar gap is the flood plain between the River Clyde in the west and the River Tweed in the east. (Pl's 1 & 2) The area is often cited as being the major route for Mesolithic travellers migrating east/west between the Firth of Clyde and the east coast. Actual evidence other than the topography of the landscape has never been presented and a field walking exercise has been underway by the Biggar Group to establish if such evidence can be found.

The title of the first project is "*Radiolarian chert procurement and use in the Southern Uplands of Scotland*", and the second project is known as "*The Biggar Gap Project*"

Both objectives of this project were achieved;

The radiocarbon date shows the activity did take place in the Late Mesolithic period and the quarrying method was by percussion using stone hand tools.

Expert analyses of the debris and possible debitage from the site is being done by Torben Ballin and this is indicating preparation of the chert and possible knapping at the site (Ballin & Ward forthcoming).

The method of extraction appears to have been by smashing the surface of the chert rock face with the stone pounders (Pl's 7-9) which were found. These pounders were from a variety of rock sources and rather surprisingly, relatively soft sandstone was used in some cases, for example the largest pounder (BL2) (Pl 5), which must have been a two handed tool and therefore was not a tool used for knapping, as some of the smaller pounders could have been. However, the pounders were mostly faceted by use and showed clear indications of being used for percussion, one example (BL12) (Pl 6) was formed into a bun shape. Hammer stones were also found in chert quarries at Wide Hope Shank, also in Peeblesshire (Warren, 1998). Antler picks may have been used, however; no evidence was located for this as any such tools would have decayed in the acid soils.

Although some charcoal was retrieved it is considered that the use of fire to shatter the rock face (and perhaps water to quench) was not adopted. Larger quantities of charcoal may have been expected if such were the case and also no evidence of burning, other than the rather sporadic charcoal was found. However, at Wide Hope Shank (Warren 1998 op cit) evidence for the use of fire was found in the form of burnt chert, and its use at Burnetland cannot be ruled out on the basis of such a small excavation.

Radiolarian chert formed an important component of early pre-historic lithic tools in southern Scotland. The chert use can be traced back to the Late Upper Palaeolithic period around 14,000 years ago, although the lithic assemblages from Howburn Farm (Ballin et al, 2010) was predominantly flint, several tools and a quantity of debitage was of the locally available radiolarian chert. Clearly these earliest inhabitants of Scotland quickly found the chert, probably because in a sparsely vegetated landscape it would have been more visible than in later times, when forests and deep soils covered the landscape.

The Mesolithic people appear to have found the chert relatively soon after their arrival at least ten thousand years ago, since Site No 2 at Daer was almost exclusively chert and C14 dated to c9500 years ago (Ward 2001). Mesolithic chert microliths abound on

numerous sites discovered by BAG; ranging from Weston (Ward, 2005) in the north to Daer Valley in the south. Numbers range in the hundreds on particular sites, indicating perhaps that loss was not a concern, since there was always an abundance of chert to be had, presumably from well known sources in the area.

Other archaeological work done in the Tweed hills (Knox 1989 & Warren, 1998 op cit) shows that chert sources were understood, and that quarrying was at least one method of procurement in the Mesolithic period. It is still unknown if scree, river beaches and/or drift geology sources for chert were exploited.

Neolithic use of chert continued and this is especially true for the production of leaf arrowheads of which increasing numbers are being found by BAG. Chert was also used for manufacturing scrapers but flint appears to have been obtained for all tool types and may increasingly have been used in favour of the local chert.

In the Bronze Age chert was still being acquired for tool making, less evidence is available in BAG projects for Bronze Age chert use, as domestic sites of this period appear to have significantly less lithic than previous cultures. The use of metal may account for that, however in only one of five unenclosed platform settlements which have been excavated in Peeblesshire and Lanarkshire, only a single object of bronze has been found; a palstave at Fruid Reservoir (Paterson I & Ward T, 2010).

Barb and tang arrowheads were manufactured from chert and show that in skilled hands, even such sophisticated tool shapes were possible from radiolarian chert, which, although good homogenous samples can be found, is nowhere as good as the exotic flint.

The study of archaeological radiolarian chert from southern Scotland has only just begun (Paterson, 2010); the reason for apparent disinterest in it may be that good contextualised assemblages were not available for study. The majority of southern Scotland chert in museum collections were derived from arable fieldwalking projects, and even these were not recorded in any great details as to location, in many cases the name of a farm or even district sufficed for 'find spot'. For a geological description see Paterson (2010, op cit).

The situation has changed dramatically in recent years especially through the work of BAG, as probably the largest assemblages of southern Scotland chert have been recovered by them, not only by field walking but also by excavation (Ward, various reports), all are covered by accurate location and in the case of excavations by site context and in many cases C14 dating.

Furthermore the work of BAG continues and currently many collections of chert are being retrieved from the Daer Project where numerous Mesolithic, Neolithic and Bronze Age sites are being excavated in the face of threat by commercial forestry (Ward, 2012 forthcoming).

The BAG collections require expert analyses so that their significance may be better appreciated. Such work is under way, although on an ad hoc basis; nevertheless large collections from Weston, Cornhill and Daer are being studied at Glasgow University by Dene Wright (Ward and Wright, forthcoming), and the Burnetland chert is being studied by Torben Ballin (Ballin and Ward, forthcoming). The outcome will be academic publication on these projects.

Acknowledgement

Permission to survey and excavate was given by Mr. Benny Masterton of Burnetland Farm.

The fieldwork was carried out in severe wet and cold weather conditions and the following members of BAG participated:

Fiona Christison, Brenda Dreghorn, Denise Dudds, Joyce Durham, Jacquie Dryden, Richard Gillanders, Sandra Kelly, Jim Ness, Ian Paterson.

Ian Paterson made an initial catalogue of the finds (in this report) in preparation for expert analyses and also carried out research on radiolarian chert for further publication on the subject (Paterson & Ward, forthcoming).

David Oxley help to desk top publish this report and Jacquie Dryden designed it for the BAG website.

The writer was responsible for the management of the entire project, samples processing and all recording and he is grateful to all of the above for their contributions.

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Appendix I

Charcoal from Burnetland

Dr Jennifer Miller

Method of Analyses

Charcoal presented was passed through a stack of 4mm and 2mm sieves, and the relative volume of each fraction noted. Both fractions were scanned for seeds or unusual occurrences, before a representative proportion was identified. Since there was a large volume of material available in each sample, only fragments larger than 4mm were identified, to ensure sufficient material was present to permit absolute identification. The proportion identified was selected to represent all taxa present within the sample as much as possible, and included a minimum of twenty fragments. The volume of charcoal identified was a known percentage of the total, thus enabling extrapolation of the results obtained to give an estimated total volume of each taxon present within the sample.

Burnetland 07 Trench Basal N end

Carb veg>4mm	25ml volume
Carb veg>2mm	20ml volume
Total carb veg	45ml
15ml volume identified	= 33% total
Corylus AMS fragment x 1	= 0.20g
Corylus	x 2= 0.03g
Quercus	x17= 3.35g
Total *Corylus* identified	= 0.23g (Estimated total c 0.7g Corylus)
Total *Quercus* identified	= 3.35g (Estimated total c 10g Quercus)

Sample is primarily Quercus. It was difficult to find non-oak.

The abundance of Quercus in this sample, together with a small amount of Corylus, concurs with a very early prehistoric site, potentially of Mesolithic date.

Burnetland 07 Trench 1 Patch

Carb veg >4mm	120ml volume
Carb veg >2mm	20ml volume
Total carb veg	140ml
35ml volume identified	= 25% total
Quercus	x 30= 6.51g

No non-oak AMS fragment possible

Total Quercus identified = 6.51g (Estimated total c 26g Quercus)

Quercus was all from large trees. The abundance of Quercus charcoal from large diameter trees and the absence of any other charcoal type are in keeping with a very early pr-historic site, and concur with the suggested Mesolithic date.

Appendix II

Burnetland Chert Quarry - lithic finds

Ian Paterson

The subdivision into lots of the chert material from the basal part of the north end of Trench 1 is arbitrary to some degree but takes account of the size of the chert fragments, the degree of weathering and the extent to which the material has been worked. As might be expected, it is a characteristic of the samples that the largest specimens have mostly weathered surfaces and that the proportion of 'fresh' surface increases as the size of the specimen decreases. Specimens that retain parts of the original top or base of the chert bands are commonly weathered to a depth exceeding 5mm.

Sample Number	Context	Description
BL 1	Burnt Mound	Hammer/rubber stone - 142mm x 115mm x 86mm. 2.05kgGreywacke. Generally rounded but one large and one small face are flattened by use as a rubbing stone. One end is pointed and shows clear signs of use as a hammer. The stoneis reddened and deeply cracked and portions have spalled off.A multi-purpose tool that ended up as a pot-boiler.
BL 2	Trench 1	Hammer/rubber stone - 160mm x 150mm x 100mm. c.4kg, of dull greyish orange pink (5 YR 7/2), medium-grained, well sorted, quartzose sandstone - ?Permian sandstone, possibly Mauchline. Roughly circular with flat base and top. Flat surfaces at side suggest use as a rubbing stone. One pointed end shows signs of wear.
BL 3	Trench 1	Hammer stone - 132mm x 96mm x 88mm - roughly oval, broken. 1.65 kg. Pale brown (5 YR 5/2), medium-grained, well sorted, quartzose sandstone with scattered very small mica flakes - ?Lower Devonian sandstone. One pointed end shows signs of wear.
BL 4	Trench 1	Hammer stone - subspherical, up to 85mm in diameter, of dull greyish orange pink (5 YR 7/2), medium-grained, well sorted, quartzose sandstone with scattered very small mica flakes and a few ferruginous plant fragments - ?Lower Carboniferous. One flat surface shows signs of wear.
BL 5	Trench 1	Hammer stone - up to130mm long - broken. 0.90kg.Greywacke, medium-grained, micaceous. One face shows signs of wear.
BL 6	Trench 1	Hammer stone - fragment of. Dull greyish orange pink (5 YR 7/2), medium-grained, well sorted, quartzose sandstone with scattered very small mica flakes and a few ferruginous plant fragments - ?Lower Carboniferous. One surface roughened by use.
BL 7	Trench 1	Hammer stone - up to 96mm long. Pale brown (5 YR 5/2), medium-grained, well sorted, quartzose sandstone with scattered very small mica flakes. Traces of bedding and a few siltstone clasts - ?Lower Devonian. One pointed end shows signs of wear.
BL 8	Trench 1	Hammer stone. Elongated, waterworn pebble - up to 89mm long. One chip missing. Greywacke, medium-grained, micaceous. Both ends roughened by use.

Sample Number	Context	Description	
BL 9	Trench 1	Hammer/rubbing stone. Pebble, sub-angular, up to 78mm long of pale brown (5 YR 5/2), medium-grained, well sorted, quartzose sandstone with scattered very small mica flakes. Traces of bedding - ?Lower Devonian. One pointed end and two sides show signs of use.	
BL 10	Trench 1	Rubbing stone. Pebble, sub-angular, up to 75mm long of palebuff, fine-grained vesicular material - possibly tuff. Two sides are smoothed by use.	
BL 11	Trench 1	Rubbing stone. Pebble, sub-angular, up to 80mm long, of dull greyish orange pink ^p(5 YR 7/2), medium-grained, moderately well sorted, sandstone with scattered very small mica flakes and a small amount of pale matrix. One end roughened by use.	
BL 12	Trench 1, N end, base	Hammer/rubber stone. Flattened spheroid, c. 78mm in diameter, 50mm high - of grey-brown medium-grained gritty, finely micaceous sandstone. Roughened around curved side and on one flat side. The other apears to be smoothed.	
BL 13	Trench 1, N end, base	Hammer/rubbing stone - irregularly shaped pebble - broken off at one side. Dull greyish brown, medium-grained, well sorted, quartzose sandstone with scattered very small mica flakes and a few ferruginous plant fragments - ?Lower Carboniferous. Specimen shows both roughened and smoothed areas..	
BL 14	Trench 1, N end, base	Hammerstone. Roughly hemispherical but strongly eccentric,90mm in diameter, 40mm high. Greywacke, medium-grained, micaceous. Signs of impact around circumference but especially on steeper side.	
BL 15	Trench 1, N end, base	Hammer stone. Pebble, sub-angular, up to 80mm long, of pale grey, medium-grained, moderately well sorted, sandstone with scattered very small mica flakes and a small amount of pale matrix. One corner roughened by use.	
BL 16	Trench 1, N end, base	Hammer stone, fragment of, 75mm long - perhaps hemispherical. Greywacke, medium-grained, micaceous. Possible base appears smoothed, side roughened by use.	
BL 17	Trench 1	Chert, dark olive (5 YR 3/2). Sample consists of 11 chunks ‘routine sample’and flakes; 5 small chunks with multiple struck faces and7 small elongated multi-facetted flakes	
BL 17a	Trench 1	Possible microlith. [included in BL 17 bag].	
BL 18	Trench 1, N end, base	Chert, 166 pieces, in shades of medium to dark olive, mostly with fresh surfaces all round.	
		(a) Large ‘flakes’ and chunks	8
		(b) Medium ‘flakes’ (15-25mm)	27
		(c) Small ‘flakes’ and chips <15mm	66
		(d) Blocky chunks	14
		(e) Elongated ‘flakes’ >35mm long	5
		(f) Elongated ‘flakes’ 35 - 25mm long	11
		(g) Elongated ‘flakes’ 25 - 15mm long	16
		(h) Elongated ‘flakes’ <15mm long	19
BL 19	Trench 1, N end, base	Chert, 5 pieces, in shades of medium to dark olive, mostly with fresh surfaces all round. Chunks and ‘flakes’ showing possibleedge-damage.	

Sample Number	Context	Description
BL 20	Trench 1, N end, base	Chert in shades of medium to dark olive, mostly with fresh surfaces all round.

(a)	Large 'flakes' and chunks	5	20g
(b)	Medium 'flakes' (15-25mm)	73	185g
(c)	Small 'flakes' and chips <15mm	480	300g
(d)	Elongated 'flakes' 35 - 25mm long	22	35g
(e)	Elongated 'flakes' 25 - 15mm long	22	15g
(f)	Elongated 'flakes' <15mm long	22	5g
(g)	Chips and flakes - not sorted	103	113g
		727	**673g**

BL 21 — Trench 1, N end, base

Chert fragments, all sizes up 30mm long, mostly weathered allround; 2100 pieces weighing 1500g.

1 - 400	430g	108g	x100 pieces
401 - 800	350g	88g	x100 pieces
801 - 1200	320g	80g	x100 pieces
1201 - 1600	220g	55g	x100 pieces
1601 - 2000	60g	40g	x100 pieces
2001 - 2100	20g	20g	x100 pieces
2100	1500g	71g	x 100 pieces

BL 22 — Trench 1, N end, base

Chert fragments, most with some fresh surface.

a) Of the largest pieces, 13 are blocky and show parts of the upper and lower surfaces of the chert layer, from 45 to 55 mm thick, from which they were derived. 17 are elongate, and 10 of these have mostly fresh surfaces all round.

Total 30

(b) Intermediate (35-44mm), mostly blocky, 16 have fresh surfaces all round - a few are multifacetted.

Total 122

(c) Smallest size (<35 mm). 122 mostly blocky with little or no fresh surface, 29 have mostly fresh surface

Total 151

		Number	Total weight	Average weight
(a)	Largest	13	970g	32g
(b)	Medium	122	1230g	10g
(c)	Smallest	151	600g	4g
		286	**2800g**	**9.79g**

<table>
<tr><th>Sample Number</th><th>Context</th><th>Description</th></tr>
<tr><td>BL 23</td><td>Trench 1, N end, base</td><td>Chert fragments, most with a little fresh surface - mostly larger pieces.
(a) Of the largest pieces, most are blocky and show parts of the upper and lower surfaces of the chert layer, more than 60 mm thick, from which they were derived.
Total 13
(b) Intermediate (35-59mm), mostly blocky.
Total 25
(c) Smallest size (<35 mm). 122 mostly blocky with little or no fresh surface, 29 have mostly fresh surface - a few being multifacetted
Total 75
<table><tr><th></th><th>Number</th><th>Total weight</th><th>Average weight</th></tr><tr><td>(a) Largest</td><td>13</td><td>860g</td><td>66g</td></tr><tr><td>(b) Medium</td><td>25</td><td>460g</td><td>18g</td></tr><tr><td>(c) Smallest</td><td>75</td><td>350g</td><td>4.7g</td></tr><tr><td></td><td>113</td><td>1670g</td><td>14.8g</td></tr></table>(d) Fragment of dark purple-brown sandstone, probably Lower Devonian, with small chert pebbles</td></tr>
<tr><td>BL 24</td><td>Trench 1, N end, base</td><td>Chert fragments, very small chips and flakes, some elongate, <15mm. Most have entirely fresh surface. Some flakes show percussion ripples. 696 pieces. Total weight.67g.</td></tr>
<tr><td>BL 25</td><td>Trench 1, N end, base</td><td>Chert fragments, very small chips and flakes, some elongate, <15mm. Most have no fresh surface. Total weight.1335g.A count of 1/64th of the total obtained by repeated quartering had 700 pieces: Estimated grand total c.45 000</td></tr>
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Sample Number	Context	Description
BL 26	Trench 1, N end, base	Chert in shades of grey. The size of the fragments ranges from less than 2mm to more than 40mm.The majority of the largest pieces are weathered with little or no fresh surface. The proportion of pieces that have fresh surfaces all round tends to increase as the size of the pieces decreases suggesting that many of the smallest fragments were generated during preparatory work on the pieces of larger sizes. Thus 45% of sample (c) had fresh surfaces all round.

	No	Wt	Average
(a) Largest (>40mm) chunks	137	5920g	43.2g
(b) Large chunks (30-40mm)	428	4490g	10.5g
	0-100	1110g	
	101-200	1020g	
	201-300	950g	
	301-400	1080g	
	401-428	330g	
(c) Medium 'flakes' and chips (20-30mm)			
	1890	4550g	2.41g
(c fresh) Sample of 120 struck fragments			
(d) Small chips and flakes - 2-20mm			
	29 100	5720g	0.2g
(d fresh) Sample of 70 struck fragments			
(e) Very small chips and flakes - <10mm			
	90 000	3000g	0.03g
(e fresh) Sample of 100 struck fragments			
(f) Sample of 'fresh' pieces from BL 26a and BL 26b			
	327	2370g	
(g) Chips <4mm (dry seived)		250g	
Total weight of BL 26		**25 760g**	

BL 27	None known	9 large chunks of chert. 250g
BL 28	Trench 3, upper	Pot lid, 75mm x 70mm, slightly damaged, in purplr-brown finely micaceous, medium-grained sandstone - Lower Old Red Sandstone (Lower Devonian).
BL 29	Trench 3, upper	Chert, 22 pieces of, mostly with fresh faces all round. 17 are chunks or flakes with at least one edge that appears to have been modified or shows signs of use ?as a scraper. The other 5 are elongate, 3 being small and resembling microliths but lacking signs of retouch.

Sample Number	Context	Description
BL 30	Trench 3, upper	Chert, 1101 pieces in shades of olive grey, handpicked. 2750g. (a) 18 pieces (>20mm) struck with a single blow from a rounded, deeply weathered boulder. 160g 8.9g (b) 15 pieces (>30mm), several fresh faces but with some original weathered surface. 390g. 26.7g (c) 52 pieces (>30mm), numerous fresh faces, almost no weathered surface. 570g 11.2g (d) 390 pieces (20-30mm), flakes and chunks, almost completelyfresh faces 1230g 3.2g (e) 464 flakes (<20mm), flakes and chunks, almost all with completely fresh faces 310g 0.67g (f) 52 elongate flakes (>30 mm long) 70g 1.5g (g) 110 elongate flakes (<30 mm long) 20g 0..27g

Sample	Nunmber	% age	Weight (g)	% age
BL 30 (a)	18	1.63	160	5.82
BL 30 (b)	15	1.36	390	14.18
BL 30 (b)	52	4.72	570	20.72
BL 30 (b)	390	35.42	12BL 30	44.72
BL 30 (b)	464	42.14	310	11.27
BL 30 (b)	52	4.72	70	2.54
BL 30 (b)	110	9.99	20	0.73
	1101		**2750**	

BL 31	Trench 3, upper	Chert, in shades of olive grey, handpicked on site. 1170g. (a) 10 pieces (>20mm) struck with a single blow from a rounded, deeply weathered boulder. 50g 5g (b) 18 pieces (>30mm), several fresh faces but with some original weathered surface. 350g 19.4g (c) 10 pieces (>30mm), numerous fresh faces, almost no weathered surface. 80g 8g (d) 162 pieces (20-30mm), flakes and chunks, almost completelyfresh faces 540g 3.3g (e) 110 flakes (<20mm), flakes and chunks, almost all with completely fresh faces 80g 0.72g (f) 9 elongate flakes (>30 mm long) 30g 3.3g (g) 63 elongate flakes (<30 mm long) 40g 0..63g

Sample	No of pieces	% age	Weight (g)	% age
BL 31 (a)	10	2.61	50	4.27
BL 31 (b)	18	4.71	350	29.91
BL 31 (c)	10	2.61	80	6.84
BL 31 (d)	162	42.41	540	46.15
BL 31 (e)	110	28.80	80	6.84
BL 31 (f)	9	2.36	30	2.56
BL 31 (g	63	16.49	40	3.42
	382		**1170**	

Sample Number	Context	Description
BL 32	Trench 3, upper	Chert, in shades of olive grey, handpicked on site.2055g (a) 28 pieces (>25mm) with parts of original, deeply weathered surface 405g 14.5g (b) 17 pieces (>25mm), several fresh faces but with a good deal of original weathered surface. 160g. 9.4g (c) 43 pieces (>30mm), numerous fresh faces, almost no weathered surface. 420g 9.8g (d) 114 pieces (20-30mm), flakes and chunks, several fresh faces;50 (170g) have fresh surfaces all round 420g 3.7g (e) 753 flakes (<20mm), flakes and chunks with several fresh faces; 187 (190g) have fresh faces all round. 640g 0.85g (f) 12 elongate flakes (<30 mm long) 10g 0.8g
		SampleNo of pieces % age Weight (g) % age BL 32 (a) 28 2.9 405 19.71 BL 32 (b) 17 1.76 160 7.79 BL 32 (c) 43 4.45 420 20.44 BL 32 (d) 114 11.79 420 20.44 BL 32 (e) 753 77.87 640 31.14 BL 32 (f) 12 1.24 10 0.49 **967** **2055**
BL 33	Trench 3, upper	Chert, 179 pieces, in shades of olive grey, handpicked on site, 340g (a) 24 pieces, up to 50mm long, with parts of original, deeply weathered surface 160g 6.67g (b) 37 chunks, 20 - 40mm long, almost entirely fresh surfaces 90g 2.43g (c) 101 flakes, <20mm long, almost entirely fresh surfaces 70g 0.69g (d) 14 elongate flakes, <20mm long, fresh 5g 0.36g (e 3 pieces with possible retouch/edge damage 15g 0.5g.
BL 34	Trench 3, upper	Chert, in shades of grey, handpicked on site; 16 pieces, most flakes from 15mm to <50mm. All have an edge that show signs of retouch or possible wear from use as a scraper. 110g 6.88g
BL 35	Trench 3, upper	Chert, c.44 000 fragments, in shades of grey, mostly <15mm 1620g 0.037g Random sample, >3 250 pieces 120g (a) 54 pieces, 16 fresh all round, >10mm 30g 1.11g (b) 800 pieces <10mm size 22g 0.027g (b1) 590 pieces <10mm (in 1/4 of sample (b2) 210 'fresh' pieces <10mm (in 1/4 of sample) (c) 2400 pieces <10mm (3/4 of sample) 68g 0.027g

Sample Number	Context	Description
BL 36	Trench 1, charcoal patch	Chert, 1185 pieces in shades of grey 520g (a) 12 pieces, up to 50mm long, with parts of original, deeply weathered surface 150g 12.5g (b) 17 chunks, 30 - 50mm, weathered all round 120g 7.01g (c) 30 chunks, 20-30mm, weathered all round 100g 3.3g (d) 20 chunks, 20-30mm, mostly fresh all round 70g 3.5g (e) 53 chunks, <20mm, weathered all round 50g 0.94g (f) 42 flakes and chunks, <20mm, mostly fresh all round 25g 0.61g (g) 848 flakes etc. 2-10mm, weathered 55g 0.065 (h) 163 flakes etc. 2-10mm, 'fresh' 20g 0.12 (j) Charcoal - a few small pieces
BL 37	Burnetland Hill	Chert. The chert occurs in nodular bands of various thickness. The chert adjoining the interveining bedding planes is weathered in some cases to a depth of 15mm. Of the 6 samples, 2 are from a90mm thick bed, 2 are from a bed 55-60mm thick and 2 are from a bed 25-38mm thick.
BL 38	Burnetland Hill, Broughton	Samples collected from drain upcast to illustrate the range of c. [NT 0960 3768] a) 2 pieces Medium bluish grey [5 B 5/1] (b) 2 pieces Dark greenish grey [5 G 4/1] (c) 2 pieces Dark reddish brown [10 R 3/4] (d) 1 piece Greyish black [N 2]
BL 39	Burnetland Hill, Broughton	Chert, greyish black, block from bed up to 110mm thick. Heavily weathered on bedding and joint surfaces. Said to contain conodont fossils.

Summary

Sample	Number of pieces	Weight (g)
BL 18	166	?
BL 19	5	?
BL 20	727	673
BL 21	2100	1500
BL 22	286	2800
BL 23	113	1670
BL 24	696	67
BL 25*	45 000	1335
BL 26*	121 880	25760
BL 27	9	250
BL 30	1101	2750
BL 31	382	1170
BL 32	967	2955
BL 33	179	340
BL 34	16	110
BL 35*	44 000	1620
BL 36	1185	520
Totals	218 814	43 520

Excluding the bulk samples BL 25, 26 and 35 that contain very large numbers of fragments less than 5mm long there are 7932 chert pieces, with an average weight of 1.87g, weighing a total of 14 805g.