Biggar Pitchstone

Special Report

General characterisation of the Biggar pitchstone artefacts, and discussion of Biggar's role in the distribution of pitchstone across Neolithic northern Britain

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Introduction

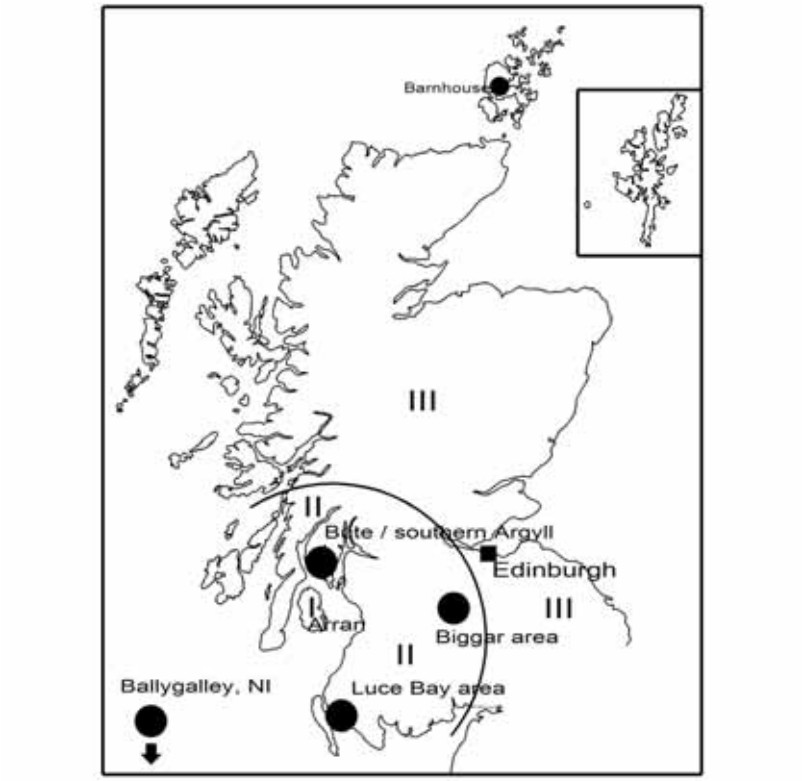
Background

In 1984 Williams Thorpe & Thorpe published their now widely cited paper on the distribution and sources of archaeological pitchstone in Britain. Based on chemical analysis of archaeological pitchstone samples, and comparison with similarly analysed samples of geological pitchstone from the Tertiary Volcanic Districts of Scotland (cf. Richey 1961; Emeleus & Bell 2005), it was concluded that most, if not all, archaeological pitchstone derives from the Isle of Arran in the Firth of Clyde. The paper included an appendix in which all archaeological sites with pitchstone were listed, and thoughts were put forward regarding the socio-economic mechanisms behind the observed distribution pattern.

Now, a quarter of a century later, many more pitchstone artefacts have been recovered, from archaeological excavations and fieldwork, with dramatic consequences to the general distribution pattern. In Williams Thorpe & Thorpe (1984, Fig. 2), only c. 100 find locations were known, and only four sites were mapped north of the Firth of Tay (one in the Highland region and three in the northern part of the Grampian region). The majority of the remaining archaeological pitchstone derived from either Arran itself, the Tweed Valley or the area around Luce Bay in Dumfries. Today (2008), the number of pitchstone-yielding sites has multiplied several times, and pitchstone artefacts have been reported from practically all parts of Scotland (apart from Shetland), as well as from northern England, Northern Ireland, and the Isle of Man (eg, Ness & Ward 2001; Simpson & Meighan 1999; Warren forthcoming; McCartan & Johnson 1991). Where Williams Thorpe & Thorpe's list included many stray finds with low research potential, the majority of the new locations represent excavated material with well-defined find contexts.

As touched upon in Ballin (2006; forthcoming b), the pitchstone artefacts appear not to be evenly, or randomly, distributed across northern Britain. Instead, they show clustering tendencies, and at present four main pitchstone 'centres' have been identified (Fig. 1): Luce Bay in Dumfries; Biggar in South Lanarkshire; Bute and southern Argyll; and Ballygalley in Northern Ireland (Ness & Ward 2001; Ballin *et al.* forthcoming; Simpson & Meighan 1999). The finds from Luce Bay are generally stray finds, collected over the last century; the large assemblage from Blackpark Plantation East in Bute (*c*. 400 pieces of pitchstone) is presently in the process of being written up; and, apart from the odd note in the archaeological literature, the finds from Ballygalley remain unpublished. To shed light on one of these pitchstone centres, it was chosen to examine and characterise the finds from the Biggar area in detail, and discuss those finds in relation to the overall distribution of worked Arran pitchstone. The distribution of archaeological pitchstone in general is to be dealt with in a planned future paper (Ballin forthcoming f).

Fig. 1. Pitchstone distribution zones, and concentrations of larger pitchstone assemblages.



Brief research history:

The Biggar Museum Archaeology Group, and the Biggar pitchstone artefacts

In the Biggar area, Arran pitchstone was first recognized as a significant archaeological raw material in connection with the Lanark and District Archaeology Society's pre-forestry fieldwalking project at Corse Law near Carnwath. This project, which was carried out in the late 1980s, resulted in the recovery of 71 pieces of worked pitchstone (Clarke 1989). Since then, the Biggar Museum Archaeology Group, established in 1981, has organised repeated, systematic, and large-scale fieldwalking and excavation programmes on an annual basis, resulting in the recovery of the almost 700 pieces of worked pitchstone on which the present paper is based.

Over the years, the members of the Biggar Museum Archaeology Group have developed a degree of expertise, allowing them to safely recognise pitchstone. However, the Group acknowledges the lay character of this knowledge, and has – as a logical consequence – established working relationships with groups of professionals, such as geologists and archaeologists. Within the field of archaeology, contacts have been made to specialists, who willingly advice the Group in areas such as lithic/stone artefact characterisation and analysis, pottery, and radiocarbon dating.

The Group's work is generally centred on the town of Biggar and covers an area of approximately 100 square km, with annual programmes of fieldwalking and excavation frequently running for several years. During these campaigns, individual pieces of worked pitchstone, as well as pitchstone clusters, have been collected, along with artefacts in other lithic raw materials, stone tools, and ceramics. Combined, these finds define prehistoric settlements, or areas of activity, which have been duly reported in relevant archaeological periodicals, such as *Discovery and Excavation in Scotland*, or via the Biggar Museum Archaeology Group's Web-site (http://www.biggararchaeology.org.uk). Many of the Group's field campaigns have been carried out in response to planned development in South Lanarkshire (eg, forestry work) or perceived threats to the sites (eg, erosion from more and more intensive farming, or from freshwater reservoirs), and much information which would otherwise have been lost has been salvaged.

As a consequence of the apparent concentration of pitchstone finds in the Biggar area, pitchstone recovery and research has developed into one of the Group's core activities.

Methodology: organisation of the Biggar database entries

Prior to the examination and analysis of the pitchstone artefacts, the finds were retrieved from their parent assemblages, and sorted into the sub-assemblages displayed in Table I. These sub-assemblages generally represent an attempt at defining groups of finds relevant to the interpretation of the Biggar pitchstone artefacts (ie, individual 'settlement sites', 'burial sites', etc.), but some of the larger assemblages are without doubt 'palimpsests', that is, conglomerates of sites of different ages and functions (for example the two Biggar Common assemblages). It would be possible to subdivide these collections further, but not within the framework defined by the present project's research means.

Finds from fieldwalking campaigns have been sorted by farm, field, and year, as the activities of the Biggar Museum Archaeology Group tended to relocate from one field to another between seasons. However, as experienced fieldwalkers will know, one field might include a number of separate settlement sites, and – *vice versa* – one prehistoric site might cover more than one field. Nevertheless, in the present context these subtleties are of little importance, as the focus is not on the distribution of worked pitchstone within the Biggar area, but on the Biggar pitchstones' meaning to the interpretation of the exchange network responsible for the dissemination of Arran pitchstone in the Neolithic period of northern Britain.

The Biggar Pitchstone Collection

Characterisation

Assemblage size

In a number of recent papers, one of the authors (Ballin 2006; 2007; forthcoming b; Ballin et al. forthcoming) suggested that the distribution pattern of Scottish archaeological pitchstone can be described in terms of three pitchstone zones (I-III): Arran itself represents Zone I (local procurement: general use of pitchstone throughout the Mesolithic, Neolithic and Early Bronze Age periods), the mainland east of Arran Zone II (regional procurement: pitchstone occasionally forms substantial proportions of assemblages; exclusively a Neolithic resource), and beyond this area, in Zone III, the frequency of pitchstone drops markedly (exotic procurement: individual pieces; exclusively a Neolithic resource).

Table I. List of assemblages recovered by Biggar Museum Archaeology Group. The catalogue numbers, are the ID numbers given to the individual assemblages in the Scottish Archaeological Pitchstone Project's database.

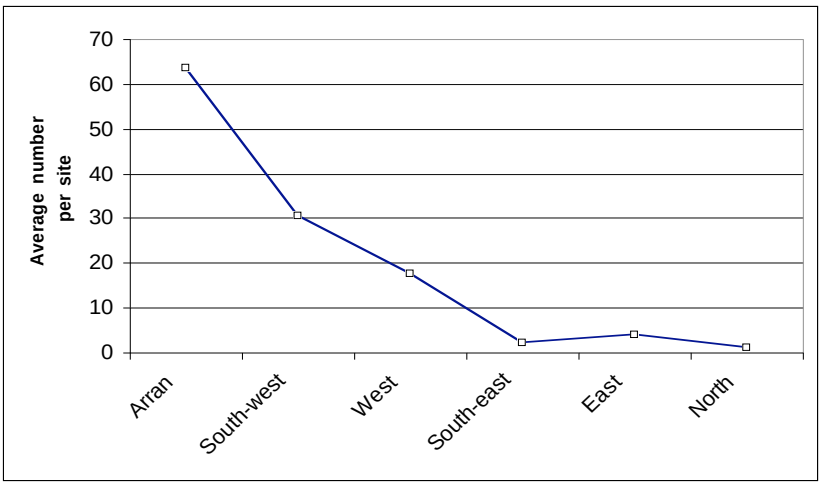
Cat no.	Site	Site type	NGR	No.
215	Corse Law, Carnwath (Lang Whang)	Stray find(s)	NT 018 505	67
216	Cloburn Cairn (Cloburn Quarry)	Burial monument	NT 947 414	6
217	Brownsbank Farm, Field 4 (excav. 2000)	Domestic settlement	NT 0766 4272	61
218	Cocklaw Farm, Elsrickle	Stray find(s)	NT 041 414	1
219	Daer Valley Reservoir, Site 8	Domestic settlement	NS 9680 0715	1
220	Hangingshaw Farm	Stray find(s)	NT 003 333	4
221	Cornhill Farm	Stray find(s)	NT 021 347	6
222	Melbourne excavation, area 1	Domestic settlement	NT 086 438	101
223	Melbourne excavation, area 2	Domestic settlement	NT 086 438	3
224	Melbourne excavation, area 3	Domestic settlement	NT 086 438	1
225	Melbourne excavation, area 4	Domestic settlement	NT 086 438	1
226	Melbourne excavation, area 5	Domestic settlement	NT 086 438	3
227	Melbourne excavation, area 6	Domestic settlement	NT 086 438	4
228	Melbourne excavation, area 7	Domestic settlement	NT 086 438	1
229	Biggar Common East (Carwood Farm)	Domestic/burial/ritual	NT 005 385	73
230	Biggar Common West	Domestic/burial/ritual	NT 005 385	54
231	Weston Farm 1998, Trench 1	Domestic settlement	NT 0337 4617	25
232	Weston Farm, fieldwalking 1998	Stray find(s)	NT 026 465	51
233	Weston Farm, fieldwalking 1999	Stray find(s)	NT 034 460	29
234	'Probably Melbourne' (PNB)	Stray find(s)	Unknown	1
235	East Gladstone Farm (PNB)	Stray find(s)	NT 0295 4228	1

Cat no.	Site	Site type	NGR	No.
236	Muirlea Farm (PNB)	Stray find(s)	NT 3099 4124	1
237	Carwood Farm (PNB)	Stray find(s)	NT 0295 4035	4
238	Cala Farm (PNB)	Stray find(s)	NS 9985 4795	2
239	Melbourne fieldwlk 1996 (PNB)	Stray find(s)	NT 095 446	2
240	Townhead Farm, Field 3 (PNB)	Stray find(s)	NT 086 450	2
241	Melbourne Wood (PNB)	Stray find(s)	NT 086 439	1
242	Westmill Farm (PNB)	Stray find(s)	NT 104 460	2
243	Scottish Woodlands Area, North (PNB)	Stray find(s)	NT 085 444	1
244	Scottish Woodlands Area, South (PNB)	Stray find(s)	NT 087 438	37
245	Brownsbank Farm, fieldwlk 1997 (PNB)	Stray find(s)	NT 081 434	4
246	Brownsbank Farm, fieldwlk 1998, Field 3 (PNB)	Stray find(s)	NT 080 433	2
247	Brownsbank Farm, fieldwlk 1999, Field 4 (PNB)	Stray find(s)	NT 076 427	10
248	Brownsbank Farm, fieldwlk 1999, Field 5 (PNB)	Stray find(s)	NT 074 424	8
249	Brownsbank Farm, fieldwlk 2000, Field 4 (PNB)	Stray find(s)	NT 074 427	41
250	Brownsbank Farm, fieldwlk 2000, Field 6 (PNB)	Stray find(s)	NT 081 432	4
251	Toftcombs Farm, fieldwlk 2006, Field 1 (PNB)	Stray find(s)	NT 057 396	3
252	Howburn Farm, fieldwlk 2004, Field 8 (PNB)	Stray find(s)	NT 082 435	15
253	Howburn Farm, fieldwlk 2004, Field 11 (PNB)	Stray find(s)	NT 7900 42151	1
254	Howburn Farm, fieldwlk 2005, Field 8 (PNB)	Stray find(s)	NT 080 435	20
255	Howburn Farm, fieldwlk 2005, Field 14 (PNB)	Stray find(s)	NT 07390 42910	1
256	Howburn Farm, fieldwlk 2006, Field 8 (PNB)	Stray find(s)	NT 081 435	9
257	Howburn Farm, fieldwlk 2007, Field 8 (PNB)	Stray find(s)	NT 08088 43504	1
258	Howburn Farm, fieldwlk 2007, unknown field (PNB)	Stray find(s)	NT 6779 43894	5
263	Heavyside Farm (BGP)	Stray find(s)	NT 055 375	11
264	Boghall Farm (BGP)	Stray find(s)	NT 03649 36708	1
265	Melbourne fieldwlk 2002 (PNB)	Stray find(s)	NS 94966 08892	1
266	Brownsbank Farm, fieldwlk 20020, Field 4 (PNB)	Stray find(s)	NT 07170 42643	1
267	Brownsbank Farm, fieldwlk 2002, Field 9 (PNB)	Stray find(s)	NT 072 426	3
268	Howburn Farm, fieldwlk 2002, Field 8 (PNB)	Stray find(s)	NT 081 435	3
TOTAL				690

Table II. The NMS collection: Average number pitchstone artefacts per site per region.

Zone	Site	No.
Zone I	Arran	63.4
Zone II	South-west	30.5
	West	17.6
Zone III	South-east	2.2
	East	3.8
	North	1.0

Fig. 2. The NMS collection: Average number of pitchstone artefacts per site per region



This impression was supported by the distribution of the pitchstone finds held by the National Museums Scotland (NMS). A total of 1,737 pitchstone finds from the NMS were examined, and their distribution across Scotland demonstrated that the above distribution pattern may be a reality (Table II; Fig. 2).

However, the pitchstone collection from Biggar contains small as well as large assemblages (Tables III-IV). Thirty-two assemblages include from one to five pieces of pitchstone (the norm in Zone III; Table II), whereas the remaining 18 assemblages include from six to more than one hundred pitchstone artefacts. Apart from 'oddities' like the Barnhouse settlement on Orkney (Richards 2005; Middleton 2005; Ballin forthcoming b), with its 23 pieces of pitchstone, assemblages with more than 20 pieces of pitchstone are usually only found within the four central areas defined above.

Table III. The assemblages of Table I sorted according to numerical size categories.

No. of pitchstone artefacts (numerical categories)	No. of assemblages
1	16
2-5	16
6-10	5
11-25	4
26-50	3
51-75	5
76-100	0
>100	1
TOTAL	**50**

As mentioned in the methodology section (above), some of these assemblages may represent individual parts of larger assemblages. If the pitchstone artefacts are summed up by farm, the following seven (potentially chronologically unmixed) 'farm collections' emerge (apart from the finds from Biggar Common, which are known to be an accumulation of Early and later Neolithic material from several domestic, burial and ritual sites; Johnston 1997).

Table IV. List of main assemblages recovered by Biggar Museum Archaeology Group, and their numerical sizes.

Site	Number	Average num. size
Brownsbank Farm	134	92.0
Biggar Common	127	
Weston Farm	105	
Melbourne Farm	119	
Corse Law	67	
Howburn (PNB)	55	
Scott Woodlands Area, South (PNB)	37	
Other sites (16 sites)	46	2.9
TOTAL (50 entries)	**694**	**15.2**

Raw material composition

Traditionally, pitchstone has been sub-divided into two main forms, namely aphyric, or non-porphyritic, material and porphyritic material. Aphyric pitchstone is characterised by being almost completely homogeneous (although a number of forms have very large *spherulites* [devitrification products], such as some pitchstone from the Fairy Glen on Arran; Ballin & Faithfull forthcoming), whereas porphyritic pitchstone is characterised by the presence of small or large *phenocrysts* (crystals) (Tyrrell 1928).

It is a popular perception that assemblages from Arran may include occasionally large proportions of porphyritic material, whereas assemblages from the remaining parts of Scotland are entirely aphyric (Corriegills Type; Tyrrell 1928, 229; Ballin & Faithfull forthcoming). This is only partly true. The examination of finds from the NMS, as well as the investigation of recently recovered finds from Bute (Ballin *et al.* forthcoming), revealed that assemblages from Argyll & Bute in general, including the Southern Hebrides, occasionally include substantial numbers of porphyritic pieces. The *c*. 400-piece pitchstone assemblage from Blackpark Plantation East (Bute), for example, includes approximately 80% porphyritic pitchstone, which by thin-section analysis was shown to probably derive from the Schoolhouse Outcrop or from sources in northern or western Arran. Outside this area (Arran and Argyll & Bute), it seems that archaeological pitchstone is predominantly aphyric material belonging to Tyrrell's Corriegills Type.

Table V shows the assemblages from the Biggar area which include porphyritic pitchstone, and in the table the ratio of porphyritic pitchstone has been calculated. The ratio varies between 2% and 50%, but 1) all assemblages with high ratios are fairly small and therefore open to random statistical fluctuations, 2) most assemblages from the Biggar area (which are not included in Table V) include no porphyritic pitchstone at all, and 3) probably about half of all the porphyritic pitchstone listed above may in fact be aphyric pieces with unusually large spherulites, which can be very difficult to distinguish from phenocrysts.

Table V. Porphyritic pitchstone as a percentage of their total assemblage sizes. Only assemblages which include porphyritic pitchstone has been included.

Cat no.	Site	Total pitchstone	Porphyritic pitchstone	Per cent
215	Corse Law, Carnwath (Lang Whang)	67	5	7
222	Melbourne excavation, area 1	101	4	4
252	Howburn Farm, fieldwlk 2004, Field 8 (PNB)	15	3	20
263	Heavyside Farm (BGP)	11	2	18
233	Weston Farm, fieldwalking 1999	29	2	7
232	Weston Farm, fieldwalking 1998	51	1	2
267	Brownsbank Farm, fieldwlk 2002 (PNB)	3	1	33
254	Howburn Farm, fieldwlk 2005, Field 8 (PNB)	20	1	5
240	Townhead Farm, Field 3 (PNB)	2	1	50
242	Westmill Farm (PNB)	2	1	50
	Average	**305**	**21**	**7**

The average ratio of 7% is somewhat misleading, as it has been calculated on the basis of the assemblages included in Table V (assemblages which include pieces with porphyritic pitchstone). If this ratio was calculated on the basis of all pitchstone-bearing assemblages in the Biggar area, the result would be c. 2.5%.

Fig. 3. Heavily porphyritic flake fragment from the Biggar Gap Project (BG 310B).

The most obviously porphyritic piece of archaeological pitchstone from the Biggar area is a piece (BG 310B; Fig. 3) from the Biggar Gap Project, which is very similar to the porphyritic pieces recovered on Bute. As mentioned above, most of the porphyritic pitchstone from Blackpark Plantation East on Bute may derive from the Schoolhouse Outcrop at the northern end of Brodick on Arran, or from sources in the northern 'Granite' (Ballin *et al.* forthcoming) or possibly the Tormore area. Mann's (1918, 147) thin-section analysis of a piece from Dunagoil, also on Bute, suggested that the two porphyritic pieces from Dunagoil (only one 'survives' today) may have been imported from the Schoolhouse Outcrop. It is highly likely that the same outcrops may also have been the source of the above piece from the Biggar Gap Project.

Fig. 4. Weathered grey pitchstone from Daer Reservoir (Daer Site 8, NE Knoll). It is possible to see the original black colour, where the edges have been nicked.

Fig. 5. A light-green, burnt and 'micro-crazed' flake from Biggar Common (A1/177) (left) and a stray, unaltered, black pitchstone flake from Arran (right).

Fig. 6. A light-brown, disintegrating piece from Brownsbank Farm (BB 00.112).

Fig. 7. A partially burnt (light-brown/black) blade from Weston (WE TI/6).

Fig. 8. A partially burnt (light-brown/white) chip from Cloburn (CL 71).

Other sub-types of pitchstone are grey pitchstone and light-green pitchstone. The grey variety (Fig. 4) noticed amongst the Biggar pitchstones is simply ordinary pitchstone which has been superficially altered due to deposition in alkaline conditions. As pitchstone is acid, like flint, it probably reacts to deposition in alkaline conditions like flint, which is by obtaining a lighter surface colour and by slowly disintegrating (Shepherd 1972). This process of disintegration starts from the outside, and slowly a new greyish cortex develops. Truly grey (mostly steel-grey) forms of pitchstone are only known from the Glenashdale area of Arran (cf. Ballin & Faithfull forthcoming).

The light-green pieces (Figs 5-8) are more interesting, as they are in most cases dark pitchstones which altered their colour as a result of exposure to fire. This discolouration, which is not superficial, is usually associated with some degree of weight-loss, as well as micro-crazing. In some cases, the colour may be more light-brown than light-green (eg, the main body of the pitchstone assemblage from Torrs Warren; Cowie 1996; Ballin forthcoming f), and in rare instances the pieces may turn completely white and disintegrate entirely, with crumbling edges and corners being the first sign of this process (see for example the pieces from Lussa Wood I on Jura; Mercer 1980). The Biggar pitchstone assemblages include a total of 19 clearly burnt pieces of pitchstone, resulting in a ‘burnt piece ratio’ of *c*. 2.8%. These objects are useful indicators of the presence of prehistoric fireplaces.

General assemblage composition (main artefact categories)

Usually, the discussion of the general composition of lithic assemblages includes three categories, namely debitage, cores and tools. In the present case, the assemblages were perceived as including material from five categories, with the additional groups being ’unworked material’ (either in the form of tabular pieces or pebbles) and ‘preparation flakes’ (crested pieces and core rejuvenation flakes). This approach was chosen as, in relation to the parent sites, raw pitchstone would have been as exotic as reduced pitchstone, thereby potentially containing information of value to the interpretation of the location. Preparation flakes were seen as being of potential value to the discussion of whether the recovered pitchstone artefacts had been reduced on the pitchstone-bearing sites or whether they were manufactured on Arran and exported in finished form.

Table VI. General composition of the Biggar pitchstone collection.

	Number	Per cent
Unworked	2	0.3%
Debitage	563	81.6%
Preparation flakes	14	2.0%
Cores	47	6.8%
Tools	64	9.3%
TOTAL	**690**	**100.0%**

Table VI shows that the assemblages from Biggar are heavily dominated by debitage (81.6%), with cores and tools forming relatively substantial groups (6.8% and 9.3%, respectively). Unworked pitchstone makes up 0.3% and preparation flakes 2.0%. These figures demonstrate two important facts, namely 1) that pitchstone *was* reduced on the Biggar sites (evidenced by the presence of crested pieces and exceedingly small [1.5-2 cm across], completely exhausted cores), and 2) that – contrary to the generally accepted myth that 'there are practically no pitchstone tools outwith Arran' – pitchstone tools *do* occur on the Scottish mainland (examples are shown as Figs 18-25).

However, the question is whether the pitchstone 'tools' identified in the Biggar assemblages are tools *sensu largo* or tools *sensu stricto*? The former category embraces all secondarily modified blanks, including simple edge-retouched pieces, whereas the latter category is made up of so-called *formal* implements, that is, standardised types of scrapers, piercers, knives, arrowheads, etc. As shown in Table VII, tools *sensu largo* amount to 64 pieces, or a tool ratio of 9.3%, with tools *sensu stricto* only amounting to 20 pieces, or a ratio of 2.9%.

It has been suggested that the absence, or almost absence, of pitchstone tools on the Scottish mainland indicates the special (symbolic) status this exotic raw material enjoyed outwith Arran, but although the authors definitely believe that pitchstone was perceived as a 'special' material by prehistoric people on the Scottish mainland, this particular argument is obviously invalid. The special status of pitchstone is probably better evidenced by the material's general distribution pattern, where individual pieces of Arran pitchstone are found on settlements from the Isle of Man to Orkney, and from the Western Isles to the east-coast of Scotland (cf. Ballin 2006; 2007; forthcoming b; forthcoming f).

Table VII. Assemblages with tools and their tool ratios. Sorted according to ascending tool ratio.

Site	Total assemblage	Total tools	Tool ratio	Formal tools
Brownsbank Farm, fieldwlk 2000 (PNB)	41	1	2	
Brownsbank Farm, Field 4 (excav. 2000)	61	2	3	
Biggar Common East (Carwood Farm)	73	4	5	1 piercer
Melbourne excavation, area 1	101	6	6	1 knife, 2 truncations
Weston Farm, fieldwalking 1998	51	4	8	1 truncation
Weston Farm, fieldwalking 1999	29	3	10	1 truncation
Howburn Farm, fieldwlk 2005, Field 8 (PNB)	20	2	10	

Site	Total assemblage	Total tools	Tool ratio	Formal tools
Howburn Farm, fieldwlk 2006, Field 8 (PNB)	9	1	11	
Howburn Farm, fieldwlk 2004, Field 8 (PNB)	15	2	13	1 blade-scraper
Corse Law, Carnwath (Lang Whang)	67	7	11	2 truncations
Scottish Woodlands Area, South (PNB)	37	6	16	1 chisel-shaped arrowhead, 1 side-scraper
Heavyside Farm (Biggar Gap Project)	11	2	18	
Biggar Common West	54	11	20	1 short end-scraper, 2 truncations
Cornhill Farm	6	2	33	1 short end-scraper
Brownsbank Farm, fieldwlk 2002, Field 9 (PNB)	3	1	33	1 piercer
Howburn Farm, fieldwlk 2002, Field 8 (PNB)	3	1	33	1 notch
Howburn Farm, fieldwlk 2007, N of farm (PNB)	5	2	40	1 double-scraper
Brownsbank Farm, fieldwlk 1997 (PNB)	4	2	50	2 short end-scrapers
Westmill Farm (PNB)	2	1	50	
Melbourne fieldwlk 1996 (PNB)	2	1	50	
Townhead Farm, Field 3 (PNB)	2	1	50	
Howburn Farm, fieldwlk 2005 (PNB)	1	1	100	
Boghall Farm (Biggar Gap Project)	1	1	100	
Assemblages without tools	92	0	0	
TOTAL	690	64	9.3	20 formal tools

Technology

The assemblages from Biggar (690 pieces) generally confirm the impression of pitchstone technology acquired by the examination of the NMS pitchstone holdings (1,737 pieces). It seems that most – if not all – archaeological pitchstone outwith Arran was produced by one or more blade or microblade industries, with Biggar blade/microblade blanks and flake blanks being approximately equally numerous (43.5% / 42.9%; Table VIII).

Blades and microblades are approximately equally common (*c*. 22% each). Although some fairly broad, possibly later Neolithic blades do occur, most of the blade material appears to be narrow, with widths immediately to either side of the blade/microblade cut-off measure of 8 mm (traditionally, blades narrower than 8 mm are referred to as microblades, whereas blades broader than 8 mm are referred to as macroblades or simply blades; eg, Wickham-Jones 1990, 73; Ballin 1996, 9). This suggests that most of the material from Biggar may be roughly contemporary, and it was probably produced by the same Early Neolithic industry, with a minority being manufactured by a later Neolithic industry (see dating section).

Throughout the country, pitchstone assemblages occasionally include unworked tabular pieces, suggesting that this was the form in which this material was traded. This assumption is supported by the important find from Torrs Warren, in the Glen Luce area, Dumfries (Cowie 1996), where a probably largely later Neolithic assemblage included large numbers of tabular 'scrap'.

Table VIII. Debitage and preparation flakes.

	Number	Per cent
Chips	61	10.6%
Flakes	247	42.9%
Blades	124	21.5%
Microblades	127	22.0%
Indeterminate pieces	4	0.7%
Crested pieces	12	2.1%
Platform rejuvenation flakes	1	0.2%
TOTAL	**576**	**100.0%**

Preparation flakes (cf. Fig. 11) make up 2.3% of the debitage (12 crested pieces and one core tablet), suggesting that initial core preparation took place (cresting), but that core preparation between the individual blank series may have been a less common occurrence (core tablets). The latter may be an effect of the raw material's general attributes, such as the fact that it was provided in the form of relatively *small* tabular pieces. It is possible that these diminutive cores would be spent fairly quickly, and discarded after only one or two blank series, thus making platform rejuvenation less relevant.

Prior to commencement of blank production, and between the individual blank series, the platform-edges were carefully trimmed and subsequently abraded. This provided the platforms with a more rounded edge, which was stronger than an untreated edge, and platform collapse was generally prevented. The platforms themselves are mostly plain and unprepared.

Table IX. Cores.

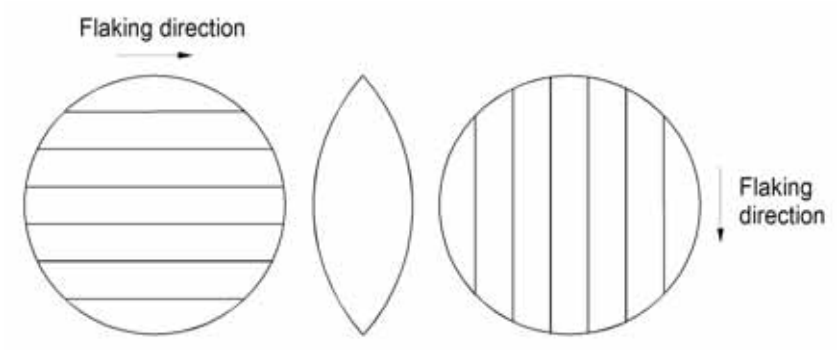
	Number	Per cent
Single-platform cores	18	36.7%
Opposed-platform cores	13	26.5%
Cores w two platf at an angle	5	10.2%
Discoidal cores	6	12.3%
Irregular cores	7	14.3%
TOTAL	**49**	**100.0%**

With a small number of exceptions, it is possible to classify the Biggar pitchstone cores (Figs 12-17) according to standard typologies (Table IX). Making up more than one-third, single-platform cores dominate the category, followed by opposed-platform cores (*c*. 27%), irregular cores (*c*. 14%), discoidal cores (*c*. 12%), and cores with two platforms at an angle (*c*. 10%). However, due to the flaking properties of the pitchstone (defined mainly by the tabular character and flowbanding of the raw material), these cores differ slightly from their flint counterparts. Single- as well as dual-platform cores are frequently characterised by a flat, natural 'back-side' (a plane-of-weakness), whereas the irregular cores tend to be more rounded, due to the presence of three or more platforms (flaking directions). Blanks in pitchstone have an exaggerated tendency to curve along the long axis (Fig. 9), frequently causing blades to overshoot and remove the apex of the cores. This results in many cores having distinctly curved surviving apexes (occasionally, a curving apex was used as a second platform; Fig. 16). In exceptional cases, it was attempted to detach bladelets from very narrow sides of tabular pieces, producing core forms which are unique to this raw material.

Fig. 9. Heavily curved blade from Melbourne (MB 04/78).

The examination of the rich pitchstone finds from the Glen Luce area in Dumfries allowed the definition of a specific form of discoidal core, which is rarely (if ever?) seen in other raw materials. In a sense, this type is a hybrid core form, with elements from discoidal cores and cores with two platforms at an angle. It is most certainly discoidal, in terms of its general shape, but the microblades detached from the two faces are orientated at perpendicular angles to each other (Fig. 10, 17). In contrast to this, most typical cores with two platforms at an angle are rather cubic specimens. It is possible that the creation of this core type is also a result of the pitchstone blades' exaggerated tendency to curve along the long axis. The discoidal cores listed in Table IX belong to this core type, and no Late Neolithic Levallois-like discoidal cores are present.

Fig. 10. Typical small discoidal core in pitchstone ('Glen Luce Type').



Figs 11-17. Preparation flakes and cores. 11) Crested blade (MB 00/23); 12) conical core (MB 95/53); 13) multi-facial single-platform core (WE 408); 14) unifacial single-platform core (MB 1/60); 15) unifacial single-platform core (WE 99/1117); 16) S-shaped opposed-platform core (CH 17); 17) discoidal core of 'Glen Luce Type' (BG 328).

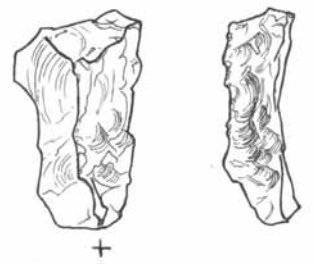


FIG. 11

FIG. 12

FIG. 13

FIG. 14

FIG. 15

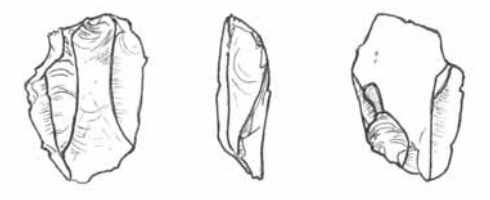


FIG. 16

FIG. 17

Figs 18-25. Tools. 18) Chisel-shaped arrowhead (MB 95/52); 19) scraper – the ventral face may be a thermal fracture (MB 97/31); 20) blade-scraper (MB 4/78); 21) piercer (BC A1/712); 22) scale-flaked knife – the scale-flaked cutting-edge is along the concave left lateral side (MB 1/79); 23) oblique truncation (LW 20); 24) oblique truncation (LW 89); 25) piece with invasive retouch (WE 162).

FIG 18

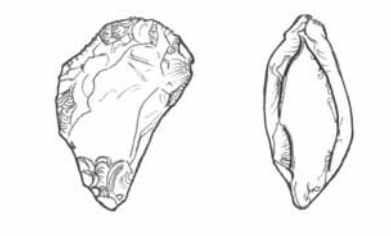


FIG 19

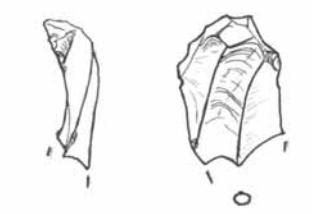


FIG 20

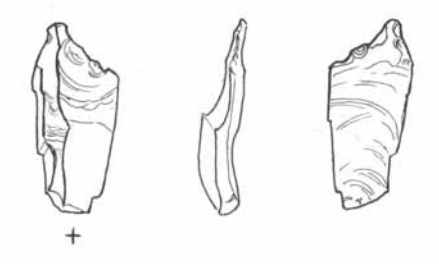


FIG 21

FIG 22

FIG 23

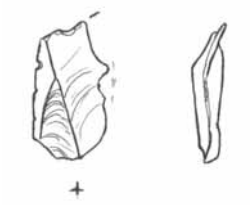


FIG 24

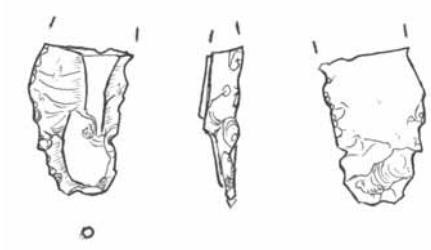


FIG 25

In the Biggar area, bipolar pitchstone cores are absent, and throughout Scotland they are generally quite rare. The three times larger NMS assemblage only included six bipolar cores, or 6% of all pitchstone cores in that collection. The paucity of bipolar cores in this material is probably mainly due to the brittle character of pitchstone, which renders bipolar technique more or less inappropriate. The application of the violent bipolar, or hammer-and-anvil, technique would most likely result in the production of multiple blanks with platform collapse as well as a generally much higher fragmentation ratio.

Dating

The Biggar pitchstones include very few datable elements, with the most important being: 1) diagnostic types; 2) technological attributes; and 3) the association with finds in other materials (eg., stone axes and pottery).

Basically, only one diagnostic tool type was recovered from the excavations and fieldwalking campaigns in the Biggar area, namely the basal fragment of a chisel-shaped arrowhead (MB 95/52; Table VII). This piece was found during fieldwalking in the Scottish Woodlands Area South, which formed part of a group of closely situated pitchstone-bearing areas, including Melbourne, Howburn and Brownsbank (Location 1 in Fig. 4). The fragmented arrowhead indicates a date probably at the very end of the Early Neolithic period[1] (cf. Johnson & Ballin 2006; the dating of chisel-shaped and oblique arrowheads is also discussed in Ballin forthcoming g).

After the first cursory examination of the pitchstone finds from Biggar, the 'pitchstone' tools included four implements datable to the Late Mesolithic period – all from Corse Law. They were: one unfinished microlith, one refitting strangulated bladelet (a form of microburin), and two backed bladelets. However, closer scrutiny revealed that three of the pieces were in very dark smokey quartz (LW 69a, LW 69b, LW 73), and one in almost black fine-grained chert (LW 984).

The most important technological attribute, in terms of dating, is the character of the blade material: how many (macro)blades are there, and how many microblades? A number of factors suggest that, in Scotland, Early Neolithic lithic assemblages may largely be characterised by microblades, which are very narrow at the beginning of the period, and which gradually grow broader through the period. The Late Neolithic period is characterised by a dominance of markedly broader blades.

The definition of, at least, the beginning of the Early Neolithic period as belonging to the narrow blade tradition, is supported by a number of important finds, such as 1) pitchstone microblades in radiocarbon-dated pits (eg, at Fordhouse Barrow in Angus and Carzield in Dumfries; Ballin forthcoming e; Maynard 1993, 31 – dates have also been obtained from two Early Neolithic pitchstone-bearing pits in the Biggar area[2]); and 2) recently excavated Early Neolithic assemblages dominated by microblades (eg, the large flint assemblage from Garthdee Road in Aberdeen; Ballin forthcoming d). That the Late Neolithic period is characterised by a dominance of broader blades is supported by, *inter alia*, the pitchstone assemblages from Machrie Moor on Arran (Haggarty 1991; Ballin forthcoming f) and Barnhouse on Orkney (Richards 2005; Middleton 2005; Ballin forthcoming b), where broad blades were recovered with Late Neolithic Levallois-like cores (Ballin forthcoming a).

The pitchstone finds from the Biggar area are generally heavily dominated by microblades, supplemented by some blades, but the macroblade:microblade ratio varies substantially between the individual assemblages. The ratios of the two Biggar Common collections, for example, suggest that the finds from Biggar Common East may, as a whole, be slightly earlier than that from Biggar Common West, with the former having a macroblade:microblade ratio of approximately 1:1.5 and the latter 2:1. To put this slightly differently: at BCE, microblades are roughly twice as common as broader blades, whereas at BCW broader blades are roughly twice as common as microblades.

The association with other finds groups, such as stone axes and pottery, generally supports the notion of most of the Biggar pitchstones dating to the first half of the Early Neolithic period. In Ness & Ward (2001), the larger pitchstone assemblages from the Biggar area are briefly commented upon, and it appears that, in most cases, large pitchstone assemblages coincide with the presence of Early Neolithic carinated pottery and fragments of axes in Cumbrian tuff from the Great Langdale axe factories (Bradley & Edmonds 1993). On occasion, Grooved Ware has been found in connection with fieldwalking in the Biggar area, but these assemblages by and large have very low pitchstone ratios.

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[1] Some analysts subdivide the Neolithic period into two phases (Early and Late), others into three periods (Early, Middle and Late). In the present paper a distinction is made between two phases, the Early and Late Neolithic periods, defined by the presence of certain pottery styles. Put simply, this paper distinguishes between an early phase characterised (mainly) by carinated pottery, and a later phase characterised (mainly) by Grooved Ware pottery.

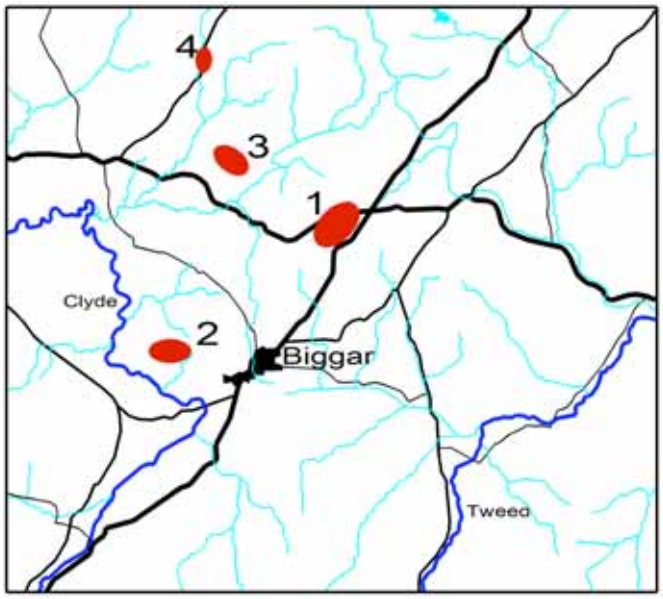
[2] Brownsbank: 3692-3639 cal BC (GU-9303); Nether Hangingshaw: 3640-3520 cal BC (GU-12113).

In general, microliths in pitchstone have only been found on Arran, and typical Early Bronze Age implements in pitchstone are also unique to that island.

Distribution within the ‘Biggar Gap’

Geographically, the Biggar area is characterised by its position between southern Scotland’s two main rivers, The Clyde and The Tweed, popularly referred to as the Biggar Gap. In Figure 26, the four main pitchstone concentrations are marked, with the larger of the four being Concentration 1. Concentration 1 embraces the significant assemblages from Brownsbank, Howburn, Melbourne, and Scottish Woodlands Area South, and this area includes approximately half of all pitchstone found around Biggar. Each of the Concentrations 2-4 include from between 10% and 20% of the Biggar area’s total number of pitchstone finds, with the remaining smaller sites, combined, only including approximately 10% of the total.

Fig. 26. The ‘Biggar Gap’ and the distribution of the area’s main pitchstone assemblages: 1) Brownsbank, Howburn, Melbourne and Scottish Woodlands Area South; 2) Biggar Common; 3) Weston; and 4) Corse Law. Black: main roads; dark blue: the Clyde and the Tweed; and light blue: minor water courses.



The main aim behind Biggar Museum Archaeology Group’s Biggar Gap Project was to test whether the Biggar Gap may have served as a corridor, linking the east- and west-coasts of Stone Age southern Scotland, by connecting The Clyde and The Tweed. This now seems likely. The four main concentrations are all located within a *c*. 10 x 10 km square between the two great rivers, and no similarly rich concentrations are known towards the west (until one reaches the shores of Glen Luce Bay in Dumfries) or east.

It has been suggested that these large concentrations are simply effects of the work of one very enthusiastic group of local people (the Biggar Museum Archaeology Group). However, probably half of all pitchstone from the Biggar area were recovered during fieldwalking (the large assemblage from Corse Law entirely so; Clarke 1989), and the fields of Tweeddale have been fieldwalked (almost) equally stringently without providing the same massive pitchstone assemblages (cf., Mulholland 1970). In the Scottish Borders area, the largest known assemblages (Ballin forthcoming f) include approximately a dozen pieces, and in most cases these collections were recovered during fieldwalking of many fields within a larger area (eg, labelled ‘The Kelso Area’ or ‘Roxburghshire’).

A possible special status of the Biggar area is also indicated by the area's many Neolithic monuments, and it has been suggested that the area around and to the north of Biggar may represent a Neolithic ceremonial landscape (Land Use Consultants 1999, 10). Around Biggar, we therefore have an area with a special ceremonial status, within which artefacts in a raw material with special status clearly concentrate (touched upon above). It is not possible to assess the other Scottish/Northern Irish concentrations in a similar manner, partly due to the fact that the pitchstone finds from these areas are still unpublished or in the process of being published. However, the unusual concentration of pitchstone artefacts on Orkney (Barnhouse and Ness of Brodgar; Ballin forthcoming b; Card 2005; Card & Sharman 2006) clearly coincide with a marked concentration of ceremonial sites and high-status settlements (cf., Foster 2006). The location of the exceptionally rich pitchstone-bearing site of Blackpark Plantation East, on Bute, is probably not coincidental either. The find-spot (a field near the shores of Kilchattan Bay) indicates a date of deposition approximately around the time of the Marine Maximum, at which time inlets on either side of the island would have almost separated southern Bute from the main part of the island, with megalithic monuments (the Blackpark or Kingarth stone circle and the Stravanan Bay row of standing stones) indicating ceremonial activity in that general area. On Arran, large pitchstone assemblages have been recovered within the Machrie Moor area, which is also characterised by a concentration of ceremonial sites (Haggarty 1991).

Discussion

The distribution of worked Arran pitchstone throughout northern Britain is presently being analysed in connection with the Scottish Archaeological Pitchstone Project (Ballin forthcoming f), and although this project is still ongoing, it is possible to define a number of likely distribution patterns. These patterns are of great importance to the understanding of the Biggar pitchstones and the role of the Biggar area in the Neolithic exchange of this material.

As indicated above, it seems possible to subdivide northern Britain into three main pitchstone zones (I-III), based on a combination of decreasing assemblage size and decreasing typological variability with increasing distance to the raw material sources on the Isle of Arran. Detailed analysis of the pitchstone finds in the holdings of the NMS, supported by preliminary examination of finds from other Scottish museums, suggests two different trends, which may be important to the understanding of 1) the territorial structure of Neolithic Scotland, and 2) the exchange network responsible for the dissemination of Arran pitchstone.

The two trends hinted at above concerns the distribution of archaeological pitchstone throughout Zone II, the zone surrounding the Isle of Arran (Zone I) (see Fig. 1). On the mainland east of Arran, as well as in Northern Ireland, there are strong indications that the exchange implicated a series of large redistribution centres: the Biggar area (South Lanarkshire), the Glen Luce area (Dumfries), and Ballygalley (Co. Antrim). Within these areas of approximately 10 x 10 km, a number of large assemblages have been found, occasionally including more than 100 pieces of pitchstone, although in Northern Ireland only the Ballygalley site itself is of noticeable numerical size (*c*. 500 pieces; Simpson & Meighan 1999). Between these Zone II centres, most pitchstone assemblages are comparable in size to Zone III assemblages, although some occasionally embrace up to approximately a dozen pieces.

Table X. Significant pitchstone assemblages in Argyll & Bute

Argyll & Bute Assemblages	Numbers
Blackpark Plantation East, Bute (Ballin *et al.* forthcoming)	400
Auchategan, Glendaruel, Argyll (Ballin 2006)	90
Lussa Wood 1, Jura (Mercer 1980)	67
Ellary Boulder Cave, northern Kintyre (Tolan-Smith 2001)	62
Balloch Hill, southern Kintyre (Peltenburg 1982)	58
Lealt Bay, Jura (Mercer 1968)	34
Midross, Loch Lomond, Argyll (Ballin forthcoming c)	27

The situation is distinctly different in the area of Argyll & Bute, including the Southern Hebrides. This area incorporates the largest known single pitchstone assemblage outwith Arran (Blackpark Plantation East, Bute), but also a relatively large number of significant assemblages scattered throughout the area. Table X lists the most prominent of these assemblages. The assemblage from Blackpark Plantation East (presently) numbers 400 pieces, and as it is based entirely on two 'walkovers' and the excavation of two small test-pits (by archaeologist Sarah Phillips and Curator Anne Speirs, Bute Museum), it is quite likely that an excavation of the site could yield as much as a thousand pieces of pitchstone or more (based on the authors' personal experience in the repeated fieldwalking of rich areas). The remaining assemblages in Table X are all based on excavation.

There are two likely interpretations of this distribution patterns, namely:
Arran and Argyll & Bute represent two different social territories, and the relatively large assemblages in Argyll & Bute correspond to redistribution centres like the ones identified on the mainland east of Arran and in Northern Ireland, although mostly of slightly smaller numerical sizes. Due to the archipelago/fiord-like character of the area, the local exchange network operated with a number of smaller and more closely spaced centres, for example one on each island or one in each fiord.

Arran and Argyll & Bute represent one coherent social territory, or at least two closely allied territories, where members of the social territory or 'political' unit had free access to Arran's pitchstone sources. This 'free access' model was suggested by Bruen Olsen & Alsaker (1984, 96; also, Bergsvik & Bruen Olsen 2003, 402) in their discussion of the West Norwegian social territories and their internal exchange in raw materials for stone axes.

At present, it is not possible to determine whether Option 1 or 2 may be the more likely one. A more substantial exploitation of porphyritic pitchstone on Arran and in Argyll & Bute than in the remaining parts of Zone II possibly supports Option 2. Bute assemblages include substantially more porphyritic material than expected (eg, Blackpark Plantation East, Dunagoil, The Plan; and Kingarth Quarry; Ballin *et al.* forthcoming; Mann 1918; Finlay 2003; Rees 2001), and assemblages in Argyll and in the Southern Hebrides also include more porphyritic material than sites in the remaining parts of Zone II. However, it is also possible that an increased use of porphyritic pitchstone is a chronological phenomenon, more specifically – a later Neolithic phenomenon, and that the different aphyric:porphyritic ratios of the different Scottish regions are due to some regions being dominated by Early Neolithic sites and some by later Neolithic sites.

The general composition of the huge mainly aphyric Glen Luce assemblages (Ballin forthcoming f) suggests that those probably date largely to the beginning of the Early Neolithic, whereas the general composition of assemblages with noticeable proportions of porphyritic material, such as Blackpark Plantation East in Bute (Ballin *et al.* forthcoming) and Barnhouse on Orkney (Ballin forthcoming b), are thought to be later Neolithic.

Whether Option 1 or 2 may turn out to be the more likely one does not affect the fact that pitchstone was generally exchanged via an extensive and probably complex exchange network, where the Biggar area was one of less than a handful of substantial redistribution centres. Most likely, this network also included the exchange of materials such as stone axes in Cumbrian tuff from the Great Langdale 'axe factories' in the Lake District (Bradley & Edmonds 1993), Antrim flint (Saville 1994, 62), and Yorkshire flint (Saville 1994, 63).

But as the case is in archaeology – any new insight usually presents a whole raft of new questions. If the existence of a complex Neolithic exchange network is accepted – including trade in pitchstone, and with the Biggar area being one of a number of noticeable redistribution centres – how does this affect our understanding of Neolithic society in northern Britain in general? In his paper on 'Settlement Systems of Early Agricultural Societies in East Jutland, Denmark', Torsten Madsen (1982, 228) argues that some degree of ranking developed in Neolithic society, with megalithic tombs and redistribution centres being visible indicators of this process. In the present case, one might ask: who organised the trade in pitchstone (among other things) and who was responsible for the redistribution process? However, these questions are not embraced by the framework of the present paper and require further research.

Acknowledgements

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