

SERF Archive Report: Flaked Lithic Assemblages 2007-10

Introduction

The flaked lithic assemblages from the SERF excavations from 2007 to 2010, inclusive are numerically modest at 120 artefacts. 86.66% of the lithics were recovered from Neolithic and Bronze Age contexts; Early Medieval 9.17% and hilltop enclosures 4.17%.

A total of five lithics were recovered from the hilltop enclosures excavations at Jacksstairs (JK07), Dunknock (DK08), Green of Invermay (GR09) and Law of Dumbuils (LD10).

The Neolithic and Bronze assemblage comprises of 104 artefacts from the palisaded enclosure (FN07; FN10.05a; FN10.05b; FN10.07), the henge, timber circle and cist burial (FN08/2; FN09), and the multiphase ceremonial monument (FN10.06). The assemblage is compared to the 442 lithics recovered from the excavations undertaken at the palisaded enclosure at Meldon Bridge, Peeblesshire (cf. Speak and Burgess 1999 and Ballin 1999). There are potential issues with the comparanda, e.g. it was noted Area G at Meldon Bridge was a discrete area for blade production (Ballin 1999, 88), and in contrast the recovery location of the majority of the lithics from Forteviot may be said to be the result of either random events, or unknown taphonomic processes.

11 artefacts were recovered during the excavations of a barrow and unenclosed grave cemetery (FC07), and a Pictish cemetery and Iron Age enclosure (FC09).

The solid and drift geology of Forteviot is recorded to determine the potential availability or otherwise of raw materials.

Methodology

The methodology, type and attribute terminologies employed for the analysis of the primary and secondary technologies follows the format devised and adopted for the *Southern Hebrides Mesolithic Project* (Finlayson *et al.* 2000). This augmented the research design used for the analysis of the lithic assemblage from the site at Kinloch on Rùm (Wickham-Jones 1990), which was itself derived from earlier terminologies and technological classifications (Tixier *et al.* 1980), subsequently enhanced (Inizan *et al.* 1999). This format lends itself to the incorporation of later prehistoric forms such as projectile points, 'knives', certain types of scrapers and Post-Medieval gunflints. The database for the typological and technological analysis of the lithics has been compiled using Access™ 2010.

Primary Technology speaks to those initial procedures of the *chaîne opératoire* relating to the choices made in the selection and the obtaining of appropriate raw material, the reduction strategies, the production of blanks, e.g. flakes and blades through to the discard of cores. The knapping reduction strategies undertaken in the past are determined by reference to the detailed analysis of the characteristics and attributes of the cores and debitage products recovered during archaeological fieldwork (Finlay *et al.* 2000a, 553; Woodman *et al.* 2006, 78)

Secondary Technology refers to the later stages of the *chaîne opératoire* which considers the process of the modification of blanks, their utilisation and discard. Following the removal of a blank from a core, modification is generally achieved by the application of pressure to the edge of the blank. In the case of scrapers the modified edge functions as the working edge. However, that may not be the case for all retouched artefacts. For example, the modification may be undertaken to facilitate hafting (Finlay *et al.* 2000b, 571; Wickham-Jones and McCartan 1990, 87). Invasive and inverse retouch are generally particular features of secondary modification during the Neolithic and Bronze Age periods (Ballin 1999 and others).

Hilltop enclosures

Jackschairs (JK07)

A tested flint platform flake core (small find 001: catalogue number 013) was retrieved from slumped material (011) on the face of rampart 2 in Area C (cf. Poller and Goldberg 2007, Figure 2). There are two attempted removals transverse to the direction of the original flake. The flake core is fresh in condition with a pinkish-grey hue. The presence of diffuse negative bulbs of percussion indicates the use of a soft hammerstone percussor.

It is not possible to offer a relative date for the flake core.

Dunknock (DK08)

A gunflint (031: 042) [Figure 1] was recovered from (591) underlying cobbles associated with the collapse of rampart material in Trench E.



Figure 1: Post-Medieval gunflint recovered from Dunknock.

The artefact does not fit within the principal typologies for manufactured gunflints (Skertchly 1879), although the wedge form morphology is broadly similar to an illustration of a German gunflint (*ibid.* Figure 61). The gunflint (L 28mm; W 30mm; Th 8mm) has retouch to all four edges. There are common differences to an artefact found in Suffolk and reported by the Portable Antiquities Scheme in England (Reference SF-BE0AE8). The finds location may suggest that it was manufactured at the Brandon flint works. The Suffolk gunflint is also a wedge form with continuous retouch (L 30mm; W 30mm; Th 9mm), and has been interpreted as Post-Medieval dating to 1550-1800CE (Pendleton 2011).

A study has recently been conducted on early gunflints from a workshop on the Outer Hebridean island of Lewis (Ballin 2012). Many of the locally produced artefacts are amorphous in plan (after Ballin 2012) and generally lack the consistence of symmetry of type found in gunflints from the later major industrial centres (after Skertchly 1879). If the evidence from Lewis is indicative of locally produced gunflints then the morphology of the gunflint from Dunknock suggests that it may derive from a specialised gunflint factory in England.

Two post-Medieval gunflints and a gunflint fragment were recovered nearby during fieldwalking at Leadketty Farm, Dunning in 1994 (Henson 1997). A visit to Perth Museum on 3 July 2012 determined that one of the artefacts had common differences in morphology and retouch to the find from Dunknock, although much smaller in size (L 21mm; W 18mm; Th 5mm). The second artefact appears to a Second Carbine type [L 19mm; W 13mm; Th 4mm] (after Skertchly 1879, 53).

Green of Invermay (GR09)

Two irregular bipolar flint flakes were recovered at GR09. A complete flake (053:098) was found in the medieval plough soil (905). The second artefact is a

medial and distal fragment (099: 099) from the upper fill (910) of a curvilinear ditch feature [909].

Law of Dumbuils (LD10)

A bipolar agate chunk (9001: 121) was collected from the plough soil at rampart 2.

Discussion and summary

The recovery locations of the lithic artefacts from the hilltop enclosures are indicative of random events due to unknown taphonomic processes.

Forteviot: Solid and drift geology

The data has been ascertained from the Geology Roam® online Digimap facility at Edina® (<http://edina.ac.uk/>). The solid geology consists of Glenvale Sandstone Formation, and the drift geology comprises of alluvium and river terrace deposits which appears to overly Devensian glacial till.

Neolithic and Bronze Age

Raw materials

Quartz is the most common raw material utilised at 32.70%. The percentage occurrence of agate (20.19%), flint (19.23%) and chalcedonies, including jasper (19.28%) are similar. Other raw materials such as Arran pitchstone, chert and siltstone are present indicating a diverse use of exploitable stone resources (Figure 2).

There are no known local sources of chert (Wickham-Jones and Collins 1977, Figure 2). The British Geological Survey for the Midland Valley states that the occurrence of siliceous pebbles in the Glenvale Sandstone Formation is rare, although quartz is common (Phillips 2007, 11). However, nodules of chert have been noted in dressed sandstone, e.g. the dovecote at Green of Invermay and at Invermay House on the Invermay Estate. It is possible that chert eroding out of the solid geology and glacial till may have been available from riverine locations (after Wickham-Jones and Collins 1977, 7), although this assumes that the dovecote and Invermay House were constructed using locally derived sandstone from the Glenvale Sandstone Formation.

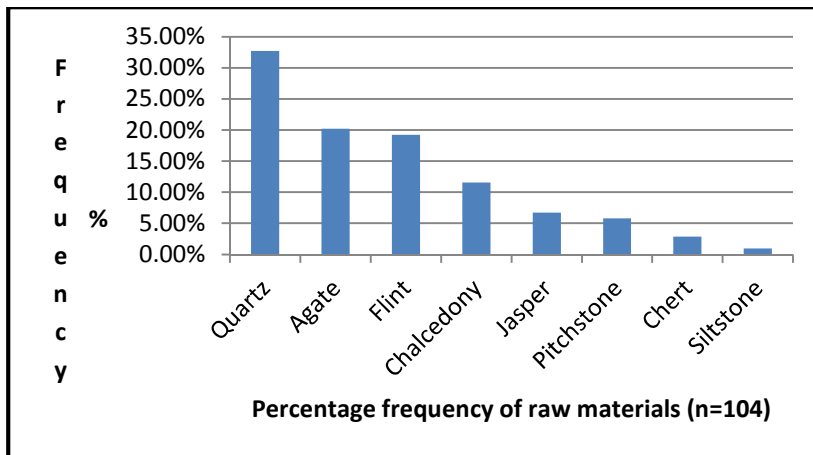


Figure 2: Percentage frequency of raw materials.

51.92% of the lithics have retained traces of cortex (Table 1). The dominance of either a smooth/hard or a moderately pitted surface suggests that raw materials derive from fluvioglacial riverine deposits. Two flint artefacts have evidence of an original smooth/chalky cortical surface rolled smooth/hard providing further evidence for the collection of raw materials from riverine resources.

The diversity of raw materials may indicate different selection policies from secondary resources and different episodes of lithic reduction.

	Agate	Chert	Chalcedony	Flint	Jasper	Pitchstone	Quartz
Smooth/chalky				2			
Smooth/hard	2	1	2	3	3	1	16
Pitted	9	1	3	1	2	1	3
Semi-battered	2		1				1
	13	2	6	6	5	2	20

Table 1: Numerical analysis of artefacts by type of cortex present.

Character

The character of the assemblages is shown at Table 2. The only primary flakes and blades present are quartz, although there are tested split pebbles for all raw materials except for pitchstone. The majority of flakes and blades are secondary and tertiary (89.47%).

Nine (15.79%) of flakes and blades are regular, comprising of five pitchstone blades, two flint flakes, one flint blade and one chalcedony flake.

	Total	Agate	Chert	Chalcedony	Flint	Jasper	Pitchstone	Quartz	Siltstone
Tested Split Pebbles	13	3	1	1	1	2		4	1
Chunks	7	2		2	1	1		1	
Cores	9	2	1	1	2		1	2	
Flakes	48	11	1	4	9	1	1	21	
<i>Primary</i>	5							5	
<i>Secondary</i>	17	6		3	1		1	6	
<i>Tertiary</i>	26	5	1	1	8	1		10	
<i>Primary regular</i>									
<i>Primary irregular</i>	5							5	
<i>Secondary regular</i>	2			1			1		
<i>Secondary irregular</i>	15	6		2	1			6	
<i>Tertiary regular</i>	1				1				
<i>Tertiary irregular</i>	24	4	1	1	7	1		10	
Blades	10				2	1	4	3	
<i>Primary</i>	1							1	
<i>Secondary</i>	4					1	1	2	
<i>Tertiary</i>	5				2		3		
<i>Primary regular</i>									
<i>Primary irregular</i>	1							1	
<i>Secondary regular</i>	1						1		
<i>Secondary irregular</i>	3					1		2	
<i>Tertiary regular</i>	5				2		3		
<i>Tertiary irregular</i>									
Small Fraction	9	2		3	1	1		2	
Modified	8	1		1	4	1		1	
Total	104	21	3	12	20	7	6	34	1

Table 2: Character of the assemblage.

Condition

The overwhelming majority of the pieces within the assemblage are fresh (88.46%). Three of the four burnt (3.85%) artefacts are flint and were recovered from the burial area within the henge (FN09; 082: 084; bulk: 091; bulk: 092). There are six rolled (5.77%) and two weathered pieces [1.92%] (Table 3).

	Total	Fresh	Burnt	Rolled	Weathered
Agate	21	17		3	1
Chalcedony	12	11		1	
Chert	3	3			
Flint	20	16	3		1
Jasper	7	7			
Pitchstone	6	6			
Quartz	34	32	1	1	
Siltstone	1			1	
	104	92	4	6	2

Table 3: Condition of the assemblage by raw material.

Primary Technology

Four of the five complete cores from FN08/2 are bipolar (quartz 2; chert 1; agate 1). The other is a non-specific platform chalcedony core with opposable platforms. There is also a fragment of an agate core. Two cores were recovered from FN09, a flake platform core with opposable platforms and a fragment of a pitchstone core. A bipolar flint flake core (5006: 105) from FN10.05a came from the upper fill (5034) of the cist. All of the cores have the negative scars of a diffuse bulb of percussion indicating the use of a soft hammerstone.

It should be noted that bipolar blanks will be under-represented because not all debitage products will present with attributes associated with a bipolar reduction strategy (after Kuijt *et al.* 1995, 117).

53.85% of flakes, blades, chunks and tested split pebbles have attributes associated with bipolar reduction (Table 4). Apart from chert, other siliceous materials, i.e. flint and chalcedonies tend to have greater incidence of platform reduction, although bipolar working has a significant percentage occurrence. One flint flake (173: 028) displays evidence for anvil supporting suggesting that the use of bipolar and platform strategies were episodically coeval. This is further evidenced by the two flint cores. One is bipolar and the other is a flake platform core.

Arran pitchstone is used exclusively for platform reduction. A pitchstone flake (001: 001) has evidence for anvil supporting and the pitchstone platform core fragment supports this interpretation (Table 4).

49 (84.48%) of the 58 blanks, i.e. flakes and blades are irregular; 9 (15.52% regular. There are 40 blanks where the proximal end is present, of these 70% have a diffuse bulb of percussion and 30% have a bulb with lip attribute indicating an exclusive use of a soft hammerstone.

A regular flint blade (FN09: 083: 085) was recovered from near the base of the fill (506) of a posthole [505] to the timber circle in Area G. There is a medial fragment of a regular flint blade recovered from a sample (FN09: 1041) of a cremation deposit (617) in Area AA. A fragment of burnt human lower long bone from (617) has been radiocarbon dated at 1σ to 2930-2870BCE (4275 \pm 30BP SUERC-29186).

	Total	Bipolar	Platform
Debitage (non SFD)			
Agate	16	6	10
Chalcedony	7	3	4
Chert	2	2	
Flint	13	4	9
Jasper	5	2	3
Pitchstone	5		5
Quartz	29	25	4
Siltstone	1		1
	78	42	36
Cores			
Agate	2	2	
Chalcedony	1		1
Chert	1	1	
Flint	2	1	1
Pitchstone	1		1
Quartz	2	2	
	9	6	3

Table 4: Numerical frequency of cores and blanks by reduction strategy.

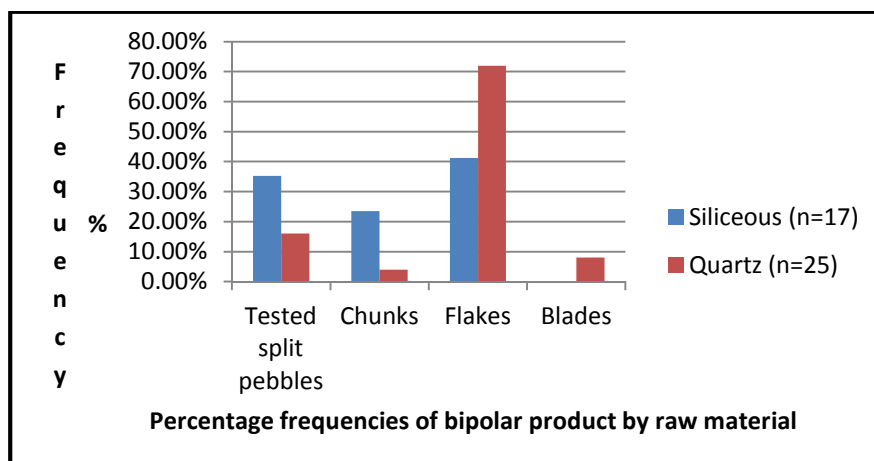


Figure 3: Percentage frequencies of bipolar product by raw material. Siliceous materials include flint, chert, agate, jasper and chalcedony.

	Total	Agate	Chalcedony	Chert	Flint	Jasper	Pitchstone	Quartz
Flakes								
FN07	1						1	
FN08/2	11		1		4			6
FN09	26	4	3		5	1		13
FN10.05a	3	2						1
FN10.05b	2	2						
FN10.06	4	3		1				
FN10.07	1							1
	48	11	4	1	9	1	1	21
Blades								
FN08/2	4						2	2
FN09	5				2	1	1	1
FN10.05a	1						1	
	10				2	1	4	3

Table 5: Analysis of blanks by raw material and excavation.

Secondary Technology

The artefacts with secondary modification comprise of four scrapers and two Early Neolithic leaf-shaped arrowheads (cf. Warren 2006, 40), one Late Neolithic oblique arrowhead (cf. Thomas 2010), and a ‘small knife’.

Scrapers

A perfunctory jasper scraper with semi-abrupt retouch (FN07: 005: 029) was recovered in the top soil during cleaning of the avenue to the palisaded enclosure. There were three scrapers of different raw materials found during the excavations in 2009 (FN09). A fragment of a short convex agate scraper (023: 058) with abrupt retouch was also found in the top soil. A weathered flint sub-angled scraper (006: 046) with abrupt retouch was found in the soil matrix amidst the rubble of the upper henge ditch fill (543) in Area S. The third scraper was a water-rolled quartz sub-angled type (062: 072) with abrupt retouch. It was recovered from Area Q/R in a loose sandy gravel fill (600) underlying (579) [543].

Projectile points

Two finely worked complete Early Neolithic leaf-shaped arrowheads with invasive bifacial retouch were found during the FN09 excavations. The flint arrowhead (079: 082) was recovered from the lower fill (622) of the henge ditch in Area Q/R. The second arrowhead (057: 069) was found in the fill (593) underlying the stone concentration in the burial area.

A Late Neolithic flint oblique arrowhead (FN08/2: 150: 020) was recovered from the plough damaged cobble layer (321) overlying the stone fill of the henge (320). The artefact has semi-invasive direct retouch to all three sides and inverse retouch

to the butt and left hand side. It has common differences to an oblique arrowhead from the Neolithic horned cairn at Ormiegill, Ulbster, Caithness (cf. Clarke and Sharples 1985).

'Small knife'

A complex invasive retouched artefact 'small knife' (FN10.05a: 5013: 120) was recovered from the mid-brown gravelly silt fill (5073) of the cist underlying (5048). Both the right and left hand sides have semi-invasive direct retouch from the proximal end to the upper medial, and invasive direct retouch from the upper medial culminating in a point at the distal end. There is damage to the point, although this may be post-depositional and not necessarily due to use-wear.

Discussion and summary

Lithic assemblages associated with ritual sites from the Neolithic, and the same may be said of the Bronze Age (e.g. Watson and Bradley 2000), are generally small in comparison to those from the Mesolithic period (after Warren 2006, 34). This has been explained by radical changes in depositional practice in the Neolithic (Healy 1987; Warren 2006a, 34-35).

There is a diverse range of raw materials in the assemblage with quartz as the dominant raw material. An increase in the use of quartz has been attributed as an Early Neolithic development in Eastern Scotland (Warren 2006), while pitchstone from mainland contexts generally relates to Post-Mesolithic activities (Ballin and Faithfull 2009). All of the raw materials, apart from the pitchstone imported from Arran, appear to have derived from river resources from fluvio-glacial deposits. This is in direct contrast to the assemblage from Meldon Bridge where chert is most common raw material with lesser frequencies of flint, agate and pitchstone, although it is noted that apart from pitchstone raw materials are sourced locally (Ballin 1999, 82).

The assemblages from Forteviot and Meldon Bridge have evidence of bipolar and platform reduction (after Ballin 1999, 83-84). Contra to Forteviot there does not appear to be any artefacts with evidence of anvil supporting at Meldon Bridge. It is possible that bipolar reduction speaks to different temporal episodes bearing in mind that bipolar and platform strategies were at some point coeval at Forteviot, although that does not necessarily preclude that some element of bipolar reduction may represent different events. Unlike Forteviot platform as opposed to bipolar reduction is more common at Meldon Bridge where single platform cores have the greatest percentile frequency (after Ballin 1999, 86). 66.67% of the cores from Forteviot are bipolar; Meldon Bridge 22.22%. There is no distinction in the reduction technology for blanks from Meldon Bridge and further comparison is not possible. The absence of quartz from Meldon Bridge which is predominantly used in bipolar strategies at Forteviot does have some bearing the comparison of technological statistical data. From the description one conical single platform

blade core from Meldon Bridge (after Ballin 1999, 83) would not be out of place in a Mesolithic assemblage.

The principal common difference in the primary technologies from Forteviot and Meldon Bridge is in the dominance of flakes as the main product of the reduction strategies employed (after Ballin 1999, 84).

The deposition of a flint blade (FN09: 083: 085) at the base of one of the postholes [505] to the timber circle may constitute an event in its ritual decommissioning. Similarly, the medial flint blade found within the Late Neolithic cremation deposit (617) may represent an aspect associated with depositional practice.

Scrapers are common artefacts in the assemblages of later prehistory (Finlay *et al.* 2000b, 583). It is difficult to compare the forms between Forteviot and Meldon Bridge due to differential terminologies. However, the illustrations from Meldon Bridge (Ballin 1999, illustration 47) detail a dominance of convex forms. The scraper typologies from Forteviot and Meldon Bridge do not contravene relative dating to Neolithic and Bronze Age periods.

In common with Forteviot, leaf-shaped and oblique arrowheads were recovered from Meldon Bridge (Ballin 1999, 84). The FN09 leaf-shaped arrowheads have a thickness of >2mm and <3mm. There is no evidence of either use-wear, or hafting residues. It is possible that these artefacts are not functional and may have been manufactured for ritual practice.

The 'small knife' from the triple cist (FN10.05a: 5013: 120) is analogous to a Bronze Age type slug knife from the double cist at Meldon Bridge (Speak and Burgess 1999, 30), and constitutes depositional practice associated with burial.

A scalene triangle microlith was found at Meldon Bridge which represented the only unequivocal evidence for a Mesolithic presence in the lithic assemblage (Speak and Burgess 1999, 9). Radiocarbon dates (FN08: 7480-7250BCE [8290±30BP SUERC-23247]; FN09: 6920-6680BCE [7925±30BP SUERC-29175]) from these excavations at Forteviot give proxy evidence only for putative Mesolithic events. The lack of artefactual material for the Mesolithic at Forteviot corresponds to the total attestable absence of the Mesolithic in Perth and Kinross (Wright 2012), with the exception of the assemblage from Ben Lawers (Atkinson forthcoming). The lithic assemblage from Forteviot indicates events in the Early Neolithic, Late Neolithic and Bronze Age.

Early Medieval

Raw Materials, Character and Condition

The character of the assemblage from FC07 and FC09 and the percentage frequencies of raw materials are set out at Table 6. The six artefacts from FC07 and five from FC09 are in fresh condition.

	Total	Agate	Chalcedony	Flint	Pitchstone
Cores	1	1			
Flakes	7	2	1	3	1
Secondary	1			1	
Tertiary	6	2	1	2	1
Secondary irregular	1			1	
Tertiary regular	1				1
Tertiary irregular	5	2	1	2	
Blades	2			2	
Tertiary	2			2	
Tertiary regular	2			2	
Modified	1			1	
Total	11	3	1	6	1
Percentage frequency		27.3%	9.1%	54.5%	9.1%

Table 6: Character of the assemblage and percentage frequency of raw materials.

Primary Technology

An agate bipolar core (FC09: catalogue number 104) fashioned from a small pebble was recovered from the top soil (702). The core has opposable platforms and was probably abandoned due to the combination of the failure to maintain a working angle and stepping and hinging to the flaking surface.

There are two flint flakes and one chalcedony flake from FC07. One of the flint flakes (021: 011) was recovered from the upper fill (045) of the western half of the central grave in barrow 1 [075]. The artefact presents with a lug on the left hand side at the medial. Charcoals from this context were used to acquire three radiocarbon dates which at 1 σ are:

1320-1120BCE 2990 \pm 30BP SUERC 22835 (*Alnus* charcoal);
 1500-1370BCE 3140 \pm 30BP SUERC-22836 (*Corylus* charcoal); and
 660-880CE 1265 \pm 30BP SUERC-22837 (*Corylus avellana* charcoal).

Two agate flakes and one each of flint and pitchstone were recovered from the top soil at FC09.

There are two flint blades from FC07, one of which (003: 007) presents with proximal spalling was found in the orange yellow silt sub-soil in Area B4. The other is a medial fragment from the upper fill (033) of the central grave in barrow 2 [032]. Two radiocarbon dates were obtained from charcoals from this context. The determinations at 1σ are:

990-1160CE	980 \pm 30BP SUERC-22846 (<i>Alnus</i> charcoal); and
1020-1180CE	925 \pm 30BP SUERC-22847 (<i>Corylus</i> charcoal).

Secondary Technology

An Early Bronze Age flint barbed and tanged arrowhead with invasive bifacial retouch was found in the upper fill (051) of a grave cut [050] in Area G. The dimensions of the arrowhead typologically classify it as Sutton B (after Green 1980). Two Sutton B were recovered from an Early Bronze Age context at St. Germain's, Tranent, East Lothian (Alexander and Watkins 1998, 212). A Sutton A type barbed and tanged arrowhead (after Green 1980, 122) was found during the excavations of the palisaded enclosure at Meldon Bridge (Ballin 1999, 85).

Discussion and summary

The flint flake and barbed and tanged arrowheads were recovered from the upper fills of grave cuts. The context of recovery suggests that these were not curated artefacts associated with Early Medieval interments. It is most likely that these artefacts were representative of random events from unknown taphonomic processes swept up in backfilling the grave cuts. However, barbed and tanged arrowheads are frequently associated with beaker burials and it is possible that the Sutton B recovered from the grave fill was from a disturbed Bronze Age cremation burial.

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Bibliography

- Alexander, D. and T. Watkins. 1998. St Germain's, Tranent, East Lothian: the excavation of Early Bronze Age remains and Iron Age enclosed and unenclosed settlements. *Proceedings of The Society of Antiquaries of Scotland*, 128: 203-254.
- Atkinson, J. forthcoming. Ben Lawers: An Archaeological Landscape in Time. SAIR.
- Ballin, T. B. 1999. The Lithic Assemblage in S. Speak and C. Burgess: Meldon Bridge: a centre of the third millennium BC in Peeblesshire. *Proceedings of The Society of Antiquaries of Scotland*, 129: 81-93.
- Ballin, T. B. 2012. 'State of the Art' of British gunflint research, with special focus on the early gunflint workshop at Dun Eistean, Lewis. *Post-Medieval Archaeology*, 46(1): 116-142.
- Ballin, T. B. and J. Faithfull. 2009. *Gazetteer of Arran Pitchstone Sources: Presentation of exposed pitchstone dykes and sills across the Isle of Arran, and discussion of the archaeological relevance of these outcrops.* (<http://www.sair.org.uk/sair38/>): SAIR 38.
- Clarke, D. V. and N. Sharples. 1985. Settlement and subsistence in the third millennium BC. In C. Renfrew (ed.), *The Prehistory of Orkney*: 286-305. Edinburgh: Edinburgh University Press.
- Finlay, N., B. Finlayson and S. J. Mithen. 2000a. The Primary Technology: its Character and Inter-site Variability. In S. J. Mithen (ed.), *Hunter-gatherer landscape archaeology: The Southern Hebrides Mesolithic Project 1988-98. Volume 1: Project development, palaeoenvironmental studies and archaeological fieldwork on Islay. Volume 2: Archaeological fieldwork on Colonsay, computer modelling, experimental archaeology, and final interpretations*: 553-569. Cambridge: McDonald Institute for Archaeological Research.
- Finlay, N., B. Finlayson and S. J. Mithen. 2000b. The Secondary Technology: its Character and Inter-site Variability. In S. J. Mithen (ed.), *Hunter-gatherer landscape archaeology: The Southern Hebrides Mesolithic Project 1988-98. Volume 1: Project development, palaeoenvironmental studies and archaeological fieldwork on Islay. Volume 2: Archaeological fieldwork on Colonsay, computer modelling, experimental archaeology, and final interpretations*: 571-587. Cambridge: McDonald Institute for Archaeological Research.
- Finlayson, B., N. Finlay and S. J. Mithen. 2000. The cataloguing and analysis of the lithic assemblages. In S. J. Mithen (ed.), *Hunter-gatherer landscape archaeology: The Southern Hebrides Mesolithic Project 1988-98. Volume 1: Project development, palaeoenvironmental studies and archaeological fieldwork on Islay. Volume 2: Archaeological fieldwork on Colonsay, computer modelling, experimental archaeology, and final interpretations*: 61-72. Cambridge: McDonald Institute for Archaeological Research.
- Green, H. S. 1980. *The flint arrowheads of the British Isles: a detailed study of material from England and Wales with comparanda from Scotland and Ireland.* Oxford: Archaeopress.
- Healy, F. 1987. Prediction or Prejudice? The relationship between field survey and excavation. In A. G. Brown, and M. Edmonds (eds), *Lithic Analysis and later*

- British Prehistory: some problems and approaches*: 9-17. Oxford: Archaeopress.
- Henson, D. 1997. Artefacts from fieldwalking at Dunning, Perthshire. Unpublished manuscript.
- Inizan, M.-L., M. Reduron-Ballinger, H. Roche and J. Tixier. 1999. *Technology and Terminology of Knapped Stone*. Nanterre: CREP.
- Kuijt, I., W. C. Prentiss and D. L. Pokotylo. 1995. Bipolar Reduction: An Experimental Study of Debitage Variability. *Lithic Technology*, 20(2): 116-127.
- Pendleton, I. 2011. *Gunflint SF-BEOAE8*. (<http://finds.org.uk/database/artefacts/record/id/288830>) Last Viewed 24 January 2012: Portable Antiquities Scheme Database.
- Phillips, E. 2007. *Petrology and provenance of the Siluro-Devonian (Old Red Sandstone facies) sedimentary rocks of the Midland Valley, Scotland*: British Geological Survey Internal Report (IR/07/040).
- Poller, T. and M. Goldberg. 2007. Jackschairs Wood Hillfort Excavations 2007. Unpublished SERF DSR: University of Glasgow.
- Skertchly, S. B. J. 1879. *Memoirs of the Geological Survey England and Wales on the Manufacture of Gun-flints, the Methods of Excavating for Flint, the Age of Palaeolithic Man, and the Connexion between Neolithic Art and the Gun-flint Trade*. London: HMSO.
- Speak, S. and C. Burgess. 1999. Meldon Bridge: a centre of the third millennium BC in Peeblesshire. *Proceedings of The Society of Antiquaries of Scotland*, 129: 1-118.
- Thomas, J. 2010. The Return of the Rinyo-clacton Folk? The Cultural Significance of the Grooved Ware Complex in Later Neolithic Britain. *Cambridge Archaeological Journal*, 20(1): 1-15.
- Tixier, J., M.-L. Inizan and H. Roche. 1980. *Préhistoire de la pierre taillée, 1 terminologie et technologie*. Valbonne: CREP.
- Warren, G. 2006. Chipped Stone Tool Industries of the Earlier Neolithic in Eastern Scotland. *Scottish Archaeological Journal*, 28(1): 27-47.
- Watson, A. and R. Bradley. 2000. Worked stone. In R. Bradley (ed.), *The Good Stones: a new investigation of the Clava Cairns*: 82-86. Edinburgh: Society of the Antiquaries of Scotland.
- Wickham-Jones, C. R. (ed.). 1990. *Rhum, Mesolithic and Later Sites at Kinloch: excavations 1984-86*. Edinburgh: Edinburgh University Press.
- Wickham-Jones, C. R. and G. H. Collins. 1977. The sources of flint and chert in northern Britain. *Proceedings of the Society of Antiquaries of Scotland*, 109: 7-21.
- Wickham-Jones, C. R. and S. B. McCartan. 1990. The Lithic Assemblage: Secondary Technology. In C. R. Wickham-Jones (ed.), *Rhum: Mesolithic and Later sites At Kinloch: excavations 1984-86*: 87-102. Edinburgh: Society of Antiquaries of Scotland.
- Woodman, P. C., N. Finlay and E. Anderson. 2006. *The Archaeology of a Collection: The Keiller-Knowles Collection of the National Museum of Ireland*. Wicklow: Wordwell.
- Wright, A. D. 2012. Tay Landscape Partnership Scheme: Report on the assessment of lithic artefacts. Unpublished report: Perth and Kinross Heritage Trust.