

Introduction

A lithic assemblage of 128 pieces of chipped stone was recovered during the course of the excavations at the Earl's Bu, Orphir. These artefacts are the focus of this report.

Methodology

The methodology, type and attribute terminologies employed for the analysis of lithics from the Earl's Bu follows the format devised and adopted for the *Southern Hebrides Mesolithic Project* (Finlayson *et al.* 1996, 2000). This built upon the research design used for the analysis of the lithic assemblage from Kinloch, Rùm (Wickham-Jones 1990), which was itself derived from the terminologies of technological analysis put forward by Tixier *et al.* (1980); subsequently enhanced (Inizan *et al.* 1999). It also incorporates aspects of Madsen's (1992) classification scheme for primary technological attributes. This format lends itself to the incorporation of later prehistoric forms such as Neolithic, and Bronze Age projectile points and certain types of scrapers. A glossary of terms may be found at Appendix 1.

The database for the typological and technological analysis of the lithics has been compiled using Access™ 2010. References to specific artefacts will cite the catalogue number followed by the small finds number.

Raw materials

Flint dominates the assemblage; 126 lithics representing 98.44%. The only other raw materials present are a jasper flake and a tested quartz cobble. Attempts at removals from the cobble produced multiple step terminations resulting in its discard. It has been noted previously that there are no flint sources at Orphir. The nearest sources of drift flint are recorded as North Ronaldsay and Swona/Stroma (Batey 1986, 295; Wickham-Jones and Collins 1977, 12).

78.57% of the flint is the ubiquitous grey hues associated with flint nodules eroding out of the offshore cretaceous sediments (after Hall 1991, Figure 3). 36 flint artefacts present with cortex of which 72.22% display and smooth/ hard variant; smooth/chalky 16.67% and pitted 11.11%. The artefacts with a pitted cortex are all grey and indicate the use of beach pebbles. One flint artefact with a smooth/hard cortex has been burnt white leaving no trace of its original colour. 76.92% of the smooth/hard variant is grey suggesting a fluvio-glacial origin, although beach

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pebbles cannot be categorically ruled out. All of the artefacts with the smooth/chalky variant have been water rolled pointing to a fluvio-glacial source.

Condition

88.28% of the lithics are fresh; burnt 11.72%. The frequency of burnt pieces is probably understated. Experimental work undertaken by Finlayson (1990, 53) on flint indicated that burnt pieces would not be classified as such due to the absence of burnt attributes.

The absence of any of the stages of patination suggests that the lithics have been recovered from either moisture retaining soil matrices, or similar. The process of patination refers to the change of the original inner colour of raw material to white, which results from the loss of water from the internal crystallite structure of siliceous materials. For example, a predominantly sand matrix will produce white cortication (after Shepherd 1972).

Character

The character of the assemblage and the percentage frequencies of artefact types are shown at Table 1 and Figure 1, respectively.

All four cores recovered from the excavations were platform cores (0100/SF475; 0123/SF959; 0124/SF865; 0125/SF894). However, three (6.12%) of the 49 blanks, i.e. 44 flakes and five blades, display bipolar attributes. All four chunks and the tested quartz cobble are bipolar. Generally, 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).

There are 27 blanks where it is possible to determine the bulb of percussion. 14 (51.85%) have a diffuse bulb and 33.33% have lip attributes; flat 11.11% and pronounced 3.71%. This indicates the dominance of using a soft hammer to remove blanks from cores. It is possible to determine the striking platform on 25 blanks; simple 88.00%, cortical 8.00% and simple with trimming/scrub preparation 4.00%.

Eight of the non-bipolar blanks (17.39%) have evidence of anvil support. The practice refers to those occasions where the platform core is placed on an anvil for support to facilitate blank removals. It suggests that platform and bipolar reduction strategies may have been coeval (cf. Wright 2012).

91.84% of the blanks are irregular; regular 8.16%. The regular pieces comprise of two flakes (0026/SF3038; 0089/SF4014) and two blades (0010/SF4023; 0082/SF4018). Regularity is determined by a blank with a straight edge greater than 10mm. Blanks with a straight edge of less than 10mm are classified as irregular (Wickham-Jones 2004, 71).

Small fraction debitage accounts for 46.88% of the assemblage. The term refers to pieces where all of the metric variants are less 10mm (cf. Finlayson *et al.* 2000, Table 2.5.5).

The modified pieces, which are discussed below, comprise of five scrapers (0004/SF2868; 0005/SF2506; 0006/SF347; 0048/SF406; 0126/SF883), two leaf-shaped arrowheads (0062/SF076; 0063/SF2960), one abruptly backed piece (0121/SF2758), and one denticulate (0122/SF2990).

	Total	Flint	Jasper	Quartz
Tested Split Pebbles	2	1		1
Chunks	4	4		
Cores	4	4		
Flakes	44	43	1	
Primary	6	6		
Secondary	7	7		
Tertiary	31	30	1	
Primary regular				
Primary irregular	6	6		
Secondary regular				
Secondary irregular	7	7		
Tertiary regular	2	2		
Tertiary irregular	29	28	1	
Blades	5	5		
Primary				
Secondary	1	1		
Tertiary	4	4		
Primary regular				
Primary irregular				
Secondary regular	1	1		
Secondary irregular				
Tertiary regular	1	1		
Tertiary irregular	3	3		
Small Fraction	60	60		
Modified	9	9		
Total	128	126	1	1

Table 1: Character of the lithic assemblage.

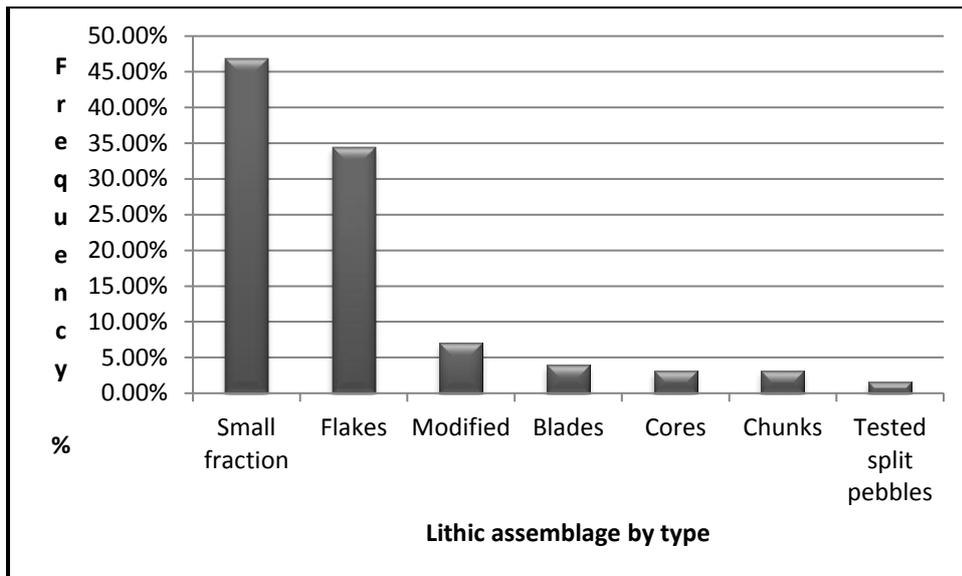


Figure 1: Percentage frequency of lithics by type.

Phases of events at the Earl's Bu

Table 2 breaks down the lithics recovered to the phases of events at the Earl's Bu. The artefacts from phases M, V and X, together with the modified pieces from phases H, Q, T and Y will be the subject of additional analysis.

	Total	H	I	M	O	P	Q	R	T	V	X	Y
Tested split pebble	2			1							1	
Chunks	4			1	1				1		1	
Cores	4			3						1		
Flakes	43			6		1		1	6	11	15	3
Blades	5									3	2	
Small fraction	60		1	12		2			5	26	14	
Modified												
Leaf shaped arrowhead	2	1							1			
Scraper	5			1			1				2	1
Abruptly backed	1			1								
Denticulate	1			1								
	127	1	1	26	1	3	1	1	13	41	35	4

Table 2: Type of lithics recovered by phase. The table does not include the bipolar flint fragment from the Barn Site (O128/SF255).

Phase M: Middens pre-dating the mill

Midden deposits were excavated to the south and east of the mill, behind walls and underlying the levels of the tail race at the east end. Non-lithics artefacts recovered are typologically datable to the early Viking period. Charred grain from Area B/D (371) has been radiocarbon dated to 881-1050 cal AD (Beta-84858 1050±50BP).

All of the finds are flint, save for the tested quartz cobble from (379). 92.31% of the lithics were recovered from Area F and 16 (66.67%) of those 24 pieces were retrieved from (362) [Table 3]. The cores, flakes and scraper from (362) together with the denticulate from (379) have been further considered.

Primary technology

Two of the three cores are flake core fragments (0123/SF959; 0124/SF865) with simple platforms. Both cores were abandoned because of step terminations to the flaking surface. The third is a non-specific core (0125/SF894) with opposed simple platforms. The core presents with a pitted cortex indicating a beach pebble source. The angularity suggests that the beach pebble was sub-rounded and of medium size. The negative scars provide evidence for the removal of flakes and the attempted removal of bladelets producing multiple step terminations, which resulted in the abandonment of the core.

Two of the four flakes are burnt and complete, one has pitted cortex again suggesting the utilisation of beach pebbles. The flakes were struck from simple platform cores using a soft hammer. The others are flake fragments. All four flakes are irregular, although two display evidence of anvil support.

Secondary technology

A scraper and an abruptly backed piece were recovered from (362). The angled scraper (0126/SF883) is fashioned from a primary flake of brown flint. The cortex was originally smooth/chalky, subsequently water rolled to hard/smooth. The artefact presents with both direct and inverse scalar retouch. The form of retouch is abrupt and short. There is edge damage visible of the ventral surface.

Part of the left hand side of a flake distal fragment has been abruptly backed (0121/SF2758). The blunting of the edge has been achieved with direct, abrupt, short, scalar retouch.

Context	Total	Cores	Flakes	Small fraction	Tsp	Chunks	Scrapers	Abruptly backed	Denticulate
Area F									
362	16	3	4	6		1	1	1	
369	1			1					
370	1			1					
376	2		1	1					
379	2				1				1
603	2			2					
Area B/D									
371	1		1						
Area D									
225	1			1					
	26	3	6	12	1	1	1	1	1

Table 3: Numerical frequency of lithics by area, context and type.

A flint denticulate (0122/SF2990) was retrieved from (379) [Table 3]. The flake fragment shows denticulated retouch to the left hand side. The character and form of the retouch has common differences with the abruptly backed piece (0121/SF2758) from (362).

Phase V: Upper middens and dumps

Phase V relates to stage II of the post-mill events and refers to middens and dumps of material infilling the underhouse and leat. Charred grain from (390B) in Area C/E had been radiocarbon dated to 997-1164 cal AD (Beta-84859 960±40BP).

All of the lithics are flint. 63.41% of the lithics from Phase V are small fraction debitage. The analysis will focus on the core and two blades Area C/E and the flakes from Area E (Table 4).

The non-specific flint core (0100/SF0475) from (415) has a smooth/hard cortex. There are two opposed simple platforms and it was abandoned due to step terminations. The size of the core (L 17mm; B 17mm; Th 9mm) and the negative scarring leading to the step terminations may indicate the attempted removal of bladelets.

Two bladelets were recovered from (338). A secondary regular flint bladelet (L 13mm; B 3mm; Th 2mm) [0082/SF4018] with smooth/hard cortex, and attributes indicating that it was struck from core with a simple platform using a soft hammer. The width of the bladelet was split/truncated, i.e. *siret* fracture, on detachment from the core. The second bladelet (L13mm; B 3mm; Th 2mm) [0083/SF3035] is a fragment, tertiary and irregular. The proximal end is absent due to a knapping error evidenced by a *languette* fracture.

Two of the three flakes from (195) [0096/SF3042; 0097/SF3042] have broad common differences. There are irregular, tertiary with the proximal ends missing. Distal spalling suggests anvil support. The third flake (0101/SF3041) is a core rejuvenation flake to remove a lug set within the flaking surface of the core. It is complete, tertiary and irregular, although there is proximal spalling. It was removed from a multi-directional core with a simple platform. The presence of a pronounced bulb of percussion and rippling to the ventral surface signifies the use of a hard hammer.

A sub-rounded jasper pebble (L 39mm; B 20mm; W 14mm) was collected from Area C/E indicating the availability of this raw material resource. The metrics of the jasper flake [L16mm; B20mm; W5mm] (Area C/D; Phase X) is limited evidence for the utilisation of pebbles of that size.

Context	Total	Cores	Flakes	Blades	Small fraction
Area C					
242	1		1		
Area C/E					
338	7			2	5
363	1				1
403	1		1		
405	1	1			
Area E					
195	13		3		10
242	2				2
Area G					
348	1		1		
388	1				1
390	1				1
394	3		2	1	
559	2		1		1
560	1				1
567	1				1
Area G ext					
390	2		1		1
558	3		1		2
	41	1	11	3	26

Table 4: Numerical frequency of lithics by area, context and type.

Phase X

Phase X refers to partially disturbed but uniform midden deposits spread over the site. Charred grain from (339) in Area C/E has been radiocarbon dated to 941-1155 cal AD (Beta-84857 1020±50BP).

All of the lithics are flint, save for a jasper flake from (76/77) [Tables 1 and 5]. 29 (82.86%) of the 35 were recovered from Area C/E of which 12 (41.38%) are small fraction debitage. The analysis will consider the seven flakes from (334), and the flake, blade and scraper from (339), together with the scraper from Area D ext (659).

Primary technology

Three of the seven irregular flakes have the proximal end absent, two are medial fragments, one is complete (0036/SF3031) and one is complete save for proximal spalling (0017/SF3029). A medial fragment has a rippled ventral surface suggesting the utilisation of a hard hammer to detach the flake from the core. Another flake fragment has evidence for anvil support.

Both 'complete' flakes were struck from unidirectional cores with simple platforms. The complete flake (0036/SF3031) is tertiary. There is a flat bulb of percussion with a lip which points to the use of a soft hammer, and a feathered distal termination. The flake with the proximal spalling is secondary with a smooth/hard cortex. The bulb of percussion is diffuse with an *erailleur* scar and a plunging distal termination.

The blade and flake from (339) are tertiary and irregular. They have been detached from simple platform cores with a soft hammer. The narrow blade (L13mm; B 6mm; Th 3mm) [0012/SF4042] has a *siret* fracture and a flat bulb of percussion with an *erailleur* scar. It was struck from a multi-directional core. The distal end of the flake (0008/SF3036) is missing. Although the ventral surface is rippled the presence of the diffuse bulb of percussion with a lip indicates a soft hammer. The flake was removed from a unidirectional core.

Context	Total	Flakes	Blades	Small fraction	Tsp	Chunks	Scrapers
Area C							
193	1			1			
Area C/D							
76/77	1	1					
Area C/E							
332	3	2			1		
334	15	7		8			
336	3	1		1		1	
339	5	1	1	2			1
400	3	1	1	1			
Area D ext							
659	2	1					1
Area E							
190	1	1					
Area G							
356	1			1			
	35	15	2	14	1	1	2

Table 5: Numerical frequency of lithics by area, context and type.

Secondary technology

The scraper (0006/SF0347) from (339) was fashioned on a flake with the proximal absent and a plunging distal termination. The dorsal scarring shows that previous removals were opposed. The left hand side of the piece has been modified to create a concave scraping edge. The scalar retouch is direct and semi-abrupt and the extent of which may be classified as semi-invasive.

A modified tertiary, irregular flint flake (0005/SF2506) was recovered from (659). There is a pronounced bulb of percussion with an *erailleur* scar indicating the use of a hard hammer. The distal has a *languette* fracture. Retouch has been applied to the left hand side of the flake producing a straight denticulated scraping edge. The scalar retouch may be categorised as inverse, abrupt and short.

Other modified artefacts

Phase H: Area F (Context 375)

A greyish natural clay was revealed to the east of the tail race and in the bottom of the underhouse.

A fragment of a finely crafted flint leaf-shaped arrowhead (L 22mm; B 15mm; Th 2mm) [0063/SF2960] was recovered from the surface of the clay natural. The point is missing. The retouch is bifacial, semi-invasive and covers the entire surface of the arrowhead.

Phase Q: Area G (Context 357)

This phase relates to later adaptations to the mill structure. The scraper (0004/SF2868) was recovered from a dense clay packing (357).

Modifications have been made to both proximal and distal ends of the flint flake. There is a shallow concave scraping edge to the distal. The retouch is scalar, direct, abrupt and short. The scraping edge to the proximal end is angled with both direct and inverse retouch, which may be classified as abrupt, parallel and short.

Phase T: Area D (Context 084)

A leaf-shaped arrowhead (0062/SF76) was found in midden material dumped into the collapsed and uncovered underhouse.

The character of the retouch has broad common differences with (0063/SF2960). The form of the retouch appears to be of a poorer standard. It is probable that the piece was abandoned.

Phase Y: Area G (Context 342)

Phase Y refers to the modern re-deposition of midden material.

The scraper (0048/SF406) is a modified flint flake with a flat bulb of percussion and lip and a plunging distal termination. There is evidence of scrub platform preparation prior to the removal of the flake from the core. Scalar retouch to the right hand side has formed a concave scraping edge. The retouch is direct, semi-abrupt and short. In contrast, the modifications to the left hand side has produced a shallow convex scraping edge with retouch analysed as scalar, direct, abrupt and short.

Barn Site

A bipolar flint fragment was recovered from the Barn Site (0128/SF255).

Discussion and summary

The lithic assemblage is small but includes most of the types of debitage products associated with larger assemblages, e.g. cores, tested split pebbles, chunks, blades, flakes and small fraction. The range of modified artefacts is more limited, although nonetheless interesting and promisingly informative.

The recovery of lithics from midden deposits highlights that none of the material has been recovered from its primary location(s), save potentially for the leaf-

shaped arrowhead fragment (0063/SF2960) found on the natural clay (375). The other artefacts have been disturbed and swept up from either primary or even secondary locations with midden materials in the vicinity of the Earl's Bu.

Primary technology

The only lithics where an archaeological epoch can be inferred are the non-specific cores from Phase M (0125/SF894) and Phase V (0100/SF475). Both cores have opposed simple platforms producing bladelets. It is quite feasible that these artefacts indicate Mesolithic events in the local environs (after Hardy and Wickham-Jones 2007; Mithen 2000; Wickham-Jones 1990; Wright 2012 and others).

Secondary technology

Both the denticulate (0122/SF2990) and the abruptly backed piece (0122/SF2758) from Phase M present with retouch which may be interpreted as microlithic. Accordingly, these pieces could tentatively be ascribed to be Mesolithic in origin.

The leaf-shaped arrowheads (0121/SF2758; 0122/SF2990) from Phase M may be said to reference the Early Neolithic (cf. Warren 2006 and others). It is not uncommon to find Neolithic leaf-shaped arrowheads with Mesolithic scatters (cf. Edmonds 1995, 31-32; Wickham-Jones and McCartan 1990, 97).

Scrapers are common artefacts in the assemblages of later prehistory and applying a provenance based on the morphology of scrapers as casual finds without further corroborative evidence is generally not sound practice (cf. Finlay *et al.* 2000, 583). 'Thumbnail' scrapers and rounded scrapers with invasive retouch are typically Bronze Age (Edmonds 1995, 159-160; Hardy and Wickham-Jones 2007). Two of the rounded scrapers from fieldwalking at Lavacroon in the vicinity of the Earl's Bu may date to Bronze Age events (cf. Batey 1986, 286-287 and Illustration 1). A radiocarbon date from features below the burnt mound of 2145-1871 cal BC (Beta-84861 620±BP) references Early Bronze Age activity.

The situation is more complicated for other forms. Angled and sub-angled scrapers are common in Mesolithic assemblages, e.g. they have the highest incidence of occurrence at Kinloch, Rùm. Concave scrapers were also present in the assemblage (Wickham-Jones and McCartan 1990, 91-93). These together with convex and straight edge may, however, be found in Neolithic assemblages, with 'horseshoe' and 'disc-like' forms with invasive retouch indicative of the Late Neolithic (Edmonds 1995, 104-105). None of the scrapers in the assemblage from either the Earl's Bu, or the piece recovered from the Barn site can unequivocally be attributed to a specific archaeological period.

The common differences of the scrapers fashioned on plunging flakes from Phase X (0126/SF883) and Phase Y (0048/SF406) are of particular interest despite their unknown origin. It is possible that they are contemporaneous to a single phase of

knapping, i.e. in the sense of more than one episode within a relatively short timeframe, and may even have been made by the same hand.

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Appendix 1: Glossary of Terms

Introduction

The definitions of terms is a composite from a number of different sources (i.e. Finlayson *et al.* 2000; Inizan *et al.* 1999; Wickham-Jones 1990, 2004). If other sources are used then the relevant section is referenced accordingly.

Glossary

Anvil: These coarse stone artefacts are recognised by distinctive wear patterns (Clarke 1990, Illustration 78). They may have also used as percussors (Finlayson *et al.* 2000, 72).

Anvil support: Refers to those occasions where the platform core is placed on an anvil for support to facilitate blank removals.

Blade: A blade is arbitrarily defined as an artefact which is twice as long as it is wide usually with straight parallel sides. Such examples may sometimes be referred to as 'true blades' to distinguish them (Wickham-Jones 2004, 69).

Blade-like flakes: The blade fits the metric parameters to be categorised as such, however, the morphology of the piece is more in keeping with that of flakes, e.g. they may often be irregular and do not have parallel sides.

Blanks: Collective term for blades and flakes (Wickham-Jones 2004, 69).

Bulb of percussion: This attribute signifies where the core was struck to detach the blank. A pronounced bulb may indicate the use of a hard hammer, and a diffuse bulb invariably indicates the use of a softer hammer (Wickham -Jones 2004, 69). Bulb and lip and pronounced lips are associated with the use of soft hammer. Lip attributes may suggest the use of an antler percussor (Madsen 1992, 104-105). Experimental studies confirm this, although such studies are usually undertaken using flint of exceptional quality (cf. Ohnuma and Bergman 1982). Bulb attributes will vary with different raw materials (cf. Costa *et al.* 2005).

Chunk: These artefacts are generally a by-product, and do not have a platform or ventral face. Some chunks may have been used, e.g. *pièces esquillées* (Wickham-Jones 2004, 69).

Cores: The core is the artefact from which blades and flakes are struck.

Bipolar/bipolar cores: Indicates that cores are worked utilising an anvil. They may present with removals from both the proximal and distal ends due to the strike of the hammerstone and the shock reverberation from the anvil, and there may be evidence of severe crushing damage, percussion

ridges from repeated strikes, step and hinge terminations and the presence of cortex (Hayden 1991, 3).

Platform/platform cores: The term refers to the utilisation of a plain or simple platform which is struck to detach blades and flakes. These cores can be predominantly for either blade or flake production. A distinction that is ascertained by determining the most common form of blank removed. Some cores will be classified as non-specific platform referring to the removal of blades and flakes in broadly equal frequencies. The remaining category is for cores described as amorphous which represent irregular knapping sequences (Wickham-Jones 2004, 70; Finlayson *et al.* 2000, Table 2.5.3).

Core rejuvenation strategies: Knapping accidents will occur resulting in negative step and/or hinge terminations on the flaking surface of the core, which may be removed by a core rejuvenation blank to leave a clear flaking surface for future removals. Accumulations of material at the distal end of the core can be removed by the blank with a plunging termination. Strategies are also encountered when part of the platform surface is removed by a side blow (after Inizan *et al.* 1999, 153).

Cortex: Refers to the original surface of the nodule or pebble, which may be fresh, rolled, abraded, pitted or battered. Cortex may be either smooth/chalky or smooth/hard. The cortical attribute may indicate the possible source of the raw material (Wickham-Jones 2004, 69).

Dorsal and ventral faces of blanks: The upper face or dorsal is the flaking surface of the core prior to the removal of the blank. The lower face or ventral represents the fracture face of the blank having been detached from the core. The ventral and the core will conjoin.

Edge damage: Edge damage may result from the reduction strategy, use and other post-depositional factors such as ploughing, trampling, natural abrasion, and other unknown taphonomic processes (Finlayson *et al.* 2000, Table 2.5.1; Mallouf 1982; McBrearty *et al.* 1998; Neilsen 1991).

Flake: A classification of a blank. Metric variants distinguish flakes from blades. Flakes are also generally less regular than blades. They may be either modified or unmodified for use (Wickham-Jones 2004, 69).

Hammerstone: Hammerstones vary in hardness which may be indicated by the bulb of percussion on blanks, and the negative bulb of percussion visible on cores (Wickham-Jones 2004, 69-70).

Languette: Represents a knapping error creating tongue-like distal termination. They are associated with a soft hammer (Inizan 1999 *et al.*, 144).

Original pebble/nodule size: A medium sized pebble has been categorised as fist-sized. An approximate term based in the size of pebbles recorded on Islay (Finlayson *et al.* 2000, Table 2.5.2).

Patination: Discolouration of original fresh colour artefacts. Variations in patination may arise because of the nature of the soil matrix from which they were recovered. It may also indicate ground disturbance (Inizan *et al.* 1999, 147; Wickham-Jones 2004, 69).

Platform type: There are four types of platform referred to (Finlayson *et al.* 2000, Table 2.5.4).

Cortical: The entire blank platform is covered in cortex.

Simple/plain: Represented by a simple flaked surface.

Complex/faceted: Multiple flake removals define this form of platform. Examples of this strategy during the Mesolithic period are likely to be accidental.

Crushed: A collapsed platform associated with bipolar reduction.

Primary material: Cortex covers the dorsal surface of the artefact (Wickham-Jones 2004, 70).

Primary technology: Refers to the procurement of raw material, preparation of cores and debitage products, such as blades, flakes, chunks and small fraction debitage (Wickham -Jones 2004, 70).

Reduction strategy: Refers to the use of either bipolar or platform reduction strategies (Wickham-Jones 2004, 71).

Regular/irregular blanks: Regularity is determined by a blank with a straight edge <10mm. Blanks with a straight edge of <10mm are classified as irregular (Wickham-Jones 2004a, 71).

Remaining platform size: This schema is taken from Madsen (1992, Figure 70).

Point: Where remaining platform represents <33.33% of blank width.

Small/narrow: Remaining platform width is c.33.33% of blank and length is <33.33% and >66.67%.

Broad/narrow: Remaining platform length is >66.67% of blank.

Large: The width and length of the remaining platform is >66.67%.

Retouch, angle of: There are four forms of retouch referred to in this study (cf. Inizan *et al.* 1999, 129-130; Woodman *et al.* 2006, 95). The first three categories are focused on the edge of the blank.

Abrupt: Marginally less than 90° .

Enclume: Use of anvil with angle at 90° .

Semi-abrupt: angle at approximately 45° .

Semi-invasive: Similar to semi-abrupt, although retouch extends across the surface of the blank.

Retouch, extent of: The extent of removals are classified as either short, semi-invasive, invasive or covering (Figure 6).

Retouch, position of: Direct retouch is visible on the dorsal face, conversely inverse retouch is seen on the ventral face. Alternate is where a blank has been modified by both direct and inverse retouch.

Secondary material: Artefact with cortex visible on the dorsal surface (Wickham-Jones 2004, 71).

Secondary technology: Refers to the modification of blanks into tools (Wickham-Jones 2004, 71).

Scrapers: Scrapers present with a blunt working edge (cf. Finlayson *et al.* 2000, Table 2.5.8).

Short convex: Convex scraping edge <10mm thick.

Short convex flared: As for short convex but where artefact narrows from scraping edge.

Short thick convex: As for short convex with scraping edge <10mm.

Short thick convex flared: As for short thick convex but flared.

Long convex: Scraper which is twice as long as it is wide with a scraping edge of <10mm.

Long convex flared: As for long convex but flared.

Long thick convex flared: Scraper which is twice as long as it is wide with a scraping edge of >10mm.

Disc: Continuous retouch to circumference of scraper.

Concave: Scraper with concave scraping edge.

Denticulate: Scraping edge is denticulated or presents with multiple notches.

Angled: A scraper with more than one scraping edge which meets to form an angled corner(s).

Sub-angled: As for angled but with rounded corners.

Straight: The edge is neither convex nor concave in plan.

Wide convex: A side scraper with retouch to longest axis.

Irregular: Scrapers which do not fit into the other classifications.

Fragment: Refers to a scraper fragment.

Siret fracture: Refers to a knapping error where the width of the blank is split. This may or not extend the full length of the blank (Inizan *et al.* 1999, 156).

Small fraction debitage: Debitage where metric variants are all <10mm (Finlayson *et al.* 2000, Table 2.5.5).

Tertiary material: Artefact without any trace of the original cortical surface present (Wickham-Jones 2004, 70).

Tool form types: General term for all tool forms. Apart from microliths and scrapers other tool forms are set out below (cf. Finlayson *et al.* 2000, Table 2.5.1).

Abruptly backed: Any artefact which has abrupt retouch to blunt edge.

Thin-backed: Refers to any artefact with fine retouch to blunt edge.

Point: Two or more convergent edges with retouch.

Denticulate: Edge is formed as a series of notches. Each notch may be as a result of single or multiple removals.

Thick denticulate: As for denticulate but where modified edge is >10mm.

Notch: Artefact with non-contiguous notch attributes. The notch may be as a result of single or multiple removals.

Miscellaneous retouch: Artefact with retouch that do not fit into any of the other categories.

Awl: Generally awls are fashioned on thick blanks and comprise of abrupt retouch on two sides to form point.

Trimming: Relates to the abrasion of an unretouched edge producing semi-invasive scalar removals. It is associated with the shaping of artefacts.