Shiant Islands excavations, HI 15 and RI 41B

A report on the Coarse Stone and Flaked Baked Mudstone Assemblages

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1. Introduction

This report discusses two separate stone assemblages: the flaked lithic assemblages of baked mudstone and quartz (table 1) and the coarse stone assemblages (table 2) from the excavations at HI 15, the blackhouse and RI 41B Annit. A discussion of the types of raw materials that were selected for use (section 2) precedes an analysis of the assemblages from each site (sections 3 and 4). The final section explores the use of stone tools on the Shiant Islands and places them in a wider context.

	HI 15	RI 41B
Baked mudstone:		
Flakes	269	4
Retouched pieces	8	
Cores	31	1
Chunks	79	2
Vein quartz		6
Quartz chunks		4
Quartz scalar core		1
Quartzite flake	2	
Quartzite chunk	1	

Table 1: Artefacts of flaked baked mudstone and quartz from HI 15 and RI 41B.

	HI 15	RI 41B
Pounder/grinder	8	13
Faceted cobble		2
Polisher	3	2
Smoother	2	1
Plain hammerstone		1
Cobble tool fragment		1
Flaked hammerstone		1
Rotary quern	3 + ?1	
Saddle quern	1	
?Baking plate	3	
Flaked cobble	2	
Unused cobble	5	
Pumice	1	
Slag	1	

Table 2: Coarse stone assemblages from HI 15 and RI 41B

2. Raw material

The islanders exploited a local source of baked mudstone in the prehistoric period to produce tools based on flakes. The mudstones, part of a series of Jurassic sedimentary rocks were baked by contact with heat from the intruding magma sills during Tertiary igneous activity. This is well described and discussed in Kathryn Goodenough's geology report on the Shiant Islands website (Goodenough 1999). The alteration of these mudstones by heat produced a hard, fine-grained rock that could be knapped quite easily to produce a range of flake and blade shapes.

The nodules of baked mudstone are quite blocky in shape and these have broken following the natural bedding formations of the sedimentary rock (Goodenough 1999, figs 22 and 24). It was these blocks that were selected as the parent nodules from which to detach flakes (see 3.1); though slightly abraded and rounded most retain their blocky character so it is unlikely that the raw material traveled very far from its source. There was only slight evidence that the more rounded beach pebbles of baked mudstone were selected for use (see below).

The condition of the flaked mudstone varies from quite fresh through to corticated and heavily abraded. Some 30% of the assemblage was observed to be affected by abrasion with over half of these so heavily abraded that characteristics such as presence of cortex or knapping technique could not be determined (table 4). The abrasion is located around the whole of each piece and was most likely caused by chemical action, perhaps in the acid environment of peat and its run off. The largest proportion of abraded pieces came from A219 (T=45) where the surfaces of all the lithics had been affected; here the process of mineralization of the clay may have altered the lithics.

A small amount of flaked quartzite was also present in the form of two flakes and a chunk (table 1).

A range of materials was selected for the cobble tools; the rock types were not able to be identified for each tool but most of them were made on cobbles of igneous rocks such as basalt. Of most interest is the differential selection between sites for cobble tool shape; at RI 41B the cobbles are of a thin elongated form whilst those from HI 15 tend to be rounder in shape. This may be because the different stone types are rolled by wave action into specific cobble shapes; the structure of the basalt may allow it to fracture more readily into long, thin forms with quartzites and dolerites forming into rounder cobbles. The differential selection of cobbles by shape between sites (see below) could simply be accounted for by the occurrence of specific cobble shapes on the beaches nearest the sites depending on the local geology (hence implying that the inhabitants made use of nearby beach cobble sources) or it could indicate that cobbles were selected specifically for shape and/ or rock hardness depending on the job requirements.

3. HI 15

3. 1 Artefacts

3.1.1 Baked mudstone T=387

As a whole the baked mudstone assemblage represents all levels of flake production and use; from the reduction of large nodules, through to core preparation and platform trimming and then the selection of particular flakes for further shaping. Although this report identifies the various lithic reduction techniques present in the assemblage this does not necessarily mean that they were all used together throughout the use of the site. In fact there is evidence (see 3.2) that the excavated assemblage was formed from several differing episodes of lithic reduction, perhaps widely spaced in time.

Primary reduction techniques

Flaked blocks	4
Flaked chunks	11
Flaked pebbles	3
Single platform	6
Multi platform	1
Right angled platforms	2
Pyramid core	1
Scalar core	3

Table 3: HI 15: Core types of baked mudstone

A range of knapping strategies can be observed from the evidence. Many of the cores are simply flaked blocks and chunks with the natural flat faces used as platforms from which to detach the flakes (table 3). Some of the surviving flaked blocks are quite large: 120mm to 160mm in length but there is a cluster between 50mm to 80mm in length (figure 1). Many of these blocky nodules must have been larger when first selected since there is evidence that the blocks were reduced in size by the removal of large flakes. These flakes, which could be termed 'mass reduction' flakes (Bradley and Edmonds 1993), are characterised by their large size, great thickness, presence of cortex and where present, the angularity of the original cortical face. Figure 2 illustrates the larger size of these cortical flakes in relation to the rest of the debitage. The flaking of the chunks and blocks was not done in a controlled manner and many of the cores that were produced could be described as amorphous forms with irregular flake removal.

Occasionally smaller rounded pebbles were selected for flaking (table 3) and these are also amorphous forms.

A series of platform cores exhibit more controlled flaking techniques. There are a variety of forms which range from single flat platforms through to opposed and multiple platforms (table 3). Flakes are the most common removal but a mixture of flakes and blades were removed from two of the cores and there is a fine pyramid core (the smallest core present) with narrow blade removals. The cores vary in size but some are more than 80mm in length (figure 1) indicating the large size of the original nodule (see above) and the desire for flakes of reasonable dimensions. The platforms of these cores were carefully shaped as shown by the presence of a number (T=14) of core trimming flakes (where overhangs and denticulate platform edges are removed in order to trim the platform lip) and two platform rejuvenation flakes (where the entire platform is removed to start again).

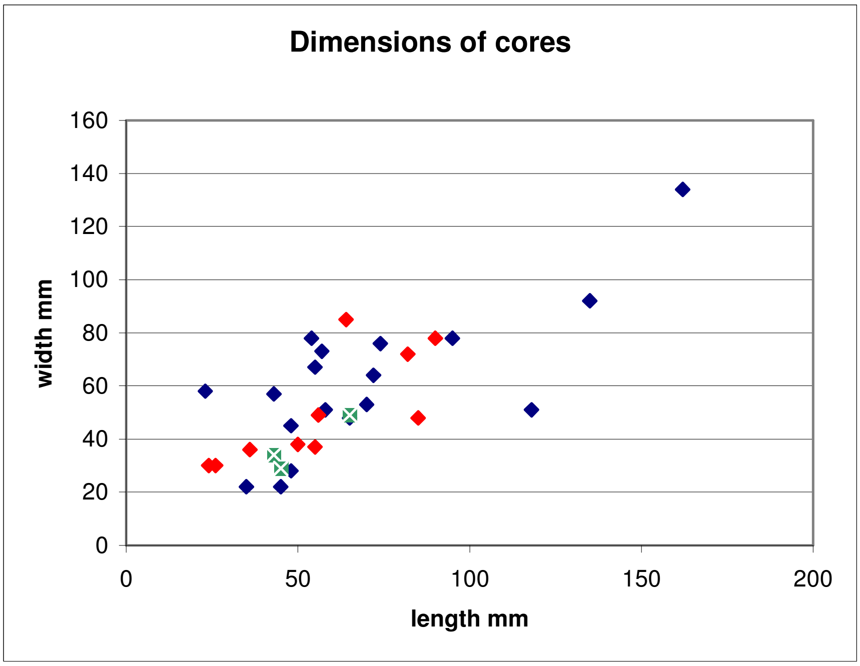

Figure 1: Baked mudstone core dimensions. Blue: flaked blocks, chunks and pebbles, Red: flat platform cores, Green: scalar cores.

Another knapping technique is the bipolar method whereby a nodule is held on an anvil and percussed directly from above with a hammerstone. This causes flakes to be removed from either end of the nodule simultaneously and distinctive chisel-shaped platform edges, or scalar edges, are formed. There are three of these scalar cores in the assemblage and these are amongst the smallest of the cores (figure 1). A number of flakes with clear scalar or crushed platforms have also been identified with lengths of up to 97mm indicating that some quite large blocks were reduced using this method.

With the exception of the pyramid core, none of the cores are diagnostic of a particular period. The amorphous cores based on flaked blocks and chunks appear to be a very simple technology but this may reflect the abundance of a local supply of baked mudstone and the necessity to test the homogenous quality of the rock by reduction. The platform cores and scalar cores occur together throughout the use of the site. The presence of scalar cores does not necessarily indicate a later knapping technology; they are more a reaction to the quality of the raw material and the desire for particular types of flakes. Just three of these cores have a mix of blade and flake removals, the rest are all flake cores which would indicate a period of use from the Late Neolithic onward.

The production of flakes was the intention of the prehistoric knappers though there is some evidence from the cores for blade production too in the form of narrow blades (the pyramid core) and larger blades (on two cores and some platform trimming flakes). A particular group of flakes were noticed during cataloguing and these are broad, regular flakes which have been detached from prepared flat platforms. Their size range is illustrated in figure 2. A Late Neolithic/ Early Bronze Age date could possibly be assigned to these particular forms (photograph insert).

	Primary	Secondary	Inner	Abraded	Total
Flakes	6	26	49	19	264
Chunks	2	17	64	17	78

Table 4: Percentage of flakes and chunks with cortex and abraded

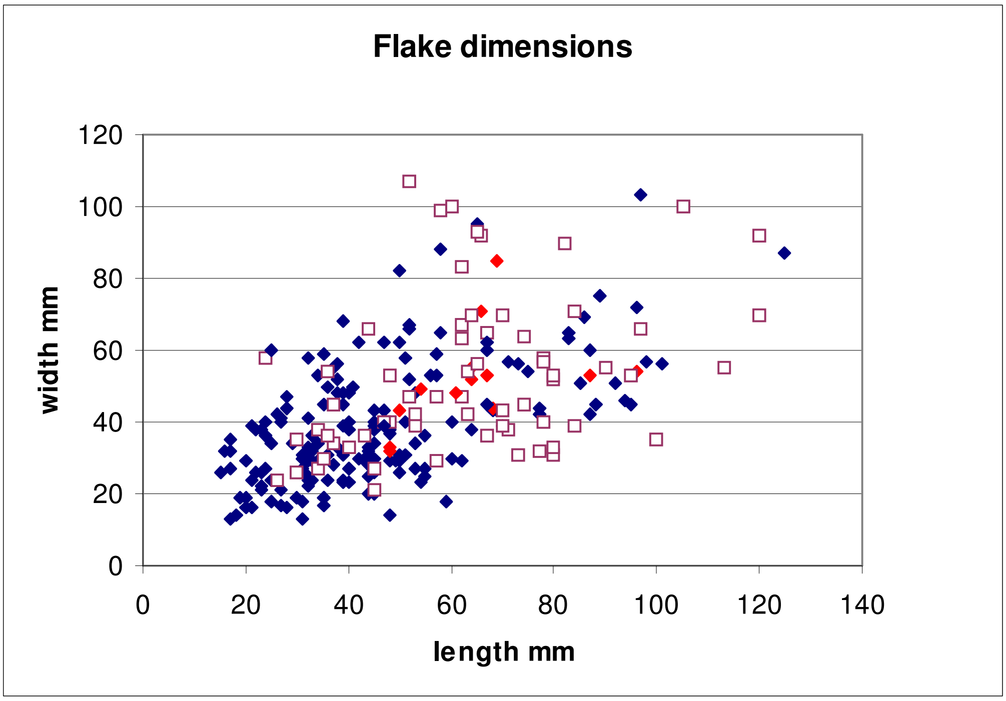

Figure 2: Baked mudstone flake dimensions. Red: regular broad flakes with isolated flat platforms, Open purple square: flakes with cortex; Blue: inner flakes.

Chunks also form a significant component of the assemblage (20%) (table 4) and this is perhaps related to the amount of nodule reduction prior to its shaping into a core as well as the blocky nature of the raw material that in some cases may have fractured into chunks more easily.

Secondary reduction

A small number of flakes had additional flaking in order to alter the edge morphology for specific use (table 5).

The two end scrapers are both made on broad flakes; one bears a notched edge (267) whilst the other is a fine regular scraper (510) of a probable Late Neolithic/ Early Bronze Age date. Three other scrapers have quite irregular scraper edges; two made on chunks (one 288 with a concave scraper edge) and a larger piece may be a core later utilized as a scraper (267). This latter piece looks as though it has been reflaked over a corticated face. Two secondary flakes, one is almost a split pebble, bear irregular unifacial retouch down one edge. Finally, there is a possible tanged point (570); this is a long pointed inner flake which is abraded. Small amounts of retouch isolate a butt end and make slight point. This reflaking appears to be over the abraded surface suggesting that this flake, and also the core scraper, were selected for further retouching from an assemblage that had been formed considerably earlier.

End scraper	2
Concave scraper	1
Irregular scraper	2
Edge retouch	2
?tanged point	1

Table 5: HI 15: Retouched tools

3.1.2 Coarse stone artefacts T=23

Pounder/ grinders are the most common tool cobble type here (table 2). They have been made on a variety of rock types from fine- to coarse-grained and they tend to be a rounded oval in shape (figure 3). Single, broad facets pecked onto one or both ends are the most common wear pattern on these tools but on one rounded cobble four worn facets conjoin to alter over three quarters of the perimeter (G169). Most of these pounder/grinders also exhibit single faces that have been worn flat and smooth. Additional wear patterns are present on two of these tools (G130 F. no. 569 and G169) in the form of spreads of linear pecking/ striations encircling the width of the tool. These may have developed through later use of the tools as anvils or else they may have been to aid some later form of hafting.

The smoothers and polishers have not been heavily worn through use. One of the polishers (F 54 F. No. 516) is a pebble segment which is worn smooth and polished all over; it is not known whether this was shaped deliberately or not.

There are two flaked cobbles (A191 F. No. 487 and 488) which are both flat cobbles that have been roughly flaked from one face around part of the circumference to create a chopper-like edge. This flaking may have been deliberate shaping or else incidental through the use of the cobble as a chopper. A small saddle quern (A 169 F. no. 486) is made from a large cobble of coarse-grained rock; it has been worn on one face to a smooth asymmetrical cross-section.

There are three definite rotary querns and a questionable fragment. One quern (A75 F. no. 454) described by the excavator as a millstone was reused as a drain cap; it has not been seen or catalogued. A further rotary quern (A2 F. no. 84) was reused as the bedding of a hearth A11. The stone for this quern was sourced from the Jurassic outcrop on Mary Island (reference); half of this upper stone survives with the remnants of a central spindle hole. Its diameter is about 440mm. The third rotary quern is just a fragment with no features other than a flat base surviving (B34 F. no. 278).

A single piece of pumice (B31 F. No. 191) shows no obvious sign of use wear or shaping. The large vesicles on this piece give it a very coarse texture and the pumice may have been selected for use as a float rather than as an abrader.

Three fragments of a tabular black metamorphosed sedimentary rock, possibly phyllite, are present and could possibly be parts of stone baking plates. They appear to be unshaped though the largest piece (A19 F. no. 273) is shaped like a lollipop with a 'handle' and rounded head; it is not certain whether this is in fact deliberate shaping as all the edges exhibit flat snapped faces rather than being carefully chipped.

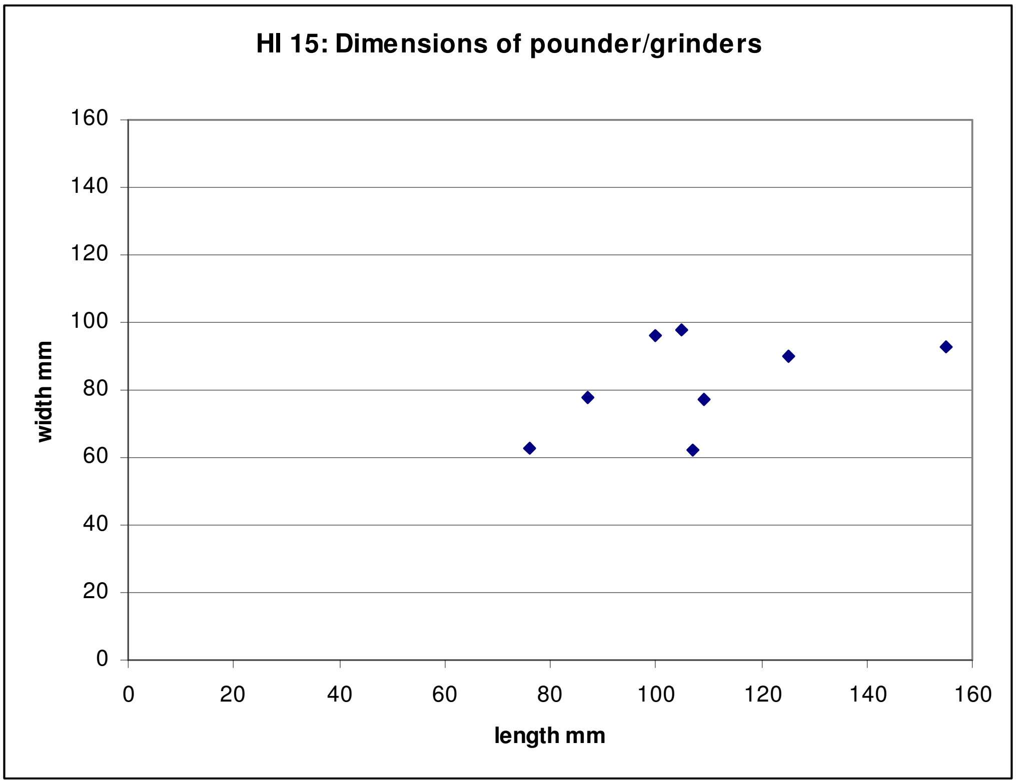

Figure 3: HI 15: Dimensions of pounder/ grinders

3.2 Assemblage formation and date

The pyramid core, from which narrow blades were removed, is a type that is most commonly associated with the Mesolithic period. It came from a deposit of burnt peat (F212) associated with a kiln clamp. Its red discolouration indicated that it had been burnt. This core most likely came in with the peat turves (there were no other flaked lithics from this context) and could possibly indicate the presence of a Late Mesolithic site, buried under the peat, within the vicinity. A Mesolithic assemblage was found during excavations of the medieval site at Ben Lawers, Perthshire and here the lithics had clearly been incorporated into the structure along with the use of turf as a building material (Atkinson pers.comm.). As Chris Barrowman has observed no Mesolithic lithic industry has yet been found in the Western Isles (Barrowman 2008) so the discovery of a core potentially dateable to this early prehistoric period is of great interest.

For the purposes of this discussion the stone assemblages have been divided into the broad periods defined in the context list. The assemblages from later contexts G130 and G169 (dated from the 18th and 15th Centuries though with MIA pottery from G169) were very interesting in composition and these were kept separate in order to compare them with material from the known earlier contexts (table 6 and figure 4). It should be remembered that the assemblage itself is not very large and when divided by artefact type and then further by phase some aspects might be over-emphasised (e.g. the proportion of broad flakes) however figure 4 illustrates the proportion of each artefact type in each phase and as such indicates the broad characteristics of each assemblage.

Some 46% of the whole assemblage is from the earliest contexts: those defined as LBA/EIA, EIA and IA. A further 28% were from two other main contexts: the late limpet midden (G130) and rubble directly below (G169).

It has been difficult to provide dates for the formation of the assemblage purely from the types of tool and flaking technology present. The indications are that the industry was, for the most part, based on the production of flakes some of which were broad, regular flakes suggestive of a Late Neolithic/ Early Bronze Age date. The retouched pieces are few in number but one, a fine scraper made on a broad flake, is most probably also a Late Neolithic/ Early Bronze Age type.

This 2nd millennium date for at least part of the assemblage is at odds with the Late Bronze Age and Iron Age dates suggested by the excavators, though the earlier dating of the mudstone lithics is also supported by some scraper forms found in the flint assemblage (Barrowman 2008). The contexts with the greater portion of the nice broad flakes are G130 and G169 (table 6 and figure 4) though they do occur in all prehistoric phases. The broad scraper was found in A219 the basal layer. No broad flakes were found in the later phases

The lithics and coarse stone tools from G130 and G169 are clearly derived from activity earlier than the (historic) contexts in which they were found. The excavation of area G was unfortunately unfinished owing to the inclement weather conditions so the issue of their origin has not been resolved. The fact that the stone artefacts were found amongst rubble could indicated that they were incorporated into the later structure, perhaps as wall core or even in turves though the large size of many of the lithics as well as the presence of some cobble tools would suggest that this latter method of redeposition was not used. Field clearance is another possible mechanism for how these larger stone tools may have become incorporated into a cobble and rubble pile. Alternatively, the lithics could have been present in upcast from the trench for wall B90 which was dug through the Iron Age level.

The issue is of dating the formation of the assemblage is further confused with the presence of three pieces which appear to have been reused at some point in later prehistory: these are the core scraper, tanged point and a utilized flake. On these pieces the tiny flakes that were detached by deliberate retouch or use have actually removed the corticated surface of the flake to reveal the fresh and original black colour of the baked mudstone. This means that these flakes must have been produced some considerable time before they were retouched and used. The edge damaged flake and the tanged point were from G130 and the core scraper from G215 dated to the LBA/EIA.

The use of flaked lithics in the Late Bronze Age and the Iron Age over the whole of Northern Britain appears to be quite different to that in earlier prehistory. During this later period the techniques of flint working had become impoverished and only a simple core-flake technology was used (Edmonds 1995, 184). The range of retouched tools was considerably reduced too leaving simple scrapers, awls and notched tools as the common forms (ibid, 184). Recent work has studied the use of flint during the Iron Age and identified knapping techniques that are haphazard, the products of which tend to be thick flakes with an emphasis on chunky scrapers and awls. The reuse of products of an earlier lithic industry is also observed particularly where the piece has been reflaked over a patinated surface (Young and Humphrey 1999).

A working hypothesis for the formation of at least part of the flaked lithic assemblage is that baked mudstone was flaked during the Late Neolithic/Early Bronze Age and that some of these flakes were then reused in the Late Bronze Age/Early Iron Age. Evidence for both of these processes comes from area G with the presence of broad flakes and flakes that were later reflaked. Cobble tools were also found in these contexts G130 and G169 which could have been used during the Bronze Age or Iron Age. Interestingly there is some indication that two of the pounder/ grinders, from G130 and B30 were also reused; this is demonstrated by traces of linear pecking located around the width of the cobbles suggesting that the tools may have been reused as anvils.

Just how late into the historic period the baked mudstone was flaked for tools is open to question. Though about a quarter of the assemblage is from these later

	Flakes	Nice flakes	Cores	Retouched	Chunks	P/G	SM	FC	POL
Late limpet midden (G130, B30)	22	3	3	2	**4**	2	1		
Rubble under G130 (G169)	39	5	8		23	2			
IA level	50	1	4	1	9		1		
EIA	29	2	2		11	3		2	
LBA/EIA	55	2	6	2	7				
Later contexts	61		7	2	24				1
Total Assemblage	256	13	31	8	79	8	2	2	3

Table 6: Assemblage composition by phase
P/G pounder/grinder; SM smoother; FC flaked cobble; POL polisher.

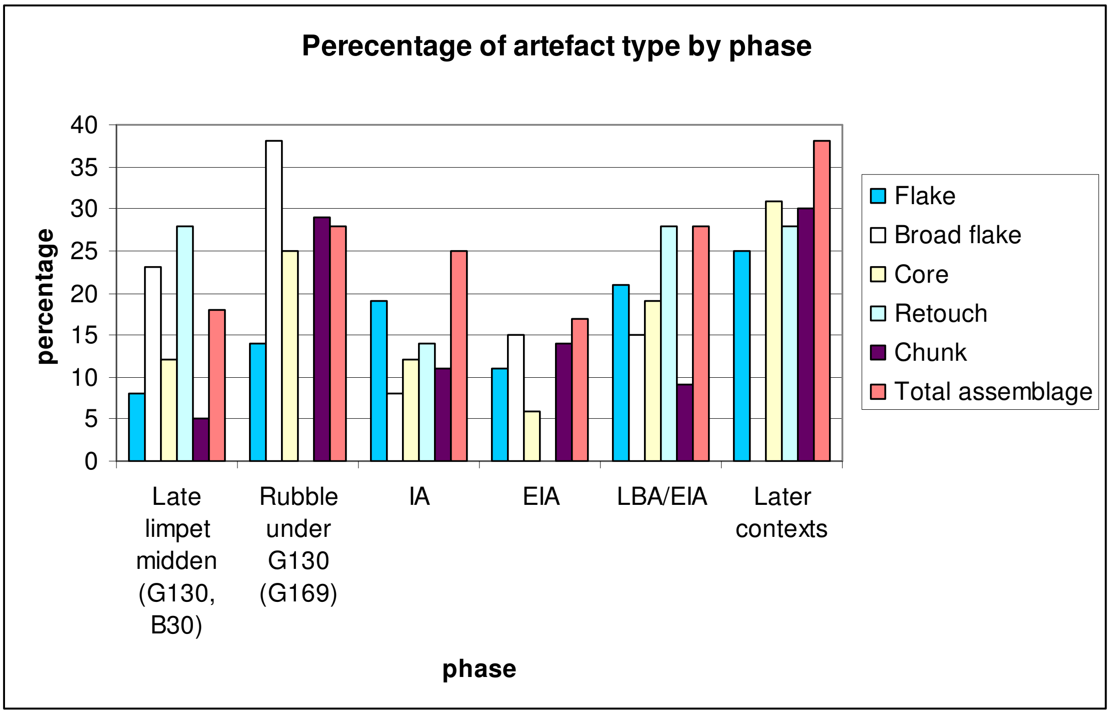

Figure 4: Percentage of artefact types by phase

contexts most could be interpreted as being redeposited. A group of flaked mudstone pieces from C120 and C121 includes thinning flakes and mass reduction flakes as well as a concave scraper made on a chunk. Some of these pieces show clear signs of having been burnt and it is probable that they were burnt together with the peat that constituted part of the soil; this suggests that at least a portion of this group was redeposited leaving in doubt the derivation of the remainder of the assemblage.

The dating of the coarse stone assemblage does little to resolve the issues of assemblage formation. Most of the tool types could have been in use during the Bronze Age and Iron Age though the two flaked cobbles from A191 an Early Iron Age context are most usually indicative of a Bronze Age date (Clarke 2006).

4. RI 41B Annit

4.1 Artefacts

4.1.1 Baked mudstone T=7 and quartz T=11
Just seven pieces of baked mudstone were found (table 1), mainly flakes, none of which had any clear indication of knapping technique. One of the flakes has irregular bifacial flaking on an end which may indicate that this edge had been deliberately modified for further use; alternatively, the flake could have been used as a core and the subsequent flakes removed in a bipolar fashion leaving a scalar platform edge (see section 3.1.1).

The quartz is also undistinguished with simple chunks of vein and pebble quartz predominating; these do not appear to have been deliberately worked (table 1). Just one small scalar core is present (ML 25mm) which indicates the use of the bipolar technique for flake reduction (see above). There was also a fine quartz flake found during test pitting (Barrowman 2008).

4.1.2 Coarse stone tools T=21
A range of tool types was found including pounder/ grinders, faceted cobbles, smoothers and polishers and a flaked hammerstone (table 2). For more detailed identification and discussion of these various types of cobble tools the reader is referred to Clarke 2006.

By far the most common tool present is the pounder/grinder and this group is remarkably uniform in terms of raw material, shape and size. All of the cobbles selected for use are of a dark igneous rock, most likely basalt. They all tend towards a narrow elongated form where the length is around twice the width. The length dimensions range from 113mm to 152mm but there is a discrete grouping of between 130mm to 140mm (figure 5).

The wear traces, which are present on these cobbles, indicate a range in the degree of use. Most commonly single flat to rounded facets are present on either end. These can be pecked and ground to a smooth finish or else more heavily bashed and flaked. On two of the pounder/ grinders the worked facets form a ridge on one end. Another feature of these tools is the single faces that have been worn flat and/ or shiny and this is present on eight of the cobbles.

The two faceted cobbles are distinguished from the pounder/ grinders by their smaller size. The narrow bands of faceting on these tools are produced by various degrees of pecking.

The smoother (406) has been used on one face that has left a smooth surface with visible multi-directional striations to indicate that the tool had been used in various directions.

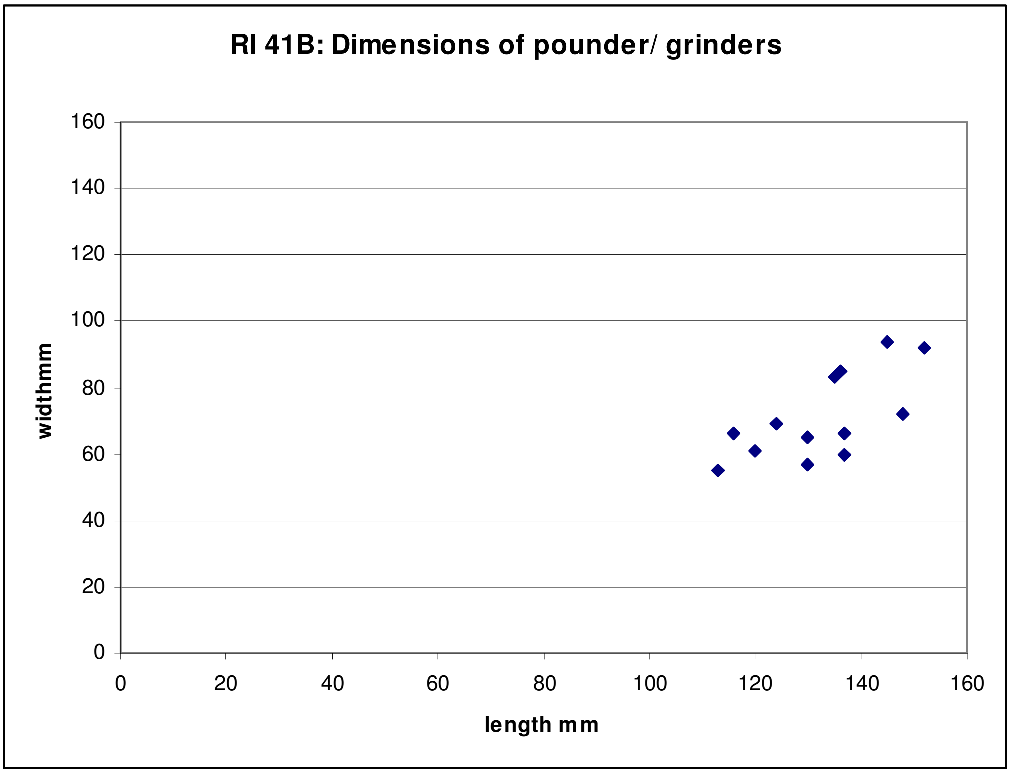

Figure 5: RI 41B: Dimensions of pounder/grinders

The polishers are rounded pebbles with a high polish present on one face. One (417) is domed in profile with a flattish base that is subsequently polished.

The flaked hammerstone (2) is made on a tabular cobble and has flake damage on either end as if from use. Some smoothing and polish on the sides of this tool may indicate that the cobble was hafted in some way for use.

4.2 Assemblage function and context

The evidence for a knapping industry of mudstone and quartz is slight; just two scalar cores indicate that these materials were chosen for the production of flakes. There is also little information to support a date for the formation of this collection as most if not all of the flaked lithics were from redeposited contexts; the mudstone flakes were mainly from the late mixed layers (2, 3 and 4) though one came from the fill of the W compartment. The small scalar core of quartz came from the redeposited ashy soil fill of a pit. It is likely that these flakes and cores are just redeposited remnants of a larger prehistoric lithic industry.

The coarse stone assemblage is very discrete in character. The dominance of cobble tools in the assemblage and the inclusion of tool types such as pounder/ grinders, polishers and a smoother and a flaked hammerstone are characteristic of Iron Age assemblages across Scotland (Clarke 2006). This use of cobbles for tools continued into the Late Iron Age before dropping off quite sharply during the Viking and Early Medieval periods.

At this site the majority of the cobble tools (T=9) were from C.43 (a ?floor level) which suggests that these tools were deliberately selected and reused for the cobble flooring. The rest were from layers above this; either from the compartment fills, reused to edge a drain or from the mixed later deposits. There were no tools directly associated with the lower Iron Age contexts.

5. The use of stone for flaked and cobble tools on the Shiant Islands

Baked mudstone has been well documented as a lithic resource from archaeological sites around the Sound of Skye. Research for the Scotland's First Settlers (SFS) Project has identified an outcrop of baked mudstone at Staffin on Skye which, together with the evidence for prolific settlement throughout the prehistoric period in the area suggests that this stone was an important regional resource. At the Mesolithic site of Sand across the Sound artefacts of baked mudstone formed the largest proportion of the lithic assemblage and this together with the presence of bloodstone from Rum to the south amply demonstrates the mobility of the early populations of this area (Hardy and Wickham-Jones in press).

The baked mudstone on the Shiant Islands could also be considered as an important local resource. It was most certainly used for tools in the Late Neolithic/ Early Bronze Age and onwards and there is even a suggestion, from the pyramid core, that it might have been chosen for knapping during the Mesolithic. Whether the islands were visited or settled in this early prehistoric period specifically to procure access to this stone resource can only be hypothesised. The SFS project has demonstrated that a detailed program of test pitting and field walking over a large area is needed in order to begin to resolve these wider questions.

The cobble tool assemblages from both HI 15 and RI 41B have tool types that are standard to sites of the Bronze Age and Iron Age across Scotland (Clarke 2006). The tools from RI 41B are classic Iron Age forms whilst those, or at least some of those, from HI 15 may have been in use during the Bronze Age. The saddle quern from G169 is most probably a Bronze Age type as those that occur in the Early Iron Age are usually shallow and worn right out to the edge of the stone.

Excavations at the blackhouse HI 15 have clearly demonstrated the presence of prehistoric occupation underneath the main structure. The dating of this occupation though is open to question and it is unlikely to be resolved fully by the lithics particularly because of the problems of redeposition and reuse of some of the assemblage. The best way forward would be to test pit an area around the blackhouse that was free of historic structures in order to assess the potential of finding a less disturbed prehistoric occupation.

Acknowledgements
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