7 Chipped Stone *by G Warren*

7.1 Introduction

A vast assemblage of worked and natural quartz, flint and other kinds of stone was recovered from on, within, under and near the cairn at Olcote. This material presents a series of analytical challenges and opportunities. For understandable reasons archaeologists have been cautious about categorizing quartz industries, not least because of the inherent vagaries of the material (see below). It is also significant that, until recently, the focus of lithic analysis has been formal artefacts rather than craft traditions, of which formal pieces formed a part. Given the comparative rarity of formal artefacts in quartz, the dominance of typological criteria has contributed to the marginalization of quartz-working in accounts of prehistoric stone craft. There are exceptions, for example Mercer's work on the quartz-rich late Mesolithic assemblages from Lussa River, Jura (Mercer 1971) but, in a general sense, our understanding of quartz-working is underdeveloped, often simply framed within categories of 'expediency'.[1] This is compounded by the fact that quartz has often formed a small part of assemblages, rather than the bulk of them, and consequently it is harder to assess the character of the industry as a whole. Furthermore, difficulties of recognition of worked quartz in the field lead to unrepresentative assemblages. Whereas policies of retention of all flint are common, facilitated by the fact that in a Scottish context flint is often a non-local material, it is unusual to extend this approach to all quartz, which can be superabundant.

The difficulties of analysing quartz industries are fairly well recognized. Because of its crystalline structure, quartz fractures in a less predictable fashion than more homogenous silica minerals such as flint or chert (Whittaker 1994; Andrefsky 1998). Consequently, signatures of stone crafting (such as bulbs of percussion, ripple scars and coherent morphology) are underdeveloped and it is not always possible to be completely confident of the human origin of quartz 'artefacts'. These analytical problems can be particularly acute in an area where natural quartz may be present, although Bradley offers one approach to this problem (Bradley 1995). Olcote is in such an area, and many pieces in the assemblage are clearly natural. In other instances it is difficult to assess whether an artefact is clearly struck. This is especially significant given that quartz pebbles appear to have been smashed on site, producing many very simple chips and fragments that are especially difficult to interpret confidently as intentional products of human activity. In order to reflect these difficulties, a category of 'possibly worked' has been retained in this analysis.

[1] Since the completion of this report in 2000, work on Scottish quartz has continued apace, with Torben Ballin involved in the analysis of numerous assemblages (for discussion see Saville and Ballin 2001). This has included discussion of quartz quarries in the vicinity of the Olcote site (Ballin 2004).

7.2 Methodology

An assemblage of 15,456 worked and natural stones was recovered during excavations at the cairn itself (Table 4) and a further 77 worked items from test pits (see below). This assemblage was macroscopically analysed and divided into a number of basic categories. Artefacts less than 10 mm in maximum dimension are described as 'smalls'. These are further divided into 'worked' and 'possible/natural' groups (see below for discussion of the problems of this methodology). Smalls from test pits were not subdivided into types but identified by material. Artefacts more than 10 mm in maximum dimension were classified as 'worked', 'possibly worked' or 'natural'. Natural or possible artefacts were bagged in bulk, whilst worked artefacts were described according to standard analytical procedures and received individual catalogue references. The following totals were recorded.

Table 4 Total quantities of stone recovered from the main trench

	Smalls	10 mm	Total
Quartz	12,369	2729	15,098
Flint	94	73	167
Sedimentary	174	10	184
Other	1	6	7
Total	12,638	2818	15,456

The bulk of the assemblage is comprised of quartz and a high proportion of this material was natural. For example, only 6% (754 of 12,369) of the quartz smalls from the main site were worked; 47.6% of the larger quartz artefacts were also natural and a further 368 (13.5%) only possibly worked (Table 5).

When only clearly worked artefacts > 10 mm in maximum dimension are considered, the number of artefacts drops dramatically to 1219.

7.3 Raw materials

A range of raw materials was found in the assemblage. Quartz was by far the most common (92% of

Table 5 Totals of worked/possibly worked/natural pieces > 10 mm

Raw material		Main site
Quartz	Natural	1298
Quartz	Possible	368
Quartz	Worked	1063
Flint	Worked	73
Sedimentary	Possible	8
Sedimentary	Worked	2
Other	Worked	6

Table 6 Worked quartz types

Quartz type	*n*	% age
QTZ1	941	84.0
QTZ2	1	0.1
QTZ3	166	14.8
QTZ4	12	1.1
Total	1120	

total > 10 mm) and varied widely in quality. In order to categorize this diversity, a crude system of differentiating between quartz types was used (Table 6). Two groups are the most important: QTZ1 describes the predominant material, grey, white or slightly yellowish in colour and varying in homogeneity. Because of the continuous variation of quartz this category includes 'powdery' crystalline quartz and more homogenous material. It has been argued (Lacaille 1937, 282) that granular quartz is the highest quality material on Traigh na Beirgh, on the Bhaltos peninsula of north-west Lewis, but this does not appear to be true of the Olcote assemblage. Although experimental knapping was not undertaken, much of the granular 'powdery' quartz is friable and seems unlikely to be the most desirable raw material.

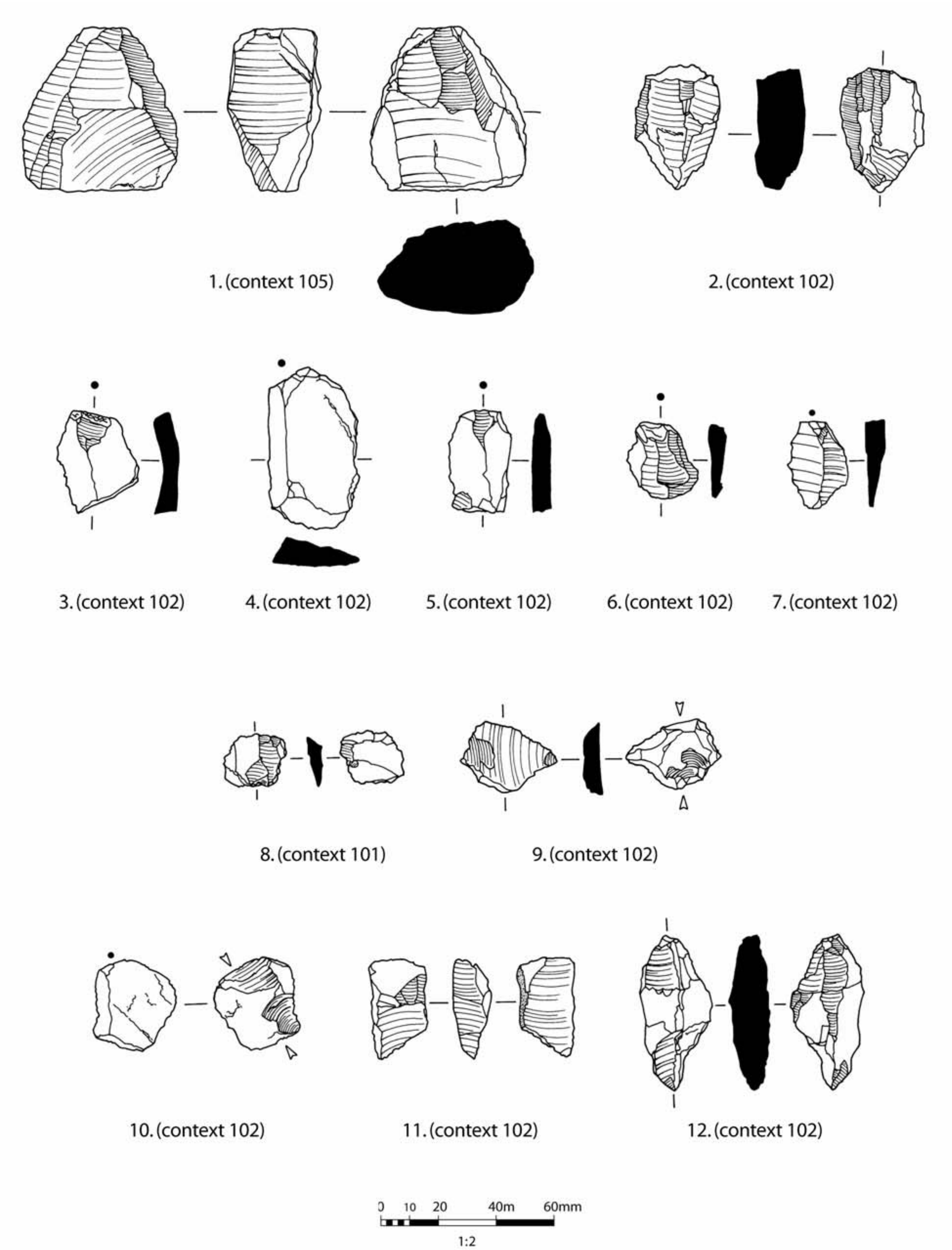
QTZ3 is the highest quality raw material although this category again describes a spectrum of quartzes. Examples of this type are either clear with occasional banding or milky-white in colour – they are always homogenous. Artefacts of this fine material tend to be more regular in character than those of other types of quartz and are more likely to be retouched. They are often slightly smaller than those of QTZ1. QTZ2, a shiny laminated material, is very rare although more frequently observed amongst natural pieces, while QTZ4 is grey, notably veined low-quality quartz. It must be stressed that these types are not discontinuous and that QTZ3 represents the upper end of a spectrum of variation. Further divisions of raw material type are made in the analysis of cores (see below). A variety of sources of quartz was being utilized, including outcropping veins of quartz, locally on the beach, and rolled pebbles. Unfortunately, it is impossible to differentiate between these sources unless cortex is present and it was therefore not possible to make an accurate assessment of the proportions of material utilized from them.

A total of 87 flint artefacts >10 mm in size were retrieved from the excavations and test pits. This material was of quite low quality and much of it was affected by heat ($n = 21$, 24.1%) or patination ($n = 21$, 24.1%). Fresh flint tended to be grey in colour although it did vary slightly and a few ($n = 5$) honey flints were observed. Most of the flint was very small and much of it, including ten primary flakes ($n = 43$, 49.4%), was cortical. A derived pebble source, probably from local beaches, is likely for this material.

A number of flakes of unusual raw materials were identified in the assemblage. Of most interest is the presence of metamorphosed sedimentary rocks, identified as baked or banded shales. This material is presumably comparable to the mylonite identified by Ballin at the main Calanais ritual complex (Ballin forthcoming), being characterized by weathering and thin horizons of grey or blue material. These are poorly understood materials; mylonite for example was identified by Simpson at Northton (Simpson 1976) but later described as banded mudstone from Skye (Wickham-Jones 1986, 7). Standardization in terminology is to be desired. In this report the materials are described as sedimentary. They are friable, heavily weathered materials, found frequently as small fragments in the gridded collections. Some of the larger pieces have been flaked and it is clear that this material does form a small part of the assemblage on site, even if it is very difficult to characterize this dependency. The most notable artefact among this material is a fine barbed and tanged arrowhead. Outcrops of shales to the north of the site are known although further work is required on this raw material in order to clarify patterns of exploitation. Other materials include two certain and one possible flake of granodolerite, a coarse-grained Hebridean rock, and a possible flake and small chunk of epidosite, also known locally.

7.4 Composition of the assemblage

Archaeological research into prehistoric stone craft is dominated by analytical techniques derived from the study of high quality silicates such as flint (for discussions see Holm & Knutsson 1998). The fracture properties of quartz are different from flint and it is therefore arguable that different classifications are required. Knuttson, for example, has developed very detailed models of fracture properties for a range of Swedish materials and proposes alternative classifications for quartz (Knuttson 1998, 76). Despite concern about the validity of flint-derived classifications, it is not clear that the use of Scandinavian models would necessarily be appropriate in this context. Local experimental studies are required in order to understand the varied fracture properties of Scottish quartz (these are currently being organized by the author). In the absence of such analyses, it was decided to utilize a standard classification technique, which also has the advantage of facilitating comparisons between different materials on site. The only unusual description is that of 'anvil split'. This is a subdivision of split pebbles, referring



Illus 23 Worked stone. 1–2: cores; 3–7: flakes; 8–10 and 12: bipolar cores; 11: anvil split. All quartz except for 6 (flint)

Table 7 Artefact and raw material types

	Quartz	% of raw material	Flint	% of raw material	Sedimentary	% of raw material	Other	% of raw material
Anvil split	37	3.3						
Bashed lump	33	2.9						
Bipolar core	65	5.8	1	1.1				
Blade	9	0.8	2	2.3				
Chunk	282	25.1	26	31				
Core	30	2.7						
Flake (irregular)	354	31.5	27	43.7	2	66.7	2	33.3
Flake (regular)	268	23.9	16	20.7	1	33.3	4	66.7
Split pebble	43	3.8	1	1.1				
Pebble	2	0.2						
Total	1123		73		3		6	

Table 8 Quality of quartz used for anvil splits, split pebbles, bashed lumps, cores and bipolar cores

	Very low	Low	Medium	High	Very high
Anvil splits			24	13	
Split pebble	1	1	32	7	1
Bashed lumps		1	16	16	
Cores		1	4	20	
Bipolar cores		2	9	28	18

to pebbles that have clearly been split on an anvil but are not bipolar flake cores (see below and Illus 23). The assemblage is discussed as a whole, including the finds from the test pits.

7.5 The quartz

Although regular flakes are significant, irregular flakes and chunks dominate the quartz assemblage (Illus 23, 3–7), presumably in part reflecting the irregular fracture of this material. Blades are rare. Formal platform cores are rare, whereas bipolar cores are common (Illus 23, 1, 2, 8–12). There is also a range of split pebbles, some – anvil splits (Illus 23, 11) – with clear evidence of bipolar traditions. The presence of micro-débitage ('smalls') confirms that this assemblage includes material originating from stone-crafting activities although it is not possible to identify whether this is primary or secondary manufacture.

Given very varied raw material, unless very heavy weathering or battering is present there are difficulties in clearly ascertaining whether a piece of quartz has originated from the outside of a pebble or an outcrop. Because of this factor, the proportions of primary or secondary material identified may be too low and, because primary material comprises only 4.1% of the assemblage and secondary material 28.1%, this does appear to have been a problem in analysis. Despite the low proportion of exterior flakes, it seems that most stages of the reduction process are present in the assemblage, including primary testing and structured reduction strategies.

7.5.1 Cores and split pebbles

All cores and split pebbles from the main site were analysed in order to characterize the technological characteristics of this industry (material from test pits was not incorporated into these analyses). The number of removals, blows or platforms present and the weight were catalogued for each piece. A further subjective interpretation of the raw material quality was made, irrespective of the raw material type already identified, loosely describing material as very low, low, medium, high or very high in quality (Table 8).

Split pebbles and anvil splits are split quartz pebbles or chunks. Sometimes they have been clearly split on an anvil by a bipolar blow (anvil splits), in other cases not so clearly (split pebble). It is, therefore, necessary to note that the division of anvil splits, bipolar cores and split pebbles describes only the final form of the artefact, not the processes involved in its manufacture. It is possible, for example, that bipolar blows did not result in clear bipolar evidence. Notwithstanding these difficulties, there are differences between these types. For example, there are 37 anvil splits, all manufactured of QTZ1, and 42 split pebbles, 40 of QTZ1 and one each of QTZ3 and QTZ4. Most of the material is of medium quality but it is notable that anvil splits are frequently of slightly higher quality than split pebbles. Anvil splits also

Table 9 Weight (in g) of anvil splits, split pebbles, bashed lumps, cores and bipolar cores

	Range	Mean	Interquartile range	*n*
Anvil splits	2–322	29.7	9–33	37
Split pebbles	1–64	20.1	8–26	42
Bashed lumps	8–577	107.5	33–117	33
Cores	5–125	37.7	11.75–48.5	25
Bipolar cores	1–77	8.9	3–8	57

tend to be a little heavier than split pebbles and have a wider range of weight (Table 9). This differentiation suggests that the categories may capture something of technological decisions made in prehistory. It is possible that anvil splits, with the hints of bipolar working, reflect a more structured approach to working than split pebbles. Indeed the latter are little more than fractured pebbles and it is possible that some have resulted from activities as simple as throwing a quartz pebble onto the cairn.

There are 33 bashed lumps of quartz in the assemblage. These are large pebbles or chunks with few removals and no signs of formal platforms. Sixteen are of high quality quartz, 16 of medium quality and one of low quality quartz, 30 are of QTZ1 and one of QTZ4. Bashed lumps range in weight from 8 to 577 g, averaging 107.5 g with an interquartile range of 33–117 g. Most bashed lumps have one ($n = 7$) or two ($n = 22$) removals, two have three removals and one has four.

Twenty-five platform cores are present, all manufactured on QTZ1. Most of this material is of high quality ($n = 20$), the rest is medium or low quality; cores are therefore slightly higher quality material than bashed lumps. Cores are much larger than bipolar cores but tend to be a smaller than bashed lumps, averaging 37.7 g with an interquartile range of 11.75–48.5 g. Most cores only have one platform ($n = 17$), six have two platforms and two have three platforms (Table 10). The minimum number of removals from the cores is generally low, which probably reflects the large size of most of the flakes in a quartz industry (see below). Platforms are either natural or very simple artificial types.

The 57 quartz bipolar cores range greatly in size and many very small cores are of high quality material (Illus 23, 8–12). Only one bipolar core is of flint and this is excluded from the analyses that follow. Many bipolar cores are very small, averaging only 8.9 g with an interquartile range of 3–8 g. This pattern is especially true for the higher quality cores and those manufactured on QTZ3, which often weigh less than 5 g. Whilst this pattern may partly reflect the importance of these high quality raw materials, it is possible, given the very small size of the resulting flakes, that some of these smallest bipolar cores result from little more than deliberate smashing of quartz items. It is interesting to note that bipolar cores are manufactured on QTZ3 ($n = 14$, 24.5%), whereas no platform cores utilize this material. This may reflect the size of this material, which is often small, or the value attributed to it.

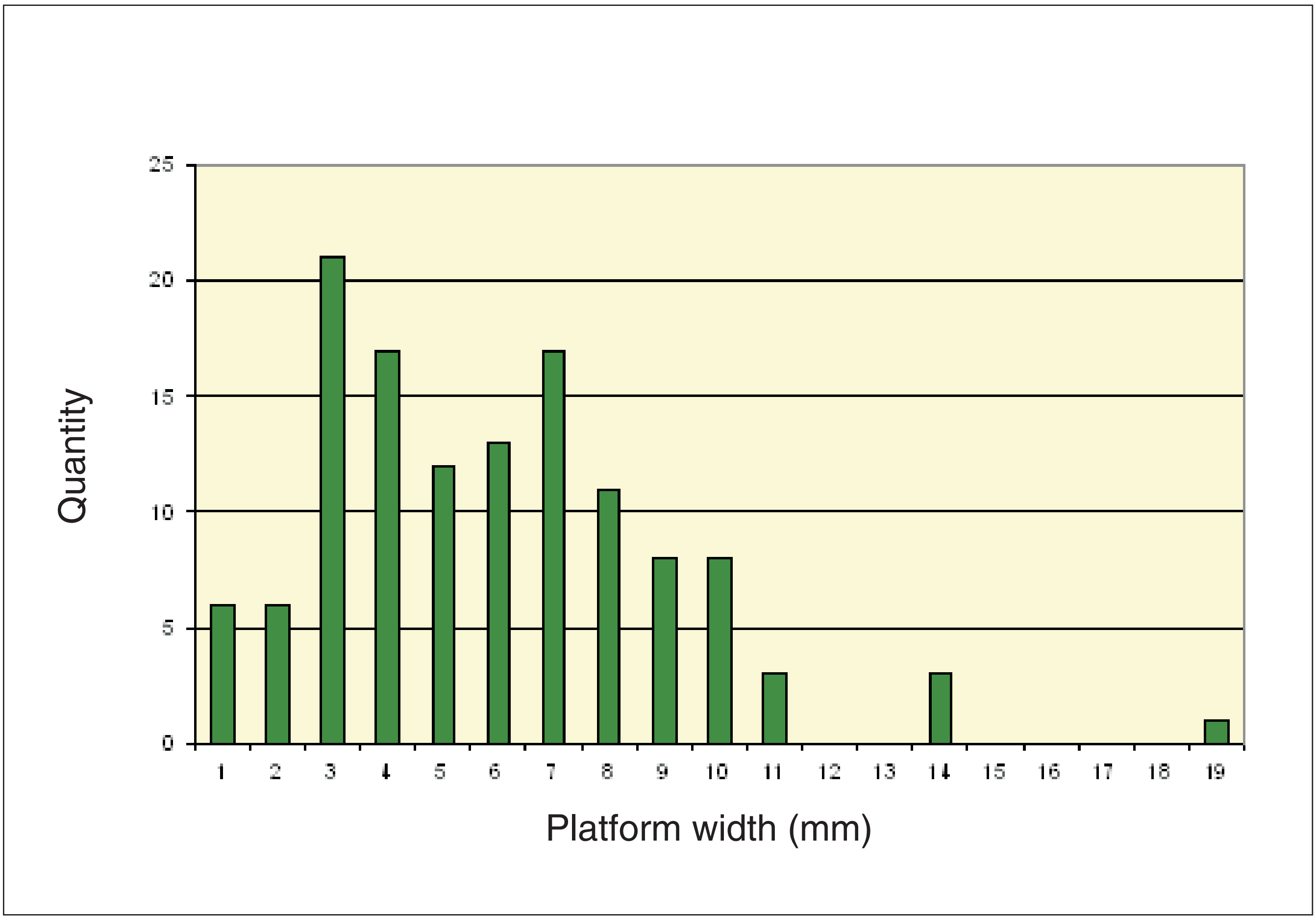
Table 10 Numbers of removals and platforms on cores

No of platforms	No of removals 1	2	3	4	5	6
1	1	9	6	1	0	0
2	0	1	2	1	2	0
3	0	0	0	0	1	1

These simple analyses of core types show a number of interesting patterns. Notwithstanding the simple split pebbles, which may reflect either testing of material or merely the deliberate fracturing of quartz pebbles, there are some distinctions between the other categories identified. Bashed lumps tend to be large and consist of a variety of raw materials, whereas platform cores are smaller and of slightly higher quality. These are not absolute distinctions but rather they reflect a continuum of testing of material and removal of flakes as part of skilled routines of stone crafting. Bipolar cores are much smaller than other cores and are often manufactured from high quality raw material. Sometimes the size of these cores is such that a practical use for their products is unlikely.

7.5.2 Removals

A total of 259 regular quartz flakes are present in the assemblage. These are quite large and tend to be thick and slightly longer than they are wide (interquartile ranges of 20–33.5 mm for length, 15–26 mm for breadth and 5–10 mm for thickness for complete flakes). The importance of structured routines of flake removal is clear from the proportion of regular flakes with platforms. The presence and character of platform preparation was noted for 127 quartz flakes. Most of these had very simple artificial ($n = 100$) or natural ($n = 20$) platforms. Seven showed evidence of more complex preparation, sometimes isolation or scrubbing and, in one case, a bird's wing platform. Platform sizes varied from 1 to 19 mm (Illus 24) but were generally quite large (interquartile range 3–8 mm). It is difficult to identify the hammer types used on quartz industries because of the irregular fracture properties of the material. However, large platform sizes, together with the number of crushed platforms, suggest that direct percussion with a fairly hard hammer was frequent.



Illus 24 Width of platforms of quartz flakes

7.5.3 Discussion

The analysis of this large quartz assemblage has highlighted a number of distinctive features of its primary technology. A variety of craft processes can be identified amongst the Olcote assemblage, from testing of material through to the structured production of flakes from platform cores. Interestingly, there are no cores of the highest quality quartz (QTZ3) except for small bipolar examples and these are unlikely to have provided the source for the flakes within this assemblage. This implies some complexity in the treatment of this attractive material. It is also notable that, although the knapping activity is clearly responsible for much of the assemblage, the high numbers of crude, broken materials such as split pebbles can be interpreted simply as the result of deliberately smashing pebbles. This interpretation is also possible for some of the small bipolar cores of QTZ3 and may help explain the large numbers of chunks and 'possibly worked' artefacts.

7.6 The flint

The flint assemblage is dominated by chunks and irregular flakes (Table 7). There are no formal cores, only one small bipolar core and a split pebble of exceptionally poor quality flint. It is therefore difficult to say much about the technological characteristics of the flint industry, other than to highlight that the presence of micro-débitage indicates that the assemblage derives in part from stone tool production activities as well as use. The absence of cores might be understood in terms of the importance or scarcity of this material. These may have been valuable, curated items. This in turn implies that stone-crafting routines extended across the wider landscape with cores being carried to and from varied locations. The presence or absence of platform preparation was noted on seven flint flakes, which tended to be simple platform isolation or edge scrubbing (n = 4). Two flakes had unprepared artificial platforms and one had a bird's wing platform. Platform widths were small, one of 1 mm, five of 2 mm and one of 4 mm. It appears that flint was treated differently from quartz, which implies the use of slightly differing skills.

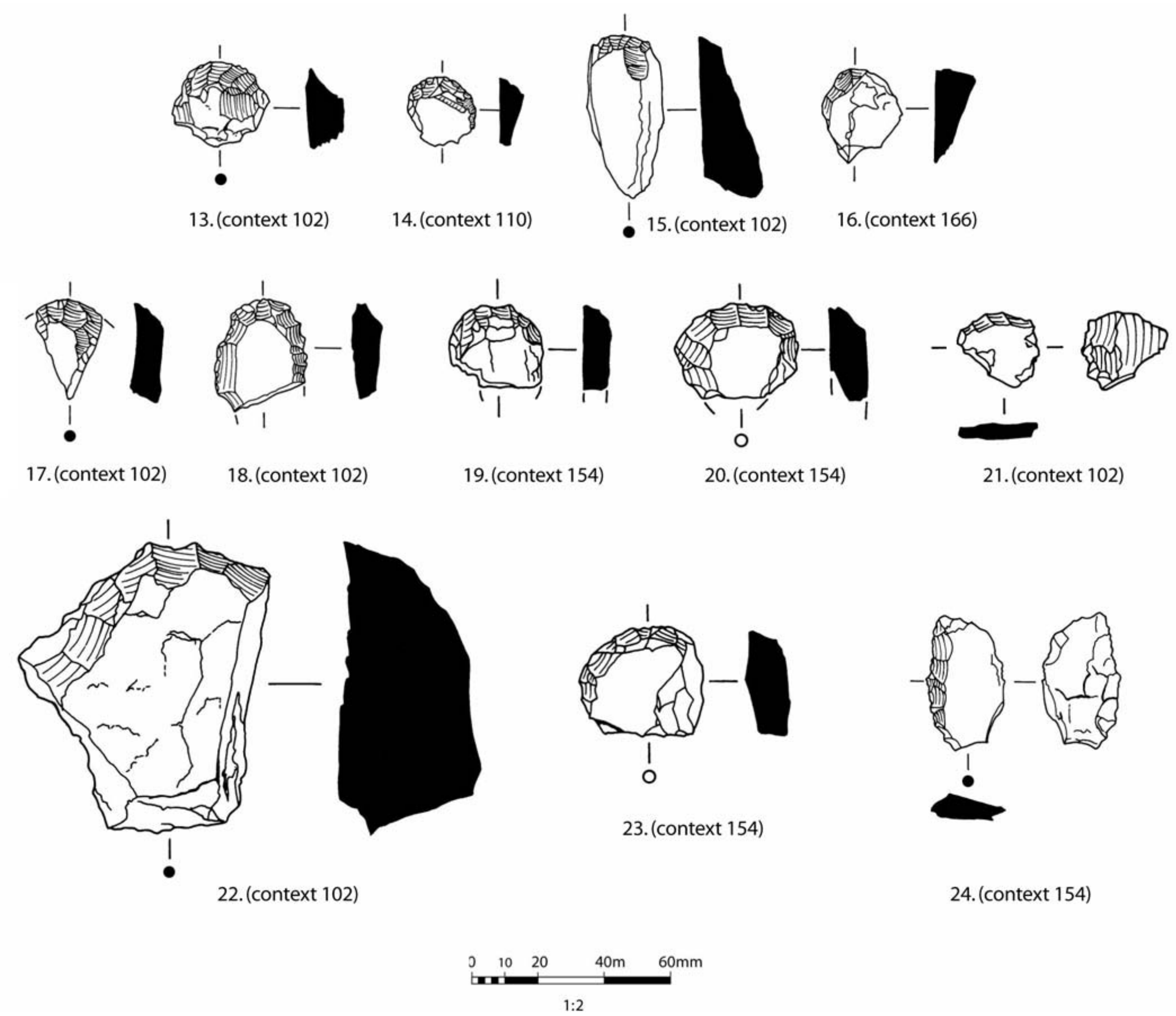
7.7 Other materials

The few flakes of banded shales and granodolerite do not allow any characterization of the exploitation of this material. The presence of seemingly unworked sedimentary material away from the cairn (see below) is difficult to interpret although it may reflect the degradation of artefacts or débitage.

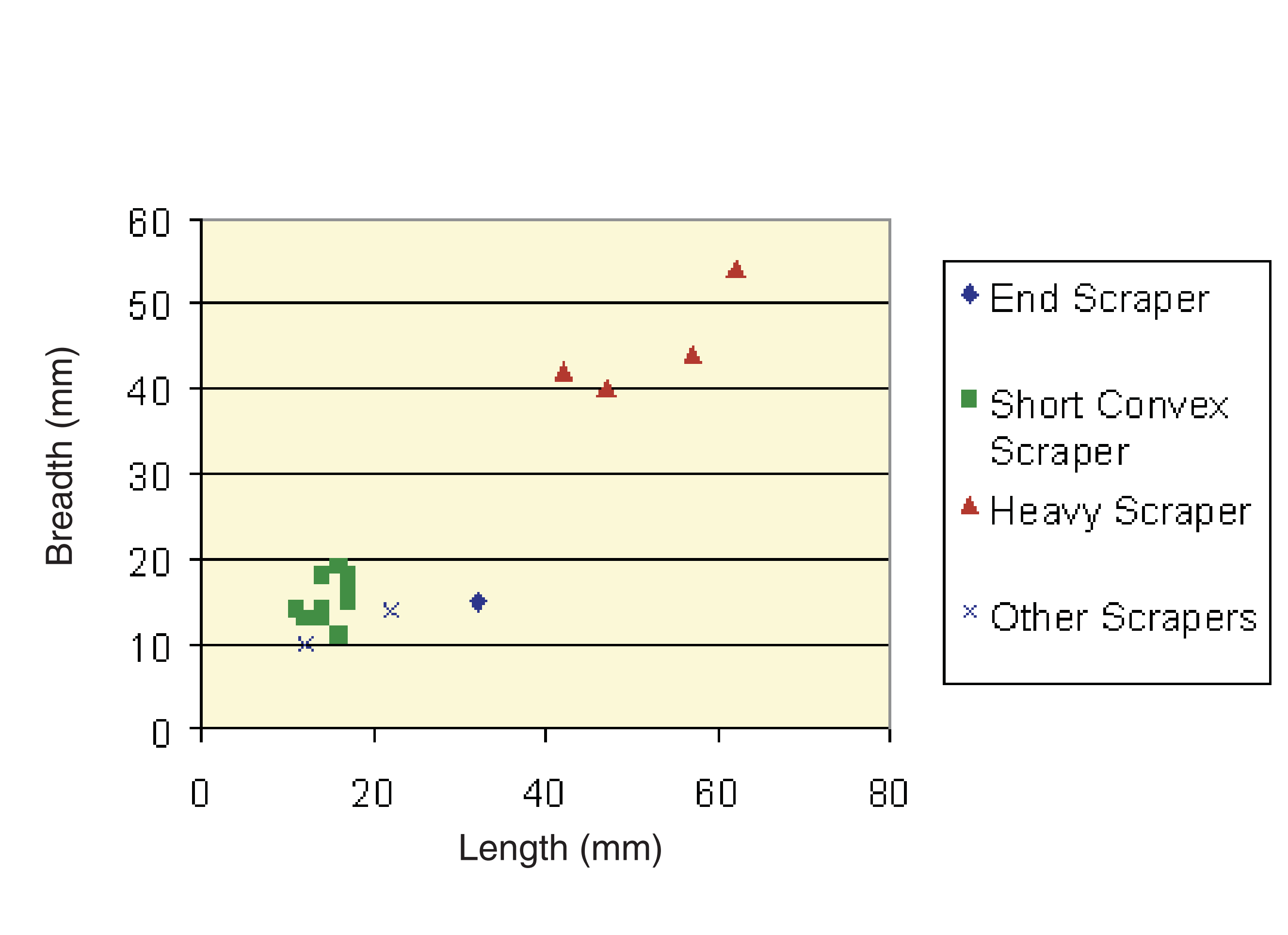
7.8 Retouched artefacts

A total of 33 clearly retouched and seven possibly modified artefacts were recovered from Olcote. The seven possibly retouched artefacts are fragmentary or abraded pieces. In addition, there is one irregular flint flake with extensive damage or possible irregular retouch. Of the 33 definitely retouched artefacts, 26 are quartz, seven are flint and one is of banded shale. Flint is greatly over-represented amongst retouched artefacts as compared to the assemblage as a whole. Nine of the retouched quartz artefacts are of QTZ3, the high quality banded or milky quartz. This is also an over-representation.

The dominant tool type are scrapers (*n* = 29) (Illus 25). These are mainly of three types: heavy convex scrapers manufactured on chunks of quartz (*n* = 4) (Illus 25, 22); convex end scrapers (*n* = 2) (Illus 25, 15); and short convex (or 'thumbnail') scrapers (*n* = 18) (Illus 25, 13, 14, 16–21, 23). There are a further five varied scrapers (Illus 25, 17–21), all mainly convex but including short tangs or multiple scraper edges as well as a neat side scraper (Illus 25, 24). One is a fine artefact (Illus 25, 18) with neat retouch extending all around the edges of an oval flake. This piece is clearly distinct from the rest of the scraper assemblage. The short convex (thumbnail) scrapers are the most notable formal types and are all very small, less than 20 mm in maximum size, and many are abraded or edge-damaged. The amount of retouch present on these pieces varies, some being approximately 90% retouched, others almost the entire piece. The angle of the scraper edge also varies, from steep to shallow. Despite this variation, they clearly form a group. Illus 26 shows the size of the complete



Illus 25 Worked stone. 13, 14, 16–21 and 23: short convex scraper; 15: long convex end scraper; 22: heavy convex scraper; 24: side scraper. All quartz except for 13, 14, 16 and 19 (flint)



Illus 26 Length:breadth ratios of complete scrapers

scrapers present in the assemblage, comparing only length and breadth.

Three edge-retouched artefacts were also found, including two flint flakes with miscellaneous retouch. Most notable amongst these artefacts is C.154.14, a fine percussion flake of quartz with extensive unifacial retouch (Illus 25, 14). One fragmentary arrowhead and one possible incomplete arrowhead are also present; these are both triangular in shape and neither is diagnostic.

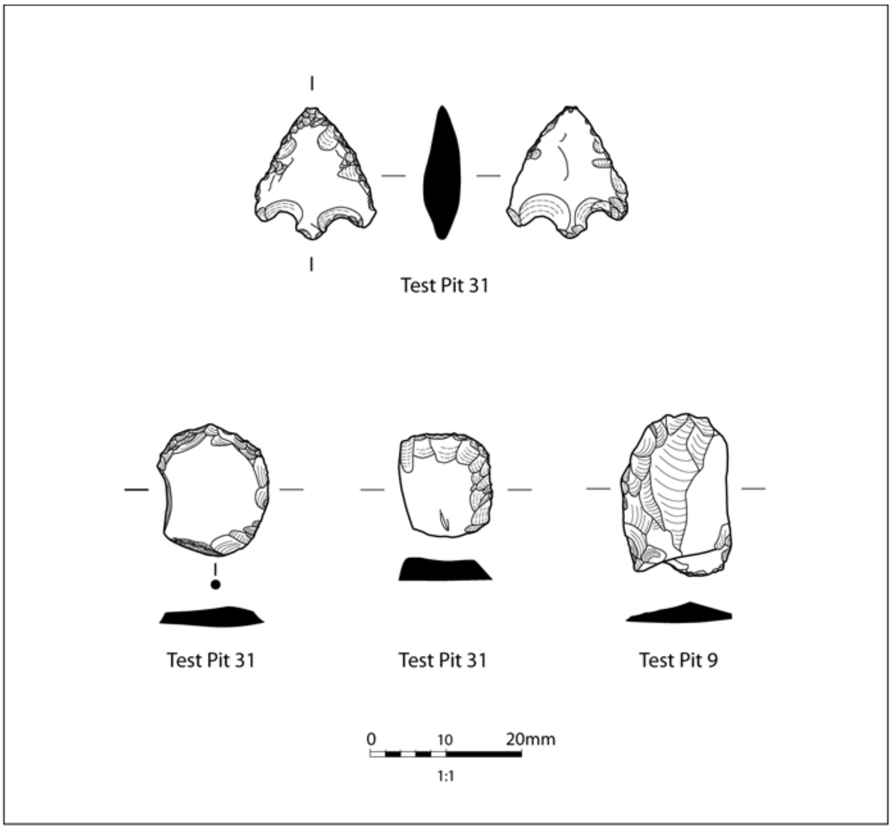
Finally, a fine barbed and tanged arrowhead, manufactured in sedimentary material, was recovered from Test Pit 31, immediately to the south-east of the cairn (Illus 27). It is a small arrowhead measuring 18 × 16 × 5 mm with light damage to the tips and barbs. It has a slightly chunky section and has been formed by semi-invasive retouch. It does not fit easily into any of the categories proposed by Green, its barbs being rather weakly developed (Green 1980, 122).

7.9 Location of finds

The location of finds within the main trenches and in the test pits adds focus to the discussion. At the largest scale, worked or possibly worked material was identified in small proportions in 15 test pits but these are mainly from the areas immediately surrounding the cairn. The information in the test pits, in conjunction with the analyses offered below, seem to indicate that knapping activity was focused around the area of the cairn. For example, Test Pits 8 and 9 indicate some knapping to the north of the cairn itself.

7.9.1 Smalls

A wide range of very small lithics and natural pieces were recovered by hand and within samples from across the site. These were analysed macroscopically in order to characterize the spatial extent of flint débitage and to see if the quartz debris might also have resulted from human activity. All 'smalls' were attributed to one of two categories: worked or possible/natural. All flint was assumed to be worked as it does not occur locally. There is a degree of subjectivity involved in attributing quartz items to these categories and, in some ways, the category of worked quartz is limited to fresh-looking quartz fractures. Not every attribution will be correct but a generalized picture



Illus 27 Worked stone from test pits. Top: barbed and tanged arrowhead, banded shale. Bottom (left to right): scrapers, flint, flint, quartz

still emerges, allowing the analysis of differences between regions of the site. Indeed, close similarities between the location of worked quartz and flint smalls indicate that the strategy has validity. Single appearances of smalls are excluded from the discussion that follows.

Flint smalls are present in quantities of greater than one in a range of deposits (Table 12, column 1). These include re-deposited burnt peat or ash deposits (134, 135, 153, 180, 181), the central cist (129), pits 124 and 126 and deposits below the cairn (154, 157, 159, 177). Flint made up between 6.3% (in 129) and 30.4% (in 182) of the worked smalls in these deposits, averaging 16.8%; it comprised 15.7% of the 'blind' sample of worked smalls from sample residues. Smalls of sedimentary rock were mainly recorded from the grids collected outside the cairn. Only the cremation deposit (129) and the ash (135) contained this material; those in the latter were all natural.

The significance of worked quartz smalls is harder to assess because of a background of natural and possibly worked quartz. On average, 6.1% (n = 754, total 12,369) of the quartz smalls are worked but the percentage within any given context ranges from 0 to 100%. For example, the pottery-rich area in the north-west quadrant (121) contained eight flint smalls, 60 worked quartz smalls and 221 possible or natural smalls. The variation across the site as a whole partly reflects genuine spatial variation across the site but has also been influenced by collection strategies: a more controlled understanding emerges by examining quartz recovered from samples. One implication of this is that it is hard to assess the patterning in the areas where samples were not taken. Of the residue materials, 19.2% (n = 502 from a sample of 2542) are worked. This initially suggests that the smallest worked quartz chips were missed during collection by hand. However, this may not be the entire story, as many small natural quartz pieces were recovered. Therefore, the high proportions of quartz in the samples may also therefore reflect the concentration of quartz débitage in the immediate vicinity of the cairn.

The proportions of worked smalls varies widely, from 100% in a post-hole in the north-east quadrant (194, n = 12) and a stone-filled pit to the south-west of the cairn (172, n = 11) to none in another post-hole in the north-east quadrant (195, n = 11) and a pit in the north-west quadrant (186, n = 8). This variety also makes rigorous analysis difficult. However, by considering only samples with more than five worked pieces and a proportion of worked material higher than average (>19.2%), a simpler picture emerges. Table 12 compares the contexts that contain two or more flint smalls and those containing greater than five quartz smalls, which makeup over 20% of those present. This demonstrates that the two distributions are closely comparable, the only significant difference being the absence of flint from the post-holes.

Table 11 Finds from test pits

Test pit	Depth (m)	Quartz worked	Quartz possible	Total quartz	Total quartz per unit depth	Flint (smalls)	Sedimentary (smalls)	Proportion worked quartz	Proportion worked flint
1	0.1	0	0	33	330	0	0		
2	0.1	6	0	51	500	1	0	High	
3	0.26	11	7	126	485	4	0	High	High
4	0.04	0	1	> 500	> 500	2	0		
5	0.2	7	2	> 500	> 500	0	0		
6	0.2	2	2	> 500	> 500	0	0		
7	0.1	2	0	> 500	> 500	0	0		
8	0.1	10	4	> 500	> 500	1	0	Moderate	
9	0.4	13	6	> 500	> 500	4	1	Moderate	Moderate
10	0.52	0	0	1	2	0	0		
11	0.5	0	0	1	2	0	0		
12	0.5	1	0	> 500	> 500	0	0		
13	0.46	0	0	215	467	0	0		
14	0.28	2	4	67	239	0	0	High	
15	0.15	0	0	0	0	0	0		
16	0.26	0	1	65	250	0	1		
17	0.28	3	1	71	254	1	0	High	
18	0.17	0	0	5	29	0	0		
19	0.22	0	1	16	73	0	0		
20	0.3	1	1	42	140	0	0		
21	0.26	0	0	28	108	0	0		
22	0.17	0	0	83	488	0	0		
23	0.5	0	0	4	8	0	0		
24	0.28	0	0	4	14	0	0		
25	0.6	0	0	46	77	0	0		
26	0.45	0	0	6	13	0	0		
27	0.3	0	0	0	0	0	0		
28	0.28	3	2	22	79	1	0	High	
29	0.18	3	1	54	300	2	0	High	
30	0.25	1	0	> 500	> 500	0	0		
31	0.28	12	12	> 500	> 500	5	0	Moderate	Moderate
32	0.29	0	0	> 500	> 500	1	0		
Total		77							

The flint and worked quartz smalls result in part from knapping episodes although it is difficult to assess whether this reflects primary tool production or secondary finishing. Although collection strategies may have played a part in the final distribution, general tendencies are apparent and activity seems to focus on the region of the cairn itself. Further affirmation of this argument at a wider scale can be drawn from the comparative absence of worked quartz smalls from the test pits.

7.9.2 Larger artefacts

Worked quartz was found throughout the site, generally comprising about 90% of the worked material in any given area. There was a slight tendency for more material to be found in the north of the site than the south although the general impression is that the cairn and the area immediately around it were covered in quartz debris. This assessment is also borne out by the evidence from the test pits (see above). Quartz was found above and within the cairn and large amounts of material were retrieved from the old ground surface. Large deposits of quartz were also found immediately outside the kerb in the north-west quadrant (110). It is difficult to assess variation within these deposits, not least because of the disturbance the site has suffered.

Flint was found over much of the site, both within the cairn itself and in a notable concentration to its north. This area contained 24 of the artefacts, with perhaps the greatest concentration in the north-west. The distribution of flint artefacts closely matches that of the flint micro-débitage.

There is little meaningful distinction between the

Table 12 Location of smalls

Context	Flint	Quartz
121: Pottery-rich north-west quad	Y	Y
122: Central cist	Y	Y
123: Pit in south-east quad	(n = 1)	Y
124: Pit in south-east quad	Y	Y
126: Pit fill in north-west quad	Y	(n = 44, 11.2%)
129: Cremation deposit	Y	(n = 44, 10.7%)
134: Red burnt peat (as 180)	Y	(n = 6, 17.1%)
135: Red burnt peat	Y	Y
153: Red ash	Y	Y
154: Beneath cairn	Y	Y
157: Beneath cairn	Y	(n = 31, 10.4%)
159: Peat above OGS under cairn	Y	(n = 13, 18.6%)
177: Central area	Y	Y
180: North-west quad burnt layer	Y	Y
181: North-west quad burnt layer	Y	Y
182: North-west quad	Y	Y
194: Post-hole in north-east quad		Y
202: Post-hole in north-east quad sealed by cairn		Y
Post-hole 90		Y

artefact types found in different areas of the site. Many of the samples from individual contexts are small, rendering comparison very difficult. One pattern of some interest is that many of the simple split pebbles or anvil splits came from on or near the cairn (102, 103). This again seems to indicate that some of these pieces result from little more than deliberately smashing pebbles.

The thumbnail scrapers were found in a variety of locations, many under or on the cairn itself (Table 13), although two were found in the south part of the site. The thick, heavy scrapers were found within and beneath the cairn, as were the edge-retouched tools. The arrowhead was found with two thumbnail scrapers in Test Pit 31 immediately to the south-east of the cairn (Illus 27). A slight concentration of retouched tools was apparent beneath the cairn (154) where they comprised 8.3% (4/48) of the finds from this deposit; a high proportion of regular flakes (39.6%) was also found here. The cairn itself, and the ground surface beneath it, appear to have acted as foci for patterns of deposition.

7.9.3 Discussion

Artefacts were found on, within, under and near the cairn. Deposits below the cairn yielded a high proportion of retouched and regular material but no exclusive patterns emerged as activity continued across the site. Knapping deposits extended away from the cairn, and were indistinguishable in character from those close to it. The complex construction of the cairn itself defies easy chronological interpretation although activities on site may have extended over a long period of time. Furthermore, evidence for disturbance of the site is clear.

Given these facts, it would not be appropriate to reconstruct a detailed sequence of lithic deposition on site. However, broad themes that appear to have been important in structuring activity can be identified. The site of the cairn appears to have acted as a focus for varied stone-crafting activities over some time, presumably including the deliberate deposition of retouched artefacts before and during the construction of the cairn. Small thumbnail scrapers were particularly significant there. Lithics were also incorporated into the body of the cairn through the re-deposition of material from elsewhere and had also been added to the cairn after its construction although the timescale is obscure. The site was carpeted with quartz and the seemingly deliberate addition of crudely smashed quartz to the cairn body during and after its construction appears to have been significant. As well as these activities, there was a series of knapping episodes in the immediate vicinity of the cairn. The chronological relationship of these materials to the cairn itself is not clear. They may pre-date the cairn, possibly being associated with structures represented by some of the post-holes and with earlier pottery types. The scatters may be contemporary, reflecting the use of the site for funerary purposes; or they may be later. It is difficult to disentangle these themes solely by reference to the site itself and it is necessary to step back from our data.

Table 13 Location of retouched pieces

	Scraper: short convex	Scraper: misc	Edge-retouched	Arrowhead
Context 101		1		
Context 102		1		
Context 103		1		1?
Context 110	2			
Context 133	1			
Context 154	3		1	
Context 157	1		1	
Context 165	1			
Context 166	1			
Context 177		1		
Grid C		1		
Grid F		1		
Grid J	1			
Grid K	1			
Context 102/103	6	2	1	
TP31	2			1
TP9	2			
Total	21	8	3	1

7.10 The assemblage in context

Good parallels for the Olcote assemblage can be found in both funerary and other contexts. Local comparisons include the main Calanais ritual complex, where quartz, mylonite and flint industries have been recorded (Ballin forthcoming). Further quartz and flint industries have been identified from sub-peat contexts by the Calanais Fields Project (Flitcroft *et al*. 2001). Although neither assemblage is closely dated, both demonstrate similarities to the reduction techniques noted at Olcote. Lacaille commented on surface quartz and coarse stone industries from Traigh na Beirgh (Lacaille 1937; Lacaille 1954) but the date and associations of these artefacts are unclear.

Other quartz industries have been identified elsewhere in the Western Isles, including several kilograms in midden deposits of Beaker age at Rosinish (Shepherd 1976, 212). Quartz artefacts, few of which are retouched, form part of the assemblage from Northton, alongside pebble flint and banded mylonite (Simpson 1976). Retouched forms include small thumbnail scrapers comparable to those from Olcote and slightly larger irregular scrapers. Dates for the Beaker layers are 1654±70 BC (BM707) and 1531±54 BC (BM707). Flake industries utilizing bipolar and platform techniques to exploit flint and quartz assemblages have been recorded on Barra (Wickham-Jones 1995). The industries are likely to be Neolithic in date and include both barbed and tanged and leaf-shaped points.

Local parallels from funerary contexts are rarer. The beehive-shaped structure at Rosinish contained no lithics (Crawford 1978). An old soil sealed by the kerb cairn at Cnip, and therefore pre-dating it, contained four large, unused quartz artefacts, two of which had been refitted (Close-Brooks 1995). A broader series of associations can be seen by looking further afield. Thumbnail scrapers are often associated with Beakers, sometimes as funerary deposits, and it has been argued that they are a closely defined tool type whose use was surrounded by 'subtle conventions' (Edmonds 1995, 140–1). Early Bronze Age funerary contexts sometimes include a variety of lithics, perhaps intended for use by the dead, or as part of their personal property, or sometimes as a more abstract symbol (Edmonds 1995, 153). In addition, barbed and tanged arrowheads are frequently associated with Beaker burials although their use and manufacture were not necessarily limited to funerary occasions (Edmonds 1995, 143; Edmonds 1998). Local manifestations of these associations are also evident at Calanais and possibly on Barra.

The presence of quartz itself in association with the cairn is very interesting. Quartz pebbles appear to have played an important role in funerary rituals of various kinds in Scottish prehistory. The persistence of quartz and funerary associations on Lewis is demonstrated by the presence of unworked quartz pebbles in Middle Iron Age funerary contexts at An Dunan, *c* 400–100 BC (S Gilmour, pers comm) and there is a wide range of ethnographic material discussing the possible significance of raw materials (e.g. Taçon 1991). Lebour highlights the properties of quartz (Lebour 1914), a distinctly iridescent material which emits a bright spark if two pebbles are struck together, especially under water. It would not be appropriate to use a direct analogy for the prehistoric inhabitants of Lewis and it is important to note that the relationship of our crude category of quartz, including many variations of material type, to complex subdivisions of classification that presumably existed in prehistory could be flawed. Nevertheless, these studies, and the use of quartz in such distinctive contexts at Olcote, demand interpretation.

Although it is difficult to interpret the precise role of quartz at Olcote some interesting associations can be identified (see Warren & Neighbour 2004). Archaeologists realize that quartz was a poor quality lithic raw material as well as a symbolically charged resource suitable for use in funerary rituals. Rarely do we gain much sense of the interplay between such ways of understanding the material. This is significant because, at Olcote, it has proved impossible to separate its function as a ritual or symbolic medium from its use as part of a mundane tool kit. Instead it appears to have been both, different characteristics of the material being more or less significant in specific contexts. During the construction of the cairn, for example, that particular activity appears to have provided a close structure for the deposition of material, presumably with some funerary associations. Presumably, these were times when the symbolism of quartz was paramount. However, not all activities on site revolved around the cairn, some of the material pre-dating the construction of the cairn itself. The contexts for this behaviour are hard to establish although at such times the symbolic associations of quartz may not have been as important.

7.11 Conclusions

In an interpretative sense the assemblage remains a little obscure. A range of deliberate deposits of lithic material can be identified, including the deliberate smashing of quartz pebbles, a raw material that may have had some associations with funerary contexts, during and/or after the construction of the cairn, which appears to have been carpeted with it. Finely made formal artefacts were also deposited into and under the cairn. These included types of objects that often had funerary associations. The area around the cairn included scatters of worked quartz and flint. It is possible that stone-working was attracted to this location by the presence of the cairn itself, or that the cairn was built in an area already significant for stone-working. Whichever was the case, the working of quartz and flint at Olcote was an important process by which people made sense of the feature over a long period of time.