3.3 Excavation at Sand, the flaked lithic assemblage | Caroline Wickham-Jones

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3.3.1 Introduction

Over 16,500 pieces of flaked stone have been recovered from Sand, 451 pieces prior to excavation and over 16,000 pieces from the main excavation in 2000. Because of the different recovery methods, and recording systems, the pre-excavation material has been dealt with separately prior to consideration of the stratified material.

3.3.2 Pre-excavation lithics

This material includes the pieces of flaked stone recognised by Steven Birch when he first visited the site as well as the assemblage recovered from the 11 test pits dug across the site in 1999. Not surprisingly, it reflects the assemblage from the main (2000) excavation, both in content and raw material (see Tables 99 & 100, both below; and Illustration 363, below). See Section 5 for a full discussion of lithic raw material use around the Inner Sound. There is a slightly higher percentage of baked mudstone in the 1999 assemblage, but this may well be a reflection of one of the initial concerns of the project which dwelt on the use of baked mudstone. Skip Tables. Skip Chart.

Table 99

Sand Material	Quantity	Percent of Total
Chalcedonic Silica	70	15%
Baked Mudstone	192	43%
Rùm Bloodstone	32	7%
Quartz and Quartzite	143	32%
Agate, Jasper, Rock Crystal	8	2%
Coarse Stone	5	1%
Unknown	1	<1%
Total Assemblage	451	100%

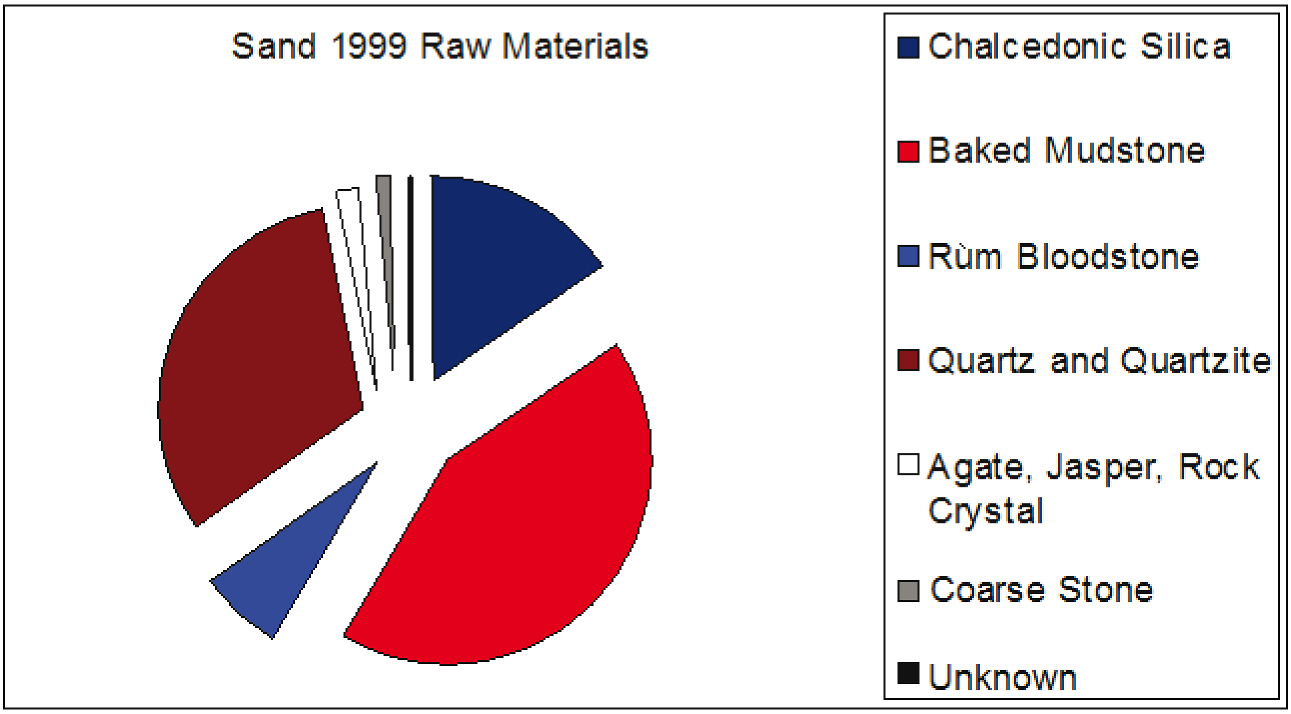
Table 99: Lithic raw materials in the Sand 1999 assemblage

Table 100

Trench	Quantity

Surface	122
TP1	81
TP2	110
TP3	2
TP4	2
TP5	7
TP7	77
TP9	48
TP11	2

Table 100: Sand, location of the 1999 lithics by test pit



Illus 363: Breakdown of lithic raw materials in the Sand 1999 assemblage

3.3.3 Location of the 1999 lithics

Table 101 (below) shows that the lithic assemblage was not evenly located across the test pits dug in 1999. In general it suggested, as was later found by excavation, that the lithic concentration was to be found on the apron immediately outside of the main rockshelter. As with the excavation in 2000, no lithics were found within the rockshelter where the ground was heavily eroded.

Table 101

Type	Quantity	Percent
Pebbles	11	2%
Cores	7 (1 plat; 6 bip)	1.5%
Chunks	121	27%
Debitage flakes	67	15%
Regular flakes	211	46.5%
Blades	18	4%
Microliths	8	2%

Edge retouched pieces	4	1%
Scrapers	2	0.5%
Barbed and tanged point	1	0.25%
Miscellaneous retouch	1	0.25%
Total	451	100%

Table 101: Breakdown of the flaked lithic assemblage from Sand, 1999

3.3.4 The nature of the lithic assemblage

The assemblage recovered in 1999 (see Table 102, below) reflects that recovered in 2000, with the exception that regular flakes and blades form a much more significant part of the 1999 assemblage. This is likely to be due to the collection techniques which unwittingly reduced the quantity of debitage.

Table 102

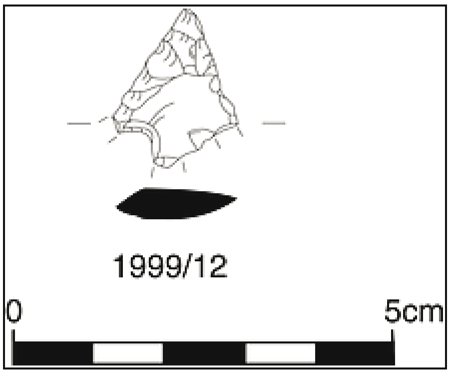
Sand Context	Type	No of Lithics
1	topsoil and turf*+	3,152
1/2	topsoil mixed with shell*	294
1/3	topsoil and turf*	47
5	Organic rich palaeo-channel, area B3	79
7/8	Sandy-silt, slopewash, over 5, area B3	1,052
11	Ashy layer of shells, within 13, area B1	74
12	Band of crushed shell, over 13, area B1	162
13	Main shell midden, over 6, under 12, area B1 & B2	903
13/23	Shell midden disturbed by moles, area B3	365
13/24	Shell midden and discrete tips disturbed by moles, area B3	48
13/23/24	Shell midden and discrete tips disturbed by moles, area B3	227
14	Fine sand washed from bedrock, under 5, area B3	76
14/21	Base of 14	3
17	Sandy soil, over 28, containing heat cracked stone, area A	3,389
17/27	disturbed	268
21	Natural, over bedrock	45
22	Organic rich silt, under 28 & 13, area A & B3	1,875
24	Fragmented shell, over 13, area B2	184
25	Sterile palaeosol, under 22 and 27, area A	113
26	natural	11
27	Stony slump, under 28, area A	504
28	Shell midden, over 22, various tips visible, area A	519
29	Sandy soil, over 28, containing heat cracked stone, area A	999
	Total	14,389

Table 102: Sand, lithics by context; Back to 'Sect 3.3.12 Context'

* = not completely catalogued; + = not all artefacts recovered

3.3.5 Significance of the 1999 assemblage

A discussion of the assemblage in terms of the interpretation of activity at Sand is to be found below. This assemblage is of additional significance, however, because it confirmed the presence of archaeological deposits at Sand and indicated that these included at least some Mesolithic activity (Finlayson *et al* 1999). The test pits provided basic information, but detailed excavation was necessary in order to look at the record of human history at Sand with more precision.



Illus 364: Sand – the barbed and tanged arrowhead, baked mudstone

Finally, the presence of a single barbed and tanged point (see Illustration 364, right), recovered by Steven Birch from a molehill during his first visit, to the site is worth noting. This is indicative of activity in the Bronze Age and unlikely to have any relationship with the Mesolithic site. It is interesting to note that there is a Bronze Age date from one of the three human teeth recovered from the midden (B1A Spit 3, Context 13; 2150–1770 cal BC; AA-50698), especially in light of the insertion of burials into midden sites in the Bronze Age (Pollard 1990), though no other human bones occur, and whether three teeth really represent a burial is debatable. It is possible that some small-scale smithing work also took place on top of the midden in the Bronze Age (Sections 3.2 & 3.9) but this left no trace of deliberate alteration of the rockshelter or earlier deposits. In general, the paucity of evidence for Bronze Age activity suggests that this arrowhead represents an isolated loss in the field rather than a suite of settled domestic activities. This is, of course, a likely scenario for arrowheads and has been noted elsewhere, for example at Kinloch on Rùm where the similar find of an isolated Bronze Age arrowhead in advance of the excavation of Mesolithic remains must be dismissed as coincidence (Wickham-Jones 1990).

3.3.6 The excavated assemblage

The excavations in 2000 yielded over 16,000 pieces of flaked stone, of which 14,389, from 23 contexts, have been catalogued. Due to limited time and money it was not possible to catalogue everything and so the analysis concentrated on pieces recovered from contexts below the topsoil and turf.

3.3.7 Stratigraphy

Lithics were recovered from a total of 23 contexts (see Table 102, above) and there were three contexts (6, 9 & 10) which yielded no lithics. In order to simplify understanding of the site the contexts were amalgamated into related units (see Table 103) and this forms the basis of the following discussion. Detailed analysis of Sand suggested that there was no major chronological or cultural divergence in the majority of the finds from the midden (Section 3.2.4), so that for the purposes of the technology and materials the lithic assemblage has been regarded as a unity. This assumption is supported by an examination of the individual aspects of the assemblage.

Table 103

Sand Context Description	Context Numbers	Area	No of Lithics
Topsoil and turf in Trench A (incomplete)	1, 1/2, 1/3	ALL	313
Topsoil and Turf in Trench B, row B *	1, 1 /2, 1/3	B2, B3 & to N	3,181

Main shell midden	13, 11, 12, 13/23, 13/24, 13/23/24, 24	B1, B2, B3	1,962
Shell midden	28	A	519
Slumped stony deposit between midden and sandy soil	27	A	504
Sandy soil with heat cracked stone	17, 29, 17/27	A	4,656
Palaeo-channel and below	5, 14, 14/21	B3	158
Slopewash over palaeo-channel	7/8	B3	1,052
Lower organic rich silt (below midden)	22	A & B3	1,875
Natural	21, 26, 25	ALL	169
		Total	14,389

Table 103: Sand, resolution of Contexts and lithic content
NB: * = A complete catalogue of material from B1B–B21B was made in order to assess lithic material away from the midden

3.3.8 Raw materials

The assemblage is made up of five types of raw material: chalcedonic silica, including flint, chert, agate and jasper; baked mudstone; Rùm bloodstone; quartz, quartzite and rock crystal; and coarse stone, including a variety of sandstones (see Illustration 365, right; and Table 104, below). Both local materials and materials from further afield were used and these are discussed in detail in Section 5. The sources exploited for raw material included both in situ deposits and redeposited materials found as pebble nodules in beach and river gravels.

Illus 365: The main raw materials used at Sand; From top left: Rùm bloodstone ×2, baked mudstone ×2, quartz ×3, with chalcedonic silica ×2 in the centre

Table 104

Material	Quantity	Percent of Total
Baked Mudstone	5,776	39%
Chalcedonic Silicas	2,555	17%
Rùm Bloodstone	1,061	7.5%
Quartz and Quartzite	5,345	36%
Coarse Stone	100	0.5%
Unknown	3	trace
Total	14,840	100%

Table 104: Sand, lithic raw materials, including material from the 1999 test pits

The main outcrops of baked mudstone occur at Staffin Bay on the north coast of Skye, across the Inner Sound from Sand (see Illustration 366, right). Recent blasting means that it is impossible to assess whether or not there was any prehistoric extraction from the outcrops of baked mudstone here, in the cliffs above the site at An Corran, but nodules of baked mudstone are abundant on the beach and in both till and top soil deposits below. It was impossible to tell from the cortex on pieces from Sand whether in situ material was preferred to pebble nodules, but both would have been easily available at Staffin. Baked mudstone

Illus 366: General view of

degrades easily once removed from the parent rock, and it does not occur naturally away from the Staffin Area.

Chalcedonic silica is also plentiful at Staffin, both as it erodes out along the coast and further inland where it may be collected from till deposits in exposures that have been cut by burns such as the Suarbie Burn. Pebble nodules of chalcedonic silica may also be collected from the river gravels and beach here. Elsewhere around the Inner Sound, pebble nodules of chalcedonic silica were not abundant in gravel deposits or on present day beaches, though they are often cited as a component of local rocks. Noteworthy, but isolated, nodules of chalcedonic silica were collected from Flodigarry in North Skye and the beach at Ob Gavascaig in the south. The piece from Flodigarry was found in till; it is a large piece and apparently of good quality flint. There are two much smaller nodules from Ob Gavascaig, both from the present beach and both also apparently of flint.

Rùm bloodstone also outcrops at various sites in the region though work in the 1980s sourced the archaeological material to the island of Rùm (Wickham-Jones 1990). The bloodstone from Sand and other sites of SFS is similar in nature to that from Kinloch on Rùm and is likely to have come from Rùm; a journey of some 60km by sea to the south. Rùm bloodstone was mainly collected as pebble nodules from screes and beaches on the west coast of Rùm (see Illustration 367, right).

Illus 367: Bloodstone Hill, Rùm

Quartz is to be found across the study area, but particularly in the east. It is common in the Applecross area around Sand, and quartz nodules may be collected from both gravels and near to outcrops and exposures of bedrock. There were plenty of quartz pebble nodules from Sand (see below), but the material of the assemblage suggests that some vein quartz was also used.

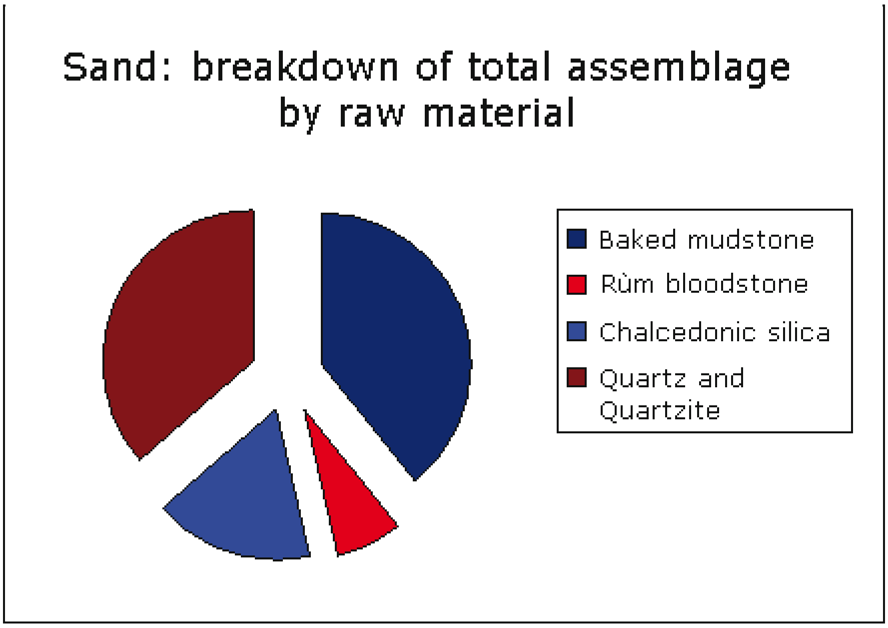
Finally, there were 100 pieces of flaked coarse stone. Most are of micaceous sandstone, a local material that was used for the cobble tools.

Illus 368: The marine transport of pebbles caught in the roots of seaweed, Sand beach 1999

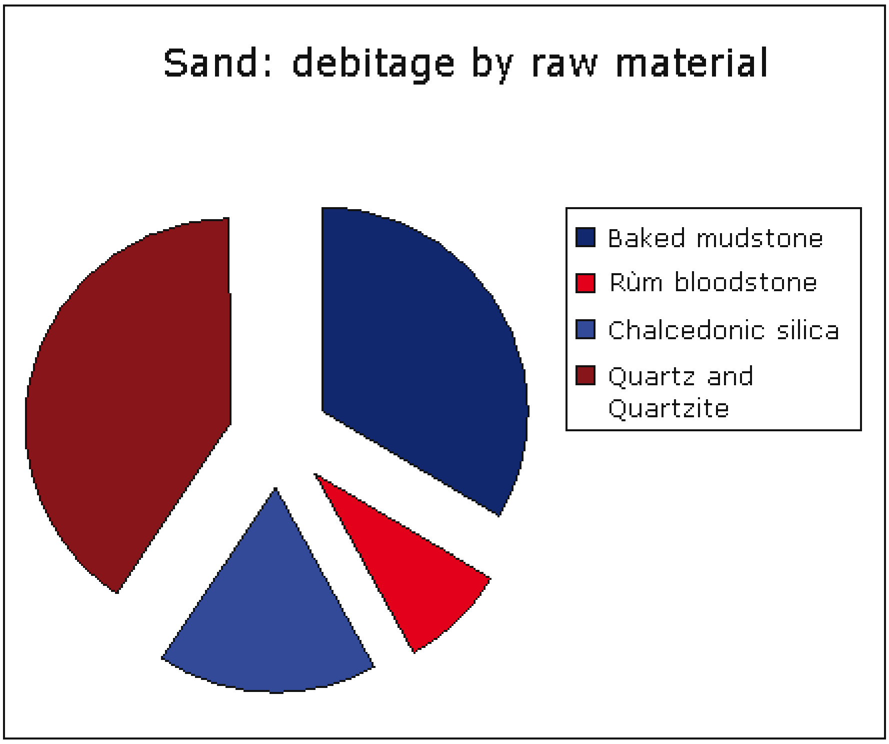
Beachcombing produced little material suitable for knapping from any part of the Inner Sound, though in the bay at Sand there was some evidence of the role of marine transport in the movement of raw materials in the form of stones caught up in the roots of seaweed (see Illustration 368, left). It does not seem, however, that either glacial transport or marine currents played a significant role in the long distance transport of lithic raw materials around the Inner Sound. Human transport has to be responsible for those raw materials found away from their sources.

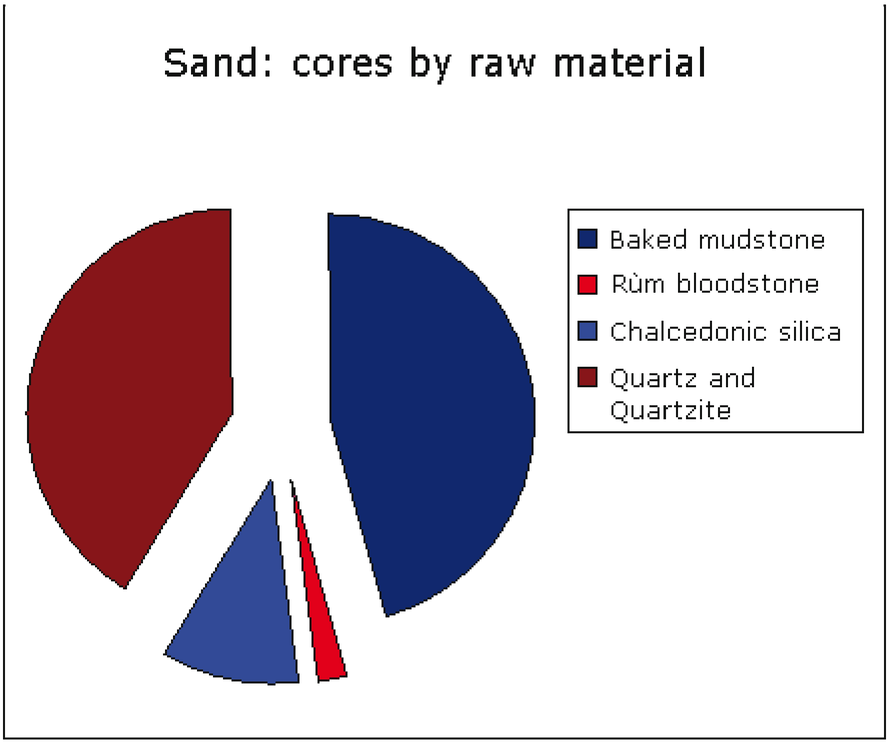
Interestingly, almost one third of the assemblage at Sand is made of baked mudstone, a material that had to be imported. It is likely that the regular flaking characteristics of baked mudstone made it an attractive material for the knappers at Sand, especially as they were keen to make particular types of tool that may well have been easier in mudstone. Blades, regular flakes and retouched pieces are all more common in mudstone (see Illustration 369, below), though it is necessary to look deeper to suggest whether this is a reflection of its more regular qualities or of conscious selection on the part of the knappers. In addition, Finlayson (1990b) has noted that raw material selection is also dependent on the different properties of the various stones when in use. Skip Charts.

Illustration 369: Sand, breakdown of the different categories of artefact by raw material

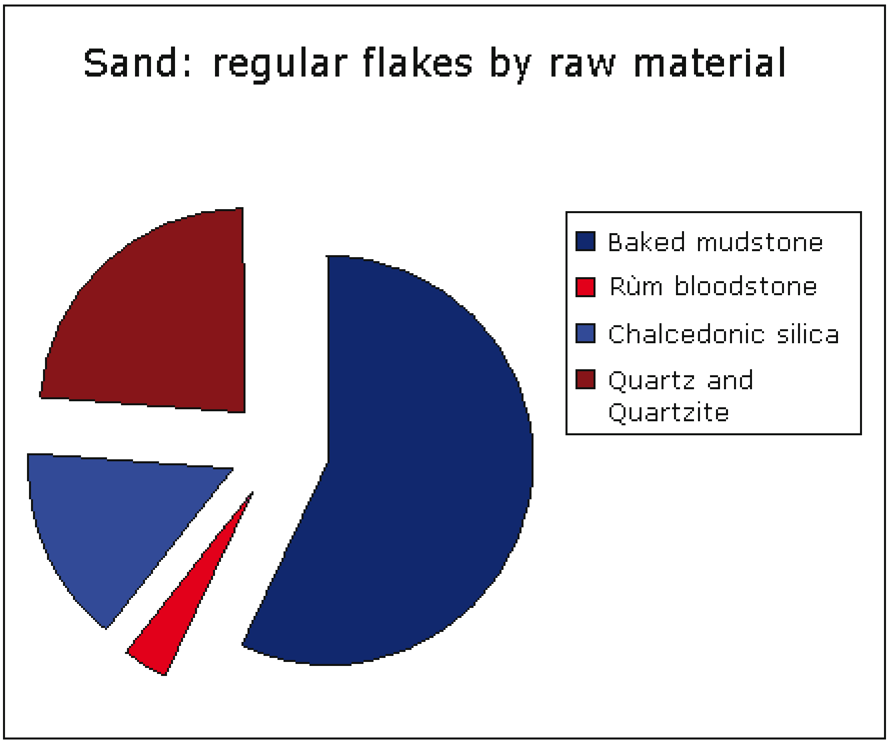


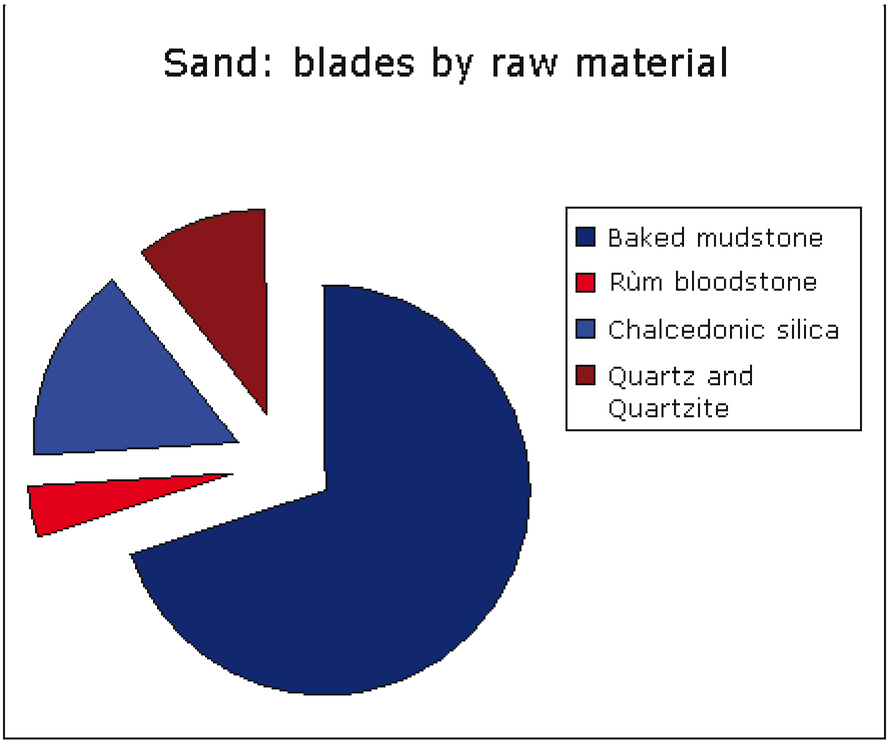
Illus 369a: Sand, breakdowns of total assemblage by raw material



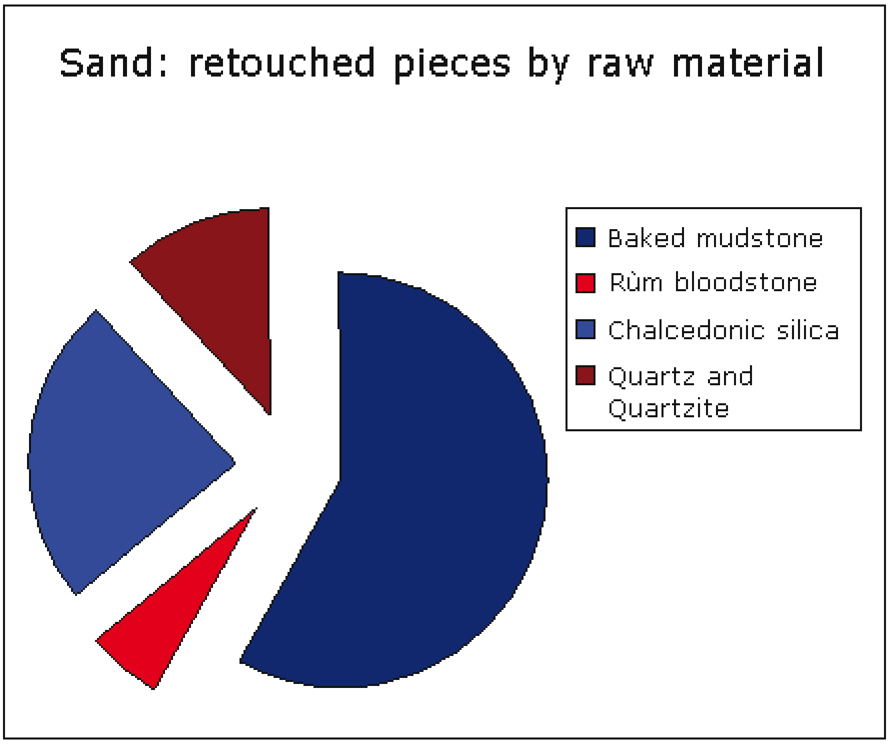


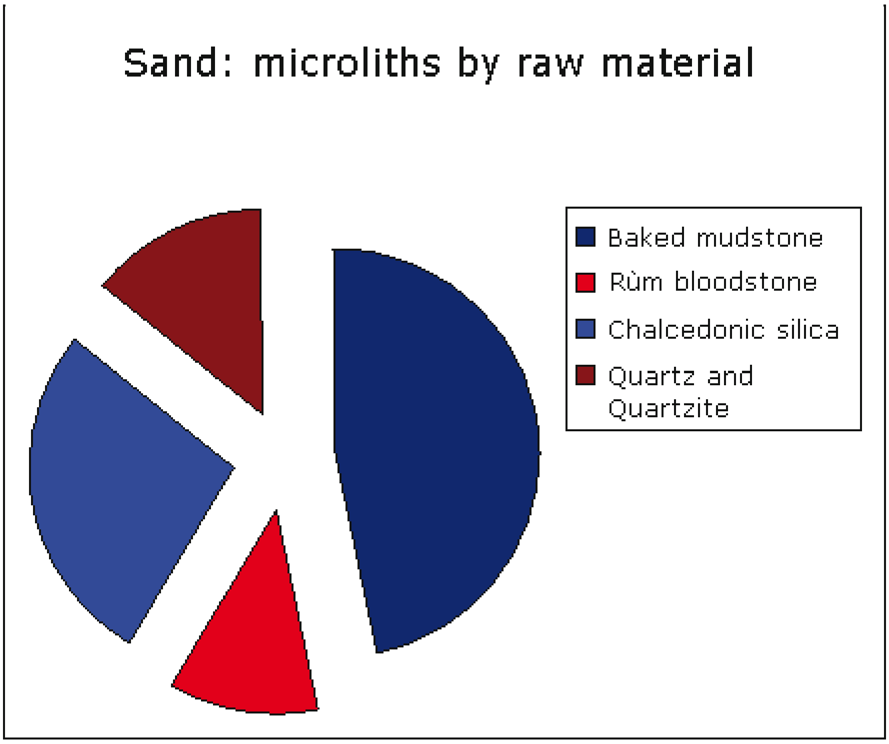
Illus 369 b & c: Sand, debitage and cores by raw material





Illus 369 d & e: Sand, regular flakes and blades by raw material



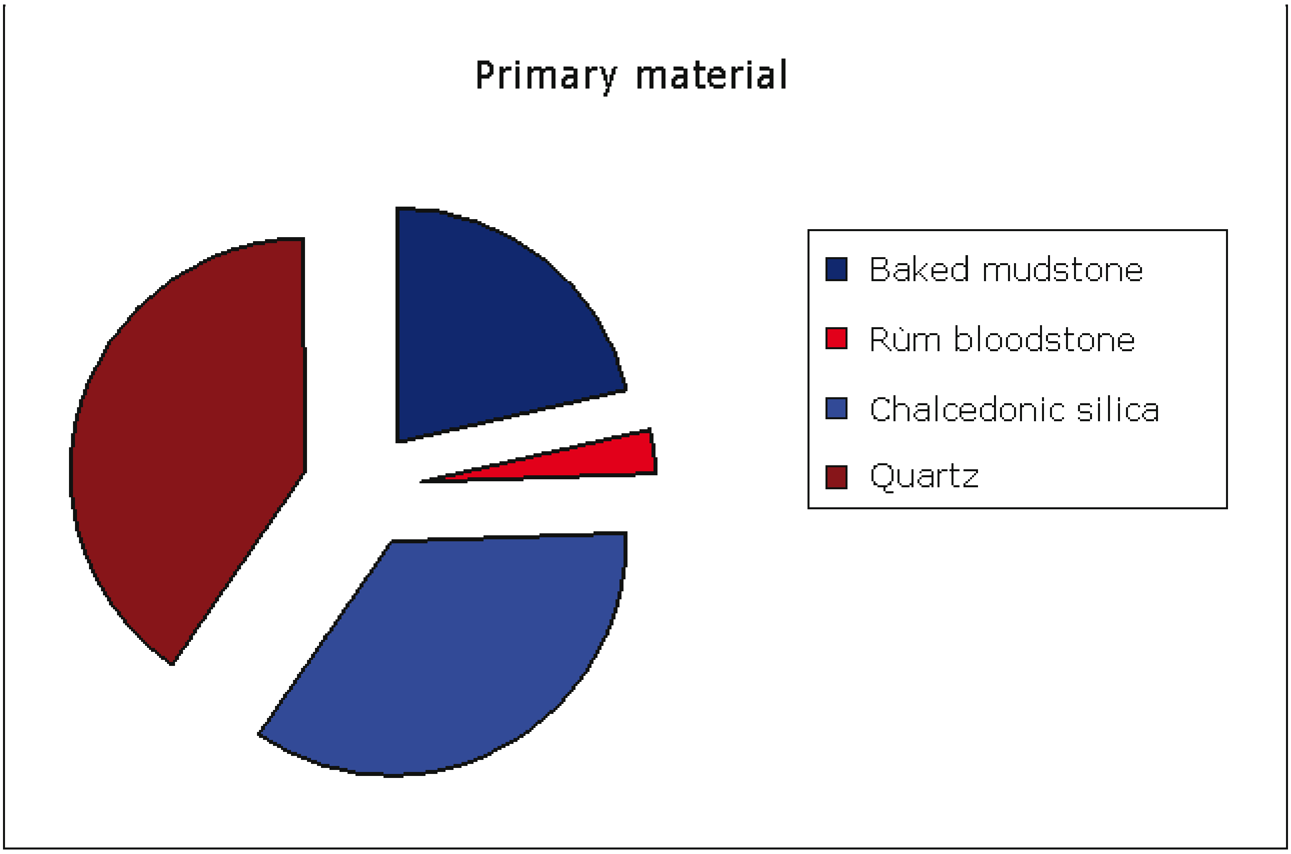


Illus 369 f & g: Sand, retouched pieces and microliths by raw material

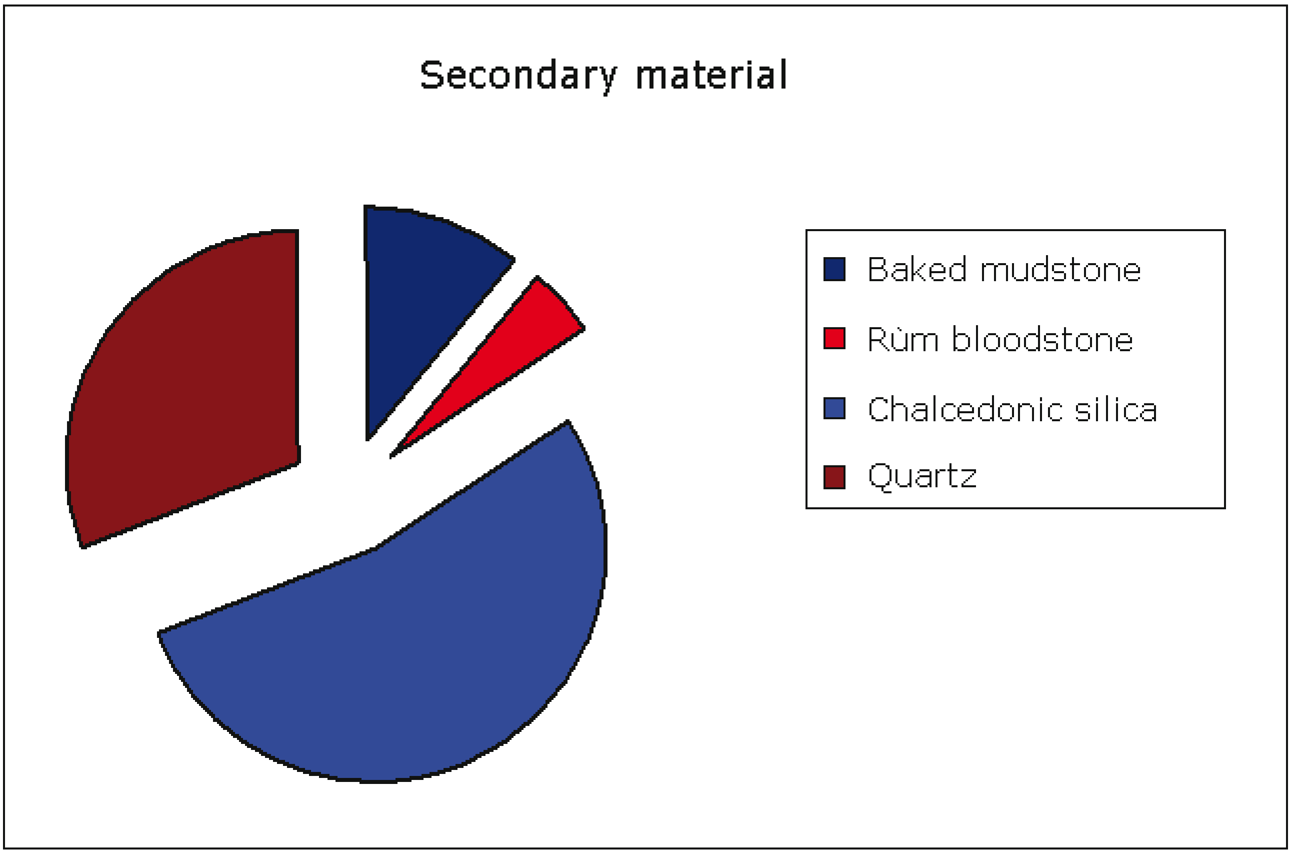
An examination of raw materials broken down by type does suggest some specific strategies on the part of the knappers (see Illustration 369, above). Quantities of debitage reflect the overall breakdown of raw material across the assemblage, and this is no doubt partly a reflection of different knapping characteristics, in that quartz is more friable and will lead to more debitage, as well as of the overall quantities of the different materials. Cores, however, provide an interesting contrast, as do, for different reasons, microliths.

Among the cores it is notable that there are very few cores of Rùm bloodstone, especially in comparison to the overall quantities of bloodstone in the assemblage, and this absence suggests that bloodstone was brought on to site as prepared material. In contrast, cores of baked mudstone, chalcedonic silica, and quartz all reflect the overall quantities of those materials and provide clear evidence of nodule preparation and knapping on site. In support of this there are few cortical pieces of Rùm bloodstone (see Illustration 370 & 371, both below). Most cortical pieces are to be found in chalcedonic silica, and there are also more in quartz, both of which are likely to be local materials. Although there are cores of baked mudstone, indicating that on-site knapping of this material clearly took place, there are not as many cortical pieces in mudstone, suggesting that cortex was removed at source. Distance may well have been a factor in the reduction of unnecessary waste prior to transport. Skip Charts.

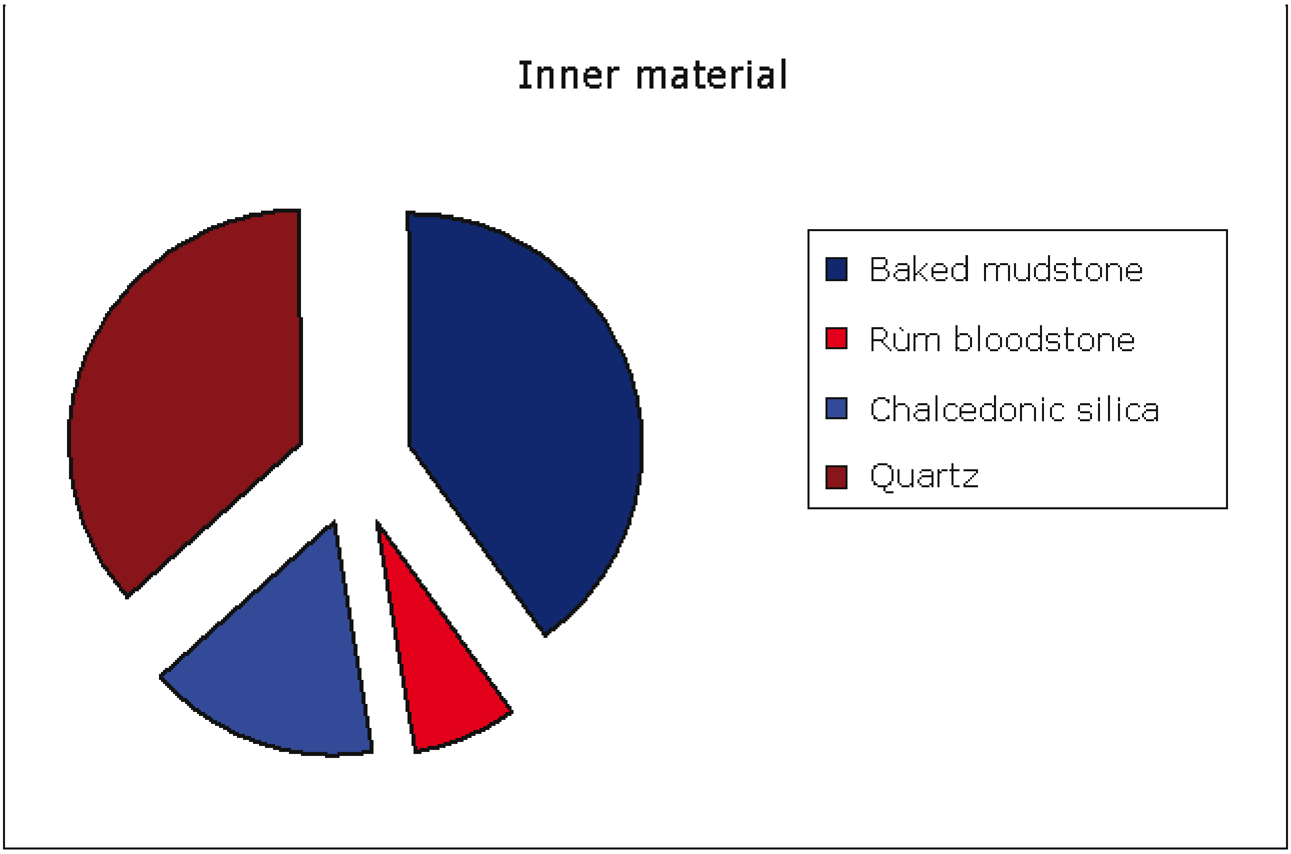
Illustration 370: Sand, breakdown of primary, secondary and inner pieces by raw material



Illus 370a: Sand, primary material

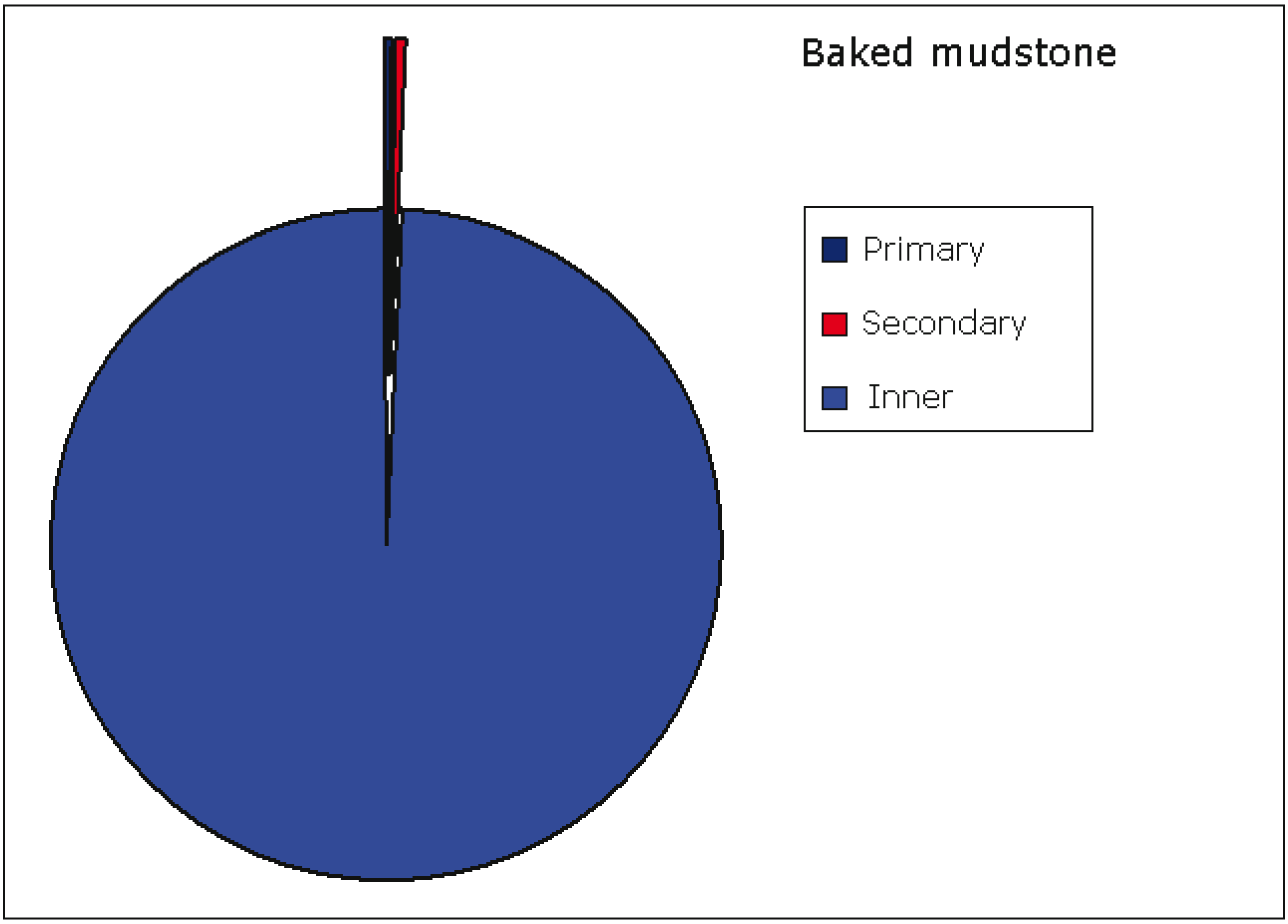


Illus 370b: Sand, secondary material

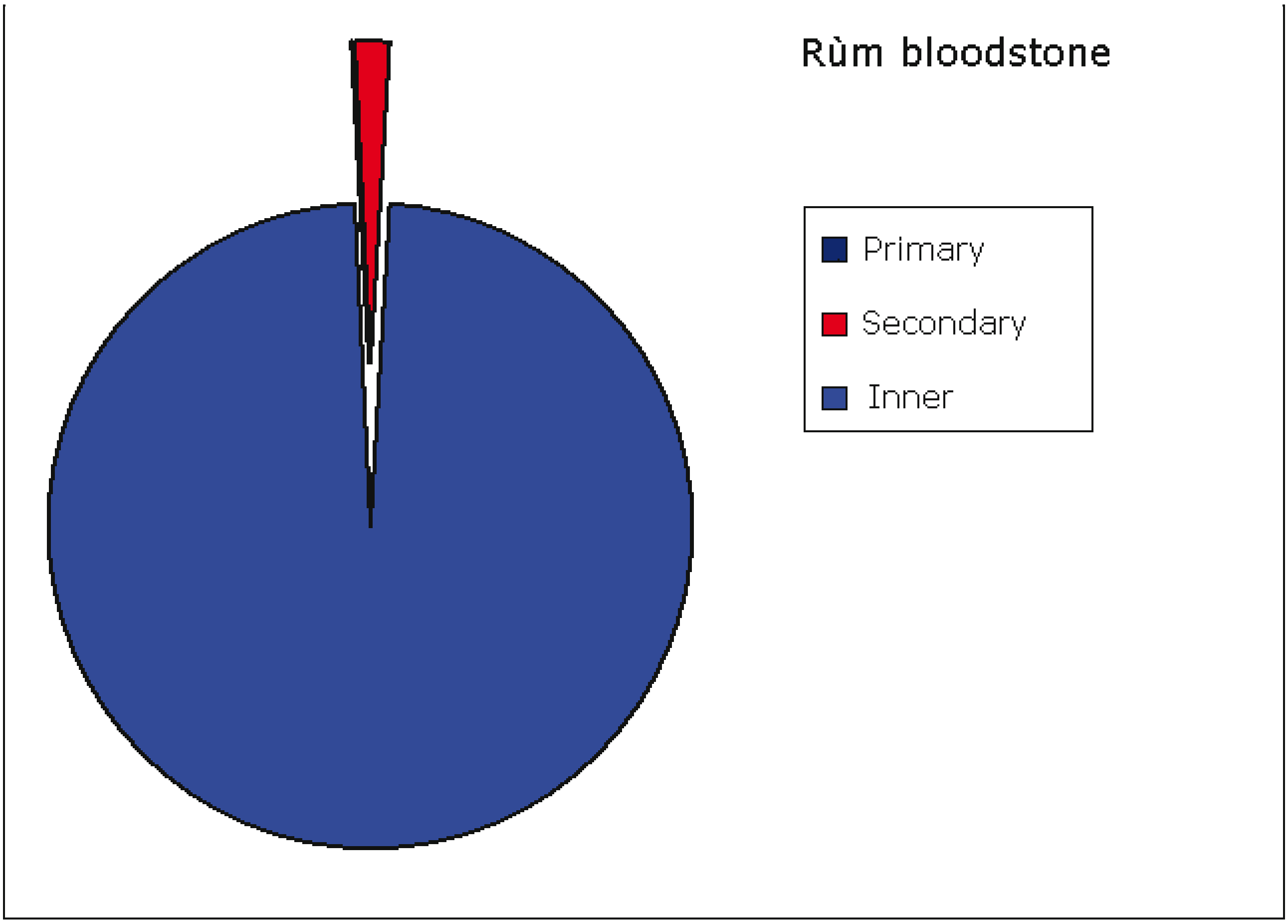


Illus 370c: Sand, inner material

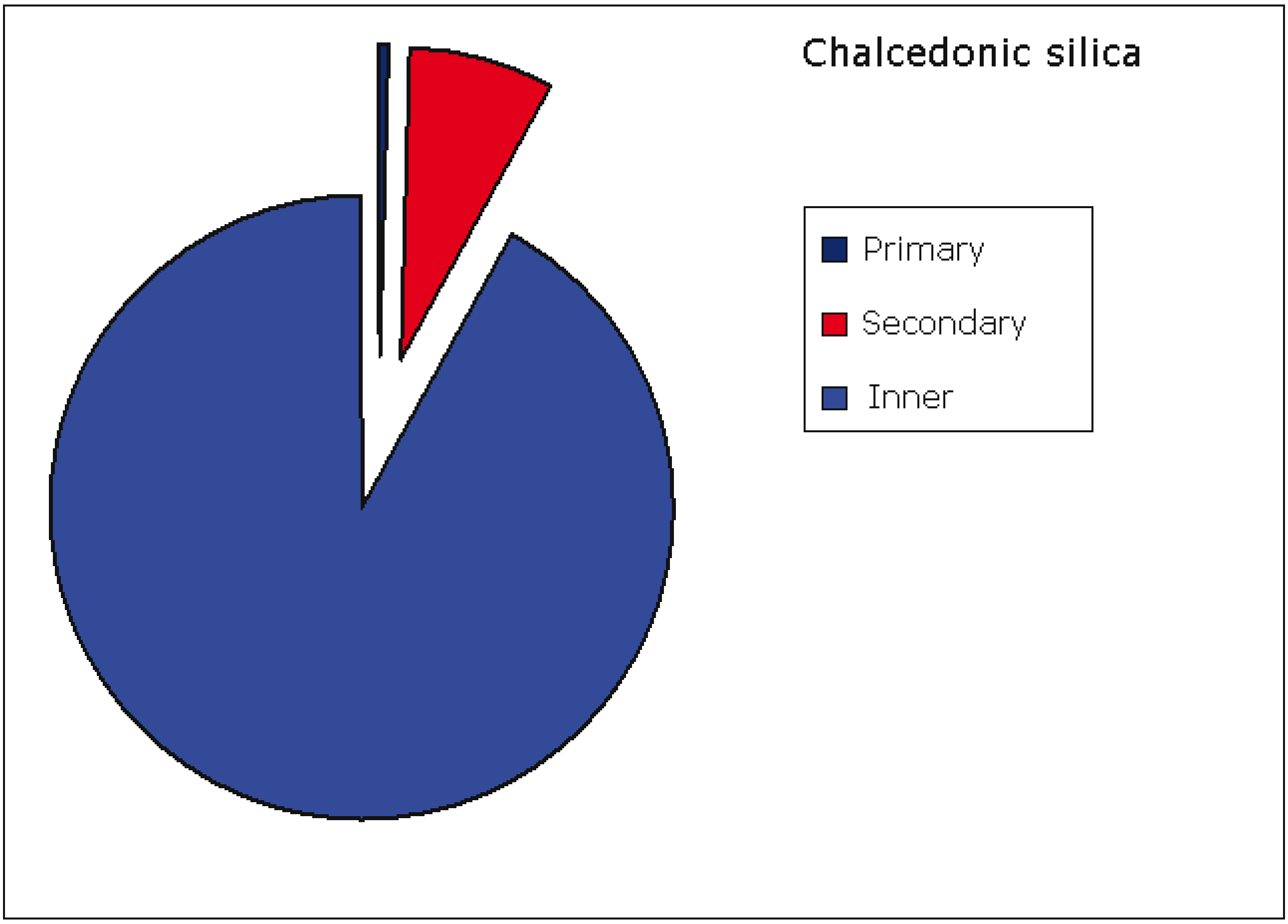
Illustration 371: Sand, breakdown of the cortical component of the different raw materials



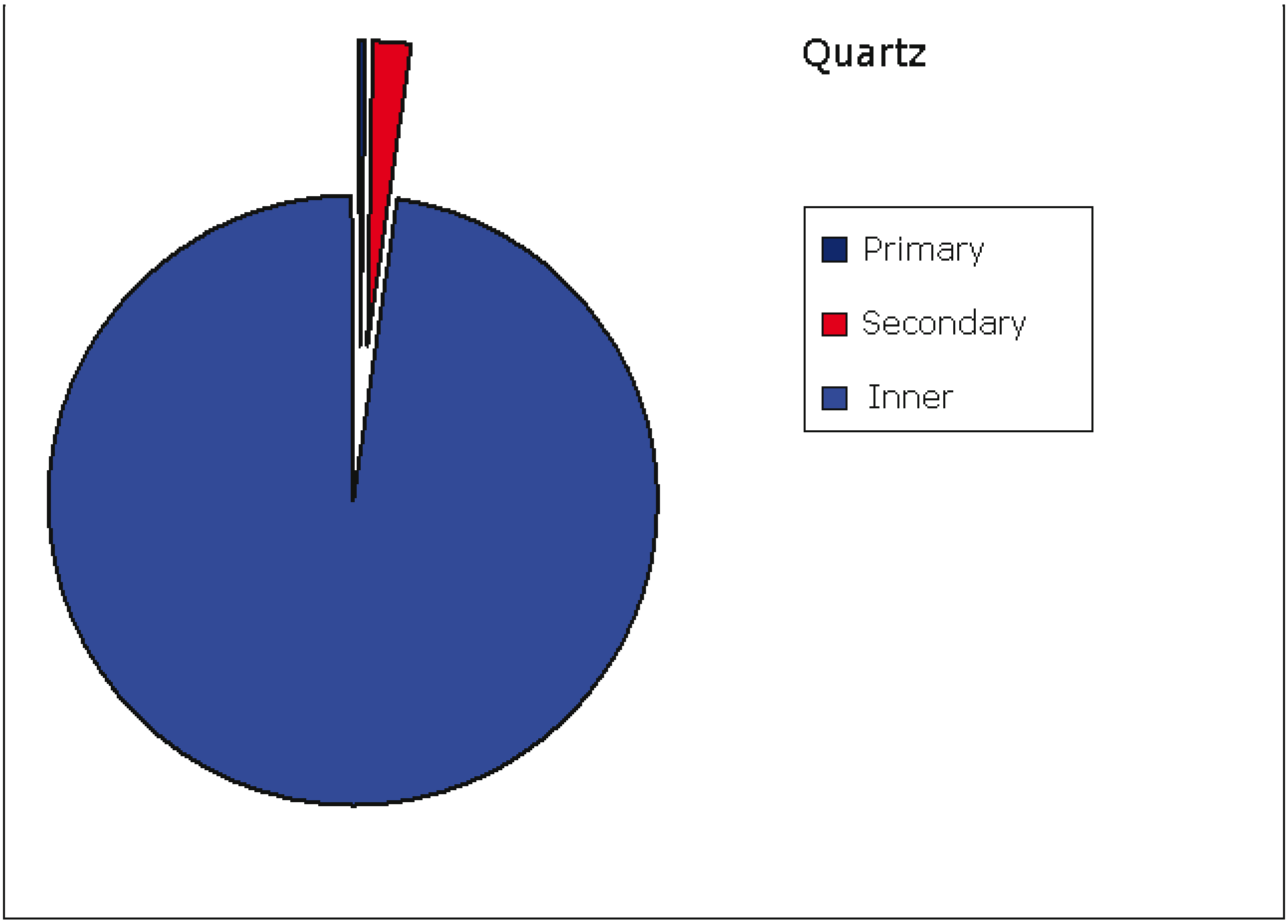
Illus 371a: Sand, baked mudstone



Illus 371b: Sand, Rùm bloodstone



Illus 371c: Sand, chalcedonic silica



Illus 371d: Sand, quartz

Blades, as discussed above, and regular flakes as well as retouched pieces, are most common in baked mudstone and there are relatively few blades and flakes of quartz. This no doubt reflects the relative problems of making regular pieces from quartz – something of which the knappers at Sand would have been only too aware. When possible, they chose to make pieces of better materials, even if they had to import those materials from further afield, but they were not averse to using quartz when they had to and could produce very respectable quartz tools.

In contrast to the other types of flaked tools, microliths are surprisingly common in Rùm bloodstone, even though it also had to be imported. Chalcedonic silica was also important for microlith manufacture, though baked mudstone still predominates. Interestingly, quartz was used very successfully to make some microliths and retouched pieces.

In any assemblage that deals with worked quartz it is important to note the general problems of recognising today those pieces of worked quartz that may have been considered suitable for use in the past. Work on the use-wear of quartz assemblages in Scandinavia has shown that a high proportion of apparent irregular waste has often been used (Broadbent 1979; Knutsson 1988). This is no doubt compounded by the irregular fracture of most quartz, and it is salutary to consider whether or not it might also be reflected in the irregular debitage of many flint and chert assemblages.

The evidence does suggest that the knappers at Sand had access to a variety of materials, both imported and local and that they exploited the different potential of each material for the individual types of tool that they needed.

3.3.9 Technology

The knappers at Sand were working with a variety of raw materials of varying quality. Some material was prepared to a certain extent before it arrived in that the more coarse outer material had been removed. Some came in fresh from the outcrops, some as rolled beach pebbles and there was a spectrum of material in between. There are 22 pebble nodules among the assemblage from Sand, mostly of quartz (15 pieces). All are small (some very small) and may represent natural background material, though a few are bigger (up to 44mm in length) and some have clearly been tested and flaked. There are six pebbles of chalcedonic silica, all are quite small (37mm in length is the maximum dimension) but they are of good quality material and some have had flakes removed. There are no pebbles of Rùm bloodstone (in accordance with the general lack of cortical material of Rùm bloodstone), but there is one pebble of baked mudstone. Interestingly, this is a large good quality pebble (70mm long) which has been split, suggesting that it was bought on to site as raw material.

These pebbles suggest that the knappers were dealing with small units of raw material and this is supported by the sizes of the cores, flakes and other artefacts (see below).

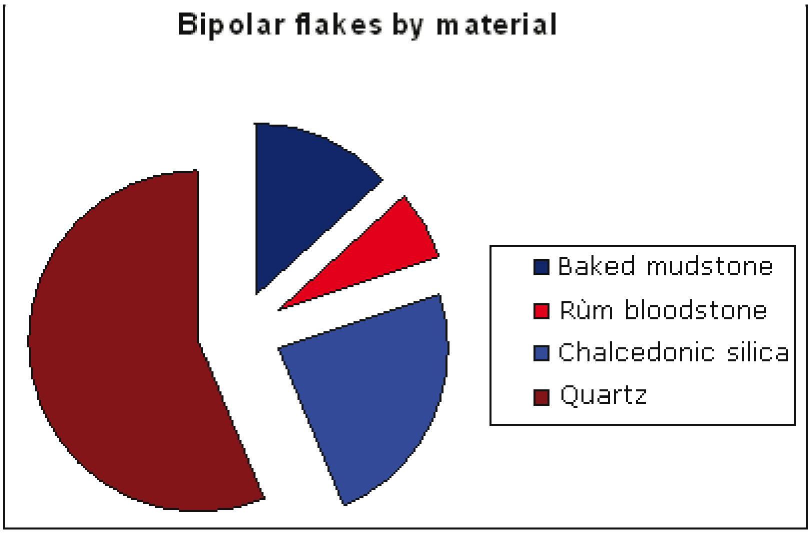
Time and money did not allow the recording of detailed information regarding the knapping techniques at Sand. This is a shame because it would be interesting to look at differences in knapping techniques between the different types of raw material. It is hoped that this may yet take place under some future project.

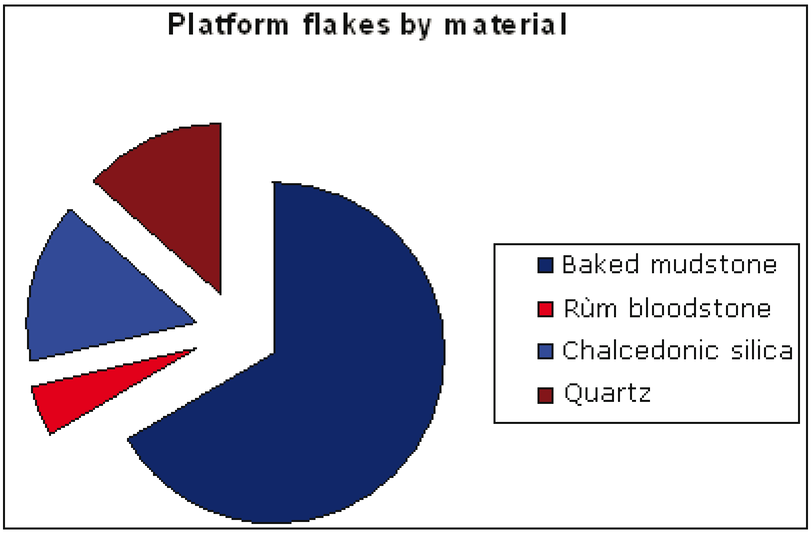
Basic information was recorded on core types, however, and this provides some detail. There are 39 cores in the assemblage, of all the main materials, though most are of baked mudstone or quartz: there are only two of Rùm bloodstone and three of chalcedonic silica. The cores are divided almost equally into platform (19) and bipolar (20) cores, though most of the cores of baked mudstone are platform cores (13 out of 19), while most of the quartz cores are bipolar (12 out of 15). This probably reflects the chosen way of dealing with the properties of these raw materials. Interestingly, three bipolar cores have signs of previous platform flaking, which supports theories that the two techniques were not mutually exclusive but part of a continuum of knapping techniques. The two types of core are of remarkably similar size: most are between 10 and 30mm in length. Some were clearly not exhausted, while others had been flaked down to fine spalls. Most of the cores have no cortical material, though there are 12 with some cortex (five platform; seven bipolar). One quartz core had clearly come from material taken directly from a vein (17/301) while others could clearly be seen to have come from pebble nodules (for example: 29/13).

In addition, a quick note was made where bipolar characteristics were observed on other artefacts. The record of bipolar characteristics on whole flakes adds to our understanding of the use of handheld percussion versus bipolar percussion. This is of interest given queries regarding the status of bipolar knapping in the Mesolithic (Wickham-Jones 1990:167). Furthermore, bipolar knapping is a technique that is sometimes preferred for the working of intractable materials or small pebble nodules such as many of those used at Sand.

Of 795 whole, regular, flakes in the assemblage, 151 (19%) show bipolar characteristics. Most of these are of quartz (see Illustration 372, below). Interestingly, while bipolar knapping was used for roughly half of the regular flakes of quartz, it only accounted for a third of those flakes of chalcedonic silica and Rùm bloodstone, and less than 5% of flakes of baked mudstone (see Illustration 373, below). Skip charts.

Illustration 372: Sand, whole regular flakes by platform type and material





Illus 372a & b: Sand, bipolar flakes and platform flakes by material

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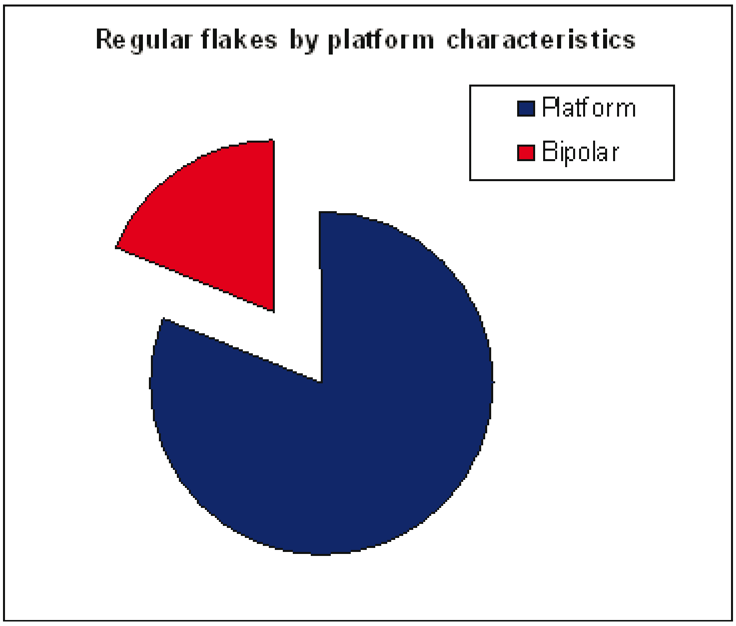
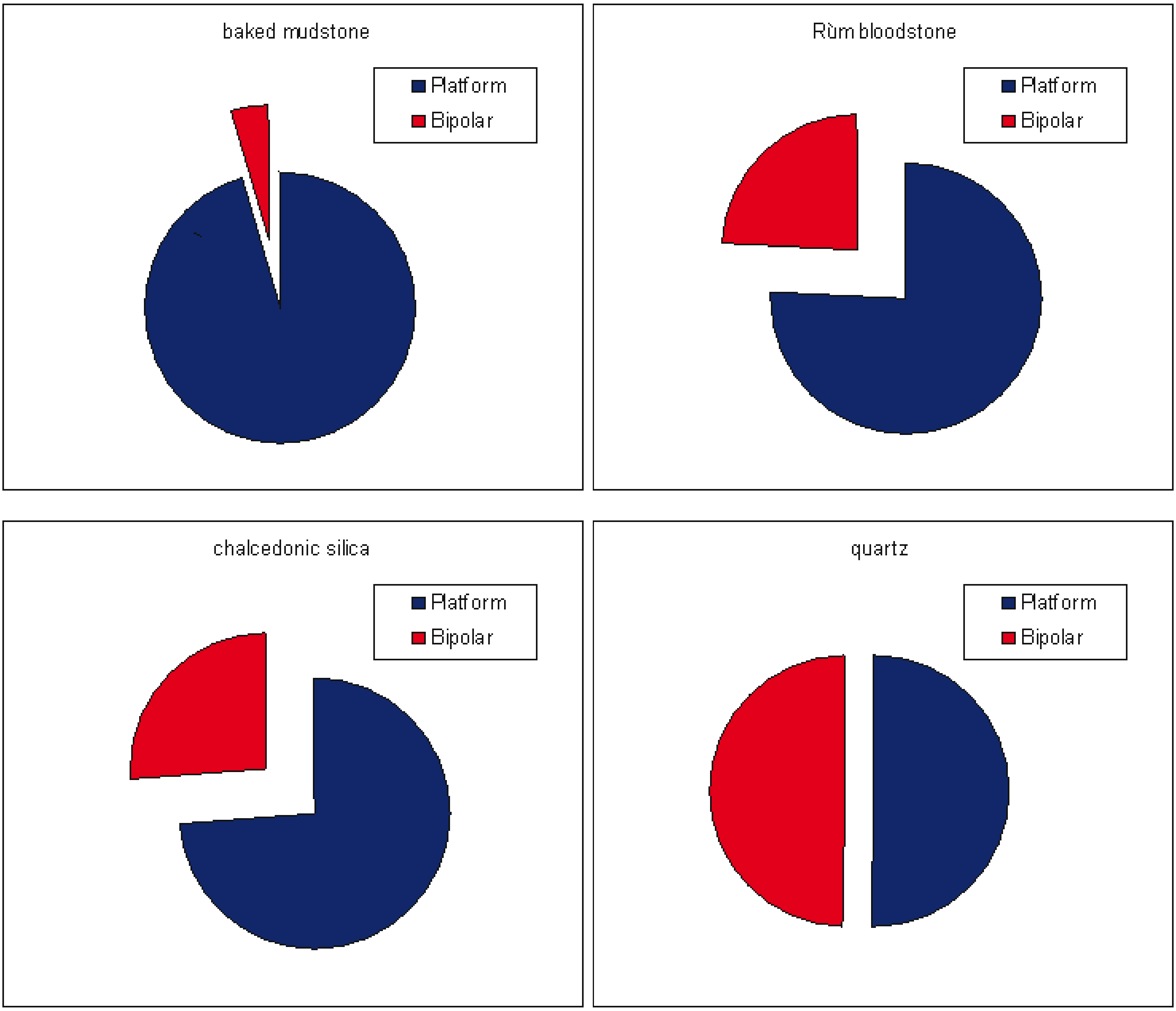
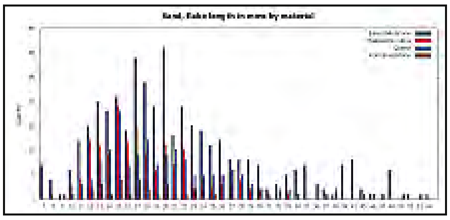
Illustration 373: Sand, breakdown of the regular flakes by platform characteristics and material





Not surprisingly, flake length shows a strong correlation with core length. Most flakes are between 10 and 30mm in length. Illustration 374 (right) shows that it was possible for the knappers to make more, longer flakes of baked mudstone and quartz. This was affected no doubt by the size of nodule available, as well as the better quality of the baked mudstone and abundance of quartz.



Illus 374: Sand, flake length in mms by material (Total 719); click for larger size

The evidence of both flakes and cores suggests that the knappers at Sand were using direct percussion in combination with both handheld cores and cores which were supported on an anvil. They were clearly varying their techniques to take account of the different qualities of the material with which they were working.

Finally, it is worth remembering that the knappers were also working coarse stone, a material that might be thought of as rather intractable. There are 100 pieces of this material, some of which are large and regular, and this should not be regarded as unusual in view of the presence of a number of cobble tools. Although few of the cobble tools have been modified by deliberate flaking, the patterns of breakage mean that some large flakes would have been produced as a by-product. Some of these flakes may well have been suitable for use and it would not take long for people to realise that similar flakes could be made deliberately. It is likely that the knappers were making use of the raw material available in out-of-use cobble tools rather than collecting this specifically for flaking. Knapping of the coarse stone is likely to have required more force and it would be harder to control the end product but the pieces here show that on occasion it could be a useful source of material.

3.3.10 Types

The knappers at Sand were making a range of artefacts (see Table 105). Seventy-seven percent of the assemblage is debitage, mainly debitage flakes, but there are also many regular flakes and blades, as well as the pieces with secondary working.

Table 105

Type	Quantity	Percent
Pebbles	22	0.1%
Chunks	323	2%
Cores	39	0.3%
Debitage Flakes	10,753	75%
Regular Flakes	2,795	19.5%
Blades	235	1.5%
Retouched Pieces	62	0.5%
Axe	1	trace
Scrapers	21	
Edge Retouched	27	
Awls	3	
Notched	3	
Bifacial Indeterminate	1	
Transverse Arrowheads	2	
Miscellaneous	5	
Microliths	159	1.1%
Microburins	6	
Backed Bladelets	14	
Rods	3	
Crescents	41	
Fine Points	36	
Scalene Triangles	5	
Obliquely Blunted points	1	
Miscellaneous Microliths	53	
Total Assemblage	14,389	100%

Table 105: Sand, breakdown of the whole assemblage by type

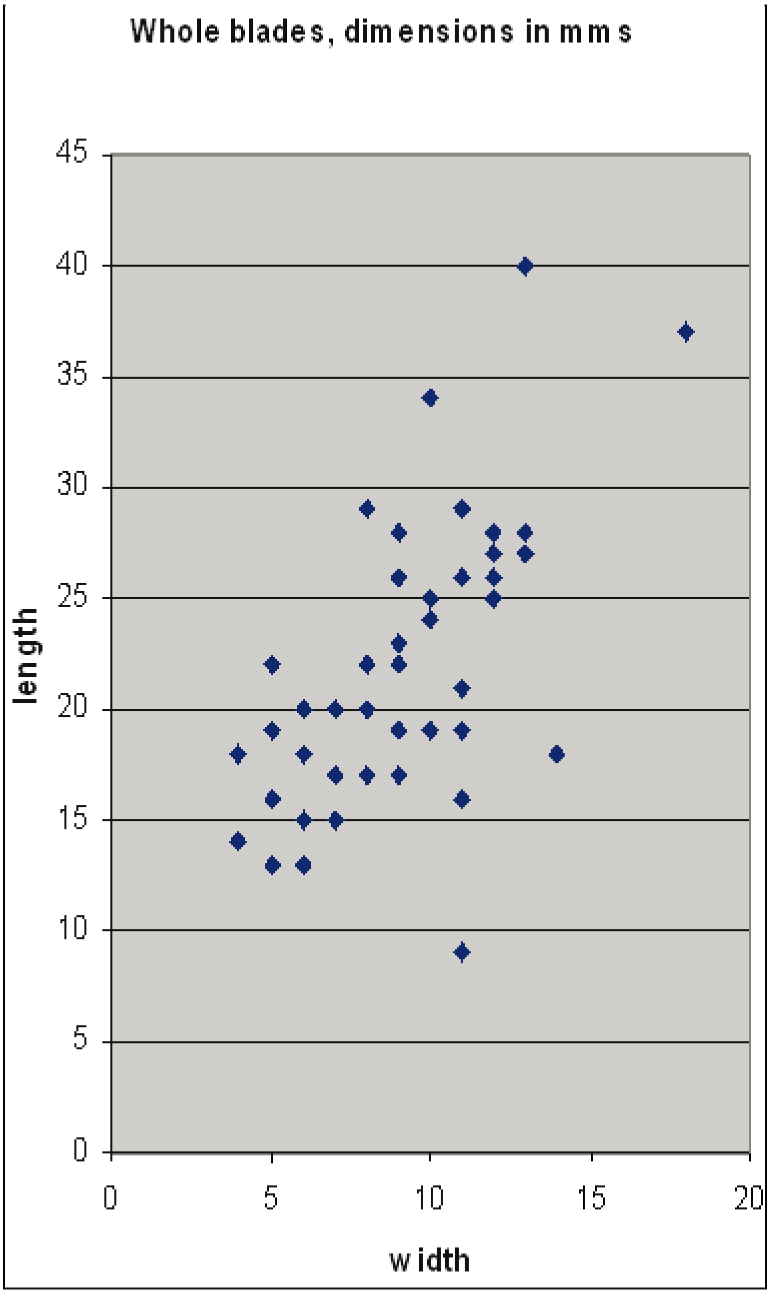
3.3.10.1 Flakes and blades

The measurements of whole flakes have been discussed in the previous section (Section 3.3.9, above). Many are broken. Resources were not available to undertake use-wear or residue analysis, but there were clearly plenty of pieces suitable for a range of tasks, and it is likely that many had been used. This applies equally to pieces without secondary working as well as to more elaborate tool types.

The ratio of flakes to blades, 8% (known as the lamellar index, Bordes & Gaussen 1970), does not suggest that blades were preferred over flakes, but they were clearly an important element of the knappers' repertoire. Most blades are made of baked mudstone (see Illustration 369, above) but if the lamellar index is worked out individually for each type of raw material (see Table 106, below), it does not alter the overall picture that blades, while important, were not preferred to flakes, though there is considerable variation between the different raw materials.

Table 106	
Raw Material	Lamellar Index
Baked Mudstone	10%
Rùm Bloodstone	11%
Chalcedonic Silica	9%
Quartz	4%

Table 106: Sand, lamellar index by raw material

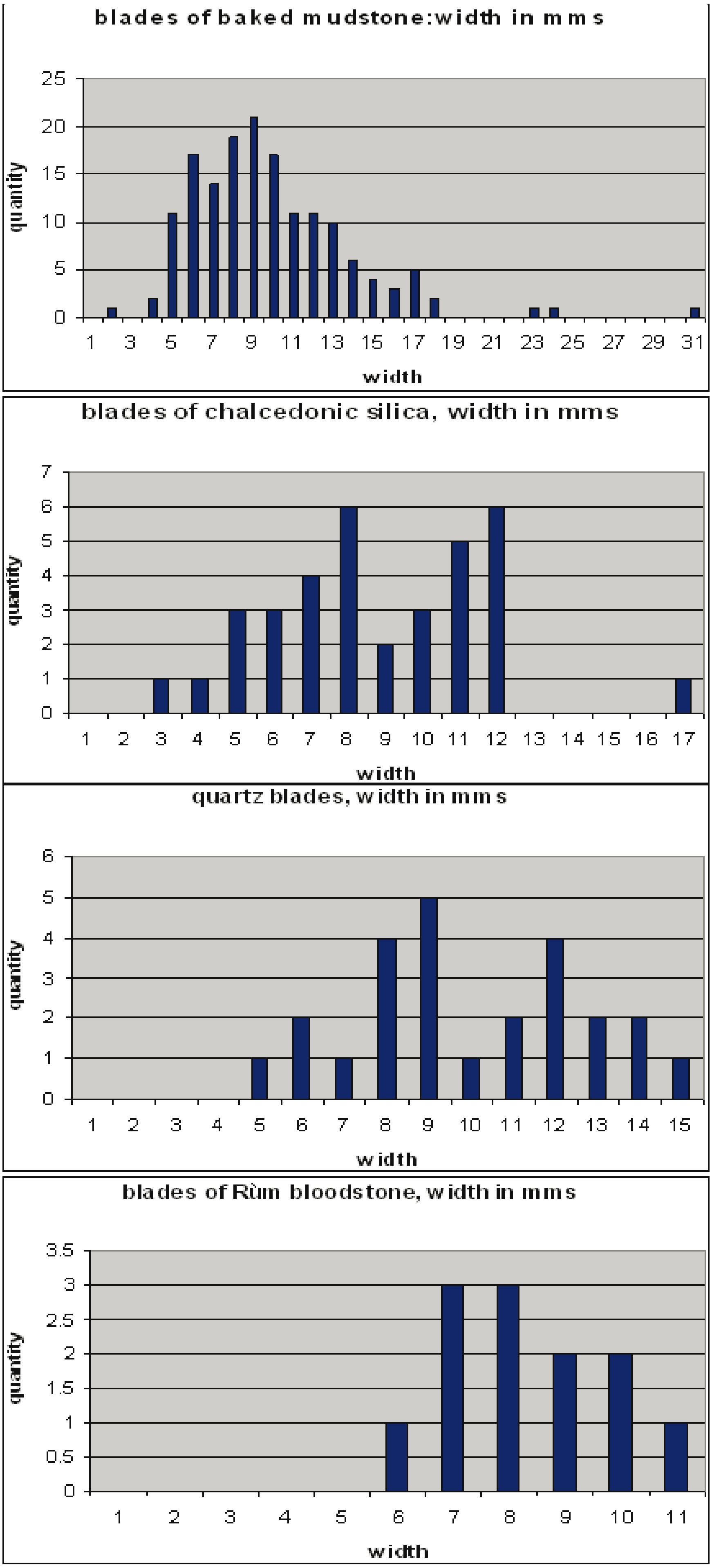


Illus 375: Sand, dimensions of whole blades in mm

An important feature of blades on Mesolithic sites is their size, in particular their width, which has been used to draw conclusions about the date or cultural affinities of the assemblage. The dimensions of whole blades at Sand (see Illustration 375, right) are remarkably similar to those from Kinloch, Rùm (Zetterlund 1990). The Kinloch blades were divided by width into chips (less than 5mm), narrow blades (5–8mm) and blades (over 8mm). If these divisions are applied to the Sand blades, then there are similar proportions of the different categories to those from Kinloch. Not surprisingly the dimensions of the Sand blades fall within the parameters of the flakes from Sand (see Illustration 374, above) and fit well within the lengths at which cores were abandoned.

An examination of the widths of all blades, by material (see Illustration 376, below) does not suggest that material had much effect on blade width, with the obvious caveat that there are more wider blades of baked mudstone, but there are more blades of mudstone anyway. There is some support among blades of chalcedonic silica and quartz for a specific group of wider blades, over 8mm in width.

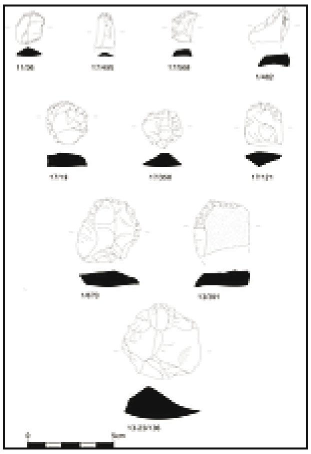
Illustration 376: Sand, blade width in mm by material



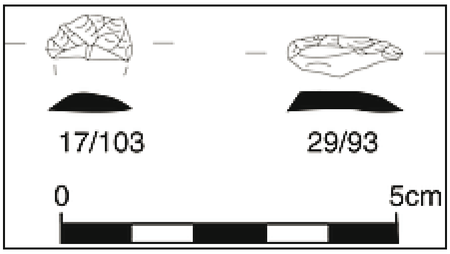
Illus 376: Sand, blade width in mm by material

It is clear that an important part of the repertoire of the knappers at Sand was the production of flakes and blades for use without modification. But they also made a variety of tools that incorporated secondary alteration by retouching. These included larger pieces like the scrapers and edge-retouched pieces, as well as many different types of microlith.

3.3.10.2 Scrapers



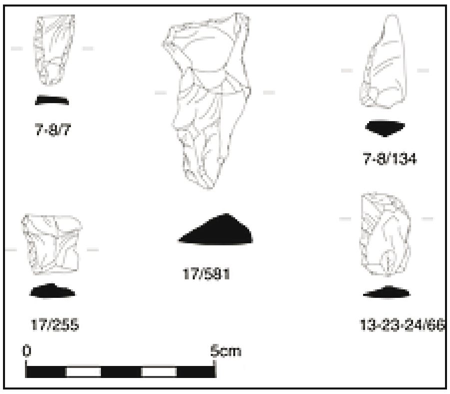
Illus 377: Sand, scraper re-sharpening flakes. Baked Mudstone: 17/495; 17/568; 17/19; 17/358; 17/121; 1/670; 13-23/136. Chalcedonic Silica: 11/36; 1/482. Quartz: 13/391



Illus 378: Sand, scraper re-sharpening flakes. Baked mudstone: 29/93; Chalcedonic silica: 17/103

There are 21 scrapers, all but two of which are made on flake blanks (see Illustration 377, right). Thirteen are made of baked mudstone, six of chalcedonic silica and two of quartz. Most (12) of the scrapers have retouch on the distal end to form an end scraper (Illustration 377, 17/495; 17/121), five of these also have some retouch on one side (Illustration 377, 17/568). There are three big horseshoe scrapers (Illustration 377, 1/670; 13/391; 13-23/136), and one tiny thumbnail scraper (Illustration 377, 17/358). In addition there is one broken scraper and four scraper re-sharpening flakes, struck across the scraper face in order to rework it (see Illustration 378, right). Angled scrapers such as those from Kinloch (Wickham-Jones & McCartan 1990) are absent – one of the end and side scrapers might fit into this category (Illustration 377, 1/482). Four scrapers have noticeable tangs opposite the scraper face (usually on the proximal end of an end scraper) which was another common trait among the scrapers at Kinloch, possibly resulting from preparation for hafting. There is considerable size variation among the scrapers, but it is worth remembering that, as a rule, archaeology deals with waste or accidental loss so that they may well have been changed through breakage or re-sharpening since they were originally made. In addition the knappers could only work within the confines of their raw material. In this respect it is worth noting that many of the scrapers are over 20mm long, suggesting that larger flakes were selected for alteration.

3.3.10.3 Edge-retouched pieces



Illus 379: Sand – edge-retouched pieces. Baked mudstone: 7–8/7; 7–8/134; 17/255; 17/581; Chalcedonic silica: 13–23–24/66

There are 27 edge-retouched pieces (see Illustration 379, left), most (20) are on flake blanks and the rest on blades. Seventeen are made of baked mudstone, five are chalcedonic silica, four are quartz and there is one of Rùm bloodstone. In general these pieces are broad, and often broken, they tend to be shorter than the scrapers, generally under 20mm long. Most have retouch on only one side (Illustration 379, 7–8/134; 17/255), but five have retouch on more than one side (Illustration 379, 7–8/7; 17/581; 13–23–24/66). In eight cases the right side has been altered, in nine the left side and three have retouch on one or both ends. The retouch is usually steep and tiny, there is considerable variation in both the shape and the configuration of the retouch among these pieces and it is likely that they were prepared for a number of tasks. The lack of use-wear analysis of any type means that this cannot be examined further.

3.3.10.4 Notched pieces

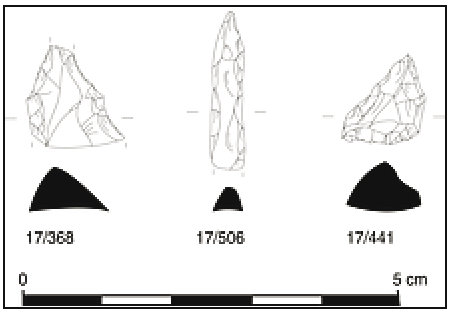
There are three notched pieces (see Illustration 380, left), all from context 7/8 (the slopewash over the palaeo-channel). Two are of baked mudstone and one of

Illus 380: Sand – notched pieces. Baked mudstone: 7–8/135; Chalcedonic silica: 7–8/25

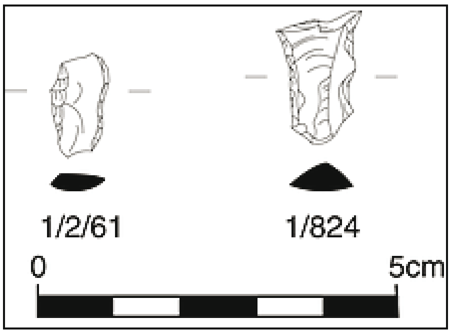
chalcedonic silica. All are on flake blanks and all are quite small. In each case the notch is formed of steep microlithic retouch, though they do not appear to be microburins.

3.3.10.5 Awls

There are three awls (see Illustration 381, right), all from context 017 (the Sandy Soil in Area A). One is on a blade of baked mudstone (17/506), the other two are on chunky flake blanks of chalcedonic silica (17/368 & 17/441). In each case the points are marked, formed at the convergence of steeply retouched sides.



Illus 381: Sand – awls. Baked mudstone: 17/506; Chalcedonic silica: 17/368; 17/441



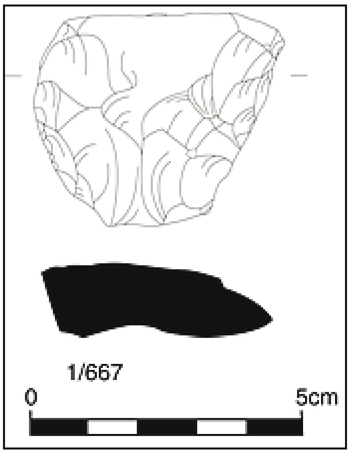
Illus 382: Sand – transverse arrowheads. Chalcedonic silica: 1/824; Rùm bloodstone: 1–2/61

3.3.10.6 Transverse arrowheads

There are two transverse arrowheads (see Illustration 382, left), both from the surface spits of Trench B running away from the midden. Both are on flake blanks, one of Rùm bloodstone and one of chalcedonic silica. Both pieces have steep retouch which has been used to blunt straight, snapped sides while a section of original flake edge has been used to provide a wide tip.

3.3.10.7 Bifacial point

The bifacial tool is made on a large flake of baked mudstone (Illustration 383, right). There is shallow invasive retouch across both faces of the tool, but it is broken so that it is impossible to determine its original nature.



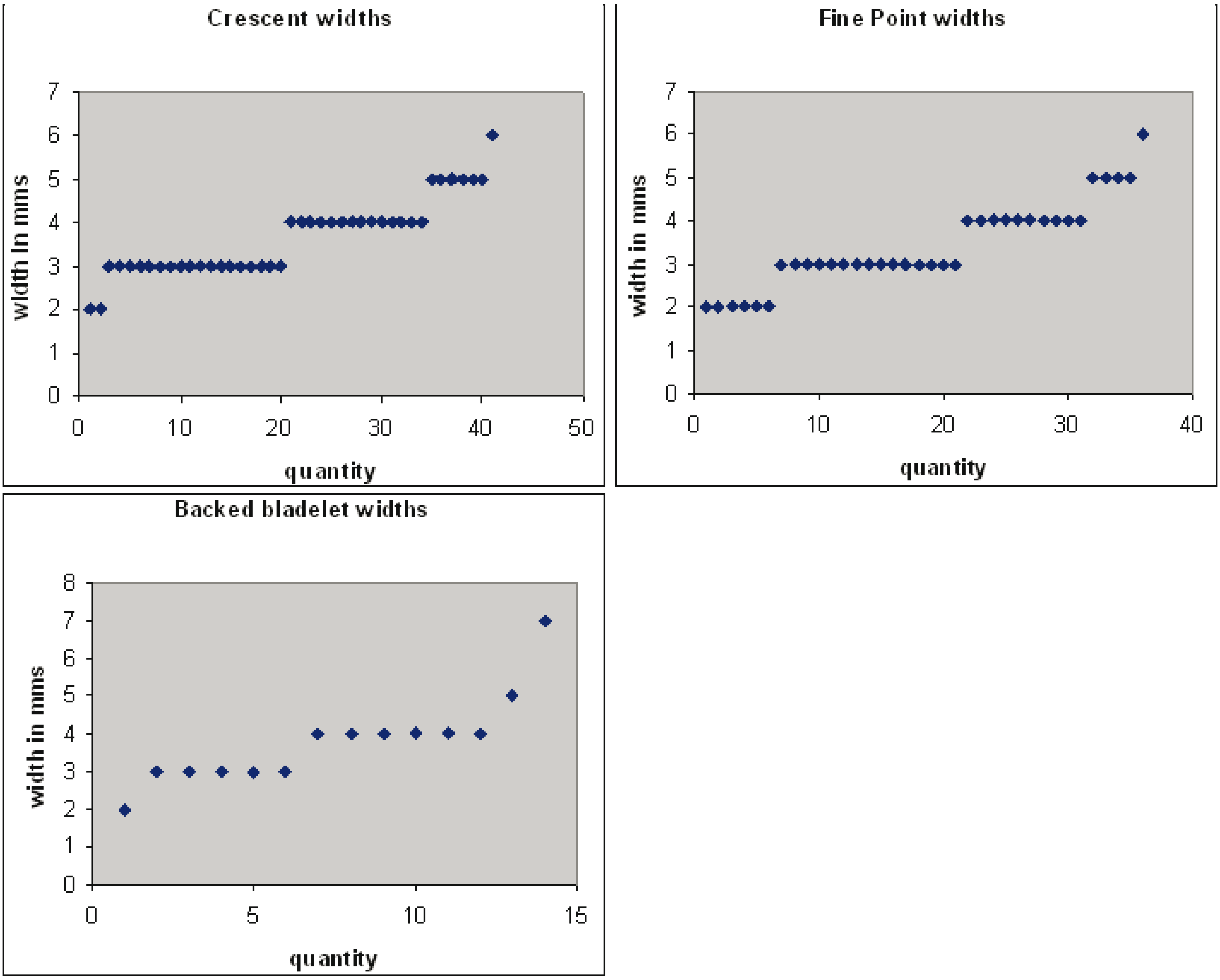
Illus 383: Sand – bifacial indeterminate. Baked mudstone

3.3.10.8 Miscellaneous and broken pieces

There are five miscellaneous pieces – made on a variety of blanks and from a variety of raw materials but all broken so that it is not possible to tell from what tools they originally came.

3.3.10.9 Microliths

There are microliths of all four material types; baked mudstone was most numerous, but tools of the other three materials are also common. The dimensions of both microburins and other microliths (see Illustrations 385, 387 & 389, below) show that they fit closely with the blade assemblage from Sand. Not surprisingly, the microliths are generally narrower than the blades. This is obviously an effect of their manufacture as all of the different microlith types have been retouched along at least one side and therefore reduced in width, but it would seem that the knappers may have been selecting blanks from among the narrower blades. This would be supported by the microburins.



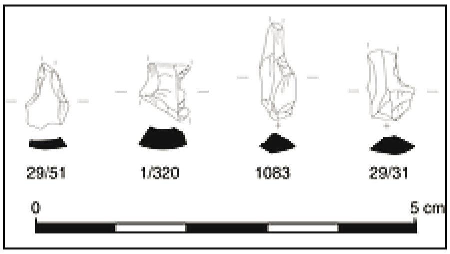
Illus 385, 387 & 389: Sand, widths of crescents, fine points and backed bladelets respectively, in mm

Microburins are traditionally regarded as a side product from microlith manufacture, though opinion is divided as to whether or not they played an essential role. The microburin technique involved the working of a notch towards one end of a blade blank. As this grew deeper it eventually resulted in the snapping of the blade, the remains of which could then be worked into a microlith. Occasionally, both ends were removed in this way. The microburin comprises the waste products, usually the proximal ends each with a characteristic half notch and 'burin' facet (see Illustration 384, below right). Microliths themselves were usually made to a strict 'pattern book' of specific types that occur in differing proportions across all Mesolithic sites. There is some gradation from one type to another and analysts have discussed how to allow for this (Finlayson *et al* 1996), but here more traditional microlith types have been adhered to. Definitions for the different microlith types follow the guidelines developed for Kinloch, Rùm (Wickham-Jones & McCartan 1990, 97–102) and subsequently used on other Scottish Mesolithic sites.

While a few people still see the use of the microburin technique as essential for all microlith manufacture (Ballin in prep), the small numbers of microburins on many sites suggest that microliths could very successfully be made without leaving obvious microburins as debris. This would be supported by the evidence from Sand and other sites (below) and is also the conclusion reached by Finlay in her research on microliths and their manufacture (Finlay 2000b). It is possible that the microburin technique was associated with the manufacture of specific microlith types, in particular scalene triangles (Brinch-Petersen 1966) and this would be supported by the small numbers of both microburins and scalene triangles at Sand (below), but there is not enough evidence to test this assumption here.

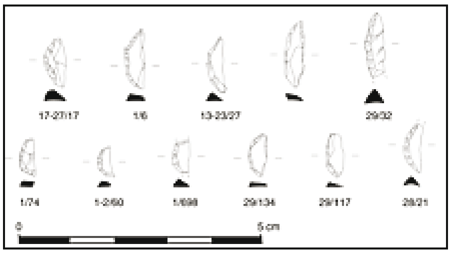
3.3.10.10 Microburins

There are six microburins (see Illustration 384, right). Three are made of baked mudstone, one of chalcedonic silica, one of Rùm bloodstone and one of quartz. Five have had a notch worked on the right side, one on the left side and one has a notch on both sides. On five the proximal end survives, the sixth has lost both ends. Five are between 5 and 7mm in width and one is 10mm, which suggests that the narrower blades were selected for alteration into microliths. This is in line with the widths of the microliths themselves (see below).



Illus 384: Sand – microburins. Baked mudstone: 1/320; 29/31; Rùm bloodstone: 29/51; Quartz: 1083

3.3.10.11 Crescents

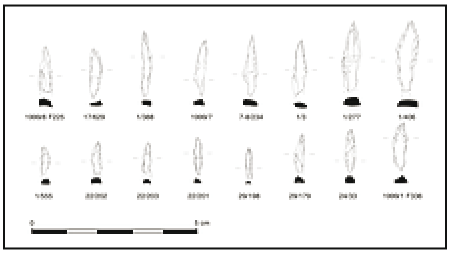


Illus 386: Sand – crescents. Baked mudstone: 13–23/27; 17–27/17; 28/21; 29/32; 29/117; 29/134; Quartz: 1/6; 1/74; 1/698; 1–2/60

Crescents are most numerous among the recognisable microliths: there are 41 (see Illustration 385, above & 386, left) of which 23 are made of baked mudstone, eight of chalcedonic silica, seven of quartz and three of Rùm bloodstone. Most are worked on one side to leave a naturally sharp side, but several have microlithic retouch along both sides. The longest is 15mm long, but most (30) are between 6 and 10mm long, although 17 of these have lost a tip. Width varies from 2 to 6mm (see Illustration 385), with most between 3 and 4mm.

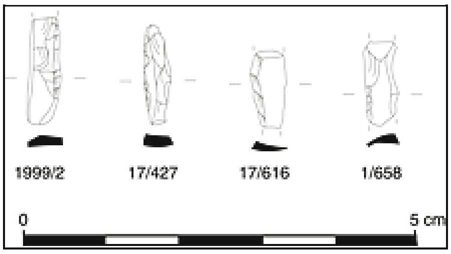
3.3.10.12 Fine points

There are 36 fine points (see Illustration 387, above & 388, right), of which 20 are of baked mudstone, ten of chalcedonic silica, four of quartz and two of Rùm bloodstone. There are a few long pieces (three fine points, each over 20mm long were found in the surface spits of trench B), but most are between 10 and 15mm long, with a few broken fragments as short as 4mm. Most are less than 5mm wide (Illustrations 387 & 388).



Illus 388: Sand – fine points. Baked mudstone: 1/3; 1/277; 1/388; 1/406; 1999/7; 24/33; 29/179; Chalcedonic silica: 1999/6; 7–8/234; 22/202; 22/203; 29/198; Rùm bloodstone: 1999/1; Quartz: 22/201

3.3.10.13 Backed bladelets

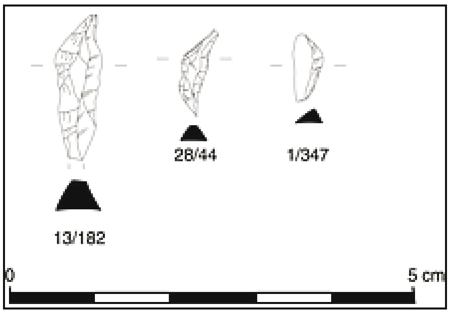


Illus 390: Sand – backed bladelets. Baked mudstone: 1/658; 1999/2; Rùm bloodstone: 17/616; Quartz: 17/427

There are 14 backed bladelets (see Illustration 389, above & 390, left), four of baked mudstone, four of chalcedonic silica, three of quartz and three of Rùm bloodstone. Over half of the backed bladelets are broken and have lost one or both ends, but tools of between 6 and 15mm seem to have been preferred. Most are 3–4mm wide (Illustration 389).

3.3.10.14 Scalene triangles

There are five scalene triangles (see Illustration 391, right), all but one are of baked mudstone, the other is of Rùm bloodstone. They vary between 8 and 17mm in length, and though two have lost one end they may have been generally longer than other microlith types. One is 6mm wide; the other four are 4mm wide.



3.3.10.15 Rods

Illus 391: Sand – scalene triangles. Baked mudstone 1/347; 13/182; Rùm bloodstone 28/44

There are three rods, two of quartz and one of chalcedonic silica. All are broken and they vary between 8 and 12mm long. Two are 4mm wide; one is 3mm wide.

3.3.10.16 Obliquely blunted points

There is one obliquely blunted point, made on a blade of chalcedonic silica that is 9mm wide. It has been snapped and microlithic retouch used to blunt the oblique snap, which lies to the left, as well as the rest of the left side. It is 14mm long. This piece clearly stands out from the rest of the microliths with regard to its width.

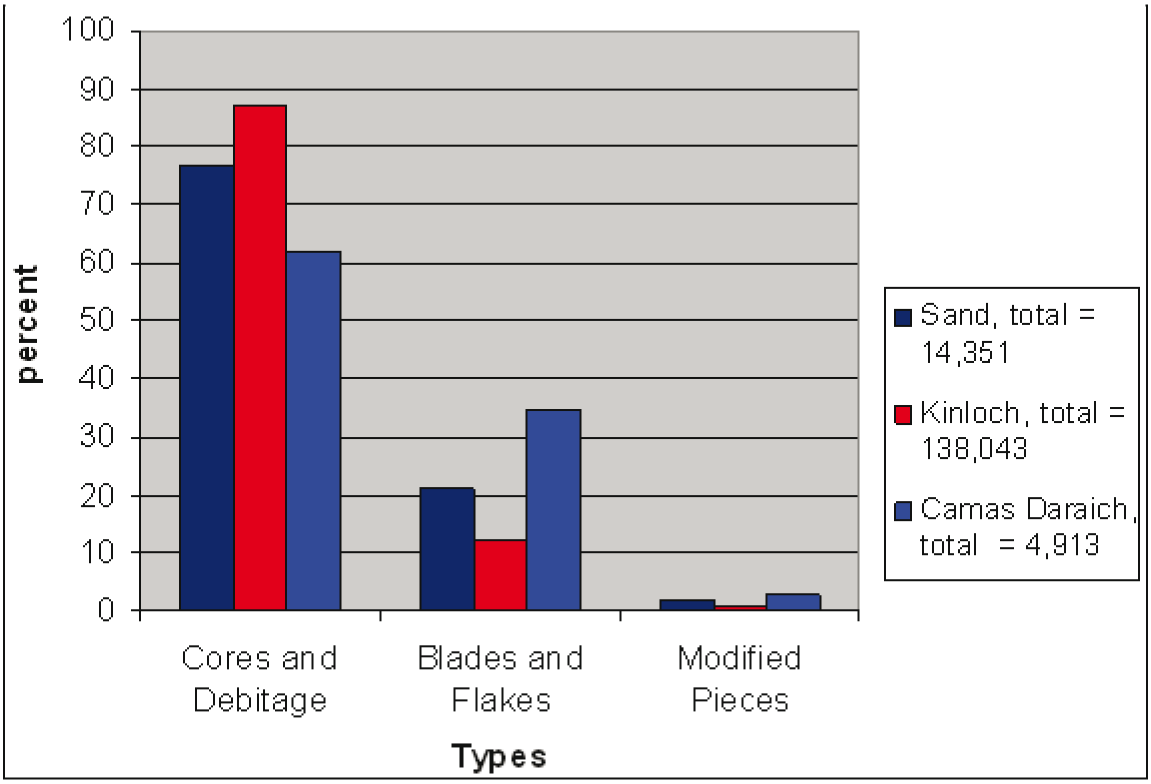
3.3.10.17 Miscellaneous microliths

Finally, there are 53 retouched pieces that have been defined as miscellaneous microliths. Most are parts of broken microliths. In some cases it is possible to suggest the original microlith type and this information is included in the notes to the catalogue but they have not been included in the discussions above, which are based on information drawn from more secure identifications.

3.3.11 Function

The flakes, blades and retouched pieces were important elements of the lithic tool kit needed by the inhabitants of Sand. They were suitable for a variety of tasks; some may well have been hafted. There are different ways in which it is possible to approach the study of the function of an assemblage of stone tools. One method is to carry out detailed use-wear and residue analysis of a sample of pieces, and this has been used to great effect in recent studies (Hardy forthcoming a; Hardy forthcoming b; Hardy *et al* forthcoming b). This was not possible at Sand, however, so that, while it remains a possibility for the future, it was necessary for this report to fall back on the more traditional, if limited, method of deducing task variability (if not task nature) from the types of piece present.

The composition of the assemblage certainly indicates that working tools are present as well as debris from the manufacture of such tools. Although there is plenty of evidence for manufacture in the form of the cores and debitage present on site, there are also plenty of pieces that suggest tool use in the form of flakes, blades and the modified pieces. Comparison of the relative proportions of these different categories gives a rough idea of the amount of material available for use – though it is of course likely that some suitable pieces were never used and work elsewhere shows that even some debitage was potentially useful (Knutsson 1988; Knutsson *et al* 1988). At Sand, cores and debitage make up 77% of the assemblage, flakes and blades comprise 21%, and retouched pieces and microliths are 2%. This overall pattern compares well with other sites such as Kinloch (Wickham-Jones 1990) and Camas Daraich (Wickham-Jones & Hardy 2004), though as Illustration 392 (below) shows it is possible that the proportion of debitage is artificially inflated as assemblages get larger. Comparisons with other assemblages are necessary to investigate this.



Illus 392: A comparison of the relative proportions of cores and debitage, blades and flakes, and modified pieces at Sand, Kinloch and Camas Daraich

Further information may be gleaned from patterns such as breakage. Breakage may occur for many reasons but it is noticeable that 80% of the blades at Sand were broken and it is likely that some of this was due either to breakage during use or to deliberate snapping as a form of modification before use. It is interesting to note that no particular part of the blade was preferentially retrieved: 34% of the snapped pieces were proximal ends, 21% distal ends and 36% the middle segment (9% odd fragments). It may be that distal ends figure less than expected but this is also the most vulnerable part of a blade. Overall the percentage of broken blades is comparable to that at Camas Daraich where 84% of the blades were broken, but it is hard to interpret the significance of this. More work is needed, especially to combine levels of breakage and particular survival patterns with use-wear analysis, before patterns of breakage at Sand can be used to add detail to our knowledge of the use of the pieces.

One final aspect of use is specialisation and it is interesting to consider whether or not there is any evidence for specialisation at Sand. Specialisation is something that has been touched upon in the analysis of other Mesolithic sites, in particular small sites such as Fife Ness (Wickham-Jones & Dalland 1998a; Wickham-Jones & Dalland 1998b), but also bigger sites, for example Kinloch (Wickham-Jones 1990:103–16). In general the lithic assemblage at Sand is a typical Mesolithic assemblage with something of everything that one would expect on a site like this. The microliths are interesting, however, in that some types that are common elsewhere, such as backed bladelets and scalene triangles, are not as common at Sand as other types that are less common elsewhere, such as crescents and fine points. Our interpretation of this depends on the meaning that we assign to the different microlith types but if we assume that the different shapes of microlith played different roles (whether within one tool or across a range of tasks), then it is likely that the differing quantities of various microlith types have functional and possibly specialist significance. This would suggest that there is an element of specialisation in the tasks undertaken at Sand. In this respect it is interesting that a high proportion of crescents also occurred at Fife Ness (Wickham-Jones & Dalland 1998a; 1998b) which has been interpreted as a specialist processing site probably in use in the autumn and exploiting a range of coastal and marine resources. This may well be the case at Sand (see below, Section 9).

Another type that is rare at Sand is the microburin. This is not the place to discuss the role of the microburin in detail, but it is worth noting that other sites such as Forvie (Warren forthcoming) and Oliclett (A Pannett, *pers comm*) had microburins in much greater quantity than Sand, so it would seem that they may have had some other role. This is supported by microscopic work by Hardy on the microburins from Forvie which suggests that they were used (G Warren, *pers comm*). Whatever the role of microburins, they were not needed at Sand.

3.3.12 Context

Although the assemblage may be divided into elements collected from a variety of specific contexts (see Table 102, above), the make-up of each context is remarkably uniform. Raw material use is similar across the different contexts, as is the broad percentage of debitage, and composition of artefact types. Microliths and other retouched pieces occur throughout the site including the midden layers. There are, however, small pockets of difference.

The notched pieces all come from context 7/8, the slopewash over the palaeo-channel away from the midden. The awls too were all found away from the midden, in context 17, the sandy soil of Area A. Context 022, the lower organic-rich silt below the shell midden, had a small concentration of six fine points of which three were particularly large. Both of the transverse arrowheads and the bifacial point came from the surface spits of Trench B away from the midden.

It is interesting that a relatively small proportion of the assemblage comes from specific midden deposits (17%). Though the composition of the assemblage recovered from the midden reflected that from the site as a whole, most of the flaked lithic assemblage was recovered from the trenches that ran away from the midden in both Area A and Area B. Furthermore, it is noticeable that, in contrast to the material outside of the midden, there were no obvious concentrations of material in the midden deposits. Perhaps this is not surprising. The midden is likely to be built up of deposits of waste which, given its loose friable nature soon became mixed into a fairly uniform whole. Away from the midden, however, the survival of odd concentrations of material perhaps suggest the presence of either specific deposits of waste, or the remains of small working areas.

3.3.13 Chronological and cultural connections

The assemblage from Sand is a standard Mesolithic assemblage and, not surprisingly, this is confirmed by the radiocarbon determinations. The lithics from Sand fit well into the picture of the early west coast Mesolithic. The raw materials were drawn from a pool of recognised lithic resources used across a well defined area. The styles of knapping and artefact types are quite in line with other west coast 'narrow blade' sites including Kinloch, An Corran and Camas Daraich: including the blades, microliths and other modified tools.

Much is made of the blade widths on individual sites. Some research workers examine the percentages of narrow (less than 8mm wide) and broad (8–12mm wide and over) blades, and this has been ascribed chronological, or cultural, significance (Ballin 2004). In general, however, most sites include a mixture of blades of both width categories and there is usually little evidence that they can be separated out in any way. Only at An Corran was there a suggestion that there might be an assemblage of broader, earlier blades, and full publication of this site is awaited. At Sand, the evidence certainly indicates that the different types of blade were part of a single assemblage: there was no contextual significance to their locations.

Further afield there is an increasing body of evidence from recent excavations in the east of Scotland. There are similarities in the use of narrow blade microliths on other early dated, and apparently specialised, sites such as Fife Ness (Wickham-Jones & Dalland 1998b), but other relevant assemblages include those from Morton (Coles 1971), Forvie (Warren forthcoming) and Oliclett (A Pannett, *pers comm*). All of these are coastal, though the dates vary considerably from potentially early material at Morton to much more recent dates at Forvie. Narrow-blade microliths have also been found in small numbers on inland and upland sites such as Nethermills (Kenworthy *unpublished*) and the Chest of Dee (Fraser, *pers comm*).

While Scottish Mesolithic sites clearly drew from a specific repertoire of stone tools there are, however, significant differences from place to place that may suggest regional differences. It is interesting, for example, that west coast microliths are often narrower than their east coast counterparts. The crescents from Fife Ness, for example, tend towards 6mm in width (Wickham-Jones & Dalland 1998b) in contrast to the 3–4mm width of the Sand crescents. This may be a reflection of the different uses to which pieces were put, the use of varying raw materials, or the facility with which different stones were knapped, but it might also reflect the growth of regional styles in tool production.

Many of these sites have still to be published in detail but it is now obvious that the Mesolithic of Scotland was more extensive and both started earlier and continued later than once believed. Together with this has come the realisation that it was a more complex period than originally recognised with its own local developments and idiosyncrasies over time. Only now are we starting to be in the position to review the lithic evidence as a whole.

3.3.14 Summary and discussion

The lithic assemblage from Sand is a typical Mesolithic assemblage and contains evidence for both the manufacture and use of stone tools in a variety of raw materials that were both drawn from local resources and from material that was brought in from further afield. With the exception of the Rùm bloodstone, which came from the island of Rùm 60km to the south, it is likely that all the material could be collected around the Inner Sound. Most of the raw material comprised pebble nodules, examples of which were found on site.

Although there is evidence that manufacture took place on, or near to, the site, the lack of cortical material of Rùm bloodstone and baked mudstone suggest that pebbles of these materials were prepared by the removal of outer material at source, before they were brought to Sand. Each material had its own knapping characteristics and the evidence indicates that the knappers were able to vary their techniques to make the most of these and produce a varied and useful assemblage including blades and fine microliths. Cores were carefully prepared and trimmed. It seems that knapping started with removals from platform cores but bipolar knapping was often used to make the most of a core before it was abandoned.

Blades and modified pieces were important end products for the knappers but regular flakes comprise a significant part of the assemblage. In general it is a typical Mesolithic assemblage from the west coast of Scotland with a variety of blades below 8mm wide and between 8 and 12mm wide, many regular flakes, and narrow-blade microliths (usually 3–4mm wide) of different types. Crescents and fine points are most numerous among the microliths.

The analysis was not able to include any detailed work on use-wear traces, but it would seem that many pieces were used. Composition and condition, as well as small pockets of deposition all point to a working assemblage. The high percentages of particular types of microliths, in contrast to other types, might suggest some degree of specialisation on site.

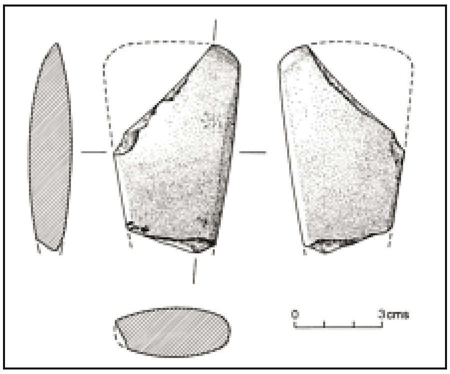
There was little significance to the different context locations of the assemblage. Tool types and raw material use were remarkably uniform across the site, though in general less lithic material came from the midden deposits than elsewhere. This is interesting in view of the problems encountered in interpreting midden sites in the past. It was long thought that midden sites and open-air sites related to separate cultural branches of Mesolithic Scotland (Lacaille 1954) on the grounds of their differing lithic assemblages. Pollard, among others, suggested that this might be due more to site function, preservation and varying excavation techniques (Finlayson 1990a ; Pollard 1990; Bonsall

1996) and his excavations at Risga (Pollard *et al* 1996) were some of the first to try and resolve the problem. We now know that shell midden sites themselves vary considerably in date and function (see below; Hardy & Wickham-Jones 2003; 2004; Hardy *et al* forthcoming b), but in brief many are associated with microlithic assemblages and it seems that they do sit quite happily within the main body of the Scottish Mesolithic as long as we accept that as a body it contained considerable variation. Chronology, function and regional differences all play a part in the record that is left to us and we, of course, add our own variations through our excavation techniques and methods of analysis. It is not hard to see how separate analysis of midden and deposits away from it might once have lead to differing conclusions, especially in a world that did not employ sieving and fine excavation techniques. As it is, the midden did contain a lithic assemblage with all the elements found elsewhere on site: debitage; flakes and blades; scrapers; edge-retouched pieces; and microliths. Most material, however, was found away from the midden.

Not only did the deposits away from the midden contain the majority of the lithic assemblage, there was also some evidence for the survival of small-scale specific deposits here as opposed to the general mixture within the midden. It was not possible, however, to determine whether these concentrations related to working areas or waste dumps.

3.3.15 The axe

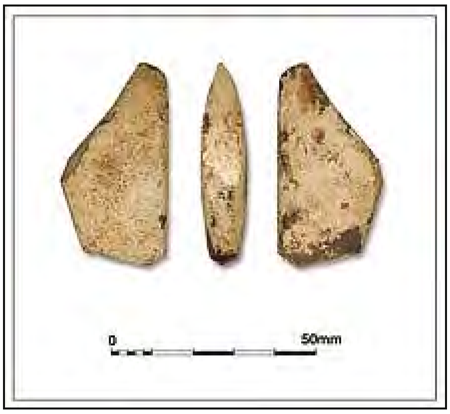
Also included within the assemblage is a small ground stone axe (see Illustration 393, right), recovered from context 27 (a slump of stony, midden-like material) at the juncture where it overlay context 22 (a sandy soil) and overlain by another slump, this time of midden.



Illus 393: Sand – stone axe, drawing

The axe is broken; a chunk has been removed diagonally across the blade, though a small length of blade survives. In addition, the butt end is damaged and it is likely that the axe was originally slight longer. The axe measures 71×39mm and is 17mm thick. It is made of a soft degraded stone, probably baked mudstone. It has squared sides and was originally ground all over; the striations from grinding are clearly visible. Tools like this were usually flaked into shape before grinding, but no trace of original flaking facets has survived. The face of the axe was slightly asymmetrical and curved in shape.

The axe from Sand is small (see Illustration 346, right), as axes go, though other examples of small axes do exist and they come from a variety of locations and contexts. A small axe of metamorphosed porphyry was recovered from a field collection at Kinbeachie in the Black Isle (Barclay *et al* 2001) and a steatite axe of similar size from beside a cist at Mousland in Orkney (Downes 1994). In Orkney there are other small axes from some of the Neolithic settlement sites such as Barnhouse (Richards 2005) and a new find in Wyre (N Card, *pers comm*). The Kinbeachie axe was associated with Neolithic material that probably related to settlement while that at Mousland related to burial and had a Bronze Age date. The dates from Context 22 at Sand are closely related to the context of the axe (Sections 3.2 & 4) and suggest an Early Neolithic date for it. Interestingly, in these examples of small axes, admittedly rather drawn at random, the materials used each relate to relatively local resources rather than stone imported long distance from an extraction centre.



Illus 346: Sand – stone axe, photo

It is difficult to see such a small axe fulfilling the traditional role of felling wood and other heavy tasks. It is of course possible that it played a lighter role in a woodworkers tool kit, especially in view of the asymmetrical profile of the edge, but it is also worth noting the ‘ritual’ nature often ascribed to many small axes such as this (Barclay *et al* 2001). There is not enough of the blade left to look at possible wear traces.

Files cited in the text

All files start from ads.ahds.ac.uk/catalogue/resources.html?sfs_ba_2007 > Downloads > …

… > Documents > Final Reports > Wickham-Jones,_Sand_excavation_lithics.pdf
… > Images > Artefacts > Coarse and ground stone tools > Axe_photo.jpg [Illustration 346]

The following have the path … > Images > Artefacts > Lithics > …

… > Barbed_and_tanged_point_-_numbered.jpg [Illustration 364]
… > lithic_raw_materials_photo.jpg [Illustration 365]
… > marine_flint_bw.jpg [Illustration 368]
… > Scrapers_-_numbered.jpg [Illustration 377]
… > Scraper_resharpening_flakes_-_numbered.jpg [Illustration 378]
… > Edge_retouched_-_numbered.jpg [Illustration 379]
… > Notched_pieces_-_numbered.jpg [Illustration 380]
… > Awls_-_numbered.jpg [Illustration 381]
… > Transverse_arrowheads_-_numbered.jpg [Illustration 382]
… > Bifacial_retouch_-_numbered.jpg [Illustration 383]
… > Microburins_-_numbered.jpg [Illustration 384]
… > Crescents_-_numbered.jpg [Illustration 386]
… > Fine_points_-_numbered.jpg [Illustration 388]
… > Backed_blades_-_numbered.jpg [Illustration 390]
… > Scalene_triangles_-_numbered.jpg [Illustration 391]