The archive version of the text can be obtained from the project archive on the Archaeology Data Service (ADS) website, after agreeing to their terms and conditions: ads.ahds.ac.uk/catalogue/resources.html?sfs_ba_2007 > Downloads > Documents > Final Reports. From here you can download the file 'Hardy_Worked_and_modified_shell.pdf'. See also the image files located at Downloads > Images > Artefacts > Worked Shell.

3.5.1 Introduction

A small assemblage of worked or decorative shell was found in the shell midden at Sand (SFS 4). It comprises scallop and cowrie shells and constitutes all the scallop and cowrie from Sand (see Table 130, below). In addition, a small assemblage of perforated limpet shells has been considered. It is not yet clear whether the limpet perforations are natural or artificial, but it is possible that these shells were deliberately collected.

Table 130

Artefact type	Artefact No	Square	Quadrant	Spit	Context	Condition
Cowrie	S1	A2B	NE	2	1/2	Whole, two opposing holes
Cowrie	S2	B1A	SW	4	13	Whole, two opposing holes
Cowrie	S3	A1B	SE	6	28	Whole, no holes
Cowrie	S4	B26B		3	1	fragment
Cowrie	S5	A2B	SW	6	27	fragment
Cowrie	S6	B3B	SE	5	13	fragment
Cowrie	S7	B2B		2	13	fragment
Scallop edge	S8	surface				Left side of scallop shell
Scallop point	S9	B1A	NE	4	13	two pieces
Cut scallop	S10	B25B	SE	6	11/13	whole
Whole scallop	S11	B26A	NW	5	1	two pieces

Table 130: Sand, catalogue of worked and decorative shells; Back to Section 3.5.3.2

3.5.2 Method

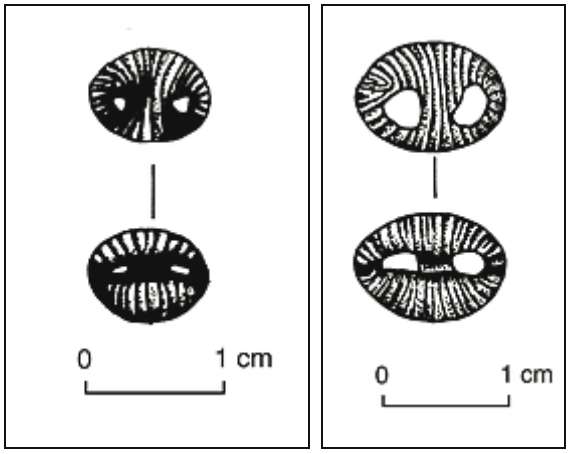
Study of shell use is difficult except in the case of obviously modified shells such as

beads. Shell can be modified naturally in many ways, some of which may at first appear artificial; for example symmetrical, round holes can be made by predators, and birds and crabs also fracture shell. Waves and the sea can cause shells to split or become 'retouched' (Claassen 1998). The modified shells in this assemblage were examined by eye and also microscopically (up to 100× magnifications) using a Meiji ML 2305 incident and transmitted light optical microscope

3.5.3 Cowrie shells

Cowrie shells with opposing perforations have been found on several Mesolithic sites in west coast Scotland. These include Oronsay, (Mellars 1987), Carding Mill Bay (Connock *et al* 1992), Ulva Cave (Simpson 1996) and possibly Risga (Russel *et al* 1995). The cowrie shells found at Sand are similar to those found on other archaeological sites (see Illustrations 448, right; 449 & 450, both below).

Illus 448: Cowrie shells from Sand. Left shell A2B NE Spit 2; right shell B1A SW Spit 4 (13)

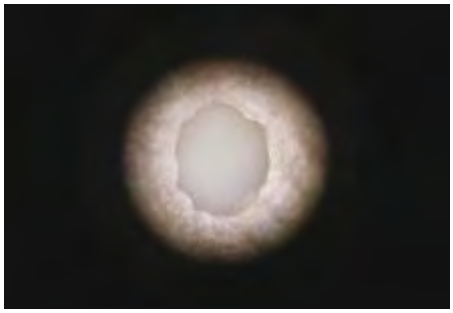


Illus 449 & 450: Cowrie shells, A2BNE Spit 2

It has been suggested (Simpson 2003) that cowrie shells only occur naturally in west coast Scotland. While cowries never appear to be common, they are recorded from around the north and west coasts of Britain and Ireland (MacDougall 2003, 2004) and can be collected from beaches today in many places including Skye, Orkney, Holy Island (Lindisfarne) and Howick, Northumberland. Hayward *et al* (1996) identify two types of cowries that occur on British beaches, the Spotted Cowrie (*Trivia monarcha*) that only occurs in western Britain and the Arctic Cowrie (*Trivia arctica*) that occurs all around Britain. Though these two species are difficult to distinguish when young, the arctic cowrie grows to a maximum of 10mm while the spotted cowrie grows to 12mm. Therefore all the cowrie shells found that are over 10mm in length are spotted cowries (Pye *pers comm*) Modern examples of spotted cowrie often have two clearly defined spots on their surface and they tend to be fawn in colour while the arctic cowrie is normally creamy white. Archaeological samples have usually lost the colours so that identification of species is normally impossible except by size. Cowries live on lower shores or in sublittoral zones and feed on ascidians, or sea squirts, that live attached to rocks or large areas of well established seaweed. They are therefore likely to be found on or near rocky shores.

Although there is an assumption (for example Simpson 1996 & 2003) that the holes in cowrie shells are of human manufacture, this may not always be the case. Cowries, like many other species of shellfish, are attacked by predators. Though no cowrie shells with or

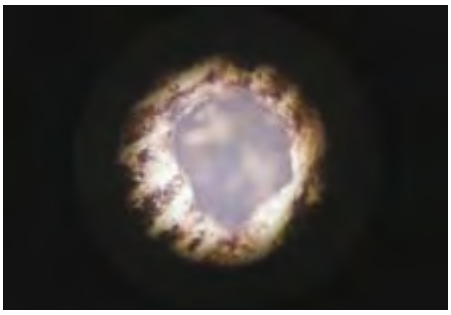
Illus 451: Modern cowrie shells found on beaches in Northumberland



Illus 453: Modern cowrie shell hole at 40× magnifications

without holes, were found on the Applecross beaches near Sand, many other types of shell on these beaches did have holes; these are normally formed by gastropods. There are six gastropod families that feed by drilling through the shells of their prey. The most common of these, are the naticids and muricids (Hayward *et al* 1996), notably the dogwhelk. Species of both of these occur around Britain and both create characteristic holes in the shells of their prey. The method of attack involves drilling a hole with a characteristically symmetrical shape and sloping sides in order to get at the meat inside. Cowries with a single hole due to predator action are relatively easy to find on beaches today and an example of a cowrie shell with two opposing holes, identical to those found on archaeological sites, was collected recently on a beach in Northumberland (see Illustrations 451, left & 452, right), though the majority of cowries, (about 80%) from a modern reference collection at the National Museums of Scotland are whole.

Illus 452: Left, modern cowrie shell collected at Howick, Northumberland; right, cowrie shell from midden (A2B NE Spit 2)



Illus 454: Sand (A2B NE spit 2), cowrie shell hole at 40× magnifications

Dogwhelk do figure among the archaeological shellfish from Sand (Section 3.12) and thus the nature and origins of the perforations in the archaeological samples remain uncertain. In order to shed light on this, the perforated cowrie shells from Sand, and some modern shells with natural perforations, were examined under an optical microscope (see Illustrations 453, left & 454, right)

3.5.3.1 Microscopic examination

An experimental study (d'Errico, *et al* 1993) examined the holes made by shellfish predators and compared them to experimentally manufactured holes. Using a scanning electron microscope they found very clear distinctions between holes made in different ways, for example by predators and by perforation. They were also able to identify areas of the holes where abrasion had occurred such as might follow from hanging on a piece of string. It was not possible to examine the shells from Sand using an SEM microscope as done by d'Errico *et al*.

Taborin (1993) examined macroscopic use wear traces on the holes of experimentally perforated shells including cowrie shells, and was able to recognise repeated patterns of macro use-wear that suggested different forms of attachment of the shell onto string or thongs. Comparing her results to those from the shells at Sand, it is clear that no use-wear was evident on any of the examples from Sand, neither at macro nor micro levels and it is fairly certain that these pieces were not used.

3.5.3.2 The cowrie assemblage from Sand

There are seven cowrie shells from Sand, two of which have two opposed perforations (see Table 130, above). Both of the latter cowries are whole and there is one more whole cowrie shell with no perforations. Additionally there are four fragments where it is not possible to tell whether or not the shell has been perforated. All four of the perforations have sharp irregular borders and there was no observable difference between them and the natural perforations in cowries collected from the beach (see Illustrations 448–454, various above). It is not clear whether the holes in the examples from Sand were perforated by predator or human action. However, even a natural perforation does not preclude human use, though the microscopic examination did not reveal any obvious

wear traces. Although it was not possible to examine shells from other Mesolithic sites under the microscope (see below), the published photographs suggest that they too have no signs of wear. This is not inconsistent with their use for decoration; for example the archaeological material may well represent shells that were lost before use.

Illus 455: Perforated cowrie shells from Cnoc Coig

Sixty-eight cowrie shells from three shell middens in Oronsay (Cnoc Coig, Caisteal nan Gillean II and Cnoc Sligeach) were also examined by eye. Sixty-three of these shells had large double perforations and the uniformity of these double perforations suggests they were artificially manufactured (see Illustrations 455, left & 456, right).

Illus 456: Double perforated cowrie shells from Cnoc Coig

There are many ethnographic examples of cowries being used for decoration (for example Jackson 1917; Sillitoe 1988; Carey 1998), but cowries also had and still have many other uses in traditional societies. A variety of recorded uses of cowries exists around the world. They are or have been used as currency, for gift exchange, in medicine (particularly against smallpox), to convey messages or ideas in code, as charms, as net sinkers, as fertility objects particularly as marriage gifts, as amulets against sterility, for divination, and in China cowries were used with rice to stuff the mouths of the dead (Gaibole 2004; Claassen 1999; Jackson 1917; Mair 1969; Sciama & Eicher 1998). It seems likely that the archaeological perception of cowries in Mesolithic Scotland as simple decoration has been over simplistic.

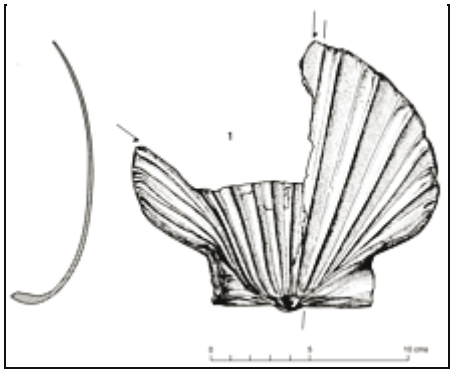
Illus 457: Rubbed holes in shells from Skara Brae

Whatever they were used for, cowries are likely to have been a valued resource. The small number of shells that are found on the archaeological sites might support this, suggesting that they were well looked after, though it is also possible that cowries were so rare that they were of little consequence. The poor quality in general of the organic record relating to the Mesolithic of Scotland means that many cowrie shells are likely to have disappeared along with their owners. If they were used for decoration or jewellery, they may well have been incorporated into the post mortem process, a process that has so far eluded archaeological discovery in Scotland (apart from the isolated human bones from Oronsay; Mellars 1987). Elsewhere, however, burials with large quantities of shells have been found, dating to the epi-palaeolithic (Vanahuren & d'Errico 2003) and the Mesolithic (Albrethsen & Brinch Petersen 1976). Though the shells were not always cowries, they do highlight the use of shells as personal ornaments, even if only in death. In the case of the epi-palaeolithic burial from La Madeleine, use-wear patterns on the shells suggested that they had been embroidered onto the surface of clothing, rather than strung as necklaces (Vanahuren & d'Errico 2003). Cowrie shells can have many different uses, many of which do not require perforation.

The use of cowrie shells in Scotland continued into the Neolithic. Perforated cowries are, for example, found on Grooved Ware midden sites in Orkney such as Skara Brae (Clarke & Shepherd forthcoming). In these cases the perforations are usually quite distinctive from those on Mesolithic cowries (see Illustration 457, above right) and this is the subject of on-going research (Hardy forthcoming a).

3.5.4 Scallop shells

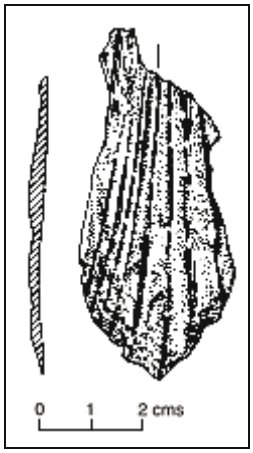
The small assemblage of three



Illus 458: Sand – cut scallop, B24B Spit 6, drawing

Illus 459: Sand – cut scallop, B24B Spit 6, photo

pieces of worked scallop from Sand comprises a 'core', that is a whole shell from which a segment has been removed, one piece of scallop edge, and one scallop point. In addition there is one whole scallop shell (S11; B26A NW Spit 5, Context 1), which though in pieces when found, was reconstructed and is a whole shell. This has been included here in view of the absence of any other scallop shell in the shell assemblage and the likelihood that it represents raw material.



Illus 460: Scallop edge, drawing

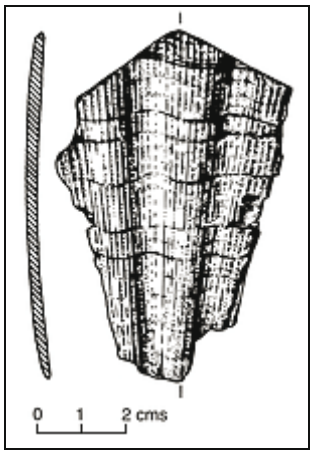
Illus 461: Scallop edge, probably unused, photo

3.5.4.1 Scallop core

S10 (B25B SE Spit 6 Context 11/13) has been cut to remove a segment of shell (see Illustrations 458, top left & 459, top right). Microscopic analysis of the cut edges (up to ×100 magnifications) does not reveal any cut marks, but breakage such as this is unlikely to be natural. In natural settings scallop shells keep their shape well, even in fairly rough conditions. Where breakage occurs it is usually along the lines of natural weakness, down the ray lines of the shell, or in the area near to the hinge where the shell is thin. This artefact has been broken across the ray lines and for this some form of scoring must have taken place, particularly across the ridges of the shell. This could not have occurred naturally.

3.5.4.2 Scallop edge (S8 surface find)

The scallop edge was initially thought to be a working point; however microscopic examination (up to 100×) did not reveal any use-wear traces. It may be a waster from the manufacture of something else, or perhaps an unused tool (see Illustrations 460, middle left & 461, middle right).



Illus 462: Scallop point, drawing

3.5.4.3 Scallop point (S9; B1A NE Spit 4, Context 13)

This piece is a point with marked use-wear and a very rounded edge. It has been shaped into a rounded point and was well used (see Illustrations 462, bottom left & 463, bottom right).

Neither of the latter two pieces had any evidence in the form of cut marks to indicate how they were removed from the main shell.

Illus 463: Edge of scallop fragment showing heavy rounding on pointed edge. B1A NE Spit 4, photo

3.5.5 Limpet shell

Although there was no clear evidence for the modification of limpets at Sand, limpets with holes in them were relatively common in the midden (see Illustration 464, below left). It is not clear whether the holes are natural or artificial, but

they have been included here because, given the fact that the meat is likely to have gone by the time the limpet was collected, their collection and presence in the midden remains an enigma. Equally, if the holes were made on site, this is worthy of discussion.

Illus 464: Perforated limpet shells from Sand

Illus 465: Dogwhelk feeding on limpet

Approximately 3% of limpets from Sand are perforated, but the mechanisms of perforation remain unclear. None have clear signs of deliberate working despite microscopic study of a sample (40× magnifications). Limpet shells with holes are relatively abundant today on many beaches including those of the Inner Sound. There is, of course, an element of weathering here in that limpets erode naturally at their apex, but examples of this have been discounted from the present discussion. There are a number of limpet predators, including dogwhelk, starfish and crabs, but only the dogwhelk drills holes through the shells to reach the meat inside (see Illustration 465, above right). Dogwhelk perforations are normally sited to one side of the apex of the limpet, and they are small and symmetrical. A sample of perforated limpets collected from the beach at Sand today demonstrates that, though the holes in archaeological limpets are sited in the right place, they are generally both larger and less symmetrical than the holes made by predators. The perforations from other archaeological collections are remarkably similar. One explanation for this may lie in the friable nature of the shell as the perforations have become enlarged over time, by erosion.

Another possibility is that the holes result from one specific use of the limpets for bait. Fishermen in Guernsey used to knock holes in limpets and string them up to suspend in willow pots in order to catch crayfish (*Palinurus elephas*). Limpets were considered excellent bait for crayfish as they avoided loss of the prey to lobsters and crabs. Another use for the limpet was to thread them on to string for salting, after which they could be kept for up to two months and used in the pot (Richard Lord *pers comm*).

If the perforations are natural, the presence of the shells in an archaeological deposit raises a number of questions. Limpets with holes will not contain meat so they are unlikely to be collected for food. There is no record of extraction techniques that result in perforation and, though some erosion is likely to have taken place in the midden, this is unlikely to lead to the repeated pattern of side perforations as recorded on many of the shells from Sand. Perforated limpet shells do thus seem to have been targeted at Sand, whether the perforations were natural or deliberate. Several possible explanations for this exist. As mentioned above, they may have been perforated for use as bait. Perforated limpets might well have been used for jewellery or decoration though other archaeological examples of 'used' limpet shells are notoriously lacking (perhaps a reflection of archaeological ignorance). There are a few ethnographic accounts of limpets being used (mainly from California, for example: Claassen 1998; and see Island of the Blue Dolphins PDF). Closer to home, a series of limpet rings was found in a group at the Neolithic site of Isbister in Orkney (Henshall 1983). Although it has not been possible to examine them microscopically, they may have been strung for ornament but it is important to remember other possible uses such as for rattles in music or as ear, nose or hair rings (Stewart 1996).

The perforated limpets from Sand would obviously have lent themselves to a variety of uses. In general, archaeological studies such as those of the Oronsay middens, have not recorded the presence or absence of perforated limpet shells so that comparative Mesolithic material is lacking. However, small assemblages of perforated limpets also

occur on several of the SFS survey sites (SFS 8 Loch a Sguirr; SFS 19 Toscaig 1; SFS 20 Toscaig 2; SFS 22 Crowlin 3; SFS 26 Crowlin 7; SFS 41 Toscaig 9; SFS 49 Creag Na H Uamha; SFS 58 Rubha Chuaig; SFS 66 Ard Clais Salacher 2; SFS 68 Allt na Criche; SFS 77 Camusteel 2; SFS 78 Camusteel 3; SFS 89 Coire Sgamhadail 1; SFS 90 Coire Sgamhadail 1; SFS 99 Clachan Church; SFS 100 Fraser's Croft, Toscaig; SFS 105 Uags 1; SFS 114 Fergus' Shelter). The wide range of dates from some of these sites (from the 7th millennium BC to recent times; Section 4) perhaps suggest a natural explanation for the perforations, though further work is clearly needed. Perhaps this discussion will lead to the recording of other examples from early Scottish sites.

3.5.6 Shell as a raw material

Throughout much of human history shell has been an important and often valuable resource to many communities across the world and it remains so today (see Illustration 466, right; for example Jackson 1917; Malinowski 1922; Mair 1969; Sillitoe 1988; Newell *et al* 1990; Eves 1998; Sciama & Eicher 1998; Carey 1998; Bradley Foster 1998; Saville 2004c; Henshilwood *et al* 2004). Not only is shell abundant to those who live by the coast, but the importance of shell as a resource is emphasised by evidence for the movement of shells into inland areas (for example: Sillitoe 1988; Claassen 1998; Jackson 1917).

Illus 466: Modern shell necklace from Mexico

In addition to the use of shells as jewellery and in various unmodified ways, shell provided a versatile raw material for tool manufacture, being both waterproof and susceptible to working. This point is emphasised by examples such as that of Tierra del Fuego where large mussel shells were used as recipients for collecting oils and animal fat as meat was being cooked, as containers in which to prepare paints, as tweezers to remove facial hair, as jewellery and as knives and scrapers (Bridges 1949; Orquera & Piana 1999; Mansur & Clemente in press). The mussels of southern Patagonia are much larger and more solid than those of Scotland, but scallops such as those from Sand would provide a similar resource.

3.5.7 Conclusion

Examples of modified shell are rare in the Scottish Mesolithic, and the use of shell as a raw material for tools has been largely ignored. Both are due, no doubt, to the general lack of preservation. Mussel shell, for example is particularly sharp when fresh. Mussel has been recorded from the midden at Sand (Section 3.12), and may well have been used, though as mussel decays faster than other shells little evidence remains. Ethnographic evidence from around the world provides a rich illustration of the importance of shell in a range of ways. The small assemblage of worked and used shell from Sand confirms the varied use of this resource in the Mesolithic. It also suggests that to consider shell only in terms of jewellery and decoration is to oversimplify the situation. Sand is a timely reminder of the potential value of shell, and our knowledge can only grow as further examples are found on other sites and the discussion broadens.

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… > Images > Artefacts > Worked Shell > SFS_S2.jpg [Illustration 450]
… > Images > Artefacts > Worked Shell > SFS_S10.jpg [Illustration 458]
… > Images > Artefacts > Worked Shell > cut_scallop_shell_photo.jpg [Illustration 459]
… > Images > Artefacts > Worked Shell > SFS_S8.jpg [Illustration 460]
… > Images > Artefacts > Worked Shell > SFS_S9.jpg [Illustration 462]