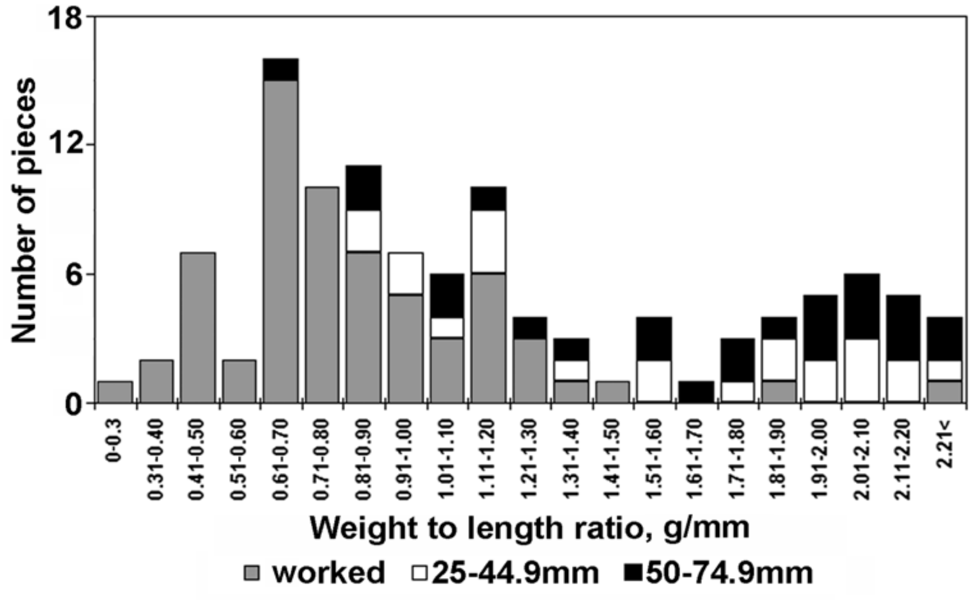


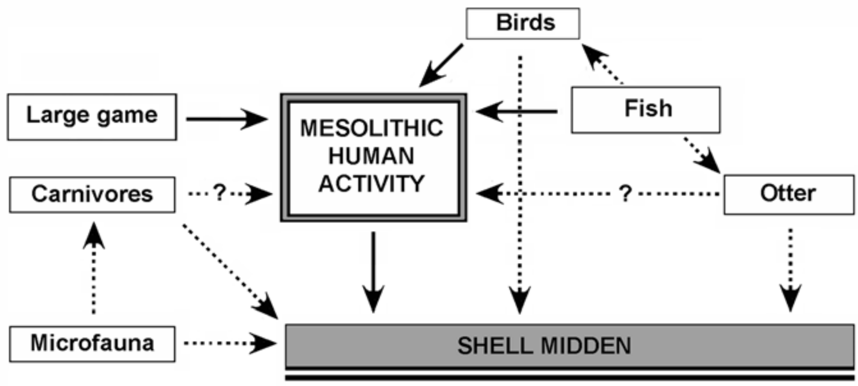
Illus 47 The weight to length distribution of bevel-ended tools ('limpet scoops') and potential raw materials (refuse bone splinters).

were recovered at An Corran, must have been available most easily during the second half of the year in the proximity of estuarine environments (Bonsall 1981, 466). Several other species (especially the young of non-cod Gadidae and flatfish) are indicative of a rather saline environment along this section of the coast (today, the estuary area of the closest major stream is to be found inside Staffin Bay; see illus 1). The massive presence of cod is indicative of moderate salinity, which cod is able to tolerate better than many other gadid species. In the open sea, the salinity of water averages 35g/l. In the uppermost approximately 40m thick water layer of lesser specific gravity, lower salinity and insulation favour the growth of algae (Muus & Dahlstrøm 1977, 19) and creatures feeding on them, which are, in turn, preyed upon by carnivorous fish, such as cod. Moreover, this is also the layer of coastal waters where marine resources of animal protein could be best exploited.

The overwhelming majority of measurable fish remains at this site represent 150–300mm-long individuals. Along with shellfish gathering, opportunistic fishing (i.e. trapping or harvesting fish by hand in tidal pools) may also have been practised. This tactic has been followed seasonally for millennia in the floodplains of the Danube and Tisza rivers in Hungary (Bartosiewicz 2007; Bartosiewicz et al 1994). According to Mellars & Wilkinson (1980, 29) angling tends to be less efficient; catching one-year-old, *c* 130mm-long specimens, with a variety of hooks at differing depths, failed to provide a sufficiently large sample of fish for the purposes of statistical analysis.

Mesolithic faunal assemblages from the west coast of Scotland show that, similarly to the whole of the country (including the islands of the Southern Hebrides; Mercer 1974b, 33), this area was originally forested and occupied by a pertinent terrestrial fauna. The universal early Holocene tree cover, as suggested by palynological (Edwards & Whittington 1997, 82) as well as anthracotomical evidence (Bartosiewicz et al 2010), is most unlikely to have started radically decreasing at the time this shell midden was deposited. The known habitat preferences of red deer neatly fit this type of forested environment at An Corran. Osteological evidence of blackbird and other passeriform birds all point in the same direction. Regardless of their actual taphonomic history, remains of micromammalia, that is, rodents and shrews, further support this general picture also emerging from contemporaneous botanical evidence from Carding Mill Bay, where oak, alder, elm and willow/aspen remained important charcoal samples throughout the Neolithic (Bartosiewicz et al 2010). Otter, a species represented only by the direct evidence of a single bone, may be regarded as a link between the waters of the forested inland and the marine environment. Remains of some mammals, especially those of predators, seem to indicate that the small rockshelter offered refuge, not only for humans but sometimes also for animals. Although carnivores may mainly have been exploited for their pelt, the lack of skinning marks (for example on the bear phalanx) makes it difficult to interpret these bones as the result of direct human activity.

Deer bones, on the other hand, may have been brought to the site from just about anywhere in the evidently forested environment, including occasional kill-sites in the vicinity of the shell midden. Similarly to other 'Obanian' sites, deer bones may be directly linked to human activity at the shell midden (meat consumption and tool use). Artefacts tentatively labelled 'limpet scoops' (Bishop 1914, 95), or as in this report, bevel-ended tools, have consistently attracted attention. Such tools may



Illus 48 The possible origins of vertebrate remains in the An Corran midden deposits. Continuous arrows indicate human mediation through predation (hunting, fowling and fishing); dashed lines indicate non-anthropogenic processes contributing to the formation of archaeozoological assemblages.

be made of stone or, alternatively, either from long bone diaphysis splinters or antler (e.g. Anderson 1895; Clark 1956). The aforementioned high concentration of deer metapodia among the refuse bone recovered from the An Corran midden may relate to the manufacturing of bevel-ended tools, which almost exclusively originate from these bones. A great number of slender metapodial bones seem to have been used this way, whilst robust fragments were less frequently selected (illus 47). Signs of other, more sophisticated, multi-stage bone manufacturing are also visible in the worked bone assemblage (for example bone points).

In consonance with the results of previous botanical and faunal studies carried out in the broader region, mammalian and bird bones identified at this site are all indicative of a wooded environment. The coastal strip studied here must have represented an ecotone between land and water, well worth human exploitation during Mesolithic/Neolithic times. It is unlikely, however, that prehistoric occupation would have been limited to the coastal area. The relatively small number of vertebrate remains which were unambiguously attributable to human activity (as opposed to the gathering of molluscs, the shells of which make up much of the deposits) suggest that fishing, fowling and hunting may have been practised by the occupants of this site, but sporadically so. Some remains may have been deposited in alternative, natural ways at the site (illus 48). This observation supports the temporary, if not strongly specialised, character of the site.

9 THE MARINE MOLLUSCS, *by Catriona Pickard and Clive Bonsall*

9.1 Introduction

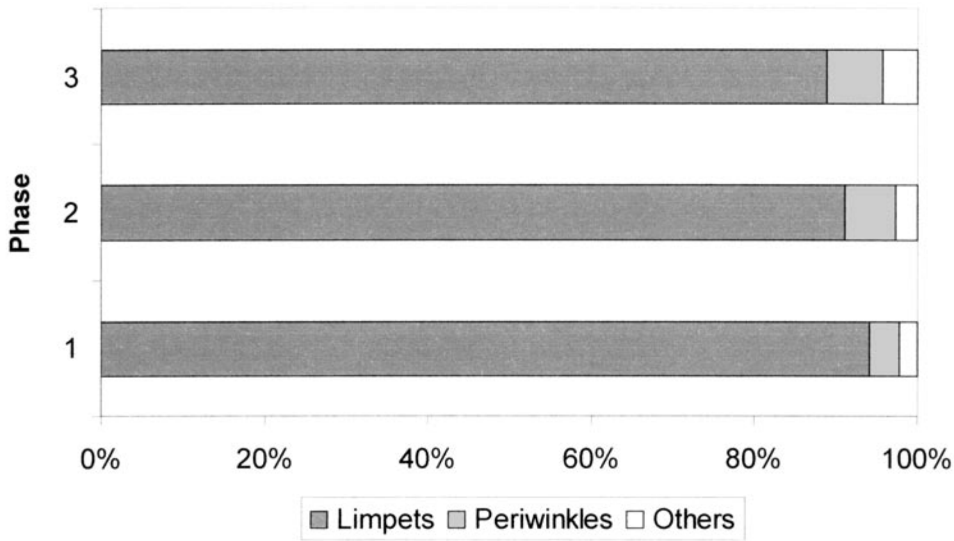
The presence of marine shells in varying states of preservation was noted in many of the contexts excavated at the An Corran site, but samples for analysis were available only from contexts C1–4, 31, 34 and 36–40. With the exception of C31 and C36, only single samples were available for analysis. C31 was represented by 13 samples, although precise information on the locations of those samples was not available. The samples from C36 include a vertical series taken from a 300 × 300mm column through the site (see illus 18). Samples B–J of this column come from C36 and were taken from lenses or layers observed within this, the largest deposit of shell material excavated. The uppermost sample from the column (sample A) comes from the deposit overlying C36 (presumed to be C31).

From the stratigraphic and radiocarbon evidence available, the shell-rich deposits at An Corran may be assigned to three broad phases in the use of the site:

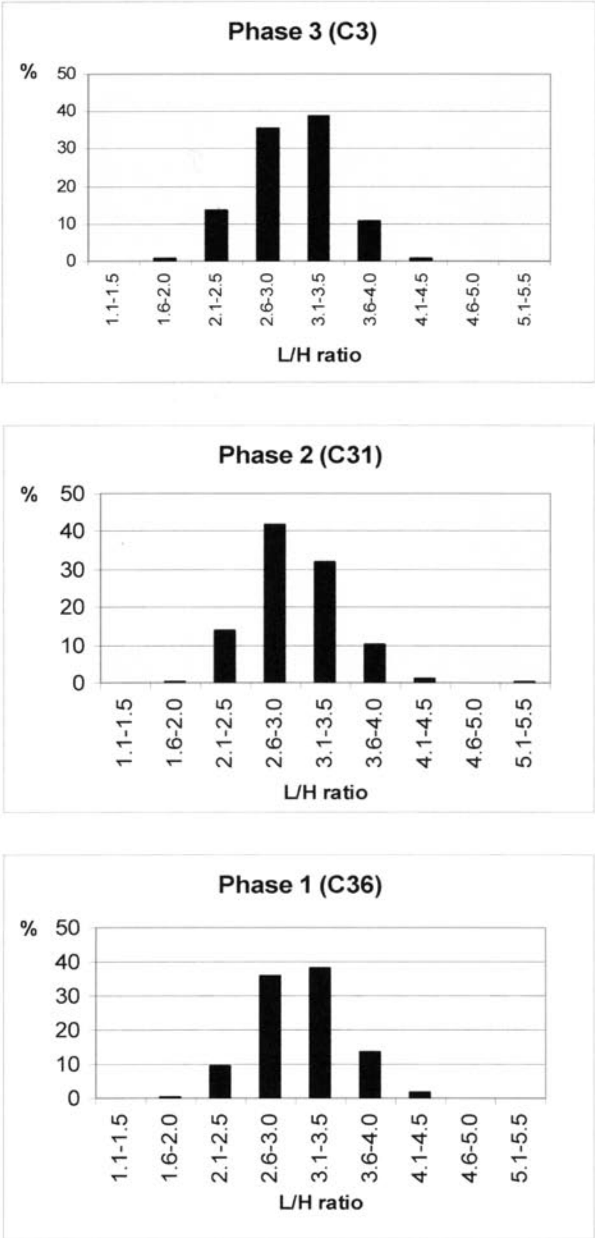
- Phase I is represented by contexts C34, 36, 37 and 40. The shells in C36 are assumed to relate mainly or wholly to the Mesolithic between *c* 6600–3800 cal BC, although significantly younger radiocarbon dates on a human bone and on a bone artefact suggest that some of the shells could have been introduced from higher levels at a later date. C34 and C37 occupy equivalent stratigraphic positions with respect to C31, and are assigned to the same phase as C36. Only two identifiable shells were recovered from the sample from C40 and possibly derived from C36.
- Phase 2 is represented by C31, which contains C38 and C39. The radiocarbon dates for C31 and C38 form a consistent series, and suggest that much of the shell material in those contexts could have been deposited between *c* 3630–1880 cal BC (Late Neolithic–Early Bronze Age).
- Phase 3 is represented by C1–C4. No radiocarbon dates are available for these deposits, but their stratigraphic positions indicate that they postdate C31. They may therefore be assumed to have been deposited later (probably substantially later) than 1880 cal BC.

9.2 Procedures

Sampling of the An Corran deposits for marine molluscan analysis was undertaken by the excavators. The bulk samples were subsequently dried, then passed through a nest of sieves with meshes at 4mm and 1mm – this initial stage of the post-excavation processing was not carried out by the authors of this report, and at the time of writing no information was available on the sizes (by weight or volume) of the original samples. All identifiable fragments of marine molluscs were picked out of the >4mm fractions, and apices of gastropods and fragments of bivalve shells which included the 'umbo' were collected from the >1mm fractions. These were identified and recorded for each sample.



Illus 49 Temporal changes in the frequencies of limpets, periwinkles and other shellfish.



Illus 50 Frequency histograms of length / height ratios (L / H) of limpet shells from successive phases.

The results are presented in Table 28. For the gastropods, MNI (minimum number of individuals) was derived by counting the apices; for the bivalves, MNI was obtained by counting the 'umbo' fragments and dividing the total by two.

In addition, measurements were taken on the complete shells of limpets, edible periwinkles and dog-whelks following the procedures adopted by Russell et al (1995). These data are presented in Tables 29–31 and illus 49–50.

9.3 Results – discussion and interpretation

Since some of the samples analysed are extremely small (<500 identifiable specimens), sampling bias is a potential problem. This is reflected in the fact that a significant degree of correlation was noted between sample size and number of species represented. Because of the small size of many of the samples and the lack of information on the stratigraphic positions of the samples, the results are discussed by context rather than individual samples. Interpretation of the data is further constrained by poor chronological resolution and by a lack of information on modern shellfish populations in the vicinity of the An Corran site and local shore ecology in general.

9.3.1 Species representation

The An Corran deposits contain shells from at least 14 species of marine molluscs. Some shells, for example limpets, could not be identified at the species level, and so the actual number of species present may be greater. Of the fourteen species identified, eleven are present in Phase 1 (C34, C36, C37 & C40), eleven in Phase 2 (C31, C38 & C39), but only eight occur in Phase 3 (Cl–C4). Notable absentees from the youngest deposits (C1–C4) are *Arctica islandica*, *Pecten maximus* and *Trivia monacha*, which in the earlier phases appear to have been collected occasionally as empty shells for use as raw material (see below).

The shells deposited in the An Corran site all come from species which normally inhabit rocky shorelines, and all can be found today around the coasts of central-west Scotland. There is no reason to suppose, therefore, that any of the shellfish was not collected in the vicinity of the site.

9.3.2 Exploitation patterns

Limpets (*Patella* spp.) predominate among the species represented in all of the contexts sampled. This is a consistent feature of prehistoric shell middens on or near rocky shores in western Scotland, including so-called 'Obanian' sites (cf Russell et al 1995). Comparing only the richest contexts from each phase (those with >1000 identifiable shells), there is evidence of a slight decline in the importance of limpets over time – the proportion of limpets is highest in Phase 1 (C36 – 94%) and lowest in Phase 3 (C3 – 89%). There is a corresponding increase in the proportion of the edible periwinkle (*Littorina littorea*), rising from 3.7% in C36 (Phase 1) to 6.9% in C3 (Phase 3) (illus 49).

Shells of dog-whelk (*Nucella lapillus*) and common mussel (*Mytilus edulis*) occur in relatively small numbers in all phases (never exceeding 4% and 1% of the total, respectively). In some contexts, shells of mussels are outnumbered by those of rarer species of Littorina (*L. mariae*, *L. saxatilis*, *L. obtusata*), the larger specimens of which may have been collected incidentally in the search for *L. littorea*.

For reasons discussed elsewhere (Jones 1985;

Table 28 Occurrence of marine molluscs in the archaeological contexts sampled

PHASE 3	Context 1		Context 2		Context 3		Context 4	
	MNI	%	MNI	%	MNI	%	MNI	%
Patella spp.	78	97.50	588	76.09	2541	88.88	212	91.77
Littorina littorea	2	2.50	174	22.48	197	6.89	17	7.35
Nucella lapillus			5	0.65	94	3.29	1	0.44
Mytilus edulis			1	0.13	16	0.56		
Littorina mariae					7	0.24	1	0.44
Littorina saxatilis			3	0.39	1	0.03		
Littorina obtusata			1	0.13	1	0.03		
Gibbula umbilicalis			2	0.26	2	0.07		
Trivia monacha								
Pecten maximus								
Modiolis modiolis								
Littorina neritoides								
Gibbula sp.								
Arctica Islandica								
Unidentified apex								
Burnt shell								
Acorn barnacle								
TOTAL	**80**		**774**		**2859**		**231**	

PHASE 2	Context 31		Context 38		Context 39	
	MNI	%	MNI	%	MNI	%
Patella spp.	11110	91.04	127	84.11	318	94.93
Littorina littorea	757	6.20	18	11.92	9	2.69
Nucella lapillus	275	2.25	5	3.31	5	1.49
Mytilus edulis	7	0.06	1	0.66	2	0.60
Littorina mariae	17	0.14			1	0.29
Littorina saxatilis	19	0.16				
Littorina obtusata	13	0.11				
Gibbula umbilicalis	1	0.01				
Trivia monacha	2	0.02				
Pecten maximus						
Modiolis modiolis	2	0.02				
Littorina neritoides						
Gibbula sp.						
Arctica Islandica	1	0.01				
Unidentified apex						
Burnt shell						
Acorn barnacle						
TOTAL	**12204**		**151**		**335**	

PHASE 1	Context 34		Context 36		Context 37		Context 40	
	MNI	%	MNI	%	MNI	%	MNI	%
Patella spp.	724	87.97	10843	94.16	252	82.62	2	100.00
Littorina littorea	64	7.78	425	3.69	36	11.80		
Nucella lapillus	22	2.67	199	1.73	12	3.93		
Mytilus edulis	10	1.22	17	0.15	2	0.66		
Littorina mariae			18	0.16	1	0.83		
Littorina saxatilis	2	0.24	1	0.01				
Littorina obtusata			4	0.03	1	0.33		
Gibbula umbilicalis			5	0.04				
Trivia monacha								
Pecten maximus	1	0.12	1	0.01				
Modiolis modiolis								
Littorina neritoides			1	0.01				
Gibbula sp.					1	0.33		
Arctica Islandica								
Unidentified apex			1	0.01				
Burnt shell								
Acorn barnacle								
TOTAL	**823**		**11515**		**305**		**2**	

Table 29 Length measurements of limpet (*Patella* spp.) shells

Context	Sample	Number	Mean length	Standard deviation	Smallest	Largest
1		45	3.9	0.39	3.2	4.6
2		231	3.5	0.50	2.4	5.4
3		442	3.0	0.55	1.9	5.1
4		87	4.2	0.57	2.5	5.5
31		3	2.8	0.39	2.4	3.3
31	BB 1	2	3.6	0.10	3.5	3.6
31	BB 1/2	7	3.2	0.69	2.4	4.4
31	BB 2/3	237	3.0	0.53	1.9	4.3
31	BB 4	8	2.7	0.55	2.2	3.7
31	BB 4/5	137	2.9	0.51	2.0	4.4
31	BB 6	382	2.9	0.49	1.7	4.5
31	BB 7/8	8	2.6	0.45	2.1	3.4
31	Col A	71	2.9	0.49	2.0	4.4
31	CoI A(a)	108	3.0	0.56	1.9	4.7
34		123	3.0	0.49	2.0	4.8
36	C36	16	2.9	0.38	2.3	3.7
36	Col B	175	2.8	0.48	1.9	4.3
36	Col B(a)	172	2.9	0.50	2.0	4.6
36	Col C(a)	170	2.9	0.51	1.9	4.5
36	Col D	915	2.8	0.49	1.7	5.4
36	Col D(a)	238	2.8	0.43	1.9	4.8
36	Col E	460	3.0	0.53	1.6	5.3
36	Col E(a)	136	3.0	0.55	2.0	4.6
36	Col F	15	2.8	0.54	2.1	3.8
36	Col F(a)	119	2.8	0.50	1.9	4.4
36	Col G	241	2.9	0.49	1.9	4.7
36	Col G(a)	189	2.8	0.51	1.9	4.8
36	Col H	322	2.8	0.42	1.9	4.1
36	Col I	166	2.8	0.59	2.0	4.1
36	Col I(a)	153	2.8	0.45	2.0	4.4
36	Col J	59	2.7	0.51	2.0	4.8
36	Col J(a)	48	2.8	0.49	2.0	4.6
37		6	3.4	0.40	3.0	4.0
38		2	3.5	0.16	3.3	3.6
39		18	3.2	0.44	2.5	4.2

Russell et al 1995), the shape of a limpet's shell (reflected in the length/height ratio) is a useful indicator of the shore zone from which the animal was collected. At An Corran, the vast majority of limpet shells from most of the contexts sampled have L/H ratios in the range 2.6–3.5 (illus 50). Time did not permit the acquisition of modern comparative samples from the shore below the site, but comparison of these results with archaeological and modern data from Ulva (Russell et al 1995) and Oronsay (Jones 1985) suggests that the limpets, the shells of which occur in the various midden deposits at An Corran, were obtained mainly from the middle and lower zones of the shore.

The collecting strategy implied by these data may be a reflection of the relative ease with which limpets may be harvested at lower shore positions, where rock-pools are more frequent and of longer duration and conditions generally damper. Jones (1984) has presented evidence to suggest that the meat from

Table 30 Length measurements of periwinkle (*Littorina littorea*) shells

Context	Sample	Number	Mean length	Standard deviation	Smallest	Largest
1		2	2.7	0.35		
2		162	2.5	0.40	1.8	3.5
3		95	2.4	0.36	1.6	3.1
4		13	2.8	0.30	2.3	3.2
31	BB 1/2	3	2.7	0.06		
31	BB 2/3	135	2.6	0.39	0.9	3.4
31	BB 3	1	2.3			
31	BB 4	21	2.5	0.24	1.7	2.9
31	BB 4/5	13	2.7	0.20	2.4	3.0
31	BB 6	256	2.4	0.36	1.4	3.4
31	Col A	4	2.6	0.26	2.2	2.8
36	C36	14	2.4	0.27	1.9	2.8
36	Col B	5	2.7	0.30	2.5	3.3
36	Col B(a)	14	2.6	0.23	2.3	3.2
36	Col D	75	2.6	0.34	1.8	3.2
36	Col D(a)	6	2.7	0.31	2.3	3.1
36	Col E	32	2.6	0.23	2.0	2.9
36	Col F	15	2.4	0.28	2.1	3.0
36	Col F(a)	7	2.5	0.16	2.7	2.3
36	Col G	10	2.6	1.47	1.4	3.4
36	Col H	21	2.6	0.26	2.1	3.1
36	Col I	70	2.5	0.30	1.5	2.9
36	Col J	9	2.4	0.18	2.2	2.6
36	Col J(a)	17	2.5	0.18	2.2	2.8
37		24	2.5	0.20	1.8	3.1
38		13	2.4	0.20	2.0	2.8
39		7	2.6	0.22	2.3	3.0

limpets collected on the upper shore may be less palatable to humans than that from limpets inhabiting the lower reaches of the shore – this argument, however, presupposes that the shellfish were gathered primarily for human consumption rather than for use as bait (see below). That some collecting did take place on the upper shore is suggested by the occurrence of a few limpets with unusually 'tall' shells in many contexts and the occasional presence of shells of the rough periwinkle (*L. saxatilis*).

It is interesting that the L/H ratio of limpets from C4 has a different distribution from those from other contexts, with over 35 per cent of the shells having L/H ratios in the range 1.6 to 2.0. Possible explanations for this pattern are that many of the shells were gathered from the upper shore, or that collection coincided with a prolonged period of unusually severe weather conditions – under stormy conditions, even limpets that live continually below the water line have to attach strongly to the rock to prevent dislodging by wave action, hence their shells become more conical in shape (Yonge 1972). This latter explanation, however, is at variance with the results of analyses of the shell-length-to-aperture-length ratio of dog-whelk shells (see below).

Clear evidence of temporal variation in shellfish exploitation patterns is difficult to identify among the An Corran data. As noted above, there are some minor changes over time in the proportions of the main species exploited (illus 49). Tables 29–31 present the average sizes of shells of limpet, periwinkle and dog-whelk for each sample examined. The average length of the periwinkle and dog-whelk shells remains consistent throughout the deposits. But some variation is evident in the size of limpets. Average length is relatively high (>3.2cm) in C1, C2 and C4, which are among the more recent deposits excavated. Several samples from the earlier deposits (C37 and C38, and one sample from C31) show similarly high values, but these samples are extremely small and therefore more prone to sampling bias. One explanation for the pattern seen in the later contexts is that they represent collecting episodes which followed prolonged periods when

Table 31 **Length measurements of dog-whelk (*Nucella lapillus*) shells**

Context	Sample	Number	Mean length	Standard deviation	Smallest	Largest
2		5	2.5	0.24	2.2	2.8
3		36	2.5	0.26	2.1	3.4
4		1	2.8			
31	BB 2/3	29	2.7	0.32	1.8	3.7
31	BB 3	2	2.6			
31	BB 4	1	2.8			
31	BB 4/5	1	3.0			
31	BB 6	47	2.7	0.30	1.9	3.3
31	BB 7/8	2	2.9			
31	CoI A(a)	1	2.9			
34		6	2.7	0.24	2.2	2.9
36	C36	5	2.6	0.21	2.4	3.0
36	Col B	3	2.6	0.24	2.3	2.9
36	Col B(a)	1	2.6			
36	Col C(a)	1	2.9			
36	Col D	16	2.8	0.32	2.2	3.3
36	Col E	5	2.7	0.31	2.1	3.0
36	Col F	3	2.7	0.16	2.5	2.9
36	Col F(a)	3	2.9	0.26	2.7	3.3
36	Col G(a)	1	2.9			
36	Col H	2	2.7			
36	Col I	10	2.5	0.16	2.5	2.9
36	Col J	6	2.6	0.32	2.2	3.1
36	Col J(a)	7	2.5	0.14	2.3	2.6
37		5	2.6	0.29	2.4	2.9
38		1	2.7			
39		2	2.7			

the shellfish were essentially free from human predation. Conversely, the character of the (probably much older) Mesolithic and Neolithic/EBA (Phases 1–2) deposits suggests that they relate to periods in the history of the site when shellfish-gathering was a more frequent activity.

9.3.3 Shore exposure

The shell-length-to-aperture-length ratio of dog-whelk shells provides an indicator of local shore conditions. Studies elsewhere have shown a close relationship between shore exposure conditions and the overall shapes of dog-whelk shells (Crothers 1985; Kitching 1985). Dog-whelks inhabiting sheltered parts of the shoreline tend to have elongated shells with narrow apertures, this form providing a better defence against predation by crabs, which are more abundant on such shores. By contrast, dog-whelks living in more exposed locations, where crabs are less common, have wider apertures and more squat forms.

Differences were noted between the shell length/aperture length ratio of modern dog-whelks and those from 'Obanian' shell middens on Oronsay (Andrews et al 1987) and Ulva (Russell et al 1995), indicating that local shore exposure conditions during the Mesolithic differed from those at the present day. In the case of Oronsay, this was linked to variations in storm frequency during the Holocene, whereas in the case of Ulva, it was attributed to changes in the configuration of the shoreline, resulting from sea-level movements.

A similar analysis was undertaken of the complete dog-whelk shells from the various contexts at An Corran. No significant differences were found between the contexts. From this, it may be concluded that no major changes in local shore exposure conditions occurred over the time-range represented by the samples analysed. However, the lack of comparative data for modern dog-whelks from the shore below the site, and the absence of radiocarbon determinations for many contexts, hinder further discussion of this topic.

9.3.4 Processing methods

The main species represented at An Corran – limpet, edible periwinkle, dog-whelk and common mussel – are all known to have been exploited in the past as human food, although recent ethnohistorical evidence from Scotland also points to the widespread use of limpets as fish bait (Fenton 1984).

Among ethnographically-known coastal communities in many parts of the world, processing of shellfish for human consumption often involved cooking. Most forms of cooking (e.g. boiling, baking) may leave no traces on the shells (Waselkov 1987). However, the reported presence of ash and charcoal in the deposits at An Corran, and the sporadic occurrence of burnt shell fragments in the samples examined, are consistent with this activity.

The easiest and most efficient way of extracting meat from bivalves is by roasting, and mussels were often processed in this way. Periwinkles are easier to remove from their shells if the animal is first killed by immersion in boiling water, and the large number of intact periwinkles recovered from the An Corran deposits suggests some form of cooking to aid meat extraction. The same applies to limpets, although experiments have shown that they are not difficult to remove from their shells without boiling (Griffitts & Bonsall 2001).

Gastropods may be broken to aid extraction of the meat, and it is interesting that the dog-whelk shells from An Corran are more fragmentary than those of periwinkles. Since dog-whelks have thicker, more robust shells than periwinkles, this evidence suggests deliberate breakage of the dog-whelk shells rather than post-depositional damage. Breakage of dog-whelk shells suggestive of processing was also observed in the midden in Ulva Cave (Russell et al 1995).

Deith (1989) has suggested that a high incidence of broken shells in archaeological deposits is indicative of collection of the shellfish for use primarily as bait. She argued that breakage often results in small fragments of shell adhering to the meat, rendering it less palatable to humans. Ethnographic studies, however, suggest that shellfish can be eaten even with shell fragments in the meat, and often are (Waselkov 1987). Dog-whelks, moreover, have a very distinctive taste that is often preferred to that of limpets and periwinkles, and in western Scotland they may have been collected primarily to add variety to the diet (Jones 1984).

9.3.5 Taphonomic considerations

In their analysis of the Ulva Cave midden, Russell et al (1995) found many very small shells of marine molluscs, including *L. littorea*, *N. lapillus* and *Helcion pellucidum* (blue-rayed limpet), which they argued were too small to have been collected as food or bait, and had probably reached the site attached to seaweed on which the animals often live. It was suggested that the seaweed had been collected for use in food processing, either as fuel or for 'wrapping' around fish or shellfish prior to baking in open fires. This interpretation was supported by the presence of pieces of vitreous slag in the midden, thought to have resulted from the burning of seaweed.

Some of the very small shells found in the An Corran deposits may have reached the site by a similar mechanism. For example, flat periwinkle (*L. obtusata*) is present in small numbers in many contexts. This species inhabits the zone of fucoid seaweeds on which it feeds, and small specimens (which are evident in the samples) often attach themselves to seaweed for safety. Acorn barnacles, the calcareous plates of which are well-represented in the larger samples examined, are also likely to have been transported to the site unintentionally, attached to objects such as stones, pieces of seaweed, driftwood or shells of marine molluscs.

9.3.6 Shell artefacts

Many coast-dwelling communities, known from both the archaeological and ethnographic records, made use of shells for the manufacture of artefacts of various kinds (Stewart 1973; Waselkov 1987). A limited range of artefacts made from marine shells occurs in 'Obanian' sites on Oronsay and elsewhere in western Scotland. These include shells of scallops (*Pecten maximus*) with manufactured perforations and/or modified edges, and shells of the European cowrie (*Trivia monacha*) which had been perforated, possibly for use as ornaments (Mellars 1987, 124).

At An Corran, two cowrie shells were recovered from C31 and fragments of scallop shells from C31, C34 and C36. None of these specimens shows clear signs of having been humanly modified, but it is possible that they were collected for use as raw material – *Pecten maximus* usually lives in fairly deep water, but the empty shells often wash up on the shore and are readily available for collection. The single valve of *Arctica islandica* found in C31 may also have been an empty shell picked up on the shore. It is interesting that all these specimens occurred in deposits assigned to the first two (Mesolithic and Neolithic/EBA) phases, and that no examples of these species were identified from the latest phase.

9.4 Conclusions

The shellfish represented at An Corran were probably all collected from the shore within a short distance of the site. Limpets predominate in each of the contexts sampled, and they were clearly the main species exploited during all phases in the use of the site. However, there is some evidence of a slight decline in the importance of limpets over time, and a corresponding increase in the importance of periwinkles. Analysis of the shape of the limpet shells suggests that they were normally collected from the middle and lower shore.

Most of the shellfish represented in the deposits were probably collected for human consumption, but some (especially limpets) may also have been used as bait for fishing. A minority of the shells (especially those from very small animals) probably reached the site unintentionally attached to materials such as seaweed or stones brought from the shore.

Evidence for the processing methods used is limited. The presence of charcoal and other traces of burning in the deposits is consistent with processing activities involving cooking, and there is some (circumstantial) evidence for intentional breakage of the shells of dog-whelks, probably to extract the meat.

No evidence was found for the deliberate modification of shells for use as tools or ornaments, but cowrie shells, as well as fragments of scallop shells, and a single valve of *Arctica islandica*, from early (Mesolithic and Neolithic/EBA) contexts, may have been collected as raw material for artefacts.

The archaeological deposits at An Corran evidently represent a considerable period of time, but there were few indications from the marine molluscan analyses of temporal variations in shellfish-collecting patterns, or major changes in shore exposure conditions during that period.