Society of Antiquaries *of* **Scotland**

Anatomy of an Iron Age Roundhouse

The Cnip Wheelhouse Excavations, Lewis

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ISBN: 978-0-903903-32-6 (hardback) • 978-1-908332-28-8 (PDF)

Chapter 4

Subsistence and environment

4.1 INTRODUCTION

The excavations at Cnip produced considerable evidence for the subsistence strategies and environmental exploitation practised by the Iron Age inhabitants of the site. As is to be expected on the alkaline machair, the survival of bone was good, including bird and fish bone as well as mammal bone, so it is possible to provide a reasonable picture of Iron Age husbandry and the exploitation of wild animals. The main limitation relates to the focus of the excavation on the deposits contained within the buildings themselves. Thus there are no extensive midden deposits which might expand the quantitative data available or perhaps widen our insights into food selection and preparation beyond those yielded by the deposition of food remains within accumulating floor deposits. Within similar limitations some insights have also been possible into agricultural practices and the exploitation of plant resources.

The nature of the project did not enable any wider analysis of the palaeoenvironmental background of Cnip. There have, however, been a number of pollen and related studies within the Bhaltos peninsula and these have been quarried for relevant insights as appropriate in the sections which follow.

4.2 ANIMAL BONE

Finbar McCormick

4.2.1 INTRODUCTION

The excavations at Cnip produced a relatively small, but interesting, assemblage of animal bone. The 14 blocks which yielded bone were analysed separately and the bones from the separate blocks are listed in tables held in the site archive. The fragments numbers and minimum numbers of individuals (MNI) from each block and phase are summarized in Table 4.1 and 4.2 of the present report. The MNI for each context was based on the most commonly occurring skeletal element, left or right, but no attempt was made to modify MNI values on the basis of bone size or stage of fusion. Tables 4.11–4.14 list the measurements of the bones of each of the main species.

Nearly all of the material came from domestic contexts, especially floors, passage-ways and middens, and for the most part represents discarded food refuse.

TABLE 4.1
Fragment distributions from different blocks.

Block	Phase	Cattle	Sheep	Pig	Dog	Red deer	Common seal	Cetacean	Otter
1	3	81	48	14	–	31	–	16	3
3	3	4	3	2	–	9	1	2	–
4	3	11	5	4	–	6	–	–	–
5a	2	70	55	4	1	34	–	4	–
5b	2	215	174	26	–	128	1	39	–
6	1	24	12	2	–	31	–	6	–
8	2	99	38	11	–	70	4	10	–
11	1/2	10	6	2	–	3	1	–	–
15	1	17	18	6	–	10	2	–	–
18	3	69	51	10	–	41	–	2	–
19	2	21	18	–	–	2	–	–	–
19(F220)	2	–	30	–	–	1	–	–	–

TABLE 4.2
Minimum numbers of individuals (MNI) values from different blocks.

Block	Phase	Cattle	Sheep	Pig	Dog	Red Deer	Common Seal	Cetacean
1	3	4	3	1	0	2	0	1
3	3	1	1	1	0	1	1	1
4	3	2	1	1	0	1	0	0
5a	2	2	4	1	1	3	0	1
5b	2	7	8	2	0	8	1	1
6	1	1	2	1	0	1	0	1
8	2	2	2	1	0	5	2	1
11	1/2	1	1	1	0	2	1	0
15	1	2	2	1	0	2	1	0
18	3	2	2	1	0	3	0	1
19	2	2	2	0	0	1	0	0
19(C220)	2	0	2	0	0	1	0	0

The only exceptions were two semi-complete sheep skeletons. The first was from Phase 1 (Context 090) and was found in the infilled entrance to Wheelhouse 2, while the second was below the entrance passage connecting Structure 3 to Wheelhouse 1 (Context 220). Cattle, sheep, pig, dog, red deer, common seal, otter, and cetacean were the only species represented on the site. There was no evidence of horse or domesticated cat.

The fragments and MNI values of the main meat-bearing species from the individual blocks were combined to give overall MNI values by phase, and the results are shown in Table 4.3 and 4.4. With the exception of a reduction in pig numbers during Phase 2, there is general consistency in the distribution between the three phases. Cattle and sheep are the principal domesticates, being present in roughly equal numbers, with pig being of much lesser importance. The most surprising aspect of the assemblage, however, is the important role played by red deer. They are as prominent, in terms of MNI, as sheep and cattle and clearly played a vital role in the provision of meat for the inhabitants.

In order to place the Cnip distribution in context, data from a series of Hebridean sites was compiled in Table 4.5. The data was confined to fragments

TABLE 4.3
Distribution of the fragments from main phases.

	Cattle	Sheep	Pig	Red Deer	No.
Ph1	41	30	8	41	122
Ph 2	435	285	41	235	996
Ph 3	165	107	30	87	389
Total frag	641	422	79	363	1505
Ph 1 %	33.6	24.6	6.6	33.3	
Ph2 %	43.7	28.6	4.1	23.6	
Ph 3 %	42.4	27.5	7.7	22.4	
Total frag %	42.6	28	5.2	24.1	

TABLE 4.4
MNI distribution of main species from Phases 1–3.

	Cattle	Sheep	Pig	Red Deer	No.
Ph 1	2	2	1	2	7
Ph 2	13	17	4	18	52
Ph 3	9	7	4	7	27
Overall MNI	24	26	9	27	186

	Cattle	Sheep	Pig	Red Deer	No.
Ph 1 %	28.6	28.6	14.3	28.6	7
Ph2 %	25	32.7	7.7	34.6	52
Ph 3 %	33.3	25.9	14.8	25.9	27
Overall MNI %	27.9	30.2	10.5	31.4	186

distribution as the use of MNI data greatly reduces the data base. The table shows that the high incidence of deer noted at Cnip is also recorded in both the Beaker period and Iron Age levels at Northton, in Harris. Between these phases, and in an earlier Neolithic phase, the importance of deer is considerably less. In a series of phases ranging from the early Iron Age to the Norse period at Dun Mor Vaul, Tiree, deer also maintain a predominant role in all but one of the phases. At Dun Ardtreck, on Skye, deer also played a prominent role. In contrast to this, however, deer played an insignificant role in a series of sites from the Uists.

It is difficult to provide a convincing explanation for the contrasting role of deer on the various sites. It might be noted that the amount of machair land at Northton and especially Cnip is relatively limited compared with the extensive machairs in the vicinity of the Uist sites. Limited agricultural land resources may have led to a higher dependence on wild animals for meat. Furthermore, both Cnip and especially Northton are closer to areas of extensive highlands which are more conducive to higher deer densities. It has also been noted that proximity to agricultural land and the presence of large numbers of lochs, indicating poorly drained habitat (Clutton-Brock & Albon 1989, 30–4), tend to coincide with lower deer densities. All these factors may contribute to the low incidence at the Uist sites.

This deterministic model cannot be applied, however, when one considers Tiree. This area has very limited areas of upland, extensive machair and few lochs, yet the incidence of deer at Dun Mor Vaul is consistently high in a period ranging from the early Iron Age to the Norse period. The physical environment and the small size of the island created a situation which should have been unsuitable to the co-existence of human settlement and a viable population of wild deer. Therefore, the economy indicated by the bone assemblage at Dun Mor Vaul could only have been maintained if deer were treated almost as a domesticated animal.

This careful 'farm' management is especially demonstrated by the presence of roe deer at Dun Mor Vaul. Nearly half the cervid bones were of roe and they are present in all of the Iron Age phases of the site. The species is now extinct on the island, the nearest being present on Mull (Clutton-Brock & Albon 1989, 172). The roe deer is essentially a woodland animal but Pilcher (1974, 207), on the basis of the palynological evidence, found no evidence for woodland near Dun Mor Vaul during the Iron Age. Even if small pockets of woodland were present on other parts of the island, the maintenance of a population over so long a period must represent careful conservation, and sensitive culling, of the deer population.

It also seems almost certain that deer, like the other domesticates, were deliberately introduced to Tiree and other islands of the Outer Hebrides although it will not strictly ever be possible to prove this hypothesis. The occasional treatment of deer as

TABLE 4.5

Percentage distribution of fragments from Hebridean sites (after Finley 2006; Halstead 2003; McCormick 1981; Mulville 1999, Tables 10.5, 10.6 and 10.33; Noddle 1974, 1980, 1981; Sergeantson forthcoming. X indicate that a species is present but in negligable quantities. *At some sites the deer bones are comprised of a mixture of red and roe. Roe deer comprise 30% of the cervid bones at Dun Mor Vaul, 7% at Dun Vulan and Dun Ardtreck, and 5% in the vallum, Iona. The Hornish and Baleshare values are of 'anatomical units' rather than fragments

		Cattle	Sheep	Pig	Red Deer	N.
Lewis + Harris						
Northton:	Neolithic	28	68		4	608
	Beaker Phase 5–6	40	43	1	16	140
	Beaker Phase 7	35	32		32	580
	Iron Age Phase 1	39	47	4	10	114
	Iron Age Phase 2	9	8	0	82	333
Cnip	Iron age Ph. 1–3	43	28	5	24	1505
Loch na Beirgh	Sub-phase 1	37	27	2	34	132
	Sub-phase 1 and 2 Iron Age	34	24	4	38	1889
Dun Bharabhat	Iron Age	27	21	4	48	327
North Uist						
Sollas	Site A Iron Age	34	59	6	1	775
	Midden B Iron Age	57	37	5	1	100
Udal	Phase 11–13 *c* AD 300–800	39	59	2	x	6689
Baleshare	Early/middle Iron Age	34	59	6	1	2040
South Uist						
Hornish Point	Late Bronze/early Iron Age	28	59	12	1	440
Dun Vulan	Adjacent to Broch	28	48	22	3	569
	Platform	47	39	14	1	2313
	Overall	41	43	15	1	3597
Tiree						
Dun Mor Vaul	Period 1. Pre-broch	19	32	2	47	81
	Phase 2. Construction	18	67	3	13	440
	Phase 3a. Broch	30	36	5	29	234
	Phase 3b. Broch	32	27	12	29	73
	Phase 4. Post-broch IA	35	31	2	32	376
	Phase 5. Norse	23	24	9	45	139
Skye						
Dun Ardtreck	Iron Age	51	8	13	28	1303
Iona						
Dun Cul Bhuirg	Iron Age	44	19	20	17	180
	Monastic Vallum AD seventh century	81	15	2	10	210
	Guest House upper AD ninth century	28	12	12	48	685
	Guest House lower AD ninth century	33	11	11	44	733

TABLE 4.6
Relative proportions of carcass meat provided by mammals (all phases).

	Cattle	Sheep	Pig	Red Deer	Common seal
Number	24	26	9	27	4
Estimated live weight (kg)	450	19	80	87	91
Estimated carcass weight (kg)	225	9.5	64	52.6	68.3
Total carcass weight (kg)	5400	247	576	1420.2	273.2
Percentage carcass weight	68.2	3.1	7.3	17.9	3.5

TABLE 4.6a
MNI Distribution from Outer Hebridean sites after Finley (1991) and Mulville (1999). The MNI values for deer at Dun Vulan were not estimated but deer bones accounted for only 1.1% of the fragments total at the site.

		Cattle	Sheep	Pig	Red Deer	No
Cnip	Ph. 1%	28.6	28.6	14.3	28.6	7
	Ph. 2%	25	32.7	7.7	34.6	52
	Ph. 3%	33.3	25.9	14.8	25.9	27
	Overall MNI %	27.9	30.2	10.5	31.4	186
Sollas	Site A Iron Age	20	70	5	5	20
	Midden B Iron Age	18.2	63.6	9.1	9.1	11
Dun Vulan	Adjacent to broch	20	55.6	24.4	–	23
	Platform	36.7	48.2	15.1		70

an almost domesticated livestock is also supported by documentary evidence from medieval Scotland. In 1288–90 there are records of deer being fed on hay at Stirling Park, although in this case it was in order to maintain fallow deer primarily for sport rather than as a food resource (Gilbert 1979, 220) while the feeding of hay to red deer in the Highlands occurs today during harsh winters.

The high incidence of red deer at Cnip and some other Hebridean sites must therefore be considered in terms of the farming rather than simply the hunting of deer. The widening of one's livestock range to include wild species allowed more effective exploitation of the grazing resources in areas of such extreme climate as the Hebrides and Northern Isles. Red deer on Lewis and Harris, despite needing 30 to 40 per cent more energy per unit of body weight for maintenance than sheep (Clutton-Brock & Albon 1989, 99), would have been able to exploit higher altitudes than hill sheep throughout the year. Careful exploitation of the deer therefore allowed the inhabitants of the islands to exploit more of the vegetation, by way of conversion to meat, than by simply limiting themselves to managing domesticated species.

Table 4.6 attempts to provide some indication of the relative importance of red deer by converting the data in Table 4.2 to dressed carcass weight. Estimating the weights of early animals can be problematical and the values used in the calculations are as follows. Cattle live-weight is based on the value used by Legge (1981, 99) in his study of Bronze Age Grimes Graves. The ewe live-weight is that of a modern adult Soay (Boyd et al 1964, 145). In both cases a dressing-out proportion of 50 per cent is assumed. The deer weight is the average of modern dressed hind carcass weights noted by Clutton-Brock and Albon (1989, 60), as the deer from Cnip are similar in size to modern types. The pig weight used is based on that used by van Wijngaarden-Bakker (1986, 71) and used for Beaker material in Ireland and assumes a dressing out proportion of 80 per cent. Finally, a common seal weight of 91kg is assumed being 20 per cent less than the maximum adult size stated by Hewer (1974, 169). White (1953, 398) suggests a dressing out proportion of 75 per cent for seal. No attempt was used to take the meat of cetacean species into consideration.

Table 4.6 indicates that cattle were clearly the most important provider of meat but that red deer provided much more than either pig or sheep. Indeed, apart from during Phase 1, sheep appear to have provided even less meat than common seal.

4.2.2 CATTLE

Although the bones from Cnip survived in good condition they tended to be extremely fragmented and the metrical data is fairly limited (Table 4.11). The sample of cattle bones was too small to allow the sex distribution to be estimated, and none of the cattle bones displayed pathological anomalies.

Two complete metatarsals, with greatest lengths of 175.9mm and 178.1mm, were present. These provide estimated wither's heights of 95.9cm and 97.1cm, using the mean of the male and female multiplication factors devised by Fock (quoted in von den Driesch and Boessneck 1984, 336). These are extremely small cattle. They are for instance smaller than cattle from Iron Age Dun Vulan, South Uist, where the average metatarsal greatest length was 194.3mm (Mulville 1999, 255). Published comparative material from contemporary mainland Scottish sites is extremely rare but two metatarsals from Roman Iron Age levels at Edinburgh Castle have greatest lengths of 202.3mm and 211.6mm (McCormick 1997, 207), while a single example from the Roman *vicus* at Inveresk in East Lothian has a greatest length of 229.1mm, although the latter is a very large example by any prehistoric or early historic standards.

TABLE 4.7
State of cattle manibular eruption and wear after Case (1967) and Grant (1982). Estimated ages are approximate and potentially inaccurate and are provided only as a guide.

Higham stage	Stage of tooth eruption	Approx age in months	Number
3	PM4 erupted, M1 not	1–4	1
4	M1 in primary eruption	5–6	3
6	M1 in tertiary eruption	7–9	1
8	M2 in primary eruption	15–16	1
13	M3 in secondary eruption	24–30	1
20+	M3 erupted, wear stages G × 3: K × 1	40+	4

TABLE 4.8
Cattle fusion data based on Silver (1969, 285–6). (Data in site archive table 5)

Approx age (in months)	% killed
0–10	40
10–18	0
18–36	0
36–42	16
42–48	13

The Cnip data also indicates cattle smaller in height than noted in Iron Age Orkney, where the lengths of the metatarsal at Howe range from 189–203mm (M=7) with a mean of 195.3mm (Smith 1994). The single complete metacarpal from Cnip (GL=158.5mm) also demonstrates the small size of the cattle present as those from Howe range from 169mm–191mm.

Smallness of animals can be attributed to poor nutrition as well as isolated breeding (see Section 4.2.5). The immediate hinterland of Cnip was fairly isolated and certainly not ideal for the raising of cattle. There is a very limited area of machair and Lewisian black earth, a fertile mixture of peat and shell sand, which is suitable for the production of grass, but it seems likely that much of this land would have been reserved for tillage. The necessity of fallow would, however, have made some machair grassland available. nineteenth-century data from the Uists, for instance, indicates that machair was tilled for three years and then allowed to return to grassland (Carmichael 1916, 253). At Cnip, however, it seems likely that most of the grazing would have occurred on the peatlands and uplands. This was certainly the case on the Uists when cattle were kept in larger numbers than at present. During the nineteenth century, the cattle were brought to the heath and hill grazing areas at the beginning of June (ibid, 364) where they were overseen from shielings throughout the summer.

Grazing would have been extremely limited during the winter and spring. Walker, quoted in McKay (1980, 97), states that in the absence of hay (winter forage), cattle were left to graze outdoors throughout the year. This leads to very low stocking rates and a generally low standard of cattle husbandry. It also seems unlikely that hay was saved during the Iron Age, if for no other reason than that the land available for hay production in the vicinity of Cnip was extremely limited. It would not be surprising, therefore, if the extremely poor environment accounted for the small size of the cattle at Cnip as they, unlike sheep, do not thrive well on poor grazing and the extreme weather conditions, which are the norm in the Western Isles during the winter.

Small size, however, had one great advantage in the Cnip area. With so much of the grazing having to be undertaken in boggy areas, and especially with the necessity of leaving cattle outdoors during the wet winter period, small cattle were much less likely to sink and become trapped in boggy areas.

The cattle ageing data from Cnip is very limited. Only a small number of mandible fragments with their innermost teeth in site were present and the data is shown in Table 4.7. This, admittedly rather limited data, indicates that about 45 per cent of cattle were less than one year at time of death, 36 per cent were old animals with the remaining 18 per cent being between one and two and a half years at time of slaughter.

The epiphyseal fusion data also shows the same age/slaughter distribution data as the tooth eruption data (Table 4.8). This bimodal cattle slaughter distribution, with an emphasis on very young and very old animals, has also been noted on other Iron Age sites in the Western Isles such as the Udal, Baleshare and Dun Vulan (Halstead 2003, 145; Mulville 1999, 25; Serjeantson forthcoming). At these sites the majority of the younger peak represented neonatal or calves of under one month of age. At Baleshare 36 per cent of the cattle were neonatal while 33 per cent were less than two or three weeks of age at the Udal. At Dun Vulan some 49 per cent were calves of less than one month of age (Mulville 1999, 246). Mulville (ibid, 271) argues that this age/slaughter pattern is a direct result of a dairying strategy but it unlikely that such a strategy would have been advantageous to dairying in the Hebrides. McCormick (1991) has shown that early literary evidence demonstrates that early cows could not be milked unless their calf was present. Martin Martin (1716, 155) indicates that this was still the case in Skye during the seventeenth century and probably the latest evidence of the trait is from the Western Isles in 1884 when Crawford states that:

> Occasionally a calf dies, and the mother cow is restive, and will not give the milk. To quiet her, and obtain milk from her, the skin of her dead calf is placed on a skeleton frame calf, made for the purpose. This is placed before the cow, and the deception has the desired effect. (Crawford quoted in Lucas 1989, 54)

McCormick (1998) has instead argued that the high incidence of calf slaughter was simply a product of poor grazing. Cows produced more calves than the land could support. The Uist proverb '*Is fearr aon laogh na da chraicionn*' (Carmichael 1916, 256) – one calf is better than two skins – succinctly summarizes the predicament facing early livestock rearers in this part of the world. A high incidence of juvenile mortality has also been noted on Atlantic Irish sites of different periods, an age slaughter pattern that is not repeated in contemporary inland sites. This again suggests that it is environmental rather than economic factors that determined this rather extreme slaughter pattern.

This does not mean, however, that cattle were not milked on the Hebrides at this time. Solinus, writing in the third century AD, states that the inhabitants of the Hebrides (*Ebudae*) lived on fish and milk (quoted in Legge 1981, 220). Additionally, lipid analysis of Late Bronze and Early Iron Age pottery from Cladh Hallan, South Uist, has produced evidence for cattle dairy fat (Jaqui Mulville pers comm) while elsewhere in Britain there is similar evidence dating back to the early Neolithic (Copley et al 2003). The presence of cattle dairy fats on early pottery, however, should not be equated with a food economy that is heavily dependent on dairy foods. The early Egyptians, for instance, milked cows but milk was only used for feeding infants and occasional medicinal usage (Darby et al 1977, 764, 771–2). Neither is there any definite evidence that they produced secondary products such as butter or cheese.

It is possible that the high incidence of cattle dairy fats in prehistoric pottery is more a reflection of attempting to make the unglazed pottery less porous than of a widespread dairying food economy. John Walker notes the use of milk for this purpose on the Hebridean island of Coll during the late eighteenth century. In his description of pottery-making he notes the following:

> In some parts of the Island, there are pits of a reddish Clay, which the Inhabitants manufacture into different kinds of Earthen Vessels which they call Crokans. This sort of ware, the most rude and simple that can be anywhere made, they frame in the following manner. The clay, without any mixture, they form by the Hand, into the Shape of the Vessel required, and then place them in the Sun, till they are thoroughly dry. After this, they are filled with Milk and set upon a strong Fire, where they

TABLE 4.9
State of sheep mandibular teeth eruption and wear after Higham (1967) and Grant (1982).

Higham Stage	State of tooth eruption	Approx Age in months	Number
4	M1 in primary eruption	3	2
6	M1 in tertiary eruption	5	2
7	M1 in wear, M2 unerupted	5–9	7
9	M2 in primary eruption	9–10	2
10	M2 in secondary eruption	10–11	1
11	M2 in tertiary eruption	11–12	1
12	M2 in wear, M3 unerupted	12–21	6
13	M3 in eruption	21–24	33
14	M3 in wear, cusp 3 unworn	24–26	1C
15+	M3, cusp 3 in wear	26+	8DEGGGGGG

> are kept till the milk be entirely be boiled away, which finishes the Operation. (McKay 1980, 171)

One should be careful of equating positive lipid results of cattle dairy fat with widespread dairy food consumption. It is likely that the analysis of early modern condoms would produce similar positive results. A handwritten label dated 1813 on a condom in Lund University Historical Museum notes the following: ‘In order to protect themselves against venereal disease, those who are inclined to have sexual intercourse should cover the penis with a thin membrane softened in warm milk [*late tepid*], and use this sheath when they fornicate with prostitutes’ (quoted in Gaimster et al 1996, 140).

4.2.3 SHEEP

4.2.3.1 General

There was no evidence for goat being present at Cnip, nor indeed on any archaeological site in the Western Isles (Serjeantson 1990, 14), so it can be confidently assumed that all the caprovine remains were of sheep. Sheep played a relatively minor role at Cnip in comparison to Sollas, North Uist and Dun Vulan, South Uist, sites for which data is available on the minimum numbers of individuals. Indeed, Table 4.2 makes clear that sheep also played a much less important role at Cnip than most other Hebridean sites of the period. It is difficult to understand this dichotomy. The Uist sites were all located within large, relatively fertile machair areas compared with the limited area of machair available at Cnip. This, as already stated, probably accounted for the higher reliance on red deer at Cnip but it is difficult to see how limited good grazing land would account for a lower incidence of sheep.

TABLE 4.10
Sheep age slaughter patterns from Cnip, Udal and Dun Vulan after Mulville (1999, 250) and Serjeanston (forthcoming).

Higham Stage	Approx Age in months	Cnip (all phases) %	Udal (*c* AD 300–800)%	Dun Vulan %
0–6	0–5	12.1	10.8	11.4
7–11	5–12	33.3	30.8	42.1
12–13	12–24	27.2	12.3	5.3
14	24–48	6.1	20	29.8
14+	48+	21.2	26.1	11.4

The sheep measurements from Cnip are presented in Table 4.13. Comparative material from the Western Isles for the period is rare but material from other areas indicates that the sheep from Cnip are generally of similar size to those noted on other Scottish Iron Age sites.

The age/slaughter pattern for sheep, on the basis of tooth eruption, is shown in Table 4.9 (the epiphyseal fusion data is contained in the site archive). In Table 4.10 the data are summarized and compared with those from the Udal, North Uist and Dun Vulan. The distributions are remarkably similar in many ways. Both show a high peak in the second half of the first year, representing the slaughter of lambs that have been fattened over the first summer and autumn.

The slaughter pattern diverges for the second and third years but the incidence of older animals killed demonstrates reasonable correlation between the three

TABLE 4.11
Cattle bone measurements (mm) (abbreviations after von den Driesch 1976).

Bone	Measurement	N	Min	Max	Mean	SD
Scapula	GLP	6	53	62.1	58.5	3.03
	SLC	4	39.5	46.1	43.6	3.14
Humerus	Bt	3	64.9	69.2	66.6	2.27
Metacarpal	GL	1			158.6	
	Bp	3	44.9	51.8	48.9	3.58
	Bd	3	42.1	53.1	48.9	5.96
	SD	1			22.5	
Tibia	Bp	1			72.5	
	BD	5	51.9	55.7	53.5	1.81
Calcaneus	GL	1			119.1	
Astralagus	GLI	3	57.9	58.5	58.2	3.05
	BD	3	35.9	37.3	36.8	0.78
Metatarsal	GL	2	175.9	178.1	177	
	Bp	2	40	41.9	41	
	Bd	3	45.9	48.5	47.6	1.47
	SD	1			25.3	

sites (Table 4.10). The data suggests that a similar proportion of older sheep for breeding, wool and possibly milk was present on the three sites but because, perhaps, of the limited good grazing lands available at Cnip surplus sheep tended to be slaughtered in their second year, rather than fattened until their third year as at Dun Vulan. It should also be noted that a small number of neonatal sheep bones were present at Cnip but were not represented by mandibulae.

There were two examples of polled sheep in Block 5a and Block 5b, the Phase 2 occupation deposits inside the wheelhouse.

4.2.3.2 Sheep burials

Two concentrations of bone were identified that could be interpreted as burials. The first (Context 090, Block 11) was deposited directly over the stack of stone in the entrance to Wheelhouse 2 (see Section 2.3.2.2). It consisted of most of the fore and a small part of the hind limb of a lamb. None of the toe bones were present. The animal was about six months of age at time of death. No chop marks were noted.

The second group (Context 220, Block 19) came from within the entrance passage between Structure 3 and Bay 2 of Wheelhouse 1 (see Section 2.4.2.1). It contained the skulls of two individuals and the post-cranial remains of one adult individual. Again the toe bones were missing. Many of the long bones were deliberately broken for the removal of marrow and one distal humerus displayed knife marks. None of the bones had been gnawed.

4.2.4 PIG AND DOG

Pig played a minor role in the diet not only at Cnip but also at all other Hebridean sites of the period. Considering the lack of trees, which could supply them with mast, their low incidence is hardly surprising. Serjeantson (1990, 13) has also noted that pig, because of their rooting habits, would rapidly destabilise the machair surface leading to soil erosion.

Nonetheless, a neo-natal pig mandible was found within Wheelhouse 1 in the early part of Phase 2 (Block 5a), indicating that pigs were bred at the site.

The pig metrical and ageing data are presented in Table 4.14, but are too limited to warrant comment.

Only one dog bone, from within Wheelhouse 1 in the early part of Phase 2 (Block 5a), was present on the site, but the presence of gnawing, though not very common, suggests that they were present during all phases of occupation.

4.2.5 RED DEER

The sample from Cnip constitutes the largest available body of metrical data from the Hebrides (Table 4.12) and indicates that the deer were of a very small size.

TABLE 4.12
Red Deer bone measurements (mm) (abbreviations after von den Driesch 1976).

Bone	Measurement	N	Min	Max	Mean	SD
Scapula	GLP	7	43.6	49	44.8	3.56
	SLC	5	24.9	30.6	28	2.71
Humerus	Bd	6	42.1	49	45.2	2.84
	Bt	8	39.5	45	41.9	1.62
Radius	Bp	1			45.1	
	Bd	9	37.9	45.1	40.7	2.92
Metacarpal	Bp	2	33.1	33.3	33.2	
Femur	Bd	3	50.9	61.1	54.6	5.62
Tibia	Bp	2	59.5	64.3	61.9	
	Bd	20	31.4	42.3	38.3	2.22
Astralagus	GLI	18	40.9	47.5	43.9	1.81
	BD	17	25.9	30.1	28.3	1.25
Metatarsal	Bd	2	29.5	29.7	29.6	

Illus 4.1 shows that the red deer from Cnip falls completely below a sample from mainland Iron Age and Dark Age deer from Edinburgh Castle.

Grigson and Mellars (1987, 254–62) noted the small size of the deer population on Oronsay during the Mesolithic period and demonstrated that they were smaller than any contemporary deer population. Only a few measurements were available for the Oronsay material but these are all still greater than the mean values at Cnip, and many are greater even than the Cnip maximum values. This suggests that the Cnip deer were generally smaller than the Mesolithic Oronsay population. They were also smaller than the early Christian deer found at Iona (McCormick 1981), which are most likely to have originated on the nearby large island of Mull (Ill 4.1).

Small size in deer can be due either to poor nutrition or the 'more long-term effects of genetic

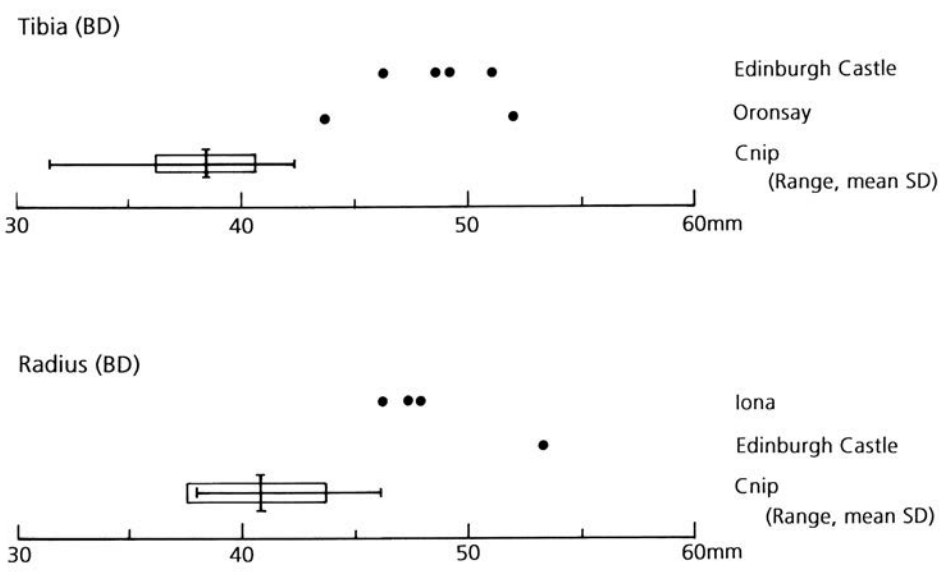

ILLUSTRATION 4.1
Red deer size ranges at Cnip compared with those from Edinburgh Castle, Oronsay and Iona.

TABLE 4.13
Sheep bone measurements (mm) (abbreviations after von den Driesch 1976).

Bone	Measurement	N	Min	Max	Mean	SD
Scapula	GLP	3	29	32.1	30.1	1.76
Humerus	Bd	10	25.1	28.4	26.4	1.2
	Bt	10	24	28.3	25.6	1.4
Radius	GL	1			135.6	
	Bp	5	25.9	29.1	27.5	1.46
	Bd	1			22.3	
	SD				14	
Metacarpal	GL	3	113.5	122.5	118.6	4.62
	Bp	6	20.2	25.1	21.6	1.87
	Bd	5	21.4	23	22.2	0.59
Femur	Bd	1			30.7	
Tibia	Bd	4	22.1	24.3	23.9	1.28
Astralagus	GLI	6	252	27.5	26.4	0.91
	BD	6	16.8	19	17.4	0.86
Metatarsal	GL	2	129.2	130.1	129.7	
	Bp	4	17.5	18.6	18.1	0.52
	Bd	5	20.5	22.2	21.2	0.63
	SD	2	9.7	10.5	10.1	

selection acting on relatively small, isolated specimens' (Grigson & Mellars 1987, 260). As outlined above, it seems most likely that deer were deliberately introduced to the Hebrides by human populations. If they had been introduced from the mainland, this decline in size must have occurred after their arrival, as deer of this small size are unknown from prehistoric or early historic mainland sites. The limited woodland available in the Western Isles may quickly have led to a decline in deer size.

The larger deer from Iona indicate that there were areas more favourable for deer on the Inner Hebrides during the early Christian period. Grigson and Mellars (ibid.) concluded that the occasional big bone present on Oronsay, represents venison imported to the island. In Orkney, the good quality of the grazing is reflected in the larger size of the Iron Age deer at Howe compared with those of the Western Isles.

It is difficult to estimate the age at which the deer at Cnip were slaughtered because no complete mandibles were present and the age at which cervid bones fused has not been published. The fusion data has, however, been recorded in the site archive, and on the basis of this some observations can be made.

Few young or fully mature animals were killed. The majority, approximately 60 per cent in age stages 3–6, were semi-mature animals. On the basis of epiphyseal data from sheep and cattle this would suggest an age of approximately from one year to two and a half to three and a half years of age. Modern Scottish deer do not reach maximum weight until about five years but the rate of weight growth begins to decrease after about three years (Clutton-Brock & Albon 1989, 63). The inhabitants of Cnip therefore seem to have undertaken a very careful hunting strategy, generally avoiding very young and old animals but concentrating on those animals that were undergoing their fastest period of growth. By avoiding the indiscriminate killing of old breeding stock, and the very young, they were able to conserve the deer herds in their area.

Red deer antler was commonly used as a raw material on the site. This was not, however, simply a by-product of hunting. The great majority of the burrs present (eight out of nine) were shed, indicating that antler was collected separately and brought to the site.

4.2.6 OTHER WILD ANIMALS

Seal bones were present in four of the blocks (Table 4.2). In all cases where they could be identified they were of common seal (*Phoca vitulina*). Common seal

TABLE 4.14
State of pig teeth eruption and wear after Higham (1967) and Grant (1982) and pig bone measurements (mm) (abbreviations after von den Driesch 1976).

Higham stage	**State of tooth eruption**	**Approx age (in months)**	**N**
3	Milk Pm4 in secondary eruption	0–4	1
8	M1 in tertiary eruption	6–7	2*
23	M3 erupted	27–29	2DD

* 2 sides of single mandible

Bone	**Measurement**	
Humerus	Bd	38.1
	Bt	29.5
Radius	Bp	23.8
Pelvis	LA	25.9

were also noted at Baleshare, while grey seal were noted at A Cheardach Mhor, on South Uist (Clarke 1960, 169). A few otter bones were also present in the occupation deposits within Structure 8 (Block 1).

Whale bones were present throughout the assemblage (Table 4.2). In only one case (a phalanx from Context 189, Block 5), could the bone be identified, and this was a Right whale, almost certainly *Balaena glacialis*. This is one of the largest whales and probably represents the exploitation of stranded animals rather than hunting. There is, however, evidence for the hunting of this whale in western Europe during the early historic period (Clarke 1989, 89).

The whale bones range from large fragments, displaying part of the bone surface, to large quantities of the internal 'honeycombed', part of the bone. Many displayed butchering marks and a few were burnt.

Since the meat can be quite easily cut away from the carcass of a large whale, it must be concluded that most of the material does not represent discarded food refuse. There is much evidence for the use of whale bone as a raw material during the Iron Age and other periods in the relatively treeless Northern and Western Isles of Scotland, and most of the Cnip fragments probably derive from such usage (see Section 3.5). Whale bones also contain much oil and by breaking the bone exposing the honeycombed interior this can be easily acquired. Clarke (1989, 94) also provides medieval literary evidence for the use of bones as fuel and the few burnt pieces may represent its use for this purpose.

4.3 BIRD REMAINS

Sheila Hamilton-Dyer

The methods used for identification and recording of the bird remains were based on the FRU (Faunal Remains Unit, Southampton) method 86 system, with some modifications. Identifications were made primarily using modern comparative collections of the FRU and the author, with reference to the Natural History Museum collections at Tring where necessary. The measurements follow von den Driesch (1976).

Most of the 48 bird bones were of auks and other sea-birds, particularly shag (*Phalacrocorax aristotelis*) and the great auk (*Alca impennis*) (Table 4.15). Other auks represented in the material were the common guillemot (*Uria aalge*), black guillemot (*Cepphus grille*) and puffin (*Fratercula arctica*). There were two fragments of gannet (*Sula bassana*) and two of a diver (probably *Gavia immer*, the great northern diver), on site. Three fragments could not be identified further than goose, as the bones were insufficiently complete for precise identification. There are several species possible, including the greylag (*Anser anser*), the white-fronted (*Anser albifrons*), the pink-footed (*Anser brachyrhnchus*), brent (*Branta bernicla*), and barnacle (*Branta leucopsis*).

The only representatives of entirely land-based birds were two bones of a grouse species, and a third which was probably also of grouse. The willow grouse (*Lagopus lagopus*), or its British sub-species, red grouse (*L l scoticus*), is probably the most likely candidate on size and morphology, but black grouse (*Lyrurus tetrix*) cannot be ruled out entirely.

None of the bird bones contained the extra medullary bone associated with females in lay (Driver 1982). Although this does not necessarily exclude breeding birds, the great northern diver today breeds only in Iceland and many of the geese found in the area are winter visitors which breed further north. Excepting the great auk, the other sea birds are common coastal residents.

The great auk material is of special interest, as this species holds the dubious distinction of being the only British bird to have become completely extinct in historic times. Although the last pair were killed in Iceland in 1844 this flightless, penguin-like relative

TABLE 4.15
Numbers of bird bones from each block, by species.

Phase	Block	Diver	Gannet	Shag	Goose	Grouse	Guillemot	Puffin	Great Auk	Unident	Total
1	6			5						4	9
1	15				1			5		2	8
1	16								2		2
2	5a								1		1
2	5b	1	1	1						3	6
2	8					2			7	3	12
2	13			1							1
3	1	1			2						3
3	3		1						1		2
3	4			1							1
3	18						2				2
3	20										1
Total		**2**	**2**	**9**	**3**	**2**	**2**	**5**	**11**	**12**	**48**
MNI		**2**	**2**	**5**	**2**	**1**	**2**	**2**	**4**		

of the razorbill is also known to have bred on St Kilda and Papa Westray until the nineteenth century (Cramp 1985; Lea & Bourne 1975). It has occasionally been recorded from archaeological sites along the north-western Atlantic coast, including the Pictish and Norse site at Buckquoy, Orkney (Bramwell 1976), and as far south as Oronsay (Grieve 1882).

Although slightly different morphologically, the bones are similar to those of the razorbill but about twice the size. Seven of the 11 bones were from a trampled secondary sand floor deposit in Structure 4, Phase 2 (Context 266, Block 8), and are probably all from one bird. These included a pair of humeri with pronounced bicipital furrows, which may be unusually deep (Serjeantson pers comm). It is possible that this feature relates to the age or sex of the specimen, but the limited comparative material does not provide a definitive answer. Detailed measurements of the great auk bones are tabulated in the site archive.

Butchery evidence on the bird bone is restricted to knife cuts on a shag femur and a grouse humerus. Both were cut near the proximal articulation, consistent with limb excision.

The anatomical distribution of the fragments is considerably biased. Most of the fragments are of major leg and wing bones, the coracoid, and the cranial portion of the sternum. There are no head bones apart from the complete head and beak of a great auk recovered from behind the wall of Wheelhouse 2 (Context 116, Block 16).

Although the best-represented elements are those which would yield most meat, they are also large and sturdy bones. The lack of skull, pelvis and synsacrum may be due to their fragility, while other bones may be unrepresented partly because their small size can count against their preservation and recovery. However, if the birds had been dressed, these waste parts may have been discarded elsewhere. Two goose fragments and two of shag showed evidence of carnivore gnawing, another source of taphonomic loss.

The fragment numbers are too small to detect any spatial or temporal changes. As can be seen from the MNI (Table 4.15), the great auk bones are numerically the most frequent, but in fact, like the rest of the species, the bones represent only a few individuals. Shag is the most common species, the nine fragments representing five individuals. The great auk is the next best represented with 11 bones from a minimum of four individuals.

4.4 THE SIEVED FISH REMAINS

Ruby Cerón-Carrasco

4.4.1 METHODS

The fish remains from Cnip discussed in this section were recovered by wet-sieving through a 1mm mesh.

TABLE 4.16
Block 1: NISP and fish bone concentration.

Species	Contexts 20	43	46	83	84
Saithe		1	2	16	1
Pollachius sp					
Cod	1		1		
Poor cod					
Rockling	1				
Gadidae				8	
Stickleback		1			
Pleuronectidae				2	
Salmonidae				1	
Unidentified		1		3	
Total	**2**	**3**	**3**	**30**	**1**
Volumes of soil sieved (litres)	**3.5**	**2**	**2**	**7**	**4.5**
Concentration/fish bone per litre	**0.6**	**1.5**	**1.5**	**4.3**	**0.2**

30 contexts from 12 blocks produced fish remains. The analysis of the material was done by block. The summary of species representation by NISP (Number of Identified Species per fragment count) and the concentration of fish remains per volume of soil (litres) sieved, of the contexts analysed by block, are listed in Tables 4.16–4.27. Table 4.28 gives the summary of species representation and NISP for each phase.

Identification of species was made using modern comparative reference collections of fish skeletons and by reference to standard guides (Roselló-Izquierdo 1988; Watt et al 1997). All fish bone elements were identified to the highest taxonomic level possible, usually to species or to the family group, but otherwise classed as unidentifiable when these consisted of mainly broken fragments. Nomenclature follows Wheeler and Jones (1989, 122–3). Where appropriate, all major paired elements were assigned to the left or right side of the skeleton. All elements were examined for signs of butchery and burning. The colour of burnt bone

TABLE 4.17
Block 2: NISP and fish bone concentration.

Species	Contexts 33	34
Saithe	23	2
Cod	2	
Cod ?	1	
Gadidae	9	
Stickleback	6	
Unidentified fragments	4	
Total	**45**	**2**
Volumes of soil sieved (litres)	**3**	**1.5**
Concentration/fish bone per litre	**15**	**1.3**

TABLE 4.18
Block 5: NISP and fish bone concentration.

Species	Contexts 173	187	201	224
Saithe	1	2	16	3
Gadidae		1	2	6
Stickleback			2	
Sandeel				1
Unidentified fragments			3	7
Total	**1**	**3**	**23**	**17**
Volumes of soil sieved (litres)	**0.01**	**3**	**1**	**1.5**
Concentration/fish bone per litre	**100**	**1**	**23**	**11.3**

TABLE 4.19
Block 7: NISP and fish bone concentration.

Species	**Context 10**
Pollachius sp	1
Total	**1**
Volumes of soil sieved (litres)	**3.5**
Concentration/fish bone per litre	**0.2**

was recorded to allow investigation of the nature of burning, that is, cooking, rubbish disposal and so on.

Measurements were not taken on the identified elements; instead, elements were classified into size categories for total body length. This was done by reference to modern specimens of known size. For specimens belonging to the *gadidae* (cod family group), some elements were categorized as 'very small' (15–20cm), 'small' (20–30cm) and 'medium' (30–60cm). For some of the non-gadoid species a classification of either 'juvenile' or 'mature' was made or the total body length given by comparison to modern species' vertebrae.

The recording of preservation of the bone was based on two characters: texture on a scale of 1 to 5 (fresh to extremely crumbly) and erosion also on a scale of 1 to 5 (none to extreme). The sum of both was used as an indication of bone condition; fresh bone would score 2 while extremely poorly preserved bone would score 10 (after Nicholson 1991). All the above information is recorded in the catalogue contained within the site archive.

4.4.2 DISCUSSION BY BLOCK

Block 1: Structure 8 occupation and infill (Table 4.16)
Contexts 020, 043, 046, 083 and 084 all contained fish remains. Of these, 083 had the highest concentration. Saithe (*Pollachius virens*) was the most abundant species followed by other unidentified *gadidae*. Flatfish (*Pleuronectidae* group) and salmon/trout (*Salmonidae*) were also present.

Block 2: Structure 8 masonry and construction activity
Contexts 033 and 034 contained fish remains. Context 033 had the higher concentration (15 per litre of soil compared to 1.3 from Context 034). Context 033 also had the largest species representation. Saithe (Pollachius virens) was the most common species, cod (Gadus morhua), other unidentified gadidae, and the tiny stickleback species (Gasterosteus aculeatus) were also present.

Block 5: Structure 1 occupation and infill (Table 4.18)
Contexts 173, 187, 201, and 224 contained fish remains. Due to the very small volume of soil sieved from Context 173 (0.01ml), this context has been left out of the general analysis as the results may be misleading. Context 187 had the highest concentration of fish remains (23 per litre of soil sieved) followed by Context 224 (11.3 per litre). The most common

TABLE 4.20
Block 8: NISP and fish bone concentration.

Species	**Contexts 103**	**175**	**243**	**251**	**266**	**279**	**280**	**284**
Saithe	998			52	8	3		1
Pollack	13							
Pollachius sp	1330			1				
Gadidae	2		1	12		2	1	
Poor cod ?		1						
Unidentified fragments	1500							
Total	**3843**	**1**	**1**	**65**	**8**	**5**	**1**	**1**
Volumes of soil sieved (litres)	**0.3**			**3**	**2.5**	**2**	**3**	**2**
Concentration/fish bone per litre	**12810**			**21**	**3.2**	**2.5**	**0.3**	**0.5**

TABLE 4.21

Block 9: NISP and fish bone concentration.

Species	Context 71
Saithe	25
Pollachius sp	3
Gadidae	6
Total	**34**
Volumes of soil sieved (litres)	**1.5**
Concentration/fish bone per litre	**22.6**

species was saithe and other unidentified gadidae. Skeletal elements of sand-eel (*Ammodytes tobianus*) and stickleback were also present.

Block 7: Upper windblown sand deposits and disturbance (Table 4.19)

Context 10 produced a single vertebra assigned to the genus *Pollachius*, that is, saithe (*Pollachius virens*) or pollack (*Pollachius pollachius*). The concentration of fish remains was only 0.2 per litre of soil sieved.

Block 8: Structure 4 occupation and infill (Table 4.20)

Contexts 103, 175, 243, 251, 266, 279, 280, and 284 all contained fish remains. The highest concentration of fish remains was found in Context 103, with the most abundant species assigned to species of the genus *Pollachius*, that is, saithe (*Pollachius virens*) or pollack (*Pollachius pollachius*). Definite identifications for saithe and pollack were also possible.

It is interesting to note the high concentration of fish remains in Context 103 which has been calculated as 12,810 per litre from the total number of fish bone present in the total volume of soil sieved which only amounted to 0.3 litres. This context was a dump of mixed sand, midden and rubble, which had formed up to 0.45m thick against the north wall of Structure 4, apparently immediately after the structure ceased to be used for domestic occupation (see Section 2.4.3.2).

TABLE 4.22

Block 11: NISP and fish bone concentration.

Context Species	90
Saithe	12
Pollachius sp	7
Total	**19**
Volumes of soil sieved (litres)	**1**
Concentration/fish bone per litre	**19**

TABLE 4.23

Block 13: NISP and fish bone concentration.

Species	Contexts 153	157
Saithe	9	7
Pollachius sp		2
Poor cod		1
Gadidae	2	
Stickleback	4	
Unidentified fragments	10	
Total	**25**	**10**
Volumes of soil sieved (litres)	**1.5**	**1**
Concentration/fish bone per litre	**16.6**	**10**

Block 9: Structure 4 masonry and construction activity (Table 4.21)

Context 071 contained fish remains with an average concentration of 22.6 per litre. The most common species was saithe (*Pollachius virens*).

Block 11: Structure 2 entrance fill (Table 4.22)

Context 090 contained fish remains with an average concentration of 19 per litre. The main species identified was saithe and some elements were assigned

TABLE 4.24

Block 15: NISP and fishbone concentration.

Species	Contexts 131	296
Saithe	6	15
Poor cod		2
Gadidae	2	3
Sandeel		5
Total	**8**	**25**
Volumes of soil sieved (litres)	**0.05**	**2**
Volumes of soil sieved (litres)	**160**	**12.5**

to *Pollachius*, that is, saithe (*Pollachius virens*) or pollack (*Pollachius pollachius*).

Block 13: Structure 5 infill (Table 4.23)
Contexts 153 and 157 contained fish remains. Context 153 had the higher concentration. Saithe (*Pollachius virens*) was the most common species present with unidentified gadidae and elements from stickleback (*Gasterosteus aculeatus*) also present.

Block 15: Structure 2 infill (Table 4.24)
Contexts 131 and 296 contained fish remains, however, only 0.05ml of soil were sieved from 131 and this context was not incorporated into the main analysis as it may give a misleading interpretation. Context 296 had a fish bone concentration of 12.5 per litre, with saithe being the most common species. Poor cod (*Trisopterus minutus*) and the sand-eel (*Ammodytes tobianus*) were also present.

Block 18: Upper midden, Structure 10 and windblown sand deposits (Table 4.25)
Context 018 contained fish bone, the fish bone concentration for this context was only 1.5 per litre; elements were assigned to *gadidae*, *cottids* and *ammoditae* (sand-eels).

Block 19: Structure 3 infill (Table 4.26)
Contexts 182 and 193 contained fish remains, and these had almost equal concentrations of fish bone. Context 182 had 28.6 per litre while Context 193 had a concentration of 29 per litre. The most abundant species was saithe (*Pollachius virens*), and some elements were assigned to the genus *Pollachius* (saithe or pollack). Rockling (*Gaidropsaurus mediterraneous*), butterfish (*Pholis gunellus*), the sand-eel (*Ammodytes tobianus*), and freshwater eel (*Anguilla anguilla*) were also present.

Block 20: Structure 8 sump masonry, construction and infill (Table 4.27)
Context 166 contained fish remains with an average concentration of 6 per litre. The most common species were saithe (*Pollachius virens*) and cod (*Gadus morhua*), other unidentified gadidae were also present.

4.4.3 DISCUSSION BY PHASE (TABLE 4.28)

Phase 2 had the highest concentration of fish bone at 54.8 elements per litre. Phase 1 had a concentration of 12.6 fish bone elements per litre, while Phase 3 had a concentration of only 3. These concentrations appear to suggest a decline in the importance of fishing during Phase 3. The species representation was similar in all phases, saithe being the most abundant species.

TABLE 4.25
Block 18: NISP and fish bone concentration.

Species	**Context 18**
Gadidae	1
Scorpionidae	1
Ammoditae	1
Total	**3**
Volumes of soil sieved (litres)	**2**
Volumes of soil sieved (litres)	**1.5**

4.4.4 THE HAND-RETRIEVED FISH REMAINS

Sheila Hamilton-Dyer

A total of 26 fragments of hand-retrieved fish remains was recovered. As hand-retrieved bone material is biased against very small skeletal parts these fragments cannot be incorporated into the overall quantification and analysis of the fish remains. The fragments derived from a variety of species including cod, hake and ballan wrasse; the most frequent of which was hake (*Merluccius merluccius*), represented by both vertebrae and head bones. The small number of fragments

TABLE 4.26
Block 19: NISP and fish bone concentration.

Species	**Contexts 182**	**193**
Saithe	35	44
Pollachius sp	6	3
Rockling		1
Gadidae		4
Butterfish	1	
Sandeel		1
Eel	1	
Unidentified fragments		5
Total	**43**	**58**
Volumes of soil sieved (litres)	**1.5**	**2**
Concentration/fish bone per litre	**28.6**	**29**

TABLE 4.27
Block 20: NISP and fish bone concentration.

Species	**Context 166**
Saithe	5
Cod	1
Gadidae	6
Total	**12**
Volumes of soil sieved (litres)	**2**
Volumes of soil sieved (litres)	**6**

prevents any analysis of spatial and temporal changes although hake was identified from all phases and appears to be randomly distributed. Further details are located in the site archive.

4.4.5 NOTES ON THE SPECIES IDENTIFIED

Saithe (*Pollachius virens*): also known as coalfish, is a common fish in northern inshore waters that usually forms small shoals. For the first two years the immature fish live near the surface. Their annual growth averages 15cm for their first three years. Immature fish then move offshore and continue to live near the surface for a further 1–2 years. Saithe feed on small crustaceans, sandeels, herring, and other smaller fish. They may reach about 100cm in length by their eleventh year (Wheeler 1969; Smith & Hardy 1970).

Pollack (*Pollachius pollachius*): also known as lythe, or green cod because of its greenish colour, is mainly an inshore fish found in the proximity of rocks; a common species found in Scotland's western coastal waters. It has been estimated that it reaches 13–17cm in its first year, 26–31cm in its second year and may attain a total length of between 80 cm and 100 cm (Wheeler 1969; Ellis 1995).

Cod (*Gadus morhua*): In the North Sea this species can grow to an average of 18cm in their first year, 36cm in their second year, 55cm in their third year and 68cm in their fourth year. A mature cod can reach 150cm in length and weigh up to 40kg. Cod is found in a great variety of habitats: only immature fish, however, tend to live close inshore. Cod in the North Atlantic exist as

TABLE 4.28
Phases 1, 2 and 3. Fish species representation by fragment count (NISP) and fish bone concentration.

	Phase 1	**Phase 2**	**Phase 3**
Saithe	28	1204	45
Pollack		13	
Saithe/Pollack	9	1346	
Cod			4
Cod ?			1
Rockling		1	1
Poor cod?	1	1	
Gadidae	2	39	18
Butterfish		1	
Sandeel		2	1
Stickleback	4	6	
Cottids			1
Pleuronectidae			2
Salmonidae			1
Eel		1	
Unidentified fragments	10	1525	8
Total	**54**	**2939**	**83**
Volumes of soil sieved (litres)	**3.5**	**25.8**	**25**
Concentration/identified elements only per litre	**12.6**	**54.8**	**3**

a number of more or less isolated populations (Garrod 1977; Gulland 1977; Wheeler 1978).

This species has spawning grounds on the Hebridean shelf where they feed largely on sand eels (*Ammoditae*). The sea areas around Cape Wrath to the Butt of Lewis and North Rona are still abundant with cod over half a metre in length; in these areas sand eels are found in large numbers throughout the year but especially so during the summer months (Rae 1966; Boyd 1997).

Hake (*Merluccius merluccius*): This is a moderately deep-water fish but may be found in shallower water during summer. It may attain up to 180cm in total length (Wheeler 1978).

Shore Rockling (*Gaidropsarus mediterraneus*): This is a shore-dweller, found on rock pools, and under algae on rocky shores. It may attain up to 25cm. Although it has no economic importance, being a common habitant of rock pools it is frequently caught while fishing for other rocky dwellers such as saithe or pollack (Wheeler 1969).

Poor cod (*Trisopterus minutus*): A common species in Northern coasts, it is mainly an offshore species but is found close to the coast in the first year. In their first year males measure up to 6cm, in their second year up to 11cm. It is usually preyed on by other fishes such as cod (Wheeler 1969).

Right-eyed flatfishes (*Pleuronectidae*): This group of flatfishes have both eyes on the right side of the body. Widely distributed in Scottish waters, most are shallow-water, bottom-living fishes. The species present at Cnip may be plaice (*Pleuronectes platessa*) or flounder (*Platichthys flesus*) which are found on sandy bottoms and gravel inshores (Wheeler 1978).

Ballan wrasse (*Labrus bergylta*): this is a common fish in northern Scotland and is found primarily in rocky substrates mainly close inshore from 2–3m depth but also at depths of down to 200m. This species attains up to 28cm in total length (Wheeler 1978; Miller & Loates 1997).

Stickleback (*Gasterosteus aculeatus*): The stickleback is widely distributed, often abundant in lakes, rivers and coastal waters where it is frequently found in tidal pools. It is often 5cm, but can grow up to 10cm, in length (Wheeler 1978).

Sand-eel (*Ammodytes tobianus*): An extremely common inshore fish, it is found close to clean, fine sand. It is a popular bait-fish and an important food to a wide variety of other fish in particular gadoid fishes. In the Hebrides the sand-eel is found on sheets of tidal waters on sandy flats (wheeler 1978; Boyd & Boyd 1996a).

Butterfish (*Pholis gunnellus*): A common fish in Northern waters, it is found in a variety of habitats from mud to sand and rocks, and also frequently among kelp (*Laminaria*) holdfasts. The skin is very slimy (hence the name butterfish) and they are extremely difficult to catch (Lythgoe et al 1971).

Cottids (bull-rout *Myoxocephalus scorpius*/sea scorpion *Taurulus bubalis*): inhabit very shallow water or tide pools and they can measure up to 30cm. They are often found among rocks (Wheeler 1978).

Salmonidae (salmon *Salmo salar*/trout *Salmo trutta*): Salmon and trout are indigenous freshwater fish in the Hebrides. Salmon have remained anadromous (spawn in fresh waters and feed at sea), while trout have become divided into an anadromous form, the sea trout, and a non-migratory form, the brown trout (Boyd & Boyd 1996b).

Eel (*Anguilla anguilla*): Elvers born in the Sargasso Sea make the astounding journey to the fresh water systems of Europe arriving in the Hebrides in April and May. They are ubiquitous in inland waters. The movement of eels into the estuaries and stream systems is often marked by the appearance of predators (herons, gulls and otters). The eels spend over 30 years in fresh water before migrating to spawn and die (Boyd 1996b).

4.4.6 DISCUSSION

Fishing at Cnip appears to have been of a small-scale domestic nature, the most likely fishing technique used being that of rock or 'craig fishing' as it is known in the Northern Isles (Orkney and Shetland). This would have been the easiest way to catch young saithe and pollack and possibly immature cod which can also be found by rocks. On close examination of fishing on Galson Beach in Lewis, it was possible to observe that in a space of an hour three people fishing from rocks with line and small hooks, would fill a bucket of 12 litres in volume with second year saithe measuring 15–17.5cm in length (Cerón-Carrasco 2005). Most of the saithe and pollack recovered at Cnip were 15–20cm in length.

The other gadoid species recovered must have been accidental catches while fishing for young saithe and pollack. These species can be eaten whole (once gutted) or with the liver, they can also be smoked and thus preserved for later use. This has been a practice in the Hebrides where small fish were simply hanged inside the blackhouses where they would be smoked by the domestic peat fire (Cerón-Carrasco 2002)).

It is also interesting to note that young saithe were traditionally used in Scotland for the extraction of fish liver oil (Smith 1984). It is recorded that the oil used for lamps or 'crusies' was that extracted from the liver of fish caught for domestic use (MacGregor 1880, 145).

The flatfish would have been caught close to the beach on sandy bottoms and may have easily been speared, although there is no artefactual evidence for this fishing method. Flatfish can also be caught using line.

Although salmon, and other freshwater fisheries have not so far been detected as a specialized industry in the Scottish ichthyo-archaeological record (Barrett et al 1999) this is due to the lack of sufficient archaeological remains of freshwater species.

The fishing of freshwater fish in the Hebridean islands has long been recorded. Martin Martin (1716) describes how the freshwater lakes in Lewis abounded with trout and eel and that the baits used to catch them were earthworms or parboiled mussels and cockles. Salmon were also abundant in several rivers of the island (ibid, 89). In Harris for instance, salmon would arrive at the beginning of May (ibid, 111).

In view of these early ethnographic accounts, it must be assumed that freshwater sources, as well as marine sources, were also being exploited in prehistory although this is less evident in the archaeological record. Salmon, trout and eel would have been easily caught at burn entrances using traps or by simple line.

4.4.7 CONCLUSION

The analysis of the fish bone assemblage from Cnip suggests that fishing was primarily of a small-scale, domestic nature. The main species exploited were saithe and pollack, the other marine species present in this assemblage would have been caught accidentally when fishing for these. Fishing for freshwater species was also being practised.

The presence of hake in the hand-retrieved material (initially analysed by Hamilton-Dyer) may suggest that fishing could also have involved the use of boats. However, as no remains of large specimens were recovered in the sieved material, it is not possible to expand on this probability and it is best to assume that these remains were the results of accidental by-catches.

The results of the analysis of the fish remains recovered by sieving suggest that fishing may have been more intense during Phase 2 than in Phase 3, where there appears to be something of a decline. However, it is possible that this could be largely accounted for by the absence in Phase 3 of sheltered midden environments, like the disused Structure 4, in which high densities of fish remains survived from Phase 2.

4.5 THE MARINE MOLLUSCS, WITH NOTES ON THE ECHINOIDEA REMAINS AND TERRESTRIAL SNAILS

Ruby Cerón-Carrasco

4.5.1 THE MARINE MOLLUSCS

4.5.1.1 Methods

The marine molluscs from Cnip were recovered from bulk soil samples by sieving through a 1mm mesh. A total of 20 contexts from 11 blocks contained marine molluscs. The apical fragments were identified to species using standard guides (Campbell 1989; Moreno-Nuño 1994a). Frequency was estimated by counting shell apices for gastropods and valve umbos for bivalve species (Moreno-Nuño 1994b).

4.5.1.2 Results

The results are presented in Table 4.29. The limpet (*Patella vulgata*) and the periwinkle (*Littorina littoralis*) were the most common species represented at Cnip. *Patella vulgata* is the most common limpet and is widely found on all rocky shores throughout the Scottish coast. *Littorina littoralis* is widely distributed and is usually found on rocks and on seaweed (*Fucus vesiculosus* and *Ascophyllum nodosum*).

Patella vulgata have long been used as a food source in Lewis, especially in times of hardship as early ethnographical records indicate. Although the flesh is quite 'rubbery', this mollusc can be boiled and the broth drunk. Martin Martin (1716, 201) describes how the milky broth from parboiled limpets was given to nursing mothers as nourishment. The broth of boiled limpets and periwinkles was also given as an astringent for infants.

Other edible molluscs recovered at Cnip were the edible mussel (*Mytilus edulis*), oyster (*Ostrea edulis*) and the razor shell (*Sollen marginatus*). Mussels were also used as bait to attract trout and eel (Martin Martin 1716, 89).

Another important function which molluscs have played in the Hebrides is that of fertilisers, which, as also described by Martin Martin (1716), were applied to the soil every seven years. Sea weeds were also used in this manner (ibid 119; Boyd & Boyd 1996b,

TABLE 4.29
Marine mollusc representation by context.

Species	Contexts 10	18	20	34	46	71	83	84	90	103	153	157	166	182	193	201	279	280	284	296
cf Calyptrea chinensis							1b				1									
Cingula cingulus	4 + 1b		34 + 14b		2		10 + 1b		1					3 + 5b			1			
Lasarea rubra			3 + 3b		1		8 + 1b													
Littorina littoralis	1b			1		1		2		1			1	2	2		2	1	1 + 1b	
Lutraria lutraria																	2			
Margerites helicinus			4 + 4b				2							7						
Mytilus edulis						2	1 + 27b	1		7				1	2		1		1	
Nassarius reticulatus												1								
Ostrea edulis											1		1			1		2b		
Patella vulgata	1	2		1	3		12	7 + 1b	2		24	1			4	1	3	5		3
Rissoa parva			8 + 5b					5 + 1b							7					
Solen marginatus											3									
Spinorbis borealis			4b		2 + 15b		4 + 4b		1					4 + 4b		2 + 8b				
Crushed shell	*b	*			*		*	*b		*	*					*		*b	*	*b

Key
b burnt   * present

51) and it is of particular interest in this context to note the presence of the tiny marine shell species *Cingula cingulus*, *Rissoa parva* and *Margerites helecicus* (these species are of a maximum size of 4mm) which, like *Littorina littoralis*, are found attached to seaweed. Likewise, the coiled remains of *Spinorbis borealis* (Serpulidae) which are tube-dwelling polychaetes are also found encrusted in sea weed. It may be important that in many of the contexts, these species had been subject to burning and it is interesting that as well as fertiliser, the ashes of burnt seaweeds have also served as an alternative salt type, particularly for preserving foodstuffs (Ceron-Carrasco 2005).

4.5.1.3 Conclusion

The marine molluscs at Cnip probably constituted an important source of nourishment, as a food supplement, as well as having additional uses, such as fertiliser and medicinal purposes. There is a strong suggestion also that several of the species arrived on the site through the burning of seaweed, that presumably was used as a fertiliser and/or seaweed ash salt for the preservation of foodstuff such as meat or for diary products such as cheese.

4.5.2 A NOTE ON THE ECHINOIDEA REMAINS

A number of contexts from all phases contained remains of the edible sea urchin *Echinus esculentus* which is abundant in the Hebrides (Boyd & Boyd 1996b). Sea urchin remains have also been recorded for the Bronze Age site of Northton, Harris (Renfrew 1993, 18). The manner of cooking these sea creatures is by boiling or roasting on hot stones (ibid), although they can also be eaten raw. Sea urchin, like most marine species, is a food rich in iron and must have been important to the diet of the inhabitants of coastal areas in prehistory. The fact that it has not been more widely recorded may be due to poor retrieval practices or other taphonomical loss.

4.5.3 A NOTE ON THE TERRESTRIAL SNAILS

The results of the analysis of terrestrial snails from Cnip are summarized in Table 4.30. Identification to species was done by comparison to reference collections and to standard guides (Beedham 1972; Cameron and Redfern 1976; Kerney & Cameron 1979).

Eighteen contexts contained land snails. Most of these contexts are sandy deposits and it is therefore not surprising that the land snail species identified are present at Cnip. For instance, *Candidula intersacta*, *Helicella itala*, *Vallonia excentrica*, and *Vertigo pygmea*, inhabit sandy environments, while *Cochlicopa lubrica* and *Cochlicopa lubricella* are usually found in mixed populations, often in dry exposed habitats. *Lauria cylindracea*, *Oxichillus alliarus*, *Oxichillus celarius*, and *Clausilia bidentata* are found on stone walls or under rocks.

Carychium minimun is often found in marshes but it is predominantly of coastal distribution.

Succinea oblonga is also found on marshes and among rocks. *Punctum pygmaeum* is found in well-vegetated places, often in marshes.

4.5.4 CONCLUSION

Terrestrial molluscs are generally studied in archaeology to investigate the nature of the local environment that these organisms inhabit. In many parts of the Scottish islands little or no recording of these molluscs has been done prior to the recovery of the archaeological material and this may be, in most cases, the only means of surveying and recording their distribution.

Most terrestrial molluscs in the Hebrides are found mainly among dunes and on limestone. The landsnails recovered at Cnip are found in such habitats. The snail species present in this assemblage are taxa typical of disturbed but shaded habitats associated with stone buildings or rubble and/or sand. It is therefore assumed that these accumulated over a period of time and are likely to be modern intrusions.

4.6 CARBONIZED PLANT MACROFOSSILS AND CHARCOAL

Mike J Church and Mike Cressey

4.6.1 SUMMARY

This report describes and discusses the charcoal and carbonized plant macrofossils recovered from the bulk samples taken during the excavations. A total of 44 samples were submitted for analysis, most of which produced carbonized remains. The sampling strategy, processing, sorting, and identification procedures are outlined and the results presented below.

The charcoal and carbonized plant macrofossils allow a limited insight into the exploitation of plants on the site. Charring of this material is likely to have occurred within domestic hearths, most likely through incorporation of plant material as fuel or through cooking accidents. The material was subsequently

TABLE 4.30
Terrestrial snail representation by context.

	Contexts																				
Species	**18**	**20**	**28**	**33**	**34**	**43**	**46**	**47**	**67**	**71**	**84**	**90**	**131**	**153**	**166**	**182**	**187**	**193**	**224**	**226**	**279**
Candidula intersacta				4								1	5			1		5			
Carychium minimun	2			3	1		2														
Carychium minimun (Juv.)	3																				
Catinella arenaria				3																	
cochlicopa lubrica	1			3	2		4		1	1	1	2		1	1	6	2	6	1	1	
Cochlicopa lubrica (Juv.)	2			16			5														
Cochlicopa lubricella																7					
Collumella aspera				3												2					
Clausilia bidentata														1							
Hellicea italica					2																
Lauria cylindraea	2						4	1													
Lauria cylindraea (Juv.)	4	2					9														
Oxichillus alliarius			1	4	1	3	18	1				1		1	3		1	5			1
Oxichillus alliarius (Juv.)																					
Oxichillus celarius	3			2		1						2	12		1	2				1	
Oxichillus celarius (Juv.)	1															1					
Oxichillus sp		1																			
Punctum pygmaeum				3																	
Vallonia excentrica	6	2		33		3	5	2						1							
Vertigo pygmea						4															

incorporated into the internal domestic contexts through the discard of hearth material.

The subsistence scale arable economy seems to have been dominated by six-row hulled barley (*Hordeum vulgare* (L) var *vulgare*), with the identification of a single caryopsis of possible emmer wheat (*Triticum* cf *dicoccum*) interpreted as a weed contaminant. The existence of barley as a locally grown crop is reinforced through local pollen and other contemporary site-based plant macrofossil assemblages.

Other useful plants include Bear berry (*Arctostaphylos uva-ursi* (L) Spreng.), heathers (*Calluna vulgaris* (L) Hull, *Erica/Calluna* spp) and grasses (*Poaceae* undifferentiated, *Poa* sp and *Danthonia decumbens* (L) DC) whilst wood litter, dung, seaweed, peat and turves were used as fuel. Overall, the assemblage has contributed to the emerging picture of plant exploitation by humans throughout prehistory in the Western Isles.

4.6.2 SAMPLING STRATEGY

Bulk samples were initially taken of all contexts where a sufficient volume of material was available, although the attempt at complete coverage of such contexts had to be abandoned in the face of time pressures during the final days of the excavation when a purely 'judgement sampling' approach was adopted. 'Judgement sampling' (Jones 1991) does not statistically represent the sampled population (ie the archaeological contexts across the site) so the results presented in this report will be biased to some degree in favour of stratigraphically important and perceived 'rich' contexts. However, the samples processed can present a qualitative picture of the type of plant macrofossils found across the site. A sub-sample of approximately 0.25 litres was removed from the bulk samples for routine soil tests (results contained in site archive).

4.6.3 METHODS

4.6.3.1 Carbonized plant macrofossils

The bulk samples were processed using a flotation tank (Kenward et al 1980) with the residue held by a 1.0mm net and the flot caught by 1.0mm and 0.3mm sieves respectively. All the flots and residues were dried and sorted using low-powered stereo/binocular microscope at x15-x80 magnification. All identifications were checked against botanical literature and modern reference material from collections in the Department of Archaeology, University of Edinburgh. Nomenclature follows *Flora Europaea* with ecological information taken from Clapham et al (1989), Stace (1991) and Pankhurst and Mullin (1994).

4.6.3.2 Charcoal

Identifications were made using a binocular microscope at magnifications ranging between x10-x200. Generally identifications were carried out on transverse cross-sections on charcoal measuring between 4–6mm. Anatomical keys listed in Schweingruber (1992), in-house reference charcoal and slide mounted micro-sections were used to aid identification. Asymmetry and morphological characteristics were recorded. In Table 4.32 roundwood is used as a term of reference for branch wood and non-timber material.

4.6.4 RESULTS AND DISCUSSION

4.6.4.1 Data presentation

Tables 4.32–4.36 present the carbonized plant macrofossils and charcoal recovered from the site. Charcoal fragments are presented by species weight. The concentration of carbonized plant macrofossils (QC/litre) was calculated by dividing the total number of quantifiable components by the volume of the bulk sample. The quantification of the carbonized plant macrofossils followed the criteria in Table 4.37.

The overall assemblage was dominated by cereal components (282 components representing approximately 75 per cent of the assemblage) with many of these components comprising caryopses or monocotyledonous culm bases/rhizomes. Only 91 components were wild species. The preservation of the plant macrofossils was poor, demonstrated by the preservation profile for the cereal caryopses (Ill 4.2) and the relatively high proportions of indeterminate cereals and wild species.

Radical shifts in plant exploitation are perhaps unlikely to have occurred during the relatively short occupation represented by Phases 2–3 which provide the vast majority of the excavated sediments (approximately 200–300 years). Also, there are insufficient numbers and concentrations of plant macrofossils to present meaningful comparisons between the blocks and phases. Therefore, the results will be analysed as a single phase assemblage.

4.6.4.2 Species represented

Charcoal

Tree and shrub taxa included birch (*Betula*), hazel (*Corylus*), pine (*Pinus*), oak (*Quercus*), and willow (*Salix*

TABLE 4.31
Charcoal species composition.

Sample/context (block)	Species	Weight (g.)	Comment
1/20 (1)	*Salix* type	0.21	very small twig
9/46 (1)	*Salix* type	0.26	small round wood (na)
9/46 (1)	*Corylus avellana*	0.016	small roundwood (na)
9/46 (1)	*Betula* sp	0.4	small roundwood (na)
12/43 (1)	*Quercus* sp	2.5	non round fragments (na)
12/43 (1)	*Salix* type	0.08	small roundwood (na)
12/43 (1)	*Quercus* sp	0.014	single fragment (na)
13/83 (1)	Indet	n/a	(a)
16/83 (1)	*Corylus* sp	0.21	small roundwood
4/34 (2)	Indet	n/a	below id range
63/187 (5)	Indet	n/a	below id range
70/201 (5)	*Salix* type	0.95	(na)
xx/224 (5)	Indet	n/a	(a)
22/103 (8)	*Salix* type	0.23	small round wood (na)
23/103 (8)	Indet	n/a	below id range
83/251 (8)	Indet	n/a	(a)
89/284 (8)	Dung?	0.9	amorphous, large voids
90/279 (8)	Indet	n/a	(a)
90/279 (8)	*Betula* sp	0.4	small roundwood
91/280 (8)	*Salix* type	0.36	small frags (a)
91/280 (8)	*Salix* type	1.26	small roundwood (na)
91/280 (8)	Dung?	n/a	
xx/266 (8)	Indet	n/a	root wood
11/71 (9)	*Betula* sp	0.04	single fragment (na)
11/71 (9)	*Salix* type	0.05	single fragment (na)
24/71 (9)	*Salix* type	1	root wood/woodworm tracks (na)
24/71 (9)	*Pinus sylvestris*	0.65	small roundwood
20/90 (11)	*Pinus sylvestris*	1.2	fragmented roundwood (na)
xx/218 (11)	*Pinus sylvestris*	14.3	2.5cm diameter roundwood (na)
32/153 (13)	*Salix* type	0.014	single fragment (na)
88/296 (15)	Indet	n/a	
6/18 (18)	*Salix* type	0.015	(na)
8/47 (18)	Indet	n/a	(a)
64/193 (19)	*Salix* type	0.19	(a)
61/166 (20)	Indet	n/a	(a)

(na) non abraded (a) abraded Salix type = White willow (Salix alba), common osier (S. viminalis), goat willow (S. caprea) or bay willow (S. pentandra). The wood of willow trees cannot be differentiated on the basis of anatomical characteristics.

type). This relatively wide variation is at odds with the extremely limited woodland found in the Western Isles today, though all the species are represented. This open landscape has been suggested throughout the Holocene for the island chain by Birks (1994), but recent work in both Lewis (Edwards et al 1994) and the Uists (Branigan & Foster 1995; Gilbertson et al 1997) point to a more complex tapestry of isolated forest cover in certain areas at certain times within the wider open landscape. Such an area may have been still managed in the pollen catchment surrounding Loch Bharabhat during the Iron Age (Edwards et al 1994),

TABLE 4.32
Carbonized plant macrofossils (samples by Blocks 1, 2 and 5).

Sample details														
Sample number		1	9	10	12	13	16	2	4	63	70	xx	xx	xx
Context number		20	46	41	43	83	83	33	34	187	201	173	201	224
Block		1	1	1	1	1	1	2	2	5	5	5	5	5
Sample volume (litres)		3.5	2	2	2	2	7	3	1.5	3	1	0	1	2
Cultivated species	**Plant part**													
Hordeum														
H. sp	caryopsis					2	1				2			
H. cf hulled	caryopsis				1			1		1				
H. hulled	caryopsis						2	3			4			
H. hulled symmetric	caryopsis						1				2			
H. hulled asymmetric	caryopsis					2	3	1						1
H. vulgare	rachis internode									1				
H. cf vulgare	rachis internode													
Triticum cf dicoccum	caryopsis													
Cereal indeterminate	caryopsis						2				3			
Cereal/monocotyledon (>2 mm.)	culm node						1							
Cereal/monocotyledon (>2 mm.)	culm node	1												
Cereal/monocotyledon (>2 mm.)	culm base	1	1			2	5				1			
Cereal/monocotyledon (>2 mm.)	culm base	6			4	8	3		1	5				
Indeterminate (>2 mm.)	rhizome	2												
Indeterminate (<2 mm.)	rhizome					1								
Wild species														
Polygonum sp	fruit						1							
Rumex sp	fruit		1											
Rumex cf crispus	fruit	5												
Brassica cf rapa	seed													
Brassica/Sinapis	seed							1						
Cruciferae undiff.	capsule base	1												
Viola sp	seed	1												
Erica/Calluna	capsule/ovary													
Calluna vulgaris (L.) Hull	capsule	1												
Calluna vulgaris	stem/leaf	1F												
Arctostaphylos uva-ursi (L.) Spreng.	seed													
Hypericum pulchrum L.	seed					4								
Poa sp	caryopsis													
Danthonia cf decumbens	caryopsis		2			1								
Poaceae undiff. (small)	caryopsis				1									
Poaceae undiff. (medium)	caryopsis			1		2	1							
Cladium mariscus (L.) Pohl	fruit													
Carex sp (biconvex)	fruit	4			1	3								
Carex sp (trigonous)	fruit	6	1			2				1				
Indeterminate	seed/fruit	2				5								
Fungal sclerotia	sclerotia					5								
Totals														
Total cereal components		10	1	0	5	15	18	5	1	6	13	0	0	1
Total wild species		20	4	1	2	17	2	1		1				
Total quantifiable components		30	5	1	7	32	20	6	1	7	13	0	0	1
Quantifiable components/litre		8.57	2.5	0.5	4	16	3	2	0.7	2.33	13	0	0	0.67

TABLE 4.33

Carbonised plant macrofossils (samples by Blocks 6, 7, 8 and 10).

Sample details														
Sample number		3	41	14	22	80	83	89	90	91	xx	xx	11	24
Context number		32	10	67	103	243	251	284	279	280	103	266	71	71
Block		6	7	8	8	8	8	8	8	8	8	8	9	9
Sample volume (litres)		6	4	2	2	1	3	2	2	3	0.3	2.5	2	2
Cultivated species	**Plant part**													
Hordeum														
H. sp	caryopsis	5									1		1	
H. cf hulled	caryopsis	7			4		2					1		
H. hulled	caryopsis	18							1			2	1	2
H. hulled symmetric	caryopsis	6												
H. hulled asymmetric	caryopsis	18												
H. vulgare	rachis internode						1						1	
H. cf vulgare	rachis internode													
Triticum cf dicoccum	caryopsis												1	
Cereal indeterminate	caryopsis	6					2							1
Cereal/monocotyledon (>2 mm.)	culm node													
Cereal/monocotyledon (<2 mm.)	culm node													
Cereal/monocotyledon (>2 mm.)	culm base		1				2		2	3		1		
Cereal/monocotyledon (<2 mm.)	culm base	2	2					1		1				
Indeterminate (>2 mm.)	rhizome	1	2							1				
Indeterminate (<2 mm.)	rhizome													
Wild species														
Polygonum sp	fruit													
Rumex sp	fruit													
Rumex cf crispus	fruit		1											
Brassica cf rapa	seed												1	
Brassica/Sinapis	seed					2	5					1	1	
Cruciferae undiff.	capsule base													
Viola sp	seed													
Erica/Calluna	capsule/ovary						1							
Calluna vulgaris (L.) Hull.	capsule													
Calluna vulgaris	stem/leaf													
Arctostaphylos uva-ursi (L.) Spreng.	seed													
Hypericum pulchrum L.	seed													
Poa sp	caryopsis		1											
Danthonia cf decumbens	caryopsis													
Poaceae undiff. (small)	caryopsis													
Poaceae undiff. (medium)	caryopsis													
Cladium mariscus (L.) Pohl	fruit													
Carex sp (biconvex)	fruit													
Carex sp (trigonous)	fruit		4			1		1		1		2		
Indeterminate	seed/fruit											1		
Fungal sclerotia	sclerotia													
Totals														
Total cereal components		63	5	0	4	0	7	1	3	5	1	4	4	3
Total wild species			6			3	6	1		1		4	2	
Total quantifiable components		63	11	0	4	3	13	2	3	6	1	8	6	3
Quantifiable components/litre		11	3	0	2	3	4	1	1.5	2	3.3	3.2	3	2

which was within easy reach (at least geographically speaking) of the occupants at Cnip.

Driftwood would have been a prime resource throughout the Iron Age, especially for construction purposes, and some of the charcoal may represent the remains of beach scavenging. As Dickson (1992) and Boardman (1995) outlined, much of the driftwood would have derived from North America depositing some non-native species on the Lewis coast. However, no such species are represented at Cnip and there is thus no positive indication of the use of driftwood.

Cultivated plants

The overwhelmingly dominant species is that of barley (*Hordeum* sp), represented by caryopses and a few rachis internodes of six-row hulled barley (*Hordeum vulgare* (L) var *vulgare*). All of the caryopses of sufficient preservation to be identified were hulled and the proportions between symmetric and asymmetric grains also point to the six-row species dominating. The single grain of possible emmer wheat (*Triticum* cf *dicoccum*) could be indicative of wheat consumption but is more likely to be a weed contaminant in the barley crop. Also, the sample from which the wheat grain was recovered was not directly associated with any occupation levels and so its importance should not be overstated (Context 071, Block 9, packing material behind the wall of Structure 4).

Wild edible species

These are represented by a single seed of Bear berry (*Arctostaphylos uva-ursi* (L) Spreng) and seeds of brassicas (*Brassica* spp), though the fruits of the latter are usually eaten prior to seeding (Boardman 1995). The Bear berry generally lives on cliffs or upland bogs and so may represent the discard from opportunistic gathering or accidental incorporation of other material from these habitats, such as peaty turf for fuel.

Useful wild species

Ling (*Calluna vulgaris* (L) Hull) and other heathers (*Erica/Calluna* spp) are represented by seed capsules and stem/leaves. The heathers have had a variety of uses throughout the highlands and islands including fuel kindling, bedding, general furnishing and thatching. The grasses (*Poaceae* undifferentiated, *Poa* sp. and *Danthonia decumbens* (L) DC) could also have served similar internal domestic uses.

Straw or grass culms are represented by cereal/monocotyledon culm nodes and bases. Straw would have been particularly useful with a variety of uses similar to heather. The monocotyledon culm bases and rhizomes, coupled with the relatively high levels of amorphous plant material (APM), point to turves and peat being also used as fuel (Dickson 1998). Other possible fuels are suggested by the presence of possible carbonized dung (Table 4.31) and the presence of certain molluscan parasites on seaweed (see Section

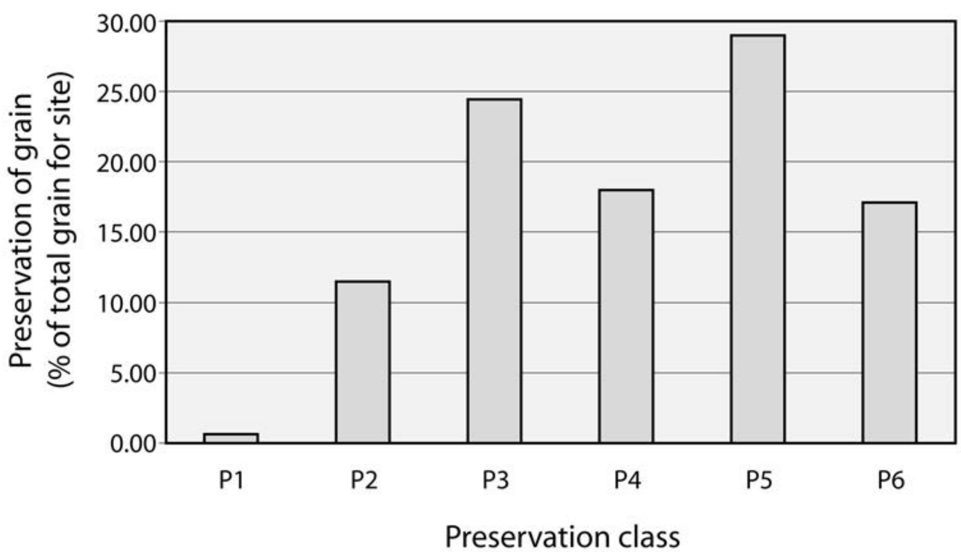

ILLUSTRATION 4.2
Preservation classes for total grain from Cnip.

TABLE 4.34
Carbonized plant macrofossils (samples by Blocks 11, 13, 14 and 15).

Sample details										
Sample number		15	20	xx	32	33	30	79	87	88
Context number		86	90	90	153	157	131	230	269	296
Block		11	11	11	13	14	15	15	15	15
Sample volume (litres)		5	1	2	2	1	0.1	3	3	2
Cultivated species	**Plant part**									
Hordeum										
H. sp	caryopsis	4								1
H. cf hulled	caryopsis	8								
H. hulled	caryopsis	8	1				1	2		1
H. hulled symmetric	caryopsis	2						1		
H. hulled asymmetric	caryopsis	5				1			1	
H. vulgare	rachis internode									
H. cf vulgare	rachis internode									
Triticum cf dicoccum	caryopsis									
Cereal indeterminate	caryopsis	1		1				2		
Cereal/monocotyledon (>2 mm.)	culm node									1
Cereal/monocotyledon (<2 mm.)	culm node									
Cereal/monocotyledon (>2 mm.)	culm base	4			1					2
Cereal/monocotyledon (<2 mm.)	culm base									3
Indeterminate (>2 mm.)	rhizome									
Indeterminate (<2 mm.)	rhizome									
Wild species										
Polygonum sp	fruit									
Rumex sp	fruit									
Rumex cf crispus	fruit									
Brassica cf rapa	seed									
Brassica/Sinapis	seed									
Cruciferae undiff.	capsule base									
Viola sp	seed									
Erica/Calluna	capsule/ovary									
Calluna vulgaris (L.) Hull.	capsule									
Calluna vulgaris	stem/leaf									
Arctostaphylos uva-ursi (L.) Spreng.	seed					1				
Hypericum pulchrum L.	seed									
Poa sp	caryopsis									
Danthonia cf decumbens	caryopsis									
Poaceae undiff. (small)	caryopsis									
Poaceae undiff. (medium)	caryopsis									
Cladium mariscus (L.) Pohl	fruit				1					
Carex sp (biconvex)	fruit									
Carex sp (trigonous)	fruit									
Indeterminate	seed/fruit									
Fungal sclerotia	sclerotia									
Totals										
Total cereal components		32	1	1	1	1	1	5	1	8
Total wild species					1	1				
Total quantifiable components		32	1	1	2	2	1	5	1	8
Quantifiable components/litre		6	1	1	1	2	20	1.7	0	4

TABLE 4.35
Carbonized plant macrofossils (samples by Blocks 17, 18, 19 and 20).

Sample details										
Sample number		17	6	8	xx	xx	62	64	66	61
Context number		84	18	47	18	30	182	193	193	166
Block		17	18	18	18	18	19	19	19	20
Sample volume (litres)		5	1.5	3	1	1	1.5	2	2	2
Cultivated species	**Plant part**									
Hordeum										
H. sp	caryopsis	1								2
H. cf hulled	caryopsis						6	2		3
H. hulled	caryopsis	2	2				4	1		7
H. hulled symmetric	caryopsis		1	2						1
H. hulled asymmetric	caryopsis			1			1			2
H. vulgare	rachis internode							1		1
H. cf vulgare	rachis internode									
Triticum cf dicoccum	caryopsis									
Cereal indeterminate	caryopsis	2		1				2		3
Cereal/monocotyledon (>2 mm.)	culm node									
Cereal/monocotyledon (<2 mm.)	culm node									
Cereal/monocotyledon (>2 mm.)	culm base	3					1			
Cereal/monocotyledon (<2 mm.)	culm base							1		1
Indeterminate (>2 mm.)	rhizome	2								
Indeterminate (<2 mm.)	rhizome									
Wild species										
Polygonum sp	fruit									
Rumex sp	fruit		2							
Rumex cf crispus	fruit		1							
Brassica cf rapa	seed									
Brassica/Sinapis	seed		1							4
Cruciferae undiff.	capsule base									
Viola sp	seed									
Erica/Calluna	capsule/ovary		1							
Calluna vulgaris (L.) Hull.	capsule	1								
Calluna vulgaris	stem/leaf	1F								
Arctostaphylos uva-ursi (L.) Spreng.	seed									
Hypericum pulchrum L.	seed									
Poa sp	caryopsis									
Danthonia cf decumbens	caryopsis		1							
Poaceae undiff. (small)	caryopsis	1								
Poaceae undiff. (medium)	caryopsis		1							
Cladium mariscus (L.) Pohl	fruit									
Carex sp (biconvex)	fruit									
Carex sp (trigonous)	fruit							1		
Indeterminate	seed/fruit	2	1				1			
Fungal sclerotia	sclerotia		1							
Totals										
Total cereal components		10	3	4	0	0	12	7	0	20
Total wild species		4	8				1	1		4
Total quantifiable components		14	11	4	0	0	13	8	0	24
Quantifiable components/litre		3	7.3	1	0	0	8.7	4	0	12

TABLE 4.36
Quantification criteria for carbonized plant macrofossils.

Plant part	**Quantifiable portion on part**	**Count of 1**
Caryopsis	Embryo end	For each end counted
Rachis internode	Shoulder	For each shoulder counted eg count of 4 for 4 attached internodes
Fruit/seed/capsule	Whole fruit/seed/capsule or embryo end (if applicable)	For each whole fruit/seed/capsule counted
Culm node	Entire node	For each node counted
Culm base	Entire circumference of base (denoted here as a 'cylinder')	For each 'cylinder' counted
Rhizome	Entire circumference of rhizome	For each rhizome fragment
Nutshell fragment or leaf/stem	n/a	Not included in quantification

4.5.1.2). However, no carbonized seaweed was recovered.

Cultivated fields and grasslands

The poor preservation of the plant macrofossils meant only a few wild species are represented from the different habitats on Lewis. Weeds of cultivated fields and grasslands are represented by seeds of knotgrass (*Polygonum* spp), docks (*Rumex* spp), brassicas (*Brassicas* spp), violets (*Viola* spp), Slender St. Johns Wort (*Hypericum pulchrum* L), and grasses (*Poaceae* undifferentiated, *Poa* sp and *Danthonia decumbens* (L) DC). The single seeds of wild turnip (*Brassica* cf *rapa*) and Slender St Johns Wort (*Hypericum pulchrum* L) hint at damp arable fields but this could come from drainage ditches in rigging from modern observation of traditional farming practices in Lewis. This is also true of the sedges (*Carex* spp). These seeds could have been brought on to site as part of crop processing debris or were deliberately gathered for domestic use (eg the grasses and brassicas).

Heath and moor species

Due to the poor preservation of the plant macrofossils many of the specimens were only identifiable to genus. Hence, almost all of the wild species on site could be attributable to the heath and moor habitats covering much of Lewis in the Iron Age. These include the knotweeds (*Polygonum* spp), docks (*Rumex* spp), violets (*Viola* spp), heathers (*Calluna vulgaris* (L) Hull, *Erica/Calluna* spp), grasses (*Poaceae* undifferentiated, *Poa* sp and *Danthonia decumbens* (L) DC) and sedges (*Carex* spp). These species could represent exploitation of the drier heaths at the fringes of the blanket bogs, though indicators of very damp conditions are represented by species such as the sedges (*Carex* spp), Great Fen-Sedge (*Cladium mariscus* (L) Pohl) and Bear berry (*Arctostaphylos uva-ursi* (L) Spreng). These species could have been brought to site with items removed deliberately from the heath such as heather and turf and peat blocks (see above, this section).

4.6.4.3 Distribution and origin of carbonized material

Charcoal

Almost all of the charcoal fragments seem to relate to the incorporation of hearth material discard with sand and organic refuse across the site, with many of the fragments relating to the occupation and infill of Structures 4 and 8, and a rather smaller amount from Wheelhouse 1. A hand retrieved sample of Scots pine (*Pinus sylvestris* L) was taken from Context 218, which was of sufficient size to be used as for internal furnishing or construction (its context is a re-deposited midden infill within the entrance to the disused Wheelhouse 2). However, the context was identified as a structural fill and so the charcoal represents re-deposited material, perhaps an artefact fragment.

Carbonized plant macrofossils

One of the key issues to assess when considering carbonized plant macrofossil taphonomy is the charring process itself (Hillman 1981). Generally, charring occurs during certain stages of crop processing, the burning of plant material as fuel (deliberate or accidental), cooking accidents and conflagrations. The soil test results (details in site archive) have suggested that most of the carbonized material resulted from the incorporation of hearth discard with sand and organic refuse across the internal domestic contexts of the site.

Hence, charring is likely to have occurred within domestic hearths as fuel or cooking accidents, the main taphonomic transform for carbonized plant material in Atlantic Scotland (Church & Peters 2004).

Cereal remains are likely to have been incorporated through cooking accidents of the cleaned crop (represented by cereal caryopses, for example Sample 3) or the burning of crop processing debris as fuel (suggested by presence of rachis internodes and possible straw, for example Sample 83). The latter process would be very hard to identify due to the nature of the assemblage and the mixing of other plant material used for fuel. Indeed, the heterogeneity, size and preservation of the assemblage in general precludes any in-depth analysis of crop processing (cf Church & Peters 2004; Hillman 1984). However, the presence of cereal sized culm nodes and bases tentatively points to uprooting as a harvesting technique to conserve as much of the straw as possible.

These culm nodes and bases, coupled with the presence of rhizomes and APM, may well have been incorporated into the site through the discard of hearth material resulting from the burning of turves and peat for fuel (Dickson 1998) For example, Sample 13 (Context 83, Block 1, from the floor of Structure 8) has some culm bases and rhizomes, with relatively high concentrations of APM, and a number of wild species indicative of heathland and bog.

Overall, the carbonized plant macrofossils seem to have been not only mixed when burnt but also during deposition and discard into the internal contexts, producing a very heterogeneous assemblage which is difficult to both interpret and pinpoint specific domestic uses of plants.

4.6.4.4 Other sites

Bhaltos peninsula

A number of archaeological and palaeoenvironmental sites have been investigated in the Bhaltos peninsula, which can contribute to our understanding of the plant macrofossil assemblage at Cnip. Three pollen profiles have been taken; the first from Loch Bharabhat (Edwards et al 1994; Lomax & Edwards 2000) with the second and third taken from the infilled loch basin of Loch na Beirgh (Lomax 1997).

The profile from Loch Bharabhat covers most of the Holocene and points to the existence of forest cover, within the pollen catchment of the loch, possibly well into the Iron Age. All the charcoal species recovered from Cnip are represented in the profile. The profiles from Loch na Beirgh, although not yet dated, seem to relate to the progressive infilling of the loch, the bulk of which can be attributed to the Iron Age judging by the 'make-up' sequence within the broch (Harding & Armit 1990; Harding & Gilmour 2000). The first profile seems to have been disturbed but the second is more coherent, with its pollen catchment relating to the valley and machair expanse in which Loch na Beirgh is situated. This machair expanse may even have extended round Cnip headland from Traigh na Beirgh, having been subsequently lost through rising sea levels. The pollen in this second profile contained significant levels of *Hordeum* type pollen with a strong association of brassicas (*Brassica* spp) and other grasses and weeds of cultivated land. Hence, it is likely that the machair supported fields of barley and could well point to the area of cultivation for the complex at Cnip.

Analysis of the carbonized plant macrofossil assemblage from the cellular phase (a period thought to slightly post-date the occupation at Cnip) at the broch in Loch na Beirgh is also dominated by six-row hulled barley (Church 2002a). There was also an association of wild turnip (*Brassica rapa* L) seeds with the carbonized grain which, when considered with the pollen evidence and presence of *Brassica* sp seeds at Cnip, points to this species being a feature in the arable expanse on the machair. Wild turnip may have been allowed to grow with the crop to stabilise the sandy soil, or could have been used as a fallow crop. This fertilization and stabilization of the machair is particularly important if the uprooting technique was used for harvesting as this would destabilise the sandy soil very quickly. With this in mind, it is interesting to note that many cereal-sized culm bases were found in a sample of crop processing debris at Beirgh (S171) which supports the evidence from Cnip.

The results from the carbonized plant macrofossils from the Iron Age sites of Loch na Beirgh (Church 2002a) and Loch Bharabhat (Church 2000, 2002b), together with the results from Cnip, present an ideal opportunity for comparison of the three sites with overlapping periods of occupation. This sort of comparison would conventionally focus on issues of crop consumption and production which can provide evidence for site function and status (Jones 1985; van der Veen 1991).

Superficially, the assemblages from Cnip and Bharabhat are very similar, with cereal caryopses dominating a small assemblage with limited species and plant part diversity. In contrast, the remains from the cellular phase at Beirgh are much more diverse, with other cereal parts, such as rachis internodes and culm nodes/bases, present in greater quantities than at Cnip. It is therefore tempting to speculate on an economic differentiation between Cnip and Bharabhat on one hand and Beirgh on the other. However, these differences could alternatively be explained through differences in sampling procedure and site formation processes than through site function and status.

For example, whilst Bharabhat and Cnip were sampled on a 'judgement' basis with only limited sample volumes of up to 7 litres, the cellular phase contexts at Beirgh were sampled on both a 'random' and 'judgement' (Jones 1991) basis with samples of at least 28 litres. Hence, the sampling from Beirgh is much more likely to pick up any diversity. Also, the site formation processes between the sites are very different, with most of the contexts sampled from Cnip and Bharabhat coming from internal domestic contexts whilst many of the 'make-up' contexts sampled from Beirgh represent the mixing of internal domestic discard with deposits brought into the broch which could have contained crop processing debris discarded externally.

Western Isles and Atlantic Scotland

The recent research projects of the Sheffield University Environmental and Archaeological Research Campaign in the Outer Hebrides (SEARCH) and Callanish Archaeological Research Project (CARP) in the late 1980s and 1990s have both produced archaeobotanical assemblages from Iron Age sites across the Western Isles (see Church 2002a and Smith & Mulville 2004 for detailed syntheses). The excavations of the radially partitioned structure at Hornish Point, middens and structures at Baleshare (Jones 2003) and Kildonan III (Valamoti unpublished) in the Uists, have all produced similar, mixed assemblages to that from Cnip. These all presumably result from the dispersal of carbonized plant material from domestic hearths across the interior of the structures, and thence to the external middens. All were dominated by cereal remains, largely of six-row hulled barley (*Hordeum vulgare* (L) var *vulgare*), with relatively small proportions of 'wild' species.

Another important site for comparison is the Iron Age multi-phase settlement at Dun Vulan, South Uist (Smith 1999) Again, six-row hulled barley (*Hordeum vulgare* (L) var *vulgare*) was the predominant crop, but there were also had rare occurrences of possible emmer wheat (*Triticum* cf *dicoccum*), oats (*Avena* sp) and possible rye (cf *Secale cereale*). Like the single caryopsis of emmer recovered from Cnip, these have been interpreted as weed contaminants. All four sites also yielded macrofossils relating to the burning of peats, turves, seaweed, and peat as well as the gathering of grasses, seaweed and heather.

At Dun Vulan, attempts were also made to locate the zone in which the crops were grown, but again the low numbers and diversity of ecological data recovered allowed only limited insights. However, Smith has argued that the most suitable zone for a barley crop would be in the blacklands rather than the adjacent machair plain. She further proposed that the perception of the machair being more fertile than the blacklands was based on the post-medieval strategy of 'easy' production of fodder, rather than the more complex arable agriculture of the Iron Age. Hence, alluding to the relatively high proportion of 'damp' wild species present in the assemblage, she proposed that the barley crop was as likely to be grown in the blacklands as the machair.

This interpretation is at odds with the tentative conclusions of machair cultivation made for Cnip, but the latter has supporting evidence from the detailed pollen analysis from Loch na Beirgh. The area of cultivation is obviously an important question when considering prehistoric landscape and land use, especially when considering the position of settlements, such as Cnip and Dun Vulan, within possible agricultural machair. These questions are difficult to answer with the recurrent problems of low numbers and diversity of 'wild' species and the mixed assemblages which have been sampled.

Ideally, what is needed are assemblages from contexts which relate to single behavioural episodes of discard from the early stages of crop processing with relatively high proportions of indicator 'wild' taxa. These are unlikely to be recovered from the excavations focused on the interiors of structures or the external middens made up of the sweepings from buildings, both of which will produce mainly fully processed crop debris. The initial analysis of the detailed sampling of interior floor levels and external stratigraphy employed at recent excavations of both SEARCH and CARP has highlighted a number of potential deposits relating to single behavioural episodes of discard. This should eventually allow more detailed analysis of Iron Age cultivation practises in the Western Isles than is possible from the present published evidence.

Turning to the wider Atlantic Scottish Iron Age, a number of trends of plant use and exploitation can be seen from the archaeobotanical assemblages, similar to those from Cnip. Firstly, barley and in particular six-row hulled barley (*Hordeum vulgare* (L) var *vulgare*), seems to dominate the arable economy which is similar to the pattern noted for the rest of Scotland (Boyd 1988; Greig 1991; Dickson & Dickson 2000). Emmer (*Triticum dicoccum* Schubl) is occasionally recovered but rarely in significant quantities and so is interpreted as a weed contaminant. This is also true of rye (*Secale cereale* L) and surprisingly oats (*Avena* sp.) which appears in significant numbers on the mainland during the Iron Age (Boyd 1988) but only seems to come to prominence in the Norse period in the Atlantic zone.

Timber would have been a valued resource, with much of the charcoal recovered relating to root or small roundwood from small trees and shrubs such as birch (*Betula* sp) and hazel (*Corylus* sp). Some pollen diagrams, such as Dun Bharabhat (Lomax & Edwards 2000), show mixed deciduous forest in the Iron Age but most profiles show a largely open landscape across much of the Atlantic zone by the Iron Age, with few significant expanses of the mixed, fully developed forest canopy which still existed in some parts of the mainland. Hence, strong structural timbers, for roofing for example, would have been a very valued resource and may well have been procured from specific managed areas in the Atlantic zone through exchange networks from the mainland (cf Fojut 2005) and from driftwood, such as spruce (*Picea* sp) from North America and Scandinavia (cf Church 2002b).

Due to the scarcity of timber, other sources of fuel were sought throughout the Iron Age, resulting in specific suites of carbonized plant macrofossils (Church & Peters 2004). These included dung, seaweed, peat, and turves (for example, see Dickson 1994). A wide variety of other useful plants were gathered from specific ecological zones, with heather being an important resource taken from the wide expanses of heath and bog and utilized in a variety of ways.

In conclusion, the archaeobotanical evidence from Cnip is in many ways typical of Iron Age assemblages from across Atlantic Scotland, and provides some specific insights into the use of tree and plant species on the site. The heterogeneous nature of much of the excavated material, however, reflects the derivation of most of the assemblage from highly mixed domestic debris. This undoubtedly obscures more detailed patterns of use which might have been recognizable had more deposits relating to single episodes of use and discard been available.