APPENDIX 6: BOTANICAL REPORT FROM DUNASBROC
by Susan Ramsay

6.1 Summary

Excavation of a number of archaeological features on Dunasbroc, a steep-sided stack in the parish of Barvas, Isle of Lewis, provided 17 bulk samples and 11 small finds of charcoal for analysis. Evidence was recovered for the utilisation of a diverse range of wood fuel types on the stack, although it is probable that none of these wood types was growing on the stack itself. The wood could have been collected from woodland on the mainland or in the form of driftwood from nearby shores. The spruce/larch charcoal from the site must have been collected as driftwood as these trees are not native to Scotland. Evidence was also found for the utilisation of cereals, particularly six-row barley, either for food or as some form of ritual deposit. There is also some indication that a wicker structure or object may have been burned within the area defined by Trench 2.

6.2 Introduction

The following archaeobotanical report details the processing, analysis and interpretation of environmental samples recovered during the excavation of archaeological features recorded at Dunasbroc, a steep-sided stack in the parish of Barvas, Isle of Lewis (McHardy 2005a). This excavation was part of the ongoing STAC research project, which is funded by Historic Scotland, Comhairle nan Eilean Siar and The Russell Trust. The excavations comprised two trenches: Trench 1 was laid out across the top of the plateau and down the landward side of the stack, whilst Trench 2 was opened across an eroding section, with pottery visible within the eroded face.

Two main objectives were set for the outcomes of this archaeobotanical investigation:

- To identify and interpret botanical evidence in terms of the utilisation of local environmental resources for food, fuel, construction or other purposes.
- To recover carbonised macroplant material for AMS radiocarbon dating.

It was anticipated that analysis of the archaeobotanical assemblages recovered during the excavations on Dunasbroc, Isle of Lewis, would add to the information gained from the archaeological excavation and other specialist analyses, and would aid in the understanding of human activity in this remote location.

6.3 Methodology

Samples were all from free-draining contexts that were highly unlikely to have retained any waterlogged remains contemporaneous with the occupation of the site. Consequently, the larger samples were floted for the recovery of carbonised remains, although the small finds were not processed prior to identification taking place. The dried flots and retents from the bulk samples were sorted using low-power microscopy, and all seeds, plant macrofossils (both carbonised and uncarbonised) and charcoal fragments greater than *c* 5mm were identified from the samples examined in order to give a good representation of the range of taxa present. For each sample, estimation was made of the total volume of carbonised material present and modern contaminants were scored using a scale of 1–3 'plus' marks. Charcoal was initially studied at variable magnifications of between ×4 and ×40 to observe the anatomy of the transverse section. Subsequently the internal wood anatomy in radial longitudinal and transverse longitudinal section was observed at ×200 magnification using the reflected light of a Zenith Metam-P1 metallurgical microscope. Identification was by comparison with the text and photographs in Schweingruber (1990).

Cereal grains and other seeds were identified at variable magnifications of between ×4 and ×40. Identification was by reference to the extensive modern reference collection at Glasgow University and to Beijerinck (1947), Jacomet (1987) and Zohary & Hopf (2000). Higher plant nomenclature follows Stace (1997) apart from cereals, which conform to the genetic classifications of Zohary & Hopf (2000).

6.4 Results

The results are shown in table 13 (for bulk sample results) and table 14 (for small finds). Where a context had more than one bulk sample taken, these results were added together and presented as a single data column in the results table, for ease of interpretation. The samples included within each context are recorded in the table. No modern seeds were recovered from any of the samples analysed.

Trench 1

Context 001 was topsoil and contained no identifiable carbonised remains, ie was essentially sterile when considering archaeobotanical evidence. Under Context 002, which lay directly beneath the turf and covered most of the plateau, lay 004, a sandy clay

layer that extended over the width of the trench and was thought to be rich in ash during excavation. The carbonised assemblage recovered was very diverse, with charcoal of birch, hazel, heather type, spruce/larch and willow all present, along with cereal grains, including hulled six-row barley. In addition, there was evidence for the burning of turf in the form of grass/sedge stems, underground rhizomes and weed seeds of dock and chickweed/mouse-ear. The carbonised remains from 004 suggest detritus from a hearth, with some indication of food preparation or ritual deposition of grain. The turf remains may have come from turves burnt on the fire or from the original turf surface of the stack itself. Below Context 004 lay a sandy clay layer 014, which showed evidence of burning and may have been a floor surface. This context contained charcoal of birch, heather and spruce/larch, together with several cereal grains that were all well enough preserved to be identifiable as six-row hulled barley. This charcoal assemblage could have come from a fire built directly on the floor surface, with the cereal grains perhaps only having been exposed to moderate heat on the floor near the fire, rather than having been in the heart of the fire itself. This could explain why the cereal grains are all well preserved. Context 005 lay under 004 and was thought to represent natural subsoil with evidence for burning. Significant numbers of charcoal fragments were recovered from this Context, with birch and spruce/larch both present. A few cereal grains were recorded, with six-row barley and also a single grain of cf emmer/spelt wheat also identified. Again, this suggests hearth waste and possibly the preparation or deposition of food on the site. Contexts 008, 013 and 022, associated with the remains of Walls A and B, together with Context 012 (the fill of linear feature 011), contained broadly similar carbonised assemblages with heather type and spruce/larch type or indeterminate conifer charcoal present. Occasional grains of six-row barley and rhizomes were also recorded. The only other addition to the carbonised assemblage was found in 008, which also contained rowan-type charcoal; the only occurrence of this type on the site. The lack of charcoal from deciduous trees is notable in these contexts and may suggest that the charcoal present in association with the walls had a different origin from that found elsewhere on the site, either in terms of the original reason for the burning or through representing a different episode of burning.

Trench 2

The five contexts (003, 006, 009, 010, 020) analysed from Trench 2 contained very similar assemblages of carbonised remains. Charcoal was generally of birch, heather type and willow with occasional pieces of hazel in Contexts 006 and 009. The small finds of charcoal (table 14) all came from Context 006 and were overwhelmingly of birch, with lesser quantities of willow and a single occurrence of hazel. The only cereals from Trench 2 came from Context 006 and were identifiable mainly to six-row hulled barley, with a few further identifiable to the hulled variety. This is in keeping with the other finds of cereal from the site. In addition, a single fragment of hazel nutshell was also recorded from Context 006. During excavation, Context 006 also produced numerous artefactual finds, including pottery, flint, bone and a leaf-shaped arrowhead.

6.5 Discussion

The carbonised assemblage from Dunasbroc was much more diverse than would have been expected considering the exposed and barren nature of the present-day stack. It seems unlikely that even in the past the stack could have supported trees of any size. Any trees that did manage to survive would have been extremely stunted and unlikely to have provided much in the way of fuel or timber for construction. Therefore, it is considered likely that most, if not all, of the tree charcoal recovered from the site was brought there, either from the mainland or collected as driftwood from mainland shores near the stack or from the base of the stack itself. The charcoal from broadleaved taxa is representative of native species that could have grown on land close to the stack, although the diversity of types may suggest that at least some of this material was collected as driftwood that had arrived from further afield. More definitive evidence for the utilisation of driftwood comes in the form of the evidence for non-native spruce/larch charcoal in Trench 1. Neither spruce nor larch would have grown in Scotland prior to the planting of these species within the last 200 years or so, initially as specimen trees on large estates and subsequently as commercial forestry plantations. Therefore, as this site is thought to be prehistoric in date, the spruce/larch charcoal must have come from collected driftwood. The practice of utilising driftwood for fuel and even construction purposes seems to have been widespread in the Western and Northern Isles throughout recorded human occupation of these areas (Dickson 1992). It is impossible to determine exactly where the driftwood came from but the most likely sources are North America or northern Europe. It was notable that no evidence for spruce/larch or any other coniferous type was present in Trench 2. This is in stark contrast to Trench 1, where spruce/larch or indeterminate conifer charcoal occurs in almost every context examined and suggests that different activities were taking place between the areas of Trench 1 and Trench 2. This contrast between the carbonised remains recovered from each trench is also highlighted by the fact that all but one of the contexts from Trench 2 contained willow charcoal, whereas only one context from Trench 1 contained this charcoal type. This could indicate that dwarf willow once grew on the stack and was used for fuel

Table 13 Botanical results from Dunasbroc (bulk samples)

Dunasbroc 2005	**Trench**	**Trench 1**											**Trench 2**					
	Context	**001**	**001**	**004**	**004**	**005**	**008**	**012**	**013**	**014**	**015**	**022**	**003**	**006**	**006**	**009**	**010**	**020**
Bulk sample results	**Sample**	**001**	**002**	**004**	**007**	**014**	**009**	**013**	**012**	**016**	**015**	**017**	**003**	**006**	**008**	**010**	**011**	**018**
	Description	**Topsoil**	**Topsoil**	**Grey sandy clay, plateau**	**Grey sandy clay, plateau**	**Gritty sand, burnt natural, plateau**	**Silty clay, between walls A & B**	**Fill of linear feature, plateau**	**Sandy silts, between walls A & B**	**Sandy clay, possible floor, plateau**	**Fill of small posthole, plateau**	**Between walls A & B**	**Browny / yellow sand**	**Grey brown silty clay, finds rich**	**Grey brown silty clay, finds rich**	**Orange brown sandy clay**	**Rough revetment & matrix**	**Grey, sandy clay, natural**
Matrix abundance																		
Vol carb veg		<<2.5ml	<<2.5ml	<2.5ml	20ml	15ml	5ml	5ml	5ml	5ml	<2.5ml	5ml	2.5ml	5ml	110ml	5ml	10ml	7.5ml
Modern veg		+++	+++	+++	+++	+++	++	++	+++	+++	++	+++	+++	+++	+	+++	+++	+++
Charcoal	**Common name**																	
Betula	birch			4 (0.05g)	6 (0.3g)	9 (0.2g)				1 (<0.05g)	1 (0.05g)		3 (0.05g)	10 (0.2g)	29 (2.95g)	11 (0.25g)	22 (0.5g)	19 (0.55g)
Corylus	hazel				1 (<0.05g)										2 (0.15g)	1 (<0.05g)		
Coniferales (indet)	conifer (indet)											21 (0.1g)						
Ericales	heather type				29 (0.2g)		20 (<0.05g)	10 (0.05g)	7 (0.05g)	3 (<0.05g)		12 (<0.05g)	1 (<0.05g)	1 (<0.05g)	50 (0.3g)	14 (<0.05g)	13 (0.1g)	20 (0.05g)
Maloideae	rowan type						3 (0.15g)											
Picea / Larix	spruce / larch			1 (<0.05g)	14 (0.85g)	16 (0.55g)	10 (0.25g)	11 (0.3g)	14 (0.25g)	6 (0.05g)								
Salix	willow				4 (0.1g)								3 (<0.05g)		18 (2.15g)		3 (0.05g)	6 (0.05g)
Cinder						+ (0.5g)		+ (0.65g)	+ (<0.05g)			+ (0.8g)						
Carbonised cereals																		
Hordeum vulgare var vulgare	six-row hulled barley				2									6				
Hordeum vulgare sl	six-row barley				9	2	4	3		8				17				
cf Hordeum vulgare sl	cf six-row barley			2											4			

Table 13 (*cont.*)

Dunasbroc 2005	**Trench**	**Trench 1**											**Trench 2**					
	Context	**001**	**001**	**004**	**004**	**005**	**008**	**012**	**013**	**014**	**015**	**022**	**003**	**006**	**006**	**009**	**010**	**020**
Bulk sample results	**Sample**	**001**	**002**	**004**	**007**	**014**	**009**	**013**	**012**	**016**	**015**	**017**	**003**	**006**	**008**	**010**	**011**	**018**
	Description	**Topsoil**	**Topsoil**	**Grey sandy clay, plateau**	**Grey sandy clay, plateau**	**Gritty sand, burnt natural, plateau**	**Silty clay, between walls A & B**	**Fill of linear feature, plateau**	**Sandy silts, between walls A & B**	**Sandy clay, possible floor, plateau**	**Fill of small posthole, plateau**	**Between walls A & B**	**Browny / yellow sand**	**Grey brown silty clay, finds rich**	**Grey brown silty clay, finds rich**	**Orange brown sandy clay**	**Rough revetment & matrix**	**Grey, sandy clay, natural**
cf Triticum dicoccum / spelta	cf emmer / spelt wheat					1												
Cereal indet					13	5								10				
Carbonised seeds etc																		
Corylus avellana nutshell	hazel nutshell														3 (<0.05g)			
Monocot stems	grass / sedge stems				1 (<0.05g)													1 (<0.05g)
Rhizomes (indet)	rhizomes				2 (<0.05g)	1 (<0.05g)		2 (0.05g)				1 (0.05g)						
Rumex sp	dock				1													
Stellaria / Cerastium	chickweed / mouse-ear				1													
Miscellaneous																		
Bone							++ (1.25g)	+ (<0.05g)	++ (0.2g)	++ (0.35g)		++ (0.2g)			+ (<0.05g)		+ (0.1g)	
Shell									+ (<0.05g)	+ (<0.05g)								

Table 14 Dunasbroc small find results and charcoal taxa

Dunasbroc Small Find Results			Charcoal Taxa		
Small Find	**Context**	**Trench**	**Betula**	**Corylus**	**Salix**
45	006	Tr2	4 (0.3g)		
49	006	Tr2	3 (0.25g)		
51	006	Tr2	1 (0.05g)		
59	006	Tr2	3 (0.35g)		
78	006	Tr2	2 (0.35g)		4 (0.6g)
131	006	Tr2	3 (0.7g)		
137	006	Tr2	3 (1.45g)	1 (0.1g)	
148	006	Tr2	3 (1.0g)		1 (0.15g)
?	006	Tr2	7 (1.5g)		1 (0.1g)
??	006	Tr2	24 (3.3g)		3 (0.15g)
???	006	Tr2	27 (3.15g)		5 (0.35g)

within the area of Trench 2. However, it could be an indication that some kind of wicker structure or object was burnt in the area of Trench 2, as willow is the commonest wood type used for wickerwork and would explain why willow is only rarely present in Trench 1.

Heather-type charcoal was common in many of the samples analysed from Dunasbroc. Heather may have grown on the stack itself or could have been collected from the mainland, most probably to be used as fuel, but it can have a multitude of uses including packing, bedding, thatching etc, although there was no evidence for any of these other uses here. Some of the heather may have come from heathy turves, used for fuel or even construction purposes. When wood was in short supply, minerogenic heather turf was often the fuel of necessity in the Highlands and Islands of Scotland, and also formed the main component of walls or wall cores in many marginal environment dwellings (Dickson & Dickson 2000). There was evidence within the carbonised assemblage from Dunasbroc for the burning of grassy turf, but it was not possible to determine whether this was deliberate burning of collected turves or simply reflected the vegetation colonising the ground surface on which a fire had been built.

Although cereal grains were not commonly found during this study, small numbers of grains were present in at least half of the samples analysed. These were generally six-row barley, with the hulled variety (*Hordeum vulgare* var *vulgare*) of this type further identifiable on occasion. Barley has been the commonest cereal type grown in Scotland from the Neolithic to the medieval period, when oats began to dominate. Naked barley (*Hordeum vulgare* var *nudum*) was generally grown in the Neolithic period, but was superseded by the hulled variety from the Bronze Age onwards in Scotland. This is thought to be a response by Bronze Age farmers to climatic deterioration because hulled barley was better protected from damp and fungal attack as a result of the grain being enclosed in papery fused glumes whereas the naked, free-threshing variety was prone to fungal infestations. A single grain of cf emmer/spelt wheat was also recovered but this does not necessarily mean that wheat was being grown as a crop in the area. The wheat may simply have been growing as a weed within the main barley crop. What is certain is that the soil conditions present on the stack would not have been suitable for the growing of crops and therefore the grain must have been transported onto the stack. The lack of crop weed seeds and chaff could suggest that the grain was fully cleaned prior to being brought onto the stack.

6.6 Conclusions

The archaeobotanical analyses of the samples taken during the excavation on Dunasbroc stack have shown that much of the plant material, including wood, cereal grains and hazelnuts, must have been transported onto the stack from elsewhere. The presence of cereal grains suggests that either food was being prepared on the stack or cereal grains were being deposited in fires built on the stack, perhaps for ritual purposes. Subsequent AMS radiocarbon dating of material from the excavations at Dunasbroc has produced dates that cluster within two distinct periods. Dating of six-row barley grains from Contexts 004, 005, 006 and 014 indicates that these were all probably deposited during the last four centuries BC. However, AMS radiocarbon dating of charcoal from Contexts 004, 006, 010 and 015 produced dates that cluster around the mid fourth millennium BC, 4,000 years earlier than the cereal grains. This discrepancy between the radiocarbon dating results of cereals and charcoal is difficult to explain. The cereals are obviously later but seem

to have become mixed with much earlier material, either through accidental percolation down into lower deposits, or through accidental or deliberate mixing of material during the utilisation of the site. It does seem clear that the site underwent two distinct periods of use, four thousand years apart, and that only the latter period of use, in the Iron Age, provides evidence for cereal deposition.

next section