

APPENDIX E ENVIRONMENTAL ANALYSIS

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1.0 BACKGROUND

A number of unprocessed samples were received from recent excavations at Tarbat Church, Easter Ross undertaken by Field Archaeology Specialists Ltd. The excavation revealed a sequence of 10 phases between the 7th and the 19th centuries, charting periods of construction, modification, abandonment and refurbishment. These samples derive from three distinct areas within the church:

A) Floor of the crypt

Two organic sediments deposited on top of silty clay floor of AD c.1620 (C1015 and C1016). These were covered by mortar dumps and spreads from the re-pointing of the crypt vault and other later sediments. FAS requested identification of the materials that constitute two spreads on the floor of the crypt:

B) Feature 125: Grave

A dark stain around a skeleton, possibly the remains of a shroud or coffin (?10th to 11th century). FAS requested further information on the nature and possible origin of the stain.

C) Feature 129: Ditch

The fills of a ditch predating the earliest stone church (7th to 9th century). FAS were interested to obtain further information regarding the function and other information available regarding this ditch.

2.0 METHOD

All the samples were examined under a binocular microscope and any identifications made with reference to the modern comparative collection of Headland Archaeology Ltd.

3.0 RESULTS AND DISCUSSION

A) Floor of the crypt

The samples from the two organic-rich contexts from the floor of the crypt are very different in character (Table 1).

1016 is dominated by dark, well-humified amorphous peat. Within this are the well-preserved remains of insects and acarid mites together with plant roots and stem tissue. The stem tissue is dominated by monocotyledon rhizome fragments (ie grass, sedge, rush) with occasional woody fragments of heather. A number of fruits and seeds were also recovered. These were primarily aquatic species, notably the crowfoots (*Ranunculus* subgen. *Batrachium*) and pondweed (*Potamogeton* sp.). Small quantities of fish and small mammal bone were also present.

1015 consists primarily of small, broken shell fragments, fish and small mammal bone with amounts of desiccated plant remains of which most is wood. A seed element is also present in Sample 103 and although one aquatic seed was encountered (water plantain - *Alisma* sp.) the majority were typical components of a segetal/ruderal flora (ie of agriculture or waste places).

The presence of aquatic fruits and seeds in sample 1016 indicates that it cannot have formed *in situ*. Although most of the material was well-humified there was also a substantial element that was well-preserved. It is therefore unlikely that the

humification (ie the degradation of plant remains) took place within the crypt. If this had occurred then a more uniform sediment would have been expected unless there had been an actively growing vegetation on its surface. This would seem unlikely in the darkness of the crypt. The evidence suggests that this material consists of fen-type peat comprising both the humified substratum and parts of the vegetation growing on its surface. The animal bone in the sample is inconsistent with the fen peat and unlikely to be from the same source. A proportion of the bone could have derived from the overlying strata such as 1015 which is bone-rich. Other potential sources include carrion feeding birds such as crows and gulls of other carnivorous animals such as owls or otters.

Exactly why a deposit of peat was spread across the floor of the crypt on top of what appears to have been a deliberately laid floor surface is unclear. It would seem an unsuitable flooring material in that it would tend to absorb moisture. One other possible explanation is that it represents the remains of peat stored in the crypt possibly for use as fuel.

The shell, bone and desiccated plants from 1015 represent a very different sediment. Small fragments of mortar are present and small-diameter gravel is common. The most likely source of this material is from the mortar used to point the crypt roof, possibly accumulating over a number of years by weathering, or a combination of different raw materials used in its manufacture. The fish bone may have been inadvertently collected with coarse shall sand from the beach for use in mortar preparation while the small mammal bone was more probably deposited by scavengers of carnivores living in the crypt. The desiccated wood and other plant material can be explained as the remains of furnishings within the crypt or other detritus that had blown into the crypt through the lights.

Table 1 Contents of sample 1015 and 1016

| Context | Sample | Category | Qty | Comments |
|---------|-----------|--------------------------|-----|--|
| 1015 | flot res | Marine shell | +++ | Highly fragmented |
| | | Mortar fragments | + | Small aggregates |
| | | Small mammal bone | + | |
| | | Fish bone | + | |
| 1015 | 103 | Insects | + | Body parts |
| | | Vegetative plant parts | +++ | Only aquatic taxa is <i>Alisma sp.</i> The rest are of disturbed places eg <i>Stellaria media</i> and <i>Chenopodium album</i> |
| 1015 | 114 | Fish bone | +++ | Large - medium sized fish |
| | | Mammal bone | + | inc. rodent teeth |
| 1015 | 116 | Fish bone | +++ | Small fish bone, head bones, vertebrae and spines |
| | | Mammal bone | + | |
| 1015 | 117 | Leather | + | One large piece |
| | | Vegetative plant | ++ | Stem/rhizome fragments |
| | | Wood fragments | +++ | Inc. bark, some possibly with fungal infections |
| 1015 | 120 | Wood fragments | +++ | |
| | | Fish bone | + | |
| 1016 | flot res. | | | Identical in composition to 121 |
| 1016 | 105 | | | Identical in composition to 121 |
| 1016 | 121 | Amorphous peat | +++ | |
| | | Invertebrate eggs | + | |
| | | Insects/mites | + | Whole mites, insect parts inc. beetle elytra |
| | | Vegetative plant remains | ++ | Roots and small diameter monocotyledon stem fragments and twigs (including heather) |
| | | Seeds/fruits | + | Aquatic species inc. <i>Ranunculus</i> subgen. <i>Batrachium</i> , <i>Potamogeton sp.</i> |

| Context | Sample | Category | Qty | Comments |
|---------|--------|-------------------|-----|---------------------------------------|
| 1016 | 123 | Wood fragments | +++ | Inc. birch bark |
| | | Fish bone | ++ | Small |
| | | Coal | + | One fragment c. 1cm sq. |
| 1016 | 125 | Fish bone | + | Small |
| | | Small mammal bone | ++ | Inc. rodent tooth |
| 1016 | 126 | Beetle elytra | ++ | Several separated elytra (wing cases) |

Key: + = rare, ++ = occasional, +++ = common

B) Feature 125 grave

Samples 217-219 are all composed of highly humified organic debris (Table 2) but some differences were noted in the texture of the different samples. 217 consisted of a fine powder. Information regarding the orientation of the samples was not available as part of this assessment but this would be consistent with fine debris that had fallen from the sides of the grave and accumulated in the lower parts of the cut. 218 and 219 are more compacted with faint traces of laminations at some points. 218 was consistent with very degraded wood/wicker.

Sample 393 consisted of well-preserved insect puparia which had been separated from the surrounding sediment. These may offer some indication of conditions in the grave but given the poor conditions of all other organic remains these are more likely to represent more recent contaminations.

Table 2 Composition of the samples from F125

| Context | Sample | Category |
|---------|--------|---|
| 1293 | 217 | Very fine brown powder with no traces of identifiable structure |
| 1293 | 218 | Highly degraded organic matter. Faint traces of degraded plant fibres are probably wood |
| 1293 | 219 | Degraded amorphous organic matter |
| 1293 | 393 | A number of insect puparia |

C) Feature 129: Ditch

These samples were dominated by charred plant remains. Wood charcoal was present in most cases with varying quantities or amorphous organic material with small mineral inclusions. It is thought likely that much of this amorphous material is burnt peat, probably the remains of fuel. Cereal remains in the form of both chaff and grain were present in contexts 1337 and 1345. The dominant cereals were bread wheat (*Triticum aestivo-compactum*) and hulled barley (*Hordeum vulgare*) but lesser amounts of oat (*Avena* sp.) and rye (*Secale cereale*) were encountered. These are unlikely to have been charred *in situ* and do not therefore inform us about the function of the ditch. The quantity of grain and the presence of chaff, which is unusual in Scottish archaeological assemblages, could however offer some interpretation of on-site activities. Such assemblages would tend to imply bulk processing of cereals nearby which charring having occurred either during the corn drying phase of processing or during a conflagration of a storage context. The presence of wheat is of major significance because finds of this date are rare in Scotland. It has been recovered from the Anglian monastic site of Hoddum, Dumfries and Galloway where, it has been suggested, it was an imported grain.

Table 3 Composition of samples from F129

| Context | Sample | Cereal grain | Seed | Chaff | Charcoal | | Amorphous material | Comments |
|---------|--------|--------------|------|-------|----------|-----|--------------------|---|
| | | | | | Qty | AMS | | |
| 1325 | 390 | | | | + | * | | Indet. Rhizome fragment |
| 1337 | 346 | | | | +++ | * | | |
| 1337 | 347 | +++ | | | ++ | * | | Barley and wheat |
| 1337 | 360 | +++ | + | ++ | ++ | * | | Mostly wheat and rye |
| 1337 | 381 | | | | | * | + | |
| 1337 | 382 | + | | | +++ | * | ++ | Wheat, barley and cf. Oat |
| 1345 | 348 | ++ | | + | + | * | ++ | Wheat barley grain and wheat rachis fragments |
| 1345 | 362 | + | | | | * | | Wheat and barley |

Key: += rare, ++ = occasional, +++ = common, * = sufficient for an AMS date

Summary and recommendations

Samples from three different archaeological features were received for assessment.

A) Floor of the crypt -

Samples from two contexts were assessed:

1016 was interpreted as a spread of fen peat with additional animal bone that had probably been brought to the site by carrion feeders.

1015 was interpreted as an accumulation of raw materials used for mortar production and weathering from the roof with additional wind-blown elements and bone brought to site by carrion feeders

Future analysis could be undertaken on, for example, the fish bone and invertebrate remains. However, because these elements are not thought to be directly associated with human activity it is not likely that this would add much information of relevance to the interpretation of the samples.

Recommendation: No further action is recommended.

B) Feature 125: Grave

These samples were found to consist largely of degraded organic material. No identifiable microscopic traces were recovered from two of the samples, but a third (218) revealed traces of what is thought to be wood. Whether this was present as timber or wattles is impossible to say. It is possible however, that thin section analysis of the larger pieces might enable identification of structures not detected so far because of the crumbly nature of the sediment.

Chemical analysis of the remains could be attempted but since most vegetable fibres are primarily constructed of cellulose this is unlikely to be able to distinguish between, for example, textiles such as linen and wood. Wool and other animal fibres are unlikely to be chemically indistinguishable from the degrading organic material from the body itself. The only possible benefit of such analyses would be if there was a suspicion that the exotic materials such as oils or waxes had been used in the preparation of the body.

Recommendation: If it is important to find out more regarding these layers, thin section analysis of some of them could be

considered.

C) Feature 129: Ditch

The samples from this feature contain quarries of charred material with cereal present from 1337 and 1345. Of significance here is the presence of wheat, a cereal which is rarely encountered in Early Historic Scotland and cereal chaff which is also rarely encountered. It is possible that they represent imports into the area. The presence of these economic species would warrant some further work in order to provide a definitive statement regarding their identification and presence in Easter Ross of the 7th to 9th centuries. A more thorough characterisation of the samples might also enable interpretation of the processes that produced them, thereby providing a further insight into on-site activities in the pre-building phases of the site. This would benefit significantly from the analysis of similar material from other parts of the same settlement.

Recommendation: a) Detailed identification and production of a catalogue of the different weed and cereal elements recovered and their interpretation with respect to species present and the processes responsible for their deposition.

B) Analysis of the charred plant remains from other parts of the pre-building phases of the site with a view to understanding broader issues relating to the interpretation of individual features and the economy of the site.