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Bronze Age Moss Fibre Garments from Scotland – the Jury’s Out

Introduction

The periodic re-evaluation of early and unusual fibre identifications has proved important in textile research (e.g. Ryder 1965; Bender Jørgensen 2013). In light of recent discoveries of early to middle Bronze Age burials with mats and fibrous material in Scotland, for example at Langwell Farm, Strath Oykel (Lelong 2009) and Forteviot, Perth and Kinross (Brophy and Nobel 2011, 798), it is timely to re-evaluate earlier finds of this period. Of particular interest are the claims for hair moss fibre garments or shrouds.

In the early 20th century, Ludovic McLellan Mann, a keen amateur archaeologist, reported several hair moss items found in Bronze Age burials and related contexts. The sources include Mann’s 1928 excavation notes, indicating a garment from Greenoakhill (Henshall 1950, 153) (Greenoakhill, Moss Fragments, Glasgow Museums, ARCHNN.1450), an apron of moss fibre (*Polytrichum commune*) from North Cairn Farm (Mann 1923, 107) (North Cairn Farm, Moss fibre garment, Glasgow Museums ARCHNN.3170) and Mann’s 1936 press release of Ferniegair moss fabric reported in Welfare (1977, 5) (Ferniegair, Shroud of moss fibres with fragments of bone, Glasgow Museums, ARCHNN.1802). The identification of hair moss was seriously doubted both by Audrey Henshall and H.G. Welfare, who each examined some of these finds (Henshall 1950, 153; Welfare 1977, 7) (Table 1) (Fig. 1).

Hair moss string and basketry items have been more securely identified in other Bronze Age and later contexts in the British Isles. A rope of hair moss (*Polytrichum commune*), as well as wadding of other types of moss (*Neckera complanata*, *Eurhynchium striata*), were used as caulking in Boat No. 3 from North

Ferriby in the north of England which is dated to the early Bronze Age (OxA-9198-9 & OxA-9524, 3575 ±24 BP, at 95% confidence 2030-1780 cal BC) (Wright and Churchill 1965, 5, pl. I upper, pl. VIII lower; Wright *et al.* 2001, 732). There have also been reports of pollen evidence for sphagnum moss (*Sphagnum sp.*) in Scottish early Bronze-Age burials and cremation urns where it is identified as layers or packing (Warsop 1996, 140; Mills 1995, 132-3 in Brück 2004, 180). A four-ply plait and bundles of “fringe-like apparatus made

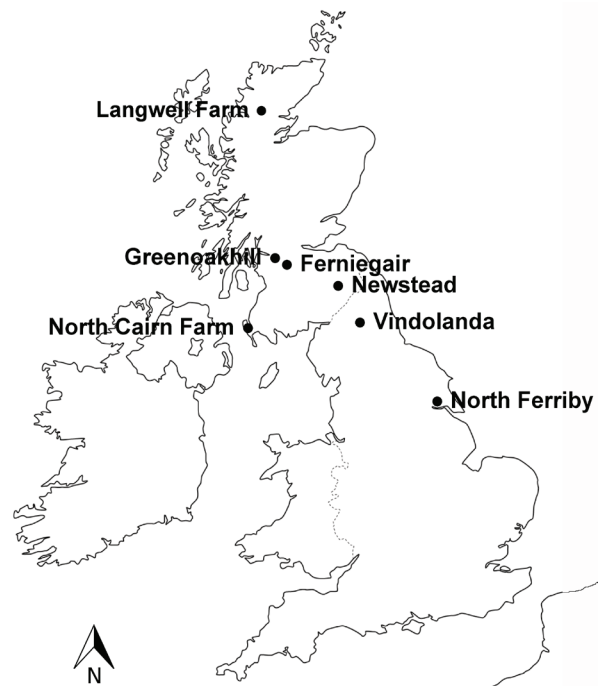


Fig. 1. Map of the British Isles with location of key sites mentioned in the text (Map: Susanna Harris).



Site and county	Object and accession number	Archaeological context	Mann's assessment	Subsequent assessment	Current research
North Cairn Farm, Dumfries and Galloway	Moss fibre garment, ARCHNN.3170	Recovered from the edge of a cairn	Hair moss apron; fibres knitted together along a twig	Henshall (1950, 153): too fine and soft to be moss	Fibrous bundle. Fibre analysis: most likely silk. Unlikely Bronze Age
Greenoakhill, Glasgow	Moss fragments, ARCHNN.1450	Cist containing inhumation of boy with Food Vessel	Hair moss garment covering the body and among the bones. Comparable to North Cairn Farm apron	Henshall (1950, 153): moss garment apparently not preserved	Compressed organic material. No weave structure. Fibre identification necessary
Ferniegair, South Lanarkshire	Shroud of moss fibres with fragments of bone, ARCHNN.1802	Cist 2, inhumation with inverted, enlarged Food Vessel	Inhumation covered by a length of fabric woven from moss	Welfare (1977, 9): unlikely to be moss as they are too coarse	Roughly parallel fibrous strands (Ø 3.5-10mm). Rather coarse to be moss. Friable and immobilised with adhesive, making fibre analysis less likely to yield good results

Table 1. Bronze Age fibres, hair moss garments or shrouds identified by Mann, subsequent assessments and current research. Finds accessioned at the Glasgow Museums Resource Centre, Glasgow.

of moss" were recovered in the late 19th century from a multi-period site at Lochlea Crannog, South Ayrshire (Munro *et al.* 1879, 192, fig. 109). Henshall considers these genuine hair moss items dating to the late 1st and 2nd centuries AD (1950, 154). There are also two Roman artefacts identified as hair moss caps. A cap (made of *Polytrichum commune*) was identified at Vindolanda Roman fort in the north of England. It is dated to AD 97-103 (Wild 1994). A similar cap was excavated from the inner ditch of Newstead Roman fort in Scotland. It is thought to be dated to around AD 86 (Wild 1994, 64). In the original report, the Newstead find is referred to as an unfinished basket made of cleaned stems of the hair moss *Polytrichum commune*, which were identified through comparison with hair moss articles in the Kew Garden collections (Curle 1911, 108, 358, pl. XV). These two near-contemporary Roman finds may reflect an earlier tradition of this region rather than a Roman one.

The abovementioned finds show that the use of hair moss fibres, and other mosses, in Bronze-Age Scotland should not be treated as completely fanciful. If proved correct, it would be significant because moss fibre, and more specifically hair moss, is only rarely identified in Britain and the neighbouring areas of Europe, although moss has recently been identified in an early Bronze-

Age oak coffin burial from Trindhøj, Denmark¹. As none of the Scottish Bronze Age hair moss fibres have been the subject of rigorous scientific testing, their fibre origins remain dubious. The purpose of this research is to review the Scottish hair moss clothing or shroud claim and carry out fibre identification of the "hair moss apron" from North Cairn Farm in the hope of bringing clarity to this interesting issue.

North Cairn Farm

At North Cairn Farm Mann reported a hank of hair moss fibres made into some kind of garment:

"The fibres were made into skeins or hanks. The hanks were doubled at the middle, where they were knitted together by the same fibres along a twig of pliable tough wood. From this the hanks were hung closely together, making an apron-like object" (Mann 1923, 107).

These were recovered from the edge of a cairn at North Cairn Farm, Corsewall. Henshall later examined the North Cairn Farm find and wrote: "That the moss of which it is formed is in fact *P. commune* is doubtful, for the remains are finer and softer to handle than the other fabrics made of this moss; indeed its whole appearance and texture is different from any other



work. [...] There seem to be small hanks with cross-binding about 3 inches apart" (Henshall 1950, 153).

Technological analysis

The North Cairn Farm artefact was examined by one of the authors (Susanna Harris) at the Glasgow Museums Resource Centre in 2014. On examination it was noted that the North Cairn Farm artefact fits the first part of Henshall's description (1950, 153). The fibres are noticeably soft to the touch, even when wearing latex gloves (Fig. 2). However, the cross-binding (in today's terminology twining or weft twining) described could not be observed anywhere within the mass of fibres, and there is no sign of the twig mentioned by Mann. The find as it is today is best described as a mass of fine, dark grey fibres measuring



Fig. 2. North Cairn Farm fibres, ARCHNN 3170 (© CSG CIC Glasgow Museums Collection).

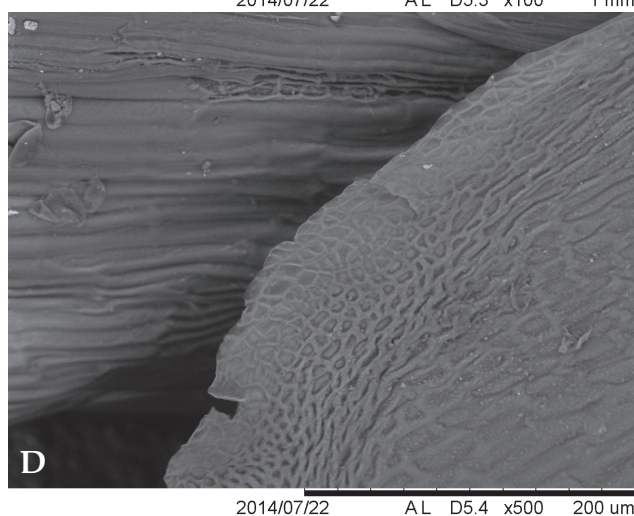
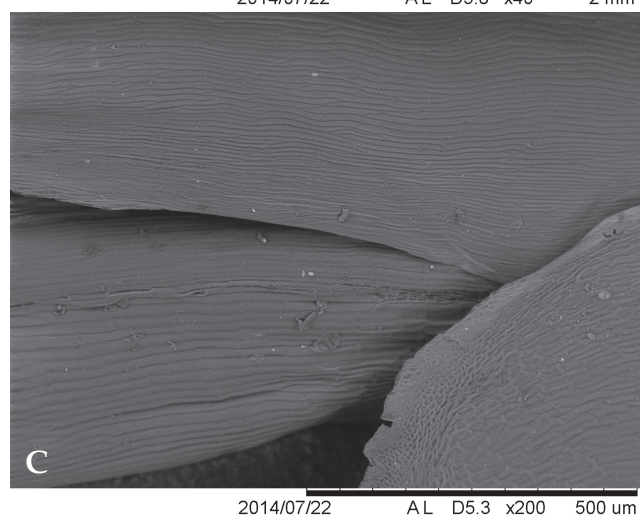
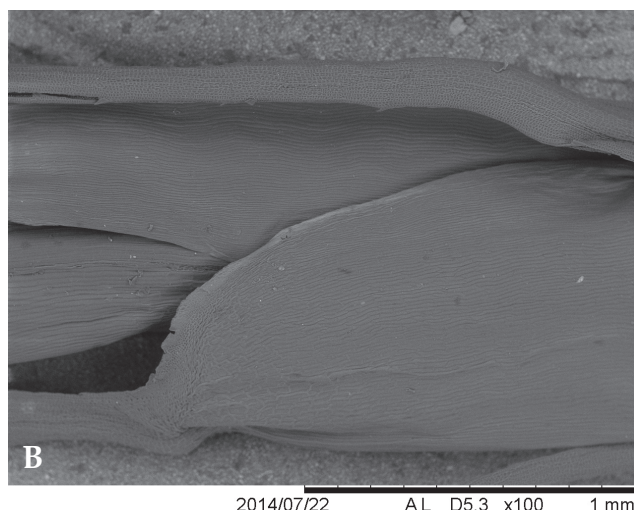
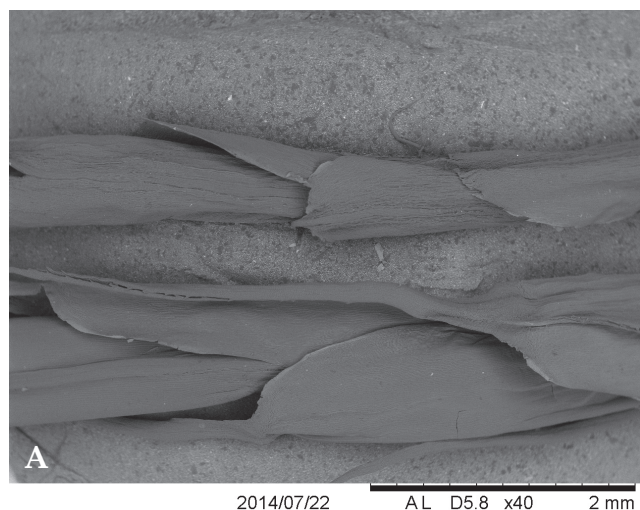


Fig. 3. Reference collection hair moss (*Polytrichum commune*) with leaves attached. Scanning Electron Micrograph at: a) x40 (tip and base), b) x100, c) x200, d) x500. Whole stems of hair moss were gathered from a water-sodden boggy area from the Outer Hebrides, Scotland by Sherry Doyle (Photo: Susanna Harris and Margarita Gleba).

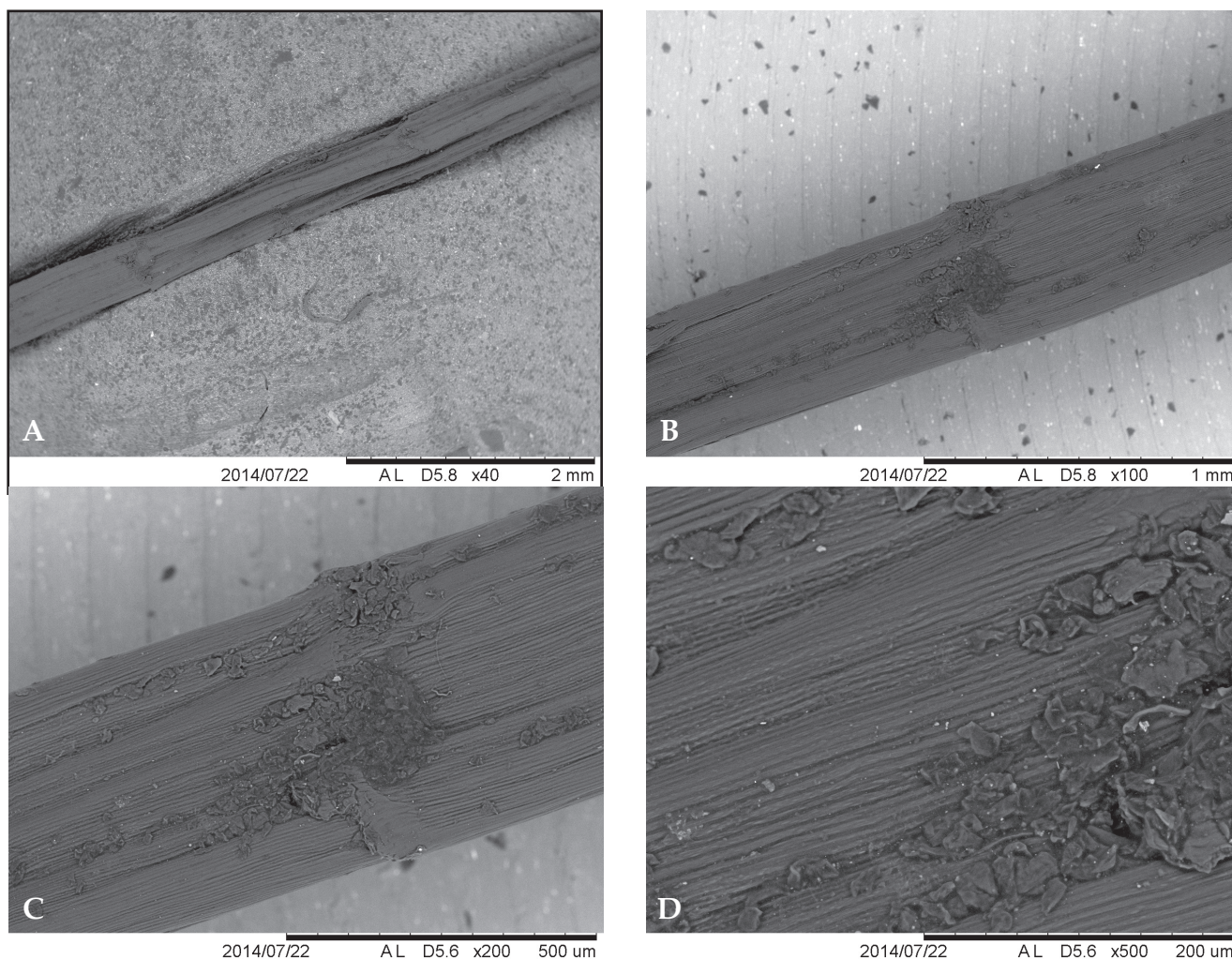


Fig. 4. Reference collection hair moss (*Polytrichum commune*) stripped of leaves. Scanning Electron Micrograph at: a) x40, b) x100, c) x200, d) x500. Whole stems of hair moss were gathered from a water-sodden boggy area from the Outer Hebrides, Scotland by Sherry Doyle (Photo: Susanna Harris and Margarita Gleba).

roughly 24 x 27 cm, coated with a light clay soil with no visible weave structure. At first glance the fibres looked spun, but on closer examination with a low-powered microscope there were bundles of fibre with no determinable s or z twist as would be characteristic of spinning. Two 5 mm samples of the fibres were taken for species identification (ARCHNN 3170.1 and ARCHNN 3170.2).

Fibre identification

The fibres were examined using a Hitachi TM3000 TableTop Scanning Electron Microscope (SEM) at the McDonald Institute for Archaeological Research, University of Cambridge, UK. In preparation, the samples were placed on a metal stub with a carbon tab and no coating was used. The following instrumental settings were used: analytical condition mode at 15.00 kV accelerating voltage, compositional

imaging and working distance of 5-10 mm. The fibres were examined longitudinally for morphological features. The features were compared with Susanna Harris's reference collection of plant and animal fibres, including processed and unprocessed fibres. It includes the standard plant and animal fibres expected for the Bronze Age (flax, nettle, tree bast, wool) and later periods (cotton, hemp, silk) plus hair moss fibre (*Polytrichum commune*) and cotton grass (*Eriophorum angustifolium*). Scanning electron micrographs of hair moss and cotton grass lint from its seed bolls are illustrated in this paper for comparative purposes, as they are not commonly illustrated elsewhere (Figs 3, 4, 5 and 6). These plants are commonly occurring in Scotland today. The cotton grass was collected fresh in the summer in Caithness by Susanna Harris and the hair moss was collected fresh in the summer in the Outer Hebrides by Sherry Doyle. Both samples were

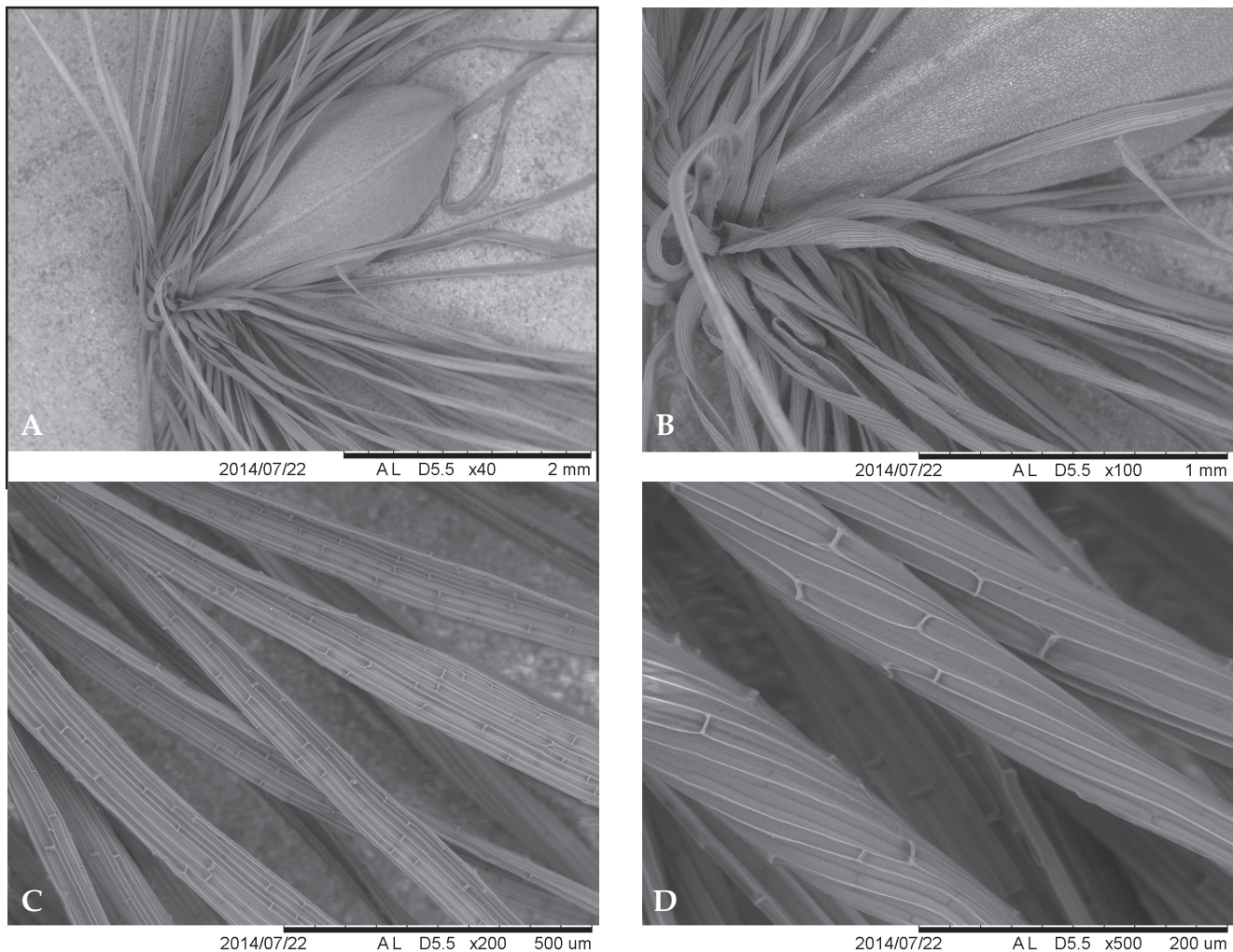


Fig. 5. Reference collection cotton grass lint (*Eriophorum angustifolium*), Scanning Electron Micrograph at: a) x40, b) x100, c) x200, d) x500 gathered in Caithness, Scotland by Susanna Harris (Photo: Susanna Harris and Margarita Gleba).

subsequently air dried. The lint was not processed in any further way. The hair moss fibres are illustrated unprocessed and with the leaves stripped off.

The fibres were covered in fine soil which can be seen by the naked eye and in the SEM micrographs which supports the report that they were dug from the edge of a Bronze Age cairn (Fig. 6). The fibres had none of the characteristics of hair moss fibre: there were no leaves nor scars where the leaves had been removed, and the stem diameter was substantially smaller than that of the reference collection hair moss sample. Five fibre diameters were taken ranging between 14.7 and 15.7 μm , falling uniformly around 15 μm , while the hair moss fibre reference samples have a diameter (stem without leaves) of 455-480 μm . Neither did the fibres have the characteristics of plant bast fibre such as flax or hemp, such as knee-joint dislocations (Catling and Grayson 1982). In addition, no scales were visible

and the fibres had a homogenous diameter along their length, which suggests they are unlikely to be wool. The fibres have some of the angular ridges of cotton, however, they are too long even for mercerised cotton and lack the characteristic twisted ribbon appearance. Therefore, the fibre is neither hair moss, bast nor wool and is also unlikely to be cotton.

This leads to the possibility that the fibres are silk or artificial. Artificial fibres first appeared in the 1920s, so the discovery date allows this possibility. The fibres are flattish, with a slight turn and ridges, and a somewhat triangular cross-section. They are irregular, pointing to a natural, rather than synthetic fibre with roughly eight fibres in a bundle. The bundles and 15 μm diameter is not unusual for silk, and they do not have the regular longitudinal striations or ridges characteristic for artificial fibres. The results of the SEM analysis suggest with high confidence the fibre is silk.

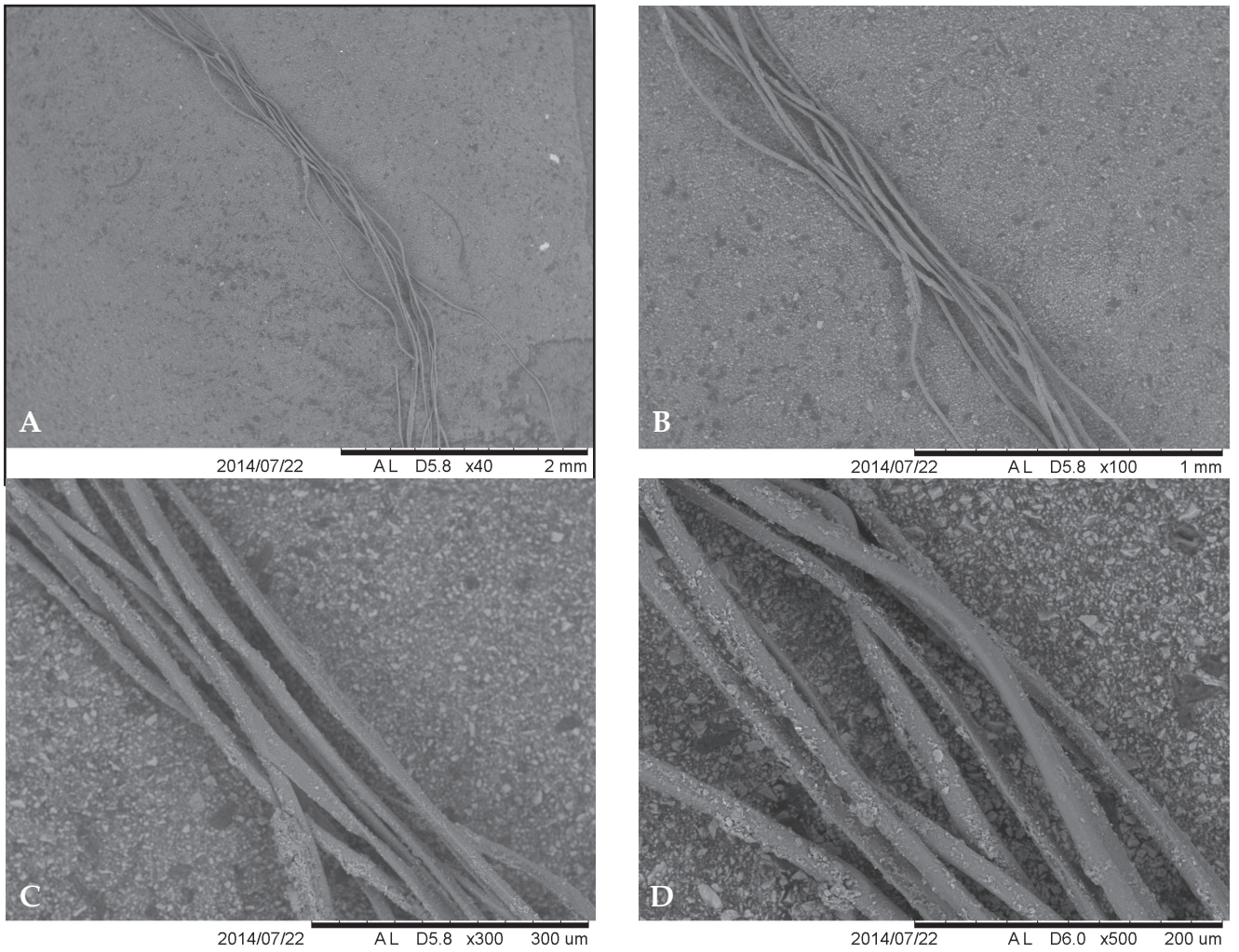


Fig. 6. North Cairn Farm fibres (Glasgow Museums, ARCHNN.3170.1) identified as most likely silk. Scanning Electron Micrograph at: a) x40, b) x100, c) x300 and d) x500 (Photo: Margarita Gleba, published with permission of Culture and Sport Glasgow, Glasgow Museums).



Fig. 7. North Cairn Farm fibres (Glasgow Museums, ARCHNN.3170.1) Scanning Electron Micrograph at x1000, with view of fibre transverse cross section (Photo: Margarita Gleba, published with permission of Culture and Sport Glasgow, Glasgow Museums).

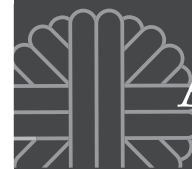


Fig. 8. Human tibia with dark, friable organic remains from Ferniegair burial, Hamilton (Glasgow Museums, ARCHNN.1802). Some areas retain the structure of coarse plant stems or fibre bundles (Photo: Susanna Harris, published with permission of Culture and Sport Glasgow, Glasgow Museums).

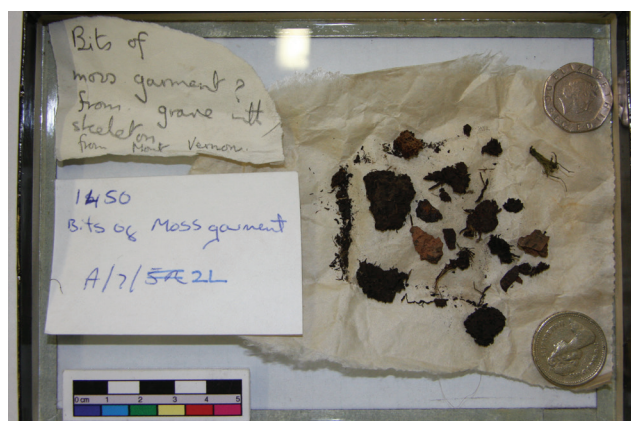


Fig. 9. Compressed organic material with hand written notes from Greenoakhill, Glasgow. Coins are used to weigh down the paper (Glasgow Museums, ARCHNN.1450) (Photo: Susanna Harris, published with permission of Culture and Sport Glasgow, Glasgow Museums).

This is supported by the impression of the fibres in the visual analysis, which on closer examination turned out to be fibre bundles – this is also a characteristic of silk.

Contextualisation

Silk was not known in Europe until the Roman period and earlier reports of silk finds have been discredited on scientific grounds (Bender Jørgensen 2013). The identification of the North Cairn Farm fibres as silk casts serious doubt on the antiquity of this find. There is additional doubt as to their origin. First, the find was dug up at the edge of a cairn by a farmer and therefore lacks secure context. Confusingly, Mann reports the find spot as North Cairn Farm near Corsewall, but it is archived as Stoneykirk. Mann was also secretive about his find spots. The Glasgow museums ARCHNN number is given to those finds whose provenance is uncertain, although they clearly belong to the Mann collection². It seems odd that the twining that Henshall mentioned was not observed by the current author. This suggests that some of the find is missing (including the twig attached to the fibres reported by Mann), and that this is a different artefact from that observed by Henshall, or that she was wrong. This is curious as the first half of Henshall's observations are valid and there is no reason to doubt them.

Ferniegair and Greenoakhill

The “Shroud of moss fibres with fragments of bone from Ferniegair burial” (Fig. 8) and the “Moss fragments” from Greenoakhill, Glasgow (Fig. 9) were examined by one of the authors (Susanna Harris) at the Glasgow Museums Resource Centre in 2009. Both come from inhumations with Food Vessel pottery; the overall date range for this pottery type in Scotland is 2140-1520 cal BC (Sheridan 2004, 249). At the time, neither was deemed appropriate for fibre analysis, and the Ferniegair find, likely made of a plant material, possibly coarse stems, was judged too friable and immobilised with an adhesive to be suitable for microscopic fibre analysis. Chemical methods have been developed for treating this type of immobilised fibrous artefact prior to microscopic analysis. These are most likely to aid only in the differentiation of plant and animal fibres, which in this case seems most likely to be plant material. As reported above, both Henshall and Welfare doubted the hair moss interpretations of these finds (Table 1). One of the authors (Susanna Harris) agrees that it seems unlikely that the Ferniegair fibres are hair moss, as even in their friable, immobilised state the organic matter resembles coarse plant stems rather than hair moss. The Ferniegair find is similar in context to the reported basketry from Langwell Farm Cist (Lelong 2009, 12, pl. 2). The right fibula of the human bone from this burial is dated 2200-1960 cal BC



(SUERC-24680, 3690±35, 2σ 95.4% 2200-1960 cal BC) (Lelong *et al.*, in press). However, the disturbance of the Langwell Farm cist shortly after its discovery has precluded scientific analysis of this possible basketry material. The accessioned item from Greenoakhill does not clearly relate to Mann's description and no weave structure was observed; on reflection the Greenoakhill remains could be matted plant fibres used as packing and, given their unconsolidated state, a fibre identification would be judicious.

Conclusion

The idea of Bronze Age hair moss (*Polytrichum commune*) garments and shrouds in Scotland originates from Ludovic McLellan Mann's reports and archive notes written in the early 20th century. His identification of hair moss was conducted in an era before scientific fibre analysis became common in Britain. The results of the SEM fibre analysis presented here suggest the North Cairn Farm fibrous bundle, referred to as an apron, is made of silk. The poor context and identification of silk lead to the conclusion that the North Cairn Farm "apron" is highly unlikely to be of Bronze Age date. If the museum wishes to pursue this issue, the fibres could be radiocarbon-dated. That hair moss was used as a fibre or plant matting material in Bronze Age Scotland remains unproven, but its identification in two hats dating to the Roman period, one in northern England the other in southern Scotland, and as rope in the Bronze Age boat from Ferriby in northern England leaves it as a distinct possibility. That other mosses were used as caulking in Boat No. 3 from North Ferriby (*Neckera complanata*, *Eurhynchium striata*), plus evidence that sphagnum moss (*Sphagnum sp.*) may have been used as a packing or padding material in early Bronze Age funerary contexts as identified through pollen adds further interest to this subject matter. Fibre analyses of other reported hair moss finds and indeed systematic fibre analysis of new finds may clarify the issue. In the meantime, old references to hair moss in the Bronze Age in Scotland should be treated with caution until there is a conclusive fibre analysis of this plant species from a secure context.

Notes

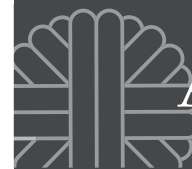
1. Personal comment by Ulla Mannering. The find is listed in Bender Jørgensen 1986, 188, no. 69, but the moss is not mentioned.
2. Personal comment by Jane Flint 29.05.14.

Acknowledgements

Thanks to Katinka Dalglish for the photograph of the North Cairn Farm fibres, Jane Flint for organising access to the archive and helping with sample permissions, Sherry Doyle for collecting the hair moss reference samples, Caroline Cartwright for advice on reference collections, Pippa White for proof reading and the useful comments of Ulla Mannering, Ben Roberts and two anonymous reviewers.

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