A piece of old tartan found in Glen Affric

Introduction

In the mid-1980s the Scottish Tartans Society (STS), now The Scottish Tartans Authority (STA), was donated a piece of tartan that had been found, buried in peat, during forestry work in Glen Affric, west of Inverness (Figure 1). Glen Affric is in a remote part of Inverness-shire is approximately 20km long and runs from Cannich to Alltbeith. No body or other artefacts associated with the find were reported at the time and unfortunately, details of where it was found, when and by whom are not recorded in the STS records.

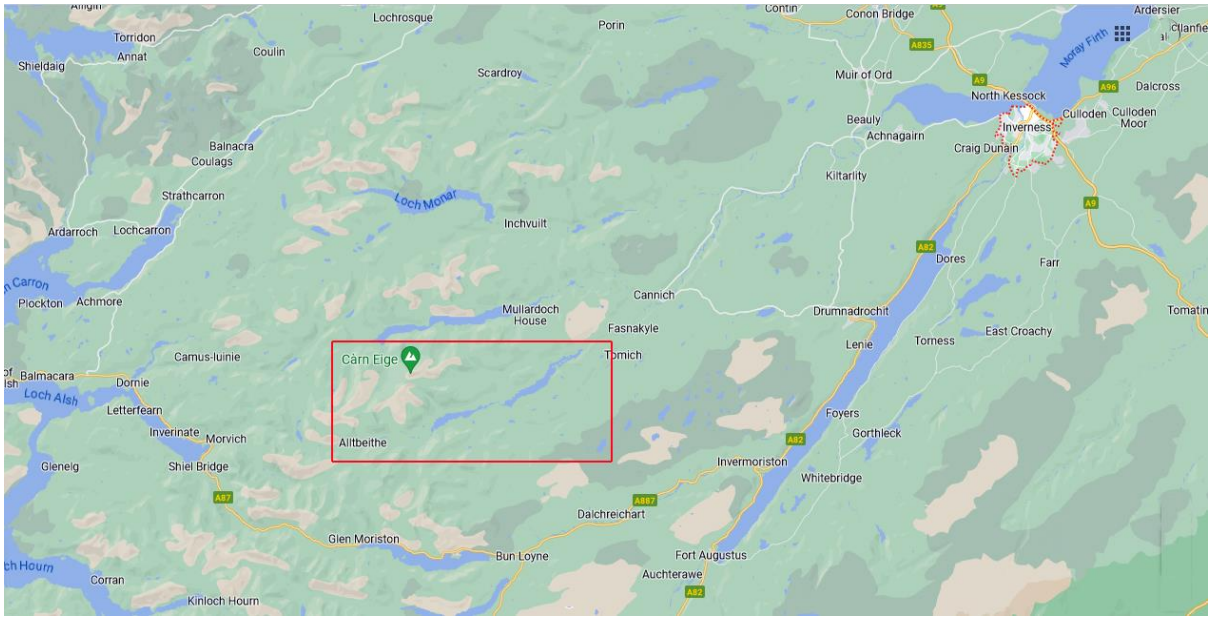

Figure 1. The position of Glen Affric relative to Inverness. Source. Google Maps.

Glen Affric is one of a group of glens that have traditionally been important routes from the west to the east. It had been thought (Mather, cited in Wordsworth 1995. p.3) that permanent human settlements were not established until the end of the 17th century.[i] However, later fieldwork revealed an extensive prehistoric roundhouse settlement at the east end of Glenstrathfarrar (Harden and Spencer-Nairn, cited in Wordsworth 1995, p.3). Wordsworth (1995) concluded 'that it seems reasonable that a similar expansion was taking place in the neighbouring glens of Cannich and Affric'.[ii] Glen Affric is a remote area that was controlled by Clan Chisholm; however, other families would have lived there too, for example, Rent rolls for 1687 and describes how land was let as shielings to men from Kintail (Fraser-MacKintosh, cited in Wordsworth 1995, p.3).

The pattern of the tartan has no obvious similarity with any known tartan and, in particular, no clan tartan which were an early 19th century development.

The author had long believed that the fragment could be a rare surviving example of a pre-1700 tartan in Scotland (Figure 2). Such specimens are rare, in part because clothes were sometimes reused to the point of destruction, and the fact that ground conditions in most of Scotland are not conducive to the preservation of buried woollen textiles. There is one older specimen of tartan-like cloth found in Scotland, the so-called Falkirk Tartan, but it is a simple two-colour check woven with undyed yarns in two natural fleece colours. It does not correspond to what many people would think of as tartan a pattern comprising multiple lines of differing proportions and involving the use two or more dyed colours. Previous dye analysis of Scottish tartans concentrated on specimens from the 18th early and 19th centuries (Cheape,

2008 p.2).[iii] In preparation for the fragment being loaned to the V&A Dundee for their exhibition 'Tartan' in 2023, The Scottish Tartans Authority (STA) commissioned dye analysis which was conducted by Lore Troalen and Edith Sandström, National Museum of Scotland Laboratory (NMS), Edinburgh. to identify the dyes involved.

Figure 2. Piece of tartan found in Glen Affric and donated to the Scottish Tartans Society.
Photo: The Author

Description

The fragment measures 55 cms x 43 cms. It has three ragged sides and one side which includes sections of a selvedge with some whipped-stitch binding, thread (Figure 3). When the fragment was in the care of the STS in the 1980s it was rinsed in cold water in order to remove the majority of the peat residue, however some minor contaminants have remained. It was then backed onto an inert material to stabilise it.

Figure 3. Selvedge (rotated to fit text) with whip-stitched binding yarn. Photo: The Author

At some point two or three small sections were cut from the piece post-find (Figure 4). It is not known when, why or by whom it was done, but it happened well before any analysis was conducted.

Figure 4. The specimen with the cut sections highlighted. Photo: The Author

The material was woven in a 2/2 staggered twill at 10 threads per cm using unplied z-spun yarn in both warp and weft. The exception is the selvedge binding thread which is a two-ply yarn, z-spun and with an s-twist (Figure 5). Spinning wheels were not in general use in the Highlands until the 18th century, and the distaff or drop spindle (Figure 6) was still in use in the west until the mid-19th century (Gauldie, 1995 p.10).[iv] The cloth is loose and open when compared with the majority of early surviving examples of tartan (Figure 7). The majority of these examples date to the first half of the 18th century. They are much more tightly spun and woven, and are often highly coloured, for example: the specimen that was spun, dyed and woven c.1740 by a Rankin from Glencoe (Figure 8).

Figure 5. Detail showing the two-ply selvedge binding yarn. Photo: National Museums Scotland.

Figure 6. Spinning with *a* Dealgan (drop spindle without a whorl) in South Uist in the early C20th.
Photo: National Trust for Scotland, Canna House

Figure 7. Detail showing the spinning and lose 2/2 weave. Photo: National Museums Scotland.

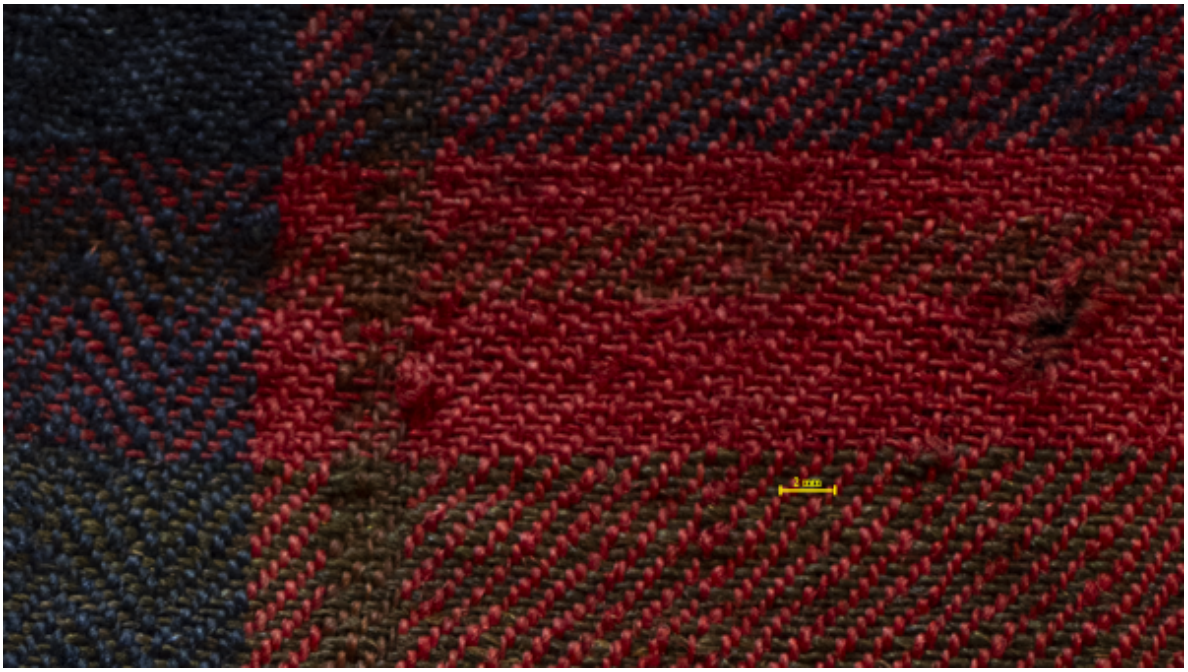

Figure 8. Example of a tightly spun and woven tartan from c.1740. Photo: EF Williams.

Dye Analysis

Despite the extensive staining as a result of being buried in peat, there is an obvious pattern of narrow green and brown/black stripes overlaid on a ground of one, possibly two, colours. In addition to the green and brown/black stripes, a visual inspection of the cloth identified what appeared to be areas of red, plus a lighter yellow section that could have been dyed, or was possibly originally a natural undyed white but now stained with peat. Dye analysis was carried out on 8 samples, 2 of each colour from different sections of the cloth (Figure 9).

Figure 9. Sampling locations of the eight samples collected. Photo: National Museums Scotland.

In summary, the report noted that: 'Despite different extraction strategies, only indigo in the green samples could be characterised. The lack of result for the other samples are likely due to external contamination, low dyestuff concentration present. The fibres could also have been undyed but low preservation of dyestuffs and high contamination concentration are more likely since a colour difference could be seen'.[v] Examples of the four colours photographed using a Keyence digital-microscope are shown in Figure 10. In summary the results are:

- Green - Indigotin[vi] from woad or indigo + an unidentified yellow source.
- Red - Unidentified source.
- Yellow - Unidentified source, but possibly natural fleece colour.
- Brown - Probable natural fleece colour.

The NMS report commented that 'Woad and indigo have identical chemical fingerprints, so it is not possible to determine if woad or indigo was used.' There is no traditional natural dyestuff which can produce a green and therefore this colour was always been achieved by using a natural yellow dye and then over dyeing with a natural blue dye. Indigo was the source of all blues in 18th century early 19th century tartans examined (Quye 1991, p17-21).

From the dye analysis, it is no surprise that an indigotin was the source of the blue, it was the only practical blue dye source available in Scotland at the time (Grierson 1983 p.63).[vii] The NMS report stated that 'based on the location of the find and the tartan design, woad was likely the source of the blue colour used.' However, this assumes that the location of the find is roughly the same area where the textile was made. As woad and indigo have identical chemical fingerprints it is not possible to determine which was used, nor where it was dyed. Although woad is often associated with the indigenous tribes in Scotland during the time of

the Roman occupation, c.71-410 CE,[viii] records of its early use are wanting. By the early 16th century woad was being imported in large quantities from Holland (Grierson 1983, p.6), and by 1580 the best quality woad was said to come from Spain (Grierson 1983, p.7). Indigo was a later import into Scotland; an early reference was a mention in a letter of the Guildry of Glasgow in 1603 (Grierson 1983 p.210). Whilst it is disappointing that the other dye(s) could not be identified beyond a probably red and yellow, it is noteworthy that there was no evidence of the use of either imported hardwood dyes or artificial. This reinforces a likely pre-1750 date for the textile as they are post 1743 (Indigo Carmine or Saxon Blue),[ix] and 1856 (Perkins Purple)[x] respectively.

Figure 10. Examples of the four colour yarns tested. Clockwise: Green; Red; Brown; and Yellow.
Photo: National Museums Scotland.

Scanning Electron Microscope imaging was undertaken to establish whether there were any differences in fibre appearance between the binding thread and the fibres of the rest of the tartan. Both the binding thread and a red sample fibre show the typical morphology expected for wool fibres. The red fibres showed signs of breakage in several places, possibly a sign of its brittleness in comparison to the binding thread. The binding thread fibres were in average 25-35 µm (micrometre) in diameter in comparison to the red sample fibres which were found to be 35-45 µm in diameter' (Fig 11). This difference may also reflect the plied nature of the binding thread meaning it would have been stronger than the yarn in the textile body and better able to withstand the pulling of the assumed joined sections.

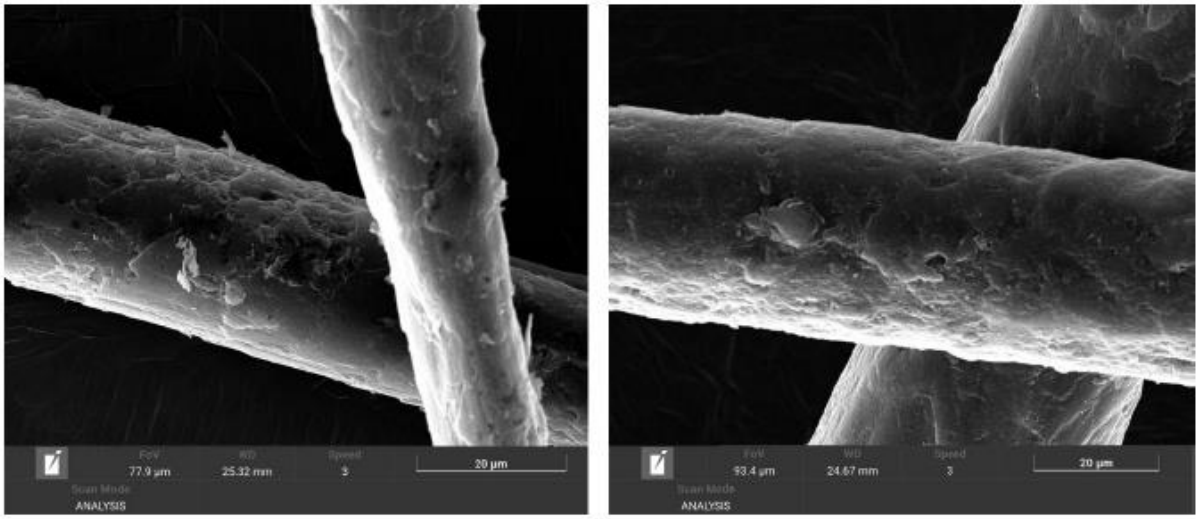

Figure 11. Left: SEM-SEI micrograph of binding thread fibres. Right: SEM-SEI micrograph of fibres from a red sample. Photo: National Museums Scotland.

Carbon 14 Testing[xi]

Following the dye analysis, the Scottish Universities Environmental Centre Radiocarbon Laboratory (SUECR) was commissioned to conduct Carbon 14 testing in order to date the piece. The work was conducted by E. Dunbar and Dr Brian Tripney in early 2023. Carbon testing is a destructive process that requires a small section of the material to be sacrificed.[xii] In order to maintain the integrity of the majority of the specimen, a small section, approx. 2.5 x 3 cms, was removed, by the laboratory, adjacent to one of the areas that had previously been cut (Figure 12).

Figure 12. Removal of test piece for Carbon 14 testing. Photo: The Author

Over a period of twelve weeks the sample was soaked in alkaline and acid solutions to remove the peat staining and residue that would have affected the results. Once stabilised, the sample was heated to destruction allowing the carbon to be measured. The results[xiii] identified a date range of 1500-1625 with a 95.4% probability of the period being 1500-1600, with the principal peak being 1522, and a secondary peak of 1625 as demonstrated below in Figure 13. This

date range is significant. Apart from the Falkirk Tartan/Check mentioned earlier, the oldest surviving examples of checks previously identified in Scotland all date to the 17th and early 18th century, (A. Henshell, p.22-26).[xiv] The Glen Affric specimen is therefore older than other early tartans from bog finds and a unique example dating to the 16th century.

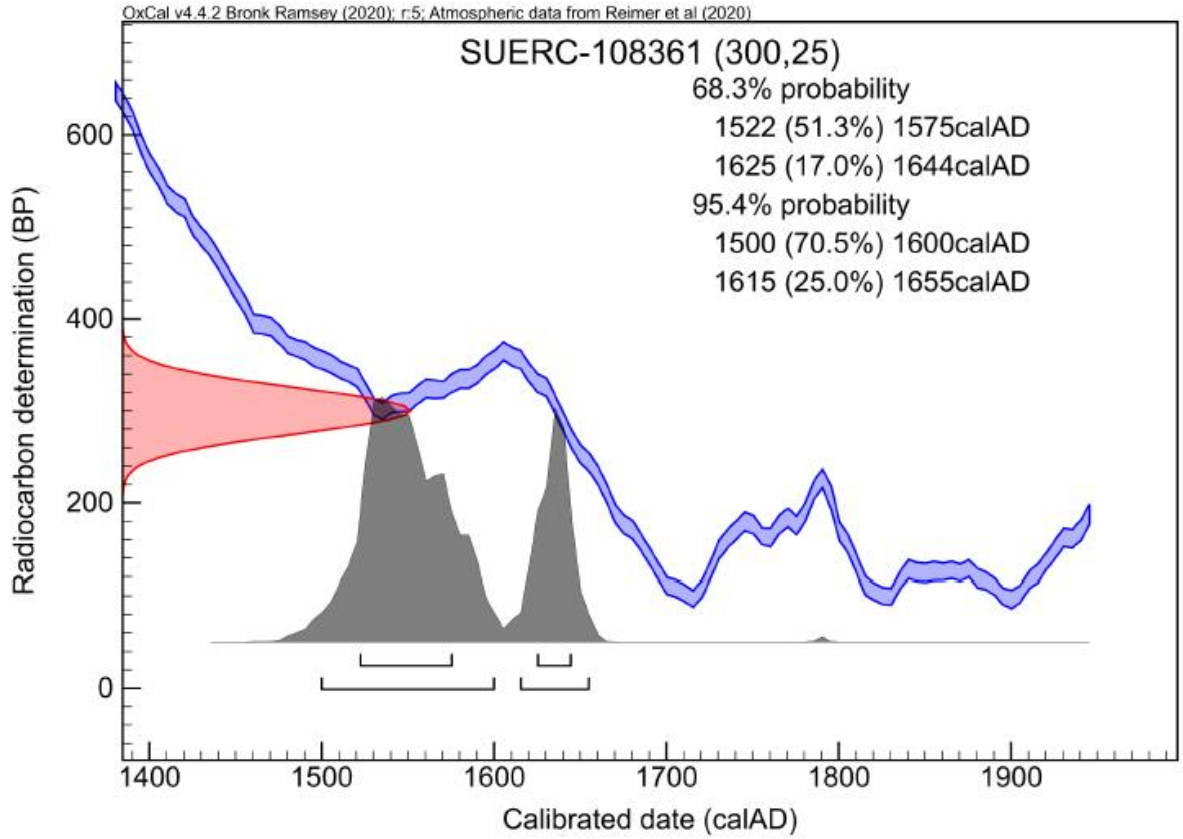

Figure 13. Radiocarbon date calibration of the tartan fragment. Source: E. Dunbar], SUERC-108361 (GU62858), (06 February 2023)

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There are inconsistencies in the size of the green overstripes and their spacing on the ground colour or colours in both the warp and weft. The irregularity in the size and arrangement of the stripes may have been due to a lack of attention to detail in both the warping, the measuring of the yarn, and then the actual weaving itself. It may also reflect a piece produced by a less experienced weaver. To aide understanding, the pattern has been corrected to allow the reader to gain an overview of the design, it does not necessarily show the original ground colour(s). If the presence of red and yellow in the ground colours is assumed, then there are a number of possible reconstructions but the lack of visual clarity or supporting definitive dye analysis means that they are speculative; the most plausible reconstruction is presented below in Figure 14. Equally, some, or none of these colours may have been used in the original and it could have been a natural (undyed) background with overstripes of dyed yarn as shown in Figure 15. Irrespective of what the ground colours may or may not have been, the pattern or sett, is unlike any traditional tartan associated with 18th and 19th century designs. These often have a larger and more defined pattern of ground colours and overstripes. In historical terms, there is a broad similarity in the structure of the pattern with that from the dress of the Huldremose Woman, a Danish Bog burial from the 2nd millennium B.C. (Figure 16), or the tartan in the plaid worn by Lord Duffus, 1715 (Figure 17).

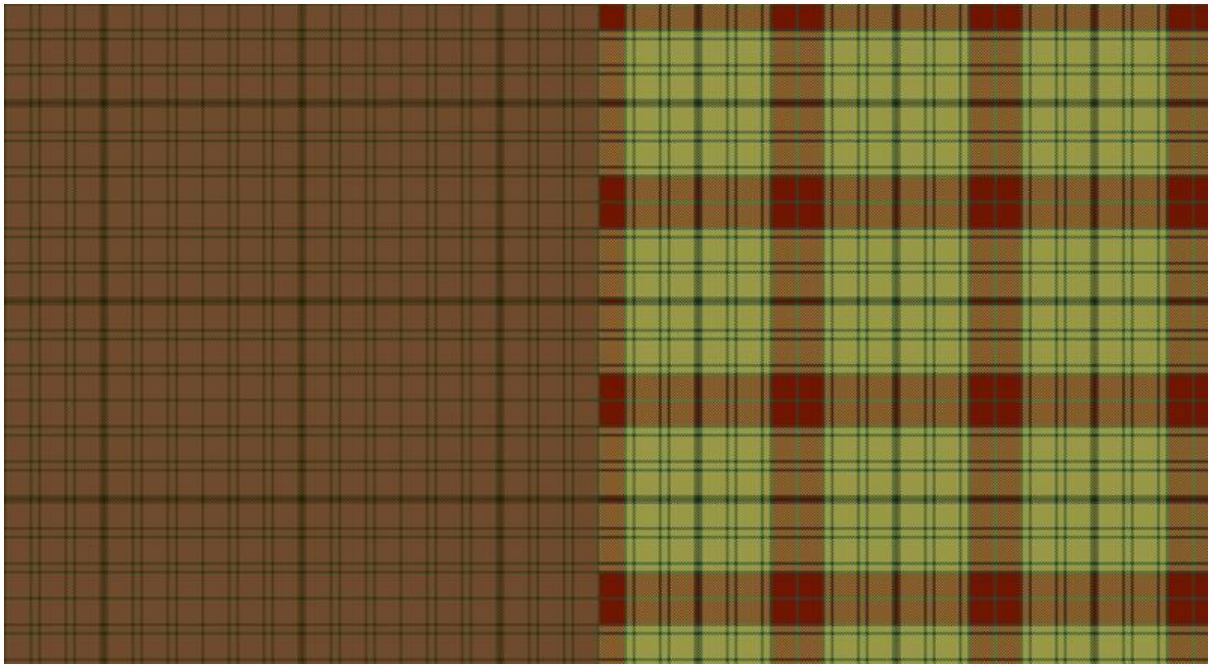

Figure 14. Graphic showing the arrangement of green and black/brown overstripes on the current ground together with a possible setting with the speculative red and yellow ground colours.
Image: The Author, March 2023

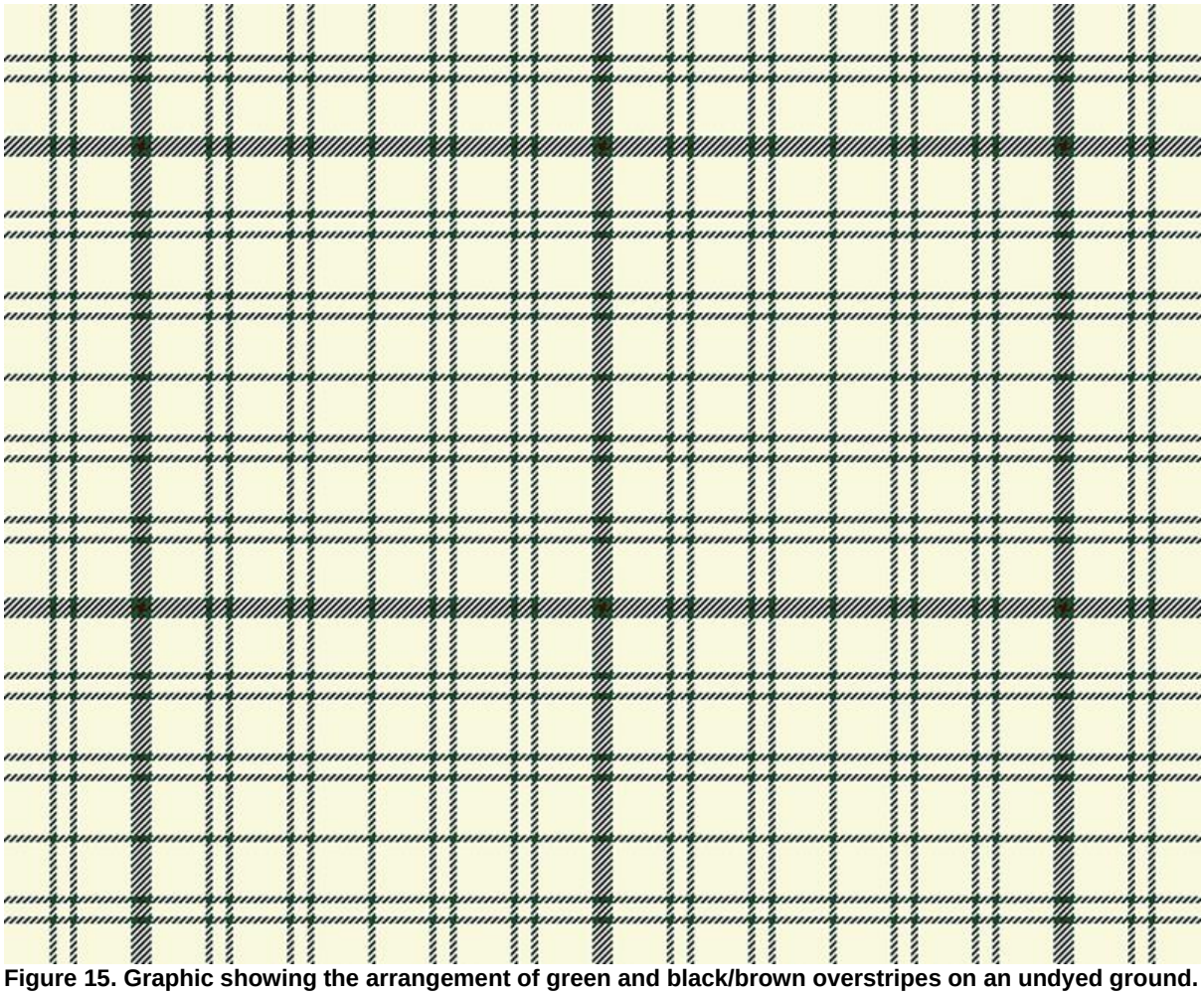

Figure 15. Graphic showing the arrangement of green and black/brown overstripes on an undyed ground.
Image: The Author, March 2023

Figure 16. Huldremose Woman's clothes with a similar pattern to that in the Glen Affric specimen
Photo: The National Museum of Denmark

Figure 17. Kenneth Sutherland, 3rd Lord Duffus, Richard Waitt c.1715.
Photo: Scottish National Portrait Gallery

Conclusion

The results of the Carbon dating demonstrate that the specimen is pre-1700. The date range 1500-1655 is quite broad but the peaks refine the date to a likely point in the first half of the 16th century (1500-1600). It can be shown to pre-date the majority of surviving early specimens of tartan by many decades and possibly more than a century. It is therefore a piece of national importance and historical significance. Whilst the so-called Falkirk tartan is much older, the Glen Affric specimen is arguably the oldest piece of what can be described as 'true tartan' found in Scotland. The principal difference between the two being that the Falkirk specimen is a simple two-colour check woven with un-dyed natural coloured yarn; whereas the Glen Affric specimen is a complex pattern woven with a number of different coloured dyed yarns. It is therefore more readily recognisable as a tartan rather than a check. Due to the incomplete dye analysis an accurate reconstruction of the pattern is not possible but a conceivable arrangement is at Figure 18, the exact shades are speculative.

There is no record of a body associated with the burial and it is unclear whether this was the result of a deliberate act or accidental loss. The shape of the specimen suggests that it was cut from a larger piece, and the whip-stitch binding thread indicates that this may have part of a joined plaid or similar garment, such as a mantle. Alternatively, the material may have been used in the woven, unjoined, width and the two-ply whip-stitch may have been used to reinforce the selvedge. The lack of a second selvedge means that it is impossible to determine which was the case and thus, how the material was used.

Whilst Glen Affric is traditionally associated with the Chisholms, other families are known to have lived in the area too. It was also an important transit route between Glen Shiel in west to the Great Glen/Loch Ness in the west. There is no way of knowing if this fragment was connected with anyone of the name Chisholm, or indeed anyone from the glen and it could equally have belonged to someone passing through. Having no definitive name or clan association, the pattern is therefore recorded in the records of The Scottish Tartans Authority simply as an 'Unnamed 16th century tartan found in Glen Affric'.

Figure 18. Speculative reconstruction of the original tartan. Photo: The Author

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[ii] **WORDSWORTH J.** 1995
[iii] **CHEAPE, H** *Tartans, dye analysis and Highland dress*. Scottish Government 2008
[iv] **GAULDIE, E** *Scotland's Past In Action – Spinning and Weaving*. National Museums of Scotland 1995
[v] AR 2022-12 Dye analysis, Scottish Tartan Authority-combined dated 23 January 2023. Accessed 07 Feb 23.
[vi] Indigotin is the crystalline compound in indigo which produces the blue colour when the textile is exposed to the air due to a reaction with oxygen.
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