

Sunniva Wilberg Halvorsen

# Dates and Dyes - New test results for the finds from Tegle and Helgeland, Norway

The two Norwegian peat bog textile finds from Tegle and Helgeland have recently received new attention, as they have been the focus of my MA thesis (Halvorsen 2008, forthcoming) and have been included in research by The Danish National Research Foundation's Centre for Textile Research on the Danish bog textiles. The finds have been re-investigated including tests for fiber quality, strontium isotopic tracing, dye analyses and <sup>14</sup>C dating. This article will present the results of the <sup>14</sup>C dating and of the dye analyses.

Textiles from peat bogs are very rare finds in a Norwegian archaeological context. Not only are these two finds exceptional being in such a good state of preservation, but they are also the only Early Iron Age peat bog textiles found in Norway.

Tegle and Helgeland are located in the south-western region of Norway and the textiles were found in 1921 and the 1930s respectively. The Tegle find consists of a textile bag (Fig. 1), which contained a prepared warp (Fig. 2), several different bundles of yarn, raw wool, a sprang tube, a twill textile fragment and a



Fig. 1. The bag from the Tegle find and some of its contents. © Arkeologisk Museum in Stavanger, Norway.

tablet-woven fringe. It is a combination of new and unfinished items with worn and fragmentary items. The find is frequently referred to when the use of the warp-weighted loom is discussed, because of the unique warp and the presence of several tablet woven starting and finishing boarders (e.g. Hoffmann 1964). The Helgeland find consists of several textile fragments, raw wool and some human hair. The items presently listed as belonging to this find were found during the period of 1929-1932 from varying parts of the bog. Already in the beginning of the 1900s textiles were reported but they were all discarded. The most spectacular item in this find is a well preserved, long and wide tablet-woven band (Fig. 3). Several of the textile fragments have seams that indicate they were originally parts of garments. The preserved textiles from both Tegle and Helgeland are all made of wool.

## <sup>14</sup>C Dating

The <sup>14</sup>C dating was carried out by the laboratory for radiological dating at NTNU in Trondheim, Norway (Table 1). Pål Svanem at the NTNU lab has developed a method for cleaning archaeological textiles that have been treated with conservation substances. It is known that the Tegle textiles were conserved with modocol; there are no records of what was done to the Helgeland textiles. The dating of the Tegle and Helgeland finds was carried out partly in order to test the new cleaning method, and it gives great hope for the dating of other museum collection textiles that have endured early experimental textile conservation methods.

The Tegle find is a closed find. It consists of several items, all of them found inside a textile bag (Fig. 1), and hence deposited together at the same time, though there is no doubt that some of the fragments were old and used when deposited. Only one sample, taken from some of the loose threads in the find, was used to date it. The Tegle find had the <sup>14</sup>C date of 1560 +/- 25 years BP. Calibrated, this gives a date AD

445-545 (68.2% probability (1 sigma)).

The first person to investigate the Tegle find was Hans Dedekam (1924), a pioneer in the research of prehistoric textiles in Norway. In addition to his technical and interpretive analysis of the find, he also proposed a dating of the textiles to “the 3rd or 4th century AD” (Dedekam 1924, 25). The dating was based on comparative finds from the Danish and North German bogs. Later, Bjørn Hougen dated the Tegle find to the Migration period, AD 400-600 (Hougen 1933, 73). This dating was based on the comparison with the Helgeland textiles and his

wide knowledge of prehistoric textiles from graves in Norway (Hougen 1935). The 14C dating of the Tegle textiles has now proved Hougen’s interpretation to be reliable and placed the find securely in the Migration Period, which in Norway belongs to the last part of Early Iron Age (Solberg 2003, 128).

The preserved textile fragments from Helgeland were collected within a 20 x 1 m area. This poses some important problems for the dating of the find, as we do not know whether all textiles were deposited at the same time, the duration of time span during which they were deposited, or how the fragments relate to



**Fig. 2. The warp from the Tegle find. © Arkeologisk Museum in Stavanger, Norway.**

each other. This means that the date of one fragment cannot be applied to the whole find. On the other hand, as the vast number of fragments could not be dated, two samples were selected as representative of the find. One was taken from the B-group of the broad tablet-woven band (Fig. 3), and another from the D-group of 2/2 twill fragments. The B-sample was 14C dated to 1595 ± 25 years BP. Calibrated, this gives the date AD 425-535 (68.2% probability (1 sigma)). The D-sample was 14C dated to 1590 ± 25 years BP, and calibrated to AD 430-535 (68.2% probability (1 sigma)). The difference of only five years between



**Fig. 3. One of several fragments of the broad tablet-woven band from the Helgeland find. © Arkeologisk Museum in Stavanger, Norway.**

Find	<sup>14</sup> C date	Calibrated date
Tegle	1560±25BP	AD 445-545
Helgeland B	1595±25BP	AD 425-535
Helgeland D	1590±25BP	AD 430-535

**Table 1. <sup>14</sup>C dates of the Tegle and Helgeland finds.**

the two samples indicates that they were probably deposited within a rather short time span.

Already in 1933, Bjørn Hougen dated the Helgeland find to the Migration Period (Hougen 1933). The <sup>14</sup>C dating supports his interpretation. An interesting aspect of this <sup>14</sup>C dating is the placing of the technique of the broad tablet-woven band within the Early Iron Age tablet weaving tradition. It combines the broad, simple band-weaving known from Roman Iron Age, with the more advanced patterning techniques common during the following Migration Period.

### Dyes

Samples from the Tegle and Helgeland finds have been tested for traces of natural organic dyes by Ina Vanden Berghe at the Royal Institute for Cultural Heritage in Belgium, and the information presented here is based on her analytical report (Vanden Berghe 2008; also cf. Vanden Berghe et al. 2009). The amount of dyes left in prehistoric fibres is generally very low, so the results presented here are based on trace amounts of dyes. Some dyes are better preserved than others. This means that we cannot exclude that textiles with no dyes detected have not been dyed originally.

As can be seen from Table 2, no dyes were detected in the sample taken from a warp thread belonging to the Tegle warp. Neither were dyes detected in samples from the sprang tube, the warp threads of the woven bag, or in the bundles of thick yarn. On the other hand, traces of dyes were found in a fragment of a fine twill, and in the long tablet-woven fringe. A sample from the warp in the twill fragment contained alizarin and indigotin. The weft in the twill fabric was not tested. The sample from the warp thread in the tablet-woven fringe tested positive for alizarin and indigotin. The weft thread which creates the fringes, contained alizarin and traces of purpurin. The combination of indigotin and alizarin indicates that the warp threads in the table-woven band were probably purple.

Three samples were selected from the Helgeland textiles. One was taken from group C, containing twill fragments with hemmed edges that possibly come from a garment. This sample tested positive for indigotin. Two other samples were taken from

the broad tablet-woven band. The sample belonging to the ground weave of the band contained luteolin, quercetin and a trace of apigenin. The sample from the pattern weave contained luteolin and a luteolin-like component. The dye sources of these components are all related to yellow dyes.

The possible yellow dye sources include weld, saw-wort, dyers broom or chamomile. Woad is the most likely source for blue indigotin in Scandinavia during the Early Iron Age. Both alizarin and purpurin indicate a red dye. Local dye plants that could give a red dye would have had purpurin as its main indicator. A dominance of alizarin on the other hand, indicates a madder-type dye. Madder and woad were probably import products during the Migration Period in Norway, either as dyes or in dyed textiles.

### Conclusion

The three new <sup>14</sup>C dates place the Tegle and Helgeland finds within the Norwegian Migration period, AD 400-575.

The Tegle items assembled in a coarsely woven and sewn bag show a wide variety of textile objects in different stages of completion and qualities. The unfinished products, such as bundles of yarn, are made of a rather thick and unevenly spun yarn, while the worn textile fragments are relatively fine. The latter include the tablet-woven fringe and the twill fragment, which the test results show were dyed with woad and a madder-like dye. The dye test results also show that the tablet-woven band was purple with red fringes, and that the twill textile was purple. The twill textile was definitely worn out before it was put in the bag, and the fringe still has some loose sewing threads which indicate that it had been attached to another object or garment. The dye combination of indigotin and alizarin in these two items, and their shared high quality, indicates that they might have belonged together. The dye combination is very special compared to any of the other fragments included in the test (Vanden Berghe 2008, 8). In an earlier study of Norwegian and Danish Iron Age textiles, including textiles from some of the wealthy chieftain graves from this period, Walton identified madder-like dye in the textiles from particularly rich burials at Veiem, Snartemo V and Evebø-Eide in Norway (Walton 1988,

Object ID	Sample ID	Warp / Weft	Sample Description	HPLC-DAD Detected Dye components	Applied extraction(s)
<b>Tegle, Norway (AD 445-545)</b>					
S4850(1)	189	warp	medium brown	no dyes detected	1
S4850(2)	190	warp	reddish brown	alizarin and indigotin	1
S4850(2)	191	weft	reddish brown	alizarin and trace of purpurin	1
S4850(3)	192	warp	dark brown	alizarin and indigotin	1
S4850(4)	193	sprang	medium brown	no dyes detected	1
S4850(5)	194	warp	dark brown	no dyes detected	1
S4850(6a)	195	yam	dark brown	no dyes detected	1
<b>Helgeland, Norway (AD 425-535)</b>					
S5960a	196	tablet weave	medium brown	luteolin, quercetin and trace of apigenin	1
S5960a	197	tablet weave	very light brown	luteolin and luteolin-like	1
S5960c	198	system A	medium brown	Indigotin	1

**Table 2. Textiles of the Tegle and Helgeland finds selected for dye analyses and the results.**

148-149). The purple and red colour from the Tegle find places these among the other exceptional Migration Period textile finds.

Woad dye seems to be more common than madder red, and indigotin has been found in the rich Norwegian Migration Period graves of Hallem, Øvre Berge, Veiem, Sætrang, Snartemo V and Enebø-Eide (Walton 1988, 148). The indigotin dye in the Helgeland textiles comes from a fragment that might be a piece of garment. This fragment does not look very different from the rest of the rather homogenous collection of fabrics in the find. This might indicate that the other Helgeland fragments are from high quality textiles as well, but too little is known about the relationship of the fragments in order to draw further conclusions. The truly exceptional part of the Helgeland find consists of the many well preserved pieces of a broad tablet-woven band. The ground weave now has a dark, purple-reddish colour, and the pattern weft has a light golden brown colour. The results of the dye analyses thus were a bit surprising. Although the ground weave has a red-purplish hue, no traces of red were discovered. The combination of luteolin, quercetin, and trace of apigenin come from a yellow dye. The pattern weft had luteolin and luteolin-like components, corresponding to the yellowish hue in the pattern. These results indicate that the band was

made in two shades of yellow.

The interesting results of the dye analyses have cast new light upon these two finds. The presence of rare imported dyes is particularly intriguing. The dye tested textiles from Tegle and Helgeland are assumed to have been made locally. This indicates that it was the dye-stuffs that were imported, not the finished product. We do not know how rare such dyes were, as only a few contemporary textiles have been tested so far, and these come mainly from very rich graves. It is interesting to note however, that even a rather plain fabric, such as the Helgeland C-group sample, proved to have been dyed blue. It shows that there might still be new information to extract from the large amount of textile fragments hidden in museum collections.

As the two finds both come from a bog context, further questions arise about possible social and religious explanations for how and why the textiles ended up in the bog. The fact that some of these textiles were very fine, gives us reason to believe that they once belonged to persons from a higher social strata, indicating that the social and economic value of the textiles might be important reasons why they were deposited in the bog.

**Bibliography**

Bender Jørgensen, L. (1986) Forhistoriske tekstiler i Skandinavien. *Nordiske Fortidsminder*, serie B, Bind 9. København.

Bender Jørgensen, L. (1992) *North European Textiles: until AD 1000*. Århus.

Dedekam, H. (1924) Et tekstilfund i myr fra romersk jernalder. *Stavanger Museums Aarshefte* 1921-24, 3-29, 1-57.

Hald, M. (1950) Olddanske tekstiler: komparative tekstil- og dragthistoriske studier paa grundlag af mosefund og gravfund fra jernalderen. *Nordiske Fortidsminder*, bind Nr 5. København.

Halvorsen, S. (2008) *Myrfunn av tekstiler – en ny undersøkelse av funnene fra Tegle og Helgeland*. Unpublished MA thesis, University of Bergen.

Halvorsen, S. (forthcoming) Norwegian Peat Bog Textiles: Tegle and Helgeland Revisited. In: Eva Andersson Strand, Margarita Gleba, Ulla Mannering, Cherine Munkholt and Maj Ringgaard: *North European Symposium for Archaeological Textiles X*, Oxbow Books. 97-103.

Hoffmann, M. and Trætteberg, R. (1959) Teglefunnet. *Stavanger museums årbok* 1959, 41-60.

Hoffmann, M. (1964) The warp-weighted loom: *Studies in the history and technology of an ancient implement*. Oslo, Universitetsforlaget.

Hougen, B. (1933) Helgelandsfunnet. Et myrfunn av tekstiler fra eldre jernalder. *Stavanger Museums Årshefte* 1930-32, 55-75.

Hougen, B. (1935) Snartemofunnene: Studier i folkevandringstidens ornamentikk og tekstilhistorie. *Norske oldfunn*, bind 7. Oslo.

Solberg, B. (2003) Jernalderen i Norge, ca. 500 f.Kr.-1030 e.Kr. Oslo.

Walterstorff, E.v. (1928). En vevstol och en varpa. *Fataburen* 1928, 143-159.

Walton, P. (1988) Dyes and Wools in Iron age Textiles from Norway and Denmark. *Journal of Danish Archaeology* 7, 144-158.

Vanden Berghe, I. (2008) *Analysis Report. Archaeological textile fragments from Danish peat bogs*. Unpublished analysis report from the Royal Institute for Cultural Heritage, Laboratories, Material and Techniques.

Vanden Berghe, I. Gleba, M. and Mannering, U. (2009) Dyestuffs from Early Iron Age Scandinavian peat bog textiles. *Journal of Archaeological Science* 36, 1910-1921.