

ARCHAEOLOGIA

Edited by
ERZSÉBET JEREM and WOLFGANG MEID

Volume 33

**Aspects of the Design, Production
and Use of Textiles and Clothing
from the Bronze Age
to the Early Modern Era**



NESAT XII.

**The North European Symposium of Archaeological Textiles
21st – 24th May 2014 in Hallstatt, Austria**

**Edited by
Karina Grömer and Frances Pritchard**



BUDAPEST 2015

Published in cooperation with
Natural History Museum Vienna



and with the support of Salinen Austria, Salzwelten GmbH, Marktgemeinde Hallstatt,
Museum Hallstatt and MuseumsPartner

Museums Partner
www.museumpartner.com



Cover illustration

Hallstatt and an Iron Age textile from the salt mine
(© Natural History Museum Vienna, photo: A. Rausch and K. Grömer)

Volume Editor
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ISBN 978-963-9911-67-3
HU-ISSN 1215-9239

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2015

ARCHAEOLOGUA ALAPÍTVÁNY
H-1250 Budapest, Úri u. 49

Desktop editing, layout: Szilamér Nemes

Printed by AduPrint Kiadó és Nyomda Kft.

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13 | Old Fragments of Women's Costumes from the Viking Age – New Method for Identification

HANA LUKEŠOVÁ

Abstract: A project for re-evaluating old textile finds from the Viking Age was undertaken at the University Museum of Bergen. In the past, textiles and metals that were found together were often separated, unfortunately without any detailed documentation. The main focus of the project was to find the original position of the textiles on the metals and to reconstruct the sequence of layers if possible. The working method involved a detailed study of the textile fragments and comparing the stains on the textiles with the metal objects. A portable XRF-spectrometer was used in this work. It was possible to retrace the lost context of many archaeological finds and to identify different types of garments.

Keywords: Archaeology, Viking Age, textile, XRF-spectrometry, costume, reconstruction

1. Introduction

The University museum of Bergen is an institution with a long history. It has collected archaeological objects since the second half of the 19th century. The textile fragments that will be discussed in this paper were found in West Norway. The majority was excavated at the end of the 19th century or in the first half of the 20th century. The finds have in fact had a “new” life with their own history since the time they were discovered. It is necessary to take into account their complete history including traces of the recent past that often have not been thought as being important.

The textile fragments were found in graves, mainly in association with metal objects. Many fragments arrived at the Museum as “dirt” on metal brooches. The first conservation reports about these objects date from the beginning of the 1970s. Most of the textile finds were separated from the metals at this time or before. Unfortunately, the process of separation took place without documenting any details. Looking for the lost context of archaeological finds that were excavated in the past is often the only way to regain missing information. It is the position of the textiles on the metal objects in particular, which could be a key to a partial costume reconstruction.

Although the textile fragments are small and often in a very bad condition they can still provide valuable information about the Viking Age costume in western Norway. The aim of the study was to regain information that has been lost in the recent past. Summarizing the content of the ensemble and making a statistical overview of the identified garment types was the next goal of the project. The plan was not to find a clue to a complete Viking Age women's costume because the study was based entirely on the preserved textile fragments, which are very small so a complete costume reconstruction was not possible. In addition, it is more than probable that numerous textile layers are missing.

2. Viking Age textiles from the University Museum of Bergen

The group of Viking Age textiles in the Late Iron Age Collection comprises 34 inventory numbers. Each number often includes more than one textile structure and many small textile fragments. Twenty finds come

from female graves, four finds from male graves, three finds from double graves and seven finds from unreliable find contexts.¹

It was possible to identify the remains of different garments in 25 finds. Two of them are remains of men's garments while the remaining 23 finds, belonged to women's garments.

Lise Bender Jørgensen studied the textile techniques of this group of fragments and published a thorough overview of the whole collection. She found clear evidence that broken lozenge twill, which she refers to as broken diamond twill and defines as so called "Birka type", was more common in western Norway than in eastern Norway (BENDER JØRGENSEN 1986, 91). Several other archaeologists such as CHARLOTTE BLINDHEIM (1947), INGER MARIE HOLM OLSEN (1976), PENELOPE WALTON ROGERS (1988), KARIN GJØL HAGEN (1992) have also discussed some of the finds.

3. Method



Fig. 13.1: A fragment of very fine broken lozenge twill belonging to the textile find (B4864_g, h) from a double grave at Hyrt in Voss in Hordaland County (photo: S. Skare).

A first step to an identification of the garments was a detailed study of the textile fragments. The following aspects were considered: the textile structure, determination of warp direction if possible, the shape of a fragment, selvages, hems, seams, stains and specific pleats, imprints, abrasion wear, holes and others. The different details were studied using a stereomicroscope (*Fig. 13.1*).

In addition, metal brooches found in connection with the textiles were studied (*Fig. 13.2–3*). The main focus was given to remains of textiles used for fastening onto brooches. In many cases textile loops and different braids were wound around brooch-pins. The shape of the brooches and their material composition were also considered.

3.1 Garment categories

Different garment categories were established and defined first of all by their position relative to the typical Viking age oval brooches. It is commonly known that these brooches were used to fasten the straps of a suspended dress. The evidence is substantiated by remains of textile loops and fragments of an upper, folded hem fastened to brooch-pins, found in numerous Viking Age graves (HÄGG 1970, 1971, 1974, 1982; HEDEAGER MADSEN 1990; KALAND 1992; SPEED – WALTON ROGERS 2003). Two categories, shift and tunic, were used for the

¹ The grave contexts were examined by Asbjørn Engevik jr.



Fig. 13.2: Two oval brooches (B8000_a) from Grødes in Hornindal in Sogn og Fjordane county. Double-shelled brooches made from copper alloy were gilded with gold and trimmed with silver bosses and chains (photo: S. Skare).

textile layers that were underneath a suspended dress. The term tunic was used in the cases when there was evidence of a shift (the undermost garment) and there was another layer of a different fabric between the shift and the suspended dress. The term “outer garments” was used for the layers that lay over the brooches, e.g. cloaks and shawls. The terms for different garments were used as means of distinguishing between different garment layers, which carried out a specific function rather than an exact garment definition.

3.2 Drawings and reconstruction of the original sequence of layers

It was necessary to handle the objects gently because of their fragility. The aim was to find a way of handling that would not affect their condition. The whole process was therefore carried out by sketches on transparent foils. This way of working allowed a mutual contact of the textile- and metal objects and their confrontation without any negative effects on their condition.

A computer programme for vector drawing was used to obtain an overview of achieved information during the reconstruction of some complicated finds. Hand drawings were scanned and converted into vector drawings. Different layers were distinguished by colour. Easy stratification, “switching off” particular layers, manipulation with the saturation of layers, rotation, reflection and other functions facilitated the reconstruction due to handling virtual objects.



Fig. 13.3: The inside of two oval brooches (B8000_d) showing the preserved brooch-pin made from iron with the remains of mineralized textile loops (photo: S. Skare).

3.3 X-ray fluorescence spectrometry

It was proved that X-ray fluorescence spectrometer can be used in the last step as a partial verification of the reconstruction of layers due to the different element composition of the outside and inside of oval brooches.

X-ray fluorescence (XRF) is a phenomenon widely used for elemental analysis (GLINSMAN 2005; JOYCE 2011; SHACKLEY 2011). The Thermo Scientific Niton XL3t Gold was used to provide the tests. It was possible to measure the element composition of stains on the textiles and comparing it with the element composition of the metals that were found close to the textiles. The typical Viking Age oval brooches, which were used to hold a suspended dress, were commonly made of copper alloy. Especially the later types were often gilded with gold and decorated with bosses containing tin, lead, copper and other elements (JANSSON 1985, 108). These bosses were often coated with a decorated silver sheet (JANSSON 1985, 99 and 109). The brooch-pin was usually made from iron. Long lasting contact between metal objects and textiles is the reason why traces of metals from brooches can still be detected on the textile fragments even though they were wet treated in the past.

4. Case study

The find is from Hyrt in Voss in Hordaland County. The textile fragments were found in a double grave containing objects typical for both male and female graves.² The textile find contains: very fine dark blue broken lozenge twill, blue tabby, coarse 2/2 twill, fine tabby, fine twill and a small piece of yarn.

It was possible to identify a sequence of three types of weaves: broken lozenge twill, blue tabby, coarse 2/2 twill (LUKEŠOVÁ 2011, 158). A photograph of the stage before the separation helped to identify an oval fragment of coarse 2/2 twill. It is clear that the fragment was under the brooch and a pin did not pierce it. It completely covered the whole area of the brooch inside, which means that this fragment does not represent a suspended dress. The upper hem of a suspended dress usually ends approximately within the first third of an oval brooch. The fragment of 2/2 twill might thus be some kind of tunic. The blue tabby made from flax or nettle³ probably belonged to a shift. Two upper and two lower loops on brooch II indicate that there were two strapped gowns. The top layer of fine diamond twill, which is to be observed on the old photograph as well, suggests some type of a cloak – an outer garment.

This find was a good starting point when testing the XRF method because the original position of the textile fragments on the metal brooch was clear in the photograph taken before the objects were separated. The aim was to see whether the element spectra of the oval brooch and the textile fragments matched. The area around the brooch fastening and a reddish stain on the coarse 2/2 twill were measured with the XRF handheld spectrometer (*Fig. 13.4*). It was possible to follow a clear link between the two objects. The brooch-pin contained a high amount of iron and the element spectrum from the textile fragment showed the same levels.

The outside of the brooch and the broken lozenge twill fragment were measured as well. The spectra indicate that there is less iron than on the inside of the brooch close to the brooch-pin. Copper predominates over zinc, lead and gold. Lead was probably used for the brooch bosses whereas gold was used for gilding. The element spectrum from the textile fragment matches the brooch; only gold is missing, which might have been caused by previous wet cleaning.

5. Preliminary results

There is evidence of 66 women's garments from 23 different finds. The suspended dress was the most common dress type, making up 50% of the total amount of identified garments. Shifts made up 14% of the identified garments while tunics were only 3%. 24% of the total amount of identified garments consists of the upper garments that lay over the brooches. The remaining 9% belongs to unidentified garments, which are referred as to women's clothing.

There was at least one suspended dress in 19 grave finds, 13 of which contained two strapped gowns and two contained as many as three strapped gowns fastened to one pair of oval brooches. Outer garments were also numerous in several grave finds.

5.1 Types of garments versus types of weave

All the fragments that were identified as a shift were tabbies, mainly made from plant material. The thread count is higher compared to the thread count of the outer garments.

² The grave context was examined by Asbjørn Engevik jr.

³ Identified by using the Herzog test.

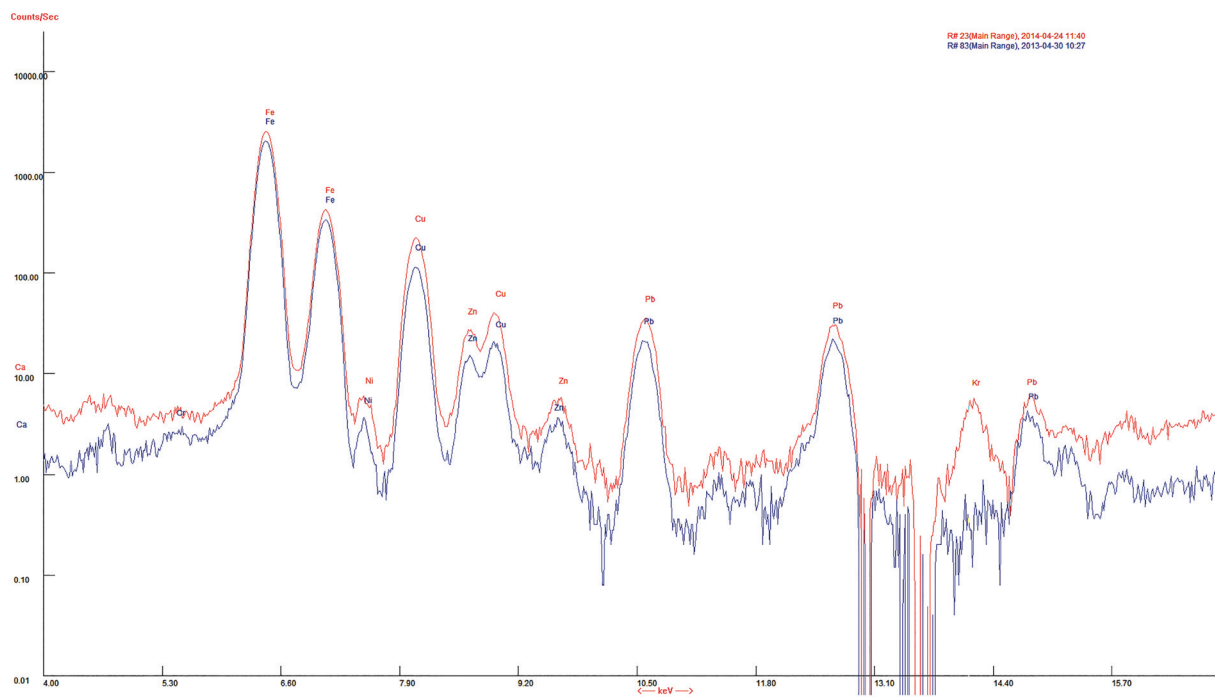


Fig. 13.4: XRF spectra of oval brooch I (B4864_i) and coarse 2/2 twill from the textile find (B4864_g, h).
Blue spectrum: the inside of oval brooch I.; red spectrum: the red stain on the coarse 2/2 twill
(graph: H. Lukešová; photo: S. Skare).

The fragments of the two identified tunics were made from rather coarse materials (both from animal hair). One tunic was made from 2/2 twill, the other was made from a coarse tabby. Both show remains of blue/blue-green colour.

34 garments were identified as some kind of dress fastened to oval brooches. The fabric type of most of the suspended dresses was fine broken lozenge twill which in many cases shows traces of blue. It is necessary to point out that the evidence of approximately half of the identified suspended dresses is substantiated on at least two preserved loops that were still attached to oval brooches. There are no remains of the dress itself.

2/2 twills dominate in the category of outer garments. Thirteen garments that lay over the oval brooches were made from rather coarse 2/2 twill. Only three outer garments were made from broken lozenge twill. Many outer garments show traces of blue as well. Some were probably made from a double-folded piece of fabric that was laid around the shoulders.

6. Discussion

The method seems to hold considerable potential. It was possible to retrace the lost context of many archaeological finds. However, it is still necessary to interpret the results as based on the reconstruction and to treat them with certain caution.

The use of the XRF-spectrometer is a promising method. However, it shows element composition only and does not give a clear answer as to what a particular metal object originally looked like. It cannot differentiate between the left and right oval brooch; it does not offer any clues in terms of reconstruction. It may support or exclude a hypothesis that has been put forward before a measurement. This method is worth using when there is a clear difference of the element composition of metal stains on textiles that are associated with metal objects or parts of metal objects (e.g. the element composition of the outside and inside of the brooch).

Using a digital x-ray photograph might help to show stains of corrosion products on textiles more clearly and it could be used for a precise focus when measuring. Another area for further research might be the behaviour of metal remains found on the archaeological textiles. How far from the metal object is the stain detectable? Corrosion products from metal objects on the textile fragments spread or stain in a different way according to the type of metal and burial environment.

7. Conclusion

It was possible to identify different types of garments despite the small size of the fragments. The evidence of garments was substantiated by a reconstructed sequence of layers and other specific details. The location of the preserved garment parts was possible due to oval brooches having an assigned place on Viking Age women's costume. All identified parts of the costumes came from the chest area. The following types of women's garments were identified: a shift, a tunic, a suspended dress and outer garments such as cloaks and shawls. What a complete Viking age women's costume looked like has been left open intentionally since the study is entirely based on the preserved textile objects.

Re-evaluating textile finds discovered in the past has been a challenging but rewarding project, which has regained important information about particular finds that had previously been overlooked.

Acknowledgements

I would like to thank Sigrid Hillern H. Kaland, Prof. Emeritus Svein Indrelid and Prof. Knut Mikjel Rio who allowed me to work on this project. Thanks to Dr. Asbjørn Engevik, Prof. Ingvild Øye, Vedis Bjørndal and many other colleagues who motivated me and supported the project in many ways. Thanks also to Dr. Melanie Wrigglesworth, who helped with language correction.

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