

# The study of three mounts from Vendel using laser scanning techniques and surface structure analysis

Charlotte Hedenstierna-Jonson

An analysis of three mounts from the Vendel Period is carried out using laser scanning techniques and surface-structure analysis. The purpose of the study is to establish if a technical examination of this kind can provide new knowledge about ornamental remains on damaged surfaces where other analysing methods have failed. The results of the study show that the technical examination can detect remnants of what could be interpreted as ornament, even though the method in this particular case had little to contribute due to the state of the artefacts. With slightly better preserved artefacts surface-structure analysis using laser scanning techniques could provide valuable and otherwise inaccessible information.

## Introduction

As a part of the SIV-project (Svealand in the Vendel and Viking Periods) a minor grave site, RAÄ 26, at Vendel in Uppland was excavated in 1996 (Seiler 1997). Two of the graves were thoroughly examined, and in the cremation layer of grave A2 three round iron mounts were found (F2:3, F2:5 and F2:7), one of them decorated with animal style ornament (fig. 1). Though now in different stages of deterioration, initially they presumably were of the same or similar construction and dimensions. They are all round, with an exact diameter of 31 mm, and with a centrally placed rivet that creates a small bump on the face of the mount. The contents of the cremation layer holds no clues as to where the mounts were originally placed. Similar mounts however have been found on shields (Nerman 1969, fig. 631ff) and on sword-belts or baldrics (Nerman 1969, figs. 524, 534), they could also have been placed on a case or a box (Seiler 1997:61).

The original shape of the mount's is most distinctly preserved in mount F2:5, where the iron body is free from corrosion and clearly shows the mounts construction and size. On mount F2:3 a metal-foil of bronze covers the face of the iron body. It is decorated with animal ornament in style B, according to Arwidssons terms of Vendel Period animal ornamentation (Arwidsson 1942:18ff), and depicts three entangled animals in the shape of a whirl pattern, a so called triskele. The mount is in relatively fine condition and the low relief ornamentation is clearly perceivable. Traces of metal-foil are also found on mount F2:5,

mainly on the backside. The third mount, F2:7, is fragmentary. The metal is severely corroded, though possible traces of ornamentation can be detected on the face of the mount. In the immediate vicinity of mounts F2:5 and F2:7 seven tiny fragments of bronze metal-foil were found, two of them with visible ornamentation. Both fragments indicate that they derive from a metal-foil decorated like mount F2:3 (fig. 2).



Figure 1. Drawing of mount F2:3 (Hedenstierna-Jonson).

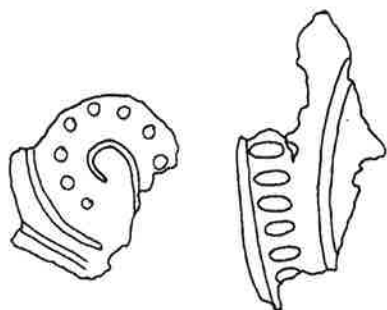


Figure 2. Drawings of two "pressbleck"-fragments with ornamentation (Hedenstierna-Jonson).

### "Pressbleck" with the triskele motif

The technique of decorating artefacts with thin metal-foil, so called "pressbleck", was commonly used during the Vendel Period. Ornamented metal-foil can be found on several categories of artefacts. The round type that the Vendel examples represent appears on round brooches and mounts, as does the whirl-motif with its three or four extensions (Nerman 1969; Ørsnes 1966). A matrix plate with a similar motif has been found on Sjælland in Denmark (Ørsnes 1971; Roth 1986). This so called Hyldagergårdsskivan has dimensions corresponding to those of the three Vendel mounts, with a diameter of 37 mm. The Danish matrix, like the Vendel mount F2:3, displays a triskele, but the design is somewhat different (fig. 3). The S-shaped animals are linked together forming a triangle between themselves. The animals are equipped with feet and their lingering bodies are each clearly defined. The metal-foil on the Vendel mount F2:3 is decorated with what could be described as a combination of a triskele and the triquetra-motif. The S-shaped animals create a whirl pattern, and at the same time, by crossing themselves, form a knot-like composition. The animals on the Vendel mount lack feet and their bodies are attached to each other in a manner that makes it difficult to separate one animal from another. The composition of Hyldagergårdsskivan appears to occur more frequently than the composition on the Vendel mount in the Vendel Period material.

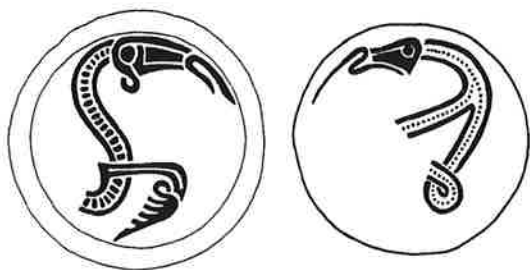


Figure 3. Drawings of the animal on Hyldagergårdsskivan (Ørsnes 1971:203), and on mount F2:3 (Hedenstierna-Jonson).



Figure 4. Topographical map of mount F2:3 (Hedenstierna-Jonson).

### Laser scanning and surface-structure analysis

The laser scanner equipment consists of a laser probe mounted on a x/y-table and a ordinary PC. The measurement data is collected in the specially designed program "Viking ristade och Grimulv". After further processing visual representations can be made by standard graphic programs. The surface can be presented as a topographical map, a 3D-profile or by grey- or colour-scale (cf. Arrhenius & Freij 1992, Hedenstierna-Jonson 1997).

Since the three Vendel mounts were probably made using the same technique and were decorated in the same or similar manner, they provide excellent material for studying the use of laser scanner technique on damaged surfaces, and surfaces where other analysing methods and techniques have failed. On a surface-structure map, traces of intended ornaments should stand out in their relative symmetry, whereas features due to corrosion should leave a more rugged impression. While the naked eye tends to smoothen out this ruggedness interpreting it as man made, the mechanical measuring of the laserscanner records every feature and displays it more clearly. When using laserscanner technique, a comparative study of the results presented in a topographical surface map and the actual artefact is necessary. By comparing the topographical structures with for example microscope-studies of the surface, potential traces of ornament can be detected.

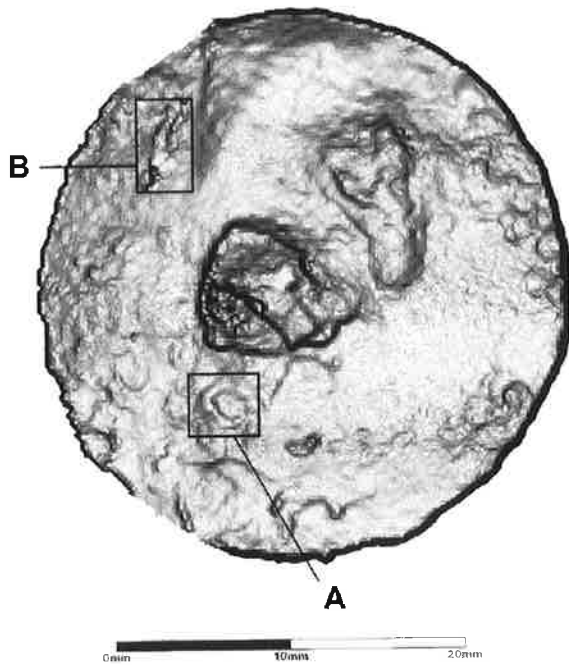


Figure 5. Topographical map of mount F2:5 (Hedenstierna-Jonson).

These traces are difficult or impossible to interpret without any comparative material, and a representation, in this case mount F2:3, increases the possibility to draw conclusions.

The three Vendel mounts were scanned with an accuracy better than  $\pm 0.002$  mm. Received measurement data was processed in PC program SURFER 32 where

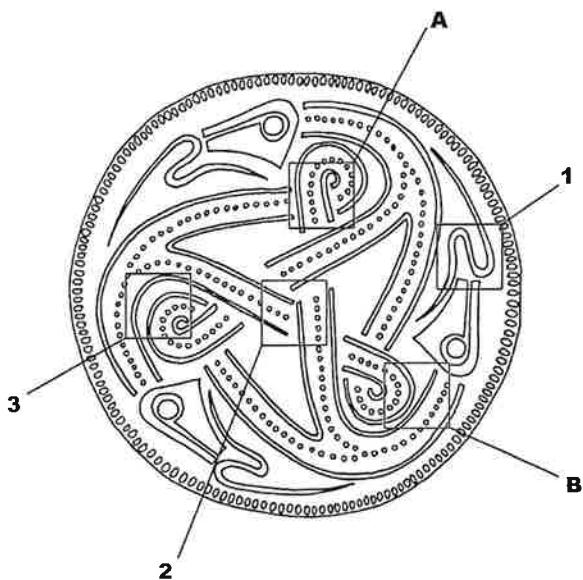


Figure 7. Possible traces of ornament on mounts F2:5 and F2:7 shown through corresponding areas on mount F2:3 (Hedenstierna-Jonson).

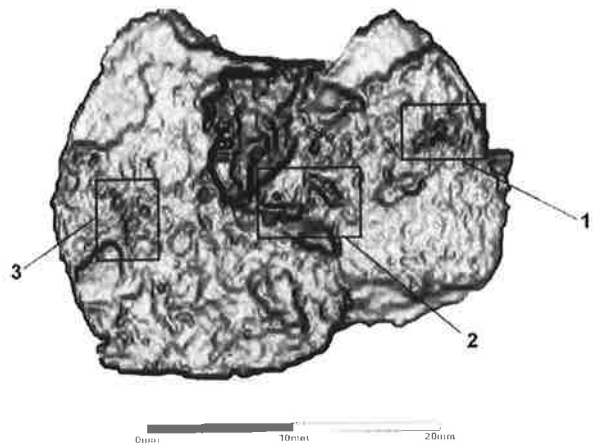


Figure 6. Topographical map of mount F2:7 (Hedenstierna-Jonson).

topographical presentations can be made enabling further surface-analysis. A topographical presentation of mount F2:3 displays how the animal style ornament of the “pressbleck” is reproduced using the processed scanning data (fig. 4). This topographical map functioned, together with the actual mount, as comparative material when the other two Vendel mounts were examined.

The scanned measurements for mounts F2:5 and F2:7, here presented as two topographical maps (figs. 5–6), reveal on the former two and on the latter three areas that, due to their relative symmetry could be interpreted as traces of ornament. When comparing them to the drawn representation of mount F2:3, small areas of the topographical representations correlate to remnants of the “pressbleck” ornaments (fig. 7). The correlation is not exact and the remnants are so small that it is impossible to draw any actual conclusions in this case. What are interpreted as traces of ornament can instead be the effects of corrosion or suchlike. Still the method should be applicable on other material with greater success.

### Conclusions

It is likely that the three Vendel mounts analysed in this paper were originally decorated in the same manner, possibly even with the same triskele motif. The laser-scanning results support this interpretation to some extent, though great caution is required when studying the processed measurement data as the mounts are too damaged to produce reliable results. The method of analysing a damaged surface using laserscanner technique could however prove beneficial. It is important for the interpretation of the received measuring data to have some kind of comparative representation of the

analysed surface which of course limits the method. The method is new and in need of further development to function properly. If further developed the method could prove very useful working with corroded or otherwise damaged relief images.

## References

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