



Journal of Archaeology and Ancient History

2016

Number 18

Editors: Frands Herschend, Paul Sinclair and Neil Price.

Editorial Board: Assyriology: Olof Pedersén. Archaeology: Anders Kaliff, Kjell Knutsson,
Classical Archaeology and Ancient History: Gunnel Ekroth, Lars Karlsson.
Global Archaeology: Paul Lane.

Editorial history: www.arkeologi.uu.se/Journal/

ISSN: 2001-1199

Published: 2016-03-25 at <http://urn.kb.se/resolve?urn=urn:nbn:se:uu:diva-286882>

**Small Masks on Migration Period jewellery.
Replication traditions of Germanic, Roman, Etruscan,
and Greek goldsmiths.**

Bálint László Tóth¹

¹ Bálint László Tóth. Balinthoth@hotmail.com



UPPSALA
UNIVERSITET

Department of Archaeology and Ancient History
Uppsala University, Sweden

Bálint László Tóth 2016. Small masks on Migration Period jewellery. Replication traditions of Germanic, Roman, Etruscan, and Greek goldsmiths.

ABSTRACT

The three Swedish gold collars are unique goldsmith masterpieces of the Migration Age, owing to the great number of small beings that inhabit them: animals, humans and hybrids. While most of these figurines were individually carved into the gold and ornated with filigree or granulation, the small masks of the Ålleberg collar stand out as seemingly being replicates. Which method was used to replicate these originally 43 masks on the collar? A thorough study of these masks is presented as well as of the bracteates decorated with replicated or unique masks. Two different techniques are proposed for the manufacture of these small masks, both going back to Roman goldsmith techniques. One of these techniques was widely used in the antique and Germanic worlds and it has its roots in Greek methods of the Archaic period. The technique used to make the masks on the Ålleberg collar and on a few of the bracteates is of a much rarer type, which only has parallels in Roman goldsmith techniques of the 2nd – 4th A.D.

KEYWORDS:

Goldsmith techniques, Swedish gold collars, Ålleberg, Möne, Bracteates, Replication, Masks, Migration Period, Germanic and Roman

Small masks on Migration Period jewellery. Replication traditions of Germanic, Roman, Etruscan, and Greek goldsmiths²

Introduction

Germanic goldsmiths learnt to master techniques originating in the Mediterranean civilizations through contacts established with the Greeks and the Romans. At first, these were perhaps indirect contacts through the intermediary of Celts, Thracians or Illyrians, but soon a more direct relation was established after the incorporation of these people into the Roman Empire in the first century B.C. - first century A.D. Owing to these contacts, the Scandinavian goldsmiths mastered techniques such as filigree, granulation and punches that they acquired from the continent from about the first century B.C. to the Migration Period.³ In the Migration Period (end of the fourth-sixth centuries A.D.), they learnt new techniques such as carving gold and

¹ Ph.D in archaeology at Paris-Sorbonne University. balinttoth@hotmail.com.

² I would like to thank Kent Andersson, Lotta Fernstål and Anna Arnberg for their kind help during my study of the objects in the Statens historiska museum in Stockholm. A majority of the Scandinavian objects decorated with these small masks are preserved in that museum. For the study of the Roman masks, I thank Karoline Zhuber-Okrog for her kind help in the Kunsthistorisches Museum of Vienna, Friederike Naumann-Steckner for presenting me the collections of the Römisch-Germanisches Museum of Cologne and Cécile Giroire for opening the outstanding collections of the Louvre to me. Many thanks to Jan Peder Lamm, Morten Axboe, Kent Andersson and Svante Fischer for their precious suggestions. I thank Nancy Wicker, Bjørn Ringstad, Ellen Grav Ellingsen, Janka Istenič, Tomislav Kajfež, Klaus Vondrovec and Birgit Körge for sending me photos of the bracteates that I could not study in person.

³ For the different techniques used by Scandinavian goldsmiths before the Migration Age, see: Andersson, 1995.

making cloisonné inlays.⁴ During this period, hybrid Roman-Germanic kingdoms were founded on the continent, which created stronger bounds than ever between the Roman and the Germanic worlds. In this article, we will discuss some of the techniques that the Scandinavian goldsmiths acquired from the South during the Roman Iron Age (from the first to the end of the fourth centuries A.D.) and the Migration Period that have only sparsely been investigated: techniques of replication of small relief figures in gold and silver. The impulse that initiated this study was an attempt to explain how the small masks on the Ålleberg collar were made (fig.3, 7-13) – they seem so alike and too small to have been worked individually – and what can this show on Migration Period society in Scandinavia.



Fig.1. Comparison of masks on the same scale from different objects studied in the article: 1. Ålleberg collar (Sweden); 2. Åsum bracteate (Sweden); 3. Tornes bracteate (Norway); 4. sheath decoration from Cologne (Germany); 5. Kranjski Rak fibula (Slovenia); bracteates from: 6. Wapno (Poland); 7. Dödevi; 8. Ravlunda; 9. Fride; 10. Riksarve; 11. Bostorp; 12. Gerete (Sweden); 13. phalera from Thorsberg moss (Germany); 14. pair of earrings of the Louvre; 15. medallion from Szilágysomlyó (Romania); 16. shield decoration from Illerup (Denmark); 17. golden cup from Kul Oba (Ukraine); 18. pair of brooches from Orvieto (Italy).
<http://files.webb.uu.se/uploader/92/fig1.jpg>

⁴ For the technique of carving gold, see: Lindqvist 1926, p.55-87; Tóth.; for the cloisonné, see: Arrhenius, 1985.

Goldsmiths in the Greek and Roman societies were more used to replicating objects than those of the Germanic world. For example, coin minting was a mechanical way of replicating objects on a large scale for which the individual manufacturing would be much more time consuming and less precise. It was made possible by using a same die to strike a great quantity of coins⁵. The Scandinavians of the sixth century do not seem to have minted coins, though they were familiar with the concept of replicating ornaments by using dies and punches on their bracteates (fig.2) and by embossing small figurines on gold foils (fig.44).⁶

The development of new manufacture processes originating from the Roman world made Wilhelm Holmqvist describe Sweden's society in the sixth century A.D. as witnessing its first industrial development.⁷ He based his view on the workshops excavated on Helgö Island, which have yielded a great quantity of mould fragments for casting relief brooches.⁸ To talk about an industrial society may be excessive, but was the sixth century a period of mass production? Products made by goldsmiths are included in this industrial view by Holmqvist, even though the luxury goods they created seem unlikely to have been mass-produced and put on a market. On the contrary, the goldsmiths' work suggests that each of the objects was unique and therefore probably made on demand. The silver or bronze brooch and button moulds found on Helgö do not prove mass production, since we do not know whether the moulds were reused. Most of the Scandinavian bracteates were struck in a comparable way to the Roman coins, but the bracteates were not mass-produced - it is rare that two come from a same die if they were not on a same necklace, and even if they were struck by a same die, they usually have different rims (see fig.41). It seems that in the case of the bracteates, the Roman technique of mass production of coins was adapted by the Scandinavians to produce unique pieces of jewellery (see fig.2).

Repeated shapes were appreciated in Germanic ornament in the Migration and Vendel periods, as shown by the punches on the bracteates, the replicated small masks we are studying here and the embossed replicated scenes on the Vendel-type helmets. This preference may be explained by the supernatural effect of repetition; hardly anything in nature is exactly replicated and human vision easily notices unusual things such as repeated shapes.⁹ In the case of

⁵ Hill, 1922; Sellwood, 1976.

⁶ For the bracteates, see for example: Axboe, 2004; Axboe, 2007; Wicker, 2011; for the gold foils: Lamm, 2004.

⁷ Holmqvist, 1979.

⁸ Holmqvist, 1972; Fischer, Victor, 2011, p.79, 80.

⁹ Gombrich, 1979, p.5-6.

Germanic art, it is not excluded that such exactly replicated masks could have had magical properties, as they have the effect of repeated runes.¹⁰



Fig.2 The Roman replication technique of striking mint applied to a unique object by Scandinavian goldsmiths: detail of the Gerete bracteate (see the third bracteate on fig.28 and fig.33 for a detail). Photo by the author
<http://files.webb.uu.se/uploader/92/fig2.jpg>

Olov Robert Janse was the first to observe the similarity between the small masks of the Ålleberg collar with those decorating some bracteates.¹¹ However, with his work on the Vendel culture's origins in 1926, Sune Lindqvist called attention to this small group of ornaments, which have tiny masks soldered onto them, namely four bracteates from southern Sweden and the famous Ålleberg collar. According to Lindqvist, these objects show a close tie between Germanic Hungary and Scandinavia owing to the East-Germanic treasure of Szilágysomlyó in Transylvania, which includes a collection of Roman medallions of the fourth century and their imitations mounted as pendants by the Germans. Indeed, the great Gratianus medallion of the first treasure of Szilágysomlyó has fifteen of these little masks decorating its frame (fig.47). This parallel was one of Lindqvist's arguments for dating the Ålleberg collar shortly after 375 A.D. and the related objects decorated with filigree on carved

¹⁰ Jansson, 1985, p.14.

¹¹ Janse, 1922, p.176.

background into the fifth century.¹² Lindqvist maintained that the treasure of Szilágysomlyó must have been hidden before the flight of the Western Goths from the Huns from Transylvania that occurred under the reign of this same emperor Gratianus (367-383).¹³ However, the masks on the Szilágysomlyó



Fig.3 Four masks on the Ålleberg collar, front and back (section 14: see fig.4). Photos by the author
<http://files.webb.uu.se/uploader/92/fig2.jpg>

medallion are larger and of cruder workmanship than those on the bracteates, when we compare them on a same scale and they may not be contemporaneous (fig.1). The ethnical identity of the owners of the two treasures of Szilágysomlyó is still debated. Furthermore, the Hungarian gold belt fittings that Lindqvist used as parallels for dating Scandinavian filigree were erroneously ascribed to the Huns from before 453; following a better knowledge of the Carpathian basin's chronology, they are dated to the Avars, that is, one and a half century later, which makes all of Lindqvist's datings obsolete.¹⁴

In his book, Lindqvist suggests that the small masks are massive and that they were struck or possibly cast, judging by the ones from the Ålleberg collar,

¹² Lindqvist, 1926, p.84-87.

¹³ Lindqvist, 1926, p.19-23.

¹⁴ Lindqvist, 1926, p.87. Other criticism of Sune Lindqvist's datings: Åberg, 1947; Ljungkvist, 2008.

the back sides of which are visible.¹⁵ One year after the publishing of his book, the remarkable bracteate from Gerete entered the collections of the Statens historiska museum in Stockholm, and Lindqvist dedicated an article to it in which he lists six Scandinavian objects decorated with small masks of this type¹⁶. Here he stipulates that the masks are so alike on the objects that feature several masks that they were surely made mechanically, probably by striking.¹⁷ Wilhelm Holmqvist shared his opinion concerning the Ålleberg collar's masks, but thought that the masks on the bracteates were individually carved into a thick sheet of gold.¹⁸ In this case, they would not be replicates, although Holmqvist admitted that they were very similar. Holmqvist must have noticed the small differences between the replicated masks on the bracteates - to which we will come back later.

In his remarkable bachelor's degree study, which is still regrettably unpublished, Per-Olof Bohlin proposed two different techniques for the manufacture of the masks on the bracteates: embossing and striking.¹⁹ According to Bohlin, the Ålleberg collar's masks were struck as we can see that they are massive. He proposed that the also masks on the Åsum, Dödevi and Bostorp bracteates were massive, whereas those on the medallion of Szilágysomlyó and on the Gerete, Fride, Ravlunda bracteates were embossed. He did so by correctly observing signs that show that the latter are hollow. The Dödevi and Bostorp bracteates did not present any revealing signs to Bohlin, but he stated that their appearance was massive. Recently, Alexandra Pesch also described the masks of the Ålleberg collar as being struck and connected this with the Roman practice of striking mint.²⁰ In his contribution to the latest great book on the Swedish collars, Jan Peder Lamm agreed with Bohlin's opinion on the different techniques used to make the masks and has provided an updated list of the bracteates with small masks, including the new one discovered in Tørnes, Norway, and published by Bjørn Ringstad.²¹

In the same book, Barbara Armbruster proposed an ingenious method for the manufacture of all of the small figures of the three collars: the animals, humans, geometric forms and the masks. This method involves lost wax casting. According to Armbruster, small figurines made of wax were laid on a wax sheet and then a clay mould was built around it. The clay was burnt, the wax melted out and then the gold could be poured into the same mould that was constructed around this wax. According to her the masks on the Ålleberg

¹⁵ Lindqvist, 1926, p.21, 23.

¹⁶ Lindqvist, 1927, p.225.

¹⁷ Lindqvist, 1927, p.220.

¹⁸ Holmqvist, 1980, p.25, 49.

¹⁹ Bohlin, 1981, p.82-85.

²⁰ Pesch, 2011, p.95.

²¹ Lamm, 2015, p.62; Ringstad, 2015.

collar were cast by this method as well as the other small figures on the collars, with the difference that first a matrix was used to replicate the masks in wax²². Before Armbruster's study, it was usually believed that the masks and the other figurines of the collar were the product of different techniques. Having studied the three Swedish collars myself, I agree with this traditional point of view. I cannot agree with the lost wax casting for the figurines; they have been carved directly into the metal and not cast for reasons that I can sum up here and which I present more in detail in a forthcoming article.²³ Armbruster suggests that the figurines were made from wax and then fixed to a wax plate. However, an observation of the figurines shows that they were just carved into a one-piece gold sheet as indicated by the fact that the carving process has pierced the sheet through in several places. The replicated masks on the Ålleberg collar on the other hand could not be individually carved and were made by a different method. However, the lost wax casting method proposed by Armbruster is improbable for the masks too, because if they were truly cut out of a sheet of gold, as we shall see, this sheet of about 0.1 mm was much too thin to be cast in a closed mould (see fig.9-10).

The question that Sune Lindqvist raised ninety years earlier about the technique used to replicate the masks is still an open one. Today, digital photography has made much easier the technological study of gold objects, because a much greater quantity of images can be easily taken and one can continue the study for a long time without having the actual object at his disposal. This article focuses on the objects that display several faces so that a comparison is possible between them. Nevertheless, the bracteates displaying a unique mask are also taken into account because they seem to have been made by the same technique as the multiple masks. To better understand how the small faces were produced, I have tried to show pictures of every mask that has been replicated so that they can be thoroughly compared with one another. The order of study is based on the two different techniques identified and on the quantity of masks on the objects, as more replicated faces there are, more easily can we understand their differences and similarities.

²² Armbruster, in Pesch, 2015, p.167-171.

²³ Developed more in detail in Tóth, forthcoming.

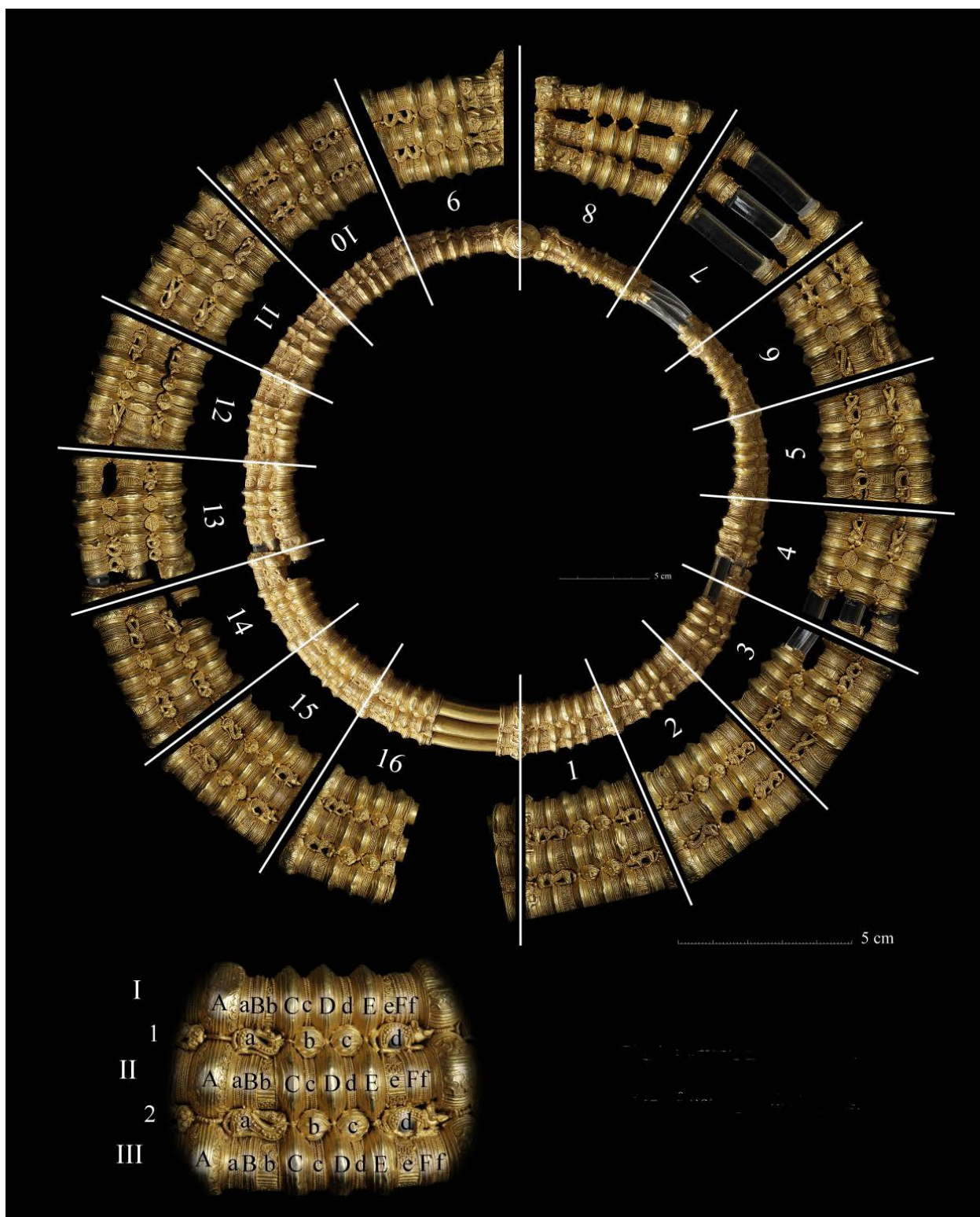


Fig 4. Lamm's nomenclature of the Ålleberg collar's parts. Photo by the author.
<http://files.webb.uu.se/uploader/92/fig4.jpg>

Masks replicated by the casting technique

It is appropriate to begin with the Ålleberg collar, which presents the greatest number of replicated masks²⁴. These are situated on two rows between the three superposed tubes that form the core of the collar (fig.3, 4). Three of the masks that have been preserved have fallen out (number 12, 22, 38 on fig.7), and only 37 masks are still soldered to the collar. Of these, three are combined with a body to form little figurines that hold up their hands, stretch out their backs and bend over the bulges where the collar closes in the front (fig.6). There are places on the collar on which the figurines have fallen out, and thus we may ask: what was the original number of masks decorating the Ålleberg collar?

It is possible to estimate the original number of masks owing to the symmetry of the collar and by taking into account the loose fillings that have been preserved²⁵. Jan Peder Lamm has introduced a convenient nomenclature of the different parts of the collar that is presented on fig.4.²⁶ It is based first on the dividing of the collar into 16 radiating segments whose numbers begin to the right of the clasp and follow an anti-clockwise direction. The nomenclature's second division is based on the tubular rows that are named I to III with the two intermediary spaces between the rows named 1 and 2. Finally, Lamm's nomenclature's third division is based on the segmentation of each of these rows into units named by capital or minuscule letters. The masks are always positioned on the two central units between the rows, that is, on position 1.b, 1.c, 2.b, 2.c on each section that contains them (fig.4 bottom).

²⁴ 22 cm wide, weighing 620 g. Found in 1827 in Ålleberg (Karleby parish, Västergötland region, Sweden). In the Statens historiska museum, Stockholm, SHM 492. Short bibliography: Montelius, 1881-1883, p.244-246; Hildebrand, 1892, p.179-180; Montelius, 1896-1900, p.81; Salin, 1904, p.211, fig.499; Lindqvist, 1926, p.55-60; Holmqvist, 1972, p.234-253; Holmqvist, 1980; Lamm, 1991; Lamm, 1994; Lamm, 1998; Andersson, *Gold des* 2008, p.72-75; Andersson, 2011, p.108-119; Pesch, 2011; Pesch, 2015.

²⁵ Holmqvist, 1980, p.34-37.

²⁶ Lamm, 1991; Lamm, ' 1998. This is in continuity with the nomenclature of Holmqvist, but Lamm has developed it to be more precise (Holmqvist, 1980). In the recent book on the Swedish gold collars, another nomenclature is introduced by Alexandra Pesch with the rows numbered from the bottom to the top instead of the top to the bottom and dividing them into right and left halves (Pesch, 2015, p.108-109). The author puts forward good reasons for this: the collars' two parts are nearly symmetrical and the inversion of the counting of the rows is explained by the fact that the best figurines are on the bottom rows. Nevertheless, the original nomenclature had the advantage not taking into account considerations of quality or symmetries on the collars. It might be also important to underline that strictly speaking they are not symmetrical, especially concerning the figurines on the Ålleberg collar (see Holmqvist, 1980, p.36; Pesch, 2015, p.116 and fig.4 in this article). The numbering from the top to the bottom seemed also more natural. In this article we follow Lamm's original nomenclature.

Not all of the sections contain masks; some present little hexagons covered by granulation (fig.5 left), while others present little spirals made by filigree at the same place (fig.5 right).



Fig. 5 Hexagons and spirals covered by granulation and beaded filigree instead of masks on the Älleberg collar, front and back view (section 13 and 6). Photos by the author <http://files.webb.uu.se/uploader/92/fig5.jpg>

What can be observed as a rule on the sections that have preserved these central units between the rows intact (all sections but 2, 7, 8) is that they never mix up these elements: each section presents either four masks, four spirals or four hexagons. There seems to be an order in which the sections with masks, spirals or hexagons are positioned. The sections close to the clasp, that is, which were on the front of the collar when it was worn, have exclusively masks in these four central units: these are sections 14, 15, 16, 1, 2, 3. These parts of the collar were probably most visible. The other sections present an alternating pattern of *spirals - masks - spirals - masks - hexagons*, which can be observed on

the well-preserved left part²⁷ of the collar: sections 9, 10, 11, 12, 13 (fig.4). This pattern seems to have been symmetrically displayed on the right side, as shown by the well-preserved sections 4, 5, 6, which are symmetrical as far as these central units are concerned with the left sections 13, 12, 11. The fact that the two deteriorated right sections 7 and 8 were also symmetrical with the left sections 10 and 9 can be deduced from the preserved fallen-off pieces of the collar. These include three masks and one spiral. Two masks must have belonged to the lower inner row of section 2 (positions 2.2.b and 2.2.c), as

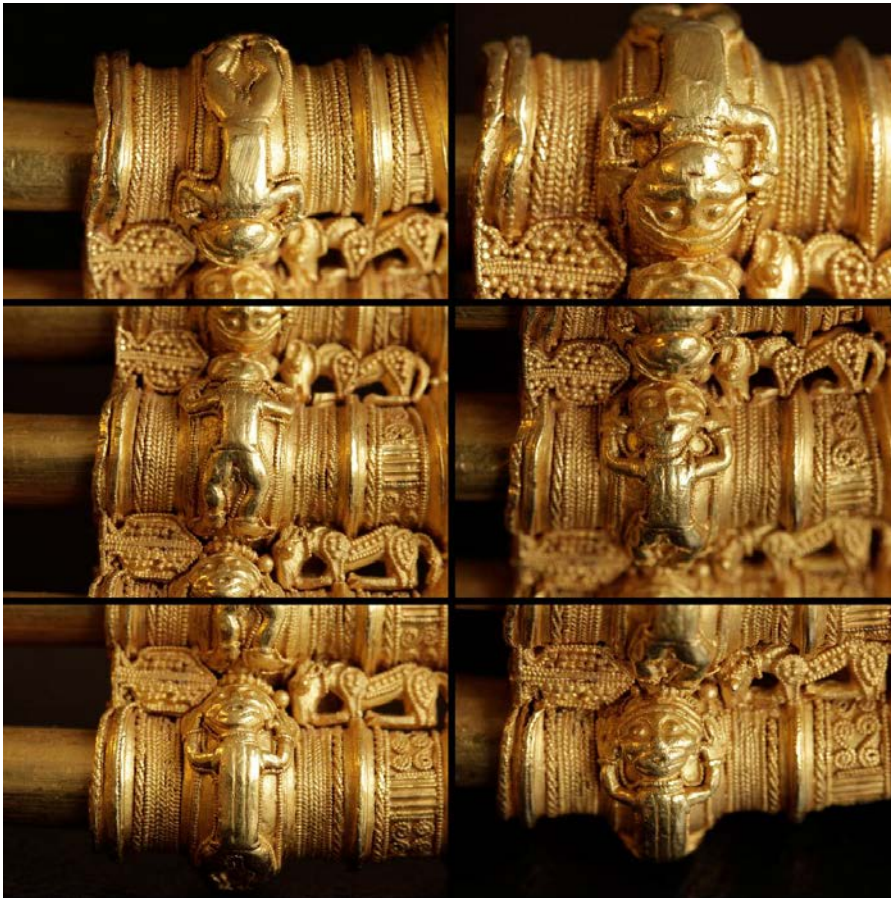


Fig.6 The masks on the three figurines ornamenting the clasp of the Ålleberg collar. Different scales. Photos by the author. <http://files.webb.uu.se/uploader/g2/fig6.jpg>

these places on the upper inner row are still occupied by two masks (positions 2.1.b and 2.1.c), and we know that the sections do not mix up masks, spirals or hexagons on these four central positions. There remains one preserved fallen-off mask and one spiral, which thus have to belong to sections 7 and 8.

²⁷ The left and right sides I refer to in this article is from the point of view of the observer, not that of the wearer of the objects.

Therefore, we know that the damaged sections 7 and 8 had masks or spirals on the four central units. We have seen that the left and right sections of the collar are symmetrical as far as the central units are concerned; hence, section 7 must have presented masks whereas section 8 had spirals. Therefore, the original number of small faces that ornamented the Ålleberg collar was probably 43 (40 masks on the two rows between the tubes plus the three figurines' faces on bulges I.A, II.A, III.A: see fig.6).

On fig.7, all forty masks are put on the same scale for comparison. The position of the faces on the collar is also given according to Lamm's nomenclature. A quick look gives the impression that they are not identical: it is obvious that they have different sizes. The masks have been organised according to their size, based on width: from n°1, which is the largest, to n°40, which is the smallest. Given the disparity of the sizes, the features of the masks are surprisingly similar; they have the same hair divided in the middle and present two grooves on the left and on the right. The hair closely follows the curving of the eyebrows. The faces have the same eyebrows, eyes, cheeks and the same outline of their mouths. One variable is the position of the hole inside the mouth, which can either be centred or shift to the left. Another difference between the masks is the wear, which is much more important on the faces soldered to the three figurines, owing to their exposed position on the clasp of the collar (fig.7:12, 22, 38).

Apart from these differences, the similarities suggest that the masks come from a same model, especially if we consider the extremely small scale of these faces - around four millimetres wide. This would make it practically impossible for goldsmiths to copy them so accurately by working them individually, since their possibilities were confined by the size of their tools and the limits of human view. The shifting of the mouth hole may be explained by the use of a mould and the consistency of its material; if the material was soft clay, it is possible that the mouth part adhered to the protruding part of the patrix²⁸ at this point.

²⁸ A patrix is a positive model of a pattern; a matrix is a negative model.



Fig.7 The forty preserved masks of the Ålleberg collar including the three figurine's masks (n°12, 22, 38) and the three loose masks (n°5, 6, 23), put in an order according to their size and with their positions on the collar. Photos by the author.
<http://files.webb.uu.se/uploader/92/fig7.jpg>

How can we explain the different sizes of the masks when the faces are so similar? Fig.8 shows a comparison between the largest and the smallest mask.



Fig.8 Comparison of the largest and the smallest masks' features from the Ålleberg collar (1.2.B and 14.1.C). Photos by the author. <http://files.webb.uu.se/uploader/92/fig8.jpg>

We can see that the features of the faces are exactly alike and have the same dimensions, but the outline of the head is more complete on the larger face, whereas the smaller one has been amputated mostly on the left, right and upper sides. Thus, the differences in the sizes of the masks provide the information that they were cut down on the sides. Were they all on one sheet of gold before they were cut out? We may answer this question by observing the sides of the masks. Unfortunately, this is only possible on the examples that have fallen out, since the ones soldered to the collar fit into a hexagonal void, which hides much of the sides of the masks.

Fig.9 compares the three loose masks that have quite different dimensions (the left one being on position 23; the middle one on position 5 and the right one on position 6 on fig.7). We can observe the consequences of the cutting down of the faces on their back: the larger ones have hexagonal forms (fig.9.5; 9.6), whereas the smaller one has been so much cut on the left and right sides that one side has disappeared and it looks more like a pentagon or a rhombus (fig.9.4).

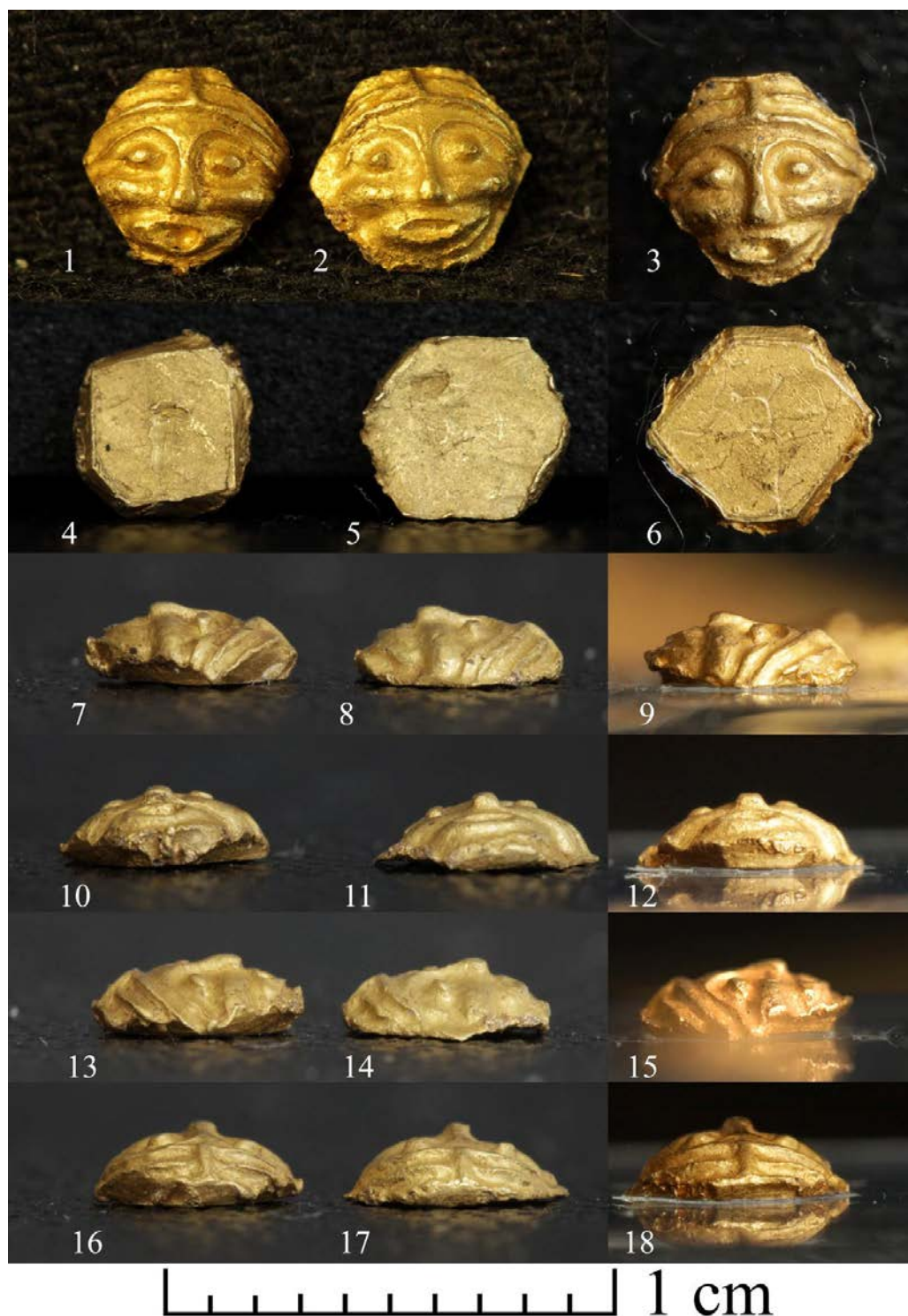


Fig.9 Comparison of the three loose masks from the Ålleberg collar²⁹. Photos by the author. <http://files.webb.uu.se/uploader/92/fig9.jpg>

²⁹ The third one is attached to glass, which is why it is photographed separately from the two others, and the second picture from the bottom is blurry: there is a small spiral from the collar glued to the same glass and which is in between the camera and the object in this position.

The hexagon cut out for the largest mask was a little larger than the represented face; this is why there are still remains of the very thin sheet from which the mask was cut out on the borders (fig.10). Many of the masks on the collar still preserve remains of this original plate from which they were cut out (see for ex. fig.13: remains on the right side of the masks). The other masks must have also been cut out from the same thin sheet of gold, but all remains of this were cut away, since their dimensions are smaller.



Fig.10 Remains of the plate from which the Ålleberg masks were cut out on loose mask n°1. Photo by the author. <http://files.webb.uu.se/uploader/92/fig10.jpg>

On fig.9.7-18 we can compare the sides of the masks. Strong cuts are visible on each side of the smaller face (the left one), whereas practically no cut on the larger face (the middle one), and a little more cutting on the slightly smaller mask (the right one). The larger faces' profiles descend harmoniously to the ground (fig.9.11,12,17,18). The cutting was done in an inclined way to the back, supposedly in order to make the masks fit better into the gaps, which have curved sides (fig.9.4).

Prior to their cutting down, the original masks seem to have been practically identical, as shown by the identical profile and thickness of the three different masks on fig.9, whether they are viewed from the right, down, up, or the left. We can better understand the effort of the goldsmiths while observing the masks in their context on the collar. For example, on fig.11 the mask on the right fits quite well into the hexagonal hollow and did not need much cutting (it has position 18 on fig.7). However, the mask on the left did not fit well and was severely cut on its left side which reduced its width considerably (it has position 24 on fig.7).



Fig.11 A mask with the left side severely cut and another more complete one (position 15.1). Photo by the author. <http://files.webb.uu.se/uploader/92/fig11.jpg>

Cutting them was not always enough to make the masks fit and some were also placed leaning to the left or the right in order to better fit into the gaps³⁰. This is clearly visible for example on the upper row of section 3, where the right mask forms an angle of 13° with the line of the collar (fig.12) and it is also visible on the back of the masks on section 14 (fig.3).



Fig.12 Mask leaning to one side in order to better fit (section 3). Photos by the author. <http://files.webb.uu.se/uploader/92/fig12.jpg>

³⁰ The solution of making the filling lean to one side to fit better was also used on the filigree masks of the Mone collar.

Granules are sometimes soldered to the back of the masks to enhance the surface of adhesion of the soldering to the collar (fig.13). There are also examples of a thin sheet of gold soldered between the mask and the collar to better cover the gap (example: positions 1.2.c and 5.2.c). Barbara Armbruster has noticed small cuts of the metal surrounding the masks and figurines bent on them in order to maintain them³¹.



Fig.13 Front and back of masks on position 16.2.b and c. Photos by the author.
<http://files.webb.uu.se/uploader/92/fig13.jpg>

//The similarities of the faces on the Ålleberg collar show the precision given by the replicating method, whereas the disparity of the sizes indicates manual intervention to make them fit into the hexagonal holes, which have different sizes. Prior to the cutting down of their edges, the masks were identical and they were attached to a same thin sheet of gold. It seems unlikely that direct stamping was used to replicate the masks, as for instance on the bracteates or on Roman coins, since their mouths have shifted in different directions, suggesting that a same patris was pushed into a soft material - probably clay. This was done repeatedly as many times as the needed number of masks. Each hollow formed an identical mould. After having hardened the clay by firing it, melted gold was poured on the mould until the liquid gold overlapped and created a thin sheet behind the masks. Once the gold had cooled down, a great amount of replicated gold faces was obtained. They were cut into different sizes to fit into the gaps on the collar. This hypothetical process is illustrated on fig.14.

As we shall see, this technique of manufacture is completely different from the one used to make the small masks on most of the bracteates, apart from the Åsum bracteate and maybe the recently discovered bracteate from Tørnes in Norway.

³¹ Armbruster, in: Pesch, 2015, Abb.67.

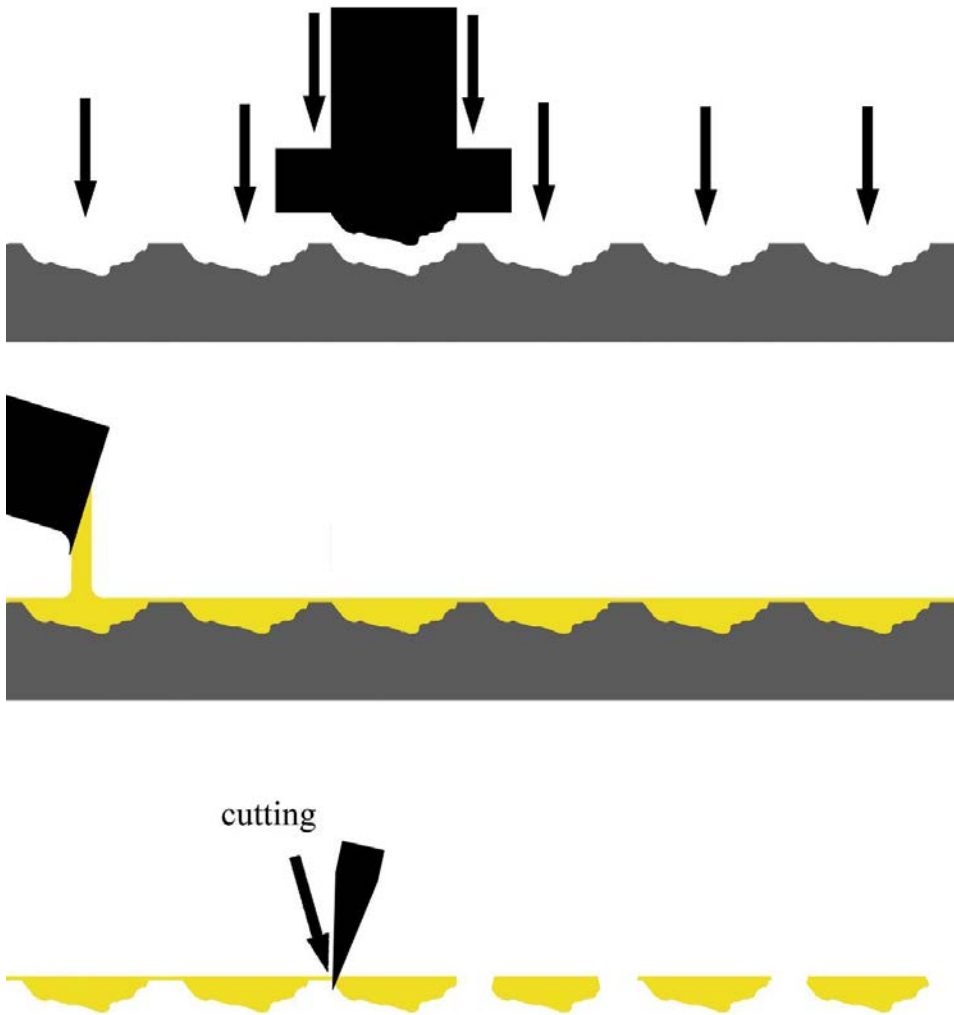


Fig.14 Suggested process of manufacture of the masks on the Ålleberg collar.
<http://files.webb.uu.se/uploader/92/fig14.jpg>



Fig.15 The only mask on the bracteate from Åsum (Skåne, Sweden). Photo by the author.
<http://files.webb.uu.se/uploader/92/fig15.jpg>

The bracteate from Åsum in Sweden is the largest one of the preserved bracteates,³² but it has only one mask, which is placed at the point where the triangular decoration finishes (fig.15). This is also the largest mask on the bracteates with a height of about 8.3 mm (fig.1). It is distinguished by its eyes enhanced by a granule surrounded by beaded wire (fig.16). It has sometimes been judged as the clumsiest of the masks,³³ but I do not share this opinion, which is probably owing to the strong wear that has erased much of the fine lines of the hair and the whole mouth. From its appearance, the mask from the Åsum bracteate is the closest one to the masks on the Ålleberg collar, which are unanimously judged as the finest ones. It has the same parting of the hair in the middle from which the hair falls down on both sides, much like on the Ålleberg collar, whereas all the other small masks studied here have simple vertical lines as hair, except the one from Bostorp (fig.1). These lines are even finer than those on the masks of the Ålleberg collar; they are still visible just under the fold of the hair where they have been preserved from wear and are still slightly visible on the right side of the mask (fig.16 left). The prolongation

³² 12.2 cm wide, weighing 100.4 g. Found in 1882 in Åsum (Södra Åsum parish, Skåne region, Sweden). In the Statens historiska museum, Stockholm, SHM 7128. IK 11 (IK referring to the series: *Ikonomographischer Katalog*, starting with Hauck, 1985), Salin, 1895, p.12, fig.23; Janse, 1922, p.94 fig.43; Lindqvist, 1927, p.229, fig.103; Öberg, 1942, fig.24; Mackeprang, 1952, n°239.

³³ Linqvist, 1927, p.225; Öberg, 1942, p.41.

under the chin suggests that there was a beard, maybe decorated in the same way as the hair³⁴.



Fig.16 The unique mask on the Åsum bracteate, front and side views. Photos by the author. <http://files.webb.uu.se/uploader/92/fig16.jpg>

It is more difficult to judge the technique used to make the Åsum bracteate's mask compared to the ones on the Ålleberg collar, because we cannot see its back. Nevertheless, there are signs that show an affinity with the technique used on the collar's masks, rather than with most of the Swedish bracteates. The Åsum mask was cut out from a plate from which there are some remains on its sides (fig.17). The other Swedish bracteates do not present any remains of the plate from which they were cut out, because they are hollow, and in their case it was possible to cut out the mask's sides directly (see fig.43). As there are remains of the plate on the Åsum mask, this suggests that it was not possible to cut out the mask's sides, probably because it is solid. The existence of this plate on the sides of the mask excludes the possibility that the mask was carved directly out of the metal. In that case there would be no need for this plate. This indicates that the mask was cast in a mould and that the metal overflow, which is similar to what has been suggested for the masks of the Ålleberg collar.

³⁴ We also find bearded masks on strap-ends from the Valsgärde 7 boatgrave and on bracteates (Arwidson, 1963, fig.8, 11).



Fig.17 Traces of the original plate from which the mask was cut out on the Åsum bracteate. Photos by the author. <http://files.webb.uu.se/uploader/92/fig17.jpg>



Fig.18 The bracteate with mask from Tørnes (Norway). Photo Åge Hojem, NTNU Vitenskapsmuseet. <http://files.webb.uu.se/uploader/92/fig18.jpg>

The way the region around the eyes and the nose was carved out on the Åsum mask suggests that it is a patric that was carved and not a matrix, which is also in conformity with what we have proposed for the manufacture of the

masks on the Ålleberg collar: first a patris is carved which is used to make a matrix out of soft clay. Once the matrix is burnt, melted gold is poured in it until it overflows. Then the plate is cut out around the mask, but some of it remains where the sides are concave.

There is another bracteate with mask that seems to use the same technique as the Ålleberg collar and the Åsum bracteate. The bracteate from Tørnes³⁵ was found with a metal-detector in 2014 as part of a small hoard (fig.18). It is remarkable because it differs from the Swedish bracteates with masks on several accounts. It is the smallest of the masks known, and is even smaller than the masks on the Ålleberg collar or its Roman counterparts (fig.1). Given its size and the vertical grooves of the hair, it seems to be closest to the masks on the Dödevi bracteate, but is still much smaller.



Fig.19 Remains of the plate from which the Tørnes mask has been cut out. Photo Åge Hojem, NTNU Vitenskapsmuseet. <http://files.webb.uu.se/uploader/92/fig19.jpg>

I could not study the bracteate in detail, only the photos that Bjørn Ringstad and the NTNU generously sent me, and thus it is too early to conclude decisively on the technique used to make this mask. Nevertheless, the pictures seem to show that the mask was cut out of a plate from which there are remains around the mask (fig.19). As the mask is very small, it could only

³⁵ I thank Jan Peder Lamm for calling my attention to this newly discovered bracteate with mask. It is 3.4 cm wide, weighing 6.095 g. Found in 2014 in Tørnes (Møre county, Norway). In the NTNU University Museum, Trondheim, T26337. IK 654; Ringstad, 2014; Ringstad, 2015.

be cut out roughly, which is why the outline of the mask is so angular. This could be explained in the same way as for the Åsum bracteate: the mask is solid and was cast in a mould. It would be interesting to do a radiography analysis to confirm this. As we shall see later, the Norwegian bracteate's central image and the stamps on its border are also quite different from those on the Swedish bracteates.

The Ålleberg collar and probably the bracteates from Åsum and Tornes are the only preserved objects from Scandinavia featuring this technique. It is possible that the figurines on the Gallehus horns were also cast, but these golden horns from Denmark have been melted down.³⁶

The technique itself seems to be of Roman origin, since it can be found on jewellery from the Empire that is older than the Ålleberg collar; it is dated to the second-fourth centuries A.D. Even if these Roman examples are few, the manufacture process itself is reminiscent of Roman design. We find a similar process in Roman pottery; replicating shapes in clay is the basis of the relief-moulded *terra sigillata* wares. The reliefs on these vessels were obtained by the use of negative clay moulds made by applying patrices into smooth clay before firing³⁷. The term 'industrial' might not be appropriate in the case of Roman moulded pottery with reliefs, because there is no extensive use of machines in the process, but it is clear that the purpose was the replication of whole objects in order to sell them on a large scale.

As a comparison to the Scandinavian goldsmith technique described above, a Roman technique of replicating small solid masks can be studied on two objects: a pair of golden brooches from Kranjski Rak in Slovenia and a silver sheath decoration from Cologne in Germany, both of which are women's dress ornaments. Unlike the Germanic examples, which are pure ornaments soldered to their background, the Roman ones are ornamented heads of nails in precious metal.

The pair of small golden brooches from Kranjski Rak³⁸ (fig.20) was buried on the Volovljek pass in the Slovenian Alps, probably as a votive deposit.³⁹

³⁶ It is possible that the Gallehus horns' figurines were also made in this way if they were actually solid, but we cannot judge by the drawings that remain. The original horns were stolen and melted down in 1802. According to their description, they were individually cast and soldered to the horns (Almgren, 1914, p.220; Axboe, 1979, p.113).

³⁷ Johns, 1971, pp.13-15.

³⁸ 5.1 cm (Vienna) and 5.2 cm (Ljubljana) long, the one in Vienna weighing 39,25 g. Found in 1859 in Kranjski Rak (Kamniška Bistrica region, Slovenia). In the Kunsthistorisches Museum, Vienna, VIIb 313 and in the Narodni Muzej, Ljubljana, AONM inv. No. R 6913; Kenner, 1863, p.61; Garbsch, 1965, p.202 n°442, p.69 fig.34.3; Šemrov, 1996, p.76 n°40, fig. p.23; Garbsch, 1999, p.25.

³⁹ Garbsch, 1999, op. cit., p.25.



Fig.20 Small masks on the pair of Roman gold brooches from Kranjski Rak (Slovenia). a) the one in the Kunsthistorisches Museum in Vienna; b) the one in the Narodni Muzej in Ljubljana. Vienna: photo by the author; National Museum of Slovenia: detail photo Tomaž Lauko. <http://files.webb.uu.se/uploader/92/fig20.jpg>

Jochen Garbsch dated it to about the first half of the second century on the basis that other examples of this type have been found with datable *terra sigillata* pottery to that period.⁴⁰ They are a more luxurious type of brooches that the women of the provinces of Norica and Pannonia wore more commonly in silver and bronze on their shoulders in the first-second centuries A.D. Despite the fact that they are three centuries older and that they come from a Roman provincial culture, the masks on this brooch have surprisingly similar dimensions to the ones on the Ålleberg collar; they are a little more

⁴⁰ Garbsch, 1965, op. cit., p.69.

than three mm wide, whereas the ones on the Swedish collar are between about four and five mm wide (fig.1). The style of the masks is of course more naturalistic on the Roman brooches, and despite their strong wear, we can distinguish small chubby heads of Cupid/Eros, the god of love. Unfortunately, on the Scandinavian jewellery, we lack the satisfaction of identifying the subject of the masks, owing to the poor knowledge on Germanic iconography.⁴¹

The two brooches from Kranjski Rak were separated and one is now in the Kunsthistorisches Museum in Vienna (fig.20a), while the other is in the Narodni Muzej of Ljubljana (fig.20b). They are nearly identical; each presents a 'leg' with pierced decoration in which the three masks are inserted, attached by nails going through the pierced decoration (fig.22). A beaded filigree frame surrounds this 'leg', which is also enhanced by granulation.



Fig.21 Comparison of the small masks' features on the Kranjski Rak brooches, the numbers referring to the ones on fig.20. 1-3 Photos by the author; 4-6 National Museum of Slovenia: detail photo Tomaž Lauko. <http://files.webb.uu.se/uploader/92/fig21.jpg>

⁴¹ On the iconography of Germanic masks: Arwidson, 1963; Back Danielsson, 2007 ; Pesch, 2015.

A closer study of the masks shows that the relatively good quality of execution of the small child's heads, despite their wear, clashes with the more approximate cutting out of the masks into small quite irregular pentagons (fig.21). The cutting out of the masks on the Ålleberg collar is much more precise, as we have seen above. It is possible that an engraver of a higher artistic capacity was employed to carve the masks' patrix, while goldsmiths of lesser workmanship were charged to cut them out and assemble them on the brooches and that they have done a poorer job. Despite the irregularities of their cutting out, the masks themselves seem to be identical, certainly coming from a same model that has been replicated. Was the technique the same as what we have studied on the Ålleberg collar?



Fig.22 Detail of the front and the back of the 'leg' of the Vienna museum's brooch. Photos by the author. <http://files.webb.uu.se/uploader/92/fig22.jpg>

To answer this, we must see if the masks are of solid, cast gold, as the ones on the Swedish collar. The remains on their edges of the sheet from which they were cut out would suggest, at first glance, that they are hollow and that they were made by stamping into a sheet of gold. Nevertheless, a careful observation

of the back of the masks, which is visible through the pierced decoration, shows that they are actually solid (fig.22). This means that what seems to remain of a 'sheet of gold' on their edges was cast with them and that this sheet had the same function as the one that remains on the bigger masks of Ålleberg. The same procedure can be proposed as for the masks on the Swedish collar (fig.23). A unique patris was pushed into soft clay several times, and gold was poured into the voids, but in order to make them evenly thick, more gold was poured than necessary, which created a gold sheet above the masks, to which they were attached, and from which they had to be cut out. This job was done with poor workmanship, leaving much remains of the sheet on the edges of the masks. On the Ålleberg collar, all remains of this original sheet have disappeared in the cutting out process, except around the largest masks.

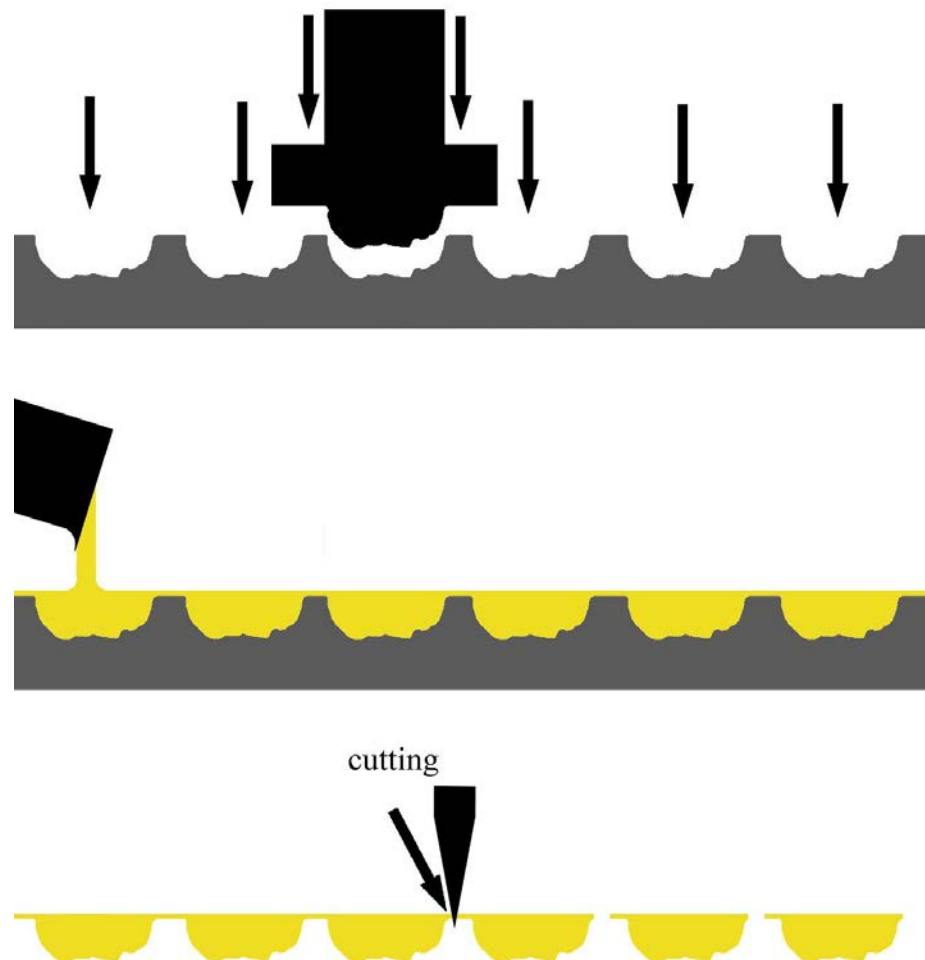


Fig.23 Suggested process of manufacture of the masks on the Kranjski Rak brooches.
<http://files.webb.uu.se/uploader/92/fig23.jpg>

This replication method has something in common with the manufacture of Celtic coins *en chapelet* - which were cast in contrast with the Greek ones, which were struck - except for the fact that the coins were cast in double

moulds with a channel connecting them in order to get a pattern on both sides⁴². The method is even more reminiscent of the casting of blanks for coins before striking them: one technique used to produce the blanks was to cast them in a series of open moulds with the metal overflowing them⁴³. There could have been an influence of techniques of coinage on jewellery in the Roman Empire as both were done by goldsmiths.

Very few examples of this Roman type of replicated small masks have been preserved.⁴⁴ Nevertheless, they were constantly produced, as suggested by the fact that we find the same kind one and a half century later on a silver sheath decoration from Cologne,⁴⁵ which can be dated - judging by the style of its pierced decoration - to the second half of the third or first half of the fourth centuries AD (fig.24). This is a very rare type of sheath decoration for a pair of small knives used by women recalling a reversed 'mushroom' by its form, from which only three examples are known which all come from the region of the Rhine-Mosel.⁴⁶ Only the one from Cologne has silver nails shaped as small masks. Of the three, this is also the one with the most elaborate pierced decoration.

The masks are small nail heads, which had both an ornamental purpose and the practical use of fastening the silver plate to the wood or leather of the sheath. Unfortunately, only one mask is still preserved, but judging by the circular empty holes on the sheet there may originally have been six of them. In 1896, when Anton Kisa published the information, three were still fixed to the silver sheet (fig.24 left).

The preserved mask is slightly larger than the ones from Kranjski Rak, and thus has approximately the same dimensions as the ones on the Ålleberg collar (fig.1). The face's features are much better preserved compared to the worn ones on the Slovenian gold brooches, and one can clearly observe the chubby face of a small child, undoubtedly Cupid/Eros (fig.25). The cuts in the face suggest that it is a patrix that was carved, and not a matrix. The mask is most probably solid, although its back is not visible. We can compare the three

⁴² Hill, 1922, p.2; Sellwood, 1976, p.65-66.

⁴³ Hill, 1922, p.8.

⁴⁴ I have observed a very similar brooch as the one from Kranjski Rak, but in silver, which may present the same decoration of small masks in the museum of the castle of Blagajna (Slovenia).

⁴⁵ Height: 4.88 cm; width: 4.67 cm. In the Römisch-Germanisches Museum, Cologne (Germany), n°1070. Kisa, 1896, p.46, pl.I, 6; Deppert-Lippitz, 1996, p.30-71, fig.18a, 18b, 22.

⁴⁶ The other two examples are: one from a fourth century sarcophagus of the Saint-Medard cemetery in Trier (Cüppers, 1973, p.370-373, Abb.12; Trier, 1984 n°132; Deppert-Lippitz, 1996, op. cit., p.45, fig.10), and one from a well preserved women's grave in a sarcophagus in Dorweiler (Kr. Euskirchen) (Haberey, 1949, p.82-93, Taf.3 Abb.2; Deppert-Lippitz, 1996, op. cit., p.45 fig.9).

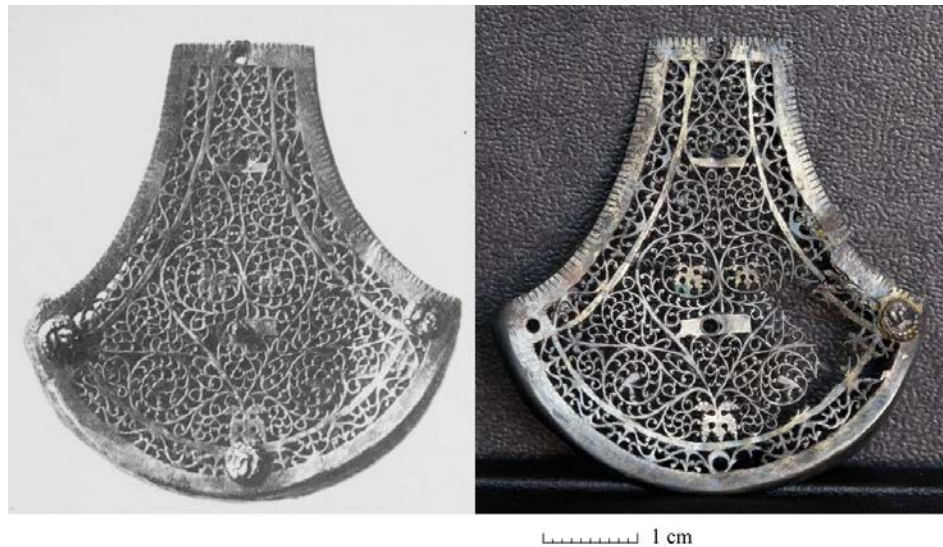


Fig.24 The silver sheath decoration from Cologne, with three masks preserved in Kisa's publication of 1896; now only one is left. Photo by the author.
<http://files.webb.uu.se/uploader/92/fig24.jpg>



1 mm

Fig.25 Two views of the preserved mask on the Cologne sheath. Photos by the author.
<http://files.webb.uu.se/uploader/92/fig25.jpg>

masks on the photograph from 1896, which is of low quality for our purpose (fig.26). Nevertheless, the faces seem to be alike and we may suppose that the replication technique was the same as for the Kranjski Rak brooches discussed above.



Fig.26 Comparison of the features of the three masks on the sheath decoration of Cologne on the picture published by Kisa in 1896.
<http://files.webb.uu.se/uploader/92/fig26.jpg>

The Roman examples of replicated small solid masks are rare, but a similar technique seems to have been used for casting unique pieces, such as the solid protruding relief ornaments on finger rings of the 2nd century AD, such as the one from Porolissum (Romania) (fig.27). These often represent two felids drinking from a vase. To achieve this flat decoration in relief it must have been convenient to first carve a patrix and then to push this into soft clay to form a simple one-sided mould, similar to the replicated small masks discussed above. A finger ring from the Roman hoard of Thetford (United-Kingdom) buried in the beginning of the 5th century with a unique small mask in relief on its bezel below two garnets is executed in a less naturalistic style, closer to that of the Scandinavian masks studied here. The technique used to make it is not clear from the available drawings, but it could be a transitional type of mask between the Roman and the Scandinavian ones. From a stylistic point of view, this is also the case of the two masks adorning another finger ring from the same hoard (these were probably embossed).⁴⁷



Fig.27 Roman finger ring with a cast protruding part: Porolissum (Romania).⁴⁸
<http://files.webb.uu.se/uploader/92/fig27.JPG>

⁴⁷ Johns, 1983, p.95 n°23, fig.16; p.86, n°9, fig.11; Johns, 1996, Fig.3.11.

⁴⁸ Alföldi, 1934, Abb.29. A few other examples: Springiersbach (Germany) (Alföldi, 1934, Abb.15b; Yeroulanou, 1999, p.260 n°335 with related bibliography); Transylvania (Rumania) (Tóth Endre, 1986, pl.22); Corbridge (United Kingdom) (Charlesworth, 1961, (p.1-36, pl.I-IX), p.31, pl.IV.12.); Augst (Switzerland) (Yeroulanou, 1999, op. cit., p.260 n°334, fig.330 with related bibliography).

Another example of non-replicated small cast reliefs is the silver brooch with pierced decoration found in the sanctuary of Samothrace.⁴⁹ It includes two masks in profile, one vase, a dolphin (another missing) and a theatre mask seen from the front. It can be loosely dated to the 3rd century AD. The technique used by the Roman goldsmiths for replicating small masks may be placed in the wider context of casting small moulded reliefs in precious metal.

Masks replicated by the embossing technique

Despite the fact that some of them have very similar dimensions to those on the Ålleberg collar and on the Roman objects studied above (fig.1), the masks ornamenting most of the Swedish bracteates seem to have been made through a very different technique. On the bracteates, the small masks are soldered to an ornamental triangle situated under the suspension loops. They vary in numbers: from one up to ten masks. Three of these bracteates feature several masks; originally ten on the Ravlunda one, six on the Gerete and three on the Dödevi ones (fig.28).



Fig.28 Comparing four bracteates decorated with masks: Dödevi, Ravlunda, Gerete, Åsum. Photo by the author. <http://files.webb.uu.se/uploader/92/fig28.jpg>

One similarity between the three bracteates is the central circular ornament which represents a head in profile on a horse's back (the subject characterising 'C-bracteates'), and the succession of three of the stamp rows are the same on the Ravlunda and the Dödevi ones. These two bracteates present masks with similar sizes of about 5.5 mm high, close to the small size of the Ålleberg faces, whereas the masks on the Gerete bracteate are larger (fig.1). A further similarity between the three bracteates is the tubular suspension loop decorated with two bulges with filigree between them, which is constructed in

⁴⁹ In the Archaeological Museum of Samothrace. A succinct mention in: Lehmann, 1975, p.112.

the same way as the tubes of the gold collars.⁵⁰ The succession of the rows of masks is built up in the same way on the three bracteates: one supplementary mask at each row.

Originally, the bracteate from Ravlunda⁵¹ in Skåne had ten masks, but the top right one has fallen off (fig.29). This bracteate is different from the two other ones with have several masks owing to its thicker gold sheet and its whiter colour, which may suggest a higher silver content. Another originality of the Ravlunda bracteate is that the small masks are soldered directly on the bracteate's main sheet in a triangular zone that interrupts the punch rows. The other two bracteates featuring several masks have a supplementary thin triangular sheet of gold soldered on top of the main sheet and the punches decorating the main sheet continue beneath the triangular sheet soldered upon it, even though these punches were not intended to be visible (see fig.38).



Fig.29 The masks on the bracteate from Ravlunda (Skåne). Photo by the author.
<http://files.webb.uu.se/uploader/92/fig29.jpg>

⁵⁰ This was first observed by Oscar Montelius, which was one of the convincing clues that the three gold collars were of Scandinavian workmanship and not oriental as it was formerly believed (Montelius, 1881-1883, p.244-246; Montelius, 1896-1900, p.81; Hildebrand, 1892, p.179-180. See also Gebühr, Axboe, Hauck, 1992, p.95 fig.2, and more recently Popović, 2008; Fischer, 2008, Pesch, 2015, p.301-309.

⁵¹ 7.3 cm wide, weighing 48.4 g. Found in 1781 in Ravlunda (Ravlunda parish, Skåne region, Sweden). In the Statens historiska museum, Stockholm, SHM 71. IK 144,1; Janse, 1922, p.141 fig.76; Lindqvist, 1926, p.22 fig.3; Lindqvist, 1927, p.217-233, p.222 fig.105; Öberg, 1942, fig.15; Holmqvist, 1980, p.49, fig.37.

Furthermore, the triangle on the Ravlunda bracteate lacks the filigree decoration placed between the small masks of the other two. The background of the masks is the plain main sheet of the bracteate, on which traces of the compass preparing the outline of the rows of punched decoration are still visible on the upper parts (fig.29).

The nine preserved masks of the Ravlunda bracteate can be compared to each other on fig.30, 31 with numbers corresponding to their position on the bracteate from the top left one to the right and down, with number four missing. They are of much cruder workmanship than those that ornate the Ålleberg collar. The goldsmith seems to have carved around the eyes, the nose and the mouth of the model, whereas on the Ålleberg collar there is a smoother rendering of the facial features. Much wear has erased the fine vertical grooves that represented the hair; it is best preserved on mask n°6. A sort of band separates the hair from the face, which might indicate a diadem, a feature perhaps reminiscent of the images of Roman emperors.⁵² The upper line of the band was chased, which means that a blunt chisel was successively pushed into the metal to form the line. This chasing is different on every mask, which means that the lines of the band and probably of the hair were made separately for each mask. In contrast to the hair part, the faces seem to be exactly alike.

The carving seems to have been done in exactly the same way on all the nine faces, which suggests that it is not the gold that was carved, but a model, and that the faces are replicates. This means that the faces were first replicated and then the hair and the band were individually chased on each mask. We could imagine a similar type of replication technique as seen on the masks of the Ålleberg collar, although there is no proof here of a soft matrix material. The mouths of the faces are too worn to be compared. However, when we compare the masks from a side view, differences appear in their different thickness (fig.31), suggesting that the technique used was not the same as on the Ålleberg collar, where they have exactly the same thickness, at least on the three fallen-off pieces (fig.9).

Furthermore, the masks of the Ravlunda bracteate might be hollow, as suggested by the markings left by the soldering behind the fallen-off mask n°4 (fig.32).⁵³ Indeed, the soldering only touched a narrow band on the periphery of the back of the mask, not its inside. If the faces are hollow - as suggested by these markings - the replication technique must have been very different from

⁵² Holmqvist sees a hairdress with a band for the faces on the Ravlunda bracteate, but the much worn grooves suggest hair (Holmqvist 1980, p.49). More surprisingly, he considers that the Gerete masks are wearing helmets, even though the well-preserved grooves clearly represent hair here, in my opinion (see fig.34).

⁵³ A fact already noticed by Bohlin (Bohlin, 1981, p.85).



Fig.30 Comparison of the nine preserved masks on the Ravlunda bracteate numbered from the top left to the right and down. Photos by the author.
<http://files.webb.uu.se/uploader/92/fig30.jpg>

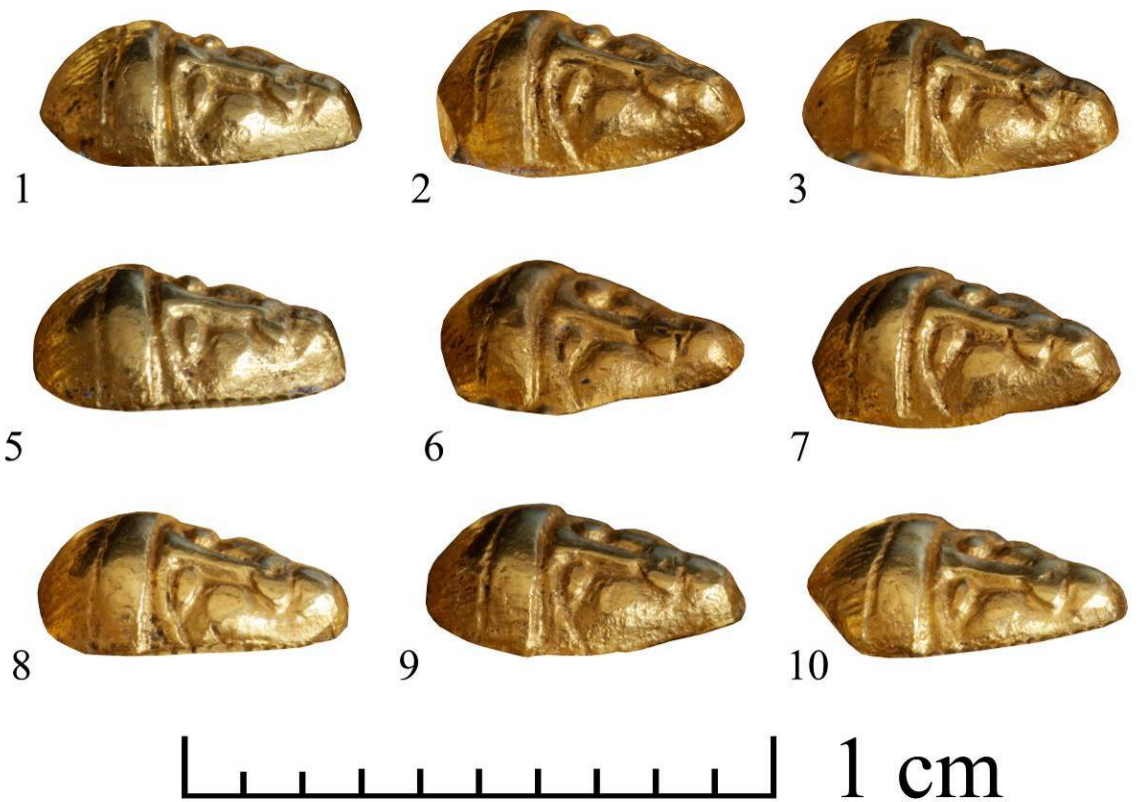


Fig.31 Comparison of the nine preserved masks on the Ravlunda bracteate, side view.
Photos by the author. <http://files.webb.uu.se/uploader/92/fig31.jpg>



Fig.32 View of the depressions left by the soldering on the sheet of gold that outlines the contours of the fallen-off fourth mask of the Ravlunda bracteate. Photo by the author.
<http://files.webb.uu.se/uploader/92/fig32.jpg>

the one described for the solid ones on the Ålleberg collar and the Kranjski Rak brooches. An X-ray of the masks of the Ravlunda bracteate may provide a definite answer to this question.

The bracteate from Gerete⁵⁴ presents longer masks, so there is only space for six of them on the triangular surface (fig.33), although it is a slightly larger triangle than the one on the Ravlunda bracteate. The masks are not aligned with each other but with the edges of the triangle, except for the middle ones (position 2 and 6), which are approximately placed vertically. The same feature is visible on the Ravlunda bracteate, even though it is less obvious; the masks on the sides are aligned with the sides of the triangle and not with the other masks (fig.29). A considerable difference is that on the Gerete bracteate the masks are soldered to a very thin supplementary triangular gold foil on which spiral-beaded filigree decorates the spaces between the faces (fig.33). The sides of the triangle are enhanced by a line of beaded filigree (doubled where the masks touch the frame) and a moulding, whereas on the Ravlunda bracteate there is only a simple line of beaded wire that acts as a frame (fig.29). The more complex decoration is not owing to the greater size of the Gerete bracteate, since we also find this on the smaller Dödevi bracteate (fig.37), but perhaps a development towards more decoration or a taste for the more ornamental.



Fig.33 The masks on the bracteate from Gerete (Gotland, Sweden). Photo by the author.
<http://files.webb.uu.se/uploader/92/fig33.jpg>

⁵⁴ 9.3 cm wide, weighing 60.0 g. Found in Gerete (Fardhem parish, Gotland region, Sweden). In the Statens historiska museum, Stockholm, SHM 18375. IK 62,1; Lindqvist, 1927; Öberg, 1942, fig.17; Mackeprang, 1952, n°211; Herschend, 1980, p.226; Arrhenius, 1987, p.466, XI,15, Taf.79.



Fig.34 The masks of the Gerete bracteate in order, numbered from the top left to the right and down. Photos by the author. <http://files.webb.uu.se/uploader/g2/fig34.jpg>

At first glance, the masks of the Gerete bracteate seem to be dissimilar (fig.34). A closer look shows that each mask has an upper part that is dissimilar and a lower one that is similar, exactly as on the Ravlunda masks. The face with the eyes, the nose and the mouth come from a same model; this is especially visible in the peculiar asymmetrical shape of the noses. The hair parts are different and they were worked individually. This is visible on the horizontal groove separating the hair from the eyes, which is placed differently on each mask. On mask n° 2, there are even two of these lines; one initiated from the right and

the other from the left. The vertical grooves are also different from one mask to another even though they have the same number. Thus, there were two phases in the manufacture of the Gerete masks: a phase of replicating the facial features and a phase of retouching the hair on each mask by making the grooves by carving, or more probably by chasing them, as on the Ravlunda masks.



Fig.35 Comparison of the six preserved masks of the Gerete bracteate, side view. Photos by the author. <http://files.webb.uu.se/uploader/92/fig35.jpg>

A side view of the masks show that their thicknesses vary considerably (fig.35) in the same way as previously noticed on the Ravlunda bracteate, suggesting a similar type of unsolved problem in their manufacture. The Gerete bracteate also hints that the masks are hollow, as indicated by the broken part on the right bottom side of mask n°1 (fig.36).⁵⁵ The hollowness of the masks seems to be confirmed by the small hole under the left eye of mask n°2 (fig.34).



Fig.36 The break in the mask n°1 on the Gerete bracteate. Photo by the author. <http://files.webb.uu.se/uploader/92/fig36.jpg>

⁵⁵ A fact already noticed by Bohlin (Bohlin, 1981, p.83).

The Dödevi bracteate⁵⁶ presents similarities with both the Ravlunda and the Gerete ones. With the Ravlunda bracteate it shares the succession of three of the rows of punches: peltae, losanges and ‘S’, as well as the similar size of its masks (fig.1). With the bracteate from Gerete it shares the colour of the gold, the concept of the ornamental triangle below the suspension loop with a supplementary thin triangular foil of gold and the filigree decoration of the masks’ background (fig.37, 38).



Fig.37 The masks on the bracteate from Dödevi (Öland, Sweden). Photo by the author.
<http://files.webb.uu.se/uploader/92/fig37.jpg>

The beaded filigree wire that surrounds each mask is a close parallel to the masks on the Gratianus medallion of the first Szilágysomlyó hoard, which presents the same filigree decoration (fig.47). However, the concept of delimiting the figures by filigree is also present on the Ålleberg collar; the three figurines on the clasp have their outlines enhanced by beaded filigree (fig.6). This is also the case for the single masks on the Åsum (fig.16) and Bostorp (fig.45) bracteates. A good technical reason for this filigree “frame” around the masks could be to enhance the surface of soldering, which might be thin if we assume that the masks are hollow (see the impression of the soldering of the fallen-off mask of the Ravlunda bracteate in fig.32). A more aesthetical reason

⁵⁶ 6.9 cm wide, weighing 32.8 g. Found in Dödevi (Högby parish, Öland region, Sweden). In the Statens historiska museum, Stockholm, SHM 5714. IK 45; Salin, ‘1895, p.16, fig.30, p.52, fig.64; Janse, 1922, p.95 fig.44; Lindqvist, 1926, p.21 fig.2; Lindqvist, 1927, p.217-233, p.222 fig.104; Öberg, 1942, fig.16; Mackeprang, 1952 n°192.

would be to conceal the irregularities of the cutting out of the masks from the original plate, as for the Åsum bracteate, which is probably solid. Another similarity with the Szilágysomlyó hoards is the peculiar filigree interlace formed by three gold threads that decorate the suspension loop of the Dödevi bracteate (fig.37). Indeed, the same filigree interlace decorates a repaired part of the “oath ring” of the second Szilágysomlyó hoard.⁵⁷



Fig.38 Side view of the triangular decoration on the Dödevi bracteate showing the punched ornaments which run beneath the thin triangular sheet of gold. Photo by the author. <http://files.webb.uu.se/uploader/92/fig38.jpg>

The masks on the Dödevi bracteates have been much damaged, as has the bracteate itself, which has an undulating sheet (fig.38). The first mask has a damaged left side of the mouth; the third has a damaged right side of the hair (fig.39). It is more difficult to establish their similarities than for the masks on the two previous bracteates. However, the features of the faces seem to be identical. These suggest a different technique than previously seen. There is a small protruding line outlining the contour of the eyes, suggesting the use of a matrix rather than a patris as in the previous examples. We can see the same kind of protruding line encircling the eye of the Germanic imitation of a Valens medallion in the Szilágysomlyó hoard, one of the first proto-bracteates.⁵⁸

The damages on the bracteate reveal the hollow nature of the masks. Indeed, mask n°3 has been pushed in and has cracked in a way that would be surprising if the mask was solid (fig.40). This seems to confirm our hypothesis for the Ravlunda and Gerete bracteates; the small replicated masks on the bracteates are hollow.

⁵⁷ Capelle, 1994, fig.56; Attila Kiss, 1999, p.69, fig.71.

⁵⁸ *Barbarenschmuck...* 1999, p.30 Abb.1.



Fig.39 The masks of the Dödevi bracteate in order numbered from the top left to the right and down. Photos by the author. <http://files.webb.uu.se/uploader/92/fig39.jpg>



Fig.40 The damages visible on the third mask of the Dödevi bracteate which has been crushed and has cracked. Bottom view with the other two masks and side view. Photos by the author. <http://files.webb.uu.se/uploader/92/fig40.jpg>

A smaller bracteate from Fride⁵⁹ and a very similar one from Riksarve⁶⁰ also show a unique mask (fig.41). These two bracteates are so alike, that they were probably struck by a same die. Their punched decoration is also identical, except that the one from Riksarve has an extra outer rim of semi-circular punches. The masks decorating them also look the same and they probably come from a same model, judging by the outline of their eyes on fig.42.⁶¹ In this case, these two bracteates would be the only example of the use of one replicated mask on different objects. This shows that the goldsmiths would put aside the mould made for a mask on one bracteate to reuse it again on another bracteate. In a same workshop, dies, punches and mask moulds were reused to make different bracteates. As all three bracteates with this die were found on Gotland, the workshop was presumably situated here.⁶²



Fig.41 The bracteates from Fride and Riksarve with a unique mask (Gotland, Sweden).
 Photo by the author; photo by Nancy Wicker.
<http://files.webb.uu.se/uploader/92/fig41.jpg>

⁵⁹ 4.88 cm wide, weighing 20 g. Found in 1843 in Fride (Ljöst parish, Gotland region, Sweden). In the Statens historiska museum, Stockholm, SHM 1088. IK 57,1; Öberg, 1942, fig.46; Lindqvist, 'Geretebrakteaten...1927, p.225, fig.109; Mackeprang, 1952, n°218.

⁶⁰ 4.97 cm wide, weighing 17.12 g. Found in 1807 at the farm of Riksarve (Rute parish, Gotland region, Sweden). The bracteate was first mentioned in 1812, but was long believed to have disappeared. It has been identified with high probability by Pekka Sarvas in the Coin Cabinet of the University of Helsinki, Collection A. Blad 1820. According to Montelius no place called 'Riksarfve' is known in Rute parish (see Mackeprang). IK 57,3; Janse, 1922, p.136 n°255; Mackeprang, 1952, p.157, n°207; Sarvas, 1971; Axboe, 1982, p.69, pl.VII, n°207; Wicker, 1990, p.297 fig.2-35.

⁶¹ I have not yet had the opportunity to study the Riksarve bracteate to verify this hypothesis.

⁶² Another more simple bracteate was struck with the same die from Öster Ryftes (Gotland): IK 57,2; Sarvas, 1971, p.27; See figures in Hauck, 1985, p.67-68, n°57,2.



Fig.42 Two different views of the mask on the Fride bracteate showing that it was smashed in and has cracked and a comparison with the mask on the Riksarve bracteate. Fride: photos by the author; Riksarve: detail photo by Nancy Wicker.
<http://files.webb.uu.se/uploader/92/fig42.jpg>

The mask on the Fride bracteate is of great interest for our purpose, because it has been heavily smashed in, cracking the chin (fig.42).⁶³ The mask from Riksarve was also crushed on the right side of its chin. These damages clearly show that the masks are hollow, seeming to confirm our hypothesis about the hollowness of the previously studied Swedish bracteate masks. Most of these have shown evidence of being hollow: the markings left by the soldering of the fourth fallen-off mask on the Ravlunda bracteate (fig.32), the break on the first mask of the Gerete bracteate (fig.36) and the damage on the third mask of the Dödevi bracteate (fig.40).

The masks on the bracteates seem to be made of gold sheet, suggesting that they were produced by embossing, a replication process considerably differing from that of the Ålleberg collar's masks (fig.43, compare with fig.14). First, a model was carved - a patris in the case of Ravlunda and Gerete, a matrix in the case of Dödevi. Then the patris was used to make a matrix in the case of Ravlunda and Gerete. The matrix must have been of a solid material such as bronze. Then the gold sheet was pressed into it by embossing: rounded tools were gradually used with diminishing diameter to deform and press the sheet into the cavities of the matrix. Next, the mask was cut out, probably from its side, as nothing seems to remain from the original flat plate. The differences in the thicknesses of the replicated masks may be explained by the cutting out, which may have been difficult to do evenly for such small objects. Some of the details were then added on each mask, as we have seen for the hair and headband parts on the bracteates of Ravlunda and Gerete (the same may be true for the masks on the Dödevi, Fride and Riksarve bracteates, but this is more difficult to judge because of the damages). To chase or engrave the details, the inside of the mask might have been filled with wax or another material to support it. This shows that the embossing process was not precise enough for rendering the details on such small objects and these had to be added on each mask.

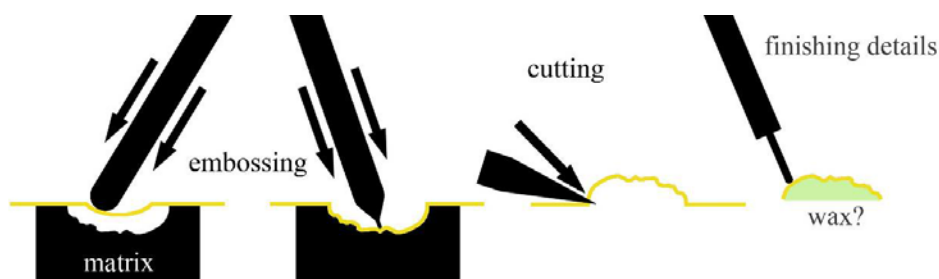


Fig.43 Suggested process of manufacture of the embossed masks on the bracteates.
<http://files.webb.uu.se/uploader/92/fig43.jpg>

⁶³ This was already noticed by Bohlin (Bohlin, 1981, p.83).

The embossing technique is a much more widespread goldsmith practice than the casting technique that we have described on the masks of the Ålleberg collar. It recalls the way most of the small gold foil figurines (*guldgubbar* in Swedish) of the 6th – 7th centuries were made, which are also replicated and which were much widespread in Scandinavia⁶⁴ (fig.44). These gold foil figurines are usually larger than the masks on the bracteates. Experiments show that they were possibly made by striking them with a patir into a thick surface of lead, the lead pushing the gold foil into the voids of the patir.⁶⁵ For manufacturing the masks on the bracteates this kind of technique would perhaps not be relevant, because the relief is more important as well as the sheet's thickness compared to the gold foil figurines. Nevertheless, it is possible that in the case of the bracteate masks the gold sheet was pushed into the matrix by hitting it with lead and not by using small tools; it is not possible to see the back of the masks to judge, but experiments could be carried out to find out which is the more plausible method.



Fig.44 Embossed replicated figurines on gold foil from Eketorp (Sweden). Photo: Statens historiska museum, Stockholm. <http://files.webb.uu.se/uploader/92/fig44.jpg>

There are two other bracteates (the Bostorp and Wapno ones) decorated with the only mask which I could not study closely (in addition to the ones from Tornes and Riksarve). Therefore, their technique is still uncertain, but some interesting information can be extracted from their photos and from their find circumstances.

The Bostorp find indicates the possibility of dating the bracteate masks with six solidi covering the period 457- 474.⁶⁶ The mask on the Bostorp bracteate⁶⁷ is one of the largest; it is the widest but is not as long as the one on

⁶⁴ Watt, 2004.

⁶⁵ Lamm, 2004, p.110-112 ; Josefson & Svensson, 2006.

⁶⁶ The Bostorp solidi are: Leo I (457-474), Libius Severus (461-464), Anthemius (467-472), Flavius Glycerius (473-474). Hofrén, 1952, p.82, 84; Axboe, 1982, pl.V n°189a/1; Axboe, 2004, p.252-253; Axboe, 2007, p.73.

⁶⁷ 6.89 cm wide, weighing 34.4 g; Sweden, Kalmar, Kalmar Läns Museum, KLM 23575; IK 221; Hofrén, 1952; Fagerlie, 1967, p.189-190; Herschend, 1980, p.228-229, fig.37; Axboe,

the Åsum bracteate (fig.1). The Bostorp mask and the Åsum one share the horizontal grooves of the hair, separated by a line in the middle, which is also a similarity with the masks of the Älleberg collar. Similar to the masks from Åsum and Dödevi, it is entirely surrounded by a beaded wire (fig.45).



Fig.45 The bracteate with a unique mask from Bostorp (Öland region, Sweden). Photo: Daniel Lindskog, Kalmar Region's Museum. <http://files.webb.uu.se/uploader/92/fig45.jpg>

The three small granules surrounded by beaded wire that fill in each of the triangle's angles around the mask are exactly the same as on the Riksarve bracteate (fig.41 right), but since the Bostorp bracteate is larger, there are two extra lines of winded wire forming the sides of the triangle in addition to the beaded wire on the Riksarve bracteate. The Åsum bracteate has the same kind of granules surrounded by beaded wire for its eyes (fig.16). The Bostorp mask seems to have the same protruding line encircling the eye as seen on the Dödevi masks (fig.39), which hints that the matrix was carved directly. These details suggest workshop connections for the Bostorp and the Riksarve bracteates and show the close ties between the bracteates with masks found on

Öland, Gotland and in Skåne. The similarities with the Riksarve bracteate and the Dödevi masks suggest that the technique used to make the masks may also have been embossing, but a close study of the mask would be necessary to confirm this.

The Swedish bracteates studied above form a homogenous group in which the connections are such that it seems difficult to distinguish different workshops. Are the bracteates with masks found outside of Sweden similar to these? We have already seen that the Norwegian bracteate from Tornes is quite different from the Swedish ones, regarding its central image and also the technique used to make the mask, which seems to be cast as the ones on the Ålleberg collar. There is another bracteate found outside Sweden, decorated with one mask, which I could not study directly.⁶⁸ It was found in Wapno (Wągrowiec County, Poland), which Lindqvist erroneously situated in the region of Halland in Sweden⁶⁹ (fig.46). The mask is one of the smallest that we know of (fig.1). It seems to be much damaged to the extent that the facial features are nearly unrecognizable. It is difficult to judge by the picture whether the mask was crushed and whether it is hollow as the masks of the Swedish bracteates or whether it is heavily worn. As no remains of an original plate seem visible, I would suggest that it was not cast, but perhaps embossed.

Apart from the Wapno bracteate, another example outside Scandinavia of the Germanic kind of mask under study here comes from the famous royal hoard of Szilágysomlyó I in Transylvania⁷⁰ (fig.48). This is not a bracteate, but its ancestor, a Roman medallion, which has been decorated by masks around its frame to which a suspension loop has been soldered secondarily, destroying some of the beaded filigree and granulation decoration that remains from a first suspension loop.⁷¹ There are fifteen masks radiating around the medallion,

⁶⁸ Jan Peder Lamm mentions another bracteate with unknown provenance with a mask that is suspected to be a fake (Lamm, in: Pesch, 2015, p.62). I thank Morten Axboe for having shown me pictures of it (he is not so sure of this bracteate being a fake). Judging by the pictures, it is not genuine in my opinion; its central circular decoration instead of being struck seems to have been entirely made by repoussé and chasing in a very fine way, a technique that the Scandinavian goldsmiths did not seem to have mastered to such a degree, judging by their clumsy way of using repoussé on other bracteates (see fig.2 in Bohlin, 1981).

⁶⁹ IK 211; Lindqvist, 1926, p.21; Lindqvist, 1927, p.225; Mackeprang, 1952, p.183 n°330, pl.11:7.

⁷⁰ The village of Szilágysomlyó followed the intricate history of Transylvania: it lay in Hungary in 1797 at the time of the discovery of the first treasure which came to the collection of the Habsburg rulers in Vienna, this is why it is still preserved there in the Kunsthistorisches Museum. The second treasure of Szilágysomlyó discovered in 1889 joined the Nemzeti Múzeum in Budapest. Today Szilágysomlyó is Șimleul-Silvaniei in Rumania. Capelle, 1994; 1999; Quast, 2011, p.125-126.

⁷¹ 6.4 cm wide, weighing 57.79 g. Found in 1797 in Szilágysomlyó, Hungary (today Șimleul-Silvaniei in Rumania). Vienna, Kunsthistorisches Museum, Münzkabinett, RO 32478.

each one encircled by beaded wire and separated from one another by spirals in filigree and granulation.⁷²



Fig.46 The bracteate from Wapno (Poland). Photo: IK 211.
<http://files.webb.uu.se/uploader/g2/fig46.JPG>



Fig.47 Front and back of the Gratianus medallion from the first Szilágysomlyó hoard with its frame decorated by masks. Photos: © KHM.
<http://files.webb.uu.se/uploader/g2/fig47.jpg>

⁷² Jan Peder Lamm compares it with a medallion of Jovianus found in Boroczyce (Poland) which presents a succession of eight embossed animal heads and eight embossed shields on its frame. Bursche, 1990, p.150, fig.4; Lamm, in: Pesch, 2015, p.60, note 72.

The masks are much larger than the ones discussed above - about two times larger than the one on the Åsum bracteate - and the features of the faces are more crudely rendered, although much worn (fig.1). This shows that the masks on the Szilágysomlyó medallion cannot be put into the same category as the smaller and prettier masks on the Scandinavian bracteates. However, they may be their predecessors, if made by the same technique - being about half a century older than the bracteates.⁷³ A closer look at the masks shows that they are exact replicates, but have been much damaged (fig.48). These damages indicate the technique used to make them, because several have been crushed in, especially n°15 on the left side of the suspension loop. Therefore, the masks are undoubtedly hollow, as also indicated by the back of the medallion's frame, where the gold sheet to which the masks are soldered has bent in behind each mask, probably under the pressure of the soil during the one and a half thousand years while the hoard was buried (fig.47 right).⁷⁴



Fig.48 The masks on the Gratianus medallion of the first Szilágysomlyó hoard, numbered in a clock-wise order starting from the right of the suspension loop. Photo based on: © KHM. <http://files.webb.uu.se/uploader/92/fig48.jpg>

⁷³ There is a considerable time gap which separates the Roman multiples from the first half of the 4th century with the bracteates which imitate them in the second half of the 5th century. According to Morten Axboe, Roman multiples were kept in Scandinavian royal treasuries and imitated much later: Axboe, 2001.

⁷⁴ The sheet on the back was also pressed in behind the spirals of the filigree, as the centre of these spirals is also hollow. One can see this on the filigree between masks 14 and 15 from which the central granule broke down and we can see the hollow left behind it.

Wear does not seem to entirely account for the bad quality of the faces; the features are too thick, probably because the sheet of gold was pressed on a patrix instead of a matrix. Therefore, the technique used on the Szilágysomlyó masks does not seem to be the same as for those decorating the bracteates. Nevertheless, they can be considered as forerunners to the masks on the bracteates in a time when the Germanic goldsmiths were working in a cruder manner. This was probably towards the end of the 4th century A.D., because the medallion is dated to Emperor Gratian's reign (377-383) and is the latest or one of the latest medallions of the treasure.⁷⁵ The Scandinavian bracteates studied here could date from the second half of the 5th century, judging by the Bostorp find, which associates one of them with six solidi covering the period 457-474.⁷⁶ They can be considered as the heirs to the Szilágysomlyó medallion-type of objects in two ways: the bracteates themselves were developed by imitating Roman imperial medallions of the type of the Gratianus medallion, and the small masks on the bracteates are a more refined continuation of the masks decorating the Gratianus medallion. We can trace an affiliation between the Germanic goldsmiths decorating Roman medallions near the border of the Roman Empire towards the end of the 4th century and the Scandinavian goldsmiths decorating bracteates in the second half of the 5th to the first half of the 6th century.

It would be interesting to know more about the identity of the royal family that hid the Szilágysomlyó I hoard. Scholars still debate on this - the rulers over the Wisigoths, the Gepids and the Ostrogoths have been suggested, but it is difficult to say more, because of the doubtfulness of the practice of assigning specific material culture to specific Germanic ethnic groups, which were mobile at this time and open to influences from each other.⁷⁷ The hoard as such reveals that this family had a bound with the Roman emperors from the end of the third to the end of the fourth centuries, from which the medallions date (286 to 383). They were imperial gifts, each one weighing several multiples of a solidus. They were made into pendants by Germanic goldsmiths, a practice learned from members of the Late Roman aristocracy.⁷⁸ Owing to the hoard's geographical localisation in the northern part of Transylvania, the royal family concerned was certainly involved in the important changes that

⁷⁵ Günther Dembski, 1999, p.33, 186.

⁷⁶ Hofrén, 1952; Axboe, 2004, p.252-253; Axboe, 2007, p.73.

⁷⁷ Bóna István, a great authority on Hungarian archaeology, believed in the possibility of recognizing different ethnies behind the Germanic material cultures in the Carpathian basin and assigned the Szilágysomlyó hoard to the Gepids, followed by several other scholars (Bóna 1986, p.130-134; Attila Kiss 1999, p.163-168).

⁷⁸ The Roman aristocrats mounted coins (especially in the third century) and medallions (especially in the fourth century). For the coins: Brenot & Metzger 1992; for the medallions: Yeroulanou 1999, fig.4, 20, 42, 43, 69, 138-140, 164.

took place in the end of the 4th century in this region owing to the effects of the early migrations.



Fig.49 Replicated masks on a Roman phalera from the Thorsberg bog. Photo by the author. <http://files.webb.uu.se/uploader/92/fig49.jpg>

The masks on the Szilágysomlyó medallion are part of a wider Germanic tradition of replicating small gold or silver figures in relief, for which we have several examples of the 3rd – 4th centuries. A pair of round gold brooches in the second hoard of Szilágysomlyó has small quadrupeds ornamenting its frame, nine looking to the left, seven looking to the right and may be dated to about the end of the 4th – the beginning of the 5th centuries⁷⁹. They are made of embossed gold sheet and probably originate from two matrixes – one with the animal facing to the right, one to the left. Germanic goldsmiths were already using the embossing technique for replicating purposes in the 3rd century, as shown by the silver beakers from the island of Zeeland (Denmark), which are decorated with a golden band representing a series of replicated animals or humans, including two masks on the Himlingøje goblet, made by embossing. These figures are larger than the small faces on the bracteates⁸⁰.

⁷⁹ The gold brooches and cups of the second Szilágysomlyó hoard are often dated late on the historical argument that it is under the Hunnic rule that gold arrived in abundance into the Barbaricum (Attila Kiss 1999, p.164). Nevertheless the treasure is of outstanding richness and was owned by a royal family, so it does not necessarily belong to the ‘golden age’ of the Huns.

⁸⁰ The masks on the Himlingøje goblet are about 9 mm high. Petersen, 1890, p.11-12; Fettich, 1930, pl.XVIII; Lotte Hedeager, 1990, p.120, n°42, fig. p.121; Jørgensen, Petersen, 1998, p.152, fig.113.



Fig. 50 Replicated masks on a curved silver decoration from the Thorsberg bog. Photo by the author. <http://files.webb.uu.se/uploader/92/fig50.jpg>

The Germanic goldsmiths probably learnt the embossing technique of replication from the Romans, who used it on such objects as the Minerva heads, which decorate two phalera from the Thorsberg moss⁸¹ and which may date from the 3rd or 4th centuries (fig. 49). These masks are made from a gilded silver sheet and are much larger than the masks on the Scandinavian bracteates (fig. 1). A close analysis has shown that these two phalera were made in the same workshop and it has been suggested that they were made by Germanic goldsmiths, as indicated by the animal frieze surrounding one of them, which has similarities with the animal friezes on the silver beakers from Zeeland.⁸² However, the animal frieze on the phalera has nothing that could be described as non-Roman and the Mars representation rather hints to Roman provincial goldsmiths. Another example of replicated masks from the same moss is a curved decoration in silver with an animal frieze, framed on two sides by replicated masks in profile wearing a headband. Every other mask is gilded, creating a rhythmical sequence of silver- and gold-coloured heads (fig. 50).⁸³ This is believed to be of Germanic workmanship, although it could also fit in as a late Roman product.⁸⁴ If it is of Germanic workmanship, it is a good illustration of the mastering of Roman replication techniques by Germanic goldsmiths.

From the Illerup and Vamoose bog deposits, replicated masks about two cm wide are believed to have adorned shields belonging to the 3rd century (fig. 1.16).⁸⁵ They are made of an embossed gilded silver sheet, the inside of

⁸¹ Each one is 13.2 cm in diameter. Fettich, 1930, pl. XX.2; Werner, 1941; Carnap-Bronheim, 1997; Blankenfeldt, 2015.

⁸² Carnap-Bronheim, 1997.

⁸³ Fettich, 1930, pl. XX.1.

⁸⁴ The rendering of the animals is not more schematic as the ones on some Roman gold bracelets of the Hoxne treasure from the end of the 4th - beginning of the 5th centuries (see: British Museum P 1994-4-8 21-22-23).

⁸⁵ Museum of Moesgaard, Denmark; photo by Lennart Larsen 1990, p. 131.

which has been filled in with tin to make them more solid.⁸⁶ Most of these masks are of Germanic type, but there is also a Roman one, coming from the Illerup deposit.⁸⁷ The shield masks from Illerup and Vimose illustrate the contacts established between Roman and Germanic goldsmiths in the interaction context of war. Perhaps it is in the soldiers' milieu that the Romans could have passed down the concept and technique of replicating masks to Germanic goldsmiths.



Fig.51 Detail of replicated figures on a pair of Etruscan gold discs from the fifth century B.C. in the Louvre Museum (Bj 1887; Bj 1888). Photo by the author.
<http://files.webb.uu.se/uploader/92/fig51.jpg>

Beyond the Romans, the origins of the embossing replication technique are Greek-Etruscan. A remarkable example of this is the small replicated Pegasus and Chimera reliefs on the golden pair of flacon containers in the Louvre, which are probably Etruscan works from the 5th century B.C. (fig.51).⁸⁸ These figures of about 1 ½ to over 2 cm are much larger than the masks on the bracteates, but they can be considered forerunners to the Germanic goldsmith replication technique of embossing.

⁸⁶ 74 masks of nine type from Illerup, 2 masks from Vimose: Ilkjær 1990, p.130 n°47, fig. p.131; Carnap-Bornheim & Ilkjær, 1996, t.5, p.433, Abb.257; Carnap-Bornheim & Ilkjær, 1996, t.7, Taf.54, 63, 64, 93, 117, 121, 129, 135, 136, 138, 145, 146, 219, 234, 243, 244.

⁸⁷ Carnap-Bornheim & Ilkjær, 1996, t.5, p.434 Abb.257S1.

⁸⁸ Diameter: 11.6 cm. In the Louvre Museum, Bj 1887; Bj 1888. Coche de la Ferté, 1956, p.82, pl.XXXVI; See a comparable object with a row of replicated masks and a row of replicated vases from Ruvo (Italy): Naples, Museo Nazionale, n°44877 (Becatti, 1955, p.114, fig. p.113; Cantilena, 1989, p.208, n°22, fig.22).



Fig.52 An Etruscan pair of earrings from the Louvre with replicated embossed masks from the sixth century B.C. Photos by the author.
<http://files.webb.uu.se/uploader/92/fig52.jpg>

Etruscan jewellery presents replicated masks on earrings from the sixth century B.C., as illustrated on fig.52.⁸⁹ These are also embossed, as shown by the damages on the noses. The pair of brooches from Orvieto (Italy) from the 5th century B.C. presents eight replicated masks (fig.53)⁹⁰. Replicated embossed masks are a common feature of Greek jewellery and precious tableware from the Classical and Hellenistic ages; therefore, the Etruscans have probably learned it from Greek goldsmiths.⁹¹ Its origins can be traced back to Greek jewellery from the Archaic Period.⁹²

Small sacrificial golden bowls (*omphaloi*) made by Greek goldsmiths for Scythian kings in the 4th century B.C. are usually decorated with various embossed replicated figures, some of which are masks. A nice vessel of this type comes from the royal mound of Kul-Oba (Crimea), where the decoration is based on the repetition of 24 Gorgon masks, 24 Scythian masks, 48 wild boar heads and 96 bees (fig.1.17).⁹³ The Scythian goldsmiths practiced this

⁸⁹ h: 1.50; w: 1.40 cm. Louvre Museum (Paris), coll. Campana, Bj 244-245.

⁹⁰ h: 4.20 cm; w: 9.80 cm. Louvre Museum (Paris), coll. Campana, Bj 820-821; Coche de la Ferté, 1956, p.84, pl.XXXVIII.1; For other Etruscan jewellery with replicated masks and figures, see: Higgins, 1961, n°33, 36, 39; Cantilena, 1989, p.210, n°27, fig.27, pl. p.77, p.210, n°30, fig.30, pl. p.76.

⁹¹ Some examples of Classical and Hellenistic Greek replicated embossed masks in gold: Williams & Ogden, 1994, n°33, 45, 56, 74, 91, 92, 94, 135, 146, 177; Deppert-Lippitz, 1985, p.188, fig.135.

⁹² See the replicated masks on the electrum pendants from Rhodos, the gold rosettes from Melos and the buttons from Megara, 7th century B.C.: Coche de la Ferté, 1956, pl.XIII, XIV.2, XV.1; Higgins, 1961, n°17-20; Deppert-Lippitz, 1985, p.100, fig.51; p.102, fig.52; p.106, fig.54.

⁹³ Gombrich, 1979, p.80, fig.87; 1993, n°46, 59.

replication technique themselves, having probably learnt it from the Achaemenids who were also keen on silver vessels with replicated figures.⁹⁴ Thracian kings also appreciated Greek gold *omphaloi* decorated with replicated masks, as shown by the well-known one from the Panagyurishte treasure (Bulgaria) from the 4th century B.C. This is decorated with 72 replicated embossed masks of Ethiopians in three concentric rows with three different dimensions.⁹⁵



Fig.53 A pair of Etruscan brooches with eight replicated masks from Orvieto (two on each side) from the fifth century B.C. Louvre museum. Photos by the author.
<http://files.webb.uu.se/uploader/92/fig53.jpg>

As we can see, repeated masks made by embossing were widespread in the antique world, and the Germanic goldsmiths adopted the practise at least from the 3rd century A.D.⁹⁶ However, these Etruscan, Greek and Germanic replicated masks are much larger than the masks on the Scandinavian bracteates - they are about 1 cm wide at least (fig.1). It seems that the Scandinavian small masks on the bracteates and on the Ålleberg collar are much smaller than most of the replicated masks from Antiquity. Fig.1 shows that the Szilágysomlyó masks are closer in size to the Etruscan examples than to the ones on the Scandinavian bracteates. On the other hand, the masks on the bracteates are similar in size to those on the Ålleberg collar, even though they were not always made by the same technique.

The casting replication technique of the Romans that we observed on the Kranjski Rak brooches was more convenient for making the smallest masks possible, since melted gold would acquire the shape of the moulds more

⁹⁴ *Gold der Skythen* 1993, n°17. See Achaemenid silver bowl in the British Museum, n°134740.

⁹⁵ Fol & Fol, 2008, fig. p.163.

⁹⁶ Kent Andersson has drawn my attention to the gold pearls from Hede (Västmanland region, Sweden), which may present replicated embossed ornaments featuring highly stylized small animal heads and are dated from about the end of the 1st century B.C. to the 1st century A.D. Andersson, 1995, p.155-157, fig.146-148.

precisely than gold pressed by the embossing technique. The fact that the goldsmiths had to retouch the details of the Gerete and Ravlunda masks illustrates this. The Roman technique of replication was an improvement from the point of view of miniaturization, compared to the Greek-Etruscan one. Some Germanic goldsmiths learnt this Roman technique and the Ålleberg collar and probably the Åsum and Tornes bracteates are the only testimony to this. The majority of the Germanic goldsmiths continued the ancient Greek-Etruscan technique of embossing. They probably learnt this technique by close contact with the Romans in their military camps or from Roman goldsmiths made prisoners in the wars in the 1st – 3rd centuries A.D.

Are the Ålleberg collar and the bracteates with small masks contemporaneous? There is a small possibility of dating these bracteates to the second half of the 5th century, owing to the solidi in the Bostorp find,⁹⁷ but even less data is available to date the Ålleberg collar.⁹⁸ The greater bracteates (Ravlunda, Gerete, Dödevi) share the construction of tubes covered by filigree and separated by bulges on their suspension system with the basic construction of the tubes of the Ålleberg collar.⁹⁹ However, this is scanty information for dating the collar, as torques and bracelets with similar kinds of construction are already known from the first Osztrópataka grave, dated to the end of the 3rd or the beginning of the 4th centuries, with the difference that in this find, instead of fine filigree, thicker gold wire is winded around the tubes.¹⁰⁰ The Szilágysomlyó ‘oath ring’ is also constructed in a similar way, with filigree winded around the tubes, but with much more elaborate bulges. They recall the Greek necklaces which are constructed in this way - but without filigree - and which are probably the forerunners to this kind of Germanic necklace type.¹⁰¹

The same kind of construction characterises the collars of Färjestaden and Möne (fig.55), but with smaller tubes. These are generally believed to be from a later period than the one from Ålleberg, based on the more evolved state of their animal decoration.¹⁰² The Möne collar is decorated with masks, similar to the Ålleberg one, but presents a very different style and technique: the faces are made of filigree and granulation soldered to a small hexagonal sheet of gold. They are all individually manufactured and the strict minimum is used to

⁹⁷ see note 66.

⁹⁸ on the dating of the collars, see also: Pesch, 2015, p.511-515.

⁹⁹ see note 50.

¹⁰⁰ Prohászka, 2004, p.50, fig.26, p.140 pl.; *Das Fürstengrab von Gommern* 2010, p.384 Abb.1b; Pesch, p.325, Abb.184.

¹⁰¹ The Szilágysomlyó ‘oath ring’: Capelle, 1994, fig.56; Attila Kiss, 1999, p.69, fig.71; Pesch, p.326, Abb.185. For a Greek parallel, see: Williams & Ogden, 1994, n°65. The resemblance of the Osztrópataka and Szilágysomlyó rings with the Swedish collars has been noticed by Elisabeth Munksgaard: Munksgaard, 1953, p.78.

¹⁰² Salin, 1904, p.211.

suggest masks: two eyes in granulation, a long nose and surrounding hair in triple beaded wire (fig.54).



Fig.54 Comparison between a pair of small masks on the Ålleberg and the Möne collars on the same scale (positions 1.1.b-c; 7.6.b-c). Photos by the author.
<http://files.webb.uu.se/uploader/92/fig54.jpg>

These masks are situated on the same two central units between the rows as those on the Ålleberg collar and they probably aimed at representing the same thing: human faces.¹⁰³ It seems likely that the Möne and Ålleberg collars were made in a same workshop, owing to their similarities and the fact that they were found c. 30 km from each other in the region of Västergötland. As the faces on the Möne collar are stylized in an advanced manner, the change in the style between the Ålleberg and the Möne faces is probably owing to a development in the aesthetic taste within a workshop. Therefore, the Ålleberg collar can be dated to earlier than the one from Möne. When dating the Möne collar, we can take into account the interesting fact that a small stylized face of Möne type has been found in the western royal mound of Gamla Uppsala, among other objects decorated in animal style II.¹⁰⁴ The high stylization of the animals on the Möne collar is itself more reminiscent of animal style II than of animal style I. It is generally believed that animal style II does not appear before the second half of the sixth century,¹⁰⁵ and this provides interesting information – albeit meagre - for dating the Möne collar. Accordingly, the Ålleberg collar should be dated to an earlier period.

¹⁰³ It has been suggested that they were animal faces, as some quadrupeds on the Möne collar have the same face (Lamm, 1994, p.45, 48). It can be argued that on the contrary, these animals have human faces, but it should be noted that instead, the goldsmiths must have been playing with the ambiguity between humans and animals, a conspicuous tendency of Germanic animal art and more generally of human psychology.

¹⁰⁴ Lindqvist, 1936, p.178, fig.100.

¹⁰⁵ Haseloff, 1981, p.614.

The Ålleberg collar's filigree decoration on a carved background is very different from the plain and punched decoration of the Sösdala style, the silver sheet brooches and the Gallehus horns from the first half of the 5th century to which it is sometimes compared.¹⁰⁶ It has much more in common with the first type of cast silver brooches with chip-carving relief, dated to the second half of the 5th century.¹⁰⁷ The Ålleberg collar could be dated broadly around the second half of the 5th and the first half of the 6th century.



Fig.55 The Möne collar. Photo by the author. <http://files.webb.uu.se/uploader/92/fig55.JPG>

The bracteates studied here and the Ålleberg collar may be contemporaneous if they are both from the second half of the 5th century. During this time, the two mask replication traditions could have coexisted, the casting one as shown by the Ålleberg collar, the Åsum and Tornes bracteates and the embossing one as shown by the other bracteates. Both tend to have the same small scale - because on one hand, the goldsmiths who have made the Ålleberg collar use the Roman technique that is well suited to the

¹⁰⁶ Oscar Almgren first noticed the connection between the decoration of the silver sheet brooches and that of the Gallehus horns, both of which he dated to the last quarter of the 4th - first half of the 5th century: Almgren, 1914, p.220-221; Nils Åberg noticed the connection of one animal form on these with the Ålleberg collar, but found much more convincing stylistic connections in my opinion with the first type of relief brooches: Åberg, 1924, p.15, fig.41. On the chronological separation between punched plate ornaments and relief decoration, see also: Munksgaard, 1953, p.72.

¹⁰⁷ Åberg, 1924, p.12-13.

manufacturing of extremely small replicated reliefs. On the other hand, goldsmiths working in the Greek-Etruscan tradition strove to make the smallest possible masks permitted by the embossing technique. It is difficult to avoid the idea that the goldsmiths using embossing knew of jewellery with miniature masks of the type of the Ålleberg collar and were doing their best to achieve the same result, but perhaps without mastering the technique. They might have adapted the embossing-replication technique to make such small faces as the ones on the Ålleberg collar. They achieved this if we consider the size of the masks, but they were far from reaching the precision of the masks on the Ålleberg collar as shown by a comparison between the small masks on the Dödevi bracteate and those from the collar (fig.1), and in many cases, they had to add details individually. This study shows that some of the goldsmith techniques did not spread uniformly over Scandinavia and were the secret of special workshops – perhaps a few Western Scandinavians mastered the technique used to replicate the masks on the Ålleberg collar and a few South-eastern Swedish ones mastered the technique used to make the masks on the bracteates, judging by the distribution of the findings (fig.56).

The places that have yielded most of the small embossed masks on bracteates - the islands of Gotland, Öland and the region of Skåne – nearly overlap with the ones that have yielded the richest solidi finds in Scandinavia, concentrated on the islands of Öland, Gotland and Bornholm.¹⁰⁸ Scholars discuss why it is precisely in these regions that solidi from the second half of the 5th and the first half of the 6th century were deposited.¹⁰⁹ The distribution map of fig.56 suggests that the regions that had a special access to Roman gold currency were to some extent also those that produced the special kind of bracteates decorated with small embossed masks. It is remarkable that none of these was found in Denmark, or in Western Sweden or Southern Norway, areas otherwise rich in bracteate finds.¹¹⁰ This supports the impression that the workshops making the small embossed masks were situated in the Southeast of Sweden. One workshop can be suggested on Gotland, because the three bracteates struck by the same die from Fride, Riksarve and Österryftes, among which the two former bear masks, were all found on Gotland.¹¹¹ Looking at the concentric stamps used on the borders of the bracteates with masks, it does not seem possible to see coherent groups linked to a territory (fig.57).

¹⁰⁸ Hildebrand, 1883, p.61; see Helena Victor's map of solidi finds in Scandinavia in Fischer, 2011, fig.1.

¹⁰⁹ Fagerlie, 1967; Herschend, 1980; Kyhlberg, 1986; Fischer, 2011, p.193.

¹¹⁰ See a simplified distribution map in Axboe, 2007, p.10, fig.1.

¹¹¹ Sarvas, 1971, p.27.

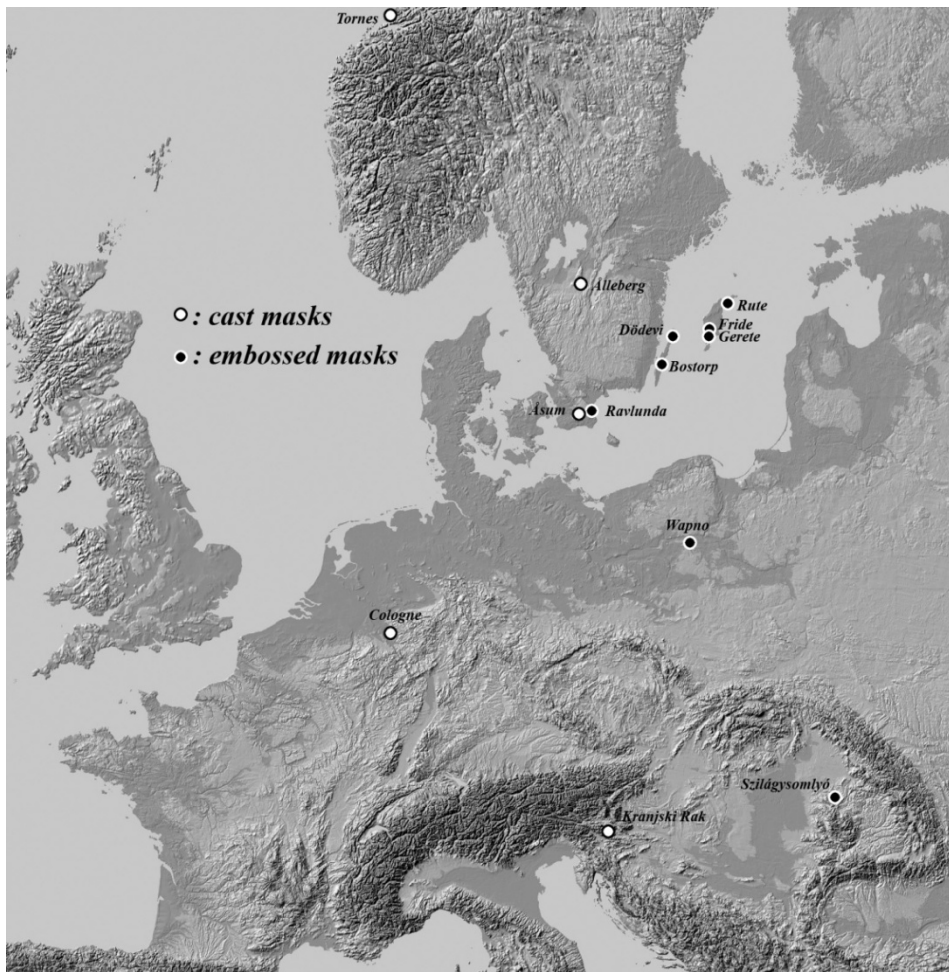


Fig.56 Geographical situation of the cast masks and the small type of embossed masks mentioned in the study. <http://files.webb.uu.se/uploader/92/fig56.jpg>

The embossing technique used in these workshops was already known to Germanic goldsmiths on the continent at least from the 3rd century. The goldsmiths working on the Ålleberg collar drew on a different tradition; therefore, their workshop may have been located in another region. Judging by the continuity suggested by the Möne collar, it might have been situated in the same region of Västergötland. If the (older) figurines of the Gallehus horns were also made in this way, it could indicate a connection with Denmark, which would not be surprising as the formal ancestors of the Swedish gold collars seem to originate in Denmark.¹¹²

All the bracteates from Skåne, Öland and Gotland bear the same kind of stamps, the variations mainly depending on the bracteates' dimensions (fig.57). The bracteate from Norway has different stamps from the Swedish ones, which could suggest a different workshop. The simple spirals that decorate its border

¹¹² See note 36. For the Danish ancestors of the Swedish gold collars: Munksgaard, 1953.

are more characteristic of bracteates from Denmark and Southwestern Sweden compared to those from Eastern Sweden, which could suggest a Danish or a Southwestern Swedish workshop for the Norwegian bracteate.¹¹³ Bearing in mind that the mask's technique is probably the same as the Ålleberg collar's masks, it is not excluded that the workshop was also the same, but there are far too few preserved masks made by the casting replication technique to judge whether there were several workshops or just one that mastered this technique in Scandinavia.



Fig.57 Comparison of the stamps framing the bracteates with masks on the same scale.
<http://files.webb.uu.se/uploader/92/fig57.jpg>

The replication techniques used by Scandinavian goldsmiths to make the small masks as those on the Ålleberg collar show a close tie with Roman techniques. Did Sweden witness its first industrial development in the 6th century with techniques learned from the Romans, as proposed by Wilhelm Holmqvist?¹¹⁴ The replicating techniques were inherited from a society that can be described as having known a nearly industrial development: the Roman Empire. However, even Roman manufacture cannot be described as 'industrial', because it does not include extensive use of machines. Although machines were known to the ancient world, they were only seldom used for amusement and entertaining purposes.¹¹⁵ Nevertheless, there is a step towards industrialisation which is perhaps the most obvious when we look at Roman architecture and the mass-production of bricks, the manufacture of standardized ceramics or the use of water power for mechanization¹¹⁶. Indeed, water power was introduced into Scandinavia only in the 11th or 12th centuries, and first blast furnaces also

¹¹³ See the map showing the distribution of spiral and volute stamps in Axboe, 1982, p.51, fig.54.

¹¹⁴ Holmqvist, 1979.

¹¹⁵ See for example Drachmann, 1963, p.106-121; Drachmann, 1963.

¹¹⁶ For the construction with bricks, see: Adam, 1984, p.157-163; for the production of moulded ceramics: Johns, 1971.

appeared in the 12th century (a technical improvement that the Romans ignored).¹¹⁷ The Roman mass-production of bricks originating from Italy only reached Sweden in the 13th century, when it helped to accelerate the construction of churches and royal palaces - which is more than a millennium after their use in Rome.¹¹⁸ Therefore, the 13th century is a better candidate for Sweden's first steps towards industrialisation than the 6th. In the Migration Period, there was apparently no need in Scandinavia to implant the seeds of Roman or medieval 'industrialisation'. On the other hand, goldsmiths importing new techniques from the south were welcome by the Scandinavian elite as they were in earlier periods. We may describe the situation in the 5th-6th centuries this way: the goldsmith techniques were more developed in Scandinavia than what we might expect from a chieftain-type society owing to special links established with the technologically and economically advanced Later Roman Empire.

References

- Adam, J.-P. 1984. *La construction romaine. Matériaux et techniques*. Picard.
- Alföldi, A. 1934. Eine spätrömische Helmform und ihre Schicksale im Germanisch-Romanischen Mittelalter. *Acta Archaeologica* (Copenhagen) V. Pp 99-144, pl.III-X.
- Almgren, O. 1914. Det runristade guldhornets datering. *Nordiska Ortnamn, hyllningskrift tillägnad Adolf Noreen*. Namn och Bygd. Pp 217-225.
- Andersson, K. 1995. *Romartide Guldsmide i Norden. III Övriga smycken, teknisk analys och verkstadsgrupper* [AUN 21]. Societas Archaeologica Upsaliensis.
- Andersson, K. 2008. *Gold des Nordens. Skandinavische Schätze - von der Bronzezeit bis zu den Wikingen*. tr. into German S. Dahmann. Theiss.
- Andersson, K. 2011. *Guldålder. Svenska arkeologiska skatter*. Balderson Förlag.
- Arrhenius, B. 1985. *Merovingian Garnet Jewellery. Emergence and social implications*. Kungl. Vitterhets Historie och Antikvitets Akademien.
- Arwidson, G. 1963. Demonmask och gudabild i germansk folkvandringstid. *TOR* 9. Pp 163-187.
- Axboe, M. 1979. Ukendte guldhorn. *Aarbøger for Nordisk Oldkyndighed og Historie*. Pp 102-116.
- Axboe, M. 1981. The Scandinavian Gold Bracteates. Studies on their manufacture and regional variations. *Acta Archaeologica* (Copenhagen) vol.52 (pub.1982). Pp 1-100.

¹¹⁷ Pettersson Jensen, 2012.

¹¹⁸ Ljung *et al.*, 2013, p.7.

- Axboe, M. 2001. Om forholdet mellem medaillon-eftertiligninger og brakteater, eller: Hvad var der i Gudmes guldrum? In: B. Magnus (ed). *Vi får tacka Lamm*. Statens Historiska Museum. Pp 39-46.
- Axboe, M. 2004. *Die Goldbrakteaten der Völkerwanderungszeit - Herstellungsprobleme und Chronologie* [Ergänzungsbände zum Reallexikon der Germanischen Altertumskunde Band 38]. Walter de Gruyter.
- Axboe, M. 2007. *Brakteatstudier*. Det Kongelige Nordiske Oldskriftelskab. *Barbarenschmuck und Römergold. Der Schatz von Szilágysomlyó*, cat. exhib. ed. W. Seipel. Kunsthistorisches Museum Wien (2 March-2 May 1999) and Magyar Nemzeti Múzeum Budapest. Skira edito (1999).
- Becatti, G. 1955. *Oreficerie antiche dalle minoiche alle barbariche*.
- Blankenfeldt, R. 2015. Fünfzig Jahre nach Joachim Werner: Überlegungen zur kaiserzeitlichen Kunst. *Bildendenkmäler zur germanischen Götter- und Heldensage*. ed. Heizmann & Oehrl [Ergänzungsbände zum Reallexikon der Germanischen Altertumskunde Band 91]. Pp 9-81
- Bohlin, P.-O. 1981. *Brakteatteknik*. Uppsats för C/20p i Arkeologi, särskilt Nordeuropeisk Uppsala VT.
- Bóna, I. 1986. Daciától Erdőelvéig. A népvándorlás kora Erdélyben. In: Makkay L., Mócsy A. (eds). *Erdély története I. A kezdetektől 1606-ig*. Akadémiai Kiadó. Pp 107-234.
- Brenot, C., Metzger, C. 1992. Trouvailles de bijoux monétaires dans l'Occident romain. In: *L'or monnayé III: Trouvailles de monnaies d'or dans l'Occident romain* [Cahiers Ernest Babelon 4].
- Bursche, A. 1991. Finds of Roman Gold Medallions in Barbaricum – New Data on Old Material. *Wiadomości Numizmatyczne* R. XXXIV (1990). Pp 3-4 (133-134). *Polish Numismatic News* V (1991).
- Cantilena, R. 1989. Le oreficerie. In: *Le Collezioni del Museo Nazionale di Napoli* (pref. E. Pozzi). De Luca Edizioni d'Arte - Leonardo. Pp 75-86.
- Capelle, T. 1994. *Die Miniaturenreihe von Szilágysomlyó (Șimleul Silvaniei)*. Dr. Rudolf Habelt GmbH.
- Carnap-Bornheim, C. von, Ilkjær, J. 1996. *Illerup Ådal 5-7. Die Prachtausrüstungen*. Aarhus University Press.
- Carnap-Bornheim, C. von. 1997. Neue Forschungen zu den beiden Zierscheiben aus dem Thorsberger Moorfund. *Germania* 75. Pp 69-99.
- Charlesworth, D. 1961. Roman jewellery found in Northumberland and Durham. *Archaeologia Aeliana* 39.
- Coche de la Ferté, É. 1956. *Les bijoux antiques*. L'œil du connaisseur. PUF.
- Cüppers, H. 1973. Medarstrasse 46. *Trierer Zeitschrift* 36. Pp 370-373. Abb.12.
- Back Danielsson, I. M. 2007. *Masking Moments. The Transition of Bodies and Beings in Late Iron Age Scandinavia*. Stockholm University.
- Deppert-Lippitz, B. 1996. Late Roman Splendor: Jewelry from the Age of Constantine. *Cleveland Studies in the History of Art* 1.
- Drachmann, A. G. 1988. *Antikens Teknik*. tr. N. Valmin. Prisma (1st ed. 1963).
- Drachmann, A. G. 1963. *The Mechanical Technology of Greek and Roman Antiquity. A Study of the Literary Sources*. Munsgaard.
- Erdély története I. A kezdetektől 1606-ig*. 1986. dir. Makkay L., Mócsy A.. Akadémiai Kiadó. (English translation: *History of Transylvania I. From The Beginnings to 1606*. 2001. ed. B. Kovrig. Columbia University Press).

- Fagerlie, J. M. 1967. *Late Roman and Byzantine Solidi Found in Sweden and Denmark*. The American Numismatic Society.
- Fettich, N. 1930. Der Schildbuckel von Herpály, sein Nordischer Kunstkreis und seine Pontischen Beziehungen. *Acta Archaeologica* (Copenhagen) I. Pp 221-262, pl.XI-XX.
- Fischer, S. 2008. The Udovice Solidus Pendants. Late-5th Century Evidence of South Scandinavian Mercenaries in the Balkans. *Fornvännen* 103. Pp 81-88.
- Fischer, S. 2011. The 5th century hoard of Theodosian solidi from Stora Brunneby, Öland, Sweden: a result from the LEO project. *Fornvännen* 106. Pp 189-204.
- Fischer, S. 2011. Forskningsprojektet LEO - en presentation. in: Bratt, Peter & Grönwall (eds.). *Makt, kult och plats: Två seminarier arrangerade av Stockholms läns museum under 2009 och 2010*. Stockholm Läns Museum.
- Fischer, S., Victor, H. 2011. New horizons for Helgö. In: B. Arrhenius, U. O'Meadhra (eds.). *Excavations at Helgö XVIII*. Kungl. Vitterhets Historie och Antikvitets Akademien. Pp 79-92.
- Fol, A., & V. Fol. 2008. *The Thracians*. Tangra TanNakRa.
- Das Fürstengrab von Gommern*. 2010 M. Becker (ed.). Landesamt für Archäologie Sachsen-Anhalt - Landesmuseum für Vorgeschichte Halle (Saale).
- Garbsch, J. 1965. *Die Norisch-Pannonische Frauentracht im 1. und 2. Jahrhundert*. C.H. Beck'sche Verlagsbuchhandlung.
- Garbsch, J. 1999. Die norisch-pannonische Frauentracht im 1. und 2. Jahrhundert. In: K. Bott (ed.). *Gold der Alpen. 4000 Jahre Schmuck und Münzen. Funde aus der Alpenregion*. Bergbaumuseum Klagenfurt. Pp 25-32.
- Gebühr, M., Axboe, M., Hauck 1992, K. Ein neuer A-Brakteat aus Schleswig-Holstein [Zur Ikonologie der Goldbrakteaten LI]. *Frühmittelalterliche Studien. Jahrbuch des Instituts für Frühmittelalterforschung der Universität Münster* 26. Pp 82-105.
- Gold der Skythen. Schätze aus der Staatlichen Eremitage St. Petersburg*. 1993. R. Busch (ed.). cat. exh. 25 Sept.-28 Nov. 1993 Hamburg. Karl Wachholtz Verlag.
- Gombrich, E. H. 1979. *The Sense of Order. A Study in the Psychology of Decorative Art*. Phaidon.
- Haberey, W. 1949. Ein spätrömisches Frauengrab aus Dorweiler, Kr. Euskirchen. *Bonner Jahrbücher* 149.
- Haseloff, G. 1981. *Die germanische Tierornamentik der Völkerwanderungszeit. Studien zu Salin's Stil I*. Walter de Gruyter (t.I-III).
- Hauck, K. 1985-1989. *Die Goldbrakteaten der Völkerwanderungszeit. Ikonographischer Katalog* (t.1-3).
- Herschend, F. 1980. *Myntat och omyntat guld. Två studier i öländska guldfynd*. Gustavianum. LiberTryck.
- Higgins, R. A. 1961. *Greek And Roman Jewellery*. Methuan and Co LTD.
- Hildebrand, H. 1883. Solidus-importen till Sverige under den tidigare jernaldern. *Från Äldre Tider. Kulturvetenskapliga och Historiska Studier*. P. A. Norstedt & Söners Förlag. Pp 58-73.
- Hildebrand, H. 1892. Näsby- och Inedals-fynd. *Kong. Vitterhets Historie och Antikvitets Akademiens Månadsblad*. Pp 167-185.
- Hill, G. F. 1922. Ancient Methods of Coining. *The Numismatic Chronicle and Journal of the Royal Numismatic Society*. Fifth Series. vol.2. Pp 1-42. vii.

- Hofrén, M. 1952. Guldskatten från Bostorp. Kalmar Län. *Kalmar Läns Fornminnesförening* XL. Pp 81-84. fig. p.83.
- Holmqvist, W. 1972. Die schwedischen goldhalskragen. In: U. E. Hagberg (ed.). *Studia Gotica. Die eisenzeitlichen Verbindungen zwischen Schweden und Südosteuropa*. Vorträge beim Gotensymposium im Statens Historiska Museum Stockholm (1970). Almqvist & Wiksell. Pp 234-253.
- Holmqvist, W. 1979. Sweden's First Industrial Society. In: H. Clarke (ed.). *Iron and Man in Prehistoric Sweden*. W. S. Maney and Son LTD. Pp 22-49.
- Holmqvist, W. 1972. Relief brooches. Comparative analysis of the A-B-C elements at the Helgö workshop. In: W. Holmqvist (ed.). *Excavations at Helgö IV. Workshop. Part 1*. Vitterhets Historie och Antikvitets Akademien. Pp 230-255.
- Holmqvist, W. 1980. *Guldhalskragarna*. LTs förlag.
- IK: referring to the series: *Ikonographischer Katalog*, starting with Hauck. *Die Goldbrakteaten...*1985, op. cit.
- Janse, O. R. 1922. *Le travail de l'or en Suède à l'époque mérovingienne*. Paul Pigelet & Fils & Cie.
- Jansson, S. B. F. 1985. *Runinskrifter i Sverige* (3rd ed.). Fälth's Tryckeri.
- Johns, C. 1971. *Arretine and Samian pottery*. University Press. Pp 13-15.
- Johns, C. 1983. *The Thetford Treasure. Roman Jewellery and Silver*.
- Johns, C. 1996. *The Jewellery of Roman Britain*. UCL Press.
- Jørgensen, L., Vang Petersen, P. 1998. *Guld, Magt og Tro. Danske guldskatte fra oldtid og middelalder. Gold, Power and Belief. Danish gold treasures from Prehistory and the Middle Ages*. Nationalmuseet. Thaning & Appel.
- Josefson, E., Svensson, O. 2006. Guldgubbar väcks åter till liv. *Populär Arkeologi* n°1. Pp 3-6.
- Kenner, F. 1863. *Beiträge zu einer Chronik der Archäologischen Funde in der Österreichischen Monarchie (1859-1861)*. K. K. Hof- und Staatsdruckerei.
- Kent, J. P. C. 1975. Section 2: The date of the Sutton Hoo hoard. In: R. Bruce-Mitford. *The Sutton Hoo Ship - Burial, vol.1 Excavations, Background, the Ship, Dating and Inventory*. The Trustees of the British Museum. Pp 588-607.
- Kisa, A. 1896. Römische Ausgrabungen an der Luxemburgerstrasse in Köln. *Bonner Jahrbücher* 99.
- Kyhlberg, O. 1986. Late Roman and Byzantine Solidi, an archaeological analysis of coins and hoards. In: A. Lundström, H. Clarke (eds.). *Excavations at Helgö X. Coins, Iron and Gold*. Kungliga Vitterhets Historie och Antikvitets Akademien. Almqvist & Wiksell International. Pp 13-126.
- Lamm, J. P. 1991. Zur Taxonomie der schwedischen Goldhalskragen der Völkerwanderungszeit. *Fornvännen* 86. Pp 153-167.
- Lamm, J. P. 1994. Guldhalskragarna. In: A. Knape (ed.). *Guldets magi i saga och verklighet*. Statens Historiska Museum. Pp 37-51.
- Lamm, J. P. 1998. Goldhalskragen. *Reallexikon der Germanischen Altertumskunde* 12. Walter de Gruyter. Pp 335-343, Taf.7.
- Lamm, J. P. 2004. Figural gold foils found in Sweden : a study based on the discoveries from Helgö. In: *Excavations at Helgö XVI Exotic and Sacral Finds from Helgö*. Almqvist & Wiksell International. Pp 41-142.
- Lehmann, K. 1975. *Samothrace. A Guide to the Excavations and the Museum*, J.J. Augustin Publisher (4th ed. rev.).
- Lindqvist, S. 1926. *Vendelkulturens Ålder och Ursprung*. Akademiens Förlag.

- Lindqvist, S. 1927. Geretebrakteaten och dess likar. *Fornvännen* 22. Pp 217-233.
- Lindqvist, S. 1936. *Uppsala Högar och Ottarshögen*. Wahlström & Widstrand.
- Ljung, J.-Å., U. Strucke, A. Vinberg, J. Risberg, J.P. Lamm. 2013. *Tegelugnen i Boo. Medeltida tegeltillverkning i större skala* [UV Rapport 2013:27]. Arkeologisk Forskningsundersökning. Riksantikvarieämbetet.
- Ljungkvist, J. 2008. Dating two royal mounds of Old Uppsala. Evaluating the elite of the 6th-7th century in Middle Sweden. *Archäologisches Korrespondenzblatt* 38. Heft 2. Pp 263-282.
- Mackeprang, M. B. 1952. *De Nordiske Guldbrakteater*. Universitetsforlaget i Aarhus.
- Montelius, O. 1882-1884. Hvad vi veta om Vestergötland under hednatiden. *Svenska Fornminnesföreningens Tidskrift* V (1881-1883). Pp 231-248.
- Montelius, O. 1896-1900. Den Nordiska Jernalderns kronologi. *Svenska Fornminnesföreningens Tidskrift* 9-10.
- Muller, S. 1897. *Vor Oldtid. Danmarks Forhistoriske Archæologi*. Det Nordiske Forlag.
- Munksgaard, E. 1953. Collared gold necklets and armlets. A remarkable Danish fifth century group. *Acta Archaeologica* (Copenhagen) 24. Pp 67-80.
- Öberg, H. 1942. *Guldbrakteaterna från Nordens Folkvandringstid*. Wahlström & Widstrand.
- Oldtidens Ansigt. Faces of the past*. 1990. red. P. Kjærsum, R. A. Olsen. Det kongelige Nordiske Oldskriftselskab. Jysk Arkæologisk Selskab.
- Pesch, A. 2007. *Die Goldbrakteaten der Völkerwanderungszeit - Thema und Variation* [Ergänzungsband zum Reallexikon der Germanischen Altertumskunde Bd. 36]. Walter de Gruyter.
- Pesch, A. 2011. Die schwedischen Goldhalskragen. Germanische Bildersprache in antiker Techniktradition. Ein Vorbericht. *Transformations in North-Western Europe (AD 300-1000)* [Neue Studien zur Sachsenforschung 3]. Pp 90-100.
- Pesch, A. 2015. *Die Kraft der Tiere. Völkerwanderungszeitliche Goldhalskragen und die Grundsätze germanischer Kunst*. Römisch Germanisches Zentralmuseum. Schnell & Steiner.
- Petersen, H. 1890. *Gravpladsen fra den ældre jernalder paa Nordrup Mark ved Ringsted*. Nordiska Fortidsminder I.
- Pettersson Jensen, I.-M. 2012. *Norberg och Järnet: bergsmännen och den medeltida industrialiseringen*. Jernkontorets bergshistoriska skriftserie 46.
- Popović, I. 2008. Solidi with Filigreed Tubular Suspension Loops from Udovice in Serbia. *Fornvännen* 103. Pp 73-80.
- Prohászka, P. 2004. *Az osztrópatakai vandál királyság*.
- Quast, D. 2011. Der Schatz der Königin? Völkerwanderungszeitliche Schatzfunde und Weibliche Eliten. In: D. Quast (ed.). *Weibliche Eliten in der Frühgeschichte*. Internationale Tagung vom 13. bis zum 14. Juni 2008 in RGZM. Verlag des Römisch-Germanischen Zentralmuseums. Pp 121-141.
- Ringstad, B. 2014. 'Det er gull alt som glitrer' - om gullfunnet på Tornes. *Romsdalsmuseet Årbok*. Pp 166-195.
- Ringstad, B. 2015. En gullskatt fra Tornes i Romasdal. *Viking* 78. Pp 141-168.
- Salin, B. 1895. De nordiska guldbrakteaterna. *Antikvarisk Tidskrift för Sverige* 14:2.
- Salin, B. 1904. *Die altgermanische Thierornamentik*. tr. J Mestorf. K. L. Beckmans Buchdruckerei.
- Sarvas, P. 1973. En guldbrakteat återfunnen. *Finskt Museum* 78 (1971). Pp 25-27.
- Sellwood, D. 1976. Minting. *Roman Crafts*. ed. D. Strong & D. Brown. Pp 63-74.

- Šemrov, A. 1996. *Slovenia. Coinage and History*. Narodni Muzej.
- Szilágyosomlyó. *A gepida királyok aranykincsei* 1999. In: A. Kiss., A. Bernhard-Walcher. Magyar Nemzeti Múzeum. cat. expo. Budapest - Kunsthistorisches Museum, Wien. Helikon.
- Tóth, B. L. 1984. How were the Swedish collars' figurines made? (forthcoming). *Trier: Kaiserresidenz und Bischofssitz* 1984. Rheinisches Landesmuseum Trier.
- Watt, M. 2004. The Gold-Figure Foils ("Guldgubbar") from Uppåkra. *Continuity For Centuries, a ceremonial building and its context at Uppåkra, southern Sweden* [Uppåkrastudier 10].
- Wicker, N. L. 1990. *Migration Period Bracteates: Art Historical Constructs and the Archaeology of Crafts Production and Distribution*. Thesis University of Minnesota.
- Wicker, N. L. 2011. "The Four Smiths" and the Replication of Bracteate Techniques. *Arkaologi i Sleswig* [Sonderband "Det 61. Internationale Sachsensymposium 2010" Haderslev]. Pp 33-44.
- Williams, D., Ogden, J. 1994. *Greek gold. Jewellery of the Classical world*. British Museum Press.
- Yeroulanou, A. 1999. *Diatrita. Pierced-work gold jewellery from the 3rd to the 7th century*. Benaki Museum.
- Åberg, N. 1924. *Den Nordiska Folkvandringstidens Kronologi*. Kungl. Vitterhets Historie och Antikvitets Akademien [Monografiserien n°14]. Cederquists Grafiska Aktiebolag.
- Åberg, N. 1947. Uppsala Högars Datering. *Fornvännen*. Pp 257-289.