Birka Spiral Posaments

Eithni ingen Talorgain
Jean Kveberg
eithni@gmail.com
www.eithni.com/posaments
Northshield Arts and Sciences Competition 2016

What Is a Posament?

The most fascinating finds from Birka are the metal trims and decorations found in over forty of the graves. These pieces have been most often called “posaments” or “passementeries” in the few publications about them, but we do not know that they would have been called by the Norse who wore them and the scholarly published sources for them are scarce. Unlike the round-knit and drawn wireweaving chains that are familiar to many who study Norse culture, the posaments are more often flat-woven braids or knots, many of which strongly resemble Celtic knotwork. And while a few of the examples are woven with drawn gold wire, most of the extant posaments are made from a peculiar spiral wire formed by wrapping a fine wire (usually silver) around a core, often of silk. The primary focus of this project will be the Birka spiral posaments with the purpose of providing a deeper understanding of these understudied artifacts and to propose a reliable means of reproducing them.

Introduction to Birka and the Posaments

Birka was a Norse settlement and trading center on the island of Björkö in Lake Mälaren and was protected by the proximity of a royal seat at Adelsö, just across the bay. Established in the eighth century, it was a major trading hub until at least the beginning of the tenth century. Today, the Birka site is a UNESCO World Heritage Site located in the modern country of Sweden.[1]

Between 1871 and 1895, Hjalmar Stolpe, an entomologist by training, conducted a series of excavations on the island, primarily looking for amber artifacts. However, the excavations yielded a much more diverse and rich collection of finds than initially anticipated and the site was recognized as being a substantial settlement. The excavations resulted in the publication in 1913 of a catalog describing and picturing many of the wood, metal, amber, and stone finds.[2] While many early archaeologists did not place great value on textile remains, Stolpe preserved many of the textiles from the Birka graves. These textile finds were published in 1938 by Agnes Geijer as Birka III: Die Textilfunde aus den Gräbern (hereafter Birka III).[3] Geijer devotes a short chapter to the *Posamentierbeiten* or “Posament work” wherein she describes twenty-seven different posaments, plus several sub-types of the most common patterns.[4] The few plates depicting a selection of the posaments were an invaluable resource because for many years they were the only published images of the posaments.[5]

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[1] "Birka Och Hovgården." Swedish National Heritage Board. Last modified August 4, 2014. http://www.raa.se/upplev-kulturarvet/varldsarv/birka-och-hovgarden/.
[2] Gustaf Hallström. *Birka I*. Stockholm: Kungl. Vitterhets Historie Och Antikvitets Akademien, 1913.
[3] Agnes Geijer. *Birka III : Die Textilfunde Aus Den Gräbern*. Uppsala: Almqvist & Wiksell, 1938.
[4] Geijer, *Birka III, 99-105*.
[5] Geijer, *Birka III,* Plates 26-30 and 35.

Remarkably little else has been published about the posaments since 1938. In 1980, Geijer published a short article summarizing and updating Birka III. This article was published in English, but was significantly shorter than the book and devoted less than two full pages to the posaments. Geijer again commented on the unusual spiral wire but gave very little other commentary on the construction and use of the posaments except to say that many were attached to silk and that some of them appeared to be parts of headgear of indeterminate sorts.[6] The Swedish History Museum (Sveriges Historiska Museet), which holds the Birka collections, was only able to provide the citation for one other resource, Annika Larsson's dissertation entitled *Klädd Krigare: Skifte I skandinaviskt dräktskick kring år 1000* (*The Clothed Warrior: The Shift In Scandinavian Costumes Circa 1000*).[7]

A major breakthrough for the study of the Birka posaments came relatively recently when the Birka finds were all put online in a searchable format.[8] Many of the finds are either illustrated or have photographs available and the increased availability of the materials has fueled interest across reenactment groups and online communities. There are several short class handouts and a few pictures of modern recreations available online, but I am unaware of any systematic assessment of the posament work.

Understanding the Posaments

The first hurdle in understanding the posaments was reading the material that was already available, as Birka III was published in German and Annika Larsson's dissertation is in Swedish, with no English translation available of either document. Attempts to translate the dissertation were deferred, primarily because the author is the Annika Larsson who recently proposed the highly suspicious reconstruction of Norse women's clothing as including pasty-style oval brooches and a voluminous train.[9] Instead, the original reports in Geijer's Birka III were the primary source consulted.

Initially, translation attempts were limited to the parts of the descriptions that included the dimensions of the posaments, but it was soon found it necessary, or at the very least desirable, to translate the whole chapter. As the writer does not speak German, the translation was done through Google translate, with heavy reference to German-English dictionaries. The final text was kindly proofread by German-speaking friends, including one trained in archaeology, but all errors are my own. The full text of the chapter in alternating German and English can be found in Appendix A.

One of the most useful components of Geijer's 1938 analysis is that she provides a categorization system for the posaments, listing twenty-seven different types of posaments[10] in five categories:

1) ongoing bands attached to the plane of the fabric;
2) bands that are affixed to the edge of a fabric;

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[6] Agnes Geijer. "The Textile Finds from Birka: Birka III, Die Texilfundue Aus Den Gräbern." *Acta Archaeologica* 50 (1980): 215-216.
[7] Annika Larsson. *Klädd Krigare: Skifte I Skandinaviskt Dräktskick Kring År 1000*. (PhD diss., Uppsala: Uppsala Universitet, 2007).
[8] http://mis.historiska.se/mis/sok/birka.asp?sm=10_7
[9] http://www.uu.se/en/news/news-document/?id=73&area=2,3,16&typ=pm&lang=en
[10] To see examples of the spiral posament types, please refer to Figure 8.

3) decorative knots or spangles sewn onto the plane of the cloth;
4) decorative belt terminals; and
5) sliding knots that probably decorated narrow bands or cords.[11]

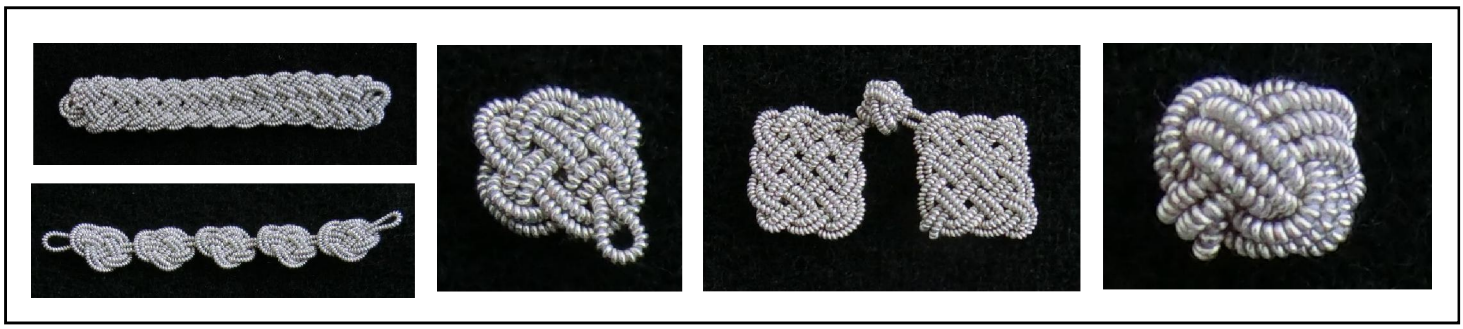

Figure 1: Categories of Posaments, According to Geijer. Counter clockwise from top left: 1) band attached to the plane of fabric, 2) band attached to the edge of fabric, 3) decorative knot or spangle, 4) decorative belt terminal, 5) sliding knot. Not to scale.

In examining the posament examples, I found several additional characteristics that were potentially of use when classifying and understanding the posaments, namely whether the posaments were made of drawn or spiral wire, the relative coarseness of that wire, and whether that wire was made of silver or gold. And while Geijer's list of the types of posaments was interesting, the text-based list organized by posament type didn't really give a good sense of either the total number of posaments found or the relative distribution of those finds throughout the graves (i.e., the number of graves with posaments and the number of posaments per grave). To help organize the multiple categories of data and to allow for easier analysis of the data as it was compiled, all the available information was entered into spreadsheets.

The translated text of the chapter provided some interesting information, but also some false leads. Geijer proposes the use of bone needles and shuttles in the construction of the braids, and directs the reader to plates showing rather large dresspin-sized needles.[12] However, later experiments showed that long or thick needles were more of a hindrance than a help to the weaving. Small, thin needles can be used to arrange the wires, but the large bone pins could not have been sharpened to a point that would have been useful for this task.

Geijer's suggestion that shuttles or bobbins might have been used, on the other hand, was a very useful one.[13] Retaining control of the wires by containing them on a bobbin prevents work hardening and kinking of the wire that can increase the difficulty of weaving and increase the number of bumps and deformed spiral sections. While this is less of a concern for soft metals like silver than for harder metals like copper, braiding or knotting long lengths of any material is prone to tangling, which can slow down production and frustrate weavers.

Geiger gives a few figures showing the weaving technique of a few of the simpler bands in her Figure 21 (see Appendix A), but doesn't explain or illustrate the more complex weaving structures. The round

[11] Geijer, *Birka III,* 101.
[12] Geijer, *Birka III,* 99 & Plate 39.
[13] Geijer, *Birka III,* 99.

bead-like posaments that she calls *gleitknoten* or "sliding knots" are recognizable as what English-speakers call Turk's Head Knots. Their construction from one continuous strand woven many times around is something many embroiderers are already familiar. The construction of some of the more complex bands, however, is more of a mystery, as Geiger notes that some of them are constructed from a single wire passed back and forth.[14] It is puzzling how this would work with some of the more lengthy braids, particularly those with multiple working lines each knot seeming to be dependent on the full completion of the previous. Unfortunately, many of the silver bands are badly oxidized and the currently available photographs are not clear enough to pick out what Geijer was able to recognize in person.

Equally imperceptible in the currently available photographs, but readily understood from the text, the drawn wire posament bands were processed with a hammer or other hard object to increase faceting and so increase the brilliance of the gold.[15] Because the current focus is on the spiral posaments, this proposed technique has not yet been evaluated.

Regarding the origin of the posament work, Geijer proposes that the drawn gold wire posaments (P4-8 and 16) were made locally but that the spiral (usually silver) wire posaments were imported, but then almost immediately allows that the lack of similar products from elsewhere in the world does leave the possibility of local manufacture open for both sorts of posaments.[16] Attempts to locate and identify any similar spiral wire trimmings from outside Scandinavia that are contemporaneous with or predate the Birka materials have been unsuccessful.[17] The only similar work is that has been identified is the spiral pewter used by the Sami for couched embroidery. This form of ornamentation had been recorded since the late 17th century and it has been proposed that it may itself be an imitation of the posament work as a result of contact between the medieval Lapps and Birka traders.[18]

As for the purpose and application of the posaments, we have a few clues from their positions in the grave and from the materials with which they occur within the graves. The drawn wire posaments often occur on or around the head, "apparently belonging to headgear."[19] However, as Geijer's categories make clear, the spiral posaments could be found in multiple places throughout the grave, including as seam finishings, hem decorations, belt finials, and other "spangle" decorations of unclear purpose.[20] While more posaments were found more often in graves that were identified as male, posaments have been found in graves of both genders.[21] Posaments of both drawn wire and spiral wire were used concurrently and could even be used together in the same burial, as seen in Grave 524.[22]

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[14] Geijer, *Birka III,* 101.
[15] Geijer, *Birka III,* 104-5.
[16] Geijer, *Birka III,* 104.
[17] I have found a few examples of other posament work from Gotland, Hedeby, and Hellvi, but these are all areas that would have had contact with Birka and could have acquired the pieces through trade.
[18] Geijer, "The Textile Finds from Birka," 216.
[19] Geijer, "The Textile Finds from Birka," 216.
[20] Geijer, *Birka III,* 101.
[21] Larsson, "*Klädd Krigare,"* Table 1.
[22] "Visa Birkagrav." Historiska Museet. Accessed January 28, 2016. http://mis.historiska.se/mis/sok/kontext.asp?kid=731.

Evaluating Extant Examples

While many of the pieces Geijer describes in Birka III are illustrated, not all of the posaments are depicted or, in some cases, their photographs are not sharp enough to make out critical details. However, the online Birka graves database often has excellent photos, some of which are in color, so links to the appropriate webpages were added to the spreadsheet of data gleaned from Birka III. Unfortunately, some of the grave records that were meant to contain posaments did not have links to posament photographs while other graves not identified in Birka III as having a posament would have a posament appear in one of the images linked to that grave. It appears that these "extra" posaments were pictured either because there were multiple artifact cases captured in one photograph or because the posament-like item had not been identified as a posament in Birka III. Attempts to search the database in order to construct a full list of posaments were similarly frustrated, this time by inconsistent naming conventions in the item records. The posaments were not uniformly catalogued and might be found under *posament, posamentband, posamenterbeten, textil, silver*, *trådarbete,* or, most maddeningly, *tråd*, which could mean yarn or thread or wire, depending on the context. These attempts to locate posaments on the Birka webpage led to the compilation of a glossary of search terms, first only those related to posaments, and then expanding to cover many other items of interest to people researching the Birka finds as more and more interesting, if not directly on topic, items were found. The Swedish-English directory of terms should be useful for future research since, while search results are easily enough translated into English, searching by English words is of limited utility in a Swedish website or database. This selected glossary is organized into several categories and subcategories to make finding desirable search terms easier and has been made available online as a sortable and searchable document (see Appendix B).

Eventually it became apparent that the only way to identify and catalogue all the posaments and possible posaments was to carefully audit all of the grave finds available online. Therefore, each record for every grave was opened and carefully examined, until all of the 1,191 Birka graves available online had been reviewed. Each grave had between zero and a few hundred items, so the time to evaluate each grave varied wildly, some taking only a moment and others consuming an hour or more. Any item with a photograph in which a posament could be clearly identified or where the description clearly identified the item as a posament band or posament fragment was counted as a posament. Reports of spiral silver threads, silver bands not clearly identified as tablet weaving bands, and tråd that was specified as being silver, as well as a few other suggestive metal pieces, were included in the list of potential posaments. This increased the number of posaments from the forty-four identified in Birka III to sixty-nine posaments and a further forty-two potential posaments.

For each grave with a posament or possible posament, a record was created which included the grave number, museum accession number, link to the record online, a note whether there is currently a photo available, and as much information as was available about the posament characteristics. For the confirmed posaments, the grave type and the posament categorization, using Geijer's 27 posament types, was also recorded. While most of the entries were missing important metrics regarding their dimensions and weights, the organization of the information into a searchable, filterable table allows for quicker searches and analysis of the metrics, such as the number of posaments in a grave, the number of times a posament is found, proportion of graves with a posament. This spreadsheet has also been made available for public use to help others find posaments that had previously been unrecognized and remain difficult to search for (See Appendix C).

Reconstructing weaving techniques

While I am a huge fan of pure research, my original intent in picking up this project was to produce reconstructions of the posaments and so some experimental archaeology was required. I decided to focus my efforts on the spiral wire posaments rather than the drawn wire posaments because I found the tighter, more intricate weaves of the spiral wire posaments to be more aesthetically pleasing.

My initial attempts were produced using pearl purl – an Elizabethan-era embroidery material that is essentially a hollow spiral of wire, often available in silver or gold options. These spiral wires tend to be made of copper and then either silver or gold plated or coated with an appropriately colored base metal. Several different sizes of pearl purl are available, including some very fine options that were nearly as fine as the spiral wires seen in Birka III. I tried several different manufacturers of pearl purl – from the chance find at Pennsic to silver plated examples from Hedgehog Handworks to specially-commissioned silver colored copper from Pakistan. I discovered that the pearl purl produced a reasonably good visual approximation of the spiral silver wires in the posaments, but the materials were difficult to work with, since pulling too hard on a wire would lead it to stretch and it could be returned to an approximation of the correct shape only with difficulty. The rigidity of the copper meant that the pearl purl had a tendency to kink sharply, work harden, and recoil wildly. Further, even the smallest pearl purl was not as fine as the smallest posament wires, meaning that the finest work could not even be attempted.

In these early attempts to recreate the posament bands, I tried to use a needle to guide the wires and to weave the knots quite tightly. However, using a needle means that the wire width is at least doubled by going through the eye, making it difficult to weave tightly. Sewing in and out of tightly woven knots also presented a problem because the wires refused to make the sharp corners required by this technique, resulting in frequent kinks and stretched spirals.

Containing the wire on small bobbins was helpful in preventing kinks, work-hardening, and injury due to wire recoil, but required the needle-assisted weaving technique be abandoned. While there is no positive evidence for the use of bobbins in the weaving of posaments and they would not have been associated with the final product, their use is plausible. Bobbins could have been made from many materials, including antler, bone, or wood, and would have been a reasonably disposable item. There is a find of an antler bobbin from Birka that would have served very nicely to assist in weaving posaments. Because of the “springy” nature of the wire, it would have had to be secured with a small cord or thong to keep the spiral wire from unwinding while weaving. A modern bobbin, originally designed for kumihimo, neatly solves this issue by enclosing the wire in a flexible keeper that folds up to load the thread and folds down to prevent too much wire from unspooling at any one time. While a thoroughly modern product, the kumihimo bobbins make the posament weaving process much smoother.

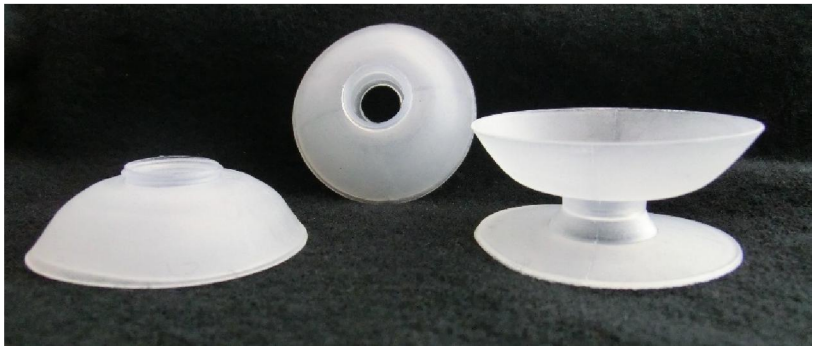

Figure 2: Bobbin from Birka, Svarta jorden (above left) Yliali Asp 2001-05-07 CC BY
http://mis.historiska.se/mis/sok/bild.asp?uid=28687

Figure 3: Modern Kumihimo Bobbins (above right). The smallest size (1.75 inches) is the best for posament work as it minimizes the amount of drawing down that needs to be done. Three bobbins illustrated, from left to right – side view, closed, top view, and side view open.

The next breakthrough came when searches for "silver tråd" brought up several online sources of spiral wire. These spiral wires are made of 96% tin and 4% silver and are used in a Sami braiding technique that is today a popular craft in Scandinavia.[23] The braids used in these Sami bracelets are remarkably similar to some of the techniques used in the Birka posaments. I will use "tråd" in this paper to mean this silk-cored spiral wire.

I acquired samples of the spiral wires from three different manufacturers in Sweden – Slöjdmaterial,[24] Pewter of Sweden,[25] and TNKreativ,[26] and found that all their basic 4% silver/96% tin products were of similar quality and properties. TNKreativ has copper tråd in a rainbow of colors, plus one size of tråd in gold plated copper and another in 7% silver, while Pewter of Sweden sells tråd with a silver content up to 10%. Disappointingly, there was no clearly perceptible difference in the silver sheen of the 4% and the 10%. The silver/tin tråd is markedly less shiny than the silver plated pearl purl, but the benefits of the silk core and the more flexible metal make the tråd the superior product for posament making. The tråd comes in several different sizes, which indicates the diameter of the wire, not the overall diameter. The standard available sizes are:

[23] "Lapland Jewelry Information." Swedart. Accessed February 04, 2016. http://www.swedart.com/lapland_Jewelry_info.htm.
[24] http://www.slojdmaterial.se/
[25] http://www.pewterofsweden.com/en/
[26] https://www.tnkreativt.com/

Table 1: Standard Commercial Tråd Dimensions

Wire diameter (mm)	Spiral diameter (mm)
0.25	0.8
0.3	0.9
0.35	1
0.4	1.2
0.45	1.3
0.5	1.4
0.6	1.6

Weaving with the silver/tin tråd was much more successful, thanks to the much softer metals and the fiber core providing strength and stability to the spiral, even when pulled. It is still possible to deform the spiral or stretch the wire and expose the core, but it is generally a more forgiving material than the pearl purl.

A fortunate consequence of deciding to use bobbins and to abandon the needle-woven technique was the discovery that weaving the posaments by using generous loops and then drawing those loops down tightly produced a much more reliable and pleasing result. This loop-and-pull technique was also made easier by the silk-stabilized tråd. While the loop-in-loop methods of constructing some of the simple trims, like P13 is obvious, many of the seemingly more complicated knots can be constructed by forming multiple loops and then weaving the loops through one another, with only the last pass needing to be woven over and under individual working lines. Posaments P9, P11, P17, P18, P19, and P20 can be wholly or partially constructed based on this method, with between two and six loops, plus a final pass that holds the knot together. The loop construction method is advantageous because it avoids the need to do a lot of weaving in and out of tight areas, which reduces the risk of kinking or deforming the tråd.

A common challenge was keeping the individual wires parallel throughout the knot when two or more wires were included in a working line. While a knot is loose, it is very difficult to keep the lines in their proper place, but once it is drawn down somewhat, but before the knot has reached its final tightness, it becomes much easier to arrange the wires and have them stay in their proper place. Therefore, I generally recommend that some attempt at keeping the wires straight be made when making the initial knots to avoid the need for frequent corrections, which can lead to substantial twisting of wires, but that it is best to wait on the final arrangements until the knot has been somewhat shrunk and stabilized. A thin needle or tweezers can be used to arrange the wires before drawing the knot down to its final tightness.

Another helpful technique is, when confronted with a difficult knot, shifting the direction of work from left to right, instead of right to left (or vice versa), often brings clarity to the process. Likewise, rather than trying to figure out how to tie P9 upside down and backwards as part of the top line of P11, it is much more efficient and elegant to simply turn the piece upside down!

As Geijer recognized, one of the challenges of working with the spiral wire is splicing pieces or bringing the braid to a graceful conclusion. She mentions that, at least in some cases, an effort was made to minimize the number of strands in a band in order to reduce the number of joins required at the end of

the band.[27] This would require that the same strand or set of strands be worked across the lengths of the band multiple times before the band being tightened. There are a limited number of intact braids and the pictures are not always crisp, so it can be difficult to see what techniques were used in the original Birka pieces. While I have not been able to determine how this was accomplished in all of the bands, I hope clearer photographs or an in-person viewing will clarify the technique.

In the interim, I have found it reasonably satisfactory to weave together the ends in such a way that they appear to be continuous and flow back into the braid in the other direction but the ends actually are tucked behind the body of the band and stitched down to secure them. Since the braids are generally attached to a fabric base, these attachments can be easily hidden on the "wrong" side. This method provides a reasonably simple method of bringing a braid to a conclusion and has the advantage of being able to be used when a band has reached the desired length, rather than needing to calculate the finished length of the braid before weaving. Similarly, splices can be made by hiding the end of one wire and the beginning of the new wire behind the body of a band. Particularly if the ends can be staggered or if the lines can be back-woven so that they do not all end in the same place, a pleasing ending can be made without much trouble.

In summary, the following are the key points to remember when weaving posaments to prevent problems and improve results.

Helpful Posament Construction Tips:

- Use a bobbin when using large amounts of tråd
- Initially weave the knot or braid very loosely, using loops whenever possible
- If you are having difficulty with a knot, try turning it around or upside down
- On the first tightening pass, draw the knot down to about twice the size of the final knot
- Straighten the lines so that the wires stay in the right order when the knot is stabilized
- Carefully draw the knot down to the final size, avoiding pulling too hard

Reconstruction of extant examples

The final phase of this project was to reproduce the extant examples. This too required some careful study, since there was no systematic evaluation of the dimensions of the tråd wires or even of the completed bands. I began by reading the translation of Geijer and recording the measurements she included in the Birka III text. Unfortunately, it quickly became apparent that not all the needed measurements were provided in the text and so additional measurements were obtained by taking measurements from the Birka III plates which provided a clear scale in the caption. This led to finding some discrepancies in the reported sizes and the measured sizes, probably due to slight differences in the scale of the photograph when published. Therefore, the reported sizes were used whenever available.

In knitting, it is common practice to knit a swatch in order to test out the effect specific needles and yarn have on the scale of a finished stitch. I borrowed this idea, assuming that if I made a scale of the same knot made in all the possible sizes of tråd as a "gauge" (See Table 2 & Figure 4) and then an exemplar of

[27] Geijer, *Birka III,* 101.

each knot described by Geijer in a standard size of tråd as a “swatch” (see Table 3 & Figure 5), it should be possible to at least make a reasonable approximation of which size tråd would be needed to produce a band of the desired dimensions. This technique was expected to be imperfect, since the different knots each have different numbers of wires used and angles of crossings that could skew the proportions. Further, the relative tightness of the extant knot also had to be estimated, since the exemplar knots were all woven to a uniform maximum tightness.

As a way of estimating the length of tråd consumed by each knot, I carefully weighed each knot and a sample of the same tråd of a known length to determine the grams per knot and the grams per centimeter of the tråd so that the length per knot could be calculated. All weights were taken three times on a pharmaceutical scale with an error of +/-0.005 grams and the average calculated.

It should be noted that while the sizes of the extant and the recreation knots may be compared and attempted to be matched, the weights will differ significantly. The material I am using in these recreations is a tin and silver alloy, not the nearly pure silver or gold of the extant items. Further, even if a pure silver wire was used to make silver tråd, the extant items may have lost weight due to oxidation, small fractures in the wire, or rotting of the silk core, or, conversely, gained weight due to conglomeration with or oxidation to nearby organic materials.

Table 2: The Tråd Gauge – performed in single P9 knots

Wire diameter	Spiral diameter	Approx. wire gauge	Weight of wire (grams/cm)	Height of knot (mm)	Width of knot (mm)	Weight of knot (grams)	Length per knot (cm)	% taller than previous	% height of 0.25
0.25	0.8	~30.25	0.0166	5.5	7	0.183	11	NA	100%
0.3	0.9	~29.5	0.0218	6.5	8	0.237	11	118%	118%
0.35	1	~27.25	0.0288	8	9	0.374	13	123%	145%
0.4	1.2	~26	0.0357	9	11	0.537	15	113%	163%
0.45	1.3	~25	0.0438	11	13.5	0.838	19	122%	200%
0.5	1.4	~24	0.0504	12	15	1	19.5	109%	218%
0.6	1.6	~22.5	0.0621	13	16	1.225	20	108%	236%

Table 3: The posament "swatches" – each performed in 0.25 tråd (0.166grams/cm) and woven tightly

Posament number	Height of Knot (mm)	Width of Knot (mm)	Weight (gm)	Length per knot (mm)
P1	2	NA	0.521	31.5
P2	6	NA	1.188	71.5
P3	2	NA	0.32	19.5
P9	5	7	0.63	38
P10	6	4.5	0.613	37
P11	13	12	0.896	54
P12	6	6	0.359	22
P13	6	5	0.494	30
P14	9	6	0.923	55.5
P15	9	6	0.622	37.5
P17	6	7	0.169	10
P18	17	18	1.079	65
P19	9	10	0.31	19
P20	11	20	0.671	40.5
P21	8	7	0.308	18.5
P22	12.5	7	0.544	33
P23	3	6.5	0.159	9.5
P24	5	5.5	0.24	14.5
P26	4	6	0.266	16

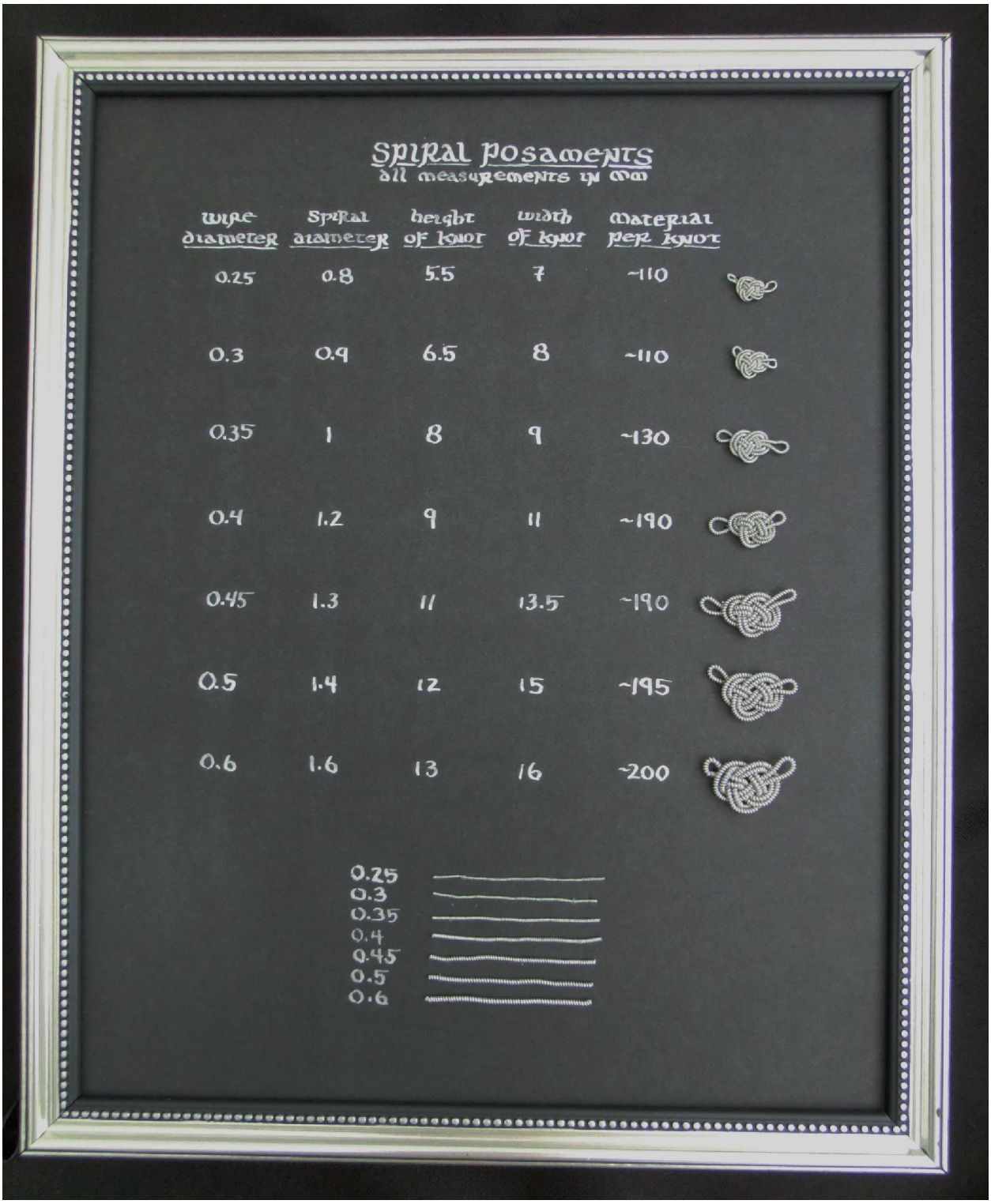

Figure 4 - The Tråd Gauge (above) performed in single P9 knots. All shown in an 8x10 frame.

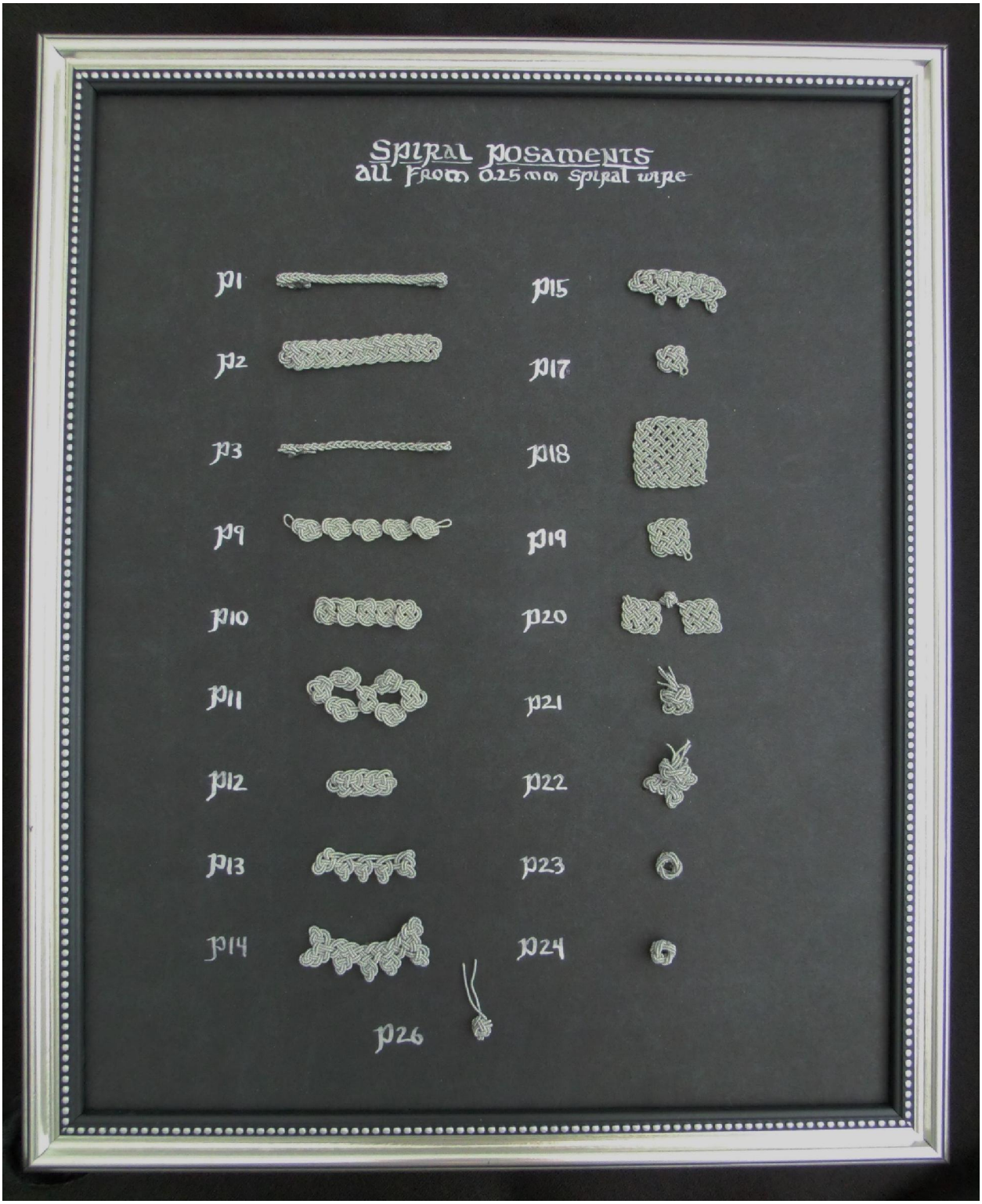

Figure 5: The Posament "Swatches" (above) – each performed in 0.25 tråd and woven tightly. All shown in an 8x10 frame.

Having acquired all these data points, it was possible to calculate the percent difference between an example of one of the extant knots and the analogous exemplar knot. Since there is not an infinite number of sizes of tråd, the commercially available tråd is not necessarily the same as that used in the Birka finds, and there is some inevitable guesswork in estimating how much of the final knot is empty space when the extant posament is loosely woven, there was still some guesswork and estimation required when choosing the tråd with which to make the reproduction. Once the closest possible size of tråd was selected, the tightness of the weave could be adjusted to better conform to the size of the extant posament if that remained consistent with the extant example, and the posaments were re-made using the next size bigger or smaller, if needed, in order to create a reproduction posament as faithful to the original as possible (Table 4 & Figure 8). The calculated recommendation as to which tråd to use worked remarkably well and only one example was woven in multiple tråd widths to try to better match the extant example and, even then, the first reproduction attempt ended up being the more faithful reproduction.

Only in three cases was there a significant departure of the reproduction from the extant examples. No reproduction of P2 was attempted, as this was the only one of my "swatch" knots that ended up being larger than the extant piece. I will need to make or buy a finer tråd before I am able to attempt a scale reproduction of that knot. On the other hand, the reproduction of P17 is somewhat too large (138% of the extant piece) because the gold plated tråd only comes in 0.35 tråd and I felt it was more important to retain the gold color than to use the 0.3 tråd that potentially would have been closer to the correct size. Spiral gold posaments are relatively rare, so I felt depicting it as the wrong metal was a bigger problem than the imprecise size. The other posament that deviates from the extant example is P21 (Figures 6 & 7). In recreating the posaments at the same scale as the extant example, it became apparent that the makers of the Birka posaments did not simply increase the diameter of the spiral by increasing the diameter of the wire, but that in some cases, the diameter of the core was increased while retaining a smaller diameter of the wire. This fine wire in a thicker spiral allows for sharper turns. Since the commercial tråd increases the diameter of the spiral solely by increasing the diameter of the wire, the coarser spirals of the 0.45 tråd did not make the corners as gracefully as in the extant example, even with a fair amount of pinching, and so the resultant knot is able to be made of the correct height, but the shape and width are somewhat amiss.

Figure 6: The extant example of P21 (above right). Badly corroded, but note the fineness of the wire. Gabriel Hildebrand SHMM 2013-03-06
http://catview.historiska.se/catview/media/highres/349355

Figure 7: The reproduction P21 (right). Note the much more coarse wire in the 0.45 tråd reproduction.

Table 4: Reproductions of Extant Pieces

Posament number	Height of 0.25 exemplar (mm)	Extant piece grave ID	Height of extant piece (mm)	Extant piece - loose or tight?	% Change needed	Reproduction tråd	Height of reproduction (mm)	% difference from extant	Weight of reproduction (gm)	Length of material (cm)
P1	2	798	2	tight	0%	0.25	2	100%	0.5	30
P2	6	798	4	tight	-33%	NA*	NA	NA	NA	NA
P3	2	886	2.5	tight	125%	0.3	2.5	100%	0.475	22
P9	5	643	7.5	loose	114%	0.25	7.75	103%	0.925	56
P10	6	520	7	tight	116%	0.3	7.75	111%	0.964	44.5
P11a	13	944	13	tight	0%	0.25	13	100%	0.985	59.5
P12	6	1040	8	tight	133%	0.35	8.25	103%	0.973	34
P13	6	944(?)	7.5	tight but spaced	125%	0.3	7.25	97%	0.864	39.5
P14	9	524	10	tight	111%	0.3	10.5	105%	1.469	67.5
P15	9	944(?)	12	tight	133%	0.3	11	92%	0.906	41.5
P17	6	561	8	loose	133%	0.35**	11	138%	0.507	17.5
P18	17	832	19	loose	111%	0.25	19	100%	1.347	81
P19	9	1125	19	loose	220%	0.5	20	105%	2.56	51
P20	11	520	15	loose	130%	0.35	16	107%	1.941	67.5
P21	8	524	14	loose	187%	0.45	14	100%	2.182	50
P22	12.5	524	17.5	loose	152%	0.35	17.5	100%	1.331	46.5
P23	3	561	8	tight	123%	0.35	8.75	109%	0.471	16.5
P24	5	327	11	tight	160%	0.4	11	100%	1.245	35
P26	4	989	5	tight	125%	0.35	5.5	110%	0.323	11.21

** P2 was not attempted because a finer* tråd *is needed than what is commercially available*

*** 0.35 is the only option available for gold plated* tråd

Other than the few cases where a close replica could not be made because of the limitations of the material, this method of estimating the size of the finished product and the amount of material used was successful. Using the gauge and the swatches, it should be possible to estimate the final sizes of any of the spiral posaments made with any of the gauges of tråd and the approximate amount of tråd needed to produce each posament. Knowing an estimated needed length is particularly helpful since it helps prevent the need for additional splicing in the middle of a band. Still, to be safe and to account for differences in weaving technique and tightness as well as the need for at least some small amount of working wire to complete the posament, these measurements should be viewed as the *minimum* necessary to complete the desired lengths at the desired gauge (see Table 5).

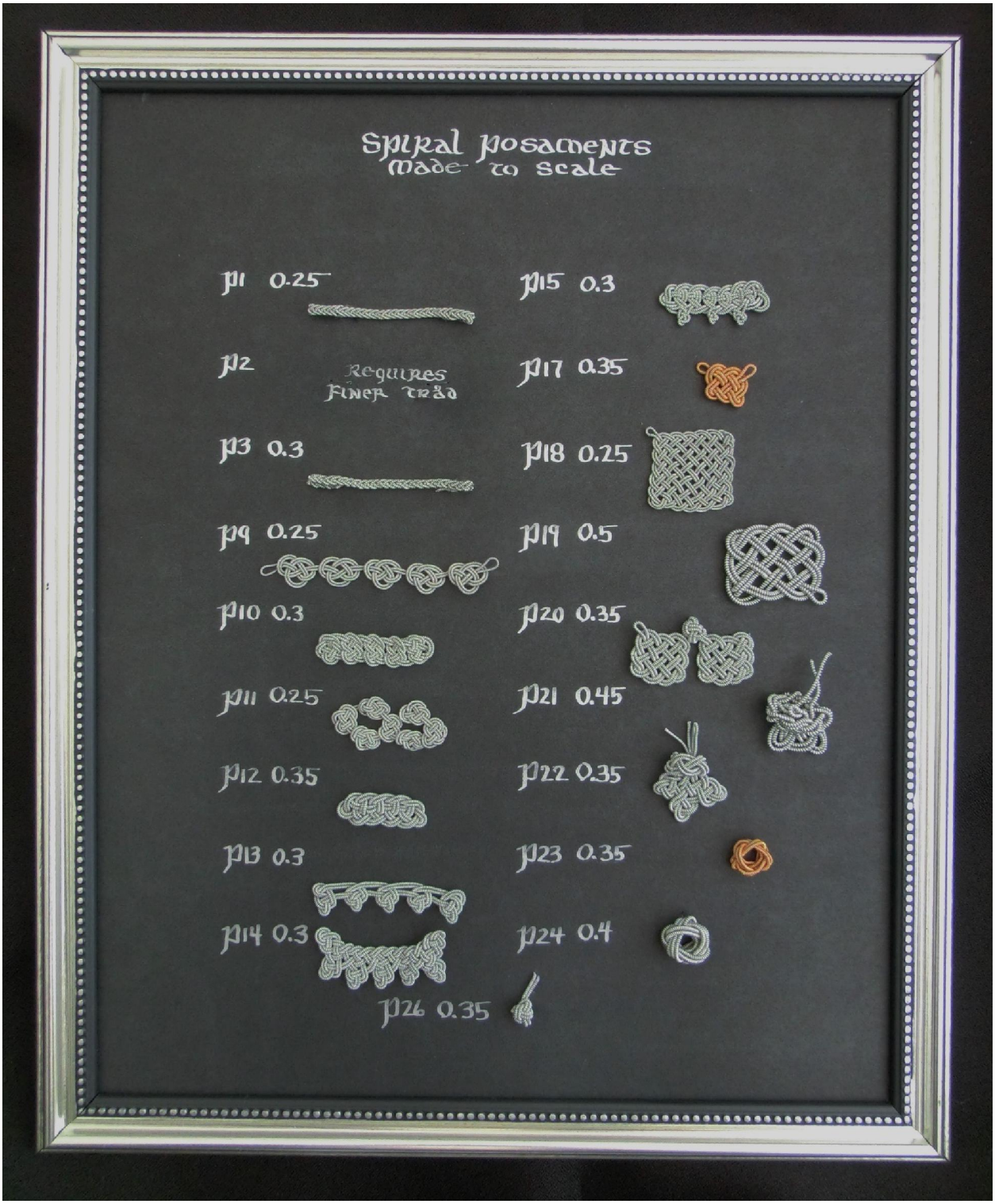

Figure 8: The posaments made to scale (above). Please note that P17 is slightly too large and P2 is absent due to not having a fine enough tråd. P21 is roughly the correct size, but the proportions are off due to the coarseness of the tråd. All shown in an 8x10 frame.

Table 5: Calculated Heights and Lengths, based off of 0.25 tråd exemplars and the tråd gauge

	0.25		0.3		0.35		0.4		0.45		0.5		0.6	
	Ht (mm)	Lg (cm)	Ht (mm)	Lg (cm)	Ht (mm)	Lg (cm)	Ht (mm)	Lg (cm)	Ht (mm)	Lg (cm)	Ht (mm)	Lg (cm)	Ht (mm)	Lg (cm)
P1	2	31.4	2.4	37	2.9	45.5	3.3	51.2	4	62.8	4.4	68.4	4.7	74.1
P2	6	71.6	7.1	84.4	8.7	103.8	9.8	116.7	12	143.1	13.1	156	14.2	168.9
P3	2	19.3	2.4	22.7	2.9	28.0	3.3	31.4	4	38.6	4.4	42.0	4.7	45.5
P9	5	38.0	5.9	44.8	7.3	55.0	8.2	61.9	10	75.9	10.9	82.7	11.8	89.6
P10	6	36.9	7.1	43.6	8.7	53.5	9.8	60.2	12	73.9	13.1	80.5	14.2	87.1
P11	13	54.0	15.3	63.7	18.9	78.3	21.2	88.0	26	108	28.3	117.7	30.7	127.4
P12	6	21.6	7.1	25.5	8.7	31.4	9.8	35.3	12	43.3	13.1	47.1	14.2	51.0
P13	6	29.8	7.1	35.1	8.7	43.2	9.8	48.5	12	59.5	13.1	64.9	14.2	70.2
P14	9	55.6	10.6	65.6	13.1	80.6	14.7	90.6	18	111.2	19.6	121.2	21.2	131.2
P15	9	37.5	10.6	44.2	13.1	54.3	14.7	61.1	18	74.9	19.6	81.7	21.2	88.4
P17	6	10.2	7.1	12.0	8.7	14.8	9.8	16.6	12	20.4	13.1	22.2	14.2	24.0
P18	17	65.0	20.1	76.7	24.7	94.3	27.7	106.0	34	130.0	37.1	141.7	40.1	153.4
P19	9	18.7	10.6	22.0	13.1	27.1	14.7	30.4	18	37.3	19.6	40.7	21.2	44.1
P20	11	40.4	13.0	47.7	16.0	58.6	17.9	65.9	22	80.8	24.0	88.1	26.0	95.4
P21	8	18.6	9.4	21.9	11.6	26.9	13.0	30.2	16	37.1	17.4	40.4	18.9	43.8
P22	12.5	32.8	14.8	38.7	18.1	47.5	20.4	53.4	25	65.5	27.3	71.4	29.5	77.3
P23	6.5	9.6	7.7	11.3	9.4	13.9	10.6	15.6	13	19.2	14.2	20.9	15.3	22.6
P24	5.5	14.5	6.5	17.1	8.0	21.0	9.0	23.6	11	28.9	12.0	31.5	13.0	34.1
P26	4.0	16.0	4.7	18.9	5.8	23.2	6.5	26.1	8	32.0	8.7	34.9	9.4	37.8

Mathematically, this appears very tidy, but in order to assess whether this method was in fact useful for making predictions, the calculated answers from Table 5 were compared with the experimentally observed heights and lengths from the reproduction pieces that were made. Since the exemplars from which Table 5 is based were all tightly woven, recreation posaments that were loosely woven were excluded. Also, since the table would simply be repeating data for the reproductions that were done in 0.25 tråd which would be essentially identical to the exemplars, those were also deleted from the sample. Lastly, P2 was excluded, as there was no attempt to make a scale reproduction due to the lack of the appropriately sized tråd.

The results (Table 6) of the comparison was encouraging – in eight of nine cases, the resultant height was within 10% of the calculated and in six of the nine cases, the estimated length of tråd needed was within 11%. This method seemed to struggle most with the “sliding knot” style posaments and with large changes in tråd sizes. The difference in P26 is probably due to differing lengths of trailing strings

that were left on at the time of weighing and subsequently trimmed. I would like to make additional exemplars at some intermediate sizes to help validate and fine tune the scale, if not simply fully fill it in. One limitation of using this method to calculate the length needed is that the length reported reflects the unit of reproduction I somewhat arbitrarily chose for the display boards. In general, this is one unit for any of the discreet items (like belt ends and sliding knots) and five units for repeating bands. The length data for the braids, as an ongoing band without discreet units and where the density of the band is highly dependent on how tightly the braid is pulled while being worked, will be harder to apply. Therefore, the suggested lengths for P17, P18, P19, P20, P21, and P22 are probably the most reliable and the suggested lengths for P9, P10, P12, P13, P14, and P15 can be used as long as the unit of reproduction is considered.

Table 6: Comparing Calculated Heights and Lengths to Experimentally Observed Heights and Lengths

	Repro tråd	Repro height	Repro length	Calculated height	% difference height	Calculated length	% difference length
P3	0.3	2.5	22	2.4	96%	22.7	103%
P10	0.3	7.75	44.5	7.1	92%	43.6	98%
P12	0.35	8.25	34	8.7	105%	31.4	92%
P13	0.3	7.25	39.5	7.1	98%	35.1	89%
P14	0.3	10.5	67.5	10.6	101%	65.6	97%
P15	0.3	11	41.5	10.6	96%	44.2	107%
P23	0.35	8.75	16.5	9.4	107%	13.9	84%
P24	0.4	11	35	9	82%	23.6	67%
P26	0.35	5.5	11.21	5.8	105%	23.2	207%

Future research goals

While this has been an extensive project already, I hope to continue my research into the posaments and further contribute to our understanding of the pieces. My goals for the coming year include:

- Take metrics from the photographs online that contain a modern scientific scale. There are plans to take new photographs of the posaments and put them online sometime this spring, so this will be on hold until those new, hopefully sharper, photographs are provided. I also now have a digital caliper what is accurate down to fractions of a millimeter, so revised size data will be able to be collected more accurately.
- Investigate and do a similar series of reproductions of the drawn wire posaments that I have, thus far, essentially ignored. Likewise, I would like to further investigate and explore the posament type materials from places other than Birka. I have already identified several from Hedeby and Gotland but have yet to explore them systematically.
- Develop a method of creating my own silver wire tråd so I can work with pure silver tråd and hopefully recreate some of the posaments that are either too small to be addressed with the commercially available tråd (P2) or where the commercially available tråd is too coarse to adequately reproduce the extant example (P21).
- Experiment with how well the posaments withstand stressors such as wear, washing, and fire. Since most of the posaments that were found in conjunction with fibers were found on silks,

they were likely to have been a luxury good, but that would not have exempted them from some wear and tear and the occasional need for cleaning. Some of the posaments are listed as having come from a "Brandgrav" or cremation burial, so I am interested in seeing what effects fire would have on the posaments.

- Investigate how to minimize the number of wire strands. The current reproductions have been made with as many working lines as necessary to make the piece all at one time. However, Geijer mentions that many of them are made by passing the tråd back and forth several times in one piece. As a companion to this project, I would also like to determine whether the terminal posaments that are topped with a ring (P21 and P22) are created as a single piece or if the ring and the pendant component are woven separately. I hope my April visit to the museum and/or the new photographs will give me the opportunity to investigate how this was done.
- Share the results of my research in person, in print, and electronically. I have plans to teach lecture and hands-on classes at SCA 50th year, Warriors and Warlords, and Pennsic. I am working on creating instructional guides on how to braid the individual posaments. I hope to eventually consolidate a short history of Birka and the posaments, and an instructional for each posament into a book to be published. In the interim, I am making selected materials available on www.eithni.com/posaments to provide a free resource for others interested in the Birka Posaments.
- Seek out additional sources of information about the Birka posaments and graves. Additional characteristics I would like to explore include placement of the posament(s) in each grave, the characteristics of any co-incident textiles, and the gender and socioeconomic status of the deceased. This will likely include making a translation of Annika Larsson's chapter on posaments from her dissertation, even if the conclusions are taken with a grain of salt.

Conclusion

While much work remains to be done on the Birka posaments and posaments from other locations, this paper and the associated appendices and spreadsheets has provided an initial systematic assessment of the information currently available. Further, the proposed method of choosing a size of spiral wire in order to achieve a desired posament size was reasonably successful in initial trials and will be revised and updated as additional data points are provided. Exciting opportunities to increase the knowledge about the extant pieces should be available this year and hopefully new insights as a consequence. Hopefully, these contributions to the study of the spiral posaments will lead to wider interest in the Birka posaments and more frequent successful recreations of these beautiful, if previously under recognized, pieces.

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All photos not otherwise attributed are by Jean Kveberg.

Acknowledgements

Special thanks to Gregory Kveberg and Julia Meyers for proofreading my translations of Birka III from German to English. Thanks to Donna Waubaum, Sonia Seiben, and Lisa Siefert at Willow Pharmacy for allowing me access to their pharmaceutical grade scale in order to make accurate measurements of the posaments and tråd. Thanks to Linda Wåhlander for her encouragement and assistance in reaching out to the Sveriges Historiska Museet. And thanks to the staff of the Sveriges Historiska Museet themselves, especially Helen Persson, for providing the Birka materials online, answering questions, and otherwise being helpful in this research.

Appendix A – Translation of Chapter VIII, Posamentierarbeiten, in Birka III by Agnes Geijer

Black is the original text
Green is translation by Jean Kveberg
Red are notes and page notations

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VIII.
Posamentierarbeiten.
Types of Posament Work.

Sinnreiche Knoten und Flechtarbeiten, für sich allein oder mit einander in Kombination, bisweilen in Verbindung mit einer Technik, bei der die Nadel verwendet wird, kommen unter den Birkatextilien reichlich vor.
Ingenious knots and braiding, used individually or in combination, or in combination with techniques which would have required a needle, are found in some number among the Birka textiles.

Technisch ist diese Arbeit ja nicht genau dasselbe, was man in späterer Zeit unter dem Wort Posamente (franz. passement) versteht. Da sie aber dem allgemeinen Charakter nach mit jüngeren Erzeugnissen dieser Art übereinstimmt, dürfte es nicht unberechtigt sein, dieselbe Bezeichnung zu verwenden.
Technically, this work is not exactly the same as what is later called Posament (passement in French), but since it is of the same general character as more recent products of this sort, it would be reasonable to use that term.

Die Posamentierarbeiten aus den Birkagräbern bestehen nun in technischer Hinsicht teils aus fortlaufenden Flechten mit verschiedener Zahl von Flechtparten (siehe Abb. 21 a—d), die in der Regel frei „geschlagen" und dann zugezogen werden, teils auch aus dekorativen Knoten, die ja auch eher eine Art von Flechten als richtige zum Festbinden bestimmte Knoten sind, die, straff zugezogen, keine praktische Funktion ausüben können. Die Zierknoten werden mittels eines oder zweier Parten hergestellt, die in Buchten gelegt und dann der Reihe nach in einander eingefädelt oder eingewirkt werden. In einzelnen Fällen ist es zweifelhaft, welche von beiden Bezeichnungen, Flechte oder Knoten, die richtigere ist.
The Posament works from the Birka graves consist mostly of continuous braiding with various numbers of working strands in each braid (see Figure 21a-d), which are generally loosely knotted then drawn down. Sometimes they are more of a decorative knot than a braid, that when drawn tight cannot have any practical purpose. The decorative knots are produced with one or two working strands which are laid in waves and then threaded sequentially or woven together. In some cases it is difficult to determine which term, braids or knots, is more accurate.

Wahrscheinlich hat man sowohl bei der Herstellung von Flechten wie auch von Knoten den Faden auf eine Art von Stäben aufgewickelt gehabt, die zweckentsprechender Weise so geschmeidig gestaltet gewesen sein müssen, dass sie sich zum Wirken eigneten. Man kann sich ganz gut vorstellen, dass die schönen Beinnadeln von unterschiedlichen Formen, die man in der Erde von Biörkö gefunden hat (Taf. 39), gerade für diesen Zweck verwendet wurden. Weiter lässt sich annehmen, dass man in einzelnen Fällen eine feste Unterlage als Stütze gehabt hat, um die „Schläge" fixieren zu können, — gewissermassen ein sehr einfaches Gegenstück zu den Klöppelkissen späterer Zeiten mit ihren Stecknadeln. Auf jeden Fall ist die Ähnlichkeit zwischen den Flechtborten P1-7 (Taf. 27) und den einfachsten Klöppelarbeiten auffallend, obwohl es aus anderen Gründen unrichtig wäre, diese Bezeichnung hier anzuwenden. Bei allen „Ausläufern" werden nämlich die Fäden hin und her gezogen und nicht wie beim Klöppeln mit den freien Parten geschlagen. Die Zierknoten sind immer flach und nach demselben System hergestellt, die Parten sind also regelmässig über- und untereinander geflochten. Der Form nach sind sie oft quadratisch. (page 100) Oft kommen Zusammenstellungen der beiden kleinsten Knoten vor (e und g in Abb. 21).

It is likely that during the production of the braids, the strands were wound around shuttles that were designed to be supple enough to be suitable for the braiding. One can imagine that the beautiful bone needles of different forms that have been found in the soil of Birka (Plate 39) were used for just this purpose. Next, it may be assumed that in some cases the maker had a solid base for support in order to secure the “knotting.” In a sense, this would be a very simple counterpart to the lace pillow and pins of later times. In any case, there is similarity between the braided braids P1-7 (Plate 27) and the simplest bobbin lace work, although it would be wrong, for other reasons, to apply that name here. The sloping strands are pulled back and forth but, unlike with lacemaking, are not beaten tight. The decorative knots are always flat and produced by working strands that are braided together. They often take a square form. (page 100) Often, the two smallest knots occur combined together. (e and g in Diagram 21)

Das Material in den erhaltenen Posamentierarbeiten ist entweder glattes Drahtgold, oft recht grob, oder — seltener — Spiralgold und nur in Ausnahmsfällen gesponnenes Gold. Das Silber kommt dagegen fast nur als Spiralfaden vor (über das

The material in the extant Posament work is either smooth gold wire, often quite coarse, or – more rarely – spiral gold which and only in exceptional cases, spun gold. By way of contrast, the silver comes almost exclusively as a spiral thread (about the

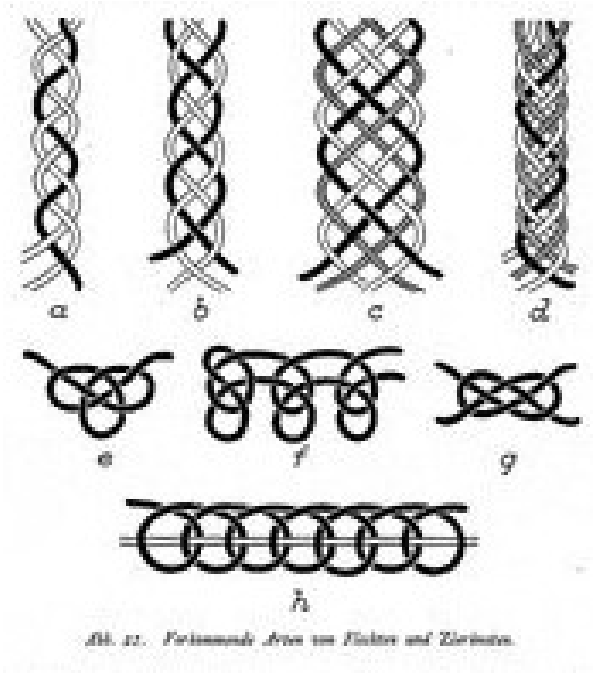

Abb. 21. Vorkommende Arten von Flechten und Zierknoten.
Fig. 21. Types of composition of braids and decorative knots.

Material siehe S. 68), im übrigen in einer bemerkenswert ebenmässigen Ausführung. Ein einzelnes Beispiel wurde gefunden, wo der Spiralfaden durch einen aus zwei Drähten gezwirnten Faden ersetzt war. An etlichen Posamenten, die aus Draht hergestellt sind, kann man — gleich wie an einem Teil der Stickereien und Bänder — deutlich erkennen, dass das fertige Erzeugnis mit etwas Hartem, einem Hammer oder dgl., bearbeitet wurde, wodurch das Gold einen stärkeren Glanz erhielt (P4 u. 8).
material, see page 68) of a remarkably consistent design. A single example was found where the spiral strand was replaced with a twisted strand of two wires. In several other posaments which are made out of wire – like on some embroidery and bands – clearly show that the finished product was processed with something hard, a hammer or the like, whereby the gold receives a higher gloss (P4 and 8).

In den meisten Fällen ist der Faden doppelt, d. h. jeder Part besteht aus zwei parallel laufenden Fäden, wodurch die Flechte, bzw. der Knoten flacher und daher (page 101) dekorativer wird. Doch kommt bisweilen sowohl ein einfacher als auch ein dreifacher Faden vor. Ausserdem sei bemerkt, dass in manchen Fällen der Schein trügt. So ist der kleine Gleitring P24 (Taf. 28:9), der dem Augenschein nach wie eine dreifache Flechte mit drei Fäden in jedem Part aussieht, nicht im eigentlichen Sinne geflochten, wozu 9 Fäden nötig gewesen wären, sondern aus einem einzigen zusammenhängenden Faden gewirkt, der 9 Mal rund herum geführt wurde. Der Ring weist daher nur die zwei (zusammengefügten) Fadenenden auf, was ästhetisch gesehen ein grosser Vorteil war. Diese Herstellungsart war bei derartigen Ringen die Regel. Besonders schwierig war es ja mit dem Spiraldraht einen gefälligen Abschluss zu machen. Man hat daher auch in anderen Fällen (die Borten P13-15) getrachtet, solche so weit wie möglich zu vermeiden, indem man derart arbeitete, dass man den Faden zwei oder drei Mal hin und her gehen liess, statt die ganze Breite der Flechte auf ein Mal fertigzustellen, was ja sonst das natürlichste und leichteste wäre.

In most cases, the thread is double, that is, each part consists of two parallel strands, so that the braid or the knot is flatter and therefore (page 101) more decorative. But sometimes it can be a single or even a triple strand. It should be noted that in some cases, appearances are deceptive. The small sliding knot P24 (Plate 28:9) is not, as appears on initial visual inspection, a triple braid in the real sense, where including nine strands would have been necessary, but rather worked from a single continuous strand passed nine times around. Therefore, the sliding knot has only two thread ends to be joined, which is aesthetically a great advantage. This sort of construction was the rule in such rings. It was especially difficult to bring the spiral wire to a pleasing conclusion. Therefore, it has been attempted in other cases (the braids P13-15) to, insofar as possible, avoid additional strands and instead work so that the strands were allowed to go back and forth two or three times instead of the entire width of the braid being completed at one time, which would have been the most natural and easiest construction.

Mit Rücksicht auf Form und Mass können die Posamenten in 5 Gruppen eingeteilt werden:
1) Fortlaufende Borten oder Schnüre, die an irgend einem Stoff angebracht waren;
2) Randbörtchen, die am Saum des betreffenden Kleidungsstücks angenäht waren;
3) Dekorative Zierknoten, die wie Paillette u. dgl. einem Stoff angenäht waren;
4) Zierate als Abschluss an den aus Seiden genähten, ziemlich schmalen Riemen;
5) Gleitknoten, die wahrscheinlich solche Bänder oder Schnüre aus Seide oder anderem Garn verziert haben.
With regards to the form and measure of the trimmings, they can be divided into five groups:
1) Ongoing braids or cords that were attached to some substance
2) Edge bands which were sewn on the hem of the garment in question
3) Decorative ornamental knots that were like spangles and the like and sewn onto cloth
4) Embellishments sewn as a terminal to rather narrow silk belts
5) Sliding knots which probably decorated bands or cords of silk or other yarn

P1. GRAB 798. Taf. 26: 2. Flechtenschnur, flache Flechtung aus 5 Parten, ungefähr wie Abb. 21 b u. c. Feiner Spiralsilberdraht, einer in jedem Part. Breite 2 mm, grösstes Stück 7 cm, im übrigen kleine Fragmente. Lag mit P 2 beisammen, mit dem es teilweise zusammengeklebt war, neben dem Fragment einer unbestimmbaren Stoffunterlage. Das Silber ist stark oxydiert, sodass stellenweise nur der Seidenkern übrig geblieben ist.
P1. GRAVE 798. Plate 26:2. Braided, flat braid from five working lines, something like figure 21b and c. Fine silver spiral wire, one in each part. Width of 2mm, the largest piece is 7cm, plus additional small fragments. Found in the same context as P2, to which it was partially stuck together, along with a fragment of indeterminate fabric backing. The silver is heavily oxidized so that in places only the silk core is left.

P2. GRAB 798. Taf. 26: 1. Flechtenschnur aus sechs Parten in flacher Flechtung, Abb. 21 c. Feiner Spiralsilberdraht, doppelt, d. h. zwei in jedem Part. Breite ca. 4 mm. Fragmente von 2-3 cm Länge und darunter. Siehe vorhergehende Nummer.
P2. GRAVE 798. Plate 26:1. Braided from six working lines in a flat braid, Figure 21c. Fine silver spiral wire, doubled, i.e., two strands in each line. Width of about 4 mm. Fragments of 2-3 cm in length and less. See previous number.

P3. GRAB 886. Taf. 26: 3. Flechtenschnur, hergestellt aus 5 Parten wie aus Abb. 21 d hervorgeht. Ziemlich grober Spiralsilberdraht, einfach. Breite 2 ½ mm. Erhalten sind 5 Teilstücke zu 6-12 cm sowie kleinere Fragmente.
P3. GRAVE 886. Plate 26:3. Braided cord, made of five working lines, as in figure 21d. Fairly coarse and simple silver spiral wire. Width 2 ½ mm. There are five sections measuring 6-12 cm and smaller fragments.

P4. GRAB 644. Taf. 27:4. Flechtenschnur, bestehend aus einer vierfachen Flechte mit einfachen Ausläufern. Grober Golddraht, doppelt. An vier Stellen ist der Draht derartig angestückelt, dass die Enden zwei bis drei Mal miteinander verschlungen wurden. Die Flechtenschnur ist kunstlos durch Umbiegen der Flechte abgeschlossen. Die Flechte trägt hier und da deutliche Merkmale von Schlägen oder Reibung, wodurch der Glanz des Goldes erhöht wurde. Breite 1.3-1.5 mm, Länge (vollständig) 26 cm.
P4. GRAVE 644. Plate 27:4. Braided cord consisting of a quadruple braid with simple slopes. Coarse gold wire, doubled. In four places the wire is pieced by intertwining the ends two or three times. The braiding is artlessly completed by bending the braid. Here and there, the braid bears clear signs of impacts or friction which increases the glitter of the gold. Width 1.3-1.5 mm, length (complete) 26 cm.

P5. GRAB 542. Taf. 27:3. Flechtenborte, bestehend aus einer vierfachen Flechte mit einfachen Ausläufern gleich den vorhergehenden, am Anfang jedoch auch ein paar kreuzförmige Austäufer. Doppelter Golddraht, an vier Stellen wie der vorhergehende angestückelt. Sorgfältig mit einigen besonderen Verschling- (page 102) ungen abgeschlossen. Ebenfalls nachträglich abgeplattet. Breite mit den Ausläufern 8 bzw. 9 mm, Länge (vollständig) 27 cm.
P5. GRAB 542. Plate 27:3. Braided band, consisting of a four-fold braid with simple slopes similar to the previous braid at the beginning, but also including a few cruciform offshoots. Double gold wire pieced in four places, same as the previous braid. Carefully finished with some (page 102) special intertwining. Also subsequently flattened. Width of the slopes 8-9 mm, length (complete) 27 cm.

P6. GRAB 710. Taf. 27: 5. Flechtenborte, bestehend aus einer vierfachen Flechte mir einfachen Ausläufern, sowie I Paar kreuzförmigen Ausläufern am Anfang. Silberdraht, doppelt. Die Borte ist mit groben Stichen (Seide) an einer schütteren, dünnen Seide angenäht, die teilweise gerade liegt, teilweise eine schräg verlaufende Naht hat. Breite 1.3-2.5 mm, Drei Fragmente von 8.5 (mit der Seide 10) cm, bzw. 5 und 4.5 cm Länge.
P6. GRAVE 710. Plate 27:5. Braided band, consisting of a four-fold braid of simple slopes, and one pair of cruciform offshoots at the beginning. Silver wire, doubled. The trim is sewn with coarse stitches (silk) to a sparse, thin silk, which is partly straight, partly has a slanted seam. Width 1.3-2.5 mm, three fragments of 8.5 (with Silk 10) cm, respectively 5 and 4.5 cm length.

P7. GRAB 524. Taf. 27:2. Flechtenborte bestehend aus einer vierfachen Flechte mit abwechselnd 2 Paar einfachen und I Paar kreuzförmigen Ausläufern. Doppelter Golddraht, an vier Stellen gestückelt. Der Anfang ist in Schlingentechnik (St 15 etc.) in Form eines Ringes und eines Stabes gearbeitet, wovon man unmittelbar zum Flechten übergegangen ist. Breite bzw. 0.9 und 2.3 cm. Länge (vollständig) 28 cm.
P7. GRAVE 524. Plate 27:2. Braided band consisting of a quadruple braid alternating two pairs of simple and one pair cruciform slopes. Double gold wire, pieced in four places. The beginning is (like St 15)

worked in loop technology in the form of a ring and a rod, of which one is passed directly to the braid. Width respectively 0.9 and 2.3 cm. Length (complete) 28 cm.

P8. GRAB 736. Taf. 27:1. Borte, bestehend aus 22 St. kreuzförmigen Knötchen, zusammenhängd mit 3-5 mm Abstand geflochten. Feiner Golddraht, doppelt. Die Knoten sind offenbar mit dem Hammer bearbeitet worden. Die ursprüngliche Länge lässt sich nicht bestimmen. An einer Stelle ist das Verbindungsglied gebrochen. Breite 8 mm, Gesamtlänge 23 cm.
P8. GRAVE 736. Plate 27:1. Band, consisting of 22 units of a cruciform knot, alternating with 3-5 mm braided distance between them. Fine gold wire, doubled. The knots appear to have been worked with the hammer. The original length cannot be determined. At one point the link is broken. Width 8 mm, total (extant) length 23 cm.

P9. GRAB 643. Taf. 28:5. Einfache Borte aus kleinen dreieckigen Zierknötchen. Abb. 21c. Doppelter Spiralsilberfaden. Grösste Breite 8mm. Unabgeschlossen. Dieselbe kommt auch in Grab 832 vor.
P9. GRAVE 643. Plate 28:5. Simple band made of small triangular decorative knots. Fig. 21c. Doubled silver spiral strands. Greatest width 8 mm. Unfinished. The same is also found in grave 832.

P10a. GRAB 520. Taf: 26:4. Knötchenborte, bestehend aus achterförmigen Zierknoten (Abb. 21 g) aneinander geknüpft. Doppelter Spiralsilberfaden, der Seidenkern teilweise erhalten. Breite 7 mm. Gesamtlänge ca. 90 cm.
P10a. GRAVE 520. Plate26:4. Knotted band, consisting of figure-eight decorative knots (Fig. 21g) linked to one another. Doubled silver spiral strands, silk core partially preserved. Width 7 mm. Total length about 90 cm.

P10b. GRAB 957. Taf, 27:6. Knötchenborte gleich der vorhergehenden, jedoch mit schütter verteilten Knoten. An dem einen Ende, wahrscheinlich dem Anfang der Arbeit, ein dreizipfliger Knoten, gleich P23. Länge 24 cm, scheint vollständig zu sein.
P10b. GRAVE 957. Plate 27:6. Knotted band equal to the previous, but of sparsely distributed knots. At one end, probably the beginning of the work, three Turk's head knots, the same as P23. Length 24 cm, appears to be complete.

P10c. GRAB 832. Taf. 26:5. Knötchenborten gleich den beiden vorhergehenden. Zusammengeknüllt in Erdklumpen und stark oxydiert.
Kommt ausserdem in den Gräbern 427, 524 (vgl. St 28) und 976 vor.
P10c. GRAVE 832. Plate 26:5. Knotted band like the two previous ones. Crumpled in clod of earth and heavily oxidized.
Occurs also in graves 427, 524 (compare to St 28) and 976 as well.

P11a. GRAB 944. Taf. 29:2u. 30:2. Knötchenborte, bestehend aus abwechselnd 2 St. dreieckigen Zierknoten und I achterförmigen Zierknoten, welch letzterer die beiden Parten verbindet. Dort wo die Borte schmäler wird, nur achterförmige Knoten. Spiralsilberfaden, sehr angegriffen und oxydiert. Alle Borten haben eine Unterlage aus grober Seide (S4), welche zum grössten Teil gerade zugeschnittene, dem Augenschein nach ursprüngliche Kanten hat. Erhalten sind teils die auf Taf. 29 abgebildeten 4 Borten, jetzt auseinander gewickelt und aufmontiert, teils ein Erdklumpen, der mindestens noch ein

derartiges Stoffstück enthält sowie Spuren einer Stickerei aus Seide auf einem schütteren, dünnen Stoff als Einfassung. Siehe St 2. Die Breite der Knötchenborte ungefähr 1.3 cm. Die festgenähten Borten 23, 18, 14 und 8 cm, zwei an dem einen Ende schmäler werdend.
P11a. GRAVE 944. Plate 29:2 and 30:2. Knotted band, consisting of alternating two units of triangular decorative knots and one figure-eight decorative knot, the latter connecting the two working lines. Where the braid is narrower, it consists of only figure-eight knots. Silver spiral strands, very damaged and oxidized. All pieces have a backing of coarse silk (S4), which to visual inspection appears to have, for the most part, straight-cut, original edges. The four extant bands are depicted in Plate 29 - now uncoiled from the clod of earth they had been attached to, which still contains at least one such piece of fabric as well as traces of silk embroidery on a sparse, thin edging fabric. See St 2. The width of the knotted band is about 1.3 cm. The stitched-down bands measure 23, 18, 14 and 8 cm, two of which taper at one end.

P11b. GRAB 944. Taf. 29:1. Knötchenborte gleich den vorhergehenden. Der Silberfaden ist hier besser erhalten, was möglicherweise auf einer anderen Lage im Grabe beruhen kann. Sie wird nach dem einen Ende zu schmäler, wobei man zuerst 2 Mal die dreieckigen Zierknoten gegen ebensolche aus einfachen Fäden ausgetauscht und dann nur achterförmige Knoten geschlagen hat. Die Borte ruhte auf einem dünnen mit Bindungs- (page 103) effekten gemusterten Seidenstoff (S2), an dem sie angenäht war. Breite 1.2 mm. Länge ca. 21 cm (nicht ganz zusammenhängend).
P11b. GRAVE 944. Plate 29:1. Knotted band similar to the previous one. The silver strands are here better preserved, possibly due to a different position in the grave. It is narrower at one end, where the first two triangular decorative knots replace knots of single strands and then woven into a figure-eight knot. The band was resting on a (page 103) thin patterned (brocaded?) silk fabric (S2), to which it had been sewn. Width 1.2 mm. Current length about 21 cm (not quite contiguous).

P12. GRAB 524. Taf. 35:5. Randborte, bestehend aus einer Reihe von Schlingen oder Halbschlägen hintereinander, die durch einen durchlaufenden, geraden Part mit einander verbunden werden (Abb. 21:h). Doppelter Spiralsilberfaden, recht grob. Breite 11 mm, Länge 3 cm. Das Gitter ist mit feinen Stichen am Saum eines Seidenstoffes angenäht. Dieselbe Borte kommt auch in den Gräbern 832 (bei dem ,,Goldhirsch") und 1040 (Taf. 28:4) vor, alle aus Spiralsilber.
P12. GRAVE 524. Plate 35:5. Edge band, consisting of a series of loops or half-circles in a row, which are connected to each other with a continuous, straight segment (Fig. 21:h). Doubled silver spiral silver strands, quite coarse. Width 11 mm, length 3 cm. The mesh is sewn with fine stitches onto the hem of a silk fabric. The same band also comes in graves 832 (with the “Gold Stag”) and 1040 (Plate 28:4) as well, all made of spiral silver.

P13. GRAB 944(?). Taf. 35:2. Randborte aus zwei Reihen von Schlingen bestehend, die einander festhalten, Abb. 21f. Ursprünglich hat man mit einem Part die Knoten geschlagen, die links auf dem Bilde sind. Mit beiden Parten hat man dann nach rechts fortgesetzt und abgeschlossen. Doppelter Spiralfaden. Die Randborte ist mit engen Stichen nach beiden Richtungen am Saum eines doppelt gefalteten Seidenstoffes (S4) angenäht. Breite ohne den daranhängenden Seidenstoff 8 mm, Länge 98 mm.
P13. GRAVE 944(?). Plate 35:2. Border band consisting of two rows of loops that interlock with one another, Figure 21f. The left hand side of the picture shows where the band was first flattened. The two working lines continue and complete the band to the right. Doubled spiral strands. The band is sewn

with tight stitches on both sides along the hem of a double-folded silk fabric (S4). Exclusive of the silk, width of 8 mm and length 98 mm.

P14. GRAB 524. Taf. 35:3. Zwei Stück gleich grosse, abgepasste Randborten aus doppelten Spiralsilberfaden. Die Technik ähnelt der vorhergehenden, P13, ist jedoch reicher, da doppelt so viele Parten in der Breite enthalten sind, wodurch eine feste Flechtpartie am oberen Rand gebildet wird. Die Arbeit an beiden Stücken wurde rechts auf dem Bild angefangen und derselbe Part ist hernach noch mehrere Male hin und her gegangen. An ein paar der Bortenspitzen hängen lose kleine, runde Knoten. Breite 10 mm, Länge 4.2 bzw. 4.5 cm. Vermutlich stellen die beiden Randborten Absehlusszierate eines Knüpfbandes irgendwelcher Art dar. Doch ist jetzt keine Spur hiervon vorhanden.
P14. GRAVE 524. Plate 35:3. Two pieces of the same size, fully completed edge bands made of doubled silver spiral thread. The technique is similar to the preceding, P13, however, is richer, since twice as many working lines are included in the width, thereby forming a solid braided band at the upper edge. The work on both pieces was started at the right on the picture and the same strand is worked several times back and forth. On a couple of points of the braids, small round knots hang down. Width 10 mm, length 4.2 or 4.5 cm. Apparently, the two edge trimmings were some kind of a decorative final of a woven band, but there is now no trace now available of it.

P15. GRAB 944(?). Taf 28:3. Randborte, bestehend aus einer Reihe von Halbschlägen, hintereinander, die durch einen gerade liegenden Part festgehalten werden, gleich P12 (Abb. 21h), ausserdem jedoch so, dass die beiden Fäden des Parts bei jedem zweiten Halbschlag je eine Schlinge bilden, die eine in die andere eingefädelt (gleich P13, Abb. 21 f), sodass eine kleine flache Spitze gebildet wird. Breite 12 mm, Länge 5 bzw. 8 cm. Fragment von Köperseide längs des oberen Randes. Daneben lag ein gewöhnliches Brettchenband mit Silberschuss (ungefähr gleich B13), doppelt zusammengenäht, so dass es dieselbe Länge wie die Randborte erhalten hat. Die beiden Stücke haben vermutlich ein Paar gebildet als Abschluss eines Knüpfbandes oder etwas Ähnliches.
P15. GRAVE 944 (?). Plate 28:3. Edge band, consisting of a series of half-loops, one after the other, which are held by a straight segment, similar to P12 (Fig. 21h), however, also having the two strands of every other half-loop split to form loops that are threaded through one another (equal to P13, Fig. 21f), so that a small flat tip is formed. Width 12 mm, length of 5 or 8 cm. Fragment of silk twill along the upper edge. Next to it was an ordinary tablet woven band with silver brocading (approximately equal to B13), double stitched together so that it has the same length as the edge trim. The two pieces have probably formed a pair to finish off a tablet woven band or something similar.

P16. GRAB 524. Taf. 28:7. Vier Stück Zierknoten hergestellt aus doppeltem Golddraht, ähnlich wie P7 a) Ein gleicharmiges einfaches Kreuz. 8 x 9 mm. b) Ein Stäbchen mit 3 Paar einfachen Ausläufern. 9 x 24 mm. c) 2 Stück gleicharmige Kreuze mit I Paar Ausläufern an jedem Arm, 22 x 23 bzw. 21 x21 mm.
P16. GRAVE 524. Plate 28:7. Four pieces of decorative knots made of doubled gold wire, similar to P7 a) An equal-simple cross. 8 x 9 mm. b) A bar with 3 pairs of simple offshoots. 9 x 24 mm. c) Two pieces with equal-crosses one pair of offshoots on each arm, 22 x 23 or 21 x21 mm.

P17. GRAB 561. Taf. 28:8. 2 Stück viereckiger Zierknoten aus doppeltem Spiralgoldfaden hergestellt. 8 x 8 mm.
P17. GRAB 561. Plate 28:8. Two square decorative knots made of double spiral gold strands. 8 x 8 mm.

P18. GRAB 832. Taf 28:14. Viereckiger Zierknoten, ungewöhnlich gross, hergestellt aus grobem doppeltem Spiralsilberfaden. War vermutlich an irgendeinem jetzt vermoderten Stoff gleich P16 und 17 befestigt, bevor er an dem Holzgriff eines Messers anklebte. 19 x20 mm.
P18. GRAVE 832. Plate 28:14. Square decorative knots, unusually large, made of coarse silver spiral strands, doubled. Was probably attached to any now decayed fabric, like P16 and 17, before sticking onto the wooden handle of a knife. 19 x20 mm.

P 19. GRAB 1125. Taf. 28:1. Abschlusszierate, aus einem grossen viereckigen Zierknoten bestehend, von dem die eine Ecke in einem genähten Seidenriemen verschwindet. Doppelter Spitalsilberfaden. 19 X 22 mm.
P19. GRAVE 1125. Plate 28:1 Finial decoration, made of a large square decorative knot, one corner stitched into a sewn silk belt. Double silver spiral strands. 19 X 22 mm.

P20. GRAB 520. Taf: 28:2. Abschlusszierate, ein Paar, jeder der beiden aus zwei viereckigen Zierknoten bestehend, die durch einen kleinen, runden Knoten zusammen gehalten werden Doppelter Spiralsilberfaden. 15 x 26 mm. Hat vermutlich den Abschluss eines genähten Knüpfbandes aus Seide gebildet.
P20. GRAVE 520. Plate 28:2. Finial decoration, a pair, each with two square decorative knots held together by a small, round knots. Double silver spiral strands. 15 x 26 mm. Was probably the finial of a silk tablet woven belt.

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P21. GRAB 524. Taf. 35:4. Abschlusszierat aus einem dreieckigen Zierknoten bestehend, der in einem genähten Seidenriemen eingenäht ist (ca. 1.2 mm br.). Die Anstückelung ist durch einen geflochtenen Ring (wie P 24) verdeckt. Doppelter Spiralsilberfaden.
P21. GRAVE 524. Plate 35:4. Finial decoration made of triangular decorative knots which is sewn onto a sewn silk belt (about 1.2 mm wide). The base of the piece is passed through a braided ring (like P 24) and it hangs top down. Double silver spiral strands.

P22. GRAB 524. Taf. 35:1. Ein Paar Abschlusszierate aus doppeltem Spiralsilberfaden. Der Knoten ist flach in Form von Spitzen geflochten, der Randborte P13 gleichend. Das Fadenende ist in einen schmalen genähten Riemen aus Seide eingearbeitet (S4). Die Anstückelung durch einen Ring wie P24 verdeckt. Masse: 18 (23) x 18 mm. 2 Stücke ganz gleich.
Ein Exemplar desselben Knotens kommt in Grab 561 vor.
P22. GRAVE 524. Plate 35:1. A pair of finial decorations in doubled silver spiral strands. The knot is woven flat in the form of points, resembling the edge braid P13. The strand ends are incorporated into a narrow belt sewn from silk (S4). The base of the piece obscured by a ring like P24. Dimensions: 18 (23) x 18 mm. Two identical pieces.
An example of the same knot occurs in grave 561 as well.

P23. GRAB 561. Taf. 28:9. Ein Paar Gleitknoten aus Spiralgoldfaden, Der Knoten ist aus einem einzigen Faden hergestellt der 6 Mal herumläuft und den Effekt einer dreifachen Flechte mit 2 Fäden in jedem Part hervorruft. Masse: 8 x 8 x 4 mm. Der eine unbeschädigt, der andere ganz zerfallen.

P23. GRAVE 561. Plate 28:9. A pair of sliding knots of gold spiral strands, each knot is made of a single thread which passes around six times to create the effect of a threefold braid with two threads in each part. Dimensions: 8 x 8 x 4 mm. One undamaged, the other completely broken apart.

P24. GRAB 327. Taf. 28:13. Gleitknoten aus Spiralsilberfaden. Hergestellt wie der vorhergehende, jedoch mit dem Effekt von 3 Fäden in jedem Part. Masse: 11 x 8 x 6 mm.
P24. GRAVE 327. Plate 28:13. Sliding knot of silver spiral silver strands. Made like the previous one, but with the effect of three threads in each part. Dimensions: 11 x 8 x 6 mm.

P25. GRAB 138. Taf. 28:11. Gleitknoten, hergestellt aus doppelgezwirntem Silberdraht, mehrmals gewickelt, sodass derselbe Effekt wie bei mehrfachen Parten entsteht.
Ein derartiger Knoten kommt in Grab 138 vor.
P25. GRAVE 138. Plate 28:11. Sliding knot, made of doubled twisted silver wire, wrapped several times, so that the same effect is achieved as with multiple working lines.
A similar knot is also found in grave 138.

P26. GRAB 989. Taf. 28:10. Abschlussknoten ebenso ausgeführt wie P23 am Ende einer aus 4 Fäden bestehenden Schnur. Silberspiralfaden. Masse: ca. 4 x 5 mm exklusive der Schnur.
P26. GRAVE 989. Plate 28:10. Well executed finial knot like P23 at the end of an existing cord of four strands. Silver spiral strand. Dimensions: about 4 x 5 mm, exclusive of the cord.

Der Knoten P23, ebenfalls in Spiralsilber ausgeführt, kommt in den Gräbern 976 und 181 vor. Rings um den Ansatz von mehreren Gehängen und Abschlusszieraten finden sich gleichartig ausgeführte Ringe (P21-22, St 22). Aus einem Brandgrab aus Krsp. Aringsås„ Småland (S. H. M. Inv. Nr. 19803:5) stammt ein Endknoten gleich P26 und ein Gleitknoten gleich P 24, beide aus Silberdraht.
The knot P23, also executed in spiral silver, is also found in graves 976 and 181. Some rings that are formed around the bases of several finial decorations (P21-22, St 22) are executed similarly to these rings. From a cremation grave from Krsp. Aringsås "Småland" (SHM Inv No 19803:5) comes an end knot similar to P26 and a sliding knot similar to P24, both made of silver wire.

P27. GRAB 557. Taf, 33:6. Abb. 22. 3 Stücke von einem Ornament aus Goldfaden, die vermutlich um irgendeinen spulenförmigen Körper befestigt waren, wie die Zeichnung zeigt. Das Material ist gesponnener Goldfaden, woraus gewöhnliche, dreifache Flechten mit doppelten Parten gemacht wurden. Daraus wurden 2 gleich grosse, halbflache Ringe gebildet sowie ein grösserer Ring, wo die Flechte in doppelten Schlingen gelegt wurde, die einander überkreuzen. Die Stückelung ist recht einfach. Der Durchmesser der kleinen Ringe 9 mm. Der grössere ist verbeult und an der Stückelung gelockert, weshalb die Masse kaum bestimmt werden können.
P27. GRAVE 557. Plate 33:6. Fig. 22. Three pieces of an ornament made of gold thread, which were probably attached to a tapered oval form, such as the drawing shows. The material is woven gold thread, from which ordinary threefold braids were made with doubled working lines. From this braid, two equally large, semi-flat rings were formed and a larger ring, which braid was placed in double loops crossing each other. The distributions of the pieces is quite simple. The diameter of the small rings is 9 mm. The larger piece is dented and loosened, which is why the dimensions cannot be clearly determined.

Betrachtet man die oben beschriebenen Arbeiten vom Standpunkt der Qualität, so können zwei Gruppen unterschieden werden. In der einen besteht das Material aus grobem glattem Draht, überwiegend aus Gold; in der anderen aus Spiraldraht, in der Regel aus Silber. Diese beiden Gruppen fallen im Grossen und Ganzen mit der Gruppierung nach der Technik zusammen. Zu der ersteren gehören die relativ einfachen, kreuzförmig geflochtenen Diademe und Verzierungsknoten, P4-8 und 16, während alle komplizierteren Knotenkombinationen aus Spiraldraht hergestellt sind.
Looking at the pieces described above from the standpoint of quality, two groups can be distinguished. In one, the material from the grave consists of coarse flat top wire, mostly made of gold; in the other, the material is spiral wire, usually made of silver. These two groups also generally group together according to the braiding technique used. To the former belong the relatively simple, cruciform braided diadems and ornamental knots, P4-8 and 16, while all the complicated knotted combinations are made of spiral wire.

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Es scheint die Annahme nahe zu liegen, dass die beiden Arten verschiedene Erzeugungen darstellen, vielleicht einheimische Erzeugung und Import. Auf Grund der Qualität ist man bereit, die erstere Gattung für einheimisch zu halten, eine Vermutung, die durch andere nordische Funde bestätigt wird, durch den von Adelsö und zwei norwegische Funde. Der einzige russische Fund, der uns bekannt ist, braucht eine solche Möglichkeit nicht auszuschliessen.
It seems to be logical to accept that the two types represent different traditions, perhaps domestic production and imports. Due to the quality one is willing to keep the former class for indigenous work, an assumption which is confirmed by other Nordic finds, through the Adelsö and two Norwegian finds. The only Russian find which is known to us means such a possibility cannot be excluded.

Zu der anderen Gruppe sind dagegen keine Gegenstücke bekannt, weder im Norden noch irgendwoanders. Doch ist ein schwerwiegendes Beweisstück dafür vorhanden, dass auch diese Art in Birka erzeugt wurde, nämlich der Spiraldraht.
For the other group, however, no counterparts are known neither to the north nor anywhere else. Rather, a major piece of evidence exists that this type was produced in Birka, namely the spiral wire.

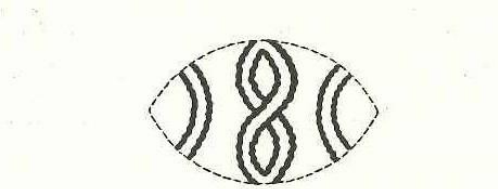

Abb. 22. Diagramm zu P 27.

Der Leser sei sowohl auf das vorhergehende wie auf das folgende Kapitel verwiesen, wo diese Frage ausführlich behandelt wird, woraus aber auch hervorgeht, dass man von der Fadensorte keinen bestimmten Schluss auf den Erzeugungsort ziehen kann. Es darf hier aber hinzugefügt werden, dass

Posamenten der oben beschriebenen Typen in mehr als 40 Gräbern konstatiert wurden und hiervon der Hauptteil aus Spiraldraht hergestellt wurde.
The reader is referred to both the previous as in the following chapter, where this issue is discussed in detail, from which also shows that one can draw no definite conclusion as to the place of production from the wire gauge. It may be added here that posaments of the types described above were observed in more than forty graves and the main part thereof was made of spiral wire.

Endnotes:

1) Der Adelsöfund besteht aus 3 Goldkreuzen gleich P16, aber viel kleiner, nur ca. 10 mm; siehe HANNA RYDH, Förhistoriska undersökningar på Adelsö, Abb. 295. Der eine norwegische Fund, ein fragmentarisches Diadem gleich P4, ist aus Vangsnes, prov. Sogn och Fjordane, und wird im Museum von Bergen aufbewahrt. Das andere ist zu Grunde gegangen; es gehörte zu dem 1864 entdeckten Rolvsöyfund, der aber leider unvollständig gesammelt wurde. Ina Jahr 1867 beobachtete Rygh einige Goldfäden, dem Aussehen nach wie Fransen, und kleine Knäuel von Goldfäden. Siehe A. W. BRögger, Rolvsöyætten, in Bergens Museums Aarbok 1920-21, S. 23.
1) The Adelsö find consists of 3 gold crosses equal to P16, but much smaller, only about 10 mm; see Hanna Rydh, Förhistoriska undersökningar på Adelsö, fig. 295. One Norwegian discovery, a fragmentary Diadem similar to P4, is from Vangsnes, prov. Sogn och Fjordane, and is kept in the museum of Bergen. The other one perished; it was part of the 1864 discovered Rolvsöyfund which was collected but unfortunately incomplete. In 1867 Rygh observed some gold threads, in appearance as fringes, and small skein of gold thread. See AW Brögger, Rolvsöyætten, in Bergen Museum Aarbok 1920-21, p. 23
Jean's note: Plaited bands from Guddal, Norway. Museum: Universitetsmuseet i Bergen, Inventory No: 031004, Motif : Guddal-drakten, BRM 31/4 Fletta snor (i4d.), Photographer : Ann-Mari Olsen. unimus.no/

2) Ein Fund von Bjelvretschenskaja in Kuban (Atchet Archeol. Komm. 1896, Abb. 211), ausgestellt in der Eremitage 1935, enthält zirka dreissig kleine Kreuze ungefähr gleich P16.
2) A discovery of Bjelvretschenskaja in Kuban (Atchet Archeol. Comm. 1896, Fig. 211), exhibited at the Hermitage in 1935, contains about thirty little crosses approximately equal to P16.
Jean's Note: *Atchet Imp Archeologicheskaja Kommissija.. St. Petersburg 1896 (1898)*
These pieces are from the 14th-15th century, much later than the Birka materials.
http://blog.eibeck.de/2014/posamente-aus-russland.html

Appendix B – Swedish-English Directory of Terms Related to Posaments and Related Research

Available as a searchable, sortable, filterable document at: http://eithni.com/wp-content/uploads/2016/01/Swedish-search-term-glossary.xlsx

Swedish	English	Category	Subcategory
agat	agate	Material	Stone
ämbar	bucket	Household good	
armbygel	armband	Accessories	Jewelry
bälte	belt	Accessories	Belts and Pouches
bältesväska	belt bag	Accessories	Belts and Pouches
bärnsten	amber	Material	Stone
ben	bone	Material	Animal Source
bergkristall	rock crystal	Material	Stone
bjällra	bell	Accessories	Jewelry
blad	blade	Weapon	Offensive
bly	lead	Material	Metal
borr	drill	Tool	Construction
börs	purse	Accessories	Belts and Pouches
bränd lera	clay	Material	Nonmetal Inorganic
brickvävd	tablet woven	Technique	Textiles
brickvävda band	tablet woven band	Accessories	Trimming
bröd	bread	Household good	Food Related
brons	bronze	Material	Metal
broscherade	brocade	Material	Textiles
bryne	whetstone	Tool	Knife-related
bygelsax	scissors	Tool	Domestic Arts
cu-leg	copper alloy	Material	Metal
damast	damask	Material	Textiles
diamantkypert	diamond twill	Material	Textiles
dräktnål	dress pin	Accessories	Jewelry
dräktprydnader	dress ornaments	Accessories	Jewelry
elddon	tinder box	Household good	
fårgpigment	colored pigments or paint	Material	Nonmetal Inorganic
finigran	filigree	Technique	Metal
fjäder	feather	Material	Animal Source
flinta	flint	Material	Stone
förgyllning	gilding	Material	Metal
fragment	fragment	General	
gångjärnsbeslag	strap hinges	Household good	Chests and Locks
glas	glass	Material	Nonmetal Inorganic
glättbräde	smoothing board	Tool	Domestic Arts
glättsten	smoothing stone	Tool	Domestic Arts
glimmer	mica	Material	Stone

grov	coarse	General	
guld	gold	Material	Metal
halsband	necklace	Accessories	Jewelry
hampa	hemp	Material	Textiles
hänge	pendant	Accessories	Jewelry
hår	hair	Material	Animal Source
horn	antler	Material	Animal Source
isbrodd	spike?	Tool	Construction
järn	iron	Material	Metal
kam	comb	Accessories	Toiletries
kamfodral	comb case	Accessories	Toiletries
kärl	cup or vessel	Household good	Food Related
karneol	carnelian	Material	Stone
kedja	chain	General	
keramik	ceramic	Material	Nonmetal Inorganic
kista	chest	Household good	Chests and Locks
knapp	button	Accessories	Fasteners
kniv	knife	Tool	Knife-related
knivslida	sheath	Tool	Knife-related
korsformigt	cross shaped	General	Shape
krucifix	crucifix	General	Shape
kvarts	quartz	Material	Stone
läder	leather	Material	Animal Source
lås	lock	Household good	Chests and Locks
linne	linen	Material	Textiles
liten	small	General	Size
lunula	lunela	General	Shape
medel	medium	General	Size
miniatyrbild	thumbnail?, very small	General	Size
montage	montage or collection or set	General	
mosaikparla	multicolored glass bead	Accessories	Jewelry
nål	needle	Tool	Domestic Arts
nålhus	needlecase	Tool	Domestic Arts
nålöglor	naalbinding?	Technique	Textiles
näver	birch bark	Material	Tree
nit	rivet	Tool	Construction
nykel	key	Household good	Chests and Locks
örslev	ear spoon	Accessories	Toiletries
oval spännbuckla	oval brooches	Accessories	Fasteners
pälsskinn	fur	Material	Animal Source
pärla	bead or gem	Accessories	Jewelry
pil	arrow	Weapon	Offensive

pincett	tweezers	Accessories	Toiletries
posamentarbete	posament work	Technique	Posament
Posamentarbeten	posament work	Technique	Posament
posamentband	posament band	Accessories	Posament
rektangulärt	rectangular	General	Shape
ring	ring	Accessories	Jewelry
rosenkvarts	rose quartz	Material	Stone
rundspänne	round buckle	Accessories	Fasteners
sax	scissors	Tool	Domestic Arts
segmenterad	segmented	General	Shape
siden	silk	Material	Textiles
silver	silver	Material	Metal
silverfolie	silver foiled	Material	Metal
sked	spoon	Household good	Food Related
skiffer	schist or slate	Material	Stone
sko	shoe	Accessories	Shoe related
skobrodd	Shoe cleat?	Accessories	Shoe related
sköld	shield	Weapon	Defensive
skopformigt	scoop shaped	General	Shape
skrin	box or casket	Household good	Chests and Locks
slagg	slag	Material	Metal
små	small	General	Size
snäckskal	shell	Material	Animal Source
sölja	clasp	Accessories	Fasteners
spänne	buckle	Accessories	Fasteners
spegel	mirror	Accessories	Toiletries
spelbräde	game board	Leisure	
spelbrika	pawn	Leisure	
spelpjäs	game pieces	Leisure	
spik	nail	Tool	Construction
spiral	spiral	General	Shape
spjut	spear	Weapon	Offensive
spjutspets	spearhead	Weapon	Offensive
stavtärning	rod dice	Leisure	
sten	stone	Material	Stone
stor	large	General	Size
stycke	jewelry	Accessories	Jewelry
svärd	sword	Weapon	Offensive
syl	awl	Tool	Construction
tärning	dice	Leisure	
textil	textile	Material	Textiles
torshammare	Thor's Hammer	General	Shape
trå	wood	Material	Tree

tråd	yarn or wire or thread	General	Posament or Textile
trådarbete	wire work	Technique	Posament
trådsarbete	wire work	Technique	Posament
treflikigt	three-lobed	General	Shape
tunn	fine	General	
ull	wool	Material	Textiles
våg	scale	Household good	Commerce
väska	bag	Accessories	Belts and Pouches
vävkam	weaving comb	Tool	Domestic Arts
vaxtavla	wax tablet	Household good	
vikingatid	Viking age	General	
vikt	weight	Household good	Commerce
vitmetall	white metal	Material	Metal
yxa	axe	Weapon	Offensive

Appendix C – Summary of Grave-by-grave Analysis of the Posament Contents of the Graves at Birka

For the complete updated, filterable, sortable, searchable list with several additional fields, see: www.eithni.com/posaments or http://eithni.com/wp-content/uploads/2016/01/posaments-for-distribution-012316.xlsx

Confirmed Posaments:

Grave number	Object number	Posament Number (Geijer)	Grave type	Wire Type	Photo?
BJ 58	616575	?New	Skelettgrav	Spiral wire	Yes
BJ 58a	467222	NP	Skelettgrav	Unknown	No
BJ 58a	467333	NP	Skelettgrav	Unknown	No
BJ 58a	467248	P9	Skelettgrav	Spiral wire	Yes
BJ 112	575036	P23	Hög, brandgrav	Spiral wire	Yes
BJ 138	616584	P25	Unknown	Twisted wire	Yes
BJ 159	616592	UI	Brandgrav	Spiral wire	Yes
BJ 181	616578	P23	Brandgrav	Spiral wire	Yes
BJ 326	616580	P9	Brandgrav	Spiral wire	Yes
BJ 327	616572	P24	Brandgrav	Spiral wire	Yes
BJ 361	616593	UI	Brandgrav	Spiral wire	Yes
BJ 408	616581	UI	Brandgrav	Spiral wire	Yes
BJ 496	617957	UI	Kammargrav	Spiral wire	Yes
BJ 520	617964	P10a	Kammargrav	Spiral wire	Yes
BJ 520	617956	P20	Kammargrav	Spiral wire	Yes
BJ 524	617939	P12	Kammargrav	Spiral wire	Yes
BJ 524	617939	P14	Kammargrav	Spiral wire	Yes
BJ 524	617962	P16a	Kammargrav	Gold wire	Yes
BJ 524	617962	P16b	Kammargrav	Gold wire	Yes
BJ 524	1089935	P16c	Kammargrav	Gold wire	Yes
BJ 524	617962	P16c	Kammargrav	Gold wire	Yes
BJ 524	617939	P21	Kammargrav	Spiral wire	Yes
BJ 524	617939	P22	Kammargrav	Spiral wire	Yes
BJ 524	617962	P7	Kammargrav	Gold wire	Yes
BJ 524	617939	sP10	Kammargrav	Spiral wire	Yes
BJ 542	106844	P5	Skelettgrav	Gold wire	Yes
BJ 557	1154848?	P27	Kammargrav	Gold thread	No
BJ 557	1154849?	P27	Kammargrav	Gold thread	No
BJ 557	1154847?	P27	Kammargrav	Gold thread	No
BJ 561	617955	P17	Kammargrav	Gold spiral wire	Yes
BJ 619	616591	P22?	Kistgrav	Spiral wire	Yes
BJ 619	616591	UI	Kistgrav	Spiral wire	Yes
BJ 644	106845	P4	Kammargrav	Gold wire	Yes
BJ 710	468084	NP	Kammargrav	Silver. (Wire or spiral unknown)	No

BJ 710	468733	NP	Kammargrav	Spun silver. (Wire or spiral unknown)	No
BJ 736	106846	P8	Kammargrav under hög	Gold wire	Yes
BJ 739	616501	P6	Kammargrav	Wire, likely silver	Yes
BJ 739	611046	NP	Kammargrav	Siver wire	No
BJ 750	106651	UI	Kammargrav under hög	Silver	No
BJ 750	106654	UI	Kammargrav under hög	Silver	No
BJ 750	106650	UI	Kammargrav under hög	Silver	No
BJ 757	616489?	UI	Skelettgrav	Spiral wire	Yes
BJ 798	566286?	P1	Kammargrav	Spiral wire	No
BJ 798	566286?	P2	Kammargrav	Spiral wire	No
BJ 825	616396	P10a	Kammargrav	Spiral wire	Yes
BJ 825	616396	P12	Kammargrav	Spiral wire	Yes
BJ 825	616596	P18	Kammargrav	Spiral wire	Yes
BJ 832	616594	P10c	Kammargrav	Spiral wire	Yes
BJ 832	616594	P10c	Kammargrav	Spiral wire	Yes
BJ 832	1090081	P12	Kammargrav	Spiral wire	Yes
BJ 854	616476	UI	Kammargrav	Spiral wire	Yes
BJ 886	616595	P3	Kammargrav	Spiral wire	Yes
BJ 886	616564?	P3?	Kammargrav	Spiral wire	Yes
BJ 925	616571	P26?	Brandgrav	Spiral wire	Yes
BJ 943	607673	NP	Kammargrav	Spiral wire	No
BJ 944	617937	P10a	Kammargrav	Spiral wire	Yes
BJ 944	617950	P11a	Kammargrav	Spiral wire	Yes
BJ 944	617993	P13	Kammargrav	Spiral wire	Yes
BJ 944	Unknown	P15	Kammargrav	Spiral wire	No
BJ 944	617937?	P10a	Kammargrav	Spiral wire	Yes
BJ 950	616357?	P10b?	Kammargrav	Spiral wire	Yes
BJ 957	616600	P10b	Kammargrav	Spiral wire	Yes
BJ 976	616598	P10c	Kistgrav	Spiral wire	Yes
BJ 976	616598	P23	Kistgrav	Spiral wire	Yes
BJ 989A	616585	P26	Skelettgrav	Spiral wire	Yes
BJ 1040	616586	P12	Brandgrav	Spiral wire	Yes
BJ 1125	617942?	P19	Kammargrav	Spiral wire	Yes
SMH3135 9:2	35437	New?	Unknown	Spiral wire	Yes
SMH3135 9:2	35435	New?	Unknown	Spiral wire	Yes

Suspected Posaments:

Grave number	Object number	Posament likelihood	Type	Photo?
BJ 1076	106632	Moderate	Silver band	No
BJ 157	575943	Moderate	two small wire fragments	No
BJ 178	478654	Moderate	silver thread	No
BJ 318	528230	Low	silver wire	No
BJ 400B	617940	Moderate	wire	No
BJ 407	546244	Low	Burnt wire, probably bronze	No
BJ 435	550820	High	spiral silver thread	No
BJ 457	552152	Moderate	Silver clump	No
BJ 457	552196	Low	Melted silver	No
BJ 460	552298	Moderate	Silver clump	No
BJ 464	1154845	Moderate	Wire fragment	No
BJ 465	611616	Moderate	Wire thread	No
BJ 465	552848	Moderate	Wire thread	No
BJ 483	554776	Moderate	Wire and textiles	No
BJ 485	554910	Moderate	Textiles with loose wires	No
BJ 514c	394599	High	Woven Material	Yes
BJ 517	556297	Moderate	Wire	No
BJ 539	557803	Moderate	Textile and wire fragments	No
BJ 552	558986	Moderate	Wire	No
BJ 552	558986	Moderate	Wire	No
BJ 557	1154848	Moderate	Wire	No
BJ 557	1154847	Moderate	Wire	No
BJ 571	560831	Low	Thread	No
BJ 585	574917	Moderate	Silver thread and wood	No
BJ 58a	467255	High	small fragments	No
BJ 597	574163	Moderate	Textile and wire fragments	No
BJ 643	462665	High	Silver threads	No
BJ 707	467306	Moderate	Silver band	No
BJ 731	476517	Moderate	Gold threads	No
BJ 752	560483	High	Twisted silver wires	No
BJ 757	561042	High	Silver	No
BJ 782	563704	High	silver?	No
BJ 835	1154834	Moderate	Wire	No
BJ 844	572397	High	Silver	No
BJ 886	616564	Moderate	Flat silver braids	No
BJ 904	973243	Moderate	Wire	No
BJ 956	106638	Moderate	Silver band	No

BJ 964	616548	Moderate	Threads	Yes
SHM 12159:10	418281	High	Twisted silver wires	No
SHM 31359:2	35436	High	wire chain	No
SMH 31359:33	35449	High	Spiral wire?	No
SMH 31359:33	35561	High	wire fragments	No