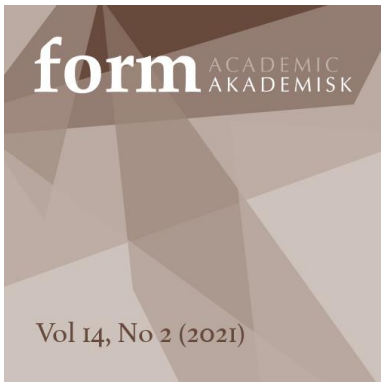


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# Tutankhamun's collar

## Repeated reconstructions of a single collar

***ABSTRACT***
*The aim of this paper is to discuss what happens when repeating a reconstruction of the same textile. The author of this article is also the craftsperson that made the four reconstructions presented. The original collar reconstructed belonged to Tutankhamun. The collar is circular, woven in a circle. Before the reconstructions, this method of weaving circular shapes had not been described. The first reconstruction focused on the collar. Fifteen years later, three additional reconstructions were made. This time, the focus was to reconstruct the craft, by the use of fewer, simpler tools. Parallel to practical work there was an exploration of how to make documentation. One conclusion in the project is when changing focus from reconstructing a textile to reconstructing a craft, more similarity to the original was achieved.*

*Keywords:*
Reconstruction craft, Weaving, Intangible knowledge, Analysis and reconstruction, Craft skills.

**INTRODUCTION**

Tutankhamun became Pharaoh of Egypt at the age of nine (1333 BC), and died at the age of eighteen (1323/2 BC). He was entombed in the Valley of the Kings. Tutankhamun's tomb was robbed shortly after his death. Nevertheless, hundreds of textiles remained when the tomb was discovered in 1922. The original textiles belong to the Egyptian museum in Cairo, Egypt (Vogelsang-Eastwood, 1997).

In the 1990's, Dr Gillian Vogelsang-Eastwood (Textile Research Centre, Leiden) established collaboration with associate professor Christina Rinaldo, and weaver and textile artist Kazuyo Nomura (Swedish School of Textiles, University of Borås). Their aim was showing Tutankhamun's wardrobe as it looked when new, by making reconstructions for a traveling exhibition: *Tutankhamun's Wardrobe* (TextilMuseet, Borås, 1999-2014). The project is documented in *Tutankhamun´s wardrobe, Garments*

*from the tomb of Tutankhamun* (Vogelsang-Eastwood, 1999) and *Tutankhamons väverskor: berättelsen om återskapandet av en textil skatt*, (Nomura & Rinaldo, 2013).

**The original collar and the first reconstruction**

There are three circular collars of the same type among Tutankhamun's textiles. They were found as single objects in one box. It is unknown to which textile they originally belonged (Reeves, 1990). Two collars (Carter 21o and 21aa) were exhibited in the Egyptian museum, Cairo (Vogelsang-Eastwood, 1997). The third one (Carter 21bb), is described as *pieces of similar garments* (Germer, 1992).

I had the opportunity to reconstruct one collar, Carter 21o (figure 1), as graduation project. This resulted in a report (Ekstedt Bjersing, 1998), the collar was included in the exhibition *Tutankhamun's Wardrobe.*

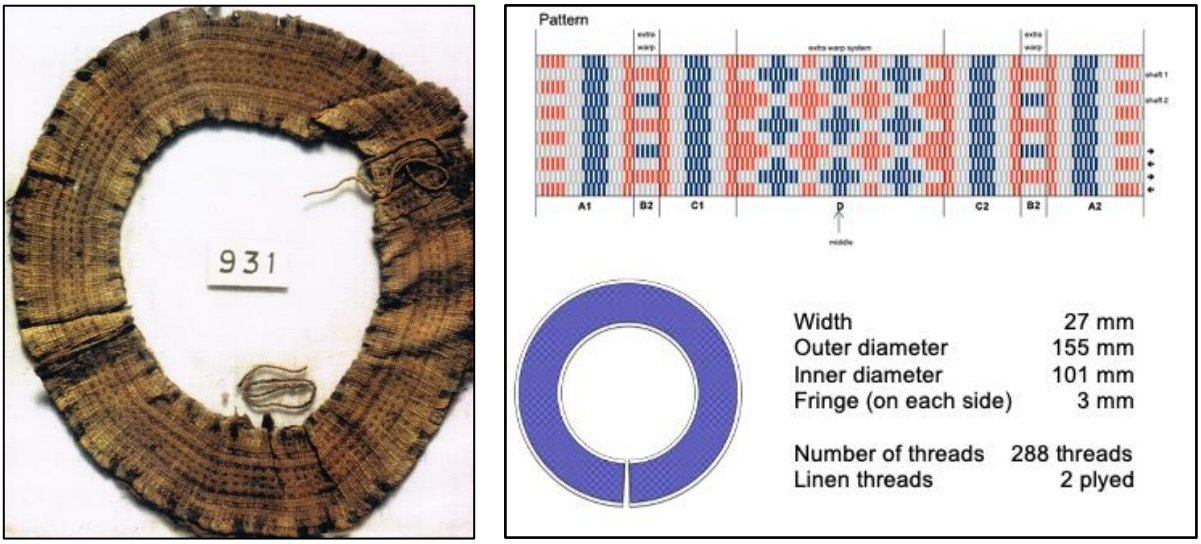


FIGURE 1-2. Detail of the original collar, Carter 21o, M.E. 931 (figure 1, Photo by Gillian Vogelsang-Eastwood). Analysis of the original (figure 2).

The collar is circular in shape, made in one piece, like a small ribbon shaped to form a circle. The inner diameter of the collar is 10.1 cm, and the weaving width is 2.7 cm (figure 2). There are 288 threads per 27 mm. There is a fringe, 3 mm wide, on both the inner and outer edge of the circle. The collar is woven with three different colours. The weaving technique is a composite of warp-faced tabby and warp-faced tabby with an extra warp system. The thread is 2-ply linen with S-twist, compatible to NeL 120-160/2. (Ekstedt Bjersing, 1998). Colours are white, blue and red. The most common textile dyes in Tutankhamun's textiles are *indigotin*, indigo and *alizarin,* madder (Vogelsang-Eastwood 1992). The white yarn was probably bleached linen threads for achieving maximum contrast to the pattern (Ekstedt Bjersing, 1998).

According to Encyclopaedia Britannica, weaving is a *production of fabric by interlacing two sets of yarns so that they cross each other, normally at right angles* (Augustyn, 2020). This collar does not fit that definition, as the warp threads form a circle. It is possible to shape textiles by not letting their weft run back and forth, but instead make the weft run only partway across the warp width and then back. Using this technique, you will have issues to maintain proper tension of the thread, since the threads will go up and down a different number of times. The weaving method for the collar was unknown at the start of the project.

Former students had made samples. Ikuko Kamiya made tests for weaving a circle. The result was a technique similar to lacemaking with individual tensioning of threads (Kamiya, 1995). I also made samples with tension alterations. Textile artist and weaver Kazuyo Nomura brought one solution, by way of mathematic analysis (Nomura, 2013). The last thread in the collar's outer ring is much longer

than the innermost thread, while the two middle threads are the same length as the outer and inner threads together (figure 3). The warp colours are mirrored (figure 2). This means that the inner and outer threads can in fact be the same thread, just as the two middle threads can be the same thread. To achieve this, half of the threads that are needed, are measured to their double minimal length. Then they are folded in the middle, around a stick (figure 4).

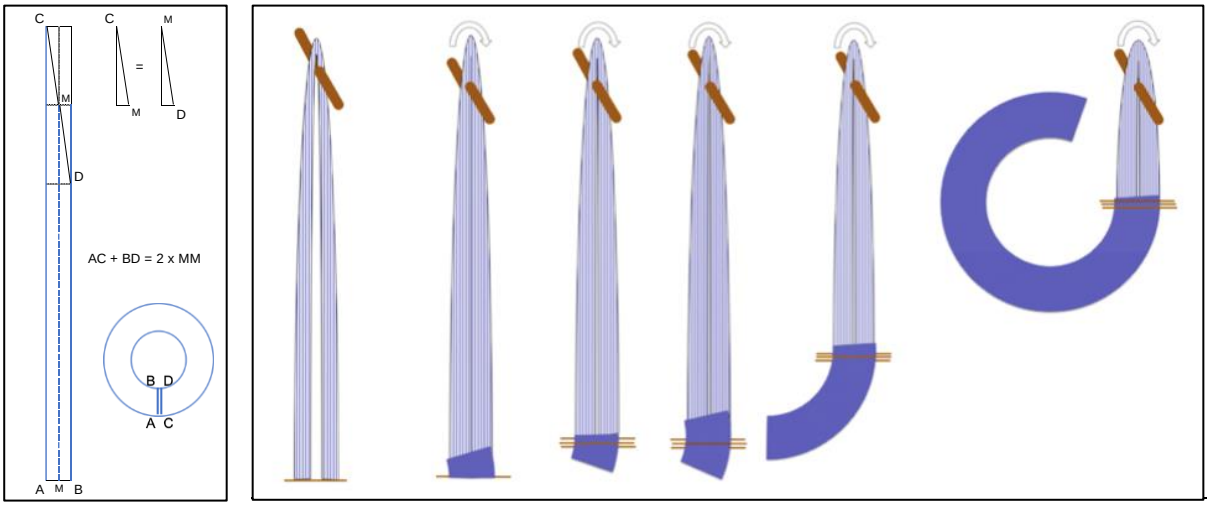


FIGURE 3-4. Calculations for thread length (figures based on Nomura 2013), (figure 3). Method for tensioning of threads (figure 4).

For the first reconstruction, photographs were used to make the analysis. The tool for weaving the reconstruction was a modern treadle loom (figure 5). Clasped heddles were used to raise and lower the threads. Instead of using beams, a wooden stick was tied to the warp beam, allowing the warp threads to move around. Initially, the weave was fixed between two pieces of wood (figure 4). The linen threads were dyed with madder and indigo (Ekstedt Bjersing, 1998).

For the exhibition *Tutankhamun's Wardrobe*, the collar was decorated with gold plates, and sewn onto the *Duck tunic* (figure 6). Kazuyo Nomura also made a reconstruction of the same collar for the exhibition. That one was sewn onto the *Tunic for the Young Tutankhamun* (Nomura & Rinaldo, 2013). This first woven reconstruction looked nice, but differed from the original regarding the number of weft threads per cm. The main issue was that the original could not have been made on a treadle loom. This loom type was invented much later. Most likely, the first reconstruction and the original collar were made with different tools.


FIGURE 5-6. Weaving the first reconstruction on a modified treadle loom (figure 5). First Reconstruction (figure 6).

## AIM AND METHODS

Aim of this project was to focus on the weaver's methods and tools. The first question was whether a new reconstruction could be made with simpler tools. During the work process, more questions and theories were added, and additional reconstructions were made. The second question was how new techniques, such as an iPad with different applications, could be used for analysis and documentation?

A central principle was that the original collar would have the answer to the questions (figure 7). When differences featured between the original and the reconstructions, the question was why. Hypotheses for the answer were made and later tested. The approach was to take on one challenge at a time. A major part of the methodological approach was alternating between the roles of practitioner and researcher. The project was carried out as independent research. Documentation was an important part of the project.

The work has been carried out by a single person. I did the weaving, documentation, calculation, assessment, writing, figures, analysis. Other craftsmen and researchers have been important for the discussions and for making new tools.

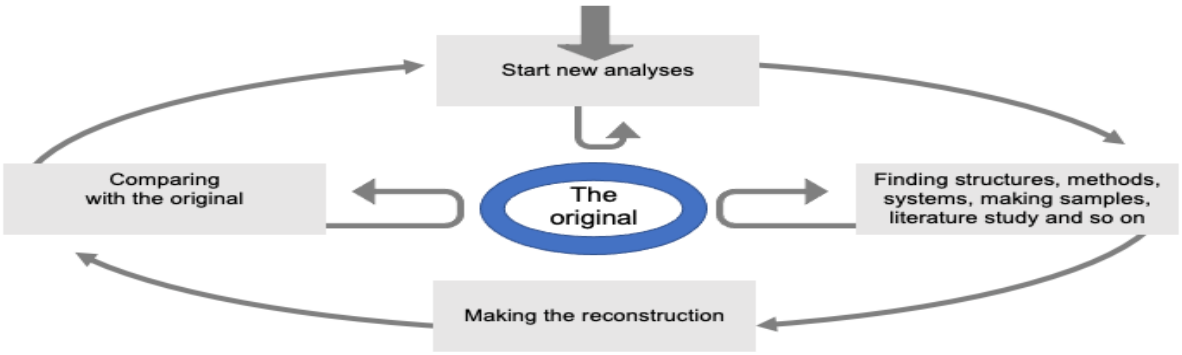


FIGURE 7. Showing the process of the reconstructions. The collar in the center, starts with an analysis. After comparison with the original new analyses can be done, continually accumulating more knowledge.

## WEAVING WITH SIMPLIFIED TOOLS – SECOND RECONSTRUCTION

The first challenge was to make reconstruction with simplified tools. The new weaving tools included ice cream sticks, plant support sticks, barbecue skewers and elastic bands (figure 8). The construction was inspired by backstrap looms. In order to weave a circle, a paper model was used. Testing was performed, with good results and then a new reconstruction was made (Ekstedt Bjersing, 2015). The collar and a loom (with handmade wooden sticks) were presented at the exhibition *Weaving the World, 7000 years of hand-woven textiles in one exhibition!* (2014) at the Textile Research Centre, Leiden.

This reconstruction proved it was possible to weave a circular collar using fewer tools (figure 9). A circle was made, but an imperfect one, of uneven width. Comparing the two reconstructions revealed differences. The colours were different, due to the use of different yarns. In the first reconstruction the circle was rounder and the width more even. Neither reconstruction had as many weft threads per cm as the original.

Why was the second reconstruction not as good as the first one? Was it the weaving tools and methods, or the weaver's skills? The hypothesis was now that it was the skill of the weaver that was lacking.


FIGURE 8-9. The second reconstruction, tools of ice cream sticks, plant support sticks, barbecue skewers and elastic bands (figure 8). The second reconstruction (figure 9).

## DOCUMENTING THE RECONSTRUCTIONS – THIRD RECONSTRUCTION

Both previous reconstructions were included in exhibitions: I wanted one collar for display purposes and decided to work on a documentation project to legitimize this.

### Analysis using new techniques

How could new techniques be used? Would an iPad be enough to make new analyses and manage all the documentation? A new analysis was made, from the same photograph as before, however this time the photographs were on the iPad. Using applications for measurements and painting, it was easy to import the photo to a drawing application, add an extra layer to the photographs, and to follow the warp and weft threads by drawing them.

Compared to the previous analyses results were the same. However, the process of analysis could be easily documented. Redoing the whole analysis made it clear where the reconstructions differed from the original. It was a reminder of what the original looks like, and what the reconstructions look like. The main difference was that the reconstructions had fewer weft threads per cm than the original.

### Preparations for documentation

Finally, before starting the reconstruction, a weaving and recording studio was created (figure 10). For documentation there was an iPad, an iPhone, both used for recording and an empty notebook with a pencil. The weaving process was recorded at all times. White threads are easier to see working with a dark background, and black was chosen as background for all recordings and photographs (figure 11). I also decided which working clothes I should wear to avoid creating visual distraction in the recording.

FIGURE 10-11. The weaving and recording studio (figure 10). Some of the handmade tools used (figure 11).

**Supporting principles and rules for the weaver**

The practical knowledge from the earlier reconstructions presented new challenges. Before starting the third reconstruction, some working rules were established, or rather some notions for helping to make decisions: *strongest wins*, *equilibrium* and *threads want to be straight*. For example, if the heddle is stronger than the thread, the thread will break. If the tension is too hard, the opposite will happen: the heddle will break.

The material was valuable, therefore material use should be kept at a minimum with minimal waste. Some properties of flax were written down as a reminder: Low elasticity and shrinkage, high tensile strength and sensitivity to abrasion. During the first reconstruction, a lot of work went into finding thin threads, as well as dyeing with indigo and madder, and there was still a lot of material left (Ekstedt Bjersing 1998, 2017).

Tools should be as simple as possible and made by hand. The principle was that all materials and tools could have been used during Tutankhamun's time. The knowledge we have from wall paintings and models from that time is that the textile tools simply consist of a number of wooden sticks (Vogelsang-Eastwood, 1992).

**The circle**

Another challenge was improving the shaping of the collar, without using a paper model or measurement, and finding methods where you could work without looking at a description or a sketch on paper. There were two reasons for this, first that comparison with a paper model adds an extra step to the process, second for finding other methods for making a circle.

I compared with the wooden knife that I had used for weaving. With the experience of how much I could weave before needing to change the tension, I had an idea about the size of a segment. Could making small segments be the way to create a circle? How many segments should be made? After calculation and test weaving, the circle was divided into 24 equal segments. Making a circle and dividing it into smaller part is easy using a compass. Two knives, one of horn and one of wood, were adjusted to the segments, 1/24 of a circle, and marked with the size of one segment. New wooden sticks were handmade with hand tools, both by the weaver and by other craftsmen.

From the original, it was possible to calculate an average of how many weft threads per centimetre should be used in each section of the weave. There is one weft thread for making the weave, and six different weft threads, three in each side, making up the fringe. (figure 12 a). The weft threads also interact with the pattern of the warp (figure 12b). A more simplified sketch was made where the fringes were excluded, since the system for the fringe was easy, white-blue-white, red-blue-red (figure 13). The last figure ended up with some letters, *MmMnMmn*, like a code or poem: *big M, small m, big M, small n, big M, small m and small n* (figure 14).

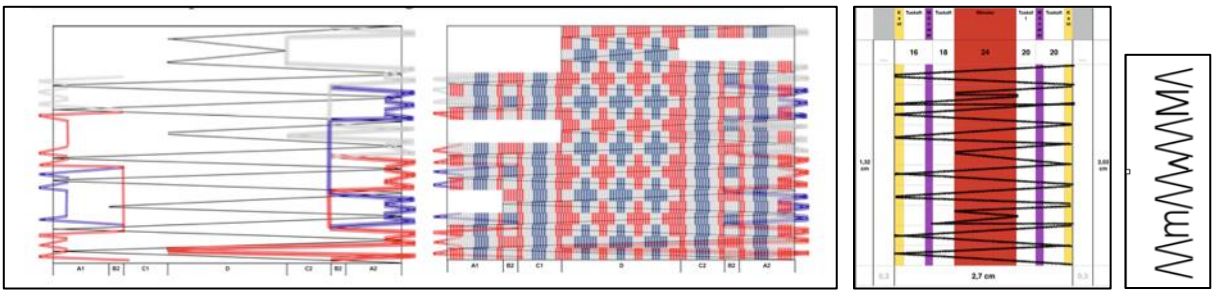

FIGURE 12-14. Sketch showing how different wefts were woven and fringes were done. The weft interacts with the warp pattern (figure 12). Simplified sketch where the fringe is excluded (figure 13). A visual reminder of how the weft worked, like a poem (figure 14).

During the days of weaving, I was a craftsman only working at the loom if at least two hours of undisrupted work was available. I could make one segment in one hour, but if anything went wrong during the weaving, I needed double that time. The work was continually recorded. The process required intense focus. Already during the first segment I found that I couldn't weave by following the "poem", so I simplified it further: MmMnM… Measurements were taken using the knife and the last weft were done by improvisation. Notes were made about the number of wefts and preparations made for starting the next segment. Then I took a break. Sometimes I tried a new knife or tried different methods for tensioning, but each segment was woven in the same way.

Each day, a summary was made using the iPad. A keynote presentation and a spreadsheet were the most important tools. The method used was asking questions and then making hypotheses. How should you go about changing colour in the fringe? Why does the middle thread have a different tension? New questions were given a new slide in the presentation. Hypotheses were put together and tested. This was sometimes followed by additional tests using different materials, to determine if the hypothesis was right. This was a good way to add structure to my thinking and a good platform for discussions with other craftsmen to find new aspects. If proof could be found, in at least two ways, then the slide was changed from the question *How to do* to the conclusion *This is happening when* or *One way of doing*.

The third reconstruction was made (figure 17). The result was a circle made of 24 segments (figure 15). But it was too large and still had too few weft threads per cm compared to the original (figure 16). By studying the video documentation, it was possible to see the craftsman's hands working during the reconstruction. Hesitation was visible in their movement.

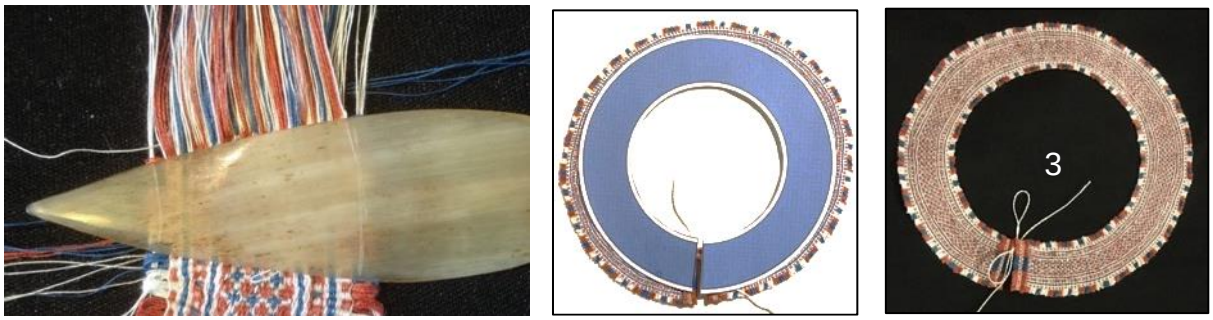


FIGURE 15-17. The circle consists of 24 segments like this, (figure 15). The third reconstruction along with the paper sketch (figure 16). The third reconstruction (figure 17).

## BACK TO THE CRAFTSMAN SKILLS – THE FOURTH RECONSTRUCTION

The three reconstructions now made showed improvement in the weaving. Some methods worked, and it was possible to produce a circle with just a knife to take measurements. The preparation of the warp was just as natural as if it had always been done that way.

The main issue was the number of weft threads per cm in the middle of the collar. Looking at the documentation, it was possible to see that there was a difference in confidence of the weaver during different phases of the work. During the setup of the loom and while making the heddles, the weavers hand appears like a professional craftsman, the hands works effortlessly, and elaborately. But during the weaving part of the movies there is some hesitation.

I had to repeat the process once more to achieve the correct size, and most importantly, I wanted to solve the problem with wefts per cm.

**The vital knife – for measurements and for beating the wefts**

Why was the third reconstruction too large? After measuring, it was found the knife that had been used was 1 mm too large. Before ordering new knives, an analysis was made, of what was needed (figure 18). Different knives were tested during reconstruction three and four in wood, bone, horn, copper and silver (figure 19).

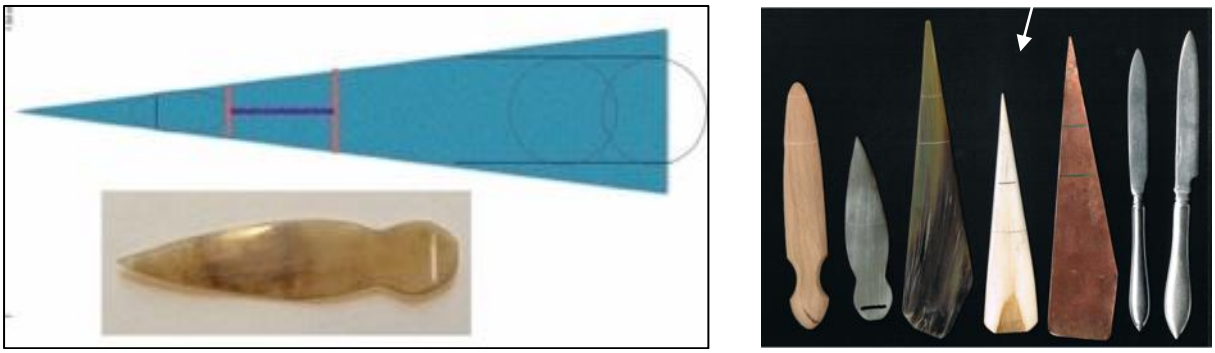

FIGURE 18-19. Analysing the knife that had been used and what was needed. The red and purple lines show the segment. The circles show the beginning and end of the knife (figure 18). Different knives. The best knife is the one in the middle in elk bone (figure 19).

**Warp tension in relation to number of weft threads per cm**

Why was it difficult to get the right number of weft threads per cm? Were there problems with tensioning in the different sections? Was the knife the wrong thickness, or was the wrong material used for warp or weft?

New calculations were made, this time assessing how many times each warp thread was going up and down. This showed what was already made plain from the weaving and from earlier tests with thicker materials: that depending on the weaving technique, the threads involved will run in various ways, requiring different lengths of thread respectively. The threads were going up and down a different number of times, which caused differences in tension and different length of the threads. One way of dealing with the loose threads was to work only on the middle part of the weave. Another solution was to divide the warp into smaller portions, which made it possible to use different tension on different threads (figure 20-22). I needed a system that could make this adjustment by itself, and the solution was to use one string to regulate the tension of all the different parts of the warp (figure 23).

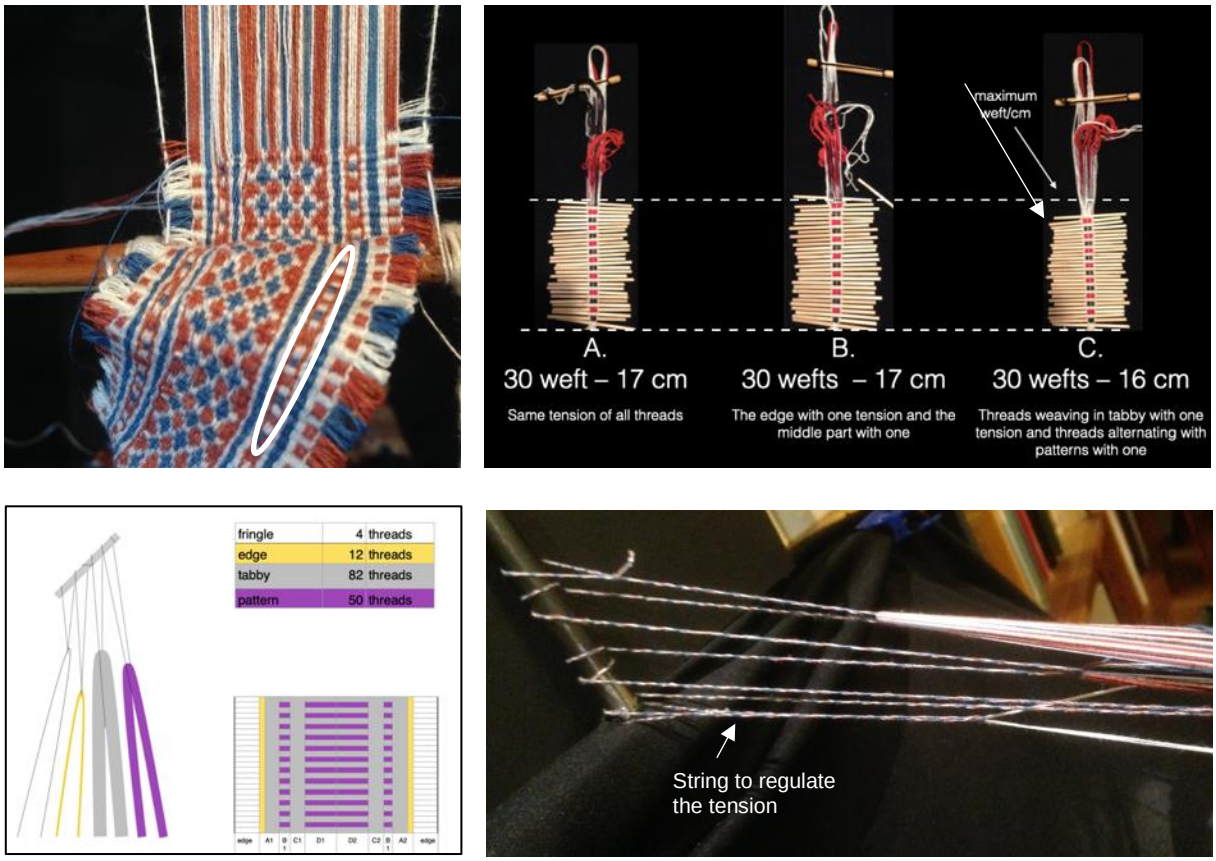


FIGURE 20-23. To test the hypothesis of tension, a small part of the collar was chosen (figure 20). Trying three different methods for tensioning the warp. White threads represent threads woven in tabby, and red and blue threads represent the two threads that alternate. Wooden sticks were used for weft. The result was clear: in order to get as many weft threads per cm as possible, the tabby thread needs different tension than the other threads (figure 21). Analysis of the different portions (figure 22). One string regulates the tension of all the different threads. All warp threads initially had the same tension, but toward the end there was a significant difference (figure 23).

For the fourth reconstruction, it was possible to increase number of weft threads per cm, from 11 to 14 (figures 25 and 26). It is also possible to see that after about 1/6 of the way, the shape of the circle is less accurate. It was here that the tensioning of the threads needed changing.

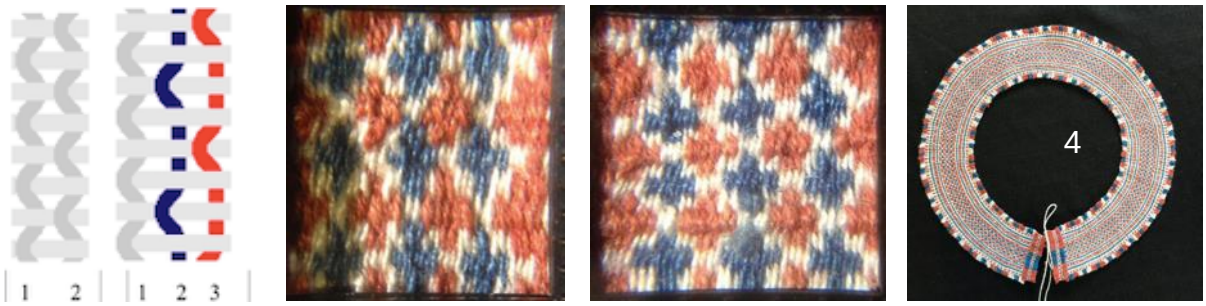


FIGURE 24-27. The grey thread are weaving in tabby. The red and blue threads are alternating to give the pattern. (figure 24). Third reconstruction, only 11 weft threads per cm (figure 25). Fourth reconstruction, 124 warp threads per cm and 14 weft threads per cm (centre section only), the same as in the original (figure 26). Fourth reconstruction (figure 27).

**RESULT AND DISCUSSION**

Four different reconstructions were made (figure 28). They look different. The tools and methods differ. Different choices for the colours were made, as well as different solutions for the fringe at the edges and ends of the weave. During the course of the project, there had also been an improvement of the weaver's skills.

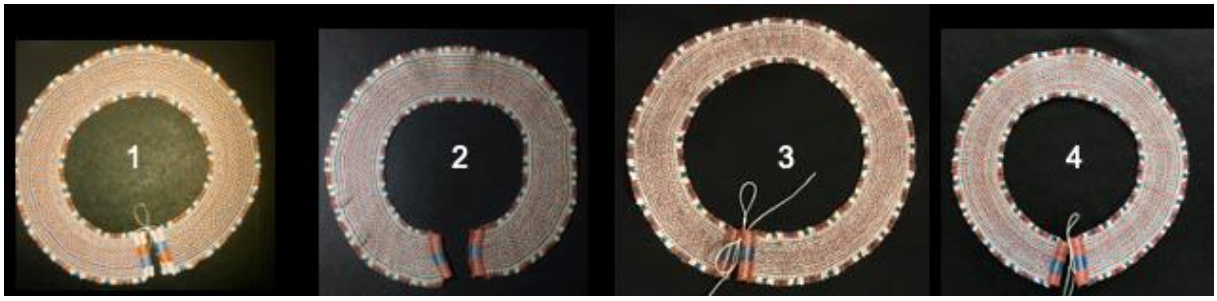


FIGURE 28. Four different reconstructions from the same original.

The first reconstruction tackled the problem of weaving a circle. For the second reconstruction the challenge was carrying out weaving with simplified tools. The third reconstruction was mainly about documentation. In the fourth reconstruction, focus was the skills and getting as many weft threads per cm as in the original. In Table 1, all reconstructions are shown, including their aim, the methods and the results.

During the first and second reconstructions, all threads were identically tensioned. After changing the way of tensioning, and by controlling the tension in different parts of the warp, the number of weft threads per cm could be increased. The first way of weaving a circle has been improved by adding differential tension. To weave with simplified tools was not a problem but proved to be a learning process.

To make a round circle, the best method was to divide the circle into small segments, 1/24 of a circle, and weave these one by one. The only measurement taken was comparing the woven segment with the mark on the knife, one segment at a time. Finding a poem made it possible to work independently of a written pattern.

TABLE 1. Results of all four reconstructions.

| | AIM | METHODS | | | RESULT |
|---|---|---|---|---|---|
| | | Analysis | Weaving | Documentation | |
| No 1. | Reconstructing collar. | Using photographs.<br>Tools: copy machine, plastic to write on. | Materials: linen, dyed with madder and indigo.<br>Tools: Modified treadle loom. Clasped heddles.<br>Paper model.<br>Wooden knife.<br>Warping on a frame, with a shed at each end. | Excel.<br>Photographs.<br>Writing a report. | Weft threads/cm fewer than original.<br>The edge at the beginning made in the same pattern report as the fringe of the circle. |
| No 2. | Reconstructing with simplified tools. | Using first analysis. | Materials: from the first reconstruction.<br>Tools: Ice cream sticks, plant support sticks, barbecue skewers and elastic bands.<br>Paper model<br>Wooden knife.<br>Warping on metal sticks, making the shed in the middle.<br>Open heddles. | Notebook.<br>Photograph by telephone. | Weft threads/cm fewer than original.<br>The shape of the circle is faulty.<br>Variations of the width of the circle. |
| No 3. | Reconstructing without paper model<br>Minimal material waste.<br>Use iPad for analysis and documentation) | New analysis from the same photographs, with the aid of measurements using iPads apps. | Materials: from first reconstruction<br>Tools: New handmade sticks, made with hand tools. Ropes made by same linen yarn as warp.<br>New knife made of horn, with marking corresponding to 1/24 of the circle.<br>Open heddles. | Notes taken during work.<br>Parallel making of Keynote presentation.<br>Working studio set up as recording-studio.<br>Recording most practical work. | Results of the analysis were the same.<br>Diameter of circle too large, caused by making the knife 1 mm too large.<br>Perfectly shaped circle<br>Weft threads/cm still fewer than in original.<br>Weaver's hands not comfortable with some movements.<br>Collar made with minimal waste of material. |
| No 4. | Reconstruction with same weft threads/cm as in original. | Using the analysis of No. 3.<br>Calculate thread lengths relative to how many times each thread goes up and down. | Materials: dyed with indigo and madder.<br>Testing handmade knives in different materials. All tools with a marking of 1/24 of the circle.<br>Open heddles. | Notes taken only after work to reduce distraction.<br>Only recording small parts of work.<br>Adding material to the Keynote presentation. | Perfect size and shape of circle.<br>In middle, weft threads/cm same as in the original. Still not as many weft threads per cm at the edges.<br>Tensioning of the warp requiring special solutions.<br>Same solutions found in the original. |

**Documentation**

Documentation was the second major aim of this project. The documentation was important, in order to have a framework for the endeavour. But it could also be a distraction; always thinking of making photographs, recordings and notes. During the last reconstruction, I stopped recording continually. The iPad proved to be a good instrument for documentation, produce photographs, tables, figures and presentation and was highly portable. Applications for mobile apps are usually easy to learn. A problem is that apps regularly requires updates and sometimes cease to work. Making an ongoing presentation was a good format. When other people were curious about the work or something needed to be discussed, there was always a presentation available.

Many craftsmen, after their work is finished, have nothing left to show afterwards. The products of their craft have gone elsewhere. Even if some of the reconstructions featured in this article have been displayed in exhibitions, they are now held in museum collections. The craftsman is often left with nothing but their skills, an intangible knowledge, and maybe a few production samples and photographs.

This effort has been a study, where most of the work has been carried out in my capacity as an independent researcher. I have been the weaver, the student, and my own supervisor. This does not mean that I have been alone in my work. I had and still have many vital discussions with other people, mostly craftsmen within other disciplines. At every step, I have tried to document what I have been doing.

**Materials in the threads**

Reconstructions were woven with linen yarn, NeL 140/2. It is likely the yarn used for reconstructions was made in a different way. Today we spin the threads and then ply them. Rooiji and Vogelsang-Eastwood (1994) consider that one feature used in making the Pharaonic textiles is the splicing together of fibres, both in singles and plied threads. There are several methods for splicing. Gleba and Harris (2019) made an analysis schedule to identify splicing in archaeological textiles. The collar is probably also made using two-ply spliced flax. It's impossible to see any traces of this in the photographs used. With a microscope, looking at the original, and using the analysis schedule, we may find traces of splicing in the collar. The reconstructions were woven with thread that had been machine made and then plied. What difference would it make to use spliced fibres?

**Traces of method. Is this the way the collar was made?**

The original weaving method used for making the circle could have been done as described here. One piece of evidence for this could be that the fourth reconstruction resulted in more weft threads per cm. To achieve this, the threads were divided into smaller groups with different tensioning. However, the tension in the middle was sometimes looser, and to fix that, the weft thread was inserted more times into the middle part of the weave than at the edges. Looking at the original, we find the same solution, with the weft woven in the middle part. This could be a sign that the same method was used making the original.

I have never seen the original in real life – only the photograph of the front of the collar, and never a photograph of the reverse side of the collar. Therefore, it is possible that the solutions for the fringes of the collar are wrong. On the reverse side, new facts as yet unknown may be found.

**Who wove the original?**

This is important for the analysis of the object, as the choice of materials, tools and methods may be influenced by who made the object, how, and for what purpose. We do not know who made the collar, probably a skilled weaver, but not necessarily a master weaver. Among Tutankhamun's textiles are items that will probably take much longer to weave than the collar itself.

**The skills of the weaver**

At first, the project focused on reconstructing a textile item. During the work, the focus changed to be more about reconstructing the craft. As a result of the shifting focus, a greater similarity to the original item was achieved. Is the improvement due to development of the weavers' skill and knowledge? Is it a result of changing methods and tools? Or it is a result of changing the approach to the work?

Peter Sjömar (2017), Craft laboratory, University of Gothenburg, argues that knowledge acquisition in crafts must happen before a critical review can take place. When, precisely, is the knowledge that the craftsman has gathered great enough to enable them to ask the critical questions? Likewise, the weaver's experience cannot be ignored. It affects their work, analysis and the drawing of conclusions, and shapes the progression in hand skills and knowledge during the project. This reconstruction project is an example of that and illustrates that the formulations of the critical questions and knowledge acquisition is an interactive and iterative process.

In the practical work, the aim was to work with the skills and technology, trying to find general principles and simple generic tools. This was a way to identify the intangible knowledge behind the original. There is a distinction between the investigative work, knowledge acquisition and exploration of techniques and materials, and the reconstruction. David Pye (1995) describes different ways of organizing work: *workmanship of risk* and *workmanship of certainty*. Can this concept be used when working with reconstructions? In *workmanship of risk*, the craftsmen work from the material. When they start, they do not always know where things will end. *Workmanship of certainty* is about production; you have to be sure that you can make a product corresponding to a specific quality. The aim of my research process is to move from *risk* to *certainty*, from the undefined to the defined. Now, it is time for the workmanship of certainty, to show that the results can be reproduced. According to the calculations, it would take approximately 40 hours to weave.

There is another reason for making a new collar. If the reconstruction can be reproduced, this will show that it is a functional method. This could be a starting point for working on the other collar from Tutankhamun's wardrobe, (Carter 21aa), with a different pattern.

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### Artefacts

*Collar*. Carter 21o, (Journal d'Entrée 62644, M.E. 931). Grand Egyptian Museum, Giza, Egypt.

*Collar*. Carter 21aa (Journal d'Entrée 62643, M.E. 937). Grand Egyptian Museum, Giza, Egypt.

*Collar*. Carter 21bb (Journal d'Entrée 62640, M.E. 1081). Grand Egyptian Museum, Giza, Egypt.

*Duck Tunic.* With a collar (reconstruction number 1) made by Marie Ekstedt Bjersing. TextilMuseet, Borås, Sweden.

*Tunic for the Young Tutankhamun*. With a collar reconstructed by Kazuyo Nomura. TextilMuseet, Borås, Sweden.

*Collar*. Reconstruction number 2 and loom for making a circular collar made by Marie Ekstedt Bjersing. Textile Research Centre, Leiden, The Netherlands (2014).

*Collars*. Reconstruction number 3 and 4, made by Marie Ekstedt Bjersing. Privately owned.

### Exhibitions

*Tutankhamun's Wardrobe.* [Traveling Exhibition]. (1999-2014). TextilMuseet, Borås, Sweden.

*Weaving the World, 7000 years of hand-woven textiles in one exhibition!* (2014), Textile Research Centre, Leiden, The Netherlands.

## Photographs and figures

Unless otherwise stated, photographs and figures by Marie Ekstedt Bjersing.

## Video documentation

Available upon request from Marie Ekstedt Bjersing.