



Beatrix Nutz

# Nets – Knots – Lace:

## Early 16th century headdresses from East Tyrol

In memoriam Liselotte Zemmer-Plank

### Abstract

In an excavation carried out in 1968 four headdresses dating from the early to first half of the 16th century were discovered in a crypt in the parish church of Lienz in East Tyrol (Austria). All four headdresses are remarkably well preserved and two of them reveal techniques that are surprising considering the early date. A hairnet with macramé knots and a coif adorned with bobbin lace most likely date before 1509 making them the earliest extant examples of macramé and bobbin lace to date. This paper gives an account of the finds and considers the implications these headdresses might have on the history of lace.

**Key words:** 16th century, headdress, netting, filet, macramé, bobbin lace, hairnet

### The excavation

In the course of the restoration of the parish church of St Andrew in Lienz-Patriasdorf in 1968 the Tyrolean State Museum Ferdinandeum carried out extensive archaeological investigations for the clarification of historical questions (Zemmer-Plank 1974). The excavations revealed six tombs, two in the north and one in the south aisle, a crypt located in the western choir room, a crypt located in the presbytery and a crypt in the central axis of the nave in front of the crucifixion altar. The crypt in the central axis in front of the altar (crypt II) was the entombment of the Freiherr Michael von Wolkenstein-Rodenegg and his wife Barbara von Thun. This was clarified by a reference found in part III, section 3, caput XIII of Matthias Burglechner's manuscript *Tirolischer Adler* of 1619 (Burglechner 1619, III/3/XIII, 889). Burglechner wrote: .... *in mitten der Kirchen vor dem Kreuzaltar liegen Herr Michael Freiherr zu Wolkenstein, und sein Gemahl Frau Barbara von Thun mit dieser grabchrift „hie ligen begraben die wolgeporn herr michel freyherr zu wolkenstain un sein gemachl frau barbara geborne freyn zu thun die an mittich des XXIX tag augusti im mdix und obbemelter freyherr an XV tag april und in mdxxiii jar gestor[blen sein den got gnadig sein“* (in the

middle of the church in front of the crucifixion altar rests Michael Freiherr zu Wolkenstein and his wife Barbara von Thun with this epitaph "Here rests the noble Freiherr Michael von Wolkenstein and his wife Barbara née Freiin zu Thun who died on Wednesday 29 August 1509 and aforementioned Freiherr on the 15th day of April in the year 1523 God have mercy." Freiherr was a title of nobility in the German-speaking areas of the Holy Roman Empire. It corresponds to baron in rank. The original distinction from barons was that a Freiherr's landed property was allodial instead of a fief (an allod is a land over which the owner can dispose freely). Freiin is the title of an unmarried daughter of a Freiherr.

### Michael von Wolkenstein-Rodenegg and Barbara von Thun

Michael von Wolkenstein-Rodenegg came from an old Tyrolian family and was the grandson of the poet and composer Oswald von Wolkenstein. Michael was a Knight of the Golden Fleece and a particularly respected member of the Tyrolean government who served as *Landhofmeister* (Lord steward of a province – Ebers 1798, 480) at the court of Emperor Maximilian I. Michael von Wolkenstein



lived in the Hofburg in Innsbruck and had a high salary of 1000 f1Rh per year (f1Rh = Rhenish guilder. Latin: *florenus Rheni*). His accommodation included a kitchen, cellar and bath. As additional benefits in kind he could pick the fruit in the courtyard garden as much as he needed, received wood for three rooms and the kitchen stove, two deer every year and enjoyed the duty-free import of a number of oxen from Carinthia (Adler 1886, 384, footnote 1). A letter from 12 October 1502 to the regiment in Innsbruck (RI XIV, 4.1 n. 16988, in *Regesta Imperii Online*) proves how high Michael von Wolkenstein stood in the favour of the emperor. In it Wolkenstein's debt of 300 guilders for pearls was erased. The reason was that Maximilian and his wife Bianca Maria Sforza had „ain kint aus der Tauf gehebt und ir dieselben Perlen in das kindlpet geschenkt“ (RI XIV.4.1 n. 16988 in *Regesta Imperii Online*). They acted as godparents to a child, Regina Bianca, of Michael and his wife Barbara and the pearls were a baptism gift (Egg 1998, 155). Michael von Wolkenstein-Rodenegg was also involved in the completion of the Golden Roof in Innsbruck in the years 1495 to 1500. His coat of arms is carved on the back of a relief of one of the *Moriskentänzer* (Morris dancer). The fact that a simple Freiherr was allowed to place his coat of arms on a monument intended to display the Glory of the King and the House of Habsburg shows that Michael von Wolkenstein had proved his skills as financier and commissary on behalf of his king. In 1501 Maximilian I sold him the rule of Lienz that included Bruck Castle, the city of Lienz, the office and district court Lienz with the associated courts and offices Kals and Virgen with Defreggen for the price of 22.000 f1Rh (RI XIV, 3.1 n. 12327, in *Regesta Imperii Online*).

Barbara von Thun belonged to the court of the queen Bianca Maria Sforza. Barbara is mentioned for the first time on 6 July 1494 as a member of the *Frauenzimmer* and on 18 August 1495 named as lady-in-waiting. At courts of the 15th century the entire royal household of a noble lady and her apartments was referred to as *Frauenzimmer* (*frawenzymmer*). By order of Emperor Maximilian she was raised in rank as her family was ennobled to *Reichspanierherren* (= *Freiherren*) in 1495 (RI XIV, 1 n. 3641, in *Regesta Imperii Online*). Barbara von Thun married Michael von Wolkenstein-Rodenegg on 29 March 1497. The wedding took place in Innsbruck in the presence of Maximilian I, but in the absence of the queen, who resided in Worms at the time. Barbara remained a member of the *Frauenzimmer* and probably only left when her husband became *Landhofmeister* in Innsbruck in 1500, officially the highest office of the Austrian



Fig. 1: Effigies of Michael von Wolkenstein-Rodenegg and his wife Barbara von Thun. Table tomb in St Andrew, Lienz, East Tyrol (© BDA. Image: Bettina Neubauer, 2012)

countries in the West. When Michael von Wolkenstein acquired the rule of Lienz, the couple moved to East Tyrol and resided at Bruck Castle. Barbara fell severely ill after the birth of her seventh child in 1509 and died the same year on 29 August at the age of 26 years (Korotin 2016, 203–205).

When Michael von Wolkenstein-Rodenegg died on 15 April 1523 in Innsbruck, they transferred him to Lienz and buried him beside Barbara von Thun. During his lifetime, he had already commissioned a magnificent table-tomb in the parish church of Lienz with effigies of himself and his wife (Mannhart 1958, 54–55) (fig. 1). The rule of Lienz belonged to the house of Wolkenstein-Rodenegg till 1642 when the family went bankrupt. This resulted in the transfer of the rule of Lienz and thus also Bruck Castle to the Tyrolean Prince Archduke Ferdinand Karl.



### The crypt – construction and contents

At a distance of 6.25 m west of the lowest step to the presbytery, there is an excellently preserved Gothic floor, a brownish screed interspersed with small white limestones. A 0.89 m wide and 1.37 m long granite stone slab with two heavy iron rings covers the entrance to the crypt (Zemmer-Plank 1985, 26, fig. 2). Beneath the stone slab a stair leads to a small room (1 m wide, 0.9 m deep and 1.24 m high) that served as an antechamber to the actual burial room (Zemmer-Plank 1985, 26-27, fig. 3 and fig. 4). A double-winged wooden door separated it from the burial chamber as some wood residues and two iron cones on both sides of the stone doorframe show. The bottom of the burial chamber with a barrel-vault lies around 0.35 m lower than the antechamber. The crypt is 2.4 m long, 1.05 m wide with a maximum height of 1.69 m. The vault starts at 1.2 m height at the two longitudinal walls. The wall plaster was applied without special care and has partially flaked off so that the stones are visible between the unsmoothed mortar zones. On the vault of the burial chamber the imprints of six 0.2 to 0.28 m wide wooden boards can be seen. The dirty brown screed is rough and uneven. On the floor of the crypt, in the eastern part of the burial chamber, five human skeletons lay pushed together. Their disorder in the crypt was so extensive that the skeletons were torn completely out of their original context. There was no anthropological investigation done and unfortunately Zemmer-Plank, who excavated the crypt, made no note in her site notebook if she was able to distinguish between skeletal remains of children and adults, male or female. The photographs taken inside the crypt are inconclusive and the bones were reinterred. It cannot be determined when this disturbance took place. Perhaps when the table tomb was dismantled in 1781 (Pizzinini 1973, 232) or during the restoration of St Andrew in 1860, when a new floor was laid, and the stone slab covering the entrance to the crypt disappeared under it. Mixed with the bones was an approximately 0.25 m high pile of debris consisting of crumbled plaster, wood scraps from the coffins and the wing door, iron bands and hinges and remains of the grave goods. A sword with a long, narrow blade, fragments of a pair of bronze wheel spurs with the associated buckles, fragments of garments and a rosary with wood and jet beads were also found (Zemmer-Plank 1992, 139-140, fig. 12.15).

From the garments, only a few indefinable fragments made of fine linen, set with a 50 mm wide velvet border and a 7 mm wide dagged edging, including one probable sleeve part, remained.

A very coarse piece of fabric in twill weave about the size of a palm of undetermined use was still present too. From the footwear, only some leather pieces could be salvaged and the soles of a pair of shoes. Because of their size, they must have belonged to a petite woman or to a child. Only two heels of spruce (20 mm high, 57 mm wide and 85 mm long) as well as the fragment of a shoe sole or patten made from cork with a preserved length of 106 mm and a width of 74 mm and two leather soles of a total length of 200 mm and a maximum width of 70 mm width (measured at the forefoot and heel) were found (Zemmer-Plank 1992, 136 & 140, fig. 12.14, 139). The soles are rounded at the toe. From the shoe upper, just some small fragments provide no clues about the design of the footwear. Amazingly well preserved were four pieces of headwear, a padded roll with ties, two hairnets and a coif. As with most finds from graves all objects now show a uniform brown colouring, and the original shades cannot be determined.

The reason why the four pieces of headwear are much better preserved than the other textiles is unknown. It could be due to the material, since the various plant and animal fibres react differently to moisture, temperature, oxygen, and other soil conditions such as pH-value and salinity, or it could be due to their position in the coffin – on the head – where they were less exposed to the decomposing bodies.

Which five members of the house of Wolkenstein-Rodenegg were buried in the crypt in St Andrew's? First, Barbara von Thun and Michael von Wolkenstein-Rodenegg and maybe two of their seven children<sup>1</sup>, Philipp and Bianca, who died at a juvenile age (Zemmer-Plank 1985, 27). This was also the opinion of Zemmer-Plank who saw the skeletal remains. Therefore, it must be assumed that she identified at least some of the bones as being those of juveniles, even if she failed to make a note. The fifth was probably their son Veit von Wolkenstein-Rodenegg. Zemmer-Plank writes that he was buried *in monasterio* in Lienz, information that she gathered from the 'genealogies of the Tyrolean nobility', by Stephan von Mayrhofen. This is a misunderstanding. The entry *sepulta in monasterio* (Mayrhofen n.d., 844) refers to the burial place of his wife Susanna von Welsperg (died 1580). Veit died in 1538 when the crypt of his parents was still relatively new. His wife Susanna outlived him by 42 years. By then the tomb had not been used for decades. It is also much more plausible that a widow like Susanna entered a convent in her old age and was then subsequently buried there, than Veit, who died – probably unexpected – at the age of 31.

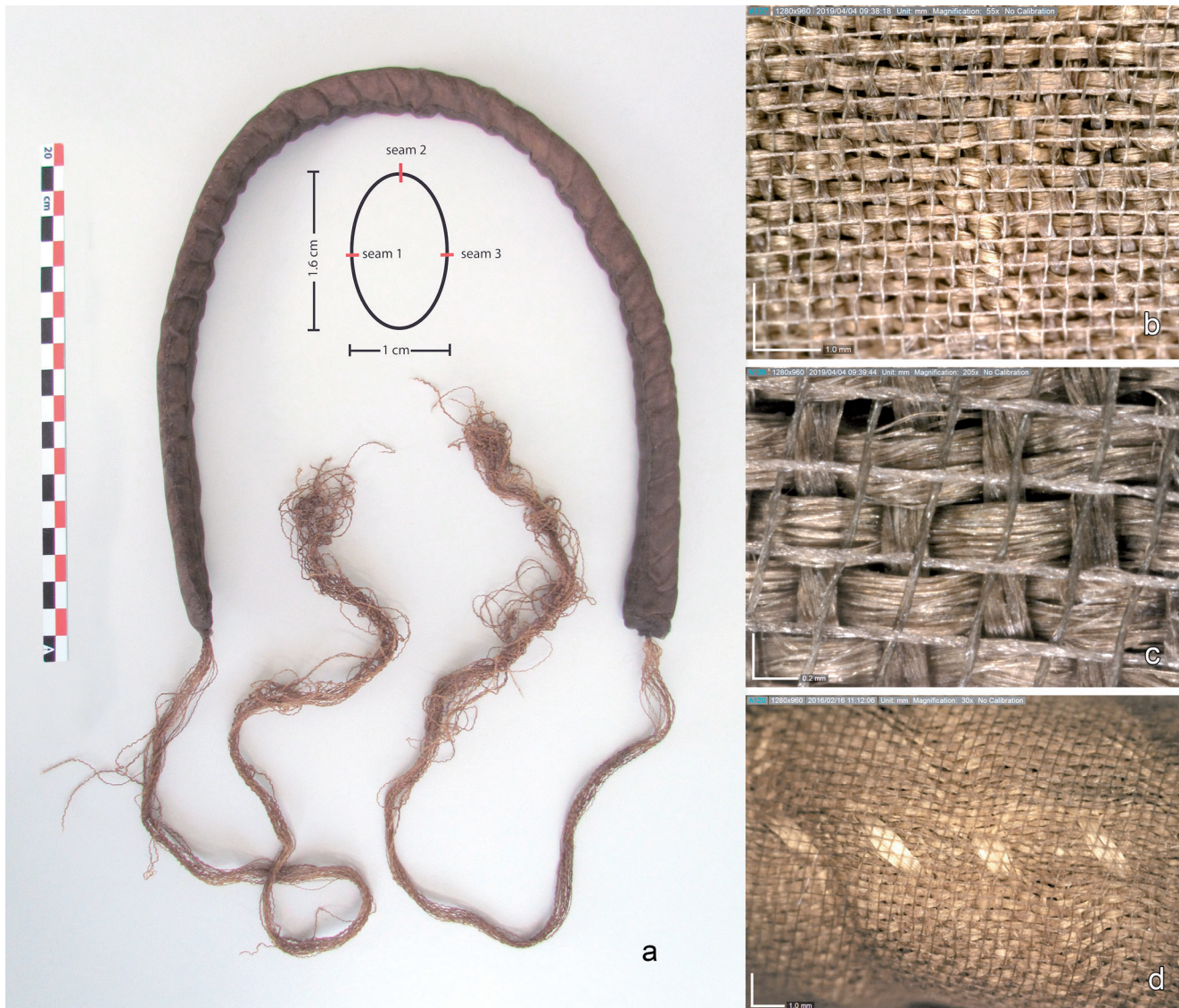


Fig. 2: a) padded roll or wulst from the crypt; b) – d) microscope images of the fabric seen through the meshes of the crepeline cover. Magnification of b = 55 x, c = 205 x, d = 30 x (© Tyrolean State Museum Ferdinandeum. Images: Beatrix Nutz)

### The textile finds from the crypt

The textile finds from the crypt of Michael von Wolkenstein-Rodenegg and his wife were first published 1985 by Liselotte Zemmer-Plank in the *Festschrift* (commemorative publication) for the 65th birthday of Erich Egg (Zemmer-Plank 1985) even though she admitted that textiles were not her area of expertise. In addition, the paper is written in German and did not gain the international attention it deserves. The finds are now housed at the Tyrolean State Museum Ferdinandeum in Innsbruck, inventory number TLMF U 18.475. Liselotte Zemmer-Plank passed away on 19 May 2015 and is sorely missed by her colleagues. In her memory, the textiles were re-examined and the results

are to be published in English to make them known to a wider audience. Elisabeth Macho-Biegler (*Atelier für Textilrestaurierung*, e-mail: [textilrest.emb@gmx.at](mailto:textilrest.emb@gmx.at)) conserved two of the textiles in 2000, as they were put on display in a temporary exhibition (Zemmer-Plank 1992). To stabilize the fragile objects, a padded roll or *wulst* and a knotted hairnet were covered with silk crepeline. The *wulst* is completely encased except for the two ties at the ends and the hairnet is sewn onto the crepeline, which now obscures the inside as well as the damaged lower parts of the hairnet on the outside. Unfortunately, this makes it difficult to obtain all data needed (e.g. weave and thread count of the fabric of the *wulst*, type of knots with pile used and bottom



finishing on the hairnet). It was also not possible to analyse the fibres according to modern standards, as the museum did not give permission to take fibre samples. In her conservation report Elisabeth Macho-Biegler identified the fibres of the knotted hairnet as silk and Zemmer-Plank wrote that the *wulst* is made of linen, but neither provided information on how they achieved this identification. Personal communication with Mrs Macho-Biegler in 2019 provided no additional information as she could not remember how she identified the fibres as silk. The re-examination of the textiles was done visually only using photography, macro photography and microscope images taken with a Dino-Lite-Microscope.

### The headdresses

#### *The padded roll*

The padded roll or *wulst* is 505 mm long (without ties), 16 mm wide and 10 mm thick (fig. 2a). It is made from three strips of fine fabric sewn together with whip stitches (fig. 2d) using sewing thread with a thread diameter of 0.66 mm and stuffed with stiff matter. As mentioned above, according to Zemmer-Plank, the fabric is made of linen, but the threads show no easily discernible twist when looked at under a Dino-Lite-microscope with 60 x magnification giving the impression of reeled silk (fig. 2b and fig. 2c). The warp threads do appear to have a very slight S-twist, which seems to be a characteristic of silk yarn used in Italian silks in the 15th to 16th century, while older silks are woven with Z-twisted yarns. This change is probably associated with a technical development in silk throwing (Crowfoot et al. 2012, 124). Lisa Monnas and Roberta Orsi Landini wrote on S-twisted silk threads: 'fourteenth-century [Italian] velvets usually have Z-spun main ends ... but from the late 1420s their main warp threads were generally S-twisted. In contrast, Ottoman velvets of the late 15th and 16th centuries generally have Z-twisted main warp threads' (Monnas 2012, 15); 'the finest silk thread was used for the warp: strong shiny silk organzine, generally made up of 2 S-twisted ends' (Orsi Landini 2017, 15-16).

The thread diameters range from 0.2 mm (warp) to 0.3 mm (weft) and the fabric is woven in plain weave with 30 threads/cm, although it occasionally appears that two threads are used in the weft in the same shed. The ties are each 450 mm long and are now a loose bundle of eighteen wavy threads once most likely either plied or braided to form a cord. The material of the padding could not be determined but it could be made from cotton, strips of fabric or even bast. Cotton padding was often used for doublets, duvets or sleeping caps

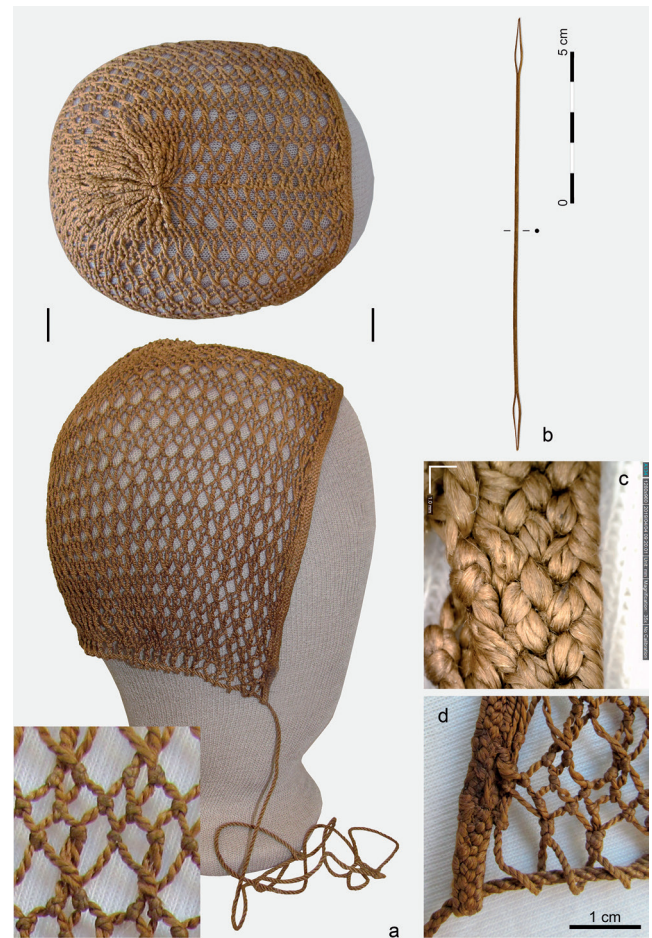
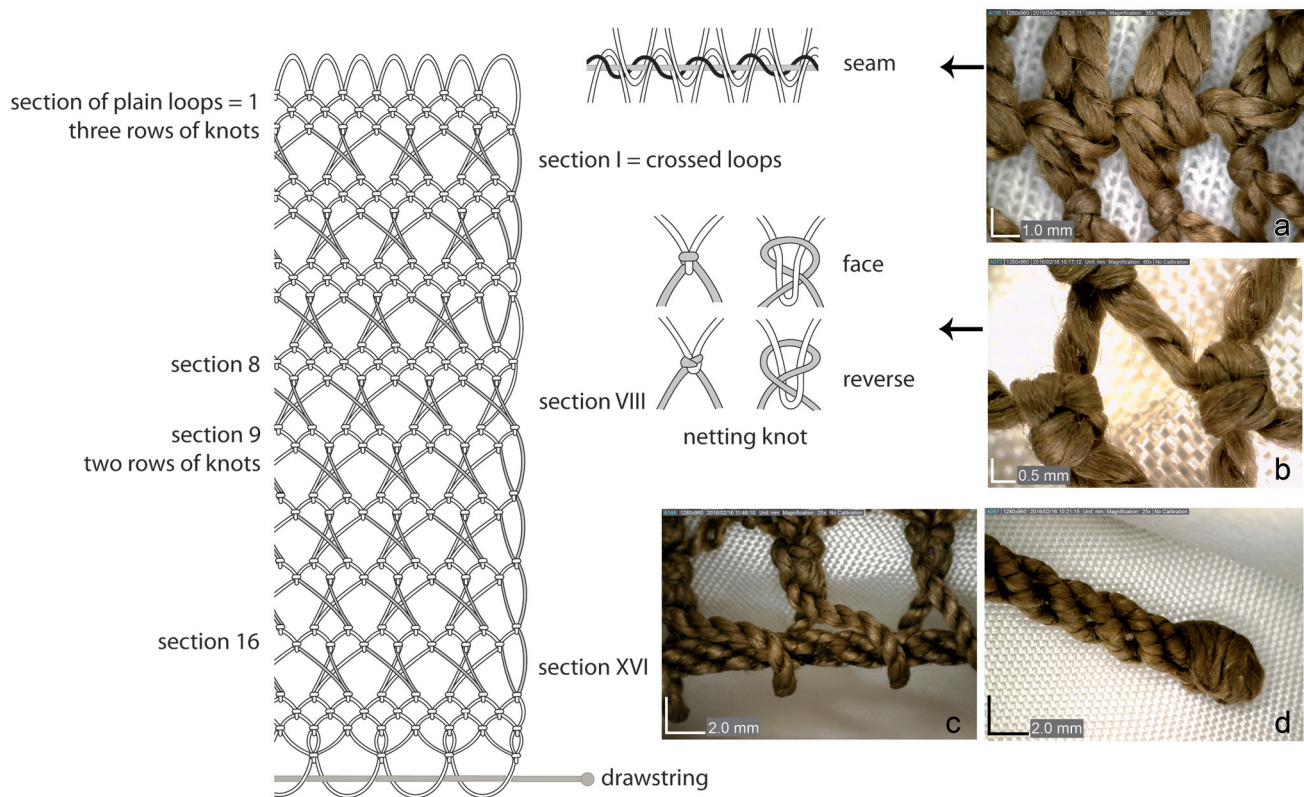


Fig. 3: a) netted hairnet; b) filet needle; c) braid – microscope image, magnification 35 x; d) drawstring running through the last row of netting loops and the loop at the end of the braid (© Tyrolean State Museum Ferdinandeum, Image: Beatrix Nutz. Filet needle: © Museum Schloss Bruck Lienz. Image: Südtiroler Landesmuseum für Kultur- und Landesgeschichte Schloss Tirol)

(Zander-Seidel 1990, 398) and of two 15th century rolls found at Lengberg Castle (Nutz 2015b, 29 and 30 fig. 4) one was stuffed with strips of linen fabric and one with lime bast, *Tilia cf cordata* (analysis by Thilo Kappelmeyer in 2013).

#### *Netted hairnet<sup>2</sup>*

The hairnet is made from a rectangular piece of netting of 220 x 500 mm with an S-plyed 2-ply thread with a thread diameter of 0.75 mm (fig. 3a). The fine mesh suggests that it was made using a filet needle. Such a needle (length 153 mm, fig. 3b), dated to the 16th century was found in a vault at Bruck Castle (Datterl 2009, 51), where the family of Wolkenstein-Rodenegg resided. The rectangular net is folded and 'sewn' together on one longitudinal side by running a thread through the loops and winding another thread

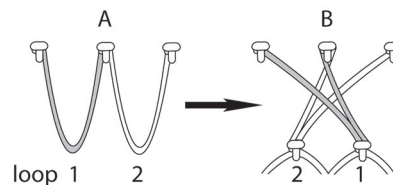


#### Diagonal netting with crossed loops

1st row long loops (A)

2nd row: 2 loops are to cross each other (B).

Begin by putting your netting-needle at first into the 2nd loop, counting from left to right, then into the 1st, so that the right loop leans to the left and the left one to the right.



3rd row: one plain loop in each of the loops of the previous row.

Fig. 4: Pattern of the netted hairnet with microscope images. a) the 'seam'; b) the netting knots; c) and the drawstring; d) the knotted end of the drawstring. Magnification of a = 35 x, b = 60 x, c and d = 25 x (© Tyrolean State Museum Ferdinandeum. Images: Beatrix Nutz)

as 'spacer' around the said thread. This side is then gathered at the back of the head leaving a seam of 75 mm length. A narrow, 550 mm long and 4 to 5 mm wide braid is sewn onto the edge of the face opening, both ends folded to make 25 mm long loops (fig. 3c and fig. 3d). The braid with a slightly D-shaped cross section, flat on one side and ridged on the other, was most likely done in a loop manipulation technique in a pattern in 15th century braiding manuals called

'a broad lace of five loops' (Speiser 2000, 49; Bennis & Barrett, 2007, 39). Through the last row of netting loops at the bottom edge and the loops of the braid runs a 1970 mm long and 2 mm thick drawstring with knotted ends made of three threads (fig. 4c and fig. 4d). The pattern consists of alternating sections of plain loops and crossed loops (16 sections of crossed loops in total) (Dillmont 1890, 397–398). Thérèse de Dillmont explains 'diagonal netting with crossed loops' for the

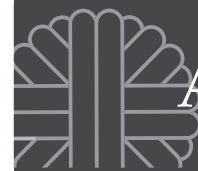


Fig. 5: a) 16th century hairnet with netting knots using increases and decreases in the Bisschoppelijk Palais in Ghent (Belgium); b) knotted hairnet with gold and silver wire in the Bisschoppelijk Palais in Ghent (Belgium) with close-up of the knots (© KIK-IRPA, Brussels, Object numbers 93124 and 93121)

crossing of three loops, but here only two loops are crossed (Dillmont 1890, 406-407, fig. 632). The pattern changes slightly after the eighth section of plain loops from a line composed of three rows of knots to two rows of knots in between the crossed loops (fig. 4). The net is finished with a row of decreasing loops for the drawstring (Dillmont 1890, 400). A comparable 16th century hairnet using increases and decreases is housed in the Bisschoppelijk Palais in Ghent (Belgium) (fig. 5a).

The decreasing loops of the hairnet are characteristic of a netting technique called *mezzo* (or *mezza*) *mandolina*. According to Margaret Abegg *mezzo mandolina* is a variety of network (Abegg 1978, 94). It is an irregular mesh that employs increases, decreases, different stitch lengths, dropped and added stitches,

to create the decorative effect. It is sometimes left plain, like the hairnet from Lienz, but more often it is embroidered in darning stitch which fills the mesh so that the background can hardly be seen between the interwoven figures. Ricci published a photograph of a plain, unembroidered net with decreases on fig. 39 and believes the embroidered chemisette (or partlet) of Eleanor of Toledo in her portrait by Agnolo Bronzino, circa 1560, to be a *mezza mandolina* net (Ricci 1913, fig. 38 and fig. 39). Levey (1990) identified the partlet worn by Isabella de Medici in her portrait by Bronzino (circa 1552-1553) as being *mezza mandolina*, but thinks the partlet of Eleanor of Toledo is of *burato*, decorated in imitation of *mezza mandolina* (Levey 1990, fig. 98 and fig. 103). *Burato* is worked on a ground fabric woven with an open gauze weave resembling the regular



mesh of the hand-knotted net (Levey 1990, 18-19). Patterns for *mezzo mandolina* can be found in Isabetta Parasole's *Specchio delle virtuose donne* published in 1595 and in *Studio delle virtuose dame* 1557 (Parasole Catanea 1595; Parasole Catanea 1597). If the hairnet from Lienz can indeed be labelled *mezza mandolina* however is debatable. Johnstone describes the *punto a mezza mandolina* as "stitch of half an almond shape" (Johnstone 1926, 16). This is an acceptable translation of the Italian term, as *punto* can translate to 'stitch', *mezzo* to 'half' and *mandolina* to 'almond-shaped'.

Pat Earnshaw gives both Abegg's and Johnstone's opinions and says that the latter describes the simplest form of buttonhole stitch loop (Earnshaw 1999, 110). Levey and Lewandowski define it as 'a form of laces where the large square mesh is covered by a cobweb-like pattern of darned thread' (Levey 1990, 122; Lewandowski 2011, 191). It is possible that *mezzo mandolina* either just refers to the type of stitches used to 'embroider' the knotted net or to both the net and the embroidery. Looking at Parasole's patterns it is most likely both.

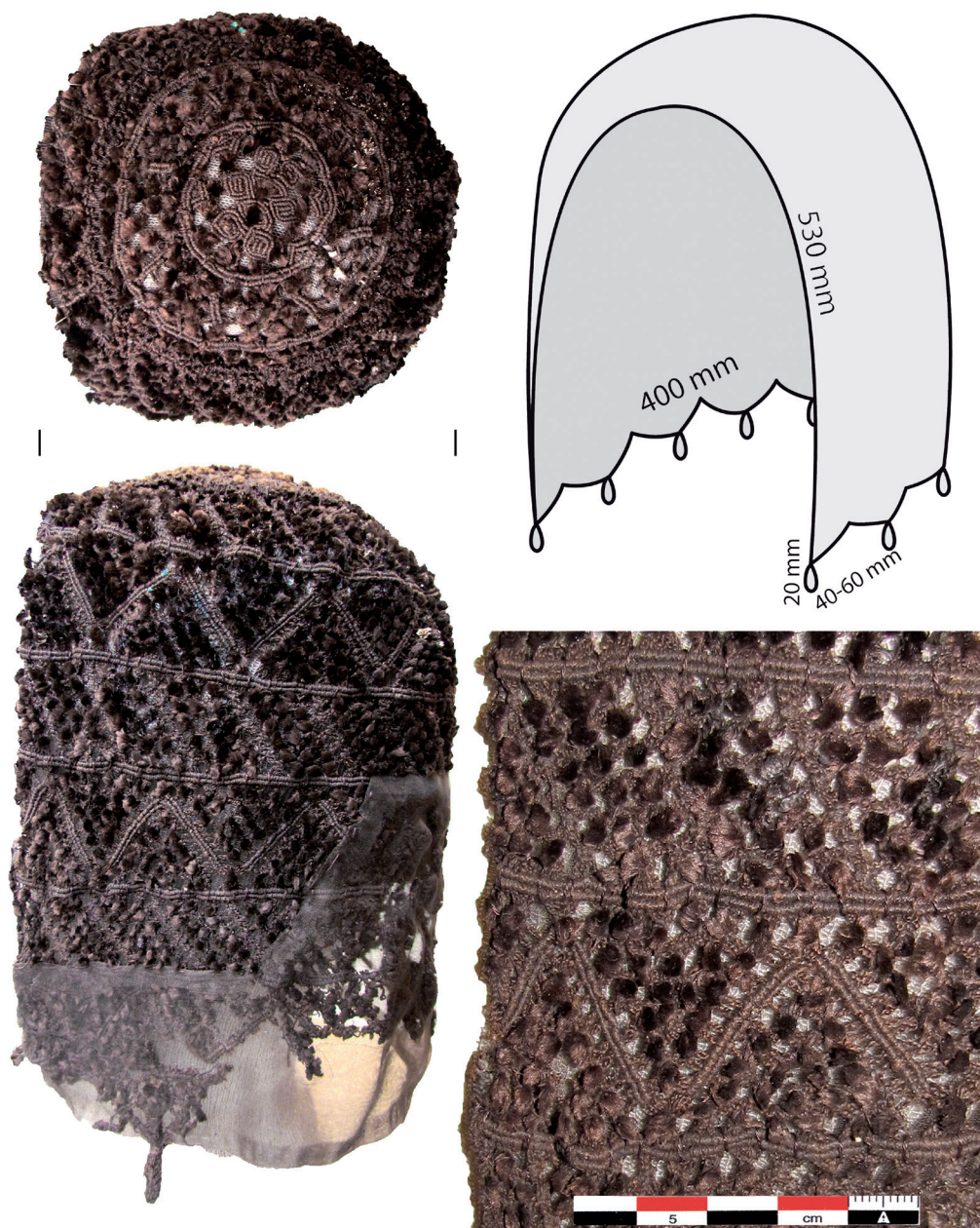


Fig. 6: Knotted (macramé) hairnet with measurements and close-up (© Tyrolean State Museum Ferdinandeum. Images: Beatrix Nutz)

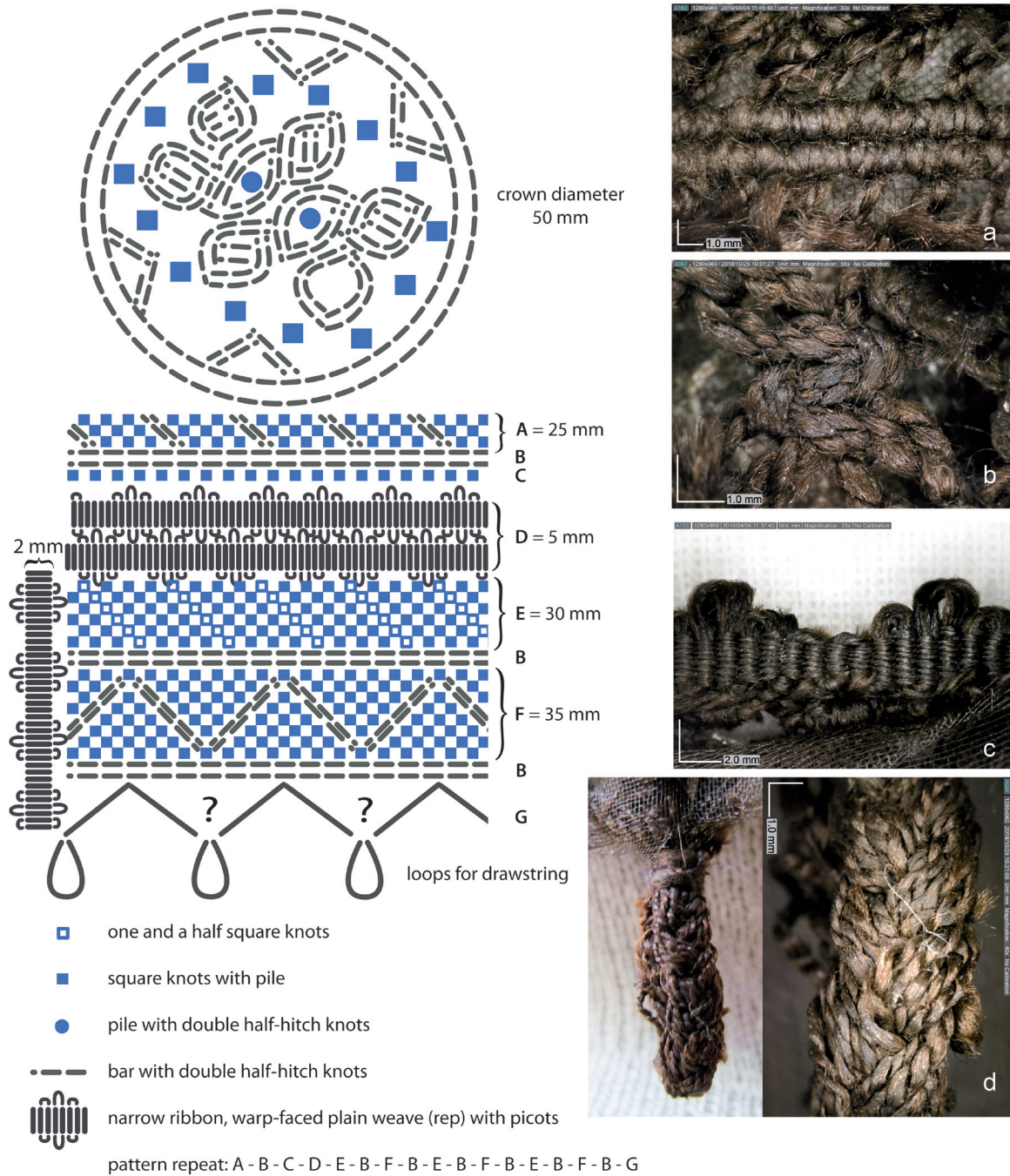


Fig. 7: Pattern of the macramé hairnet with microscope images. a) the half hitch knots; b) the one and a half square knots; c) the rep ribbon with picots; d) the loops for the drawstring with close-up (left) and microscope image (right). Magnification of a = 30 x, b = 55 x, c = 25 x, d = 40 x (© Tyrolean State Museum Ferdinandeum. Images: Beatrix Nutz)

**Knotted hairnet**

The second hairnet is worked from the top of the head down, starting with a circular centrepiece (also called an eye or crown) with swirls (fig. 6). The centrepiece is followed by concentric strips alternating between diagonal and triangular patterns separated by bars

of horizontal half-hitch knots (fig. 7a) adding threads as the diameter increases (fig. 8b). The first diagonal pattern row is followed by two very narrow ribbons in warp-faced plain weave or rep (Emery 1994, 76-77, 86) with a width of 2 mm each that are sewn onto the hairnet and obscure the knots underneath. The same

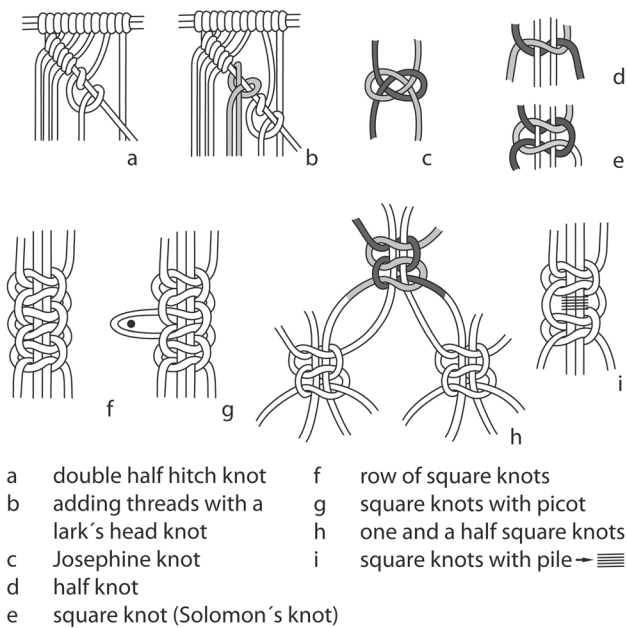


Fig. 8: Macramé knots (Image: Beatrix Nutz)

type of ribbon frames the face opening of 530 mm. The weft thread of this ribbon is used to make picots (fig. 7c). The bottom ends in several V-shaped points, but the exact pattern of the V cannot be determined due to extensive damage and the crepeline cover. At the tips of the V's the threads used for the knots are gathered, braided and the braid turned over to form a 20 mm long loop (fig. 7d) for the now missing drawstring. The surviving loops are 40 mm to 60 mm apart which would make about eight loops in total. The knots are of a type that is commonly known as macramé knots today and the pattern is achieved with bars of double half-hitch knots (fig. 8a), square knots or Solomon knots (fig. 8e) and one and a half square knots (Emery 1994, 65) (fig. 7b and fig. 8h). Small fibre bundles (pile) are knotted into the hairnet with square knots (fig. 8i). Comparable hairnets with macramé knots are found in the Czech Republic and Hungary.

The hairnet of Anne of Bohemia and Hungary, also known as Anna Jagellonica (born 1503 – died 1547), daughter of King Vladislaus II of Bohemia and Hungary and the wife of Emperor Ferdinand I, that was found in her tomb in St Vitus Cathedral in Prague and a hairnet found in a well at Prague Castle dating before 1580 (Archive of Prague Castle, inventory numbers PHA 25/2 and PHA 40) both use square knots (Czech: plochý uzel). But in contrast to the hairnet from Lienz they also employ other techniques such as needle lace and embroidery (Bravermanová et al. 1994a; 1994b; Bravermanová 2005; Fučíková

1997, 592; Súkeník 2013, 55-56). The hairnet of Anna Jagellonica is described as 'a cap made of gold thread with a bottom band of woven cloth from which there is a sewn central medallion made in openwork from "columns" of thread. Gold thread is fixed around the circumference, and out of it the cap is made in knot-work' and its origin as 'probably Italy, Germany or Austria, made up probably in Vienna or Prague'



Fig. 9: Hairnet with macramé knots found in St Martin's Church, Szombathely, Hungary (© Dominican Monastery and Museum Vasvár)



Fig. 10: Portrait of Barbara Schellenberger, née Ehem, 1507, by Hans Burgkmair. Cologne, Wallraf-Richartz-Museum & Fondation Corboud, Gemäldesammlung, Inv.-No. WRM 0851 (© Rheinisches Bildarchiv, rba\_c004538)

(Fučíková 1997, 592). It is additionally covered with a silk muslin veil. In portraits of Anna painted by Hans Maler zu Schwaz, she can be seen wearing hairnets underneath large caps. Schwaz was a German painter active as a portraitist in the village of Schwaz, near Innsbruck in North Tyrol. His clients were members of the Habsburg court in Innsbruck and Schwaz merchants, especially members of the Fugger family. He portrayed Ferdinand I at least three times and Anna of Bohemia and Hungary four times (Mackowitz 1960, 42-46).

The hairnet from St Martin (parish church until 1638) in Szombathely, Hungary (fig. 9), found in situ in grave number 16 likewise is made with rows of square knots (fig. 8f), some with picots (fig. 8g) (Sipos 1998). The grave, excavated in 1992 by Gábor Kiss, situated next to the high altar of St Martin belonged to a young woman of about 18 to 20 years, buried in a wooden coffin. Apart from the hairnet, remains of



Fig. 11: Coif with bobbin lace edging (© Tyrolean State Museum Ferdinandeum. Images: Beatrix Nutz)

her garments and a belt with silver fittings survived. The burial is dated to the end (or last third of) the 16th century, certainly before the year 1605. The hairnet is made of gilded silver threads. The eye on the top of the head is made of a handful of sewn lace rosettes framed by an embroidered net, followed by a slightly narrower braid. The macramé starts at the outer edge of the braid and the meshes are decorated with drop-shaped spangles cut from gilded silver plate, which were attached to the net with a metal



thread (Sipos 1998, 233-234). The spangles and the metal threads are reminiscent of the *Flinderhaube*, *Goldhaube* or *Haarhaube* (hair cap/coif/net). With the *Haarhauben* the complete covering of the hair was first abandoned and the hairnets, worn with a free, high forehead, clearly show Italian influence. The *Haarhaube* was in fashion in Italy and with the nobility as early as the 15th century, and appears on portraits of German women of the urban upper class from the late 1490s. Such hairnets were worn by married women and young girls alike, alone or covered with a veil, decorated with wreaths and hoops, and with or without wimples. On the occasion of her wedding

with Hans Schellenberger, the 19-year-old Augsburg woman Barbara Ehem was portrayed in 1507 by Hans Burgkmair with a hairnet where the hair at her temples is visible (fig. 10) (Zander-Seidel 1990, 119; Zander-Seidel 2010, 39-40, fig. 3). Incidentally the gold spangled headdress of a Nuremberg patrician woman, dated 1650/1700 is also made with rows of square knots in gold-coloured silk thread (Germanisches Nationalmuseum, inventory number T35). Another hairnet made with gold and silver wire, today in the Bisschoppelijk Palais in Ghent (fig. 5b) dated to the 16th century also uses one and a half square knots and Josephine knots (fig. 8c). In

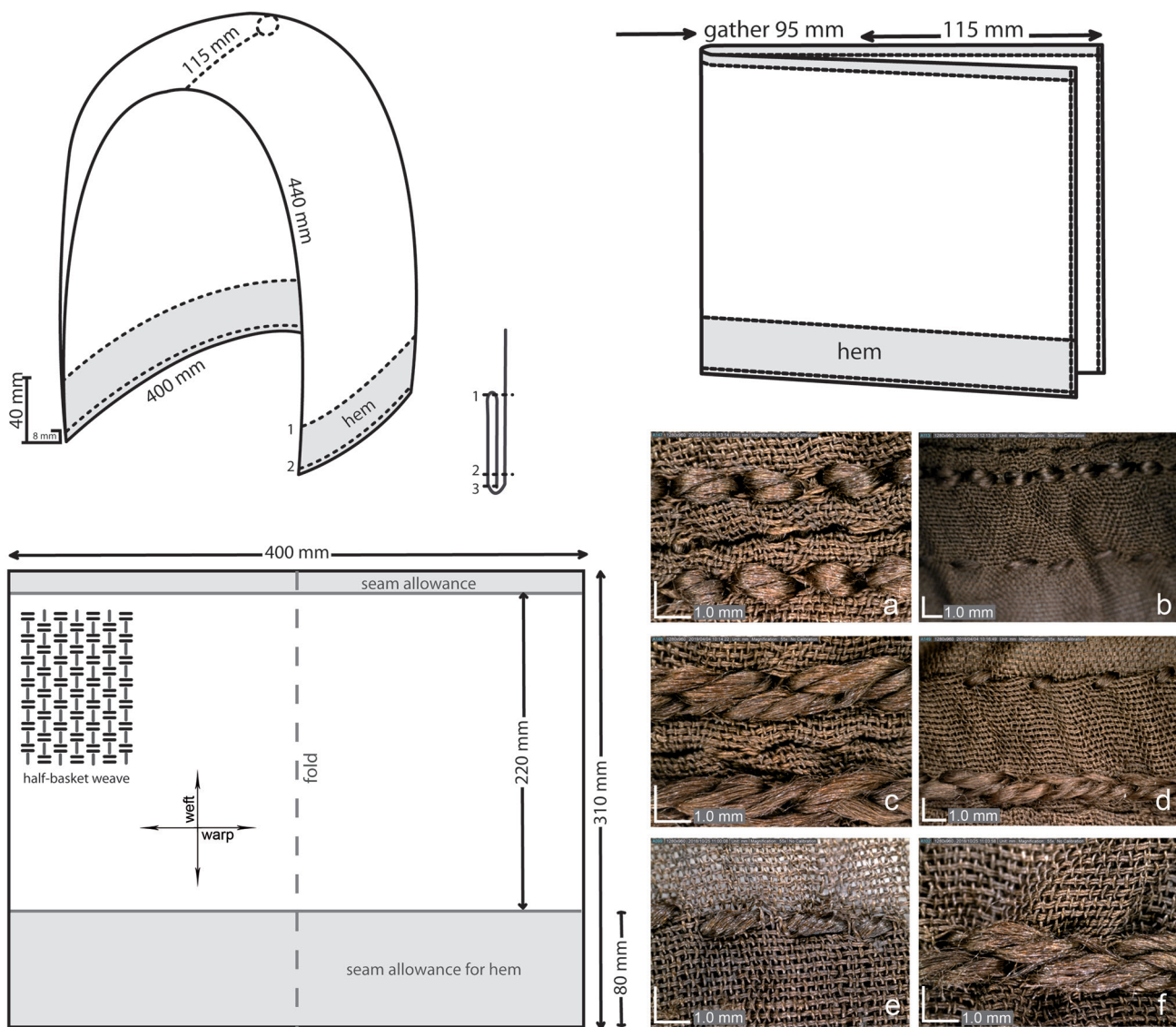


Fig. 12: Pattern with measurements of the coif. Microscope images. a-b) the seam at the parting outside; c-d) the seam inside; e) the bottom edge outside; f) the bottom edge inside. Magnification of a, c, e and f = 55 x, b = 30 x, d = 35 x (© Tyrolean State Museum Ferdinandeum. Images: Beatrix Nutz)

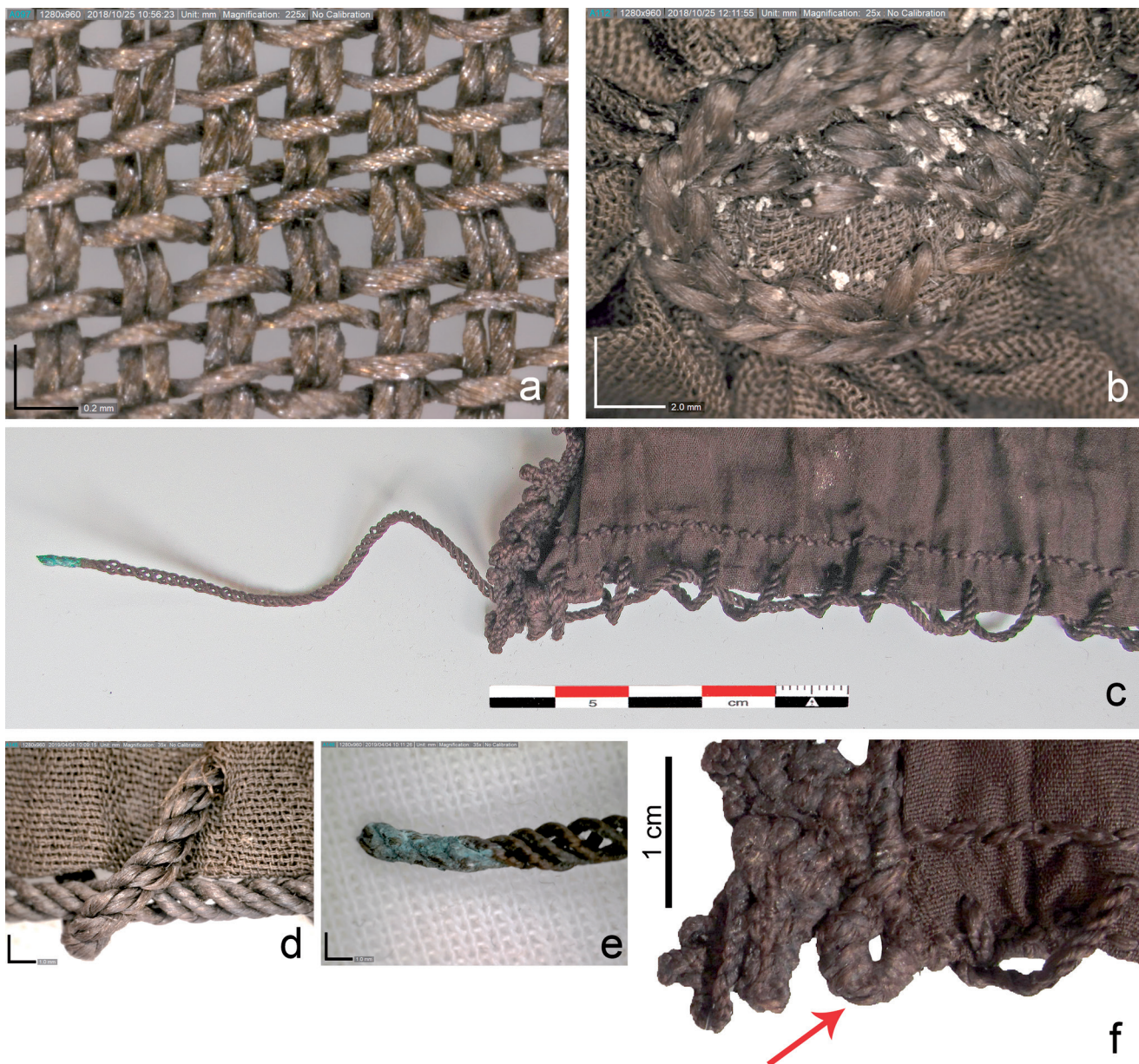


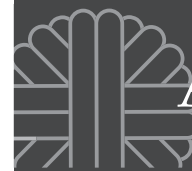
Fig. 13: Close-ups and microscope images of the coif. a) fabric; b) stitches at the gathering; c and d) string threaded through the holes to serve as loops and the drawstring; e) green staining on the end of the drawstring; f) end of the bobbin lace with loop. Magnification of a = 225 x, b = 25 x, d and e = 35 x (© Tyrolean State Museum Ferdinandeum. Images: Beatrix Nutz)

a painting by Agnolo Bronzino<sup>3</sup> (circa 1560) Eleonora di Toledo can be seen wearing a similar hairnet with Josephine knots.

#### *The coif*

The coif (fig. 11) is a similar shape to the netted hairnet as it too is made with a rectangular piece of fabric of 315 x 400 mm, folded, sewn together at one longitudinal end and gathered at the back of the head (fig. 13b), leaving a 115 mm long seam at the parting (fig. 12). The

very fine, transparent fabric is woven with Z-twisted yarn with a diameter of 0,065 to 0,09 mm and a twist angle of 29° in half-basket weave (Emery 1994, 77, 87) with 70 weft threads/cm and 40 double warp threads/cm (fig. 13a). The bottom edge is folded twice to make a 40 mm wide hem sewn with three rows of back stitches (fig. 12e and fig. 12f). At intervals of about 10 mm, holes are punched into the very bottom of the fabric without any over stitching to create eyelets (Crowfoot et al. 2012, 164; Case et al. 2017, 170) and a



string is threaded through the holes to serve as loops for the drawstring. Both strings are 14 mm thick and made with four S-plied, 2-ply threads Z-plyed together. The drawstring has a preserved length of 340 mm, and the green staining at the remaining end indicates lace chapes of nonferrous metal (fig. 13c to fig. 13e). The 440 mm long face opening is hemmed and decorated with

an 11 mm to 12 mm wide bobbin lace. The lace is made with 12 bobbins using S-plyed thread with a diameter of 0.8 mm and the pattern called Krönle mit XII (crown with 12 bobbins) in the Nüw Modelbuoch of 1561 (R. M. 1561). The same pattern but with additional picots appears in the Le Pompe, volume one of 1557 (fig. 14). The braid at the straight edge of the lace is folded on



Le Pompe, Book I, 1557



Nüw Modelbuch, Allerley gattungen Däntelschnur, 1561 (Crown with XII = 12 bobbins)

### Krönle mit XII.

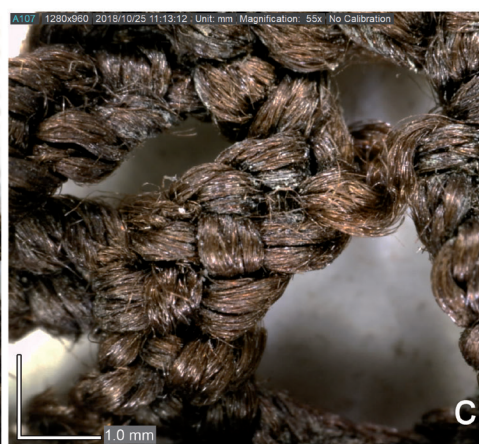
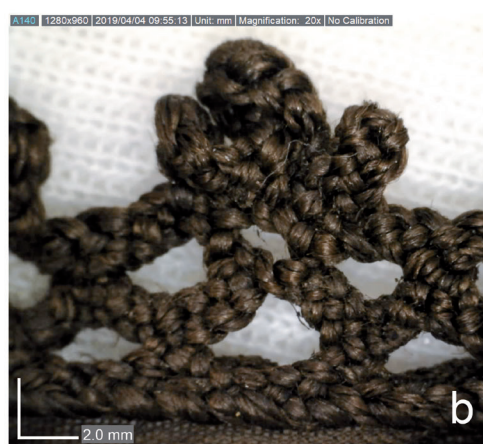


Fig. 14: Bobbin lace. a) on the coif with patterns from the *Le Pompe* and the *Nüw Modelbuoch*; b and c) Microscope images of the lace; d) structure of 4-strand plait. Magnification of b = 20 x, c = 55 x (© Tyrolean State Museum Ferdinandeum. Images: Beatrix Nutz)

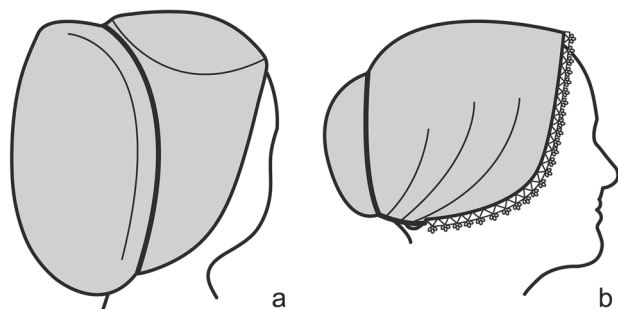


Fig. 15: How to wear: a) the macramé hairnet; b) the coif (Image: Beatrix Nutz)

both ends to make loops for the drawstring (fig. 13f – red arrow) and the lace is sewn on to the coif with whip stitches. Due to the lace and the whip stitches obscuring the edge of the fabric it is not possible to detect a hem. The coif is well preserved except for the left side where the bobbin lace has been partially torn off the edge.

#### Who did the headdresses belong to and how were they worn?

The macramé hairnet and the coif with bobbin lace most likely belonged to Barbara von Thun. Hairnets of this type were female headwear as the hairnet from the tomb of Anna Jagellonica and from the grave in St Martin, Szombathely show. The macramé hairnet was probably given shape by a stiffener inside, as with the other two hairnets found in graves, and looked similar to the hairnet of Barbara Schellenberger, née Ehem, in her portrait of 1507 (fig. 10). The now missing drawstring is crossed at the nape and wrapped around the stiffener (fig. 15a).

The coif with the bobbin lace also appears more suitable for a girl or woman and might have been worn either on top of the macramé hairnet, much like the silk veil of Anna Jagellonica, or underneath the net. It makes more sense to assume that the coif is worn underneath the hairnet as wearing it on top would spoil the impression created by the fibre bundles knotted into the net. This way it would also prevent any stray hair from sticking out through the meshes of the net. Fortunately, this headdress was not restored and the creases in the fabric caused by wear can still be seen, suggesting that the coif was tied at the back, the drawstring crossing at the nape, as with the hairnet, and tied around a bun or padding (fig. 15b). Spots of green copper oxide (patina) on both the macramé hairnet and the coif indicate hairpins

penetrated both layers. Coifs or veils of transparent fabric worn underneath a hairnet are depicted on various paintings of the 16th century such as the frescoes on the wall of the Golden Roof in Innsbruck (Weiss 2010, 104, fig. 106).

The netted hairnet does not seem to be gender specific and could have been worn by Barbara von Thun, Michael von Wolkenstein-Rodenegg or his son Veit. Yet, since it is unlikely that Barbara would have worn three headdresses at the same time, the netted hairnet was worn either by Michael or by Veit von Wolkenstein-Rodenegg. Michael, who was probably buried with parts of his equestrian harness (presumably the harness that can be seen on his effigy), as indicated by the wheel spurs and the sword, could have worn the hairnet underneath his helmet. For Veit, a rider's harness no longer necessarily belonged to the aristocratic symbol of class. He may have been buried in festive Renaissance clothing.

The *wulst* or padded roll is not thick enough to provide the large bumps seen on a *Wulsthaube* or *Steuchlein* such as the one on Barbara's effigy, but there are three other possibilities for its use. Liselotte Zemmer-Plank thought the *wulst* was used as a padded headband (*Stirnwulst*), originally embroidered or adorned with metal lace, to be worn alone or with a veil (Zemmer-Plank 1985, 28–29, fig. 5). Since the *wulst* is now covered by silk crepe-line it is not possible to see if there are any holes in the fabric indicating that a needle and thread was used for embroidery or to sew on lace. This headband would not have covered the hair, as was proper for a married woman and therefore could only have belonged to Barbara's daughter Bianca, depending on how old she was at the time of her death – which is not known. The portrait of one of the daughters of Leopold III, Margrave of Austria, on the Babenberg family tree in Klosterneuburg, painted 1489–1492 by Hans Part, shows how this supposed decorated headband could have been worn (Klosterneuburg Stiftsmuseum, GM 86 and Nutz 2015a, 103, fig. 8). It is much more likely that the *wulst* was used together with one of the hairnets. With the macramé hairnet, the *wulst* would have been used as stiffener at the back of the head or it might have been worn on top of the head underneath the netted hairnet, even if this hairnet belonged to one of the men in the tomb. Men sometimes also wore a *wulst* under a coif or hairnet, in a similar style to woman. In the estate account of Lazarus Holzschuher of 1545, a *guldin Hauben mit sampt dem wulst* (a golden cap/coif with the *wulst*) is listed among other possessions (Zander-Seidel 1990, 230 and fig. 212).



### Dating the headwear

For the same reason that no fibre analyses were done, none of the finds from the crypt were radiocarbon dated. Acting on the assumption that Veit von Wolkenstein-Rodenegg was the last person to be buried in 1538, all the grave goods must date to, or pre-date 1538. If the macramé hairnet and the coif with the bobbin lace indeed belonged to Barbara von Thun they date no later than 1509 or are even older, assuming she owned and wore them for some time before her death. This would place both headdresses among the oldest, if not the oldest, surviving examples of the techniques of macramé and bobbin lace known to date. In comparison with the hair nets of Prague and Szombathely, the macramé hairnet of Barbara von Thun is relatively simple. It was, apart from the narrow rep-bands, only worked with macramé knots using silk thread. The hairnets from the Czech Republic and Hungary are more elaborately worked, combine several textile techniques, and also use metal threads and spangles, demonstrating the development of a simple to a complex, elaborate and almost excessive style. If this type of hairnet and macramé did indeed originate in Italy, it is feasible that the technique and the fashion reached Tyrol, before it spread further north and east. The same can be said about bobbin lace that develops from rather simple braid-like laces to ever more complicated patterns.

### Some thoughts on the history and development of macramé and bobbin lace

#### Macramé

Macramé is an ancient technique whereby a row of vertical threads is knotted into a decorative pattern (Levey 1990, 122). The primary knots of macramé are the square knot and various combinations of half-hitches. Some books on macramé include the Josephine knot (Sylvia 1890, 296).

The term macramé is believed to be related either to the Arabic word *maqrama* (or *mahramatun* – Lunghi & Pessa 1996, 32), meaning 'towel', or to the Moorish word *miqramah*, meaning 'striped towel' (Levey, 1990, 5) or 'ornamental fringe' (Lunghi & Pessa 1996, 32). Both suggest that it was based on the use of loose warp threads, but it was also built up with long threads secured to a single head-thread pinned horizontally to a hard pillow. The horizontal position and the lack of bobbins (except for occasional use – see Dillmont 1890, 359-360), together with its knotted structure allows for no simple transition from macramé to lace. It seems that macramé and the other horizontal fringe techniques should be regarded as parallel methods,

benefiting from the same fashions that created lace but not contributing directly to its development (Levey 1990, 5).

The technique of square-knotting probably first arrived in Europe with the Moorish invasion of Spain in 711. From Spain, where it was called *fleco morisco*, it might have been introduced to Europe. Or it could have been discovered (or re-discovered) during the Crusades, in the period 1095-1228. Returning crusaders' ships carried the macramé art to Italy, notably Genoa (Carter 1998, 336). Nicoló Zoppino and Giovanni Tagliente may have been referring to it with the term *groppi moreschi* in their pattern books *Esemplario di lavori* (Zoppino 1529) and *Esemplario nuovo* (Tagliente 1531). Yet, although *groppi moreschi* may refer to macramé, none of the patterns appear suitable for this technique (Levey 1990, 121). Disagreement prevails between various authors over whether the term *punto groppo*, *punto a groppo*, or *gropari*, used by Pagano in 1542 for his designs *punti tagliati et gropposi*, refers to macramé. Palliser writes '*Groppo*, or *gruppo*, signifies a knot, or tie, and in this lace the threads are knotted together, like the fringes of the Genoese macramé' (Palliser 1869, 44). Levey defines the term *punto groppo* as 'used to describe needle lace made with a densely-worked knotted buttonhole stitch; first found in the sixteenth-century pattern books and thought to refer to macramé but it probably indicated a pattern to be worked in knotted embroidery stitches' (Levey 1990, 123). Sharp speaks of *punto a groppo*, or knotted lace, now known as macramé (Sharp 1913, 64), Lowes of *punto a groppo*, or macramé (Lowes 1908, 62) and for Hudson Moore all knotted laces are *punto a groppo*. '*Punto a groppo* made of cords similar to what is known as macramé. . . . *Punto a groppo*, or knotted lace, includes all the laces made of knotted cords' (Moore 1904, 61, 80). In Earnshaw's Dictionary of Lace the entry '*Groppo*, *Punto a'*' contains several variants of knotted lace, (i) knotted buttonhole stitch, (ii) macramé, (iii) puncetto, (iv) *groppi moreschi* (Earnshaw 1999, 74-75). To add to this 'Babylonian chaos', Florence May wrote that Moorish fringe (*fleco morisco*) was contemporary with macramé, suggesting that she believed it not to be the same technique, but also mentions *groppi moreschi et arabeschi* and *punto a groppo* in connection with macramé, and states that the province of Huelva made a great deal of macramé, but used the term *fleco morisco* (May 1939, 50-51). The term 'macramé' itself appears for the first time in a document of 1584 in the *Capitoli dell'Arte dei Tovagliari* (ms., cart., sec. XVI-XVIII, Genova, Biblioteca Civica Berio, m.r.l.3.20) (Lunghi & Pessa 1996, 47).

The earliest pictorial records of knotted fringes occur in the 15th century. The tablecloth in the painting *The*



*Marriage at Cana* by the Master of the Catholic Kings, circa 1495/1497 (Washington, National Gallery of Art, Samuel H. Kress Collection no. 1952.5.42), shows a knotted fringe that could be made in macramé (Lunghi & Pessa 1996, 89, fig. 116). A knotted fringe (macramé?) can also be seen on the white and blue cloth hanging on the wall behind Maria on the fresco of the Annunciation by Joos Amann von Ravensburg in the cloister of Santa Maria di Castello in Genoa, painted in 1451 (Lunghi & Pessa 1996, 88, fig. 115). Surviving examples are few, and none of them would appear to date from before the late 16th century (Levey 1990, 19). The majority of the extant macramé pieces are flat, two-dimensional knotted fringes on towels, tablecloths or clothing. The hairnets, however are three-dimensional garments in their own right, and with the hairnet from East Tyrol most likely dating to 1509, and the hairnet of Anna Jagellonica dating no later than 1547, these are the oldest surviving examples of the technique of macramé in Central Europe to date. The hairnets also testify to the fact that macramé was not only employed in making fringes, unless the term macramé is restricted to two-dimensional knot-work without regard as to the type of knots used.

### Bobbin lace

In the Encyclopædia Britannica, bobbin lace, sometimes also known as pillow or bone lace, because it is worked on a pillow and bobbins are sometimes made of bone, is explained as 'a handmade lace important in fashion from the 16th to the early 20th century. Bobbin laces are made by using a "pricking", a pattern drawn on parchment or card that is attached to a padded support, the pillow or cushion [author's note: freehand lace is worked directly on the lace pillow without using a pricked pattern]. An even number of threads (from 8 to more than 1,000) are looped over pins arranged at the top of the pattern. Each thread is wound at its lower end around the neck of an elongated spool, or bobbin. Bobbins serve several purposes: their weight provides a tension that makes manipulation of the threads easier; they act as thread reserves; and they help to keep the thread clean by providing a surface other than the thread that can be touched frequently. In the creation of bobbin lace, each hand holds one of a pair of bobbins. The threads are crossed over or twisted around each other to produce solid areas of either linen-stitch (which resembles woven fabric) or half-stitch (a more open stitch), areas of decorative filling stitches, and a background (ground) of net or bars linking the motifs together. The technique may have developed from straight-sided braids converted to openwork or from the plaiting or knotting of the

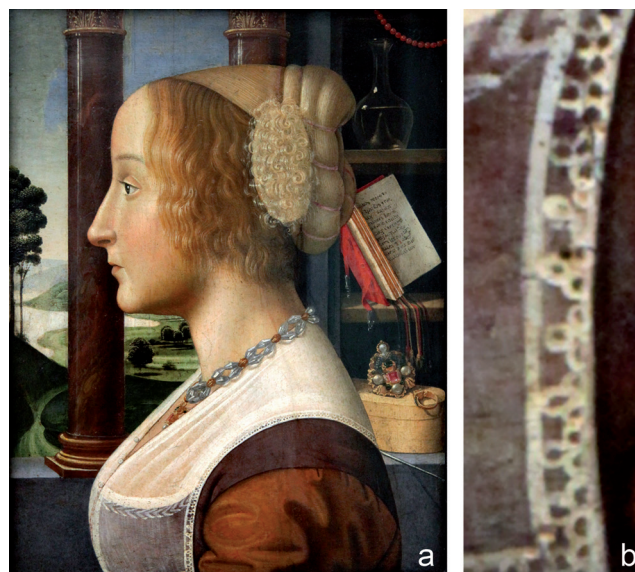


Fig. 16: a) Painting by Davide Ghirlandaio, *Portrait of a young woman*, circa 1490; b) close-up of possible lace (©Gemäldegalerie, Staatliche Museen zu Berlin, inventory number 83. Image: Volker-H. Schneider (CC) BY-NC-SA)

warp-ends of woven fabrics. The first written mention of bobbin laces dates from 1536 (in the introduction to the Zürich pattern book, printed in 1561) and places their origin in Venice. Their first use in fashion dates from the end of the 16th century, when they imitated and began to compete with the needle lace reticella, already in use for ruffs and other accessories. Two main techniques linked to different geographical areas can be distinguished: non-continuous-thread, in which the design motifs are made first and then joined together by attaching threads around them to work the ground (mainly Brussels, Honiton, and Milanese laces), and continuous-thread, where the same threads work across the lace moving from ground to motif to ground in continuity. Both techniques appear in pattern books of the late 16th century (<https://www.britannica.com/art/bobbin-lace>). This is a rather simplified description and dating, as the history and evolution of this technique is more complicated to trace. Many books have been written on this topic, some in agreement with one another, some with contradictory opinions, especially on written sources and the land of origin. Spain, Flanders and Italy are all competing for that honour (Palliser 1869, 87; May 1939, 110-111). The most frequently cited source is the Sforza Inventory of 1493 with the sentence *binda una lavorata a ponto de doii fuxi per uno lenzolo* (Cittadella 1863, 532). While most researchers translate the *doii fuxi* as 'two sides', and argue that no bobbin lace could be produced with only two bobbins (Levey 1990, 10;



Ricci, 1913, 6; van Overloop 1934, 97) the translation '12 bobbins' (Italian: 12 = *dodici*) is sometimes given (Lefébure 1904, 261; Verhaegen 1912, 10; Jackson 1900, 14). Jackson even quotes the words as *punti dei dodisi fusi*. It is certainly right that no bobbin lace can be made using only two bobbins. The pattern using the smallest number of bobbins possible is the *Spitzle mit IIII* (lace with four bobbins) in the *Nüw Modelbuoch* of 1561 (R.M. 1561). Moreover, as the word *dodici* is also found in the Sforza Inventory, it does not seem logical that the writer would have used a different spelling for the word 12 in this sentence. Could it be that all that confusion simply originates in an erroneous transcription of the handwriting? Nevertheless, the common conclusion seems to be that bobbin lace developed no earlier than the first half of the 16th century. For that, researchers rely heavily on early pattern books of the 16th and 17th century to chart the development of the art (Waters 2012, 1). This is also thought about the development of needle lace and is based in general on the first pattern books, with the earliest known book, Johannes Schonsperger's *Ein New Modelbuch*, printed in Zwickau in 1524. The oldest pattern books for bobbin lace are the two volumes of the *Le Pompe* published in 1557 and 1560 (Levey 1983). The patterns of Book I consist mainly of geometric, braid-like insertions and relatively few edging laces, while those of Book II include many free-flowing floral and interlaced designs. The quite elaborate vandyked edgings (named for the collars depicted in portraits by Vandyke; with one of several V-shaped points forming a decorative edging or a border of such points) would seem to show bobbin lace at an advanced stage (Levey 1990, 8). Since complex patterns such as these do not spring up overnight, at least some time must have passed since the first bobbin laces were made. The textile collection in the Museo della Basilica in Gandino houses several 16th century laces worked with gold and silver metal thread very similar to the patterns found in *Le Pompe* (Schoenholzer Nichols et al. 2012, 32-51, cat. 1-22).

Bobbin lace must have found its way up north at a much earlier date than 1557. At the time the *La Pompe* was published lace making had already arrived in Germany. Melchior von Ossa (born 1506 in Ossa, Saxony; died 8 August 1557 in Frauenfels, Thuringia) wrote in 1556: *Itzo findet man wol Weiber und Jungfrauen von Adel... sie lassen theils die Schmuck-Röcke... mit breiten verklöppelten goldenen gezogenen Borten verbremen... Ja itzo bringen sie ein neu Verbreme der Schmuck-Röcke auf, das heißen sie Freulein-Geschlingk, daß sie drey quer finger breit golden und silbern Striche klöppeln...* (Thonhauser 2006, 84; Ossa & Thomasius 1717, 522-523). Not only is

the German word for 'making bobbin lace' – *klöppeln* – used twice, but it becomes evident that these laces were a 'female thing'. Melchior von Ossa wrote that noble women and maidens decorated their gowns with golden borders that they call *Freulein-Geschlingk* (damsel looping).

The second oldest pattern book for bobbin lace, entitled *Nüw Modelbuoch – Allerley Gattungen Däntelschnur*, was published in Zurich in 1561. The author of the *Nüw Modelbuoch*, who is only known with her initials RM (words in the title suggest that it was a woman, since the patterns were intended as instruction for her apprentice girls = *jren Leertochteren*) writes about the introduction of bobbin lace to Switzerland by Venetian merchants '*Dan die selbigen im jar 1536 erstmals durch die Koufflüt uß Venedig vu Italien ins Tütschland bracht worden*' (RM 1561). Yet, if the date 1536 is even approximately right, it was not the year that bobbin lace was invented. It must have been common and developed enough in Italy by that time to be considered fit for export by the Venetian merchants.

When looking for more written sources on bobbin lace one encounters the same problem as with the sources on macramé. What was bobbin lace called in its early days? The *Le Pompe* talks about *merli di diverse sorte* (different types of lace) for various uses, and in the *Nüw Modelbuoch*, the German pattern book on bobbin lace, bobbins are called *dentlen* and the lace *Dentelschnüren*. *Dentel* probably derives from the Latin word *dens* (plural *dentis*), meaning tooth, and in the case of lace, something toothed or saw-toothed. Yet, even before the *Nüw Modelbuoch* was published, lace making was referred to as *klöppeln*, the German word still in use today, with the noun *Klöppel* used as the term for 'lace bobbin'. The word *Klöppel* derives from the (East) Middle High German word *kloppen* (= *Klopfer* = beater) and is used to name a rod thickened at one end for striking something, a bell clapper or – due to its similar shape – a lace bobbin. *Merli*, modern Italian *merletto*, translates to lace and the modern word for bobbin lace is *merletto a tombolo* (pillow lace). In French, bobbin lace is called *dentelle aux fuseaux* today, which is related to the Italian *punti dei fusi*, both freely translating to points/lace made with spindles/bobbins. The use of different words at different times and places for the same thing makes it difficult to detect historical sources on almost anything.

Some authors try to date bobbin lace back to the 15th century with the help of paintings or sculptures (Frauberger 1894, 212; Shepherd 2009, 21-36). Rosemary Shepherd admits, however, that she is 'looking at paintings through lace-tinted spectacles'. Indeed, some of the possible bobbin laces in the



paintings Shepherd selected are not very convincing. The knotted fringes on the gown in a painting by Bernadino dei Conti, *Portrait of a Lady*, painted before 1525, do look more like macramé than bobbin lace (Shepherd 2009, 34; Levey 1990, 19, fig. 104). A close look at the knotted fringe reveals something like picots, but those can be made in macramé too. More convincing is the lace seen on Andreas Mantegna's *Presentation at the Temple*, circa 1454, Sandro Botticelli's *Annunciazione*, 1489-1490 and Domenico Ghirlandaio's *Adorazione del Bambino* before 1494 (Shepherd 2009, 26, 28-29). A painting by Davide Ghirlandaio, *Portrait of a young woman* (Gemäldegalerie Berlin, Inv.No. 83), circa 1490 can be added to the list. The border of her shoulder cloth of transparent fabric seems to be decorated with lace (fig. 16), the pattern is reminiscent of the various *Krönle* patterns in the *Nüw Modelbuoch* and of the lace on the coif from Lienz.

Since most books and articles on the history of lace are written by art or textile historians it might be helpful to gain a new perspective by looking at lace from an archaeological point of view. It is widely thought that needle lace might have begun in the late 15th century and developed over the course of the 16th century (Levey 1990, 1-6). It is debated from whence the *punto in aria* can be considered fully-fledged needle lace (Levey 1990, 6-7). An archaeological find made in 2008 at Lengberg Castle in East Tyrol shows that the beginning of needle lace must be earlier. Four of the textiles found in a vault inside the Castle were adorned with needle lace, with one of the garments, a headdress, being radiocarbon-dated to the first half of the 15th century (AD 1390-1450: ETH-40538: 510±35BP, probability 86.1%). The ties of the headdress, which were still knotted together when the garment was recovered, are connected to the main body of the headwear in two different needle lace patterns, the needle lace sewn onto the selvages of the fabric of both main body and ties (fig. 17). While this needle lace is far from the elaborate and complicated needle lace of later times, it adheres with the definition of needle lace based on the type of stitches used: lace worked with a needle and a single thread in a succession of buttonhole stitches in varying degrees of tightness and in straight lines that support further stitches (<https://www.britannica.com/art/needle-lace>). Button hole stitches decorating fabric edges even go as far back as the Bronze Age (Broholm & Hald, 1940 93), but these hardly qualify as needle lace.

If needle lace can be traced further back by archaeology than by consultation of written or pictorial sources the same might be true of bobbin lace. This poses the question from which older technique bobbin

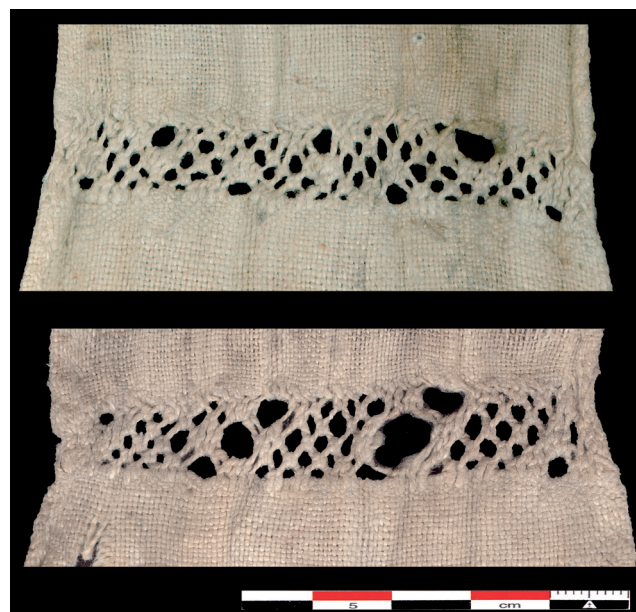


Fig. 17: Needle lace on the ties of the headdress from Lengberg Castle (Image: Beatrix Nutz)

lace might have developed. Methods of making decorative braids or laces plaited in various ways, as were most of the early bobbin laces, existed well before the advent of bobbin lace. Possible early connections are loop manipulating techniques such as finger loop braiding, or plaiting with open ends (Shepherd 2009, 1-4). In Europe, loop braiding goes back at least to the 15th century when the first instructions, the 'Treatise on the making of Laces' in the *Tollemache Book of Secrets* (privately owned) and the *Harley* (British Library, MS Harley 2320) were written. Finds from the prehistoric salt mines at Hallstatt (Austria) even suggest that loop braiding might date back to the Iron Age (Grömer et. al. 2015). The similarity between loop braiding and the braids of bobbin lace becomes obvious when comparing the 15th century openwork braid *lace maskell* made with eight loops in the *Tollemache* (Speiser 2000, 65) with a bobbin lace in the Museo della Basilica in Gandino (Schoenholzer Nichols et. al. 2012, Cat. No. 3) and the pattern in the *Nüw Modelbuoch* called *Spärilin gstemlet mit XVI* (R.M. 1561) made with 16 bobbins. Except for the picots of the bobbin lace in Gandino, which cannot be achieved with loop braiding, the lace patterns can easily be mistaken for each other. Three-strand, and especially four-strand, plaiting with open ends bear a great resemblance to early bobbin laces, where braids are made with two pairs of bobbins working together for a simple braid that is then crossed with other braids, just as with the lace edging



from Lienz, where three times four bobbins are used. Three-strand plaits crossed to make a diamond mesh were found in a layer dating to as early as the tenth century at 16-22 Coppergate, York (Walton-Rogers 1989, 351, fig. 147, 353, 358-359). Instructions for working a four-strand plait with open ends (four strands = *vir vadm*, fol. 19v.) can be found in a German manual of the 15th century among instructions for loop braiding (Badische Landesbibliothek Karlsruhe 1445/1470, fol. 19v-20r; Speiser 2003; Obhof 2004). In this manuscript, loops are called *zwischt*, the term for loop braiding is *schlahen*, and plaiting with open ends is referred to as *flecht*. It is only a small step from loop braiding and open-end plaiting to using bobbins to help organise and manipulate the threads for braids with more strands.

Therefore, it is not too far-fetched to date the coif with the bobbin lace from the tomb of Wolkenstein-Rodenegg to 1509 – or earlier. If bobbin lace developed in Italy, Bianca Maria Sforza might have brought some garments with lace with her to Tyrol when she married Maximilian I in 1498. No bobbin lace seems to be mentioned in the inventory of her dowry (Calvi 1888, 131–147; Sailer 2010, 39–42), but maybe only the more

valuable items were listed and lace not made with gold or silver thread was considered less important. Since Barbara von Thun was one of Bianca's ladies-in-waiting she might have been introduced to bobbin lace by what she saw the queen wearing. It is a nice conceit to imagine Bianca giving Barbara the coif for loyal service.

Extant textiles are a rare archaeological find as the organic matter decays over time. Wood objects, even though likewise organic, have a slightly better chance of survival as they are for the most part not as fragile. Therefore, it is advisable to look into surviving lace bobbins to help date the beginnings of bobbin lace, especially since lace bobbins can also be made of other raw materials such as bone or metal (fig. 18e, fig. 18p and fig. 18q). There is one problem though: there is no guarantee that the first and earliest lace bobbins look like what is now identified and recognised as such. Whoever 'invented' bobbin lace was faced with the problem from where to obtain the bobbins. Certainly, there were no readily available lace bobbins at the time and the worker would have to use whatever was at hand. That could be simple wood sticks, thread spools (fig. 18j) or even tapestry bobbins. Comparing



- a shape of the bone bobbin\* from Bremerholm, Denmark, c. 1550
- b shape of the wood bobbin\* from Bremerholm, Denmark, c. 1570
- c shape of the bobbin from Kempton, Germany
- d shape of the bobbin from Linköping, Sweden
- e - i 19th to 20th century lace bobbins of various shapes and sizes from Germany (e), France (f - h) and Portugal (i)

- j thread spool
- k flûte (Aubusson style bobbin)
- l shape of the bobbin\* in the Allori painting, 1603
- m 15th century tapestry bobbin from Lengberg, Austria
- n modern tapestry bobbin
- o modern Honiton lace bobbin
- p modern bone bobbin with spangles from England
- q modern metal bobbin from England

\*a, b and l are not drawn to scale

Fig. 18: Thread spools, tapestry bobbins and lace bobbins (Image: Beatrix Nutz; Images: Andreas Blackner, Institute for Archaeology, University of Innsbruck)

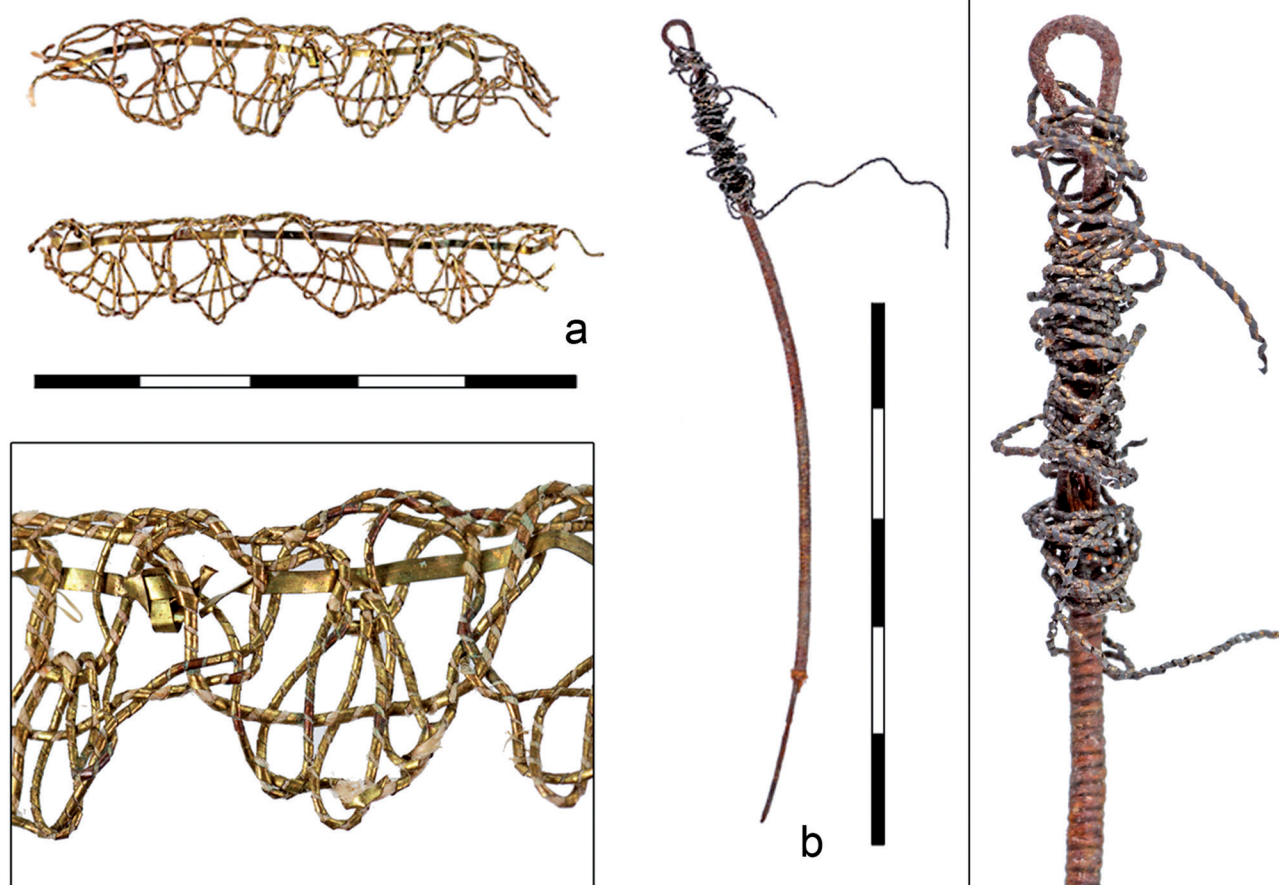


Fig. 19: Bobbin lace: a) and wire with metal thread; b) from the Benedictine Abbey of St John at Müstair, Switzerland (Images: Andreas Blaickner, Institute for Archaeology, University of Innsbruck)

bobbins used for Honiton lace (Palliser 1869, 316–358; Treadwin 1873, 48; Devonia 1875) with tapestry bobbins of the ‘broche’ type (Nutz & Ottino 2013, 56) reveals that, except for size, they are of almost identical shape (fig. 18n and fig. 18o). The size and shape of a bobbin however relates to the type of thread and the technique used. Thicker, heavier threads need bigger, heavier bobbins in order to be able to wind on enough thread and provide adequate tension (fig. 18 and fig. 19). The woodcut on the title page of the *Nüw Modelbuoch* shows rather large bobbins employed by the worker, suggesting she is working either with thick (or metal) threads, maybe even using tapestry bobbins. A painting by Alessandro Allori, *Annunciazione*, 1603 (Uffizi Galleries Florence, inventory number 1494), shows bobbins unlike any commonly used (Dahrén 2010, 61, fig. 29). They resemble thread spools or ‘flûtes’ of the low-warp tapestry loom (fig. 18k and fig. 18l). This proves that bobbin lace can be worked with bobbins

initially serving other purposes. Even in times when lace bobbins are the first choice, a craftsperson might need to use other implements if lace bobbins are not available. This could also result in bobbins hastily made out of whatever is ready to hand. This might have been the case with a tool found in the Benedictine Abbey of St John at Müstair, Switzerland: a wire with a length of 735 mm, bent to a loop on one end and with a thread wrapped tight around the shaft. A gilded silver thread (analysis by Andreas Saxer and Michael Unterwurzacher, Institute of Structural Engineering and Material Sciences, University of Innsbruck, 2013) is loosely wound around the shaft at the end with the loop. The wire was found together with fragments of bobbin lace in a layer dated 1658 to 1659 by the archaeologists and perhaps used as a makeshift lace bobbin (fig. 19b). It even works the other way round. When Kathe Todd-Hooker, a modern tapestry weaver, first started weaving in the late 1970s she did not use tapestry bobbins as they were not available in



the United States. She used lace bobbins with small rounded bottoms as substitutes. Other weavers even went as far as cutting off the beads of spangled lace bobbins to make them suitable for tapestry weaving. Probably the oldest recognisable lace bobbins, aside from the bobbins in the *Nüw Modelbuoch* woodblock print, are depicted on an engraving by Adriaen Collaert after Marten de Vos 1581. A bobbin with a length of 80 mm and of almost the same shape as the ones on Adriaen Collaert's engraving *The Seven Planets and Ages of Man* was found in Linköping, Sweden, and dated to the time between the end of the 15th century and the later part of the 1550s (fig. 18d) (Dahrén 2010, 58, fig. 26). Among the finds from the Mühlberg-Ensemble in Kempten (Bavaria, Germany) excavated in 1996/1997, are six fragments of linen bobbin lace worked with braids and linen-stitch (Rast-Eicher & Tidow 2011, 317). Additionally a 71 mm long bobbin of sycamore wood (*Acer pseudoplatanus*) with thread (fig. 18c) (Lohwasser 2011, 218 and plate 18, fig. 12) was found in the same under floor space of room seven, house eight, St-Mang-Square. The dating of the finds vary between 15th century until circa 1520/30 for the textiles (Rast-Eicher & Tidow 2011, 285, 343; Atzbach 2011, 357) and 'from the last quarter of the 15th century; nothing more specific can be said about the upper limit of time' for the wooden artefacts (Lohwasser 2011, 240). The coins found in the under floor space accumulate around 1345/1356 (the house was built in 1356), 1424/53, 1549/1557, 1581/1635 and 1661/65 (four coins), close to the heavy ice drift of 1670, which might have caused considerable remodelling in or near room seven (Atzbach 2011, 355-356). Hence, even though Rast-Eicher writes that the finds from Kempten are among the earliest datable bobbin lace (Rast-Eicher & Tidow 2011, 317), no definitive statement can be given about the dating of these finds. Archaeological excavations in Bremerholm in Copenhagen also unearthed early lace bobbins: a small turned bone bobbin dated to 1550 (fig. 18a) and a larger wood bobbin dated to 1570 (fig. 18b) (Tornehave 1987, 17, fig. 3) of a similar shape to the find from Kempten. Taking all of the above into consideration, further research into the history of bobbin lace is required and archaeologists especially should look at finds of textile tools with open minds as to their possible use.

#### Mixing textile techniques – A short side note

Sometimes the braid-like structure of bobbin lace can be found combined with (macramé) knots. A 16th century bobbin lace in the Leopold Iklé Collection is a plaited diamond net with cushion crossings and picots made with 16 bobbins (eight pairs). In addition, eight

gimp threads used double form Josephine knots (Iklé & Fäh n.d., plate 15b; Shepherd 2009, 50). This serves to show that it can be difficult to categorise textiles, even more so if one goes looking for names in different languages and from earlier periods.

#### Conclusion

The four headdresses excavated in 1968 in the parish church of Lienz reveal the utilization of textile techniques that are surprising considering the early date. Especially the lace decorating the face opening of the coif in particular provides new insight into the development and the spread of bobbin lace. The evidence from this study suggests that knots, today commonly referred to as macramé, were used for more than just knotted fringes, as previously believed. A look at finds from past excavations and old museum collections, which are not yet identified and/or dated incorrectly, forgotten in some depot, might bring more textiles to light and help explain the development of the various textile techniques. It is hoped that future studies investigating written records, pictorial sources and archaeological finds of textiles and textile tools will be able to provide more data and help clarify the rather confusing history of lace.

#### Notes

1. Regina Bianca (born 1502–died 1539), Elleonora (born 1504–died 1549), Veit (born 1506–died 1538), Catharina (born 1508–died 1568), Anna (born 1509–died 1582), Philipp and Bianca (died juveniles – no dates known) (Mayrhofen n.d., 844).
2. An image of this hairnet haunts the internet falsely labelled as being from Linz, Upper Austria, instead of Lienz in East Tyrol.
3. This painting was copied a lot of times by Bronzino's workshop and the copy in the Gemäldegalerie Berlin is attributed to Allesandro Allori.

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